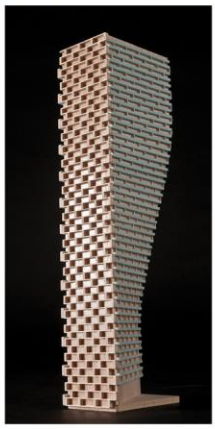
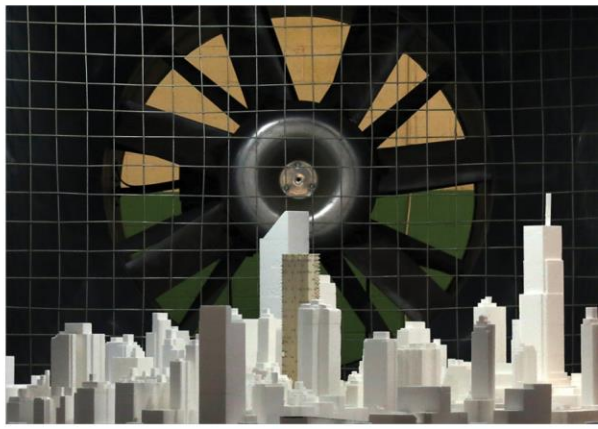
GRADIENTWIND
ENGINEERS & SCIENTISTS

ENVIRONMENTAL NOISE ASSESSMENT

3610 Innes Road
Ottawa, Ontario

Report #: 24-194–Environmental Noise





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EXECUTIVE SUMMARY

This report describes an environmental noise assessment undertaken for a proposed subdivision located at 3610 Innes Road in Ottawa, Ontario. A car wash (Halo Car Wash), separated by a green area, is located to the north, a new subdivision is located to the south, a moving services and self-storage facility (U-Haul) to the northeast, and an empty lot to the west of the development site. The subdivision will comprise ten (10) blocks consisting of 98 residential units and a public park connected by internal roadways. The major source of traffic noise impacting the residential subdivision is Innes Road to the north.

This assessment also includes a stationary noise study investigating the noise impacts of the existing Halo car wash facility located north of the study site at 3604 Innes Road and U-Haul moving services and self-storage facility located to the northeast of the study site at 3636 Innes Road.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300, Ministry of Transportation Ontario (MTO), and City of Ottawa Environmental Noise Control Guidelines (ENCG) guidelines; (ii) future vehicular traffic volumes corresponding to roadway classification obtained from the City of Ottawa; (iii) stationary noise levels of various equipment associated with the Halo car wash facility based on acoustic measurements conducted on March 15, 2022 (completed for a previous project); (iv) stationary noise levels of moving and idling trucks associated with the and U-Haul facility based on Gradient Wind's previous experience with similar projects, and (v) site plan drawings provided by Glenview Homes in September 2024.

The results of the roadway traffic noise calculations are summarized in Table 6. The results of the current analysis indicate that noise levels will range between 38 and 57 dBA during the daytime period (07:00-23:00) and between 32 and 50 dBA during the nighttime period (23:00-07:00). The highest noise level (57 dBA) occurs at the north façade of Block 1, which is directly exposed to the noise generated by Innes Road. Noise contours for the roadway traffic noise calculations are shown in Figures 6 and 7 for the daytime and nighttime periods, respectively.

The noise levels due to stationary noise sources will exceed the ENCG requirements at the façades of Blocks 1, 7, and 9. Higher STC-rated components (i.e., wall, roof, and glazing components) for the impacted townhouse buildings will be required to bring interior noise levels to an appropriate level. Upgraded building components will mitigate the noise levels and provide a comfortable indoor environment. In addition, central air conditioning or a similar mechanical system, which will allow the windows to be kept closed, will be required for Blocks 1, 6, 7, and 9. A Type D Warning Clause will also be required on all Lease, Purchase and Sale Agreements, as summarized in Section 9. Noise contours for the stationary noise calculations are shown in Figure 8 for the daytime period. For Blocks 1, 7, and 9, a Type E Warning Clause will also be required on purchase, sale, and lease agreements, as summarized in Section 9.

Although the ventilation requirements only apply to Blocks 1, 7, and 9, the residential townhome buildings are anticipated to have internal forced air heating systems such as heat pumps or fan coil units, equipped with small residential-sized air conditioning condensers. The proposed mechanical system would be required to comply with MECP's Publication NPC-216 Residential Air Conditioning Devices.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Glenview Homes to undertake an environmental noise assessment for a proposed subdivision development located at 3610 Innes Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic and stationary noise sources.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300[1], Ministry of Transportation Ontario (MTO)[2], and City of Ottawa Environmental Noise Control Guidelines (ENCG)[3] guidelines. Noise calculations were based on site plan drawings provided by Glenview Homes in September 2024, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities, and recent satellite imagery. Stationary noise levels of various equipment associated with the Halo car wash facility were based on acoustic measurements conducted on March 15, 2022. The stationary noise levels of moving and idling trucks associated with the U-Haul facility are based on Gradient Wind's previous experience with similar projects.

2. TERMS OF REFERENCE

The focus of this environmental noise assessment is a proposed residential development located at 3610 Innes Road in Ottawa, Ontario. The proposed subdivision is located on a nominally L-shaped parcel of land.

A car wash (Halo Car Wash), separated by a green area, is located to the north, a new subdivision is located to the south, a moving services and self-storage facility (U-Haul) to the northeast, and an empty lot to the west of the development site. The subdivision will comprise ten (10) blocks consisting of 98 residential units and a public park connected by internal roadways. The major source of traffic noise impacting the residential subdivision is Innes Road to the north.

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[2] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022
[3] City of Ottawa Environmental Noise Control Guidelines, January 2016

There are no associated outdoor living areas (OLA) with the development. Balconies or private terraces having less than 4 m in depth are not considered OLA, as per the ENCG. There are also no rear or side yards provided.

Gradient Wind considered all relevant noise sources affecting the site, such as roadway traffic noise and stationary noise. The major source of traffic noise impacting the residential subdivision is Innes Road to the north. The primary source of stationary noise impacting the site is the existing Halo car wash facility located to the northeast at 3604 Innes Road and U-Haul moving services and self-storage facility located to the northeast of the study site at 3636 Innes Road. Figure 1 illustrates the site location with the surrounding context.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, (ii) calculate stationary noise impacts on the proposed development generated by the existing Halo car wash facility, and (iii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 4.2 of this report.

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.

5. ROADWAY TRAFFIC NOISE

5.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a 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 period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters, respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [4]

Type of Space	Time Period	L_{eq} (dBA)
General offices, reception areas, retail stores, etc.	07:00 – 23:00	50
Living/dining/den areas of **residences**, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[5]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[6]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need

[4] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[5] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[7].

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA but are less than 60 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Where noise levels exceed 60 dBA noise mitigation is required. If these measures are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause. As per ENCG, balconies or terraces, which are not defined as amenity areas and are not deeper than 4 metres, and parks are not considered as Outdoor Living Areas.

5.2 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by computer modelling. Transportation noise source modelling is based on the software program *Predictor-Lima* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model has been accepted in the updated Environmental Guide for Noise of Ontario, 2022 by the Ministry of Transportation (MTO)[8]. The Ministry of Environment, Conservation and Parks has also adopted the TMN model as per their "Draft Guideline Noise Pollution Control Publications 306 (NPC-306)[9]. The *Predictor-Lima* computer program can represent three-dimensional surfaces and the first reflection of sound waves over a suitable spectrum for human hearing.

A set of comparative calculations was performed in the current Ontario traffic noise prediction model STAMSON for comparisons to Predictor simulation results. The STAMSON model is, however, older and requires each receptor to be calculated separately. STAMSON also does not accurately account for building reflections, multiple screening elements, and curved road geometry. A total of ten receptor locations were identified around the site, as illustrated in Figure 2.

[7] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[8] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022
[9] Ministry of Environment, Conservation and Parks, Ontario, "Methods to determine Sound Levels Due to Road and Rail Traffic", Draft February 12, 2020

Roadway noise calculations were performed by treating each road segment as separate line sources of noise, and by using existing and proposed building locations as noise barriers. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split was taken to be 92% / 8% respectively for all streets.
- The receptor heights are taken to be 1.5 m and 4.5 m above grade, representative of the first and second level heights.
- The ground surface was modelled as absorptive where grass and foliage (soft ground) are present, and as reflective where pavement and concrete are present (hard ground).
- The study site was treated as having flat or gently sloping topography.
- Massings associated with the study site were included as potential noise-screening elements.
- An existing perimeter fence along the west and south property line of the Halo car wash facility is included in the noise model.
- Ten (10) receptors were strategically placed throughout the subject site. The receptor locations are described in Table 6, and illustrated in Figure 2.

5.3 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[10] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

[10] City of Ottawa Transportation Master Plan, November 2013

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Innes Road	6-Lane Urban Arterial Divided (6-UAD)	60	**50,000**

6. STATIONARY NOISE

6.1 Stationary Noise Source Assessment and 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.

Noise criteria taken from the ENCG and NPC-300 apply to points of reception (POR). A POR is defined under the ENCG as "any location on a noise-sensitive land use where noise from a stationary source is received"[11]. 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 daycares. As the site is bordered by an arterial road, the area is considered as a Class 1 area as per the ENCG. The applicable sound level limit is the higher of the exclusionary limit outlined in Table 3, or background noise levels generated by other sources, such as roadway traffic. For this study, the sound level limits outlined in Table 3 were applied.

[11] City of Ottawa Environmental Noise Guidelines, page 9

TABLE 3: EXCLUSIONARY LIMITS FOR CLASS 1 AREA

Time of Day	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

6.2 Determination of Noise Source Power Levels

The stationary noise levels of various equipment associated with the Halo car wash facility are based on acoustic measurements conducted on March 15, 2022, for another project located in the vicinity of the subject site. The sound power data of the idling and moving trucks associated with are based on Gradient Wind's past experience with similar developments. Table 4 summarizes the sound power levels used for each source in the analysis. Figure 3 illustrates the location of these stationary noise sources.

TABLE 4: STATIONARY NOISE SOURCES SOUND POWER LEVELS (DBA)

Source ID	Description	Height Above Rooftop / Grade (m)	Frequency (Hz)								
			63	125	250	500	1000	2000	4000	8000	Total
STATIONARY NOISE SOURCES ASSOCIATED WITH HALO CAR WASH EQUIPMENT											
S1	Vacuum Area 1	1	-	-	-	-	92	-	-	-	**92**
S2	Vacuum Area 2	1	-	-	-	-	93	-	-	-	**93**
S3	Exhaust Vent	0.5	-	-	-	-	81	-	-	-	**81**
S4	Car Wash Exit Blower	3.5x3*	-	-	-	-	98	-	-	-	**98**
STATIONARY NOISE SOURCES ASSOCIATED WITH U-HAUL MOVING SERVICES & STORAGE											
S5	Moving Truck	2	65	72	76	85	90	89	83	74	**94**
S6	Idling Truck	2	63	76	85	91	91	89	86	81	**96**

*The dimensions of the exit car wash door.

6.3 Stationary Source Noise Predictions & Assumptions

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 14 receptor locations were chosen on the subject site. The receptor locations are described in Table 8, and illustrated in Figure 4. 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 Figure 8.

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 5: CALCULATION SETTINGS

Parameter	Setting
Meteorological correction method	Single value for C0
Value C0	2.0
Ground attenuation factor for roadways and paved areas	0
Ground attenuation factor for lawn	1
Temperature (K)	283.15
Pressure (kPa)	101.33
Air humidity (%)	70

The following assumptions have been made in the stationary noise impact analysis:

- The Halo car wash facility operates between 7:00-21:00 and the U-Haul moving facility operates between 7:00-20:00 during the daytime periods as per their websites. As such, the equipment is assumed to operate 100% per 1-hour period during the daytime only.
- The receptor heights are taken to be 1.5 m and 4.5 m above grade, representative of the first and second level heights.
- The ground surface was modelled as absorptive where grass and foliage (soft ground) are present, and as reflective where pavement and concrete are present (hard ground).
- The study site was treated as having flat or gently sloping topography.
- Massings associated with the study site were included as potential noise-screening elements.
- An existing perimeter fence along the west and south property line of the Halo car wash facility.
- Fourteen (14) receptors were strategically placed throughout the study area. The receptor locations are described in Table 8, and illustrated in Figure 4.

7. ROADWAY TRAFFIC NOISE RESULTS

7.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 6. The results of the current analysis indicate that noise levels will range between 38 and 57 dBA during the daytime period (07:00-23:00) and between 32 and 50 dBA during the nighttime period (23:00-07:00). The highest noise level (57 dBA) occurs at the north façade of Block 1, which is directly exposed to the noise generated by Innes Road. Noise contours for the roadway traffic noise calculations are shown in Figures 6 and 7 for the daytime and nighttime periods, respectively.

Table 7 provides a comparison between Predictor-Lima and STAMSON. Noise levels calculated in STAMSON were found to have a good correlation with Predictor-Lima and variability between the two programs was within a level of ±1 dBA. Appendix A contains a set of input and output data from STAMSON 5.04 calculations.

TABLE 6: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor ID	Receptor Location	Receptor Height (m)	PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night
R1	Block 1 - North Façade 1st Floor	1.5	56	50
	Block 1 - North Façade 2nd Floor	4.5	57	51
R2	Block 1 - North Façade 1st Floor	1.5	56	50
	Block 1 - North Façade 2nd Floor	4.5	57	51
R3	Block 1 - West Façade 1st Floor	1.5	53	46
	Block 1 - West Façade 2nd Floor	4.5	55	49
R4	Block 2 - West Façade 1st Floor	1.5	51	45
	Block 2 - West Façade 2nd Floor	4.5	51	45
R5	Block 3 - West Façade 1st Floor	1.5	49	43
	Block 3 - West Façade 2nd Floor	4.5	51	45
R6	Block 4 - West Façade 1st Floor	1.5	49	42
	Block 4 - West Façade 2nd Floor	4.5	51	44
R7	Block 6 - West Façade 1st Floor	1.5	39	32
	Block 6 - West Façade 2nd Floor	4.5	38	32
R8	Block 7 - North Façade 1st Floor	1.5	42	36
	Block 7 - North Façade 2nd Floor	4.5	42	35
R9	Block 9 - North Façade 1st Floor	1.5	49	42
	Block 9 - North Façade 2nd Floor	4.5	49	43
R10	Block 5 - West Façade 1st Floor	1.5	47	40
	Block 5 - West Façade 2nd Floor	4.5	49	43

TABLE 7: RESULT CORRELATION WITH STAMSON

Receptor Number	Receptor Location	Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R1	Block 1 - North Façade 2nd Floor	4.5	58	50	57	51
R3	Block 1 - West Façade 2nd Floor	4.5	55	48	55	49

7.2 Transportation Noise Control Measures

Based on the calculated noise levels, noise levels do not exceed 65 dBA during the daytime and 60 dBA during the nighttime. Therefore, OBC (2020) compliant building components for the whole development will be sufficient to control the traffic noise impacts. Based on the traffic noise calculation results, Block 1 will require forced air heating with provisions for central air conditioning. A Type C Warning Clauses will also be required on all purchase, sale, and lease agreements. However, stationary noise level impacts from the surrounding car wash and moving services facilities exceed the ENCG requirements. Therefore, upgraded building components will be required for some of the blocks as well as central air conditioning, or a similar mechanical system, as described in Section 8.1 below. Ventilation requirements and Warning Clause requirements for the development are outlined in Figure 5.

8. STATIONARY NOISE MEASUREMENT RESULTS

8.1 Stationary Noise Levels and Control Measures

The stationary noise sources in the neighbouring buildings are analyzed with the inclusion of the approximated car wash sound power levels as well as the moving services idling and moving trucks' noise impacts which are summarized in Table 5. The results of the current analysis indicate that noise levels will exceed the ENCG requirements at receptors that are most exposed to the carwash and moving services facilities. Stationary noise contours are shown in Figure 8.

Noise levels due to existing stationary noise sources can be mitigated for the indoor space by increasing the bedroom and living room windows' STC rating to 33. In addition, the exterior wall component should have a minimum STC rating of 45.

TABLE 8: EXTERIOR NOISE LEVELS DUE TO STATIONARY NOISE SOURCES

Receptor ID	Receptor Location	Receptor Height (m)	PREDICTOR-LIMA Noise Level (dBA)	Sound Level Limits (dBA)	Meets ENCG Criteria
			Day/ Evening	Day/ Evening	Day/ Evening
R1	Block 1 - North Façade 1st Floor	1.5	**54**	50	**No***
	Block 1 - North Façade 2nd Floor	4.5	**55**	50	**No***
R2	Block 1 - North Façade 1st Floor	1.5	**53**	50	**No***
	Block 1 - North Façade 2nd Floor	4.5	**55**	50	**No***
R3	Block 1 - West Façade 1st Floor	1.5	40	50	Yes
	Block 1 - West Façade 2nd Floor	4.5	49	50	Yes
R4	Block 2 - West Façade 1st Floor	1.5	35	50	Yes
	Block 2 - West Façade 2nd Floor	4.5	43	50	Yes
R5	Block 2 - East Façade 1st Floor	1.5	42	50	Yes
	Block 2 - East Façade 2nd Floor	4.5	44	50	Yes
R6	Block 3 - East Façade 1st Floor	1.5	46	50	Yes
	Block 3 - East Façade 2nd Floor	4.5	46	50	Yes
R7	Block 6 - North Façade 1st Floor	1.5	46	50	Yes
	Block 6 - North Façade 2nd Floor	4.5	48	50	Yes
R8	Block 7 - North Façade 1st Floor	1.5	**52**	50	**No***
	Block 7 - North Façade 2nd Floor	4.5	**54**	50	**No***
R9	Block 9 - North Façade 1st Floor	1.5	**53**	50	**No***
	Block 9 - North Façade 2nd Floor	4.5	**54**	50	**No***
R10	Block 5 - East Façade 1st Floor	1.5	29	50	Yes
	Block 5 - East Façade 2nd Floor	4.5	33	50	Yes
R11	Block 6 - East Façade 1st Floor	1.5	48	50	Yes
	Block 6 - East Façade 2nd Floor	4.5	50	50	Yes
R12	Block 7 - West Façade 1st Floor	1.5	47	50	Yes
	Block 7 - West Façade 2nd Floor	4.5	49	50	Yes
R13	Block 9 - West Façade 1st Floor	1.5	**53**	50	**No***
	Block 9 - West Façade 2nd Floor	4.5	**54**	50	**No***
R14	Block 9 - East Façade 1st Floor	1.5	41	50	Yes
	Block 9 - East Façade 2nd Floor	4.5	43	50	Yes

*Noise levels at POWs are to be mitigated via the implementation of higher STC-rated materials.

Predicted noise levels exceed the criteria listed in the ENCG for Plan of Windows (POW). Glenview Homes should implement upgraded exterior building components (i.e., walls, roof, and windows) for the impacted townhouse buildings to bring interior noise levels to an appropriate level. Typically, upgraded building components are associated with higher STC ratings which reduce overall indoor noise levels caused by exterior noise sources at the POW (i.e., traffic and stationary noise). Calculations will be required to be completed prior to the building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 5):

Bedroom Windows

(i) Bedroom windows of Block 1 and 7 facing north, and Block 9 facing north and partially west will require a minimum STC of 33.

(ii) All other bedroom windows are to satisfy Ontario Building Code requirements.

Living Room Windows

(i) Living room windows of Block 1 and 7 facing north, and Block 9 facing north and partially west will require a minimum STC of 33.

(ii) All other living room windows are to satisfy Ontario Building Code requirements.

Exterior Walls

(i) Exterior wall components of Blocks 1, 7, and 9 will require a minimum STC of 45.

The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 33, where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. Several manufacturers and various combinations of window components will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

With upgraded materials, the indoor noise levels will be reduced to acceptable levels to facilitate a comfortable indoor environment. A Type E Warning Clause will also be required on purchase, sale, and lease agreements for the buildings facing the car wash and moving services facilities; namely Blocks 1, 7, and 9; as noise levels exceed the stationary noise criteria at the façades.

In addition, central air conditioning or a similar mechanical system, which will allow the windows to be kept closed and maintain a comfortable environment, will be required for Blocks 1, 7, and 9. A Type D Warning Clause will also be required on all Lease, Purchase and Sale Agreements. The requirements overwrite the traffic noise ventilation and warning clause requirements previously described for Blocks 1, 7, and 9.

9. CONCLUSIONS AND RECOMMENDATIONS

The results of the roadway traffic noise calculations are summarized in Table 6. The results of the current analysis indicate that noise levels will range between 38 and 57 dBA during the daytime period (07:00-23:00) and between 32 and 50 dBA during the nighttime period (23:00-07:00). The highest noise level (57 dBA) occurs at the north façade of Block 1, which is directly exposed to the noise generated by Innes Road. Noise contours for the roadway traffic noise calculations are shown in Figures 6 and 7 for the daytime and nighttime periods, respectively.

The noise levels due to stationary noise sources will exceed the ENCG requirements at the façades of Blocks 1, 7, and 9. Higher STC-rated components (i.e., wall, roof, and glazing components) for the impacted townhouse buildings will be required to bring interior noise levels to an appropriate level. Upgraded building components will mitigate the noise levels and provide a comfortable indoor environment. In addition, central air conditioning or a similar mechanical system, which will allow the windows to be kept closed, will be required for Blocks 1, 7, and 9. A Type D Warning Clause will also be required on all Lease, Purchase and Sale Agreements as summarized below:

Type D

> *"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

Although the ventilation requirements only apply to Blocks 1, 7, and 9, the residential townhome buildings are anticipated to have internal forced air heating systems such as heat pumps or fan coil units, equipped with small residential-sized air conditioning condensers. The proposed mechanical system would be required to comply with MECP's Publication NPC-216 Residential Air Conditioning Devices.

For Blocks 1, 7, and 9, a Type E Warning Clause will also be required on purchase, sale, and lease agreements, as summarized below:

Type E

> *"Purchasers/tenants are advised that due to the proximity of the adjacent car wash facility, noise from the facility may at times be audible."*

Requirements are also summarized in the table below:

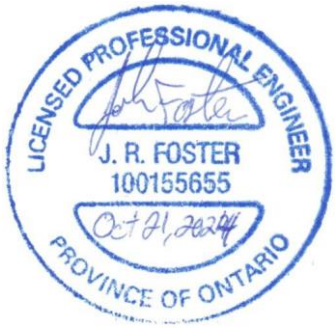
TABLE 9: MITIGATION, VENTILATION & WARNING CLAUSE REQUIREMENTS

Applicable Blocks/Dwellings	Window STC	Wall STC	Warning Clause	Ventilation Requirement
Blocks 1, 7 and 9	33	45	Type D and E	Central Air Conditioning
Blocks 2, 3, 4, 5, 6, 8, and 10	N/A	N/A	N/A	N/A

This concludes our environmental 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.



Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

GW24-194 – Environmental Noise

GRADIENTWIND
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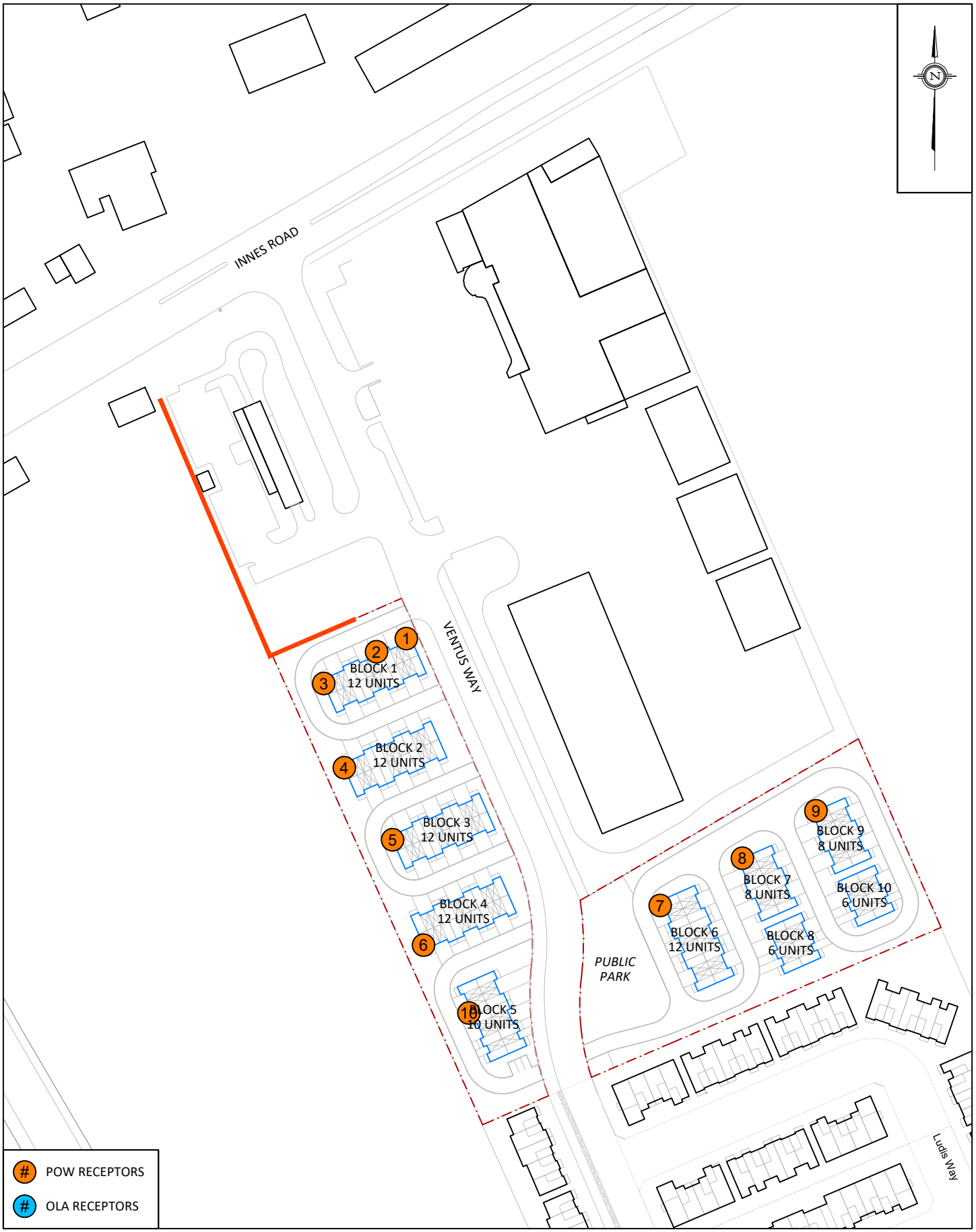
PROJECT	3610 INNES ROAD, OTTAWA ENVIRONMENTAL NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW24-194 - 1
DATE	SEPTEMBER 25, 2024	DRAWN BY	E.K.

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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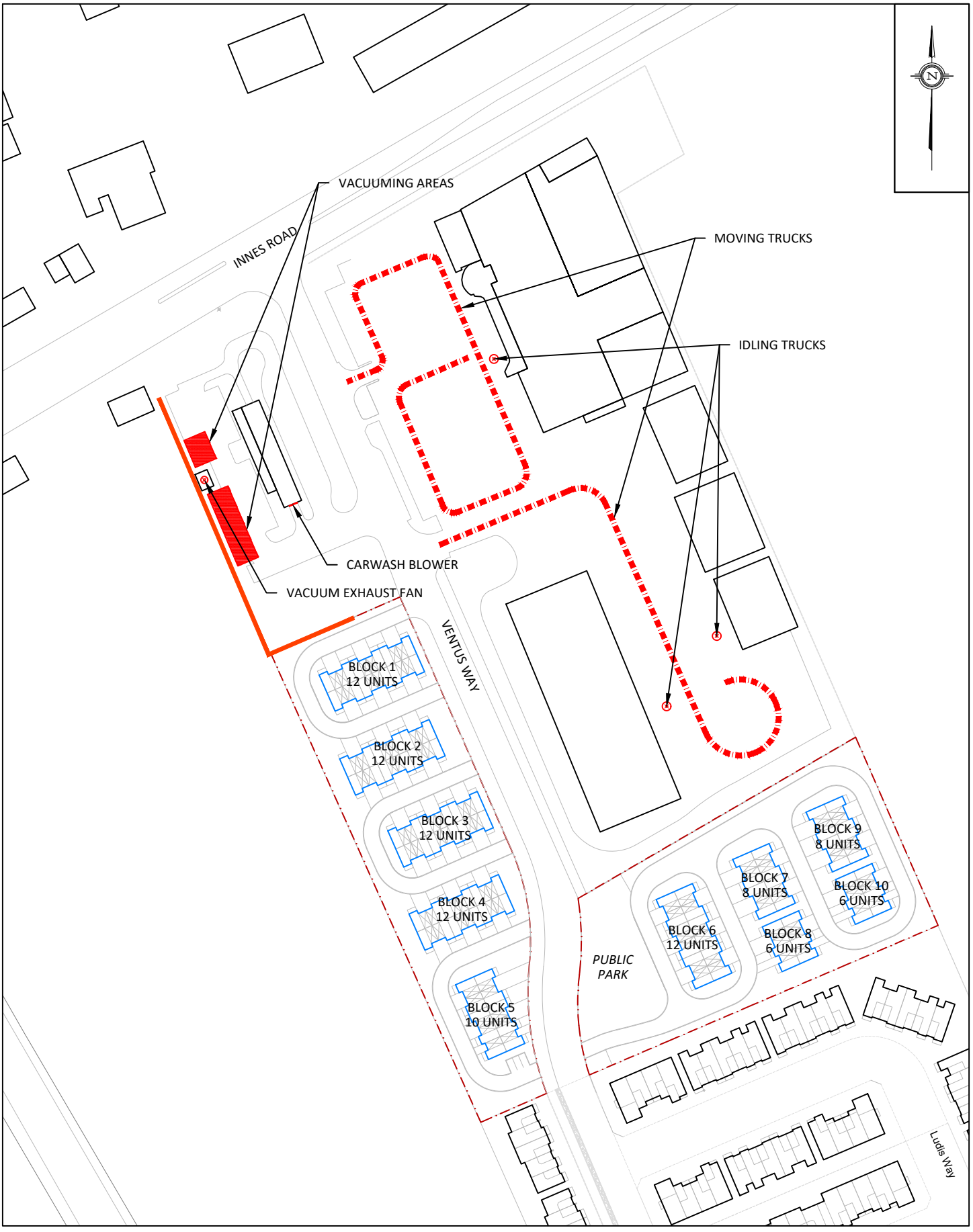
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW24-194 - 2
DATE	SEPTEMBER 25, 2024
DRAWN BY	E.K.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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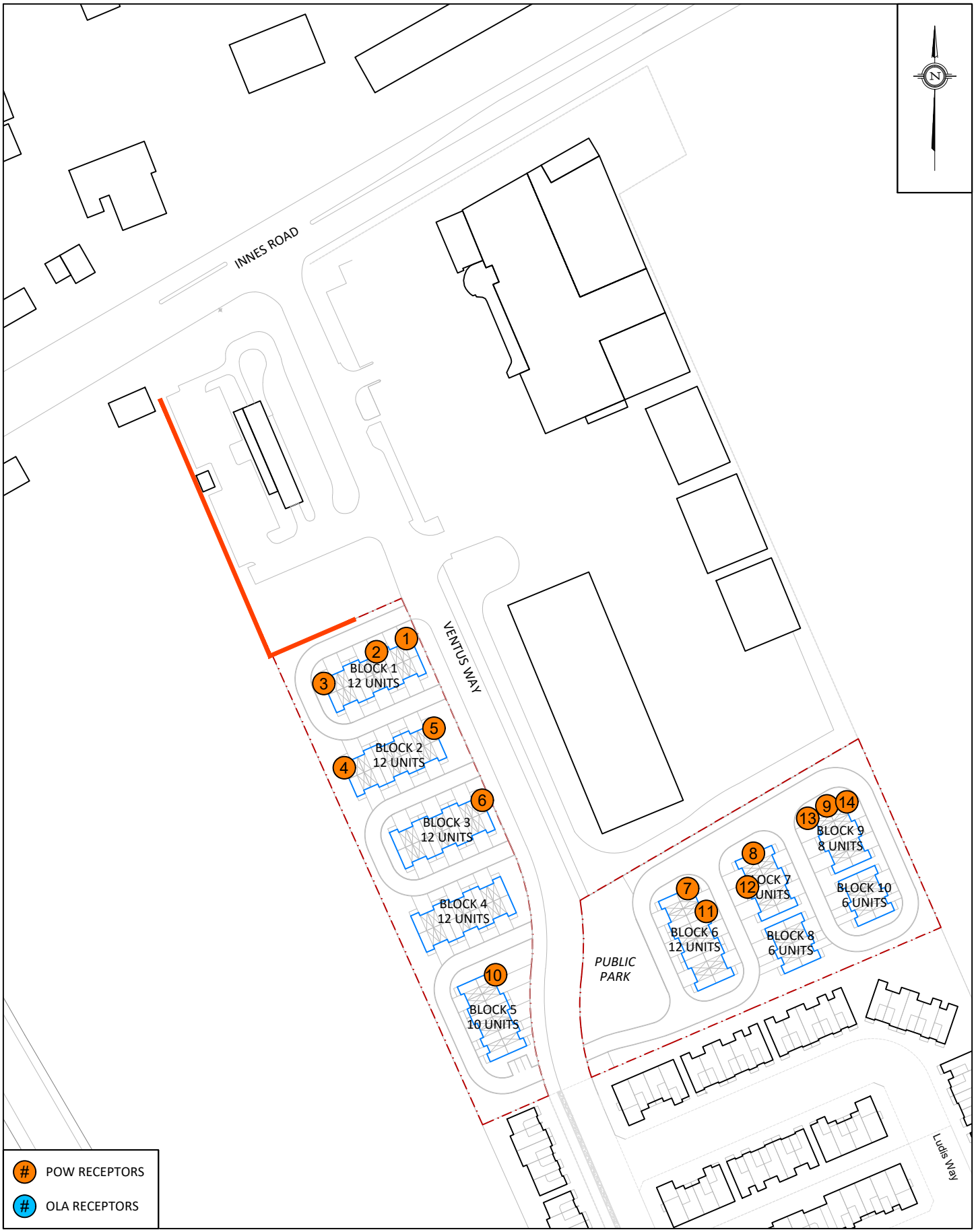
PROJECT	3610 INNES ROAD, OTTAWA ENVIRONMENTAL NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW24-194 - 3
DATE	SEPTEMBER 25, 2024	DRAWN BY	E.K.

FIGURE 3:
STATIONARY NOISE SOURCE LOCATIONS



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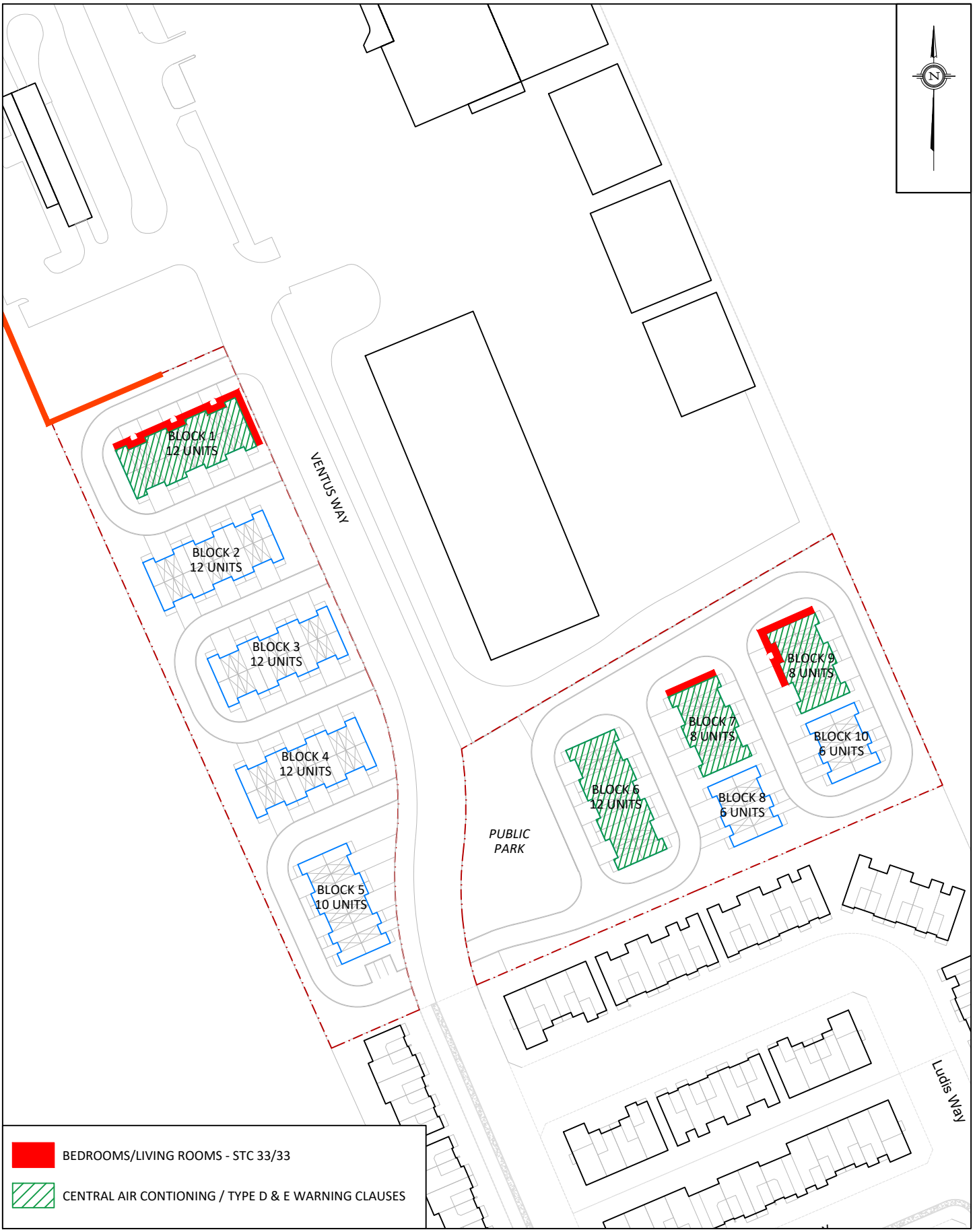
PROJECT	3610 INNES ROAD, OTTAWA ENVIRONMENTAL NOISE FEASIBILITY ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW24-194 - 4
DATE	SEPTEMBER 25, 2024
DRAWN BY	E.K.
DESCRIPTION	FIGURE 4: STATIONARY NOISE RECEPTOR LOCATIONS



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PROJECT	3610 INNES ROAD, OTTAWA ENVIRONMENTAL NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1500 (APPROX.)	DRAWING NO.	GW24-194 - 5
DATE	SEPTEMBER 25, 2024	DRAWN BY	E.K.

FIGURE 5:
STC RATING & VENTILATION REQUIREMENTS

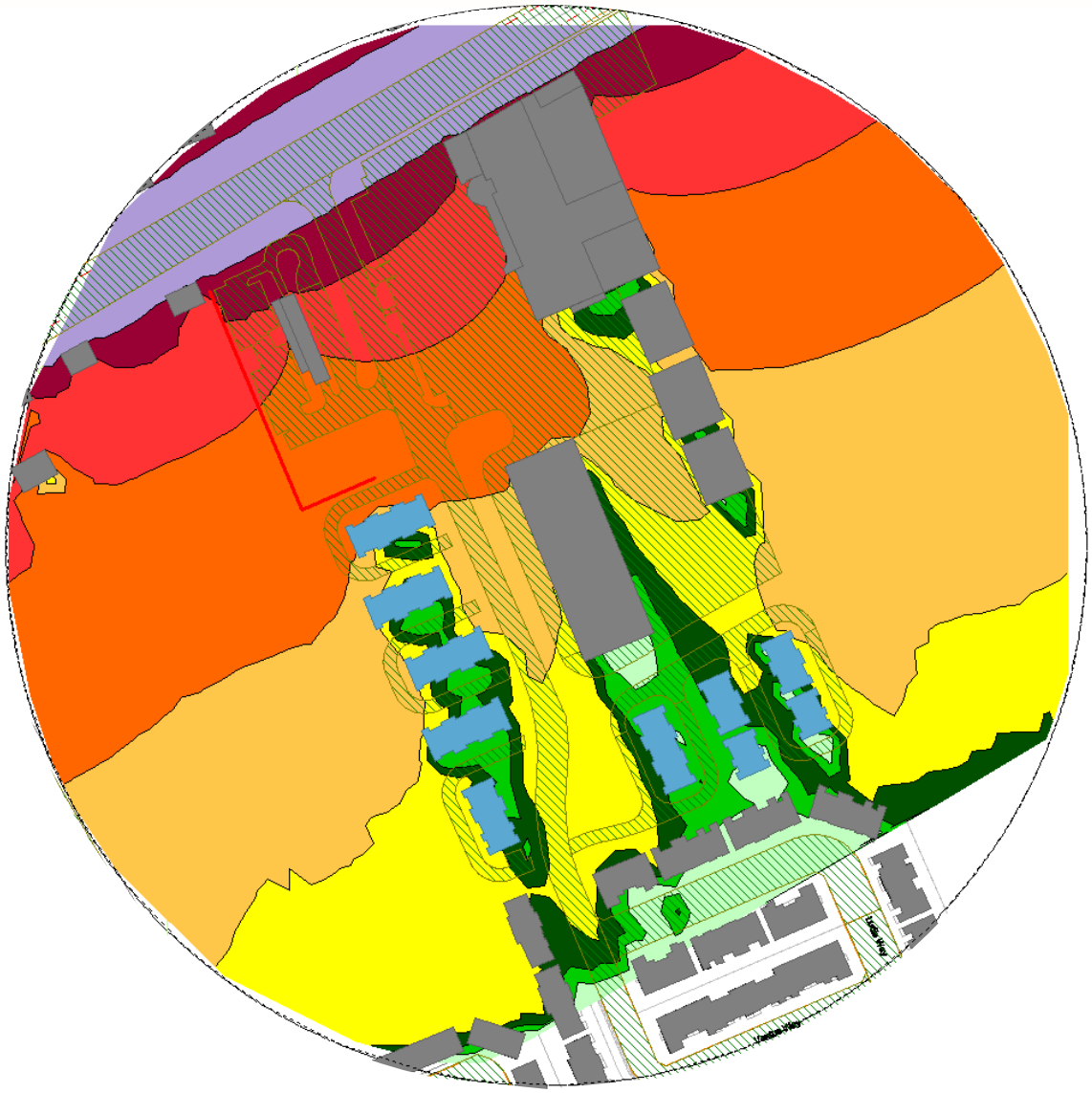

FIGURE 6: DAYTIME TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)

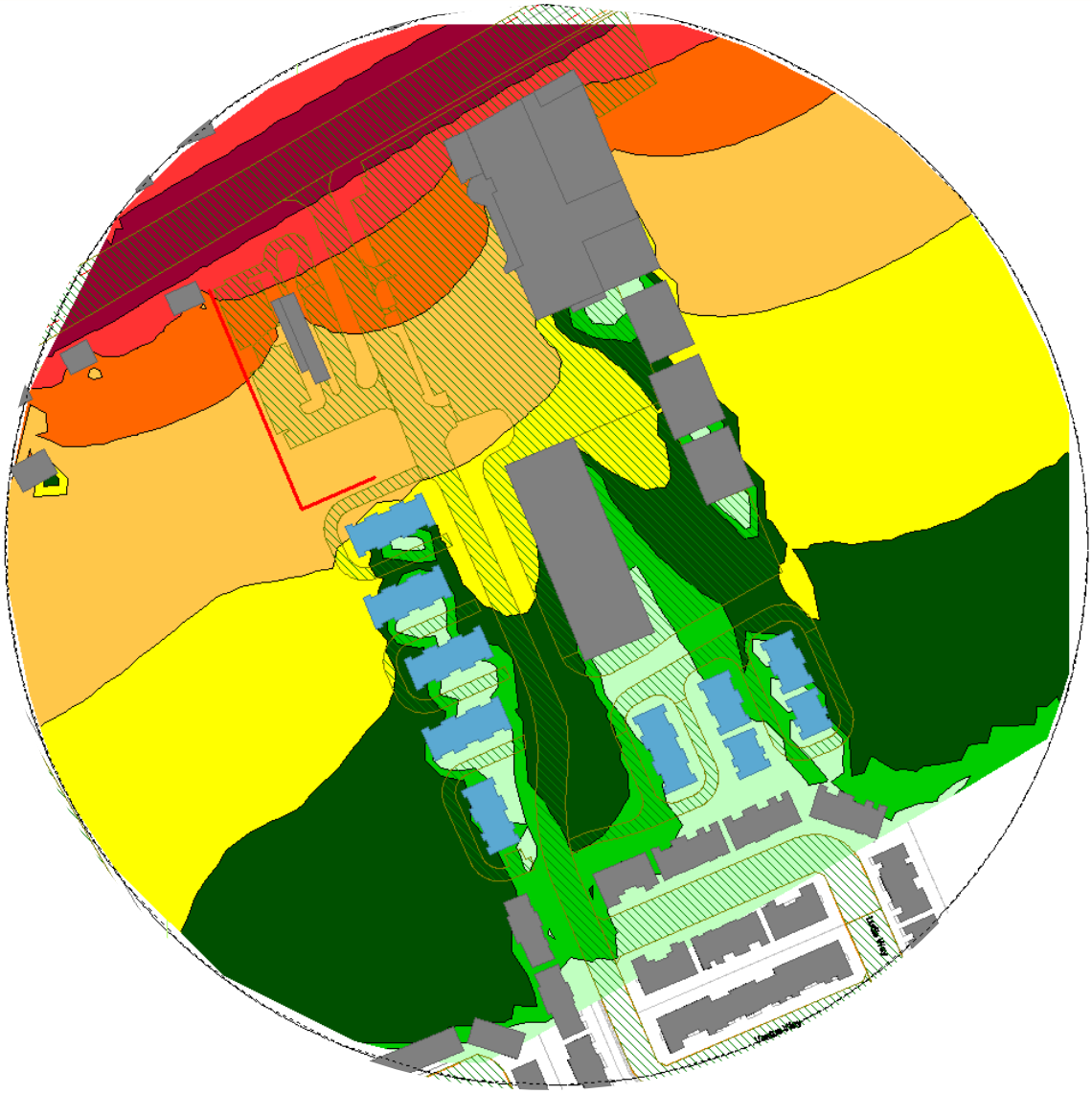

FIGURE 7: NIGHTTIME TRAFFIC NOISE CONTOURS (4.5 M ABOVE GRADE)

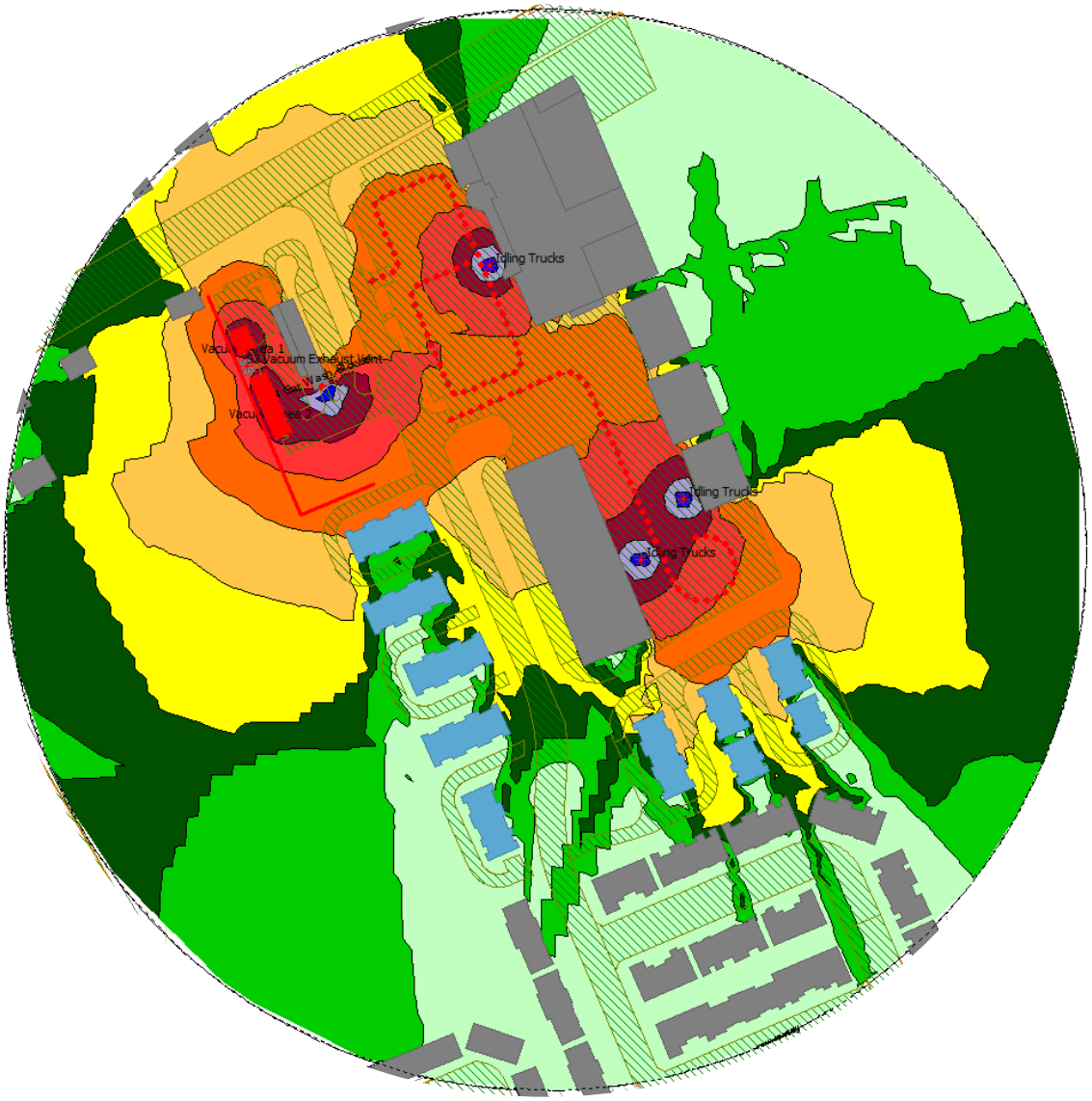

FIGURE 8: DAYTIME STATIONARY NOISE CONTOURS (4.5 M ABOVE GRADE)

- *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*

APPENDIX A

STAMSON 5.04 INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

STAMSON 5.0 NORMAL REPORT Date: 02-10-2024 13:27:49
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Innes WB1 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Innes WB1 (day/night)

Angle1 Angle2 : -90.00 deg 13.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 167.00 / 167.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Innes EB1 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Innes EB1 (day/night)

Angle1 Angle2 : -90.00 deg 13.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 154.00 / 154.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Innes WB2 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: Innes WB2 (day/night)

Angle1 Angle2 : 13.00 deg 35.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 167.00 / 167.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 4: Innes EB2 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 4: Innes EB2 (day/night)

Angle1 Angle2 : 13.00 deg 35.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 154.00 / 154.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 5: Innes WB3 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 5: Innes WB3 (day/night)

Angle1 Angle2 : 35.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 167.00 / 167.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 6: Innes EB3 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 6: Innes EB3 (day/night)

Angle1 Angle2 : 35.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 154.00 / 154.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Innes WB1 (day)

Source height = 1.50 m

ROAD (0.00 + 52.24 + 0.00) = 52.24 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 13 0.57 72.21 0.00 -16.43 -3.54 0.00 0.00 0.00 52.24

Segment Leq : 52.24 dBA

Results segment # 2: Innes EB1 (day)

Source height = 1.50 m

ROAD (0.00 + 52.79 + 0.00) = 52.79 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 13 0.57 72.21 0.00 -15.88 -3.54 0.00 0.00 0.00 52.79

Segment Leq : 52.79 dBA

Results segment # 3: Innes WB2 (day)

Source height = 1.50 m

ROAD (0.00 + 46.41 + 0.00) = 46.41 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
13 35 0.57 72.21 0.00 -16.43 -9.37 0.00 0.00 0.00 46.41

Segment Leq : 46.41 dBA

Results segment # 4: Innes EB2 (day)

Source height = 1.50 m

ROAD (0.00 + 46.96 + 0.00) = 46.96 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
13 35 0.57 72.21 0.00 -15.88 -9.37 0.00 0.00 0.00 46.96

Segment Leq : 46.96 dBA

Results segment # 5: Innes WB3 (day)

Source height = 1.50 m

ROAD (0.00 + 48.40 + 0.00) = 48.40 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
35 90 0.57 72.21 0.00 -16.43 -7.38 0.00 0.00 0.00 48.40

Segment Leq : 48.40 dBA

Results segment # 6: Innes EB3 (day)

Source height = 1.50 m

ROAD (0.00 + 48.96 + 0.00) = 48.96 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
35 90 0.57 72.21 0.00 -15.88 -7.38 0.00 0.00 0.00 48.96

Segment Leq : 48.96 dBA

Total Leq All Segments: 57.77 dBA

Results segment # 1: Innes WB1 (night)

Source height = 1.50 m

ROAD (0.00 + 44.64 + 0.00) = 44.64 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 13 0.57 64.62 0.00 -16.43 -3.54 0.00 0.00 0.00 44.64

Segment Leq : 44.64 dBA

Results segment # 2: Innes EB1 (night)

Source height = 1.50 m

ROAD (0.00 + 45.19 + 0.00) = 45.19 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 13 0.57 64.62 0.00 -15.88 -3.54 0.00 0.00 0.00 45.19

Segment Leq : 45.19 dBA

Results segment # 3: Innes WB2 (night)

Source height = 1.50 m

ROAD (0.00 + 38.82 + 0.00) = 38.82 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
13 35 0.57 64.62 0.00 -16.43 -9.37 0.00 0.00 0.00 38.82

Segment Leq : 38.82 dBA

Results segment # 4: Innes EB2 (night)

Source height = 1.50 m

ROAD (0.00 + 39.37 + 0.00) = 39.37 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
13 35 0.57 64.62 0.00 -15.88 -9.37 0.00 0.00 0.00 39.37

Segment Leq : 39.37 dBA

Results segment # 5: Innes WB3 (night)

Source height = 1.50 m

ROAD (0.00 + 40.81 + 0.00) = 40.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
35	90	0.57	64.62	0.00	-16.43	-7.38	0.00	0.00	0.00	40.81

Segment Leq : 40.81 dBA

Results segment # 6: Innes EB3 (night)

Source height = 1.50 m

ROAD (0.00 + 41.36 + 0.00) = 41.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
35	90	0.57	64.62	0.00	-15.88	-7.38	0.00	0.00	0.00	41.36

Segment Leq : 41.36 dBA

Total Leq All Segments: 50.18 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.77
(NIGHT): 50.18

STAMSON 5.0 NORMAL REPORT Date: 02-10-2024 14:13:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R3.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Innes WB1 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Innes WB1 (day/night)

Angle1 Angle2 : -90.00 deg 7.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 166.00 / 166.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Innes EB1 (day/night)

Car traffic volume : 20240/1760 veh/TimePeriod *
Medium truck volume : 1610/140 veh/TimePeriod *
Heavy truck volume : 1150/100 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 25000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Innes EB1 (day/night)

Angle1 Angle2 : -90.00 deg 7.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 153.00 / 153.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Innes WB1 (day)

Source height = 1.50 m

ROAD (0.00 + 51.94 + 0.00) = 51.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 7 0.57 72.21 0.00 -16.39 -3.88 0.00 0.00 0.00 51.94

Segment Leq : 51.94 dBA

Results segment # 2: Innes EB1 (day)

Source height = 1.50 m

ROAD (0.00 + 52.50 + 0.00) = 52.50 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 7 0.57 72.21 0.00 -15.84 -3.88 0.00 0.00 0.00 52.50

Segment Leq : 52.50 dBA

Total Leq All Segments: 55.24 dBA

Results segment # 1: Innes WB1 (night)

Source height = 1.50 m

ROAD (0.00 + 44.35 + 0.00) = 44.35 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 7 0.57 64.62 0.00 -16.39 -3.88 0.00 0.00 0.00 44.35

Segment Leq : 44.35 dBA

Results segment # 2: Innes EB1 (night)

Source height = 1.50 m

ROAD (0.00 + 44.90 + 0.00) = 44.90 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 7 0.57 64.62 0.00 -15.84 -3.88 0.00 0.00 0.00 44.90

Segment Leq : 44.90 dBA

Total Leq All Segments: 47.64 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.24
(NIGHT): 47.64