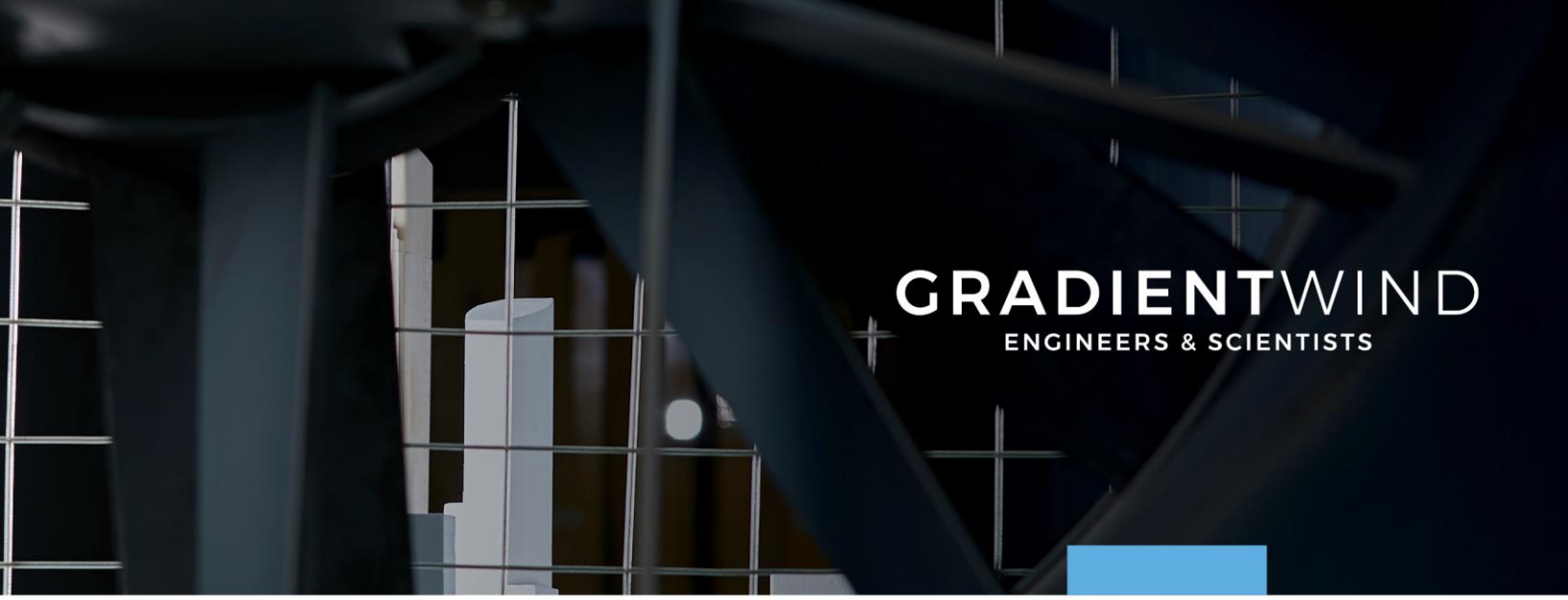
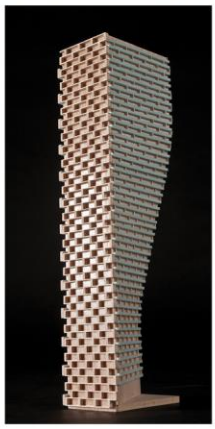


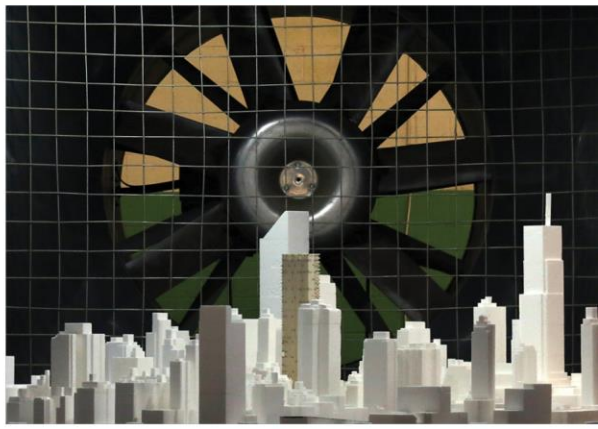
GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE ASSESSMENT

1174 Carp Road
Ottawa, Ontario

Report: 23-299 – Detailed Traffic Noise





May 17, 2024

PREPARED FOR

Le Group Maurice
2400 rue des Nations, bureau 137
Saint-Laurent, QC H4R 3G4

PREPARED BY

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

EXECUTIVE SUMMARY

This report describes a detailed roadway traffic noise assessment performed in support of a Site Plan Control application for the proposed mixed-use development located at 1174 Carp Road in Ottawa, Ontario. The study site is bordered by Hazeldean Road to the northwest, Carp Road to the northeast, and single houses to the southeast. A future multi-rise building (6310 Hazeldean Road) is located to the southwest of the study site, however, the noise-screening effects of this future development were not included in this study. The Hazeldean Road façade is referred to as "North" throughout this study. The major sources of roadway traffic noise are Hazeldean Road and Carp Road. Figure 1 illustrates the site plan with the surrounding context.

The proposed development comprises a multi-storey building with a 'C' shaped planform open to the west. The building features several amenity spaces, retail areas, and residential units at grade along with a courtyard, a parkland, a drop-off zone, outdoor parking, and a driveway leading to below-grade parking. The remaining floors comprise residential units, with floorplate setbacks at levels two (2), six (6), and ten (10).

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) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) drawings prepared by Hobin Architecture Incorporated, dated January 12, 2024.

The results of the current analysis indicate that noise levels will range between 72 and 59 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 64 and 51 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north and northeast façades, which are most exposed to Hazeldean and Carp Roads. The results of the analysis show that the noise levels in the courtyard (Receptor 10) will be below the ENCG criteria.

The results of the calculations indicate that the north, northwest, northeast, and east façades and partially west façade of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the remaining façades.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. The following Warning Clause[1] will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Potential existing sources of stationary noise, include a carwash across Carp Road, which is anticipated to fall below the noise produced from Hazelden and Carp Road.

As the proposed building is much taller than the surroundings, locating larger pieces of outdoor mechanical equipment, such as cooling towers, and emergency generators on the roof will help attenuate noise emissions from these and similar pieces of equipment. The building will be designed to comply with ENCG sound level limits. A stationary noise study will be performed once mechanical plans for the proposed building become available. This study should assess the stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study would include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits.

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

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Le Group Maurice to undertake a roadway traffic noise assessment for the proposed mixed-use development located at 1174 Carp Road in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the City of Ottawa[2] and the Ministry of the Environment, Conservation and Parks (MECP)[3] guidelines. Noise calculations were based on drawings prepared by Hobin Architecture Incorporated, dated January 12, 2024, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The proposed development is located at 1174 Carp Road, Ottawa Ontario. The study site is bordered by Hazeldean Road to the northwest, Carp Road to the northeast, and single houses to the southeast. A future multi-rise building (6310 Hazeldean Road) is located to the southwest of the study site, however, the noise-screening effects of this future development were not included in this study. The Hazeldean Road façade is referred to as "North" throughout this study.

The development comprises a multi-storey building with a 'C' shaped planform open to the west. The building features several amenity spaces, retail areas, and residential units at grade along with a courtyard, a parkland, a drop-off zone, outdoor parking, and a driveway leading to below-grade parking. The remaining floors comprise residential units, with floorplate setbacks at levels two (2), six (6), and ten (10).

The major sources of roadway traffic noise are Hazeldean Road and Carp Road. Figure 1 illustrates the site plan with the surrounding context.

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

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, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG) 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 level 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 sound pressure 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 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For vehicular traffic, 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 and LRT, 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) for roadways is 45 and 40 dBA for living rooms and sleeping quarters, respectively, and 50 for retail stores as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise

levels should be targeted, towards 42 and 37, respectively, to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA

Type of Space	Time Period	Leq (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[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. 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 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[6].

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime period (07:00 to 23:00). When noise levels exceed 55 dBA and are less than or equal to 60 dBA, mitigation should be considered to reduce noise levels to as close to 55 dBA if technically, economically, and administratively feasible. If noise levels exceed 60 dBA, mitigation must be provided to reduce noise levels below 60 dBA.

[4] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[6] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the Ministry of the Environment, Conservations and Parks' (MECP) computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. 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 for all roads was taken to be 92% / 8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard ground (pavement, concrete) on the paths between the receptors and road segments.
- Topography was assumed to be a flat/gentle slope surrounding the study site.
- A total of eleven (11) receptor locations were chosen around the study site; ten (10) of them are at the facades of the building as Plane of Window (POW) receptors and one (1) of them as Outdoor Living Area (OLA) receptor in the courtyard.
- POW receptor heights were taken to be at the centre of the highest-level windows of the related façade. The OLA receptor height was taken at 1.5 m above grade.
- The receptor distances to roadway traffic and exposure angles are illustrated in Figures 3-5.

4.2.3 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[7] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes

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

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.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Hazeldean Road	4-Lane Urban Arterial Undivided (4-UAU)	60	**30,000**
Carp Road	4-Lane Urban Arterial Undivided (4-UAU)	60	**30,000**

4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2020) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially-sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak points in a partition.

As per Section 4.2, when daytime noise levels from road sources at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels are achieved. The calculation procedure[8] considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry

[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

- Indoor sound level criteria, which vary according to the intended use of a space

Based on published research[9], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, detailed floor layouts have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels + safety factor).

5. ROADWAY TRAFFIC NOISE RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations is available in Appendix A.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Type/Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	25.5	POW/North Façade - Level 9	70	63
2	25.5	POW/Northeast Façade - Level 9	72	64
3	34.5	POW/Northeast Façade - Level 12	70	62
4	25.5	POW/East Façade - Level 9	69	62
5	25.5	POW/South Façade - Level 9	62	54
6	13.5	POW/South Façade - Level 5	59	51
7	13.5	POW/West Façade - Level 5	63	55
8	13.5	POW/North Façade - Level 5	63	55
9	25.5	POW/West Façade - Level 9	67	59
10	1.5	OLA/Courtyard	53	N/A*
11	34.5	POW/Southwest Façade - Level 12	64	57

* OLA noise levels during the nighttime are not considered, as per the ENCG.

[9] CMHC, Road & Rail Noise: Effects on Housing

The results of the current analysis indicate that noise levels will range between 72 and 59 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 64 and 51 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north and northeast façades, which are most exposed to Hazeldean and Carp Roads. The results of the analysis show that the noise levels in the courtyard (Receptor 10) will be below the ENCG criteria.

The results of the calculations indicate that the north and east façades and partially west façade of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the remaining façades.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows and walls have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels + safety factor). As per the City of Ottawa requirements, detailed STC calculations will be required to be completed prior to the building permit application. The STC requirements for the windows are summarized below for various units within the development (see also Figure 6):

- **Bedroom Windows**

(i) Bedroom windows facing the northeast façade of the 9-storey section of the building will require a minimum STC of 35.

(ii) Bedroom windows facing the northwest and northeast façades of the 12-storey section of the building will require a minimum STC of 33.

(iii) Bedroom windows facing the north and east façades of the building will require a minimum STC of 33.

(iv) Bedroom windows facing the west façade of the 9-storey section of the building will require a minimum STC of 30.

(v) All other bedroom windows are to satisfy Ontario Building Code (OBC 2020) requirements

- **Living Room Windows**

(i) Living room windows facing the northeast façade of the 9-storey section of the building will require a minimum STC of 30.

(ii) Living room windows facing the northwest and northeast façades of the 12-storey section of the building will require a minimum STC of 28.

(iii) Living room windows facing the north and east façades of the building will require a minimum STC of 28.

(iv) Living room windows facing the west façade of the 9-storey section of the building will require a minimum STC of 25.

(v) All other bedroom windows are to satisfy Ontario Building Code (OBC 2020) requirements

- **Retail Windows**

(i) Retail windows facing north, northwest, northeast, and east will require a minimum STC of 20

(ii) All other living room windows are to satisfy Ontario Building Code (OBC 2020) requirements

- **Exterior Walls**

(i) Exterior wall components on north, northwest, northeast, and east façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[10]

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 45, where a punched window and 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 that have a combination of glass thickness and inter-pane spacing. It is the responsibility of the manufacturer to ensure that the 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.

[10] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. In addition to ventilation requirements, warning clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 72 and 59 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 64 and 51 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north and northeast façades, which are most exposed to Hazeldean and Carp Roads.

The results of the calculations indicate that the north, northwest, northeast, and east façades and partially west façade of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2020) will be sufficient for the remaining façades. The results of the analysis show that the noise levels in the courtyard (Receptor 10) will be below the ENCG criteria.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. The following Warning Clause[11] will also be required to be placed 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."*

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

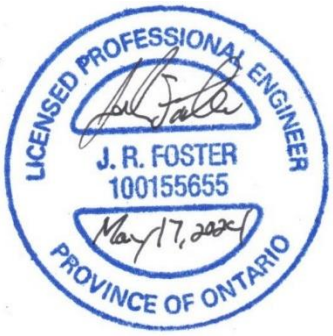
Potential existing sources of stationary noise, include a carwash across Carp Road, which is anticipated to fall below the noise produced from Hazelden and Carp Road.

As the proposed building is much taller than the surroundings, locating larger pieces of outdoor mechanical equipment, such as cooling towers, and emergency generators on the roof will help attenuate noise emissions from these and similar pieces of equipment. The building will be designed to comply with ENCG sound level limits. A stationary noise study will be performed once mechanical plans for the proposed building become available. This study should assess the stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study would include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits.

This concludes our traffic 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,

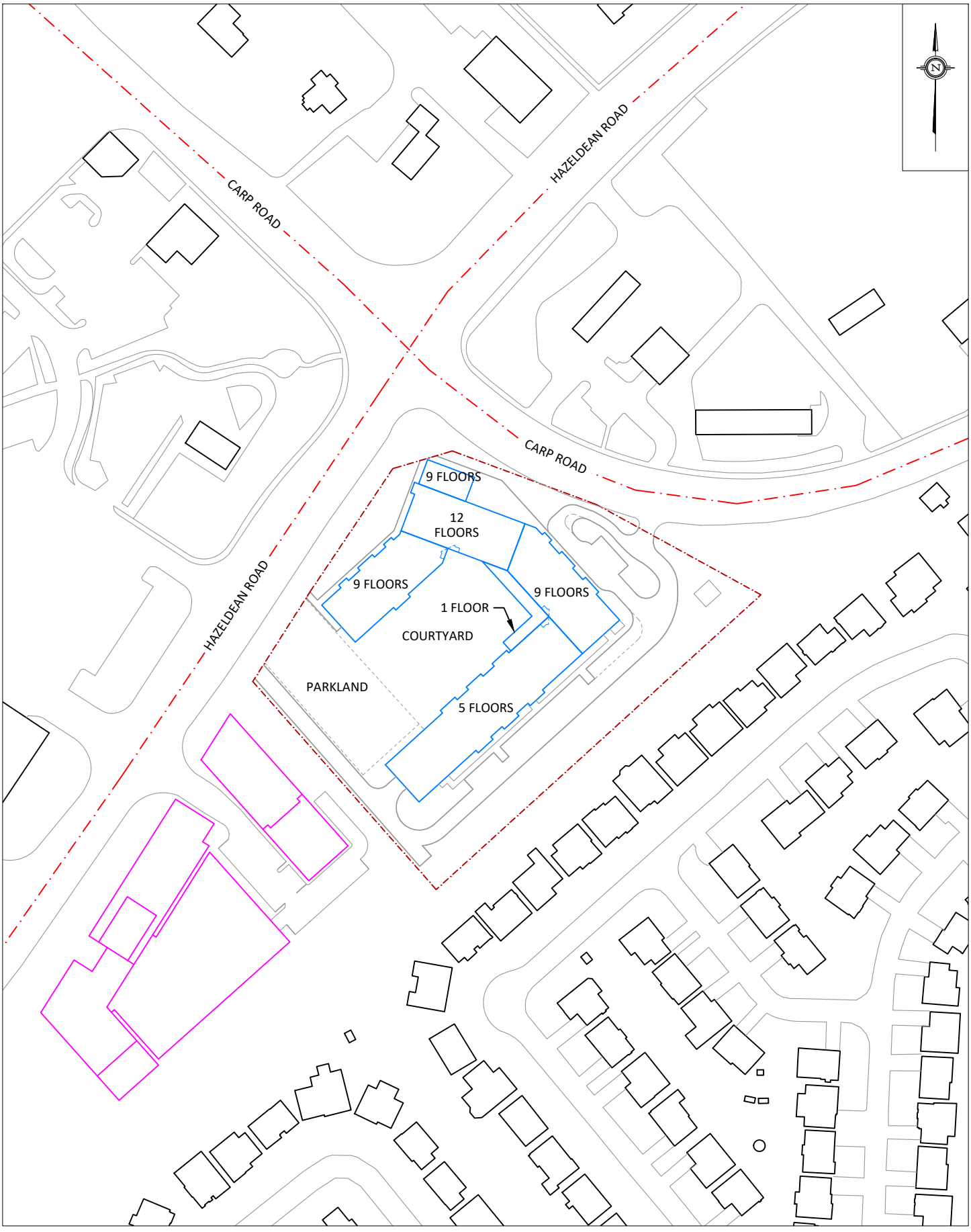
Gradient Wind Engineering Inc.



Efser Kara, MSc, LEED GA
Acoustic Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #23-299 – Detailed Traffic Noise



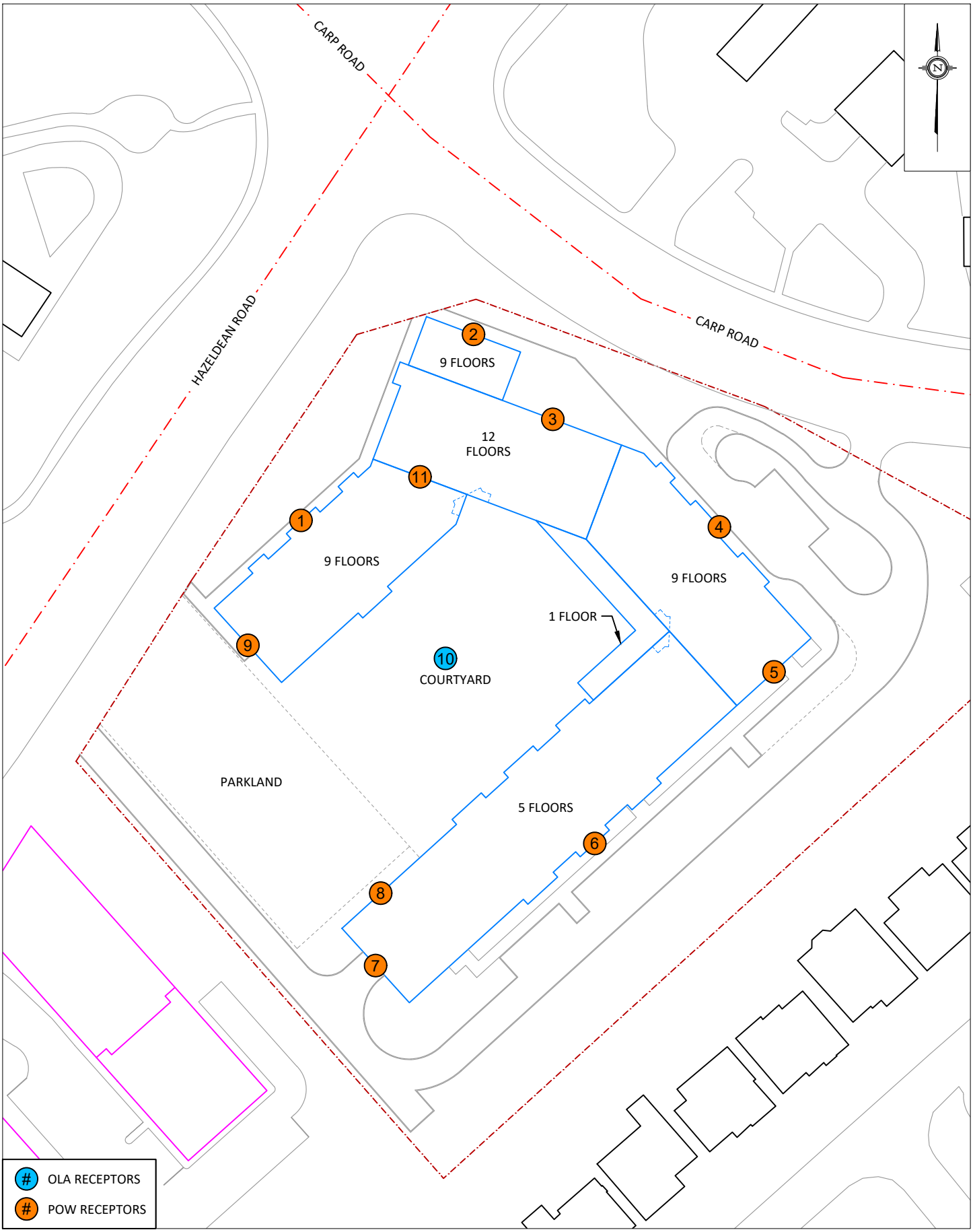
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	23-299 - 1
DATE	JANUARY 19, 2024
DRAWN BY	E.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

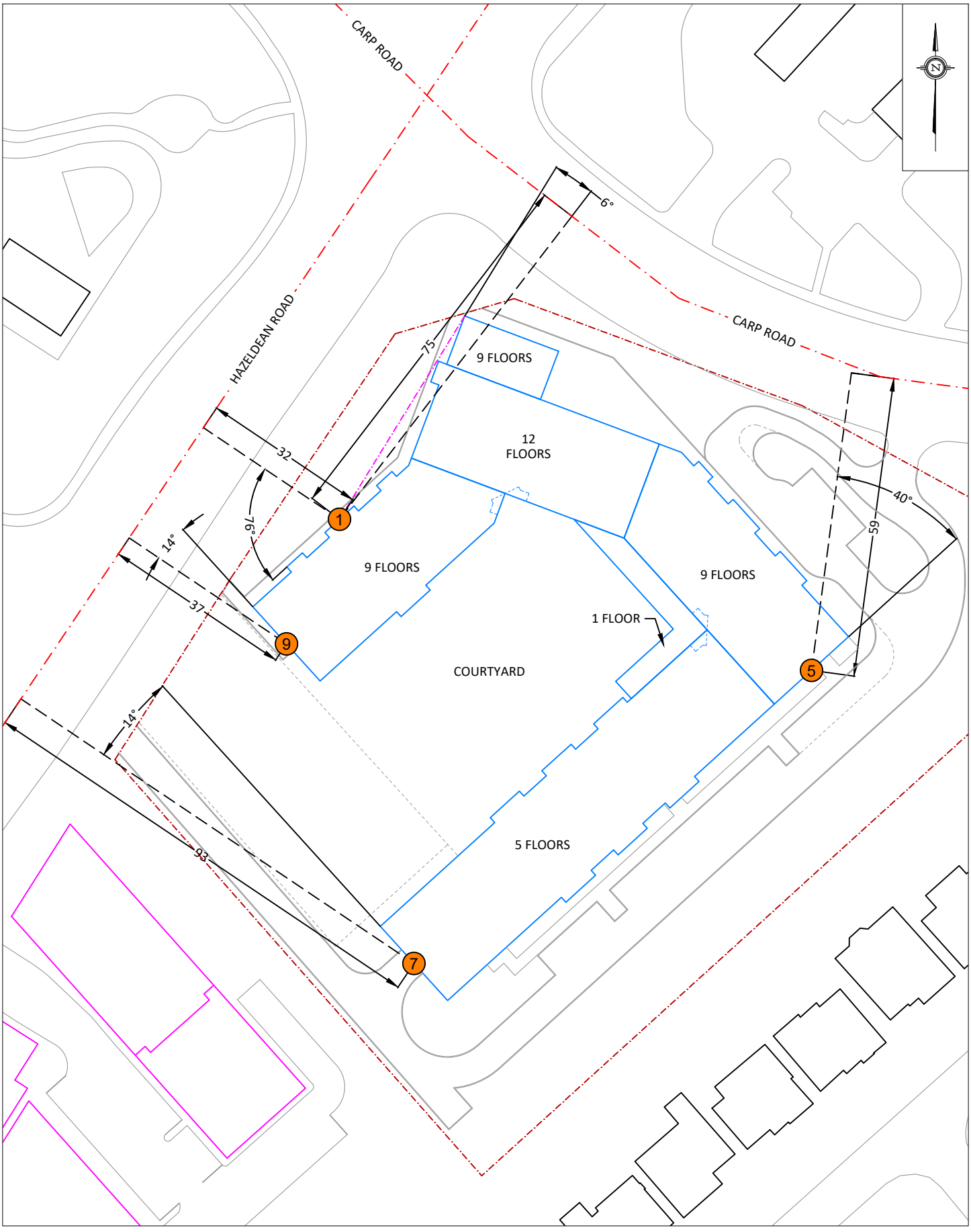


GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	23-299 - 2
DATE	JANUARY 19, 2024	DRAWN BY	E.K.

FIGURE 2:
RECEPTOR LOCATIONS



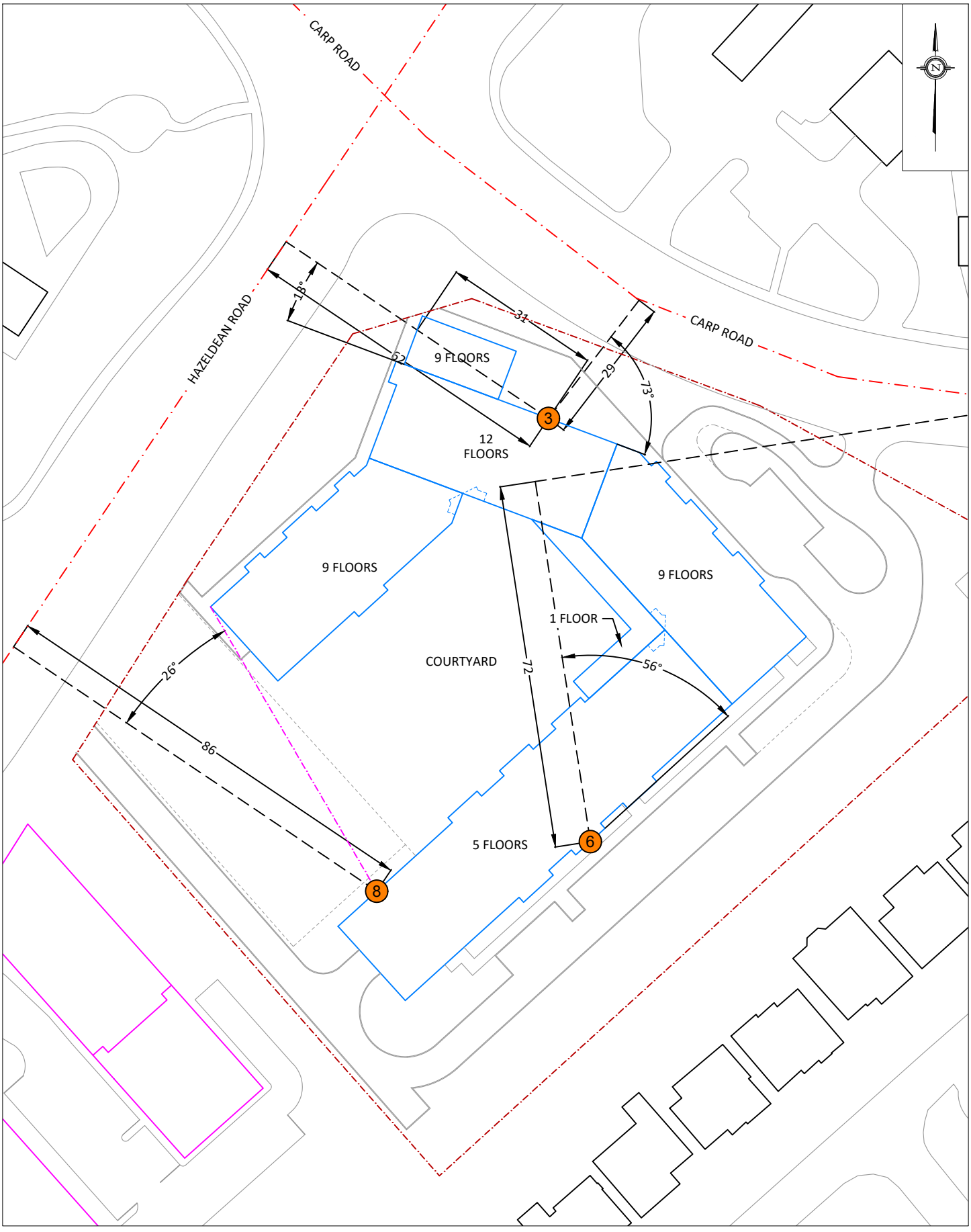
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

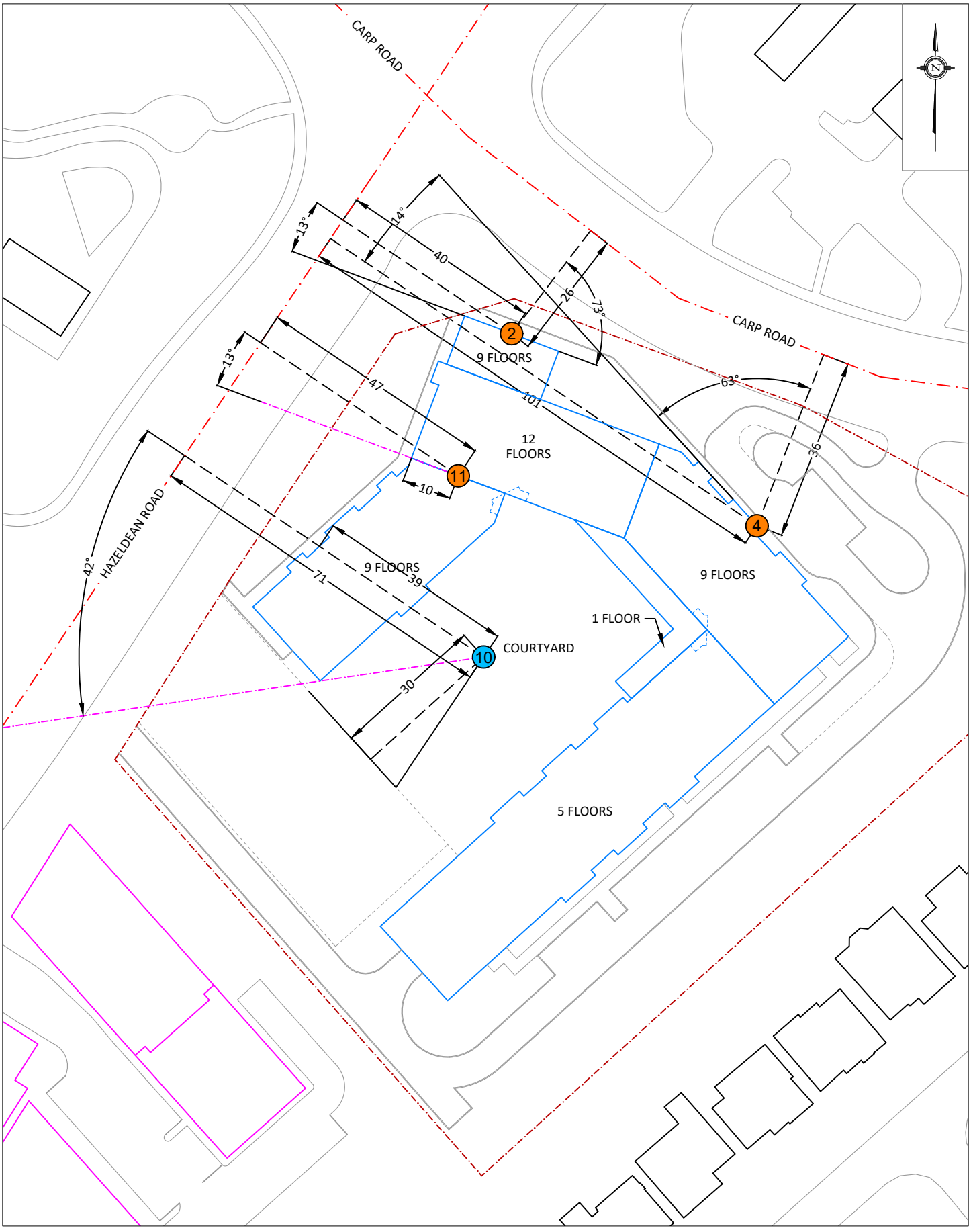
PROJECT	1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	23-299 - 3
DATE	JANUARY 19, 2024
DRAWN BY	E.K.

DESCRIPTION

FIGURE 3:
STAMSON INPUT DATA FOR
RECEPTORS 1, 5, 7, & 9



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD , OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION: FIGURE 4: STAMSON INPUT DATA FOR RECEPTORS 3, 6, & 8
	SCALE: 1:1000 (APPROX.)	DRAWING NO.: 23-299 - 4	
	DATE: JANUARY 19, 2024	DRAWN BY: E.K.	



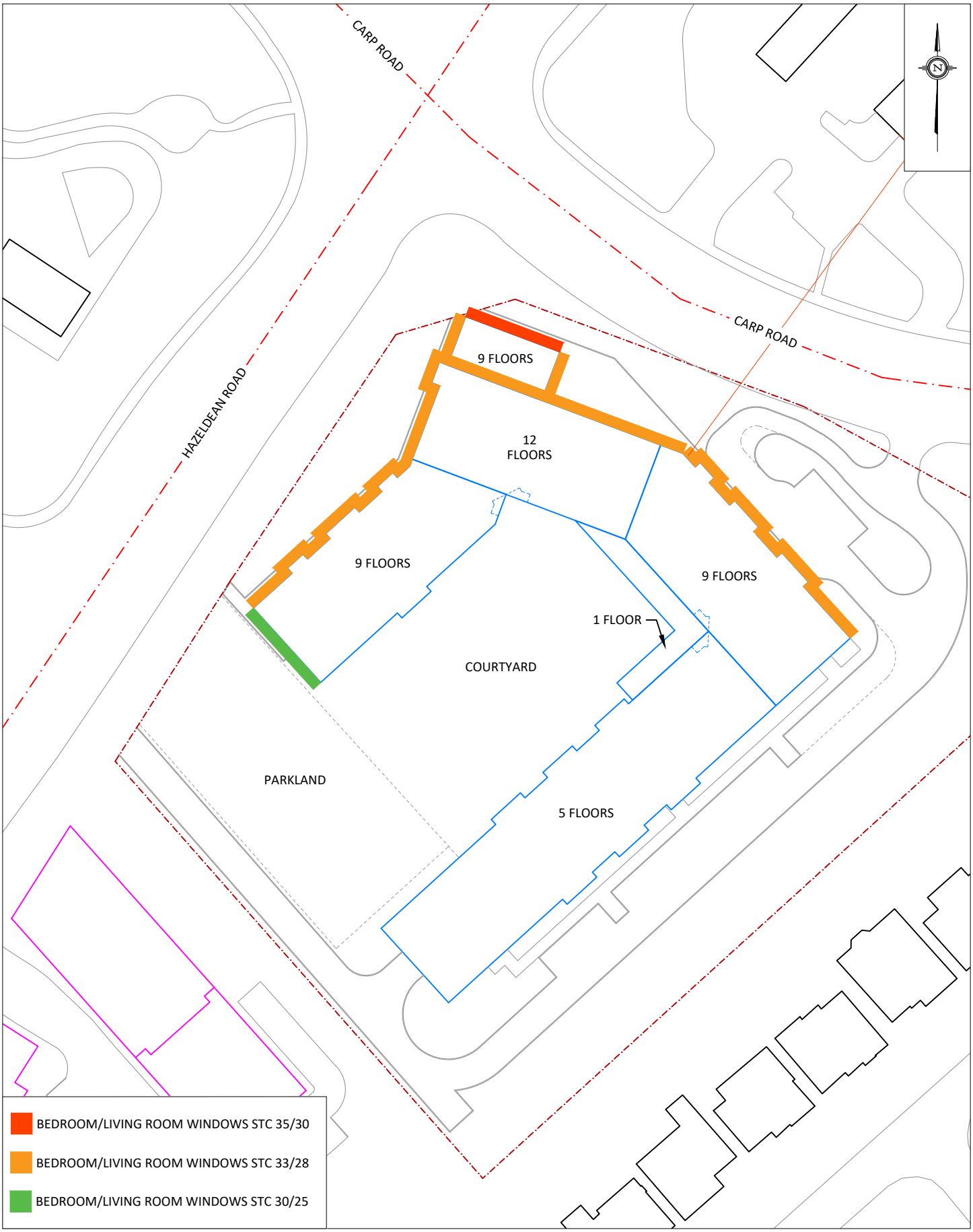
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		
SCALE	1:1000 (APPROX.)	DRAWING NO.	23-299 - 5
DATE	JANUARY 19, 2024	DRAWN BY	E.K.

DESCRIPTION

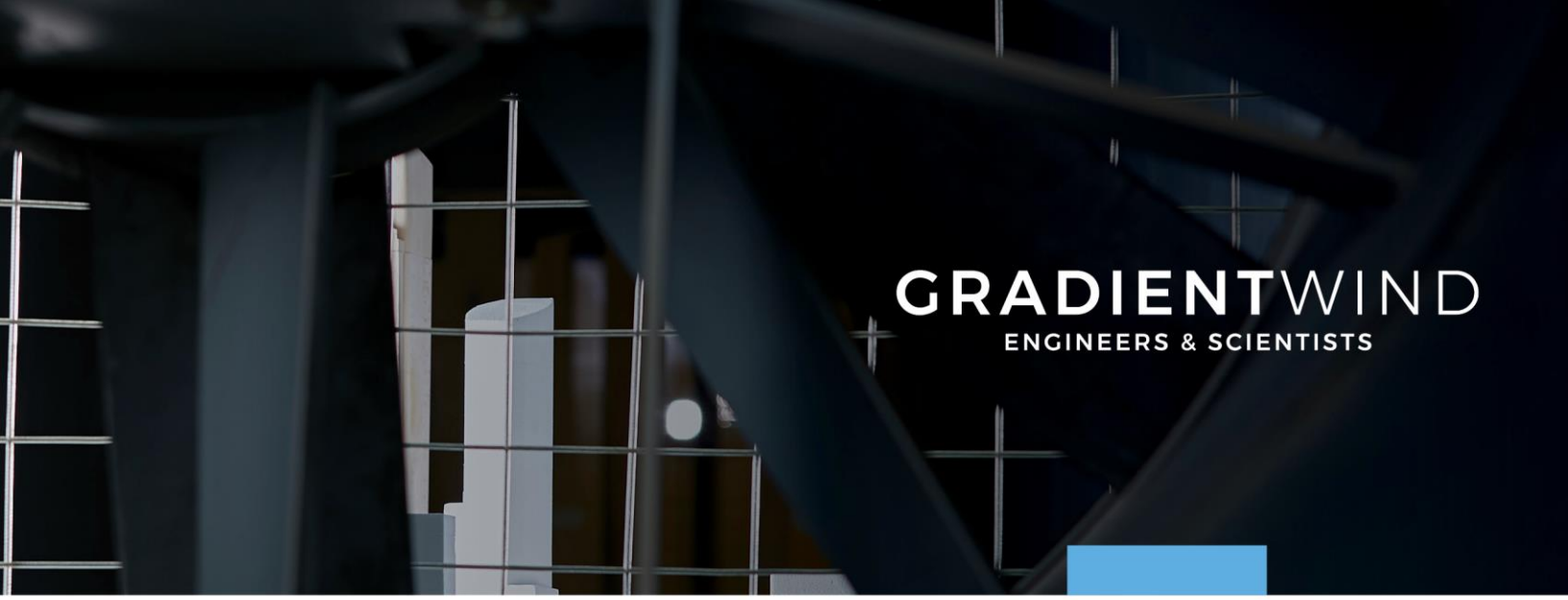
FIGURE 5:
STAMSON INPUT DATA FOR
RECEPTORS 2, 4, 10, & 11

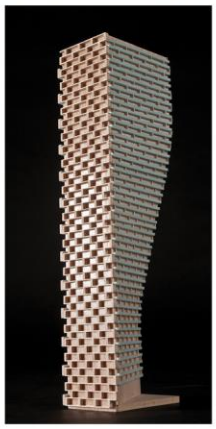


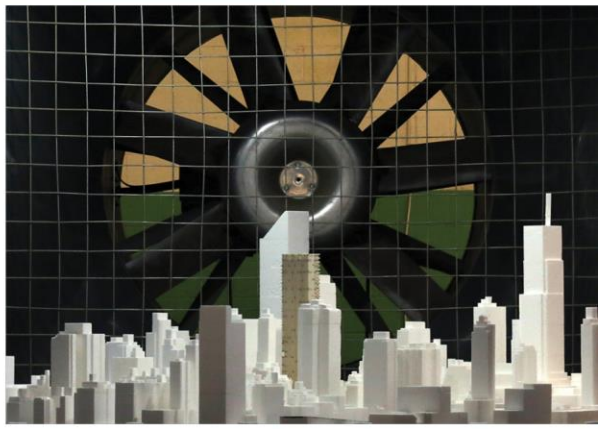
GRADIENTWIND
ENGINEERS & SCIENTISTS

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

PROJECT	1174 CARP ROAD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	23-299 - 6
DATE	JANUARY 19, 2024
DRAWN BY	E.K.
DESCRIPTION	FIGURE 6: STC REQUIREMENTS







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: 12-01-2024 17:52:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R01.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -76.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 32.00 / 32.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : -90.00 deg -6.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 69.36 + 0.00) = 69.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	90	0.00	73.01	0.00	-3.29	-0.35	0.00	0.00	0.00	69.36

Segment Leq : 69.36 dBA

Results segment # 2: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 62.71 + 0.00) = 62.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	73.01	0.00	-6.99	-3.31	0.00	0.00	0.00	62.71

Segment Leq : 62.71 dBA

Total Leq All Segments: 70.21 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 61.77 + 0.00) = 61.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	90	0.00	65.41	0.00	-3.29	-0.35	0.00	0.00	0.00	61.77

Segment Leq : 61.77 dBA

Results segment # 2: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 55.11 + 0.00) = 55.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.00	65.41	0.00	-6.99	-3.31	0.00	0.00	0.00	55.11

Segment Leq : 55.11 dBA

Total Leq All Segments: 62.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.21
(NIGHT): 62.62

STAMSON 5.0 NORMAL REPORT Date: 12-01-2024 17:58:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R02.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -13.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : -90.00 deg 73.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 26.00 / 26.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 66.32 + 0.00) = 66.32 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	90	0.00	73.01	0.00	-4.26	-2.42	0.00	0.00	0.00	66.32

Segment Leq : 66.32 dBA

Results segment # 2: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 70.19 + 0.00) = 70.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	73	0.00	73.01	0.00	-2.39	-0.43	0.00	0.00	0.00	70.19

Segment Leq : 70.19 dBA

Total Leq All Segments: 71.68 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 58.73 + 0.00) = 58.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-13	90	0.00	65.41	0.00	-4.26	-2.42	0.00	0.00	0.00	58.73

Segment Leq : 58.73 dBA

Results segment # 2: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 62.59 + 0.00) = 62.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	73	0.00	65.41	0.00	-2.39	-0.43	0.00	0.00	0.00	62.59

Segment Leq : 62.59 dBA

Total Leq All Segments: 64.09 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.68
(NIGHT): 64.09

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:31:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r03.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -13.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height : 34.50 / 34.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -13.00 deg Angle2 : 90.00 deg
Barrier height : 27.00 m
Barrier receiver distance : 31.00 / 31.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : -90.00 deg 73.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 34.50 / 34.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 34.50 ! 18.00 ! 18.00

ROAD (0.00 + 48.54 + 0.00) = 48.54 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-13 90 0.00 73.01 0.00 -6.16 -2.42 0.00 0.00 -15.88 48.54

Segment Leq : 48.54 dBA

Results segment # 2: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 69.71 + 0.00) = 69.71 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 73 0.00 73.01 0.00 -2.86 -0.43 0.00 0.00 0.00 69.71

Segment Leq : 69.71 dBA

Total Leq All Segments: 69.74 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 34.50 ! 18.00 ! 18.00

ROAD (0.00 + 40.94 + 0.00) = 40.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-13 90 0.00 65.41 0.00 -6.16 -2.42 0.00 0.00 -15.88 40.94

Segment Leq : 40.94 dBA

Results segment # 2: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 62.12 + 0.00) = 62.12 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 73 0.00 65.41 0.00 -2.86 -0.43 0.00 0.00 0.00 62.12

Segment Leq : 62.12 dBA

Total Leq All Segments: 62.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.74
(NIGHT): 62.15

STAMSON 5.0 NORMAL REPORT Date: 12-01-2024 18:11:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r04.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : 14.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 101.00 / 101.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : -63.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 36.00 / 36.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 60.98 + 0.00) = 60.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
14	90	0.00	73.01	0.00	-8.28	-3.74	0.00	0.00	0.00	60.98

Segment Leq : 60.98 dBA

Results segment # 2: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 68.50 + 0.00) = 68.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	90	0.00	73.01	0.00	-3.80	-0.71	0.00	0.00	0.00	68.50

Segment Leq : 68.50 dBA

Total Leq All Segments: 69.21 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 53.38 + 0.00) = 53.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
14	90	0.00	65.41	0.00	-8.28	-3.74	0.00	0.00	0.00	53.38

Segment Leq : 53.38 dBA

Results segment # 2: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 60.90 + 0.00) = 60.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	90	0.00	65.41	0.00	-3.80	-0.71	0.00	0.00	0.00	60.90

Segment Leq : 60.90 dBA

Total Leq All Segments: 61.61 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.21
(NIGHT): 61.61

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:26:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r05.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : 40.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 59.00 / 59.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 61.50 + 0.00) = 61.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
40	90	0.00	73.01	0.00	-5.95	-5.56	0.00	0.00	0.00	61.50

Segment Leq : 61.50 dBA

Total Leq All Segments: 61.50 dBA

Results segment # 1: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 53.90 + 0.00) = 53.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
40	90	0.00	65.41	0.00	-5.95	-5.56	0.00	0.00	0.00	53.90

Segment Leq : 53.90 dBA

Total Leq All Segments: 53.90 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.50
(NIGHT): 53.90

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:31:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r06.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Carp (day/night)

Angle1 Angle2 : 56.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 72.00 / 72.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Carp (day)

Source height = 1.50 m

ROAD (0.00 + 58.96 + 0.00) = 58.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
56	90	0.00	73.01	0.00	-6.81	-7.24	0.00	0.00	0.00	58.96

Segment Leq : 58.96 dBA

Total Leq All Segments: 58.96 dBA

Results segment # 1: Carp (night)

Source height = 1.50 m

ROAD (0.00 + 51.36 + 0.00) = 51.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
56	90	0.00	65.41	0.00	-6.81	-7.24	0.00	0.00	0.00	51.36

Segment Leq : 51.36 dBA

Total Leq All Segments: 51.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.96
(NIGHT): 51.36

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:30:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r07.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -90.00 deg 14.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 93.00 / 93.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 62.70 + 0.00) = 62.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	73.01	0.00	-7.92	-2.38	0.00	0.00	0.00	62.70

Segment Leq : 62.70 dBA

Total Leq All Segments: 62.70 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 55.10 + 0.00) = 55.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	65.41	0.00	-7.92	-2.38	0.00	0.00	0.00	55.10

Segment Leq : 55.10 dBA

Total Leq All Segments: 55.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.70
(NIGHT): 55.10

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:36:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r08.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -76.00 deg 26.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 86.00 / 86.00 m
Receiver height : 13.50 / 13.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 62.96 + 0.00) = 62.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	26	0.00	73.01	0.00	-7.58	-2.47	0.00	0.00	0.00	62.96

Segment Leq : 62.96 dBA

Total Leq All Segments: 62.96 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 55.36 + 0.00) = 55.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-76	26	0.00	65.41	0.00	-7.58	-2.47	0.00	0.00	0.00	55.36

Segment Leq : 55.36 dBA

Total Leq All Segments: 55.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.96
(NIGHT): 55.36

STAMSON 5.0 NORMAL REPORT Date: 15-01-2024 10:38:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r09.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -90.00 deg 14.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 37.00 / 37.00 m
Receiver height : 25.50 / 25.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 66.70 + 0.00) = 66.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	73.01	0.00	-3.92	-2.38	0.00	0.00	0.00	66.70

Segment Leq : 66.70 dBA

Total Leq All Segments: 66.70 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 59.11 + 0.00) = 59.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	14	0.00	65.41	0.00	-3.92	-2.38	0.00	0.00	0.00	59.11

Segment Leq : 59.11 dBA

Total Leq All Segments: 59.11 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.70
(NIGHT): 59.11

STAMSON 5.0 NORMAL REPORT Date: 05-03-2024 14:24:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -90.00 deg -42.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 71.00 / 71.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

ROAD (0.00 + 53.20 + 0.00) = 53.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-42	0.66	73.01	0.00	-11.21	-8.60	0.00	0.00	0.00	53.20

Segment Leq : 53.20 dBA

Total Leq All Segments: 53.20 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

ROAD (0.00 + 45.60 + 0.00) = 45.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-42	0.66	65.41	0.00	-11.21	-8.60	0.00	0.00	0.00	45.60

Segment Leq : 45.60 dBA

Total Leq All Segments: 45.60 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 53.20
(NIGHT): 45.60

STAMSON 5.0 NORMAL REPORT Date: 19-01-2024 15:16:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 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): 30000
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: Hazeldean (day/night)

Angle1 Angle2 : -90.00 deg -13.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 34.50 / 34.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -13.00 deg
Barrier height : 27.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Hazeldean (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 34.50 ! 27.48 ! 27.48

ROAD (0.00 + 64.36 + 0.00) = 64.36 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -13 0.00 73.01 0.00 -4.96 -3.69 0.00 0.00 -4.75 59.61*
-90 -13 0.00 73.01 0.00 -4.96 -3.69 0.00 0.00 0.00 64.36
---

* Bright Zone !

Segment Leq : 64.36 dBA

Total Leq All Segments: 64.36 dBA

Results segment # 1: Hazeldean (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 34.50 ! 27.48 ! 27.48

ROAD (0.00 + 56.76 + 0.00) = 56.76 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -13 0.00 65.41 0.00 -4.96 -3.69 0.00 0.00 -4.75 52.01*
-90 -13 0.00 65.41 0.00 -4.96 -3.69 0.00 0.00 0.00 56.76
---

* Bright Zone !

Segment Leq : 56.76 dBA

Total Leq All Segments: 56.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.36
(NIGHT): 56.76