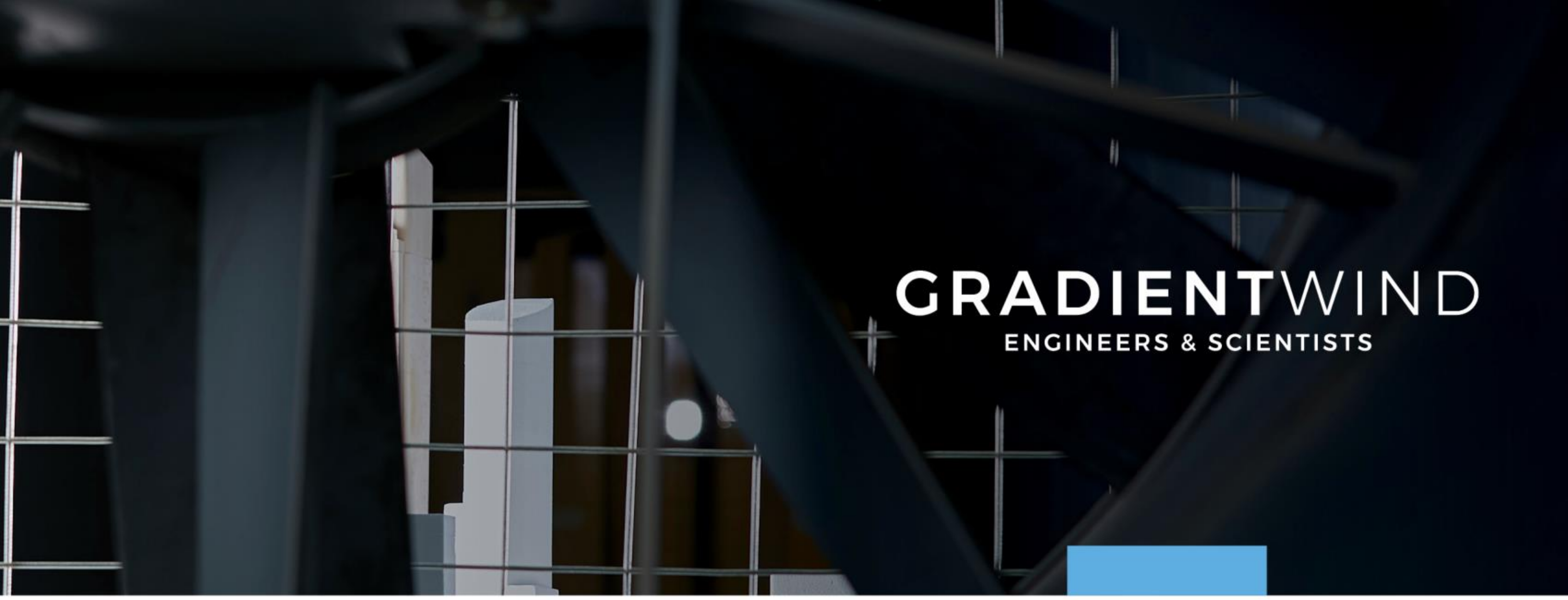
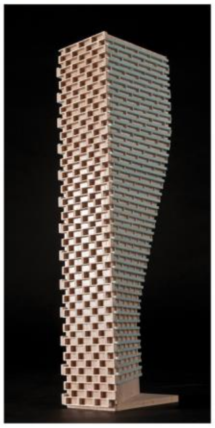
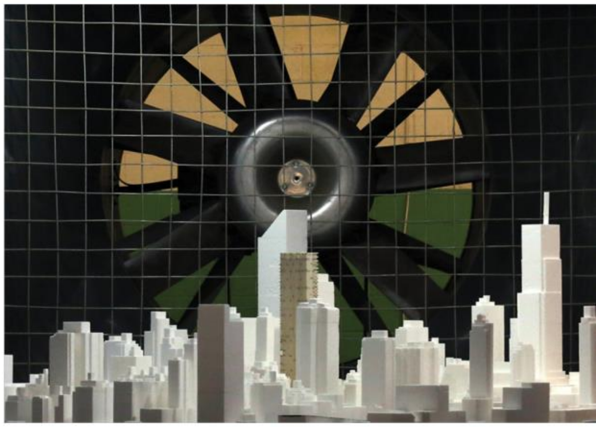


ROADWAY TRAFFIC NOISE ASSESSMENT

298 Axis Way
Ottawa, Ontario

Report: 24-197 – Detailed Traffic Noise





December 5, 2024

PREPARED FOR
Minto Communities
200 - 180 Kent Street,
Ottawa, ON K1P 0B6

PREPARED BY
Benjamin Page, AdvDip., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a detailed roadway traffic noise assessment performed for the proposed residential development, referred to as "Trails Edge – Block 139 & 140", located at 298 Axis Way in Ottawa, Ontario. The study site is located on a 2.68 hectares (ha) irregular shaped parcel of land at the southwest intersection of Brian Coburn Boulevard and Fern Casey Street. The Brian Coburn Boulevard façade is referred to as "North" throughout this study. The major sources of roadway traffic noise are Brian Coburn Boulevard, Fern Casey Street and the future Cumberland Transitway (Bus Rapid Transit). Figure 1 illustrates the site plan with the surrounding context.

The proposed development comprises 12 blocks of three-storey townhouses: Block 1 to the south, Block 2 at the southeast corner, Blocks 3 and 4 central to the site, Blocks 5, 6, 7, and 8 from the east counter clockwise to the northwest corner, and Blocks 9, 10, 11, and 12 to the west. A total of 200 units are proposed within the site; Blocks 1-8 include 160 metro towns, while Blocks 10-12 include 40 avenue towns. Additionally, a utility building is proposed to be located near the northeast corner of the site. Five newly planned private laneways provide vehicular access, with entrances to the east and at the southwest corner of the site from Fern Casey Street and Axis Way, respectively. Surface parking is located along the noted planned laneways and designated surface parking lots are situated between Blocks 1 and 3 and Blocks 7 and 8.

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) a site plan by SRN Architects, dated November 19, 2024.

The results of the current analysis indicate that noise levels will range between 52 and 70 dBA during the daytime period (07:00-23:00) and 43 and 61 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façades of Blocks 7 and 8, which are most exposed to Brian Coburn Boulevard and the future Cumberland Transitway.

The results of the calculations indicate that Blocks 2, 5, 6, 7 and 8 will require upgraded building components on select façades as indicated in Figure 4. 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 all Blocks 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.

No major pieces of mechanical equipment are expected to be associated with the development, thus impacts of stationary noise sources on the surroundings and the development itself will be negligible.

The surroundings comprise existing and future low-rise residential buildings and as such no existing sources of noise were identified around the site.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Minto Communities to undertake a roadway traffic noise assessment for the proposed residential development, referred to as "Trails Edge – Block 139 & 140", located at 298 Axis Way 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[1] and the Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on a site plan prepared by SRN Architects, dated November 19, 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 298 Axis Way in Ottawa, Ontario. The study site is located on a 2.68 hectares (ha) irregular shaped parcel of land at the southwest intersection of Brian Coburn Boulevard and Fern Casey Street. The Brian Coburn Boulevard façade is referred to as "North" throughout this study.

The proposed development comprises 12 blocks of three-storey townhouses: Block 1 to the south, Block 2 at the southeast corner, Blocks 3 and 4 central to the site, Blocks 5, 6, 7, and 8 from the east counter clockwise to the northwest corner, and Blocks 9, 10, 11, and 12 to the west. Additionally, a utility building is proposed to be located near the northeast corner of the site. Five newly planned private laneways provide vehicular access, with entrances to the east and at the southwest corner of the site from Fern Casey Street and Axis Way, respectively. Surface parking is located along the noted planned streets and designated surface parking lots are situated between Blocks 1 and 3 and Blocks 7 and 8.

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

There are no outdoor living areas (OLA) associated with this development. Balconies of less than 4 m in depth are not considered as point of assessment for a noise study. The landscaped area south of the proposed utility building labeled amenity area, is also not an OLA because it is not immediately accessible from the buildings and will function more as a landscape buffer which is not considered OLA as per the ENCG.

The major sources of roadway traffic noise are Brian Coburn Boulevard, Fern Casey Street, and the future Cumberland Transitway (Bus Rapid Transit). Figure 1 illustrates the site plan 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, 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.

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[3]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[4]. 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

[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[4] MECP, 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[5].

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.

4.2.2 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 analysis model has been recognized by the Ministry of Transportation Ontario (MTO) as the recommended noise model for transportation projects (Environmental Guide for Noise, 2022 by the MTO[6]). The MECP has also adopted the TNM model as per their "Draft Guideline Noise Pollution Control Publications 306 (NPC-306)[7].

The *Predictor-Lima* computer program can represent three-dimensional surfaces and the first reflection of sound waves over a suitable spectrum for human hearing. Calculations were performed for receptors around the study site to determine the noise impact from roadway and railway sources

Roadway noise calculations were performed by treating each road segment as separate line sources of noise. In addition to the traffic volumes summarized in section **Error! Reference source not found.**, 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.

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[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[6] Ministry of Transportation, Environmental Guide for Noise, 2022. Retrieved from Environmental Guide for Noise 2022
[7] Ministry of Environment, Conservation and Parks, Ontario, "Methods to determine Sound Levels Due to Road and Rail Traffic", Draft February 12, 2020

- The day/night split for all roads was taken to be 92% / 8%, respectively.
- Ground surfaces were taken to be absorptive due to the presence of soft ground (lawns and grassland).
- Topography was assumed to be a flat/gentle slope surrounding the study site.
- A total of eighteen (16) receptor locations were chosen around the study site.
- 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 Figure 3.

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[8] 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.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Brian Coburn Boulevard	4-Lane Urban Arterial Undivided (4-UAU)	70	**30,000**
Fern Casey Street	4-Lane Major Collector (4-UMCU)	60	**24,000**
Cumberland Transitway	BRT	80	**488 / 42***

*Day / Night Volumes based on the Brian Coburn Expansion and Cumberland Transitway Environmental Assessment

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

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 (2012) 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 point in a partition.

As per Section 4.2.1, 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. The calculation procedure[9] 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
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[10], 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. Indoor nose calculations were performed based on the NRC Building Practice Note 56 and elevation and floor plans provided by SRN Architects Inc.

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

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

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	Noise Level (dBA)	
			Day	Night
1	7	POW – South Façade Block 1 – Level 3	52	43
2	7	POW – East Façade Block 1 – Level 3	52	43
3	7	POW – South Façade Block 2 – Level 3	60	51
4	7	POW – East Façade Block 2 – Level 3	66	56
5	7	POW – North Façade Block 2 – Level 3	61	52
6	7	POW – South Façade Block 5 – Level 3	62	53
7	7	POW – East Façade Block 5 – Level 3	66	56
8	7	POW – North Façade Block 5 – Level 3	61	52
9	7	POW – South Façade Block 6 – Level 3	57	48
10	7	POW – East Façade Block 6 – Level 3	67	58
11	7	POW – North Façade Block 6 – Level 3	69	60
12	7	POW – East Façade Block 7 – Level 3	63	54
13	7	POW – North Façade Block 7 – Level 3	70	61
14	7	POW – West Façade Block 7 – Level 3	66	57
15	7	POW – North Façade Block 8 – Level 3	70	61
16	7	POW – West Façade Block 8 – Level 3	64	55

The results of the current analysis indicate that noise levels will range between 52 and 70 dBA during the daytime period (07:00-23:00) and 43 and 61 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façades of Blocks 7 and 8, which are most exposed to Brian Coburn Boulevard and the future Cumberland Transitway. Figures 6 and 7 illustrate daytime and nighttime noise contours throughout the site 4.5 m above grade.

The results of the calculations indicate that Blocks 2, 5, 6, 7 and 8 will require upgraded building components on select façades as indicated in Figure 4. 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 have been estimated based on the NRC Building Practice Note #56 The STC requirements for the windows are summarized below for various units within the development (see Figure 4):

- **Bedroom Windows and Living Room Windows**

(i) Windows facing the north on Blocks 6, 7, and 8 will require a minimum STC of 35.

(ii) Windows facing the west and east on Blocks 2, 5, 6, 7, and 8 will require a minimum STC of 32.

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

- **Exterior Walls**

(i) Exterior wall components on north, west, and east façades of Blocks 2, 5, 6, 7, and 8 will require a minimum STC of 40, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[11]

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

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

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.

The results of the calculations also indicate that all Blocks 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 (see Figure 5). 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 52 and 70 dBA during the daytime period (07:00-23:00) and 43 and 61 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the north façades of Blocks 7 and 8, which are most exposed to Brian Coburn Boulevard and the future Cumberland Transitway.

The results of the calculations indicate that Blocks 2, 5, 6, 7 and 8 will require upgraded building components on select façades as indicated in Figure 4. 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 all Blocks 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. A Type D warning clause 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."*

There are no outdoor living areas (OLA) associated with this development. Balconies of less than 4 m in depth are not considered as point of assessment for a noise study. The landscaped area south of the proposed utility building labelled amenity area, is also not an OLA because it is not immediately accessible from the buildings and will function more as a parkette which is not considered OLA as per the ENCG.

No major pieces of mechanical equipment are expected to be associated with the development, thus impacts of stationary noise sources on the surroundings and the development itself will be negligible.

The surroundings comprise existing and future low-rise residential buildings and as such no existing sources of noise were identified around the site.

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,

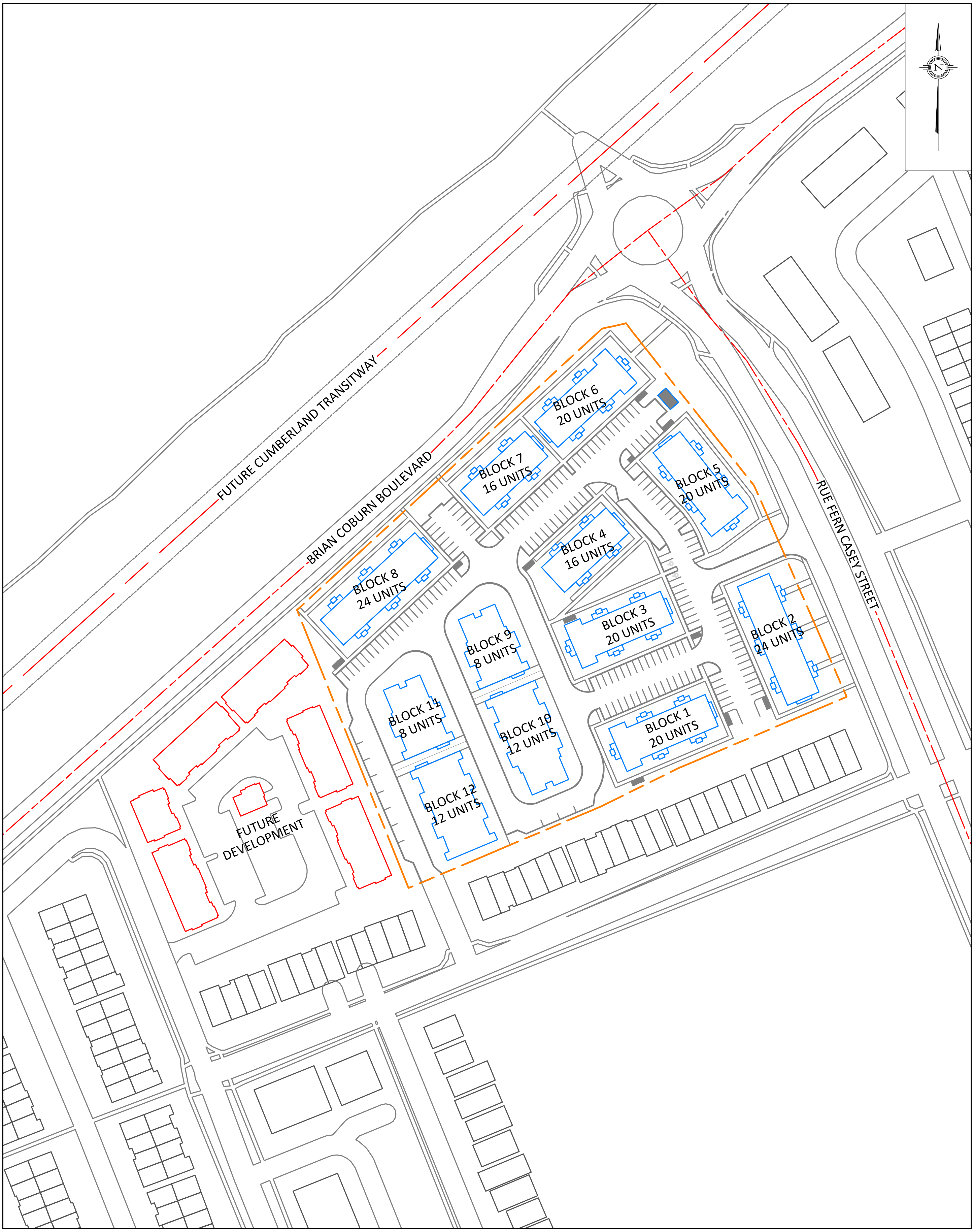
Gradient Wind Engineering Inc.

LICENSED PROFESSIONAL ENGINEER
J. R. FOSTER
100155655
Dec 5, 2024
PROVINCE OF ONTARIO

Benjamin Page, AdvDip.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #24-197 – Detailed Traffic Noise



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 289 AXIS WAY, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION: FIGURE 1: PROPOSED SITE PLAN AND SURROUNDING CONTEXT
	SCALE: 1:2000	DRAWING NO.: 24-197-NOISE-FIG1	
	DATE: DECEMBER 5, 2024	DRAWN BY: B.P.	

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PROJECT		DESCRIPTION
289 AXIS WAY, OTTAWA TRANSPORTATION NOISE STUDY		FIGURE 2: RECEPTOR LOCATIONS
SCALE 1:1500	DRAWING NO. 24-197-NOISE-FIG2	
DATE DECEMBER 5, 2024	DRAWN BY B.P.	

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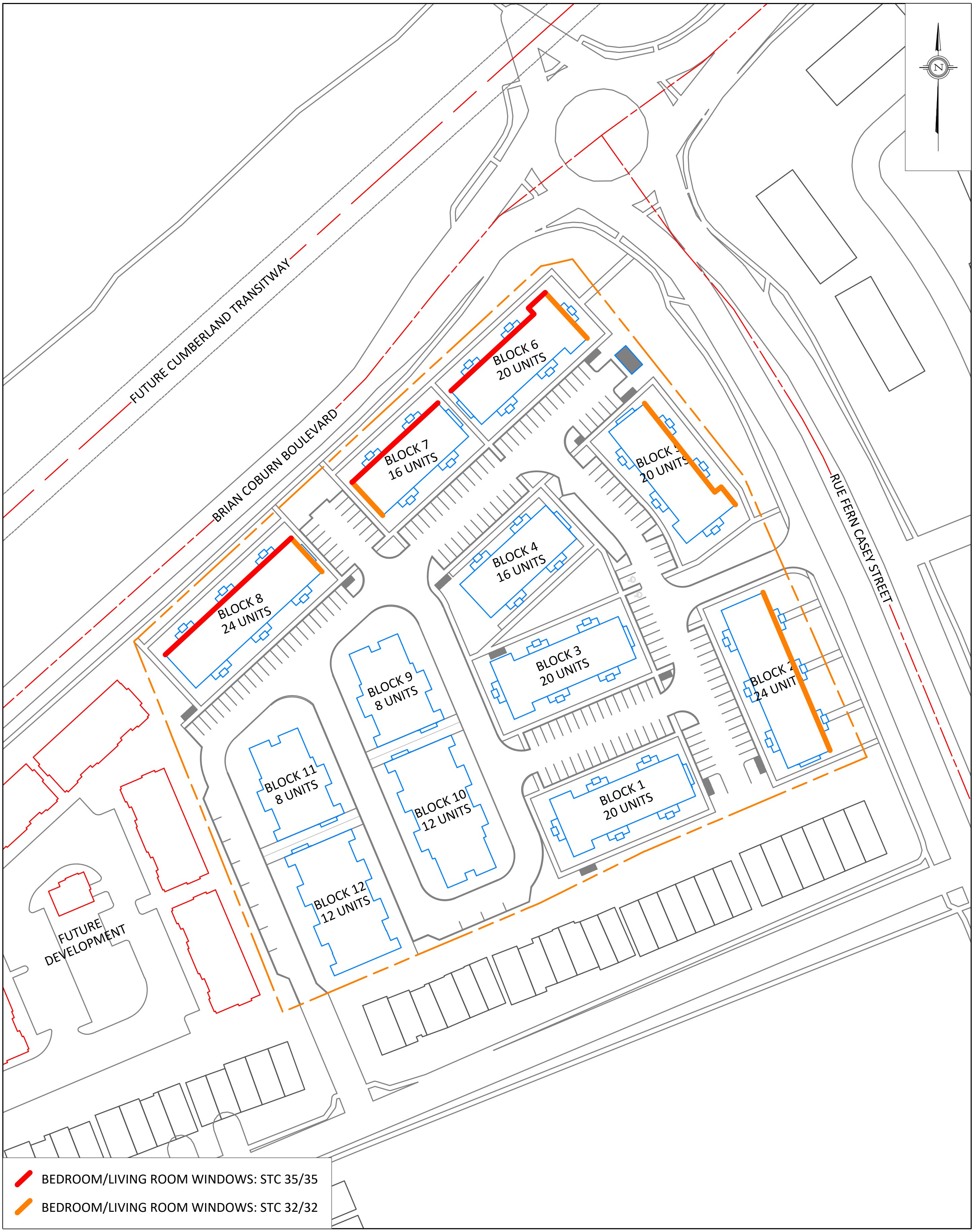
PROJECT: 289 AXIS WAY, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION: FIGURE 3: STAMSON 5.04 INPUT DATA
SCALE: 1:1500	DRAWING NO.: 24-197-NOISE-FIG3	
DATE: DECEMBER 5, 2024	DRAWN BY: B.P.	



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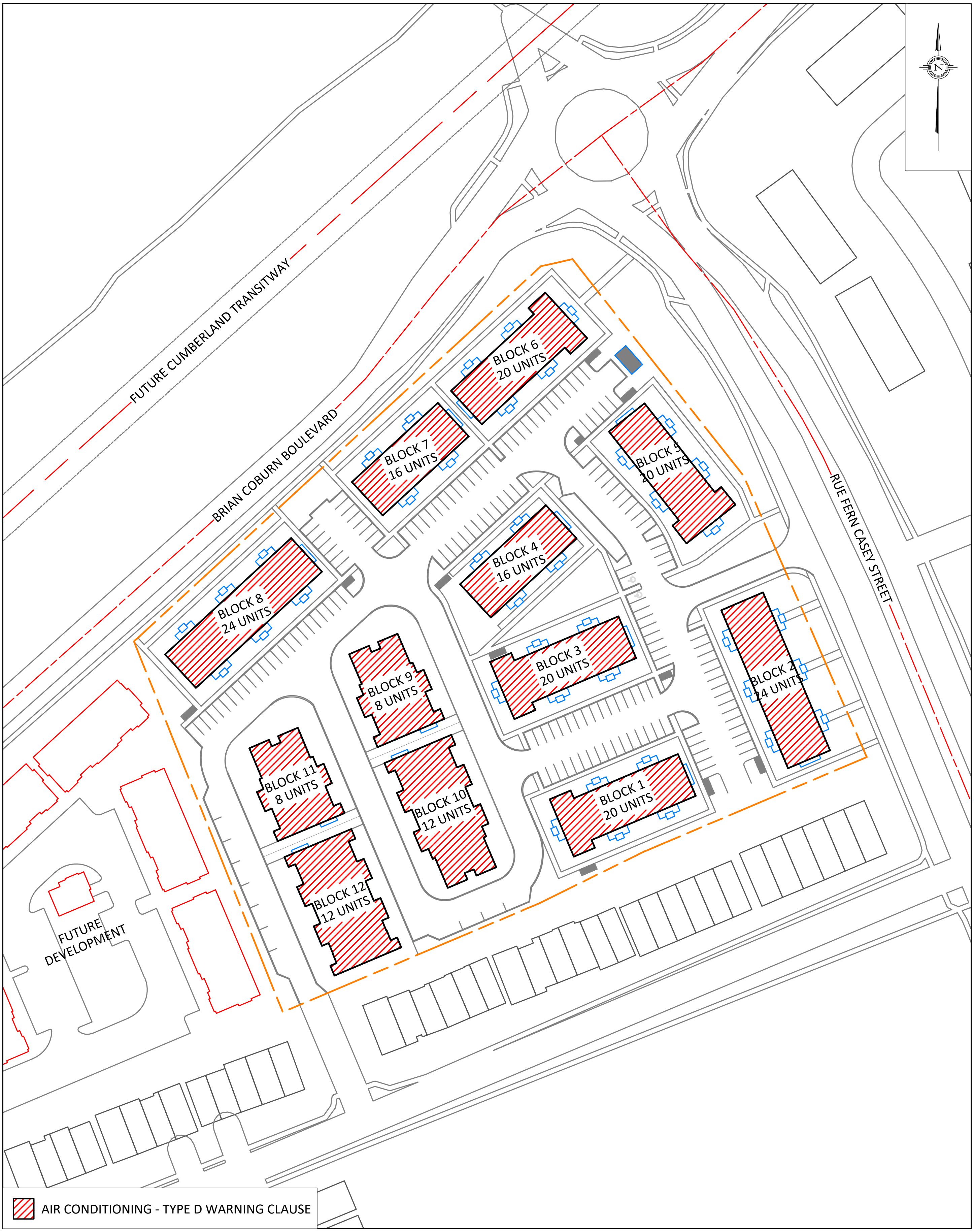
PROJECT	289 AXIS WAY, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION FIGURE 4: STC REQUIREMENTS
SCALE	1:1500	DRAWING NO. 24-197-NOISE-FIG4	
DATE	DECEMBER 5, 2024	DRAWN BY B.P.	



GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT: 289 AXIS WAY, OTTAWA TRANSPORTATION NOISE STUDY		DESCRIPTION: FIGURE 5: VENTILATION REQUIREMENTS
	SCALE: 1:1500	DRAWING NO.: 24-197-NOISE-FIG5	
	DATE: DECEMBER 5, 2024	DRAWN BY: B.P.	

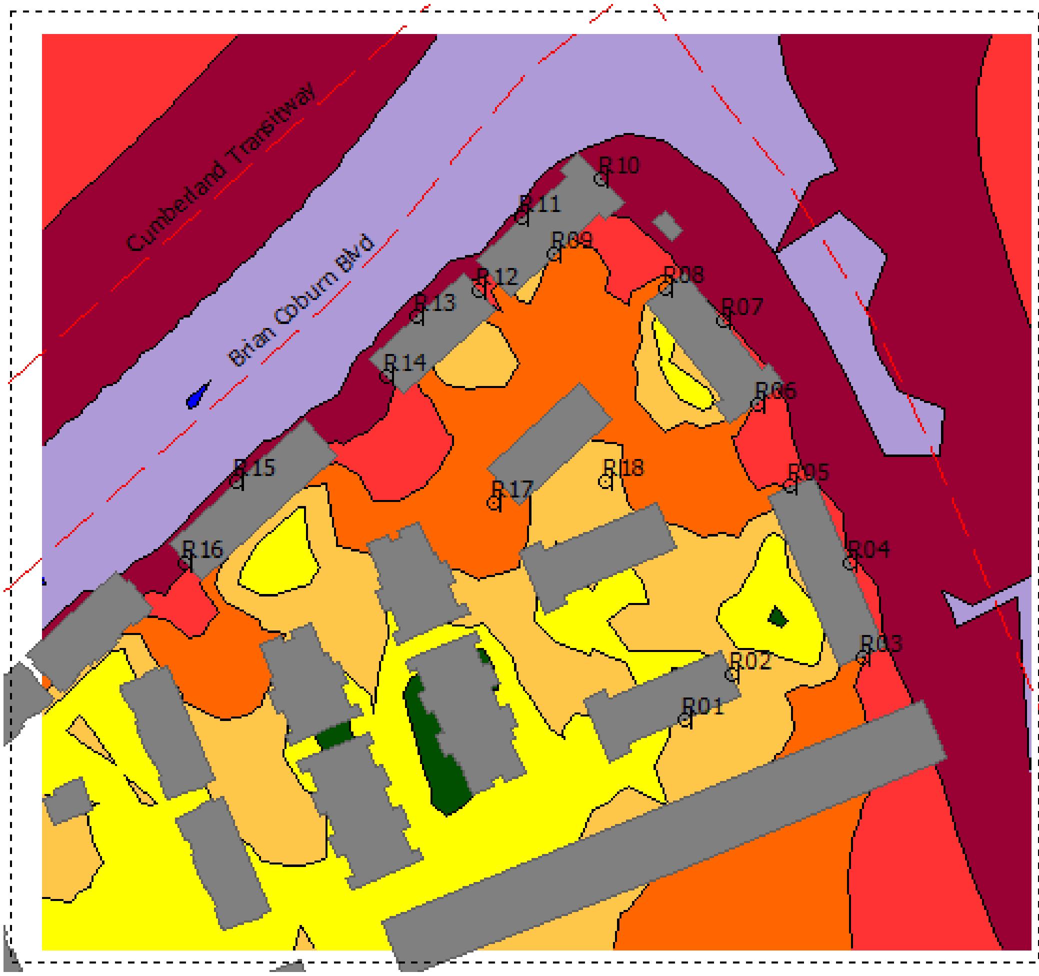
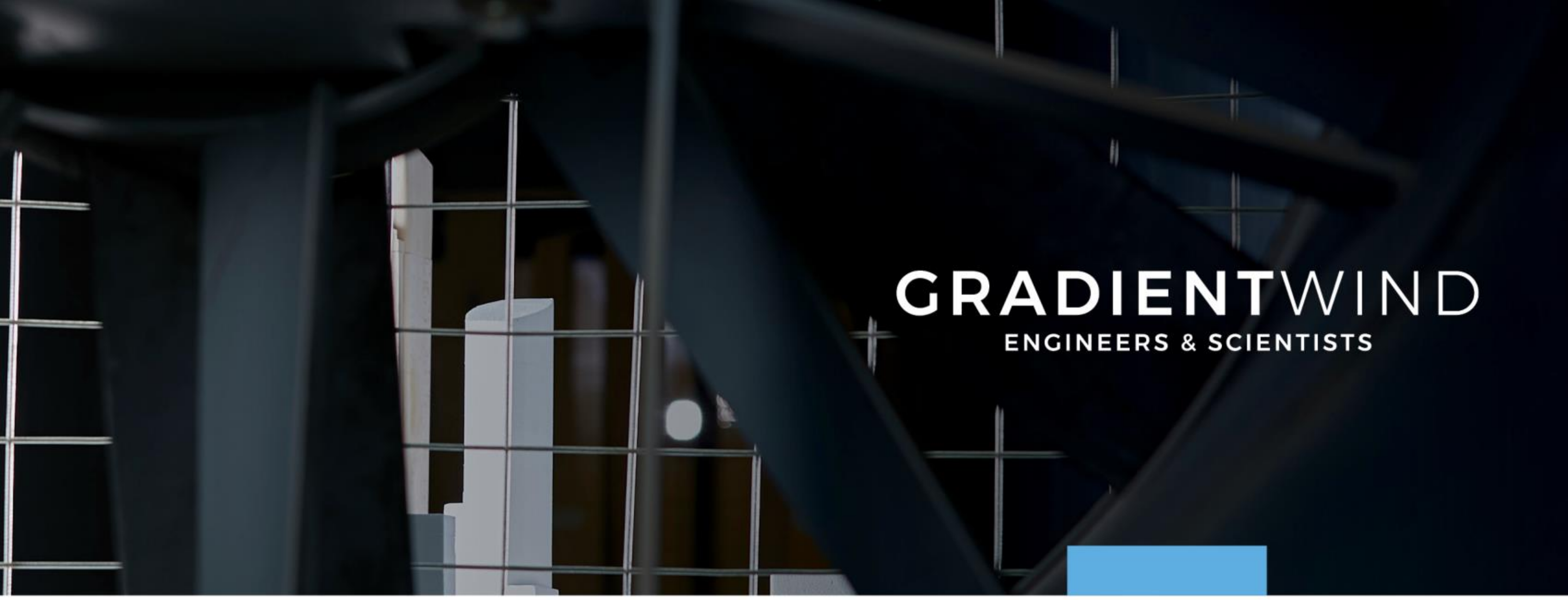


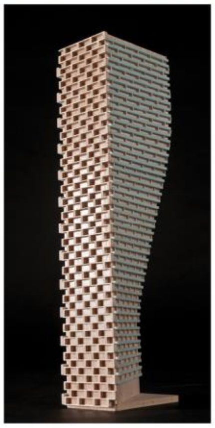
FIGURE 6: DAYTIME NOISE CONTOURS (4.5 M ABOVE GRADE)

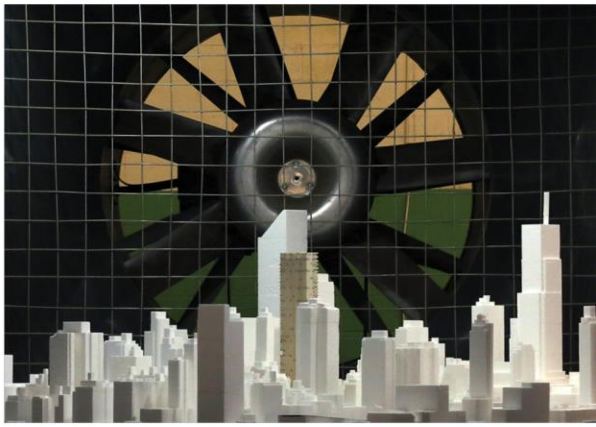
80 – 85 dB
75 – 80 dB
70 – 75 dB
65 – 70 dB
60 – 65 dB
55 – 60 dB
50 – 55 dB
45 – 50 dB
40 – 45 dB
35 – 40 dB
0 – 35 dB

FIGURE 7: NIGHTIME 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

```
STAMSON 5.0          NORMAL REPORT          Date: 26-11-2024 15:07:56
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Fern Casey (day/night)
----------------------------------------------
Car traffic volume  : 19430/1690  veh/TimePeriod  *
Medium truck volume :  1546/134   veh/TimePeriod  *
Heavy truck volume  :  1104/96    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):  24000
    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: Fern Casey (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  39.00 / 39.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Fern Casey (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.66 + 0.00) = 61.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
     0     90   0.50  72.04   0.00  -6.20  -4.18   0.00   0.00   0.00  61.66
----------------------------------------------------------------------------

Segment Leq : 61.66 dBA

Total Leq All Segments: 61.66 dBA
```

```
Results segment # 1: Fern Casey (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.06 + 0.00) = 54.06 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
     0     90   0.50  64.44   0.00  -6.20  -4.18   0.00   0.00   0.00  54.06
--------------------------------------------------------------------------

Segment Leq : 54.06 dBA

Total Leq All Segments: 54.06 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.66
                         (NIGHT): 54.06
```

```
STAMSON 5.0          NORMAL REPORT         Date: 26-11-2024 15:10:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R4.te                  Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Fern Casey (day/night)
----------------------------------------------
Car traffic volume  : 19430/1690  veh/TimePeriod  *
Medium truck volume :  1546/134   veh/TimePeriod  *
Heavy truck volume  :  1104/96    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):  24000
    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: Fern Casey (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  33.00 / 33.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Fern Casey (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.75 + 0.00) = 65.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     90   0.50  72.04   0.00  -5.12  -1.17   0.00   0.00   0.00  65.75
----------------------------------------------------------------------------

Segment Leq : 65.75 dBA

Total Leq All Segments: 65.75 dBA
```

```
Results segment # 1: Fern Casey (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.15 + 0.00) = 58.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     90   0.50  64.44   0.00  -5.12  -1.17   0.00   0.00   0.00  58.15
----------------------------------------------------------------------------

Segment Leq : 58.15 dBA

Total Leq All Segments: 58.15 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.75
                         (NIGHT): 58.15
```

```
STAMSON 5.0        NORMAL REPORT        Date: 26-11-2024 15:21:48
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R15.te                Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Brian Coburn (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  :    70 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: Brian Coburn (day/night)
----------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  20.00 / 20.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Brian Coburn (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 71.29 + 0.00) = 71.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------------
   -90     90   0.50  74.33   0.00  -1.87  -1.17   0.00   0.00   0.00  71.29
----------------------------------------------------------------------------

Segment Leq : 71.29 dBA

Total Leq All Segments: 71.29 dBA
```

```
Results segment # 1: Brian Coburn (night)
-----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.70 + 0.00) = 63.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------------
   -90     90   0.50  66.73   0.00  -1.87  -1.17   0.00   0.00   0.00  63.70
-----------------------------------------------------------------------------

Segment Leq : 63.70 dBA

Total Leq All Segments: 63.70 dBA

RT/Custom data, segment # 1: BRT (day/night)
--------------------------------------------
1 - Bus:
Traffic volume    :    31/5     veh/TimePeriod
Speed             :    80 km/h

Data for Segment # 1: BRT (day/night)
-------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  62.00 / 62.00  m
Receiver height           :   7.00 / 7.00   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: BRT (day)
------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 40.90 + 0.00) = 40.90 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     90   0.52  51.52  -9.40  -1.22   0.00   0.00   0.00  40.90
----------------------------------------------------------------------

Segment Leq : 40.90 dBA

Total Leq All Segments: 40.90 dBA
```

```
Results segment # 1: BRT (night)
--------------------------------

Source height = 0.50 m

RT/Custom (0.00 + 35.98 + 0.00) = 35.98 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
----------------------------------------------------------------------
   -90     90   0.52  46.60  -9.40  -1.22   0.00   0.00   0.00  35.98
----------------------------------------------------------------------

Segment Leq : 35.98 dBA

Total Leq All Segments: 35.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.29
                         (NIGHT): 63.71
```