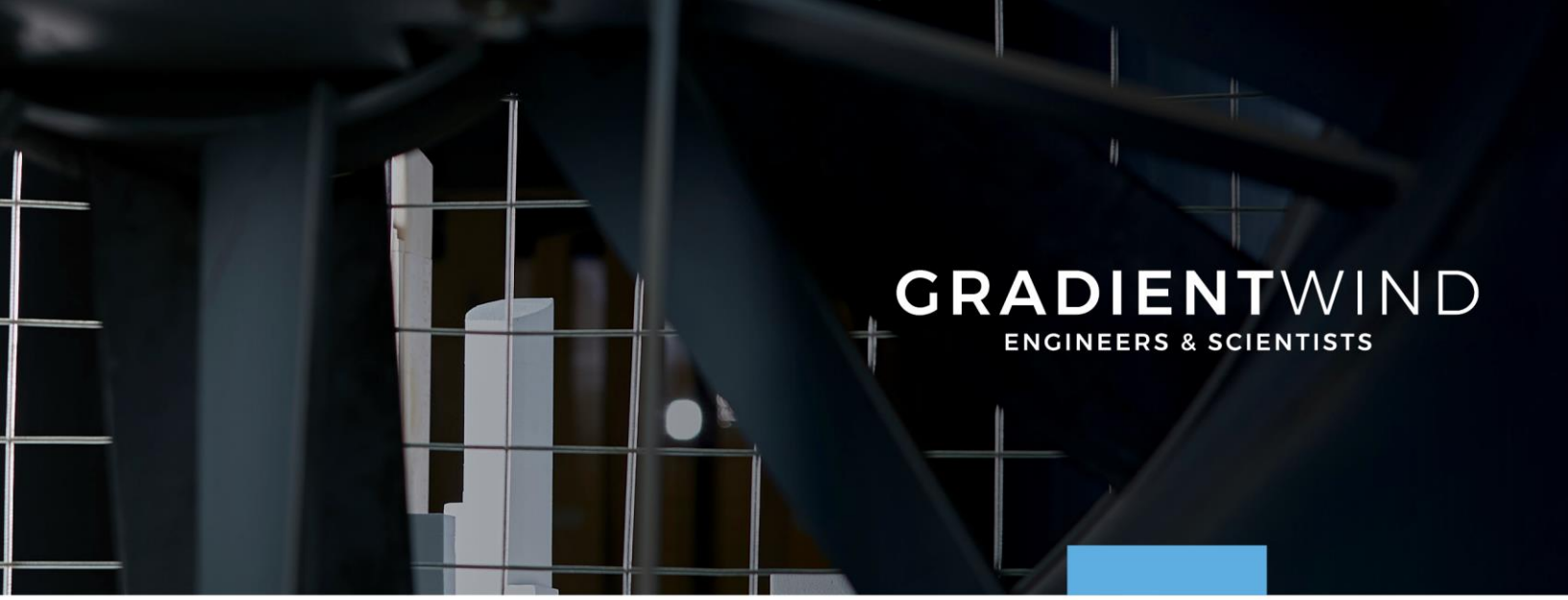
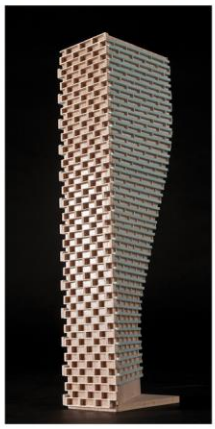


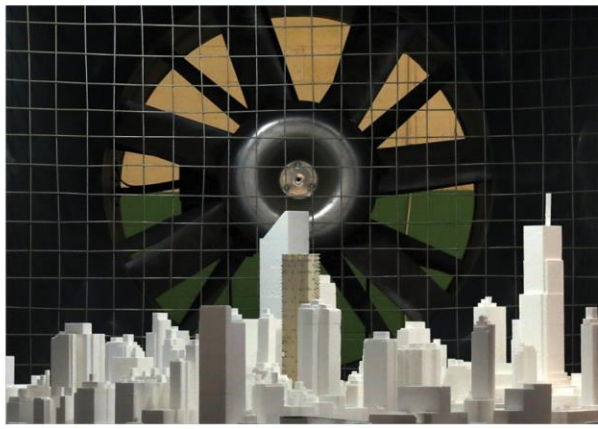
GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT

1495 Heron Road
Ottawa, Ontario

Report: 21-329 – Traffic Noise Feasibility





April 11th, 2023

PREPARED FOR
Canada Lands Company CLC Limited
c/o Stantec
400 – 1331 Clyde Avenue
Ottawa, ON K2C 3G4

PREPARED BY
Essraa Alqassab, BASc., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken for a proposed subdivision development located at 1495 Heron Road, Ontario. The proposed development is located on an irregular-shaped parcel of land on the north side of Heron Road. The primary sources of roadway traffic noise are Heron Road and Baycrest Drive to the south. Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP); (ii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iii) site plan drawings prepared by Canada Lands CLC Limited, issued April 8th, 2021.

The results of the current analysis indicate that noise levels will range between 39 and 70 dBA during the daytime period (07:00-23:00) and between 32 and 63 dBA during the nighttime period (23:00-07:00). The highest noise level (70 dBA) occurs at the south façade, which is nearest and most exposed to Heron Road. The noise levels predicted due to roadway traffic exceed the criteria listed in NPC-300 for building components and upgraded building components will be required.

Results of the calculations also indicate that the 4-storey building at the southeast corner of the development site will require central air conditioning, or a similar ventilation system, due to roadway traffic noise. Results also indicate that all other buildings in the study site will require forced air heating with provisions for air conditioning. This will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will also be required on all Lease, Purchase and Sale Agreements for buildings in this development.

A detailed roadway traffic noise study will be required at the time of site plan approval to determine specific noise control measures for the development.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Stantec, on behalf of Canada Lands Limitited CLC, to undertake a roadway traffic noise feasibility assessment for a proposed subdivision development located at 1495 Heron Road in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to a roadway traffic noise feasibility assessment of exterior noise levels generated by local roadway traffic.

The assessment was performed based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[1] guidelines. Noise calculations were based on site plan drawings prepared by Canada Lands CLC Limited, issued April 8th, 2021, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The subject site is located at 1495 Heron Road, Ottawa; situated on a parcel of land to the north of Heron Road. The site comprises a 7.3 -hectare institutional site consisting of twelve (12) buildings (names A to M), including 1.5 ha of non-developable land which is currently a wooded area along the northwest portion of the property. Canada Lands intends to rezone the property for mixed residential and retail use while retaining open spaces and considering the interests of the Ottawa Catholic School board as well as the abutting property owners.

The site is bounded by low-rise residential units to the east, parkland to the north and west, and Heron Road to the south. The main sources of roadway traffic impacting the subdivision are Heron Road and Baycrest Drive. Figure 1 illustrates the site plan and 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) explore potential noise mitigation where required.

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

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 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. NPC-300 specifies that the recommended indoor noise limit range is 50, 45, and 40 dBA for reception/retail, living rooms, and sleeping quarters, respectively, as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 47, 42, and 37 dBA, respectively, to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [2]

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[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 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 is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

[2] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[4] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[5] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were determined by computer modelling using two programs: Predictor-Lima and STAMSON 5.04. To provide a general sense of noise across the site, the employed software program was Predictor-Lima (TNM calculation), which incorporates the United States Federal Highway Administration's (FHWA) Transportation Noise Model (TNM) 2.5. This computer program is capable of representing three-dimensional surface and first reflections of sound waves over a suitable spectrum for human hearing. A receptor grid was placed across the study site, along with a number of discrete receptors at key sensitive areas. Although this program outputs noise contours, it is not the approved model for roadway predictions by the City of Ottawa. Therefore, the results were confirmed by performing discrete noise calculations with the MECP computerized noise assessment program, STAMSON 5.04, at four sample receptor locations coinciding with the receptor locations in Predictor as shown in Figure 2. Receptor distances and exposure angles are also illustrated in Figures 3. 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 streets was taken to be 92%/8%, respectively.
- Ground surfaces were modelled as reflective.
- No massing within the study site was considered as potential noise screening elements.
- Noise receptors were strategically placed at 4 locations around the study area (see Figure 2).
- Receptor distances 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[6] 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 Volume
Heron Road	4-Lane Urban Arterial Divided (4-UAD)	50	**35,000**
Baycrest Drive	2-Lane Urban Collector	50	**8,000**

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

Table 3 below provides a comparison between Predictor-Lima and STAMSON. Noise levels calculated in STAMSON were found to have good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±1-3 dBA. Figures 4 and 5 illustrate daytime and nighttime noise contours throughout the site at a height of 1.5 m above grade. Figures 6 and 7 illustrate daytime and nighttime noise contours throughout the site at a height of 4.5 m above grade, representing the plane of window (POW). The results of the current analysis indicate that noise levels will range between approximately 39 and 70 dBA during the daytime period (07:00-23:00) and between 32 and 63 dBA during the nighttime period (23:00-07:00). The highest noise levels occur at the south side of the development site, which is directly exposed to the noise generated by Heron Road.

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

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor ID	Receptor Height Above Grade/Roof (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
		Day	Night	Day	Night
R1	1.5	60	52	63	56
R2	1.5	71	63	70	63
R3	1.5	59	53	61	55
R4	1.5	45	37	39*	32*

Note* Difference in predictor noise levels is because Pridictor handles noise attenuation from buildings in a more realistic manner.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 39 and 70 dBA during the daytime period (07:00-23:00) and between 32 and 63 dBA during the nighttime period (23:00-07:00). The highest noise level (70 dBA) occurs at the south façade, which is nearest and most exposed to Heron Road.

The noise levels predicted due to roadway traffic exceed the criteria listed in NPC-300 for building components, therefore, upgraded building components will be required for the 4-storey high building located at the southeast corner of the development site. Due to the limited information available at the time of the study, which was prepared for a ZBA application, detailed STC calculations could not be performed at this time. A detailed review of the window and wall assemblies should be performed by a qualified engineer with expertise in acoustics during the detailed design stage of the building.

Results of the calculations indicate that the southern mixed-use building in the development shown in burgundy in Figure 4 will require central air conditioning, or a similar system, due to roadway traffic noise. Furthermore, results also indicate that all other buildings in the development will require forced air heating with provision for air conditioning, or a similar system. These measures will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will be required on all Lease, Purchase and Sale Agreements properties in the development.

This concludes our roadway traffic noise feasibility 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.

Essraa Alqassab, BASc.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File 21-329 – Traffic Noise Feasibility

GRADIENTWIND
ENGINEERS & SCIENTISTS

127 WALGREEN ROAD , OTTAWA, ON
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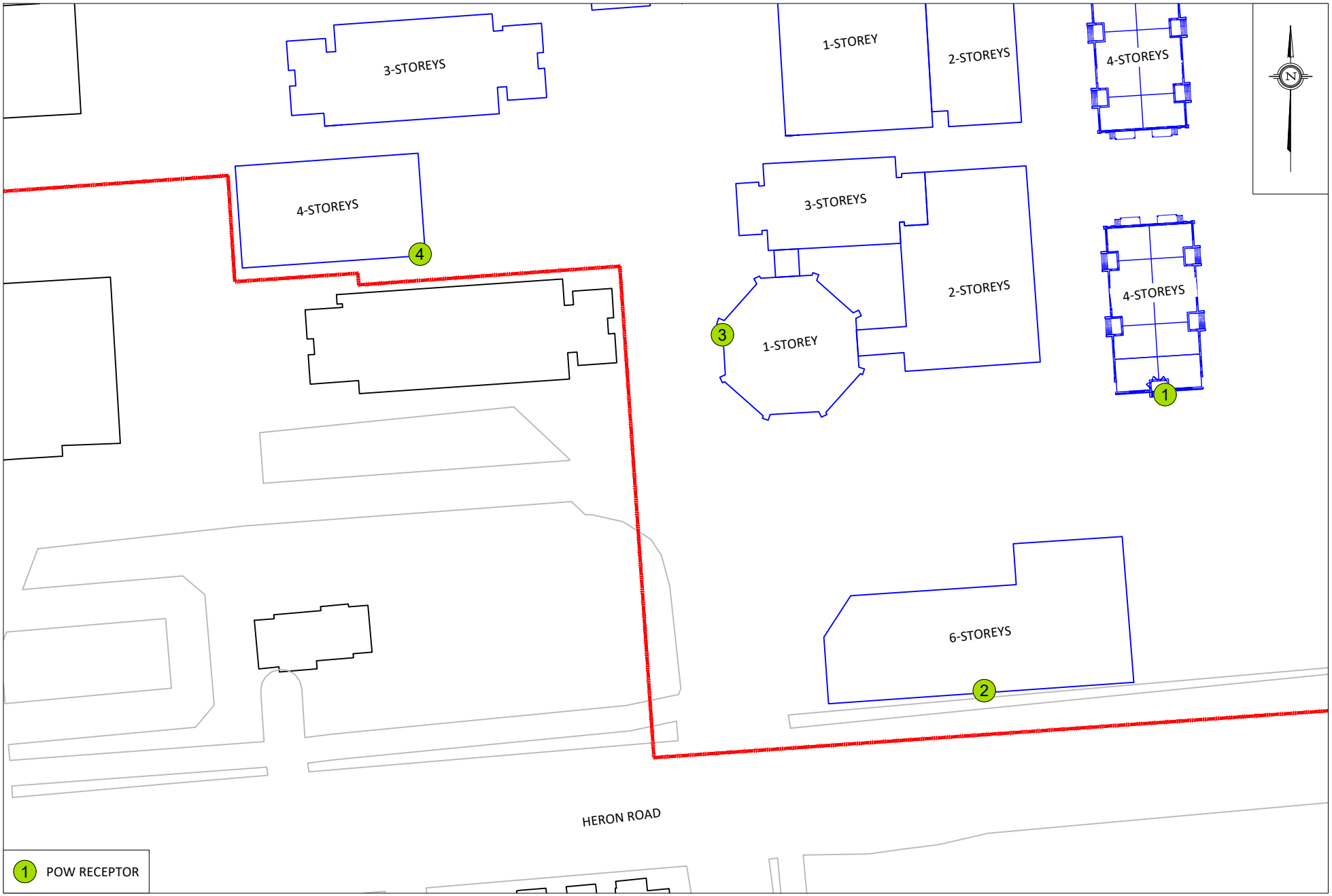
PROJECT	1495 HERON ROAD ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:3000 (APPROX.)
DRAWING NO.	GW21-329-1
DATE	JULY 7, 2022
DRAWN BY	E.A.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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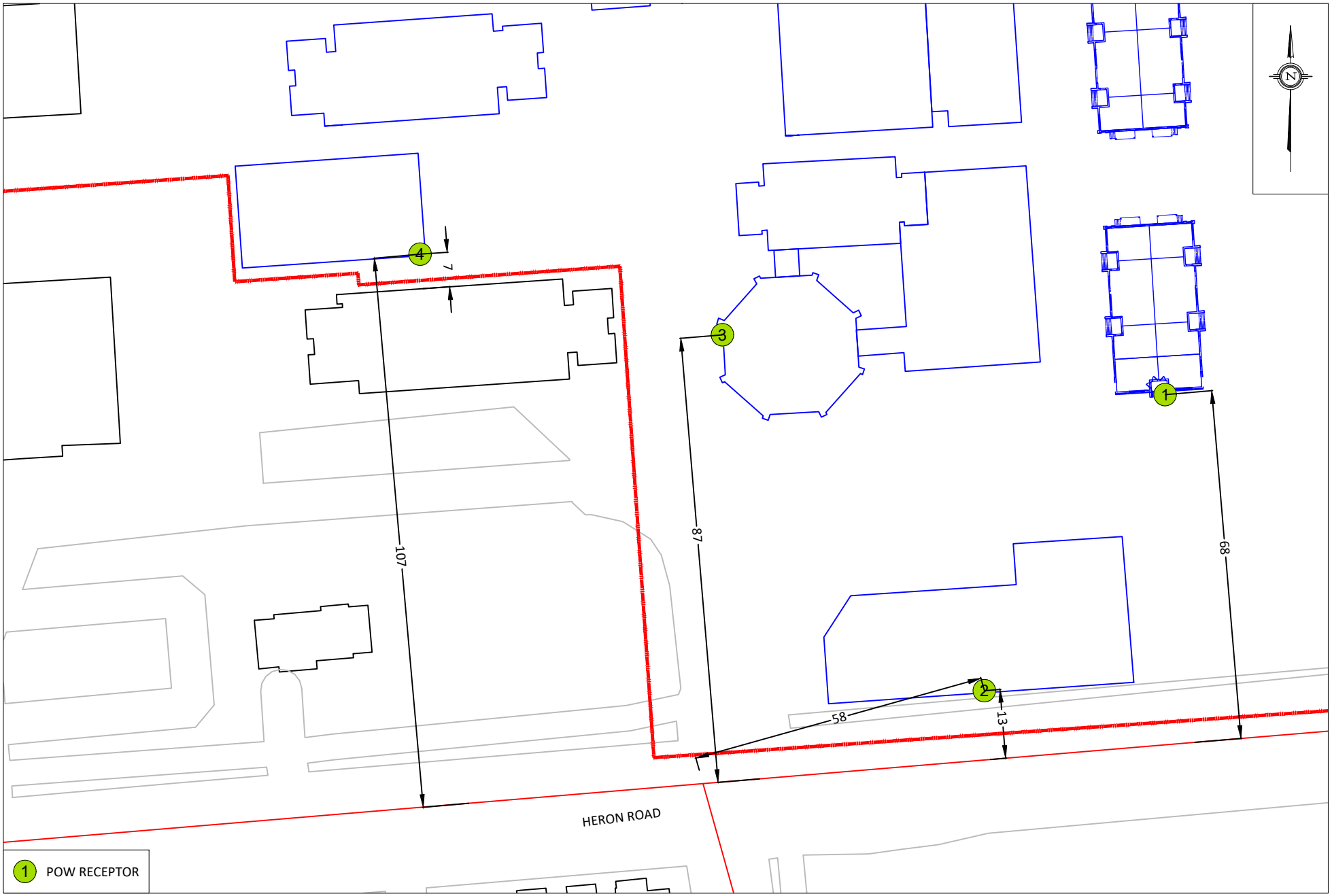
PROJECT	1495 HERON ROAD ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GW21-329-2
DATE	JULY 7, 2022
DRAWN BY	E.A.
DESCRIPTION	FIGURE 2: RECEPTOR LOCATIONS



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PROJECT	1495 HERON ROAD ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GW21-329-3
DATE	JULY 7, 2022
DRAWN BY	E.A.

DESCRIPTION

FIGURE 3:
STAMSON PARAMETERS

FIGURE 4: DAYTIME NOISE CONTOURS (1.5 M ABOVE GRADE)

FIGURE 5: NIGHTTIME NOISE CONTOURS (1.5 M ABOVE GRADE)

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

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

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: 06-07-2022 15:18:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r1.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Heron (day/night)
----------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    50 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):  35000
    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: Heron (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  :  68.00 / 68.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 59.81 + 0.00) = 59.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90    0.66  72.16   0.00 -10.90  -1.46   0.00   0.00   0.00
59.81
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 59.81 dBA

Total Leq All Segments: 59.81 dBA


Results segment # 1: Heron (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.21 + 0.00) = 52.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.66  64.56   0.00 -10.90  -1.46   0.00   0.00   0.00
52.21
-------------------------------------------------------------------------------
--

Segment Leq : 52.21 dBA

Total Leq All Segments: 52.21 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 59.81
                           (NIGHT): 52.21
```

```
STAMSON 5.0         NORMAL REPORT         Date: 06-07-2022 15:19:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Heron (day/night)
-----------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    50 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):  35000
    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: Heron (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  :  15.00 / 15.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Road data, segment # 2: Baycrest (day/night)
--------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    veh/TimePeriod  *
Posted speed limit  :    50 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):   8000
    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: Baycrest (day/night)
------------------------------------------
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  58.00 / 58.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 70.70 + 0.00) = 70.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.66  72.16   0.00   0.00  -1.46   0.00   0.00   0.00
70.70
-------------------------------------------------------------------------
--

Segment Leq : 70.70 dBA


Results segment # 2: Baycrest (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.53 + 0.00) = 51.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.66  65.75   0.00  -9.75  -4.47   0.00   0.00   0.00
51.53
-------------------------------------------------------------------------
--

Segment Leq : 51.53 dBA
```

```
Total Leq All Segments: 70.75 dBA


Results segment # 1: Heron (night)
----------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.11 + 0.00) = 63.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.66  64.56   0.00   0.00  -1.46   0.00   0.00   0.00
63.11
-------------------------------------------------------------------------
--

Segment Leq : 63.11 dBA


Results segment # 2: Baycrest (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 43.94 + 0.00) = 43.94 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      0   0.66  58.16   0.00  -9.75  -4.47   0.00   0.00   0.00
43.94
-------------------------------------------------------------------------
--

Segment Leq : 43.94 dBA

Total Leq All Segments: 63.16 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 70.75
                           (NIGHT): 63.16
```

```
STAMSON 5.0         NORMAL REPORT         Date: 07-07-2022 13:04:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Heron (day/night)
----------------------------------------
Car traffic volume  : 30800/2400  veh/TimePeriod
Medium truck volume :  2450/480   veh/TimePeriod
Heavy truck volume  :  1750/240   veh/TimePeriod
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

Data for Segment # 1: Heron (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  :  82.00 / 82.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


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

Source height = 1.50 m

ROAD (0.00 + 58.82 + 0.00) = 58.82 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90    0.66  72.52   0.00 -12.25  -1.46   0.00   0.00   0.00
58.82
-------------------------------------------------------------------------
--

Segment Leq : 58.82 dBA

Total Leq All Segments: 58.82 dBA


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

```
Source height = 1.67 m

ROAD (0.00 + 53.30 + 0.00) = 53.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.66  66.96   0.00 -12.21  -1.45   0.00   0.00   0.00
53.30
-------------------------------------------------------------------------
--

Segment Leq : 53.30 dBA

Total Leq All Segments: 53.30 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 58.82
                           (NIGHT): 53.30
```

```
STAMSON 5.0        NORMAL REPORT        Date: 07-07-2022 13:06:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Heron (day/night)
----------------------------------------
Car traffic volume  : 28336/2464  veh/TimePeriod  *
Medium truck volume :  2254/196   veh/TimePeriod  *
Heavy truck volume  :  1610/140   veh/TimePeriod  *
Posted speed limit  :    50 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):  35000
    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: Heron (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  : 107.00 / 107.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   7.00 m
Barrier receiver distance :   7.00 / 6.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Results segment # 1: Heron (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 !         1.50 !         1.50 !          1.50

ROAD (0.00 + 45.05 + 0.00) = 45.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.24  72.16   0.00 -10.58  -0.63   0.00   0.00 -15.90
45.05
-------------------------------------------------------------------------------
--

Segment Leq : 45.05 dBA

Total Leq All Segments: 45.05 dBA


Results segment # 1: Heron (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 !         1.50 !         1.50 !          1.50

ROAD (0.00 + 37.16 + 0.00) = 37.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.24  64.56   0.00 -10.58  -0.63   0.00   0.00 -16.19
37.16
-------------------------------------------------------------------------------
--

Segment Leq : 37.16 dBA

Total Leq All Segments: 37.16 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 45.05
                           (NIGHT): 37.16
```