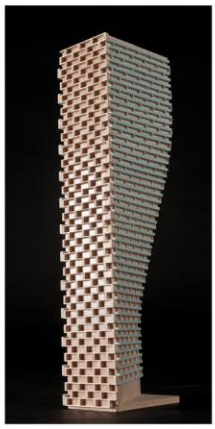
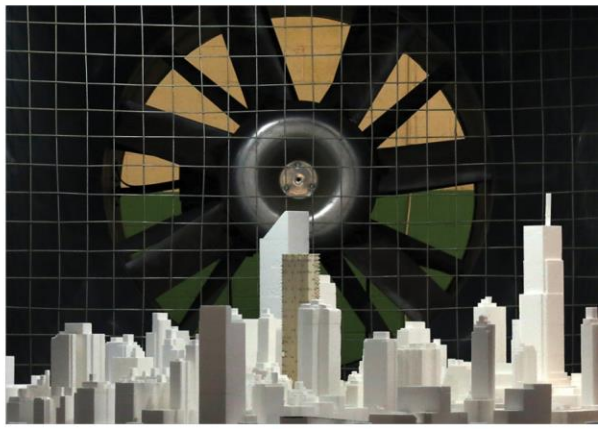
GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE ASSESSMENT

135 Lusk Street
Ottawa, Ontario

GRADIENT WIND REPORT: 21-301-Traffic Noise R1





August 16, 2022

PREPARED FOR

Stantec
400-1331 Clyde Avenue
Ottawa, ON K2C 3G4

PREPARED BY

Michael Lafortune, C.E.T., Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken for a proposed hotel development located 135 Lusk Street in Ottawa, Ontario, in support of a Zoning By-Law (ZBA) and Site Plan Control (SPA) application. The proposed development comprises a six-storey, commercial (hotel) building with a rectangular planform. The primary sources of roadway traffic noise impacting the development includes Fallowfield Road, Strandherd Drive and Highway 416. 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) 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) architectural drawings provided by Stantec.

Noise levels fall below the ENCG criteria for upgraded building components, therefore Ontario Building Code complaint building components will be adequate for the development. Results of the calculations also indicate that the development will require forced air heating with provision for central air conditioning. The development is expected to be equipped with PTAC air conditioning units, which will meet these ventilation requirements. A Type C Warning Clause will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Off-site stationary noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary, noise screens and silencers can be placed into the design. It is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess the impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits.

The surrounding buildings are primarily low-rise residential and medium-rise office buildings. Office buildings generally have small rooftop equipment that is not considered a significant noise source. An

observation of the satellite view of the area revealed no rooftop equipment that is close to the study building.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Stantec to undertake a roadway traffic noise assessment for a proposed hotel development located 135 Lusk Street in Ottawa, Ontario, in support of a Zoning By-Law (ZBA) and Site Plan Control (SPA) application. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic noise sources.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings provided by Stantec, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The subject site (Block 10) comprises an approximate triangular parcel of land within a larger block of land that is bounded by O'Keefe Court to the north, Fallowfield Road to the east, and Strandherd Drive to the south. The proposed development comprises a six-storey, commercial (hotel) building with a rectangular planform.

The primary sources of roadway traffic noise impacting the development includes Fallowfield Road, Strandherd Drive and Highway 416. The site is surrounded by low-rise residential properties to the north and east, light-industrial properties to the south, and open space/Highway 416 to the west. Figure 1 illustrates a complete 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 building 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 as outlined in Section 4.2 of this report.

[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

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. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 for sleeping quarters of hotels/motels as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 42 to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [3]

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[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 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. There are no outdoor living areas associated with the proposed development.

[3] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[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 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 streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be absorptive due to the presence of soft (landscaped) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- For select sources where appropriate, the surrounding buildings were considered as a barrier partially or fully obstructing exposure of the receptors to the source.
- Receptor distances and exposure angles are illustrated in Figures 3-4.
- Noise receptors were strategically placed at 4 locations around the study area (see Figure 2).

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 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.

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Fallowfield Road	4-Lane Urban Arterial Undivided (4-UAD)	60	**30,000**
Strandherd Drive	4-Lane Urban Arterial Divided (4-UAU)	80	**35,000**
Highway 416	4-Lane Freeway	100	**73,332**

5. ENVIRONMENTAL NOISE RESULTS

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 are available in Appendix A.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	16.5	POW – 6th Floor – East Façade	60	53
2	16.5	POW – 6th Floor – South Façade	65	57
3	16.5	POW – 6th Floor – West Façade	60	52
4	16.5	POW – 6th Floor – North Façade	59	52

The results of the current analysis indicate that noise levels will range between 59 and 65 dBA during the daytime period (07:00-23:00) and between 52 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the south façade, which is nearest and most exposed to Strandherd Drive.

6. CONCLUSIONS AND RECOMMENDATIONS

Noise levels fall below the ENCG criteria for upgraded building components, therefore Ontario Building Code complaint building components will be adequate for the development. Results of the calculations also indicate that the development will require forced air heating with provision for central air conditioning. The development is expected to be equipped with PTAC air conditioning units, which will meet these ventilation requirements. The following Type C Warning Clause[8] will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized below:

> *"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments 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, Conservation and Parks."*

Off-site stationary noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary, noise screens and silencers can be placed into the design. It is recommended a stationary noise study be conducted once mechanical plans for the proposed building become available. This study would assess the impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits.

The surrounding buildings are primarily low-rise residential and medium-rise office buildings. Office buildings generally have small rooftop equipment that is not considered a significant noise source. An observation of the satellite view of the area revealed no rooftop equipment that is close to the study building.

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

This concludes our roadway 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.

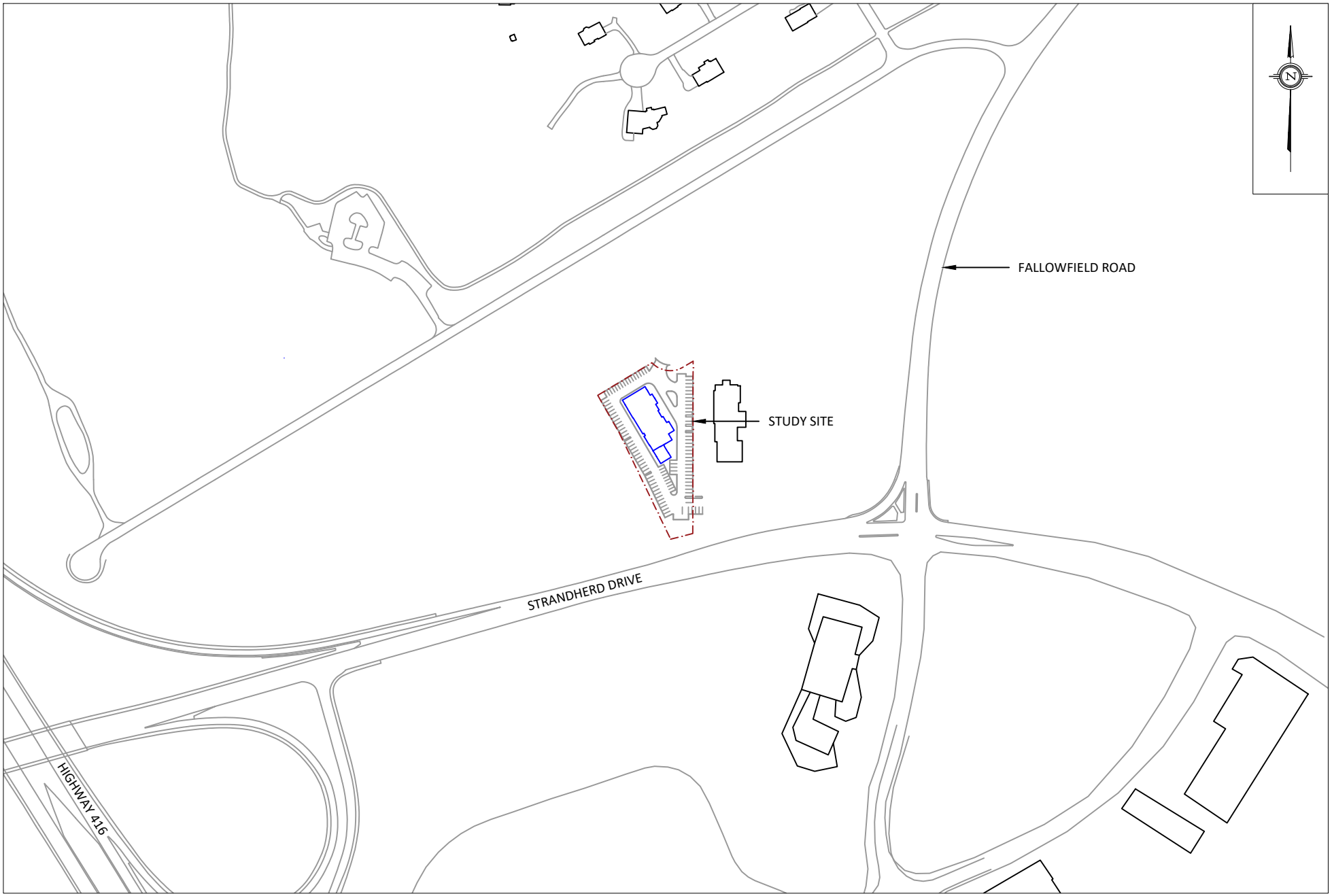
Sincerely,

Gradient Wind Engineering Inc.

Michael Lafortune, C.E.T.
Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind Report #21-301-Traffic Noise R1



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127 WALGREEN ROAD , OTTAWA, ON
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PROJECT	135 LUSK STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:4000 (APPROX.)
DRAWING NO.	GW21-301-1
DATE	SEPTEMBER 29, 2021
DRAWN BY	M.L.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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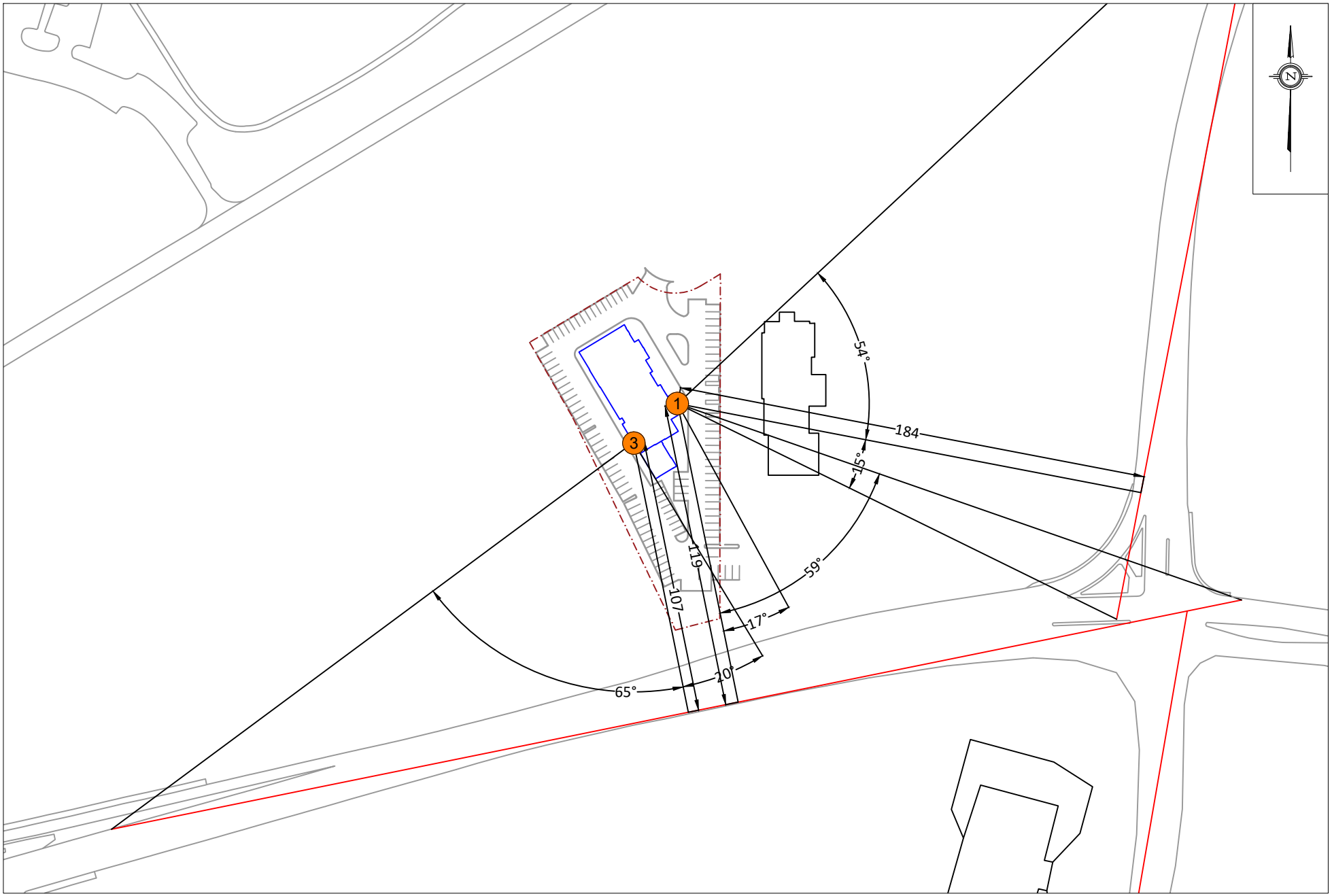
PROJECT	135 LUSK STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GW21-301-2
DATE	SEPTEMBER 29, 2021
DRAWN BY	M.L.
DESCRIPTION	FIGURE 2: RECEPTOR LOCATIONS



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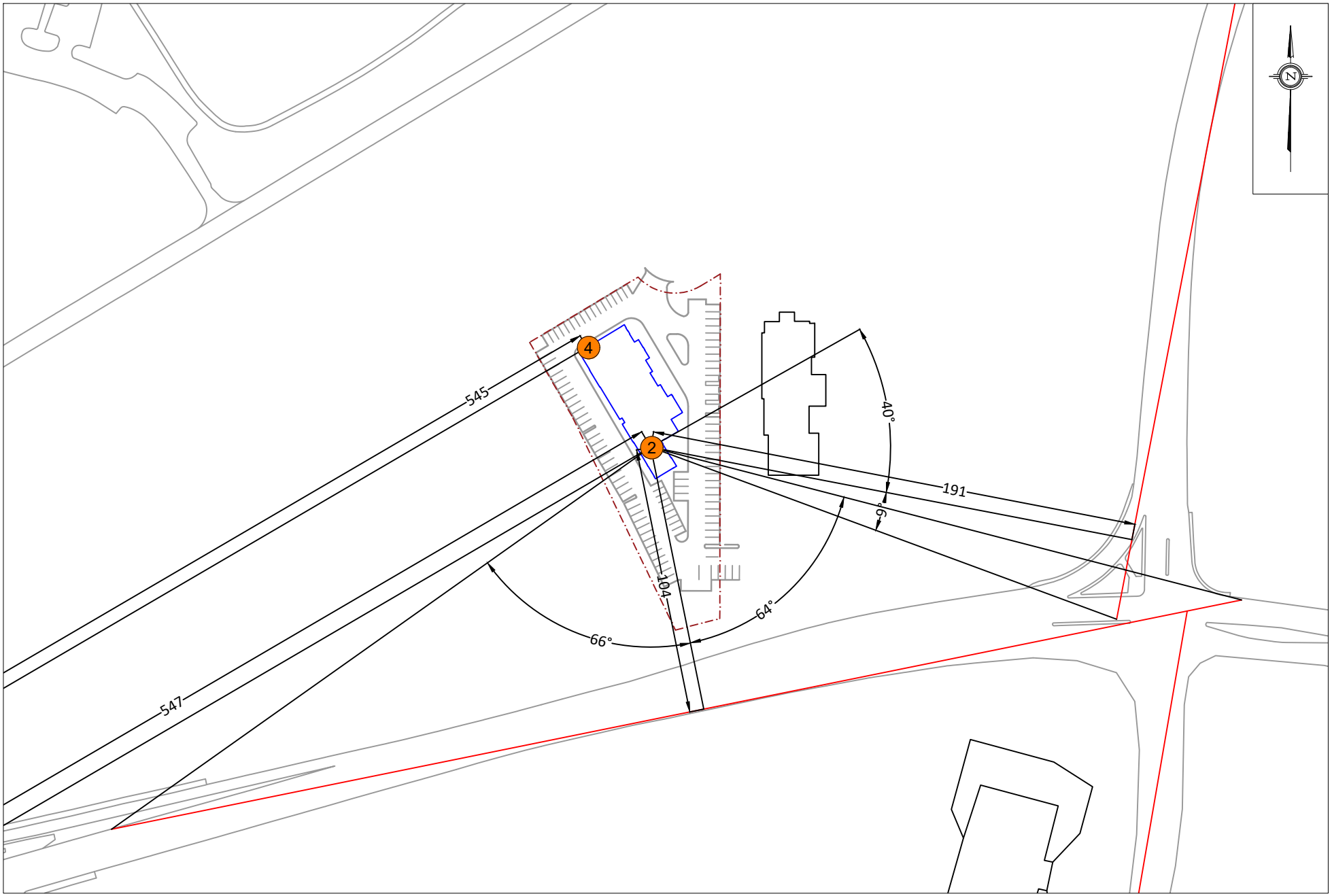
PROJECT	135 LUSK STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW21-301-3
DATE	SEPTEMBER 29, 2021
DRAWN BY	M.L.

DESCRIPTION

FIGURE 3:
STAMSON INPUT PARAMETERS - RECEPTOR 1,3



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PROJECT	135 LUSK STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW21-301-4
DATE	SEPTEMBER 29, 2021
DRAWN BY	M.L.

DESCRIPTION

FIGURE 4:
STAMSON INPUT PARAMETERS - RECEPTOR 2,4

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: 29-09-2021 14:44:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Fallowfield (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: Fallowfield (day/night)
---------------------------------------------
Angle1   Angle2           : -54.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 184.00 / 184.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Strandherd (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  :    80 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 # 2: Strandherd (day/night)
--------------------------------------------
Angle1   Angle2           : -59.00 deg   -17.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 119.00 / 119.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Fallowfield (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.55 + 0.00) = 55.55 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -54     15   0.21  73.01   0.00 -13.18  -4.28   0.00   0.00   0.00
55.55
-------------------------------------------------------------------------
--

Segment Leq : 55.55 dBA


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

Source height = 1.50 m

ROAD (0.00 + 58.71 + 0.00) = 58.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -59    -17   0.21  76.17   0.00 -10.88  -6.57   0.00   0.00   0.00
58.71
-------------------------------------------------------------------------
--

Segment Leq : 58.71 dBA

Total Leq All Segments: 60.42 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 47.95 + 0.00) = 47.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -54     15   0.21  65.41   0.00 -13.18  -4.28   0.00   0.00   0.00
47.95
-------------------------------------------------------------------------------
--

Segment Leq : 47.95 dBA


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

Source height = 1.50 m

ROAD (0.00 + 51.12 + 0.00) = 51.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -59    -17   0.21  68.57   0.00 -10.88  -6.57   0.00   0.00   0.00
51.12
-------------------------------------------------------------------------------
--

Segment Leq : 51.12 dBA

Total Leq All Segments: 52.83 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 60.42
                           (NIGHT): 52.83
```

```
STAMSON 5.0        NORMAL REPORT        Date: 29-09-2021 14:45:03
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Fallowfield (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: Fallowfield (day/night)
---------------------------------------------
Angle1   Angle2           : -40.00 deg   6.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 191.00 / 191.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Strandherd (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  :    80 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 # 2: Strandherd (day/night)
--------------------------------------------
Angle1   Angle2           : -64.00 deg   66.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 104.00 / 104.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Fallowfield (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.64 + 0.00) = 53.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -40      6   0.21  73.01   0.00 -13.37  -5.99   0.00   0.00   0.00
53.64
-------------------------------------------------------------------------------
--

Segment Leq : 53.64 dBA


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

Source height = 1.50 m

ROAD (0.00 + 64.35 + 0.00) = 64.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -64     66   0.21  76.17   0.00 -10.18  -1.64   0.00   0.00   0.00
64.35
-------------------------------------------------------------------------------
--

Segment Leq : 64.35 dBA

Total Leq All Segments: 64.70 dBA
```

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

Source height = 1.50 m

ROAD (0.00 + 46.05 + 0.00) = 46.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -40      6   0.21  65.41   0.00 -13.37  -5.99   0.00   0.00   0.00
46.05
-------------------------------------------------------------------------
--

Segment Leq : 46.05 dBA


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

Source height = 1.50 m

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
-------------------------------------------------------------------------
--
   -64     66   0.21  68.57   0.00 -10.18  -1.64   0.00   0.00   0.00
56.76
-------------------------------------------------------------------------
--

Segment Leq : 56.76 dBA

Total Leq All Segments: 57.11 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 64.70
                           (NIGHT): 57.11
```

```
STAMSON 5.0        NORMAL REPORT        Date: 29-09-2021 14:45:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Strandherd (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  :    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):  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: Strandherd (day/night)
--------------------------------------------
Angle1   Angle2           : -20.00 deg   65.00 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           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Strandherd (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.92 + 0.00) = 59.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -20     65   0.21  73.68   0.00 -10.33  -3.43   0.00   0.00   0.00
59.92
-------------------------------------------------------------------------
--

Segment Leq : 59.92 dBA

Total Leq All Segments: 59.92 dBA


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

Source height = 1.50 m

ROAD (0.00 + 52.32 + 0.00) = 52.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -20     65   0.21  66.08   0.00 -10.33  -3.43   0.00   0.00   0.00
52.32
-------------------------------------------------------------------------
--

Segment Leq : 52.32 dBA

Total Leq All Segments: 52.32 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 59.92
                           (NIGHT): 52.32
```

```
STAMSON 5.0        NORMAL REPORT        Date: 29-09-2021 14:45:13
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 416 (day/night)
---------------------------------------
Car traffic volume  : 59370/5163  veh/TimePeriod  *
Medium truck volume :  4723/411   veh/TimePeriod  *
Heavy truck volume  :  3373/293   veh/TimePeriod  *
Posted speed limit  :   100 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):  73332
    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: 416 (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  : 500.00 / 500.00 m
Receiver height           :  16.50 / 16.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: 416 (day)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.39 + 0.00) = 59.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.21  81.40   0.00 -18.43  -3.57   0.00   0.00   0.00
59.39
-------------------------------------------------------------------------
--

Segment Leq : 59.39 dBA

Total Leq All Segments: 59.39 dBA


Results segment # 1: 416 (night)
--------------------------------

Source height = 1.49 m

ROAD (0.00 + 51.80 + 0.00) = 51.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.21  73.80   0.00 -18.43  -3.57   0.00   0.00   0.00
51.80
-------------------------------------------------------------------------
--

Segment Leq : 51.80 dBA

Total Leq All Segments: 51.80 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 59.39
                           (NIGHT): 51.80
```