

**TRAFFIC NOISE
ASSESSMENT**

100 Gloucester Street
Ottawa, Ontario

Report: 22-295 – Traffic Noise



October 7, 2022

PREPARED FOR

Claridge Homes

210 Gladstone Avenue
Ottawa, ON K2P 0Y6

PREPARED BY

Essraa Alqassab, B.A.Sc., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a traffic noise assessment undertaken in support of concurrent Zoning By-law Amendment (ZBA) and Site Plan Control (SPC) application for the proposed mixed-use residential development, located at 100 Gloucester in Ottawa, Ontario. The major sources of roadway traffic noise impacting the development include Metcalfe Street and O’Conner Street. Figure 1 illustrates the site location 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), Ministry of Transportation of Ontario (MTO), 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 EVOQ Architecture in September 2022.

Results of the current analysis indicated that noise levels will range between 39 and 53 dBA during the daytime period (07:00-23:00) and between 32 and 41 dBA during the nighttime period (23:00-07:00). The highest noise level (53 dBA) occurs at the west façade, which is nearest and most exposed to O’Conner Street. Since noise levels are less than 55 dBA at all the building façades and OLAs, noise control measures are not required.

Stationary noise sources associated with the development could include rooftop air handling units, cooling towers or dry coolers, and emergency generators. Noise from these sources can be controlled to acceptable limits by judicious selection of the equipment, locating the equipment on a high roof away from nearby residential receptors, and where necessary, installing silencers or noise screens. The stationary noise impacts of the building on the surroundings should be considered at a future stage once the mechanical design has progressed and equipment has been selected

A review of arial imagery indicates that there are no existing significant sources of stationary noise in the area. The surrounding areas is a mix of medium to high rise office and residential buildings, typical of a downtown urban area.



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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Claridge Homes to undertake a traffic noise assessment to satisfy simultaneous Zoning By-law Amendment and Site Plan Control application requirements for the proposed mixed-use residential development located at 100 Gloucester Street in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300¹, Ministry of Transportation Ontario (MTO)², and City of Ottawa Environmental Noise Control Guidelines (ENCG)³ guidelines. Noise calculations were based on architectural drawings, provided by EVOQ Architecture in September 2022, 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 100 Gloucester Street in Ottawa; situated on the north side of a city block bordered by Gloucester Street to the northwest, Metcalfe Street to the northeast, Nepean Street to the southeast, and O'Connor Street to the southwest. Throughout this report, Gloucester Street is referred to as project north. The main sources of traffic noise included in this report is Metcalfe Street and O'Conner Street.

The proposed development comprises a near rectangular 27-storey building, topped with a mechanical penthouse (MPH). Above two below-grade parking levels, the ground floor of the proposed development is divided into two masses by a north-south laneway. The eastern massing includes a residential main entrance to the west, a residential main entrance and lobby at the northwest corner, residential units from the northeast corner clockwise to the south, indoor amenity at the southwest corner, and central elevator core and staircase. A drop off area is situated to the north and walkways are situated along the east and south elevations of the eastern massing. The western massing includes commercial space to the

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

² Ministry of Transportation Ontario, “*Environmental Guide for Noise*”, February 2022

³ City of Ottawa, Environmental Noise Control Guidelines, January 2016



north, a main entrance to the east, a staircase at the southeast corner, waste room to the south, and a vault area at the southwest corner. An outdoor amenity, including a pool, is situated to the south of the western massing. Levels 2-27 are reserved for residential use. A floorplate setback is situated at the northwest corner at Level 6, and private terraces are situated to the east at Level 7 and to the west at Level 8. The MPH level includes indoor mechanical space to the west. Outdoor mechanical space is situated at the southeast corner. This level is also served by an amenity terrace from the north clockwise to the southeast corner.

The near-field surroundings, defined as an area within 200-metres (m) of the subject site, include a mix of mid- and high-rise buildings in all compass directions, with isolated low-rise buildings to the southeast, southwest, west-southwest, and to the northeast. Notably, two 27-storey mixed-use residential buildings are under construction at 70 Gloucester Street and 89-91 Nepean Street, to the immediate east and southeast, respectively, of the subject site. In addition, a 30-storey mixed-use residential building is proposed (awaiting Site Plan Control approval) at 180 Metcalfe Street, approximately 100 m to the southeast, a 9-storey residential building is proposed (awaiting Site Plan Control approval) at 230-233 Lisgar Street, approximately 160 m to the southeast, a 27-storey mixed-use residential building is proposed (awaiting Zoning By-law Amendment approval) at 257 Lisgar Street and 108 Nepean Street, approximately 80 m to the south, and an eight-storey apartment building is proposed (awaiting Zoning By-law Amendment and Site Plan Control approval) at 331 Cooper Street, approximately 200 m to the south of the subject site.

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 as outlined in Section 4.2 of this report.

4. METHODOLOGY

4.1 Background

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

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) specify that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail stores, living rooms and sleeping quarters respectively for roadway as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)⁴

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction⁵. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment⁶. 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 attenuation⁷.

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved.

⁴ Adapted from ENCG 2016 – Tables 2.2b and 2.2c

⁵ Burberry, P.B. (2014). Mitchell’s Environment and Services. Routledge, Page 125

⁶ MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

⁷ 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 reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 12 locations around the study area (see Figure 2).
- For select sources where appropriate, receptors considered the existing buildings as a barrier partially or fully obstructing exposure to the source as illustrated by exposure angles in Figures 3 and 4.
- Receptor distances and exposure angles are illustrated in Figures 3 and 4.

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 Plan⁸ 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 summarizes the AADT values used for each roadway included in this assessment.

⁸ City of Ottawa Transportation Master Plan, November 2013

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Classification	Speed Limit (km/h)	Traffic Volumes
O’Conner Street	2-Lane Urban Arterial (2-UAU)	50	15,000
Metcalfe Street	2-Lane Urban Arterial (2-UAU)	50	15,000

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
R1	20.7	POW – Level 7 West Façade	45	37
R2	20.7	POW – Level 7 North Façade	41	34
R3	20.7	POW – Level 7 South Façade	41	34
R4	80.5	POW – Level 27 West Façade	53	49
R5	80.5	POW – Level 27 North Façade	45	39
R6	80.5	POW – Level 27 South Façade	48	41
R7	80.5	POW – Level 27 East Façade	46	39
R8	14.8	POW – Level 5 North Façade	39	32
R9	14.8	POW – Level 5 East Façade	43	35
R10	17.7	OLA – Level 6 East Terrace	43	N/A*
R11	83.8	OLA – Rooftop Common Amenity Terrace	46	N/A*
R12	23.6	OLA – Level 8 East Terrace	45	N/A*

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

The results of the current analysis indicated that noise levels will range between 39 and 53 dBA during the daytime period (07:00-23:00) and between 32 and 41 dBA during the nighttime period (23:00-07:00). The highest noise level (53 dBA) occurs at the west façade, which is nearest and most exposed to O’Conner Street. Since expected noise levels are less than the City’s objective limit of 55 dBA, no noise control



measures, such as upgraded building components, ventilation requirements, acoustic barriers, or warning clauses are required for this development.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicated that noise levels will range between 39 and 53 dBA during the daytime period (07:00-23:00) and between 32 and 41 dBA during the nighttime period (23:00-07:00). The highest noise level (53 dBA) occurs at the west façade, which is nearest and most exposed to O’Conner Street. Since noise levels are less than 55 dBA at all the building façades and OLAs, noise control measures are not required.

Stationary noise sources associated with the development could include rooftop air handling units, cooling towers or dry coolers, and emergency generators. Noise from these sources can be controlled to acceptable limits by judicious selection of the equipment, locating the equipment on a high roof away from nearby residential receptors, and where necessary, installing silencers or noise screens. The stationary noise impacts of the building on the surroundings should be considered at a future stage once the mechanical design has progressed and equipment has been selected

A review of arial imagery indicates that there are no existing significant sources of stationary noise in the area. The surrounding areas is a mix of medium to high rise office and residential buildings, typical of a downtown urban area.



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.



Essraa Alqassab, B.A.Sc.
Junior Environmental Scientist

Gradient Wind File #22-295

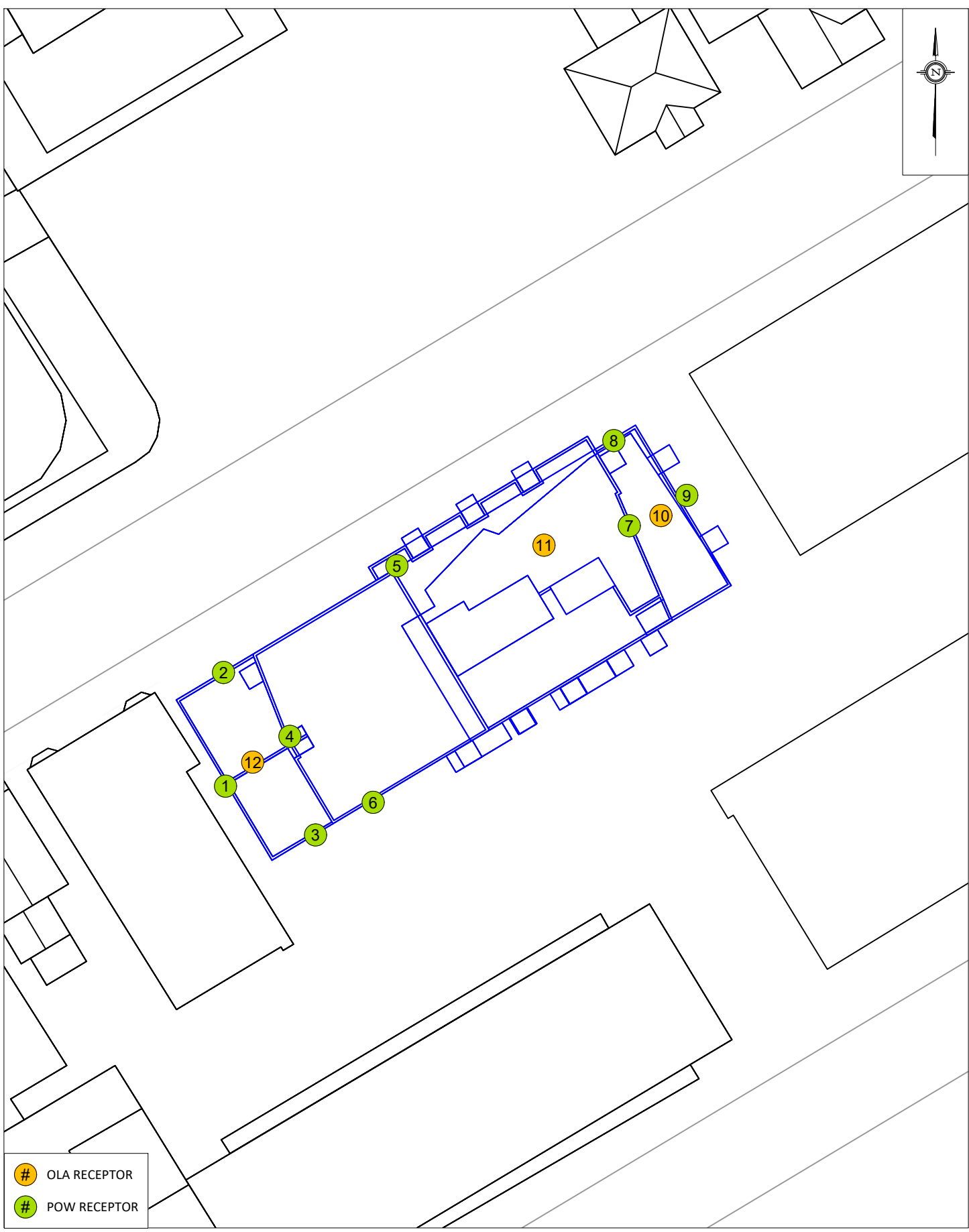
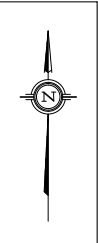


Joshua Foster, P.Eng.
Lead Engineer



PROJECT	100 GLOUCESTER STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:2000 (APPROX.)	DRAWING NO. GW22-295-1
DATE	SEPTEMBER 30, 2022	DRAWN BY E.A.

DESCRIPTION	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT
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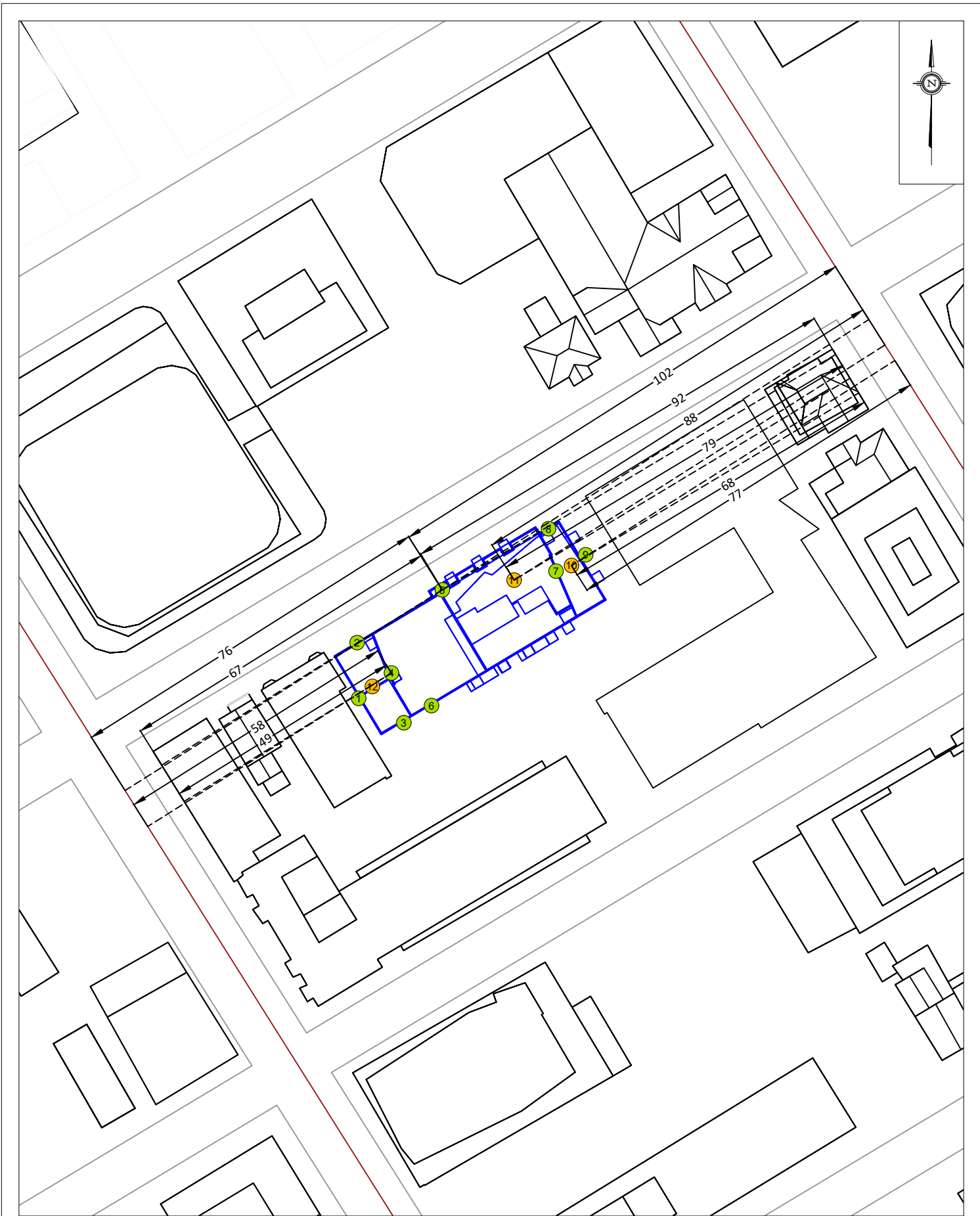


- OLA RECEPTOR
- POW RECEPTOR

PROJECT	100 GLOUCESTER STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:200 (APPROX.)	DRAWING NO. GW22-295-2
DATE	SEPTEMBER 30, 2022	DRAWN BY E.A.



PROJECT	100 GLOUCESTER STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:1000 (APPROX.)	DRAWING NO. GW22-295-3
DATE	SEPTEMBER 30, 2022	DRAWN BY E.A.

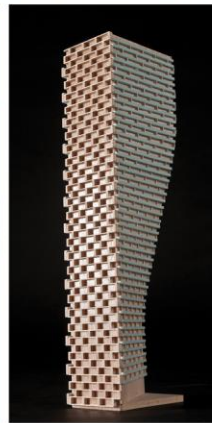


PROJECT	100 GLOUCESTER STREET, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	
SCALE	1:1000 (APPROX.)	DRAWING NO. GW22-295-4
DATE	SEPTEMBER 30, 2022	DRAWN BY E.A.

DESCRIPTION	FIGURE 4: STAMSON PARAMETERS (2)
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APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:53:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: O'Conner (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: O'Conner (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 20.70 / 20.70 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 19.00 m
Barrier receiver distance : 41.00 / 41.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

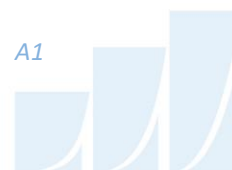
Results segment # 1: O'Conner (day)

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 ! 20.70 ! 4.95 ! 4.95



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ROAD (0.00 + 44.84 + 0.00) = 44.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-5.23	0.00	0.00	0.00	-18.41	44.84

Segment Leq : 44.84 dBA

Total Leq All Segments: 44.84 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	20.70	4.95	4.95

ROAD (0.00 + 37.24 + 0.00) = 37.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-5.23	0.00	0.00	0.00	-18.41	37.24

Segment Leq : 37.24 dBA

Total Leq All Segments: 37.24 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 44.84
(NIGHT): 37.24



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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:53:34
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: O'Conner (day/night)

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: O'Conner (day/night)

```
-----
Angle1  Angle2      : 0.00 deg  90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 2 (Reflective ground surface)
Receiver source distance : 55.00 / 55.00 m
Receiver height  : 20.70 / 20.70 m
Topography      : 2 (Flat/gentle slope; with barrier)
Barrier angle1   : 0.00 deg  Angle2 : 90.00 deg
Barrier height   : 19.00 m
Barrier receiver distance : 46.00 / 46.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Results segment # 1: O'Conner (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 !          20.70 !          4.64 !          4.64
```



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ROAD (0.00 + 41.36 + 0.00) = 41.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	68.48	0.00	-5.64	-3.01	0.00	0.00	-18.47	41.36

Segment Leq : 41.36 dBA

Total Leq All Segments: 41.36 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	20.70	4.64	4.64

ROAD (0.00 + 33.76 + 0.00) = 33.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	60.88	0.00	-5.64	-3.01	0.00	0.00	-18.47	33.76

Segment Leq : 33.76 dBA

Total Leq All Segments: 33.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 41.36
(NIGHT): 33.76



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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:54:08
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: O'Conner (day/night)

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: O'Conner (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   0.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 55.00 / 55.00 m
Receiver height  : 20.70 / 20.70 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1   : -90.00 deg   Angle2 : 0.00 deg
Barrier height   : 19.00 m
Barrier receiver distance : 46.00 / 46.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Results segment # 1: O'Conner (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 !      20.70 !      4.64 !      4.64
```



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ROAD (0.00 + 41.36 + 0.00) = 41.36 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	68.48	0.00	-5.64	-3.01	0.00	0.00	-18.47	41.36

Segment Leq : 41.36 dBA

Total Leq All Segments: 41.36 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	20.70	4.64	4.64

ROAD (0.00 + 33.76 + 0.00) = 33.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	60.88	0.00	-5.64	-3.01	0.00	0.00	-18.47	33.76

Segment Leq : 33.76 dBA

Total Leq All Segments: 33.76 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 41.36
(NIGHT): 33.76



GRADIENTWIND

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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:54:32
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: O'Conner (day/night)

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: O'Conner (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 58.00 / 49.00 m
Receiver height  : 80.50 / 80.50 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1   : -90.00 deg   Angle2 : 90.00 deg
Barrier height   : 19.00 m
Barrier receiver distance : 49.00 / 40.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Results segment # 1: O'Conner (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 !      80.50 !     13.75 !      13.75
```



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 52.62 + 0.00) = 52.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-5.87	0.00	0.00	0.00	-9.99	52.62

Segment Leq : 52.62 dBA

Total Leq All Segments: 52.62 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	80.50	16.01	16.01

ROAD (0.00 + 48.69 + 0.00) = 48.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-5.14	0.00	0.00	0.00	-7.06	48.69

Segment Leq : 48.69 dBA

Total Leq All Segments: 48.69 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.62
(NIGHT): 48.69



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:55:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: O'Conner (day/night)

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: O'Conner (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 76.00 / 76.00 m
Receiver height : 80.50 / 80.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 90.00 deg
Barrier height : 19.00 m
Barrier receiver distance : 67.00 / 67.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 1600/800 veh/TimePeriod
Medium truck volume : 320/160 veh/TimePeriod
Heavy truck volume : 160/80 veh/TimePeriod
Posted speed limit : 50 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

Data for Segment # 2: Metcalfe (day/night)



GRADIENTWIND

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```

Angle1  Angle2      : -90.00 deg   0.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 102.00 / 102.00 m
Receiver height : 80.50 / 80.50 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1  : -90.00 deg   Angle2 : 0.00 deg
Barrier height  : 20.00 m
Barrier receiver distance : 92.00 / 92.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00
  
```

Results segment # 1: O'Conner (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
1.50	!	80.50	!
		10.85	!
			10.85

ROAD (0.00 + 44.86 + 0.00) = 44.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	68.48	0.00	-7.05	-3.01	0.00	0.00	-13.57	44.86

Segment Leq : 44.86 dBA

Results segment # 2: Metcalfe (day)

Source height = 1.67 m

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
1.67	!	80.50	!
		9.39	!
			9.39

ROAD (0.00 + 34.92 + 0.00) = 34.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	62.18	0.00	-8.33	-3.01	0.00	0.00	-15.93	34.92



GRADIENTWIND

ENGINEERS & SCIENTISTS

Segment Leq : 34.92 dBA

Total Leq All Segments: 45.28 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	80.50	10.85	10.85

ROAD (0.00 + 37.26 + 0.00) = 37.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	60.88	0.00	-7.05	-3.01	0.00	0.00	-13.57	37.26

Segment Leq : 37.26 dBA

Results segment # 2: Metcalfe (night)

Source height = 1.67 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.67	80.50	9.39	9.39

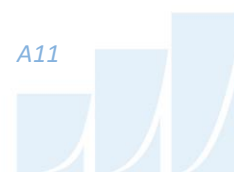
ROAD (0.00 + 34.92 + 0.00) = 34.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	62.18	0.00	-8.33	-3.01	0.00	0.00	-15.93	34.92

Segment Leq : 34.92 dBA

Total Leq All Segments: 39.26 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 45.28
(NIGHT) : 39.26



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 14:56:26
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te Time Period: Day/Night 16/8 hours
 Description:

Road data, segment # 1: O'Conner (day/night)

```
-----
Car traffic volume   : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    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): 15000
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: O'Conner (day/night)

```
-----
Angle1  Angle2      : -90.00 deg  0.00 deg
Wood depth          :      0      (No woods.)
No of house rows    :      0 / 0
Surface             :      2      (Reflective ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height     : 80.50 / 80.50 m
Topography          :      2      (Flat/gentle slope; with barrier)
Barrier angle1     : -90.00 deg  Angle2 : 0.00 deg
Barrier height      : 19.00 m
Barrier receiver distance : 53.00 / 53.00 m
Source elevation    : 0.00 m
Receiver elevation  : 0.00 m
Barrier elevation   : 0.00 m
Reference angle     : 0.00
```

Results segment # 1: O'Conner (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)
-----+-----+-----+-----
```



GRADIENTWIND

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1.50 ! 80.50 ! 12.96 ! 12.96

ROAD (0.00 + 48.29 + 0.00) = 48.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	68.48	0.00	-6.16	-3.01	0.00	0.00	-11.01	48.29

Segment Leq : 48.29 dBA

Total Leq All Segments: 48.29 dBA

Results segment # 1: O'Conner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
1.50 !	80.50 !	12.96 !	12.96

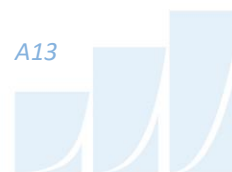
ROAD (0.00 + 40.70 + 0.00) = 40.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	60.88	0.00	-6.16	-3.01	0.00	0.00	-11.01	40.70

Segment Leq : 40.70 dBA

Total Leq All Segments: 40.70 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 48.29
(NIGHT): 40.70



GRADIENTWIND

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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:12:07
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te Time Period: Day/Night 16/8 hours
 Description:

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

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: Metcalfe (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 80.00 / 80.00 m
Receiver height  : 80.50 / 80.50 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1  : -90.00 deg   Angle2 : 90.00 deg
Barrier height   : 20.00 m
Barrier receiver distance : 71.00 / 71.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Results segment # 1: Metcalfe (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 !          80.50 !          10.38 !          10.38
```



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 46.41 + 0.00) = 46.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-7.27	0.00	0.00	0.00	-14.80	46.41

Segment Leq : 46.41 dBA

Total Leq All Segments: 46.41 dBA

Results segment # 1: Metcalfe (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	80.50	10.38	10.38

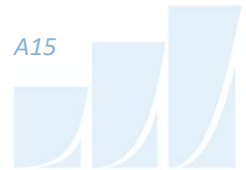
ROAD (0.00 + 38.81 + 0.00) = 38.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-7.27	0.00	0.00	0.00	-14.80	38.81

Segment Leq : 38.81 dBA

Total Leq All Segments: 38.81 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 46.41
(NIGHT): 38.81



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:12:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Metcalfe (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 77.00 / 77.00 m
Receiver height : 14.80 / 14.80 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 68.00 / 68.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Metcalfe (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 ! 14.80 ! 3.05 ! 3.05



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 39.49 + 0.00) = 39.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	68.48	0.00	-7.10	-3.01	0.00	0.00	-18.87	39.49

Segment Leq : 39.49 dBA

Total Leq All Segments: 39.49 dBA

Results segment # 1: Metcalfe (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	14.80	3.05	3.05

ROAD (0.00 + 31.90 + 0.00) = 31.90 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	60.88	0.00	-7.10	-3.01	0.00	0.00	-18.87	31.90

Segment Leq : 31.90 dBA

Total Leq All Segments: 31.90 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 39.49

(NIGHT): 31.90



GRADIENTWIND

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STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:14:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Metcakfe (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 74.00 / 74.00 m
Receiver height : 14.80 / 14.80 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 64.00 / 64.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Metcakfe (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 ! 14.80 ! 3.29 ! 3.29



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 42.73 + 0.00) = 42.73 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-6.93	0.00	0.00	0.00	-18.81	42.73

Segment Leq : 42.73 dBA

Total Leq All Segments: 42.73 dBA

Results segment # 1: Metcakfe (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	14.80	3.29	3.29

ROAD (0.00 + 35.14 + 0.00) = 35.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-6.93	0.00	0.00	0.00	-18.81	35.14

Segment Leq : 35.14 dBA

Total Leq All Segments: 35.14 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 42.73

(NIGHT): 35.14



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:19:08
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: Metcalfe (day/night)

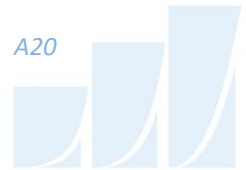
```
-----
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth           :      0      (No woods.)
No of house rows    :      0 / 0
Surface             :      2      (Reflective ground surface)
Receiver source distance : 77.00 / 77.00 m
Receiver height     : 17.70 / 17.70 m
Topography          :      2      (Flat/gentle slope; with barrier)
Barrier angle1      : -90.00 deg   Angle2 : 90.00 deg
Barrier height      : 20.00 m
Barrier receiver distance : 68.00 / 68.00 m
Source elevation    : 0.00 m
Receiver elevation  : 0.00 m
Barrier elevation    : 0.00 m
Reference angle     : 0.00
```

Results segment # 1: Metcalfe (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 !      17.70 !      3.39 !      3.39
```



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 42.57 + 0.00) = 42.57 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-7.10	0.00	0.00	0.00	-18.80	42.57

Segment Leq : 42.57 dBA

Total Leq All Segments: 42.57 dBA

Results segment # 1: Metcalfe (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	17.70	3.39	3.39

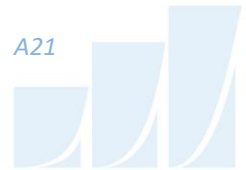
ROAD (0.00 + 34.98 + 0.00) = 34.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-7.10	0.00	0.00	0.00	-18.80	34.98

Segment Leq : 34.98 dBA

Total Leq All Segments: 34.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 42.57
(NIGHT): 34.98



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:19:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 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): 15000
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: Metcalfe (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 88.00 / 88.00 m
Receiver height : 83.80 / 83.80 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 79.00 / 79.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

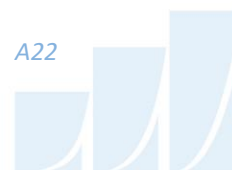
Results segment # 1: Metcalfe (day)

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 ! 83.80 ! 9.91 ! 9.91



GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 45.50 + 0.00) = 45.50 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-7.68	0.00	0.00	0.00	-15.29	45.50

Segment Leq : 45.50 dBA

Total Leq All Segments: 45.50 dBA

Results segment # 1: Metcalfe (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	83.80	9.91	9.91

ROAD (0.00 + 37.91 + 0.00) = 37.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-7.68	0.00	0.00	0.00	-15.29	37.91

Segment Leq : 37.91 dBA

Total Leq All Segments: 37.91 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 45.50
(NIGHT): 37.91



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 29-09-2022 15:19:40
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12.te Time Period: Day/Night 16/8 hours
 Description:

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

```
-----
Car traffic volume   : 12144/1056   veh/TimePeriod   *
Medium truck volume :    966/84    veh/TimePeriod   *
Heavy truck volume  :    690/60    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): 15000
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: OConner (day/night)

```
-----
Angle1  Angle2      : -90.00 deg   90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      2      (Reflective ground surface)
Receiver source distance : 53.00 / 53.00 m
Receiver height  : 23.60 / 23.60 m
Topography      :      2      (Flat/gentle slope; with barrier)
Barrier angle1   : -90.00 deg   Angle2 : 90.00 deg
Barrier height   : 20.00 m
Barrier receiver distance : 44.00 / 44.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle  : 0.00
```

Results segment # 1: OConner (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 !      23.60 !      5.25 !      5.25
```



GRADIENTWIND

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ROAD (0.00 + 44.56 + 0.00) = 44.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	68.48	0.00	-5.48	0.00	0.00	0.00	-18.44	44.56

Segment Leq : 44.56 dBA

Total Leq All Segments: 44.56 dBA

Results segment # 1: OConner (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	23.60	5.25	5.25

ROAD (0.00 + 36.96 + 0.00) = 36.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	60.88	0.00	-5.48	0.00	0.00	0.00	-18.44	36.96

Segment Leq : 36.96 dBA

Total Leq All Segments: 36.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 44.56

(NIGHT): 36.96

