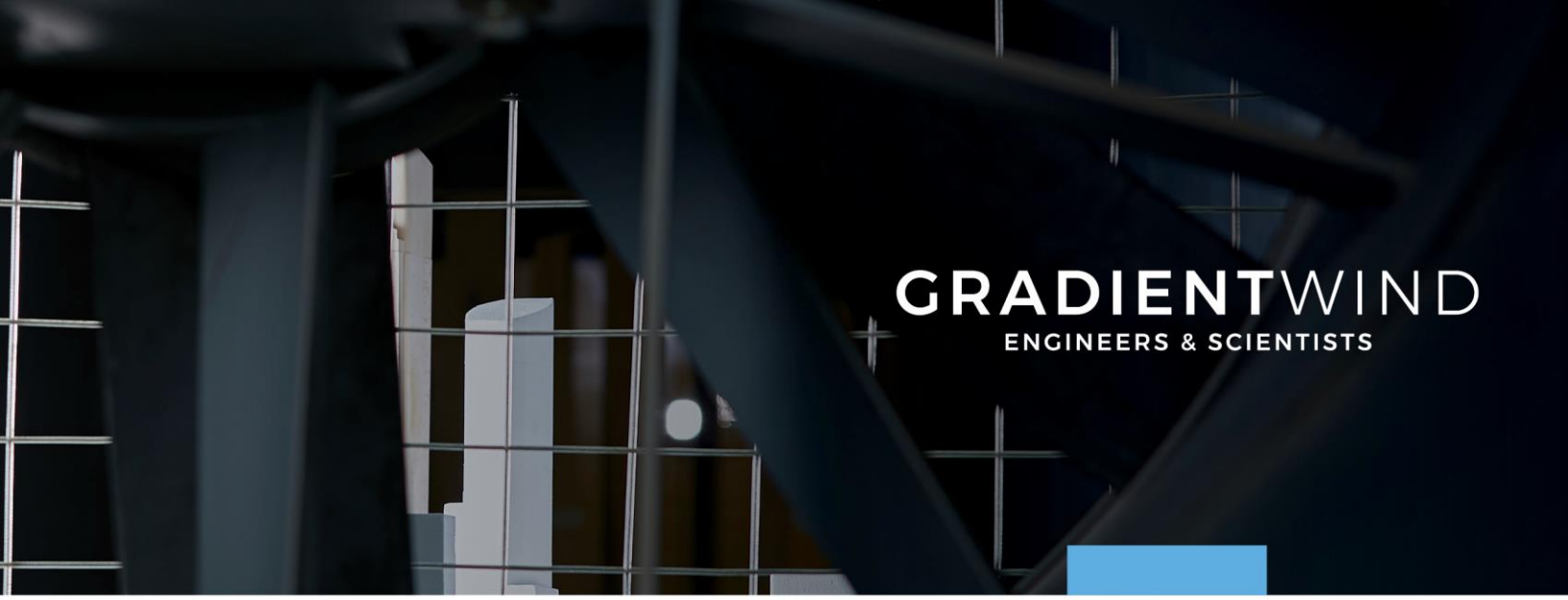

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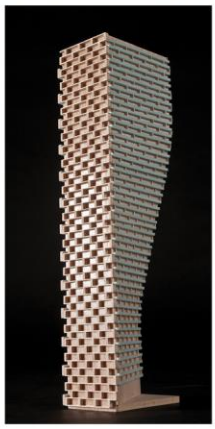
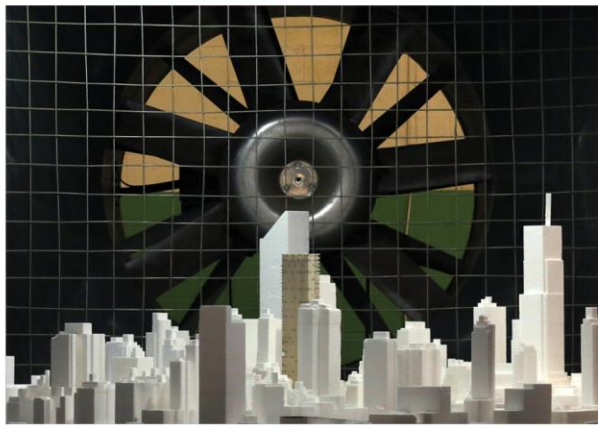
ROADWAY TRAFFIC NOISE ASSESSMENT

1740-1760 St. Laurent Boulevard
Ottawa, Ontario

Report: 20-142-Traffic Noise





July 31, 2020

PREPARED FOR

Heafey Group
768, boulevard St-Joseph, Suite 100
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PREPARED BY

Samantha Phillips, B.Eng., Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken to satisfy the requirements for a joint zoning by-law amendment (ZBA) and site plan control application (SPA) submission for a proposed mixed-use, multi-building development located at 1740-1760 St. Laurent Boulevard in Ottawa, Ontario. The development comprises four (4) buildings; Tower 1 (15 storeys), Tower 2 (15 storeys), Tower 3 (12 storeys) and Tower 4 (12 storeys). The major source of traffic noise is St. Laurent Boulevard. Figure 1 illustrates a complete site plan with 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 prepared by Pierre Martin & Associés | Architectes and LaPalme Rheault Architectes + Associés dated July 1, 2020.

The results of the current analysis indicate that noise levels will range between 57 and 74 dBA during the daytime period (07:00-23:00) and between 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the east façade of Tower 2, which is nearest and most exposed to St. Laurent Boulevard. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

Results of the calculations also indicate that Towers 1 and 2 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment, while Towers 3 and 4 will require forced air heating with provision for central air conditioning. In addition to ventilation requirements, Warning Clauses will also be required in all Lease, Purchase and Sale Agreements.

The daytime noise levels at the grade-level garden to the east of Tower 4 are expected to approach 57 dBA. Although the noise levels exceed the criterion of 55 dBA, the adjacent towers of the study site provide blockage to reduce the exposure to St. Laurent Boulevard. Given the noise levels are below 60

dBA, mitigation measures are not required, and therefore the noise levels are acceptable. Warning Clauses will be required in all Lease, Purchase and Sale Agreements.

With regard to stationary noise impacts of the development's mechanical equipment onto surrounding noise sensitive properties, a stationary noise study will be performed for the site once the mechanical plans become available. The study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of equipment. The best noise strategy would be to locate noisier pieces of equipment at the centre of the roof or in a mechanical penthouse. Where necessary, noise screens and silencers can be incorporated into the design.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Heafy Group to undertake a roadway traffic noise assessment to satisfy the requirements for a joint zoning by-law amendment (ZBA) and site plan control application (SPA) submission for a proposed mixed-use, multi-building development located at 1740-1760 St. Laurent Boulevard 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.

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 prepared by Pierre Martin & Associés | Architectes and LaPalme Rheault Architectes + Associés dated July 1, 2020, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise assessment is a proposed mixed-use, multi-building development located on a trapezoidal parcel of land at 1740-1760 St. Laurent Boulevard in Ottawa, Ontario. The study site is bounded by St. Laurent Boulevard to the east, an existing low-rise building to the south, future, proposed mid-rise buildings to the west, and an existing mid-rise building to the north. Everest Private, aligned in the east-west direction, bisects the development site providing access to the study site as well as future and existing adjacent developments to the west from St. Laurent Boulevard.

The proposed development comprises four (4) buildings; Tower 1 (15 storeys), Tower 2 (15 storeys), Tower 3 (12 storeys) and Tower 4 (12 storeys), situated at the northeast, southeast, northwest and southwest of the site, respectively. At grade, the site features a garden to the east of Tower 4 and surface vehicular parking spaces to the west of Towers 1 and 2 and to the north of Tower 3.

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

Tower 1 comprises commercial space at grade, common areas at Level 2 and residential units at all levels above. A drive-through is feature at the west site of the building accessed from Everest Private. At Level 2, the floorplate extends at the south and west sides to cover the commercial terrace and drive through below. The floorplate also sets back at the southeast corner of Level 3 and the north side of Level 4 and continues to rise with a uniform, nearly rectangular planform until Level 15 at which it sets backs at the west side. Tower 2 comprises commercial space at grade and a mixture of common areas and residential suites at Level 2. All levels above are reserved for residential occupancy. The floorplate sets back at the southeast corner of Level 3 and the north side and partial east side of Level 4. Levels 5-14 rise with a uniform, nearly L-shaped planform with its long axis oriented north-south along St. Laurent Boulevard and the short access oriented east-west along Everest Private. At Level 15, the floorplate sets back at the west side of the short axis and the south side of the long axis.

Tower 3 comprises common space at the ground floor followed by residential suites at all levels above grade. The floorplate sets back at the north side of Level 2 to provide a green roof covering the grade-level parking spaces below and creating a nearly rectangular floorplan. The floorplate sets back at the west side of Level 7 and the east side of Level 12. Tower 4 comprises common areas and residential units at grade with all levels above reserved for residential occupancy. The building has a nearly L-shaped shaped floorplan with a diagonal south wall oriented parallel to the property line. The floorplate sets back at the north side and southeast corner of Level 12.

As the balconies serving the residential suites of each tower extend less than 4 metres from the façade, they do not require consideration as outdoor living areas (OLA) in this study. The grade-level garden at the east side of Tower 4 was considered as an OLA.

The site is surrounded by low-rise commercial building to the east and south along St. Laurent Boulevard, low and mid-rise residential buildings to the west and southwest, a low-rise fire station to the northwest and a mid-rise office building to the north.

The major source of traffic noise is St. Laurent Boulevard. As Innes Road and Industrial Avenue are situated beyond 100 metres from the study buildings, they are not expected to be a significant source of noise and have therefore been excluded from this assessment. Figure 1 illustrates a complete site plan with surrounding context.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines 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) specifies that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail, living rooms and sleeping quarters respectively for roadway 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) [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 at the POW of a residential living area, 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 at the POW of a residential living area, 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 60 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

[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 reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study buildings.
- The mid-rise building at 1730 St. Laurent Boulevard to the north was considered as a noise barrier with a height of 31-metres.
- For select sources where appropriate, the receptors considered the proposed buildings as barriers, partially or fully obstructing exposure to the source as illustrated by exposure angles in Figures 4-8.
- Noise receptors were strategically placed at 14 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures 4-8.

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
St. Laurent Boulevard	4-Lane Urban Arterial Divided (4-UAD)	70	**35,000**

4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

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

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[9], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited

[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985
[9] CMHC, Road & Rail Noise: Effects on Housing

information available at the time of the study, which was prepared for a joint zoning by-law amendment and site plan control application submission, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels).

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations 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
Tower 1				
1	9.35	POW – 3rd Floor (Podium) – North Façade	69	62
2	45.05	POW – 15th Floor – North Façade	67	60
3	45.05	POW – 15th Floor – East Façade	73	65
4	45.05	POW – 15th Floor – South Façade	69	61
Tower 2				
5	6.38	POW – 2nd Floor – East Façade	73	66
6	42.08	POW – 14th Floor – North Façade	69	62
7	42.08	POW – 14th Floor – East Façade	74	65
8	42.08	POW – 14th Floor – South Façade	68	61
Tower 4				
9	33.15	POW – 11th Floor – Southeast Corner	64	56
10	33.15	POW – 11th Floor – South Façade	63	55
11	33.15	POW – 11th Floor – Northeast Corner	58	51
Tower 3				
12	33.15	POW – 11th Floor – East Façade	62	54
13	33.15	POW – 11th Floor – North Façade	60	52
Outdoor Living Areas				
14	1.5	OLA – Grade-Level Garden	57	N/A

The results of the current analysis indicate that noise levels will range between 57 and 74 dBA during the daytime period (07:00-23:00) and between 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the east façade of Tower 2, which is nearest and most exposed to St. Laurent Boulevard. The daytime noise levels at the grade-level garden to the east of Tower 4 are expected to approach 57 dBA. Although the noise levels exceed the criterion of 55 dBA, the adjacent towers of the study site provide blockage to reduce the exposure to St. Laurent Boulevard. Given the noise levels are below 60 dBA, mitigation measures are not required, and therefore the noise levels are

acceptable. Warning Clauses will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

- **Bedroom Windows**

(i) Bedroom windows facing east of Towers 1 and 2 will require a minimum STC of 37.

(ii) Bedroom windows facing north and south of Towers 1 and 2 will require a minimum STC of 32.

(iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements.

- **Living Room Windows**

(i) Living room windows facing east of Towers 1 and 2 will require a minimum STC of 32.

(ii) Living room windows facing north and south of Towers 1 and 2 will require a minimum STC of 27.

(iii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements.

- **Exterior Walls**

(i) Exterior wall components on the north, east, and south façades of Towers 1 and 2 will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data[10].

The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where a window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be

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

achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that Towers 1 and 2 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment, while Towers 3 and 4 will require forced air heating with provision for central air conditioning. In addition to ventilation requirements, Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 57 and 74 dBA during the daytime period (07:00-23:00) and between 51 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the east façade of Tower 2, which is nearest and most exposed to St. Laurent Boulevard. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

Results of the calculations also indicate that Towers 1 and 2 will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Towers 3 and 4 will require forced air heating with provision for central air conditioning. The following Warning Clause[11] will also be required on all Lease, Purchase and Sale Agreements for Towers 1 and 2, as summarized below:

> *"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic*

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

may, on occasion, interfere with some activities of the dwelling occupants, as the sound levels exceed the sound level limits of the City and the Ministry of Environment, Conservation and Parks. To help address the need for sound attenuation, this development includes:

- *STC rated multi-pane glazing elements and spandrel panels*
  - *East façade bedroom/living room: STC 37/32*
  - *North and south façade bedroom/living room: STC 32/27*
- *STC rated exterior walls*
  - *North, east, and south façade: STC 45*

This dwelling unit has also been designed with air conditioning. Air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of Environment, Conservation and Parks.

To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features."

The following Warning Clause[12] will also be required on all Lease, Purchase and Sale Agreements for Towers 3 and 4, as summarized below:

"Purchasers/tenants are advised that sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants, as the sound levels exceed the sound level limits of the City and the Ministry of Environment, Conservation and Parks.

This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of Environment, Conservation and Parks."

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

The daytime noise levels at the grade-level garden to the east of Tower 4 are expected to approach 57 dBA. Although the noise levels exceed the criterion of 55 dBA, the adjacent towers of the study site provide blockage to reduce the exposure to St. Laurent Boulevard. Given the noise levels are below 60 dBA, mitigation measures are not required, and therefore the noise levels are acceptable.

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.

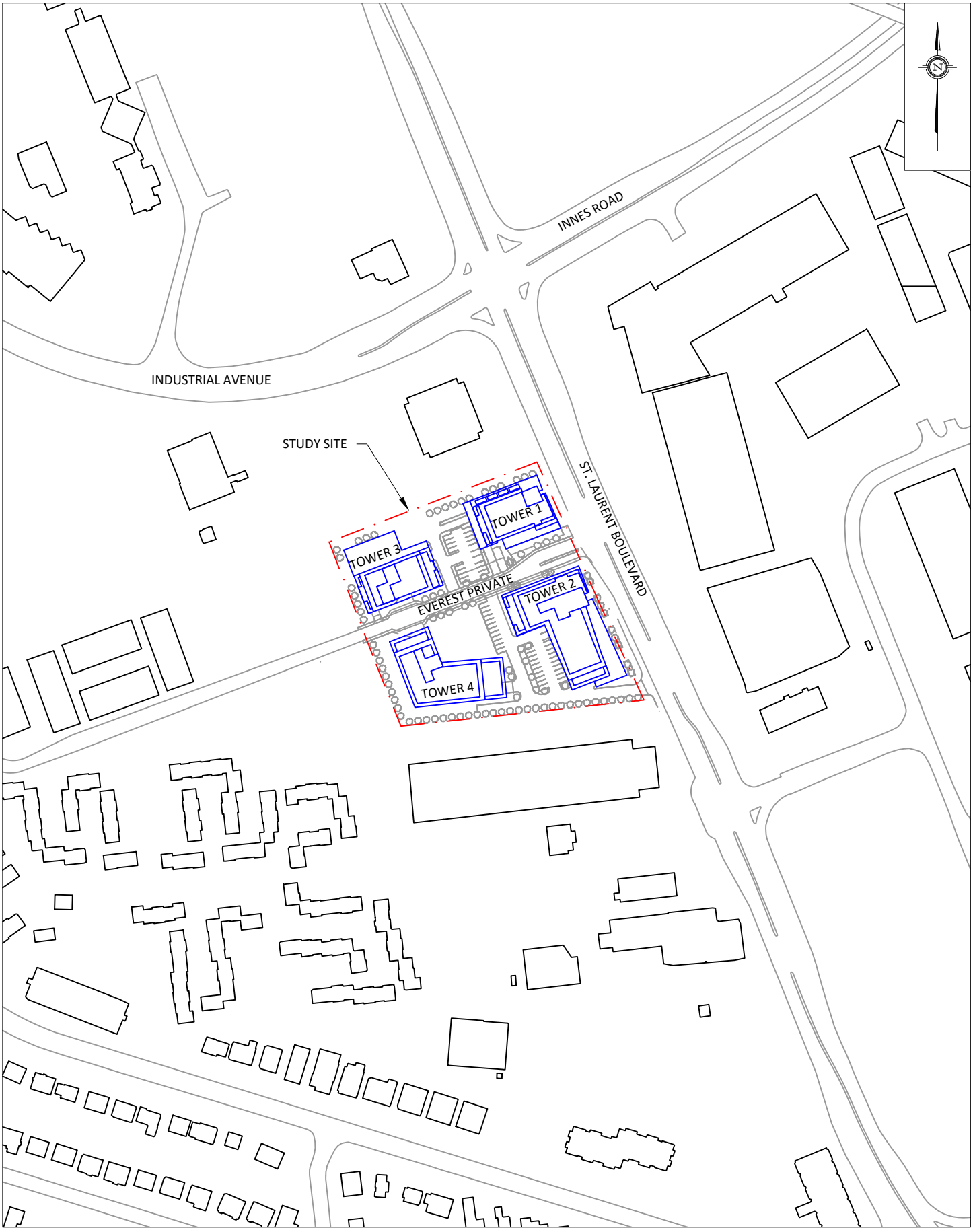
Sincerely,

Gradient Wind Engineering Inc.

Samantha Phillips, B.Eng.
Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File 20-142



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PROJECT	1740-1760 ST. LAURENT BOULEVARD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		
SCALE	1:3000 (APPROX.)	DRAWING NO.	GW20-142-1
DATE	JULY 31, 2020	DRAWN BY	S.P.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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FIGURE 2:
RECEPTOR LOCATIONS

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FIGURE 3:
WINDOW STC REQUIREMENTS

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FIGURE 4:
STAMSON INPUT PARAMETERS - RECEPTORS 1-5 & 7

GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD , OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT	1740-1760 ST. LAURENT BOULEVARD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT	DESCRIPTION FIGURE 5: STAMSON INPUT PARAMETERS - RECEPTORS 6, 8-9 & 13
	SCALE	1:1000 (APPROX.)	DRAWING NO. GW20-142-5
	DATE	JULY 31, 2020	DRAWN BY S.P.

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SCALE	1:1000 (APPROX.)	DRAWING NO. GW20-142-6	FIGURE 6: STAMSON INPUT PARAMETERS - RECEPTORS 10 & 11
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SCALE	1:1000 (APPROX.)	DRAWING NO.	GW20-142-7
DATE	JULY 31, 2020	DRAWN BY	S.P.

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FIGURE 7:
STAMSON INPUT PARAMETERS - RECEPTORS 12

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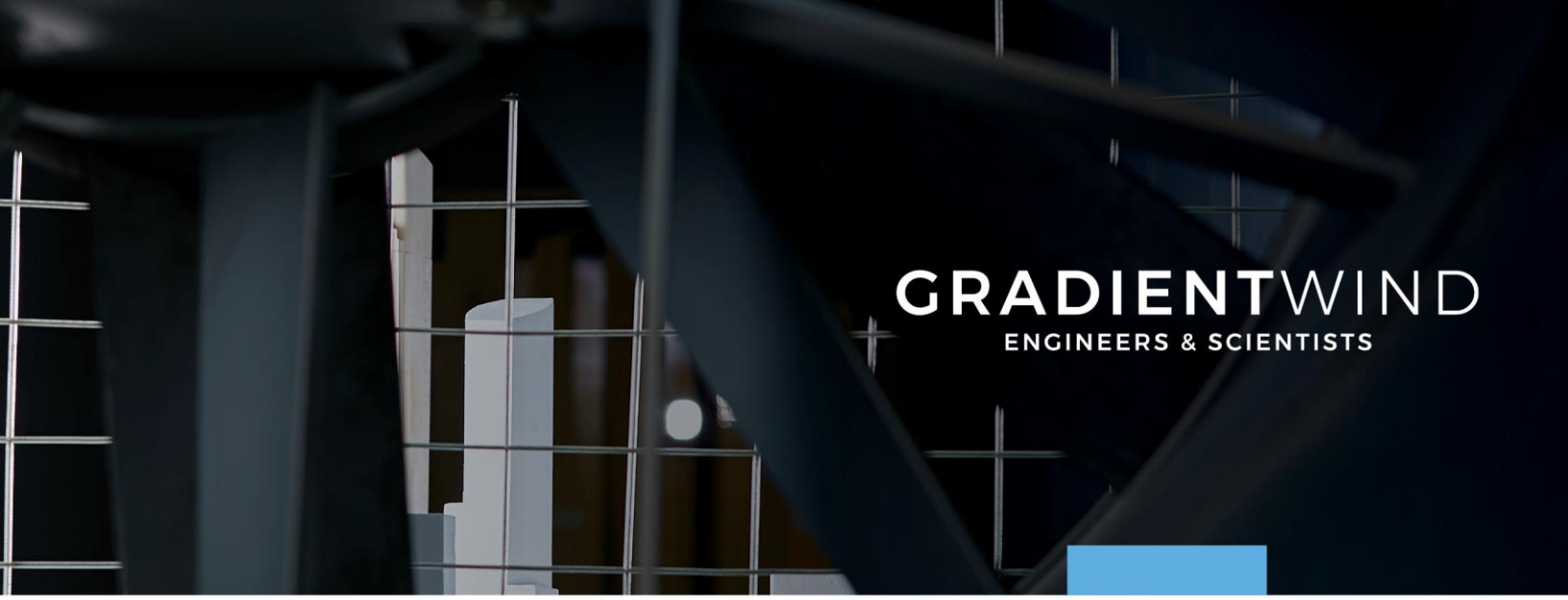
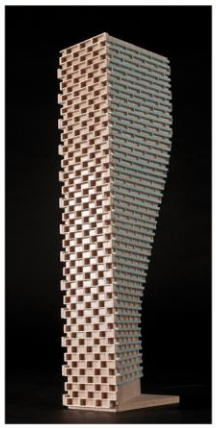
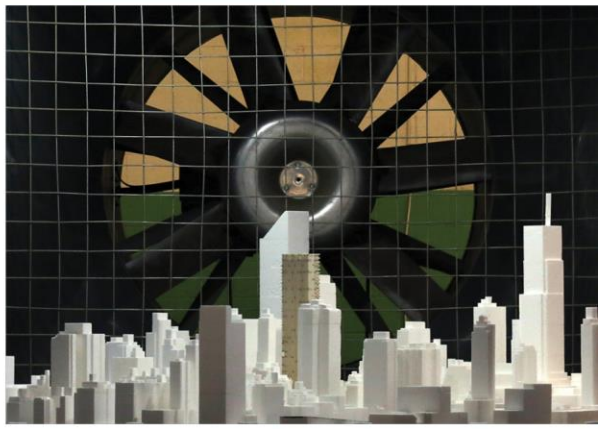
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW20-142-8
DATE	JULY 20, 2020	DRAWN BY	S.P.

FIGURE 8:
STAMSON INPUT PARAMETERS - RECEPTORS 14







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: 20-07-2020 10:27:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   2.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  28.00 / 28.00  m
Receiver height           :   9.35 / 9.35   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 69.37 + 0.00) = 69.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      2   0.00  75.00   0.00  -2.71  -2.91   0.00   0.00   0.00
69.37
-------------------------------------------------------------------------
--

Segment Leq : 69.37 dBA

Total Leq All Segments: 69.37 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.77 + 0.00) = 61.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      2   0.00  67.40   0.00  -2.71  -2.91   0.00   0.00   0.00
61.77
-------------------------------------------------------------------------
--

Segment Leq : 61.77 dBA

Total Leq All Segments: 61.77 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 69.37
                           (NIGHT): 61.77
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:30:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   2.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  41.00 / 41.00  m
Receiver height           :  45.05 / 45.05  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.71 + 0.00) = 67.71 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      2   0.00  75.00   0.00  -4.37  -2.91   0.00   0.00   0.00
67.71
-------------------------------------------------------------------------
--

Segment Leq : 67.71 dBA

Total Leq All Segments: 67.71 dBA


Results segment # 1: St Laurent (night)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.12 + 0.00) = 60.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90      2   0.00  67.40   0.00  -4.37  -2.91   0.00   0.00   0.00
60.12
-------------------------------------------------------------------------
--

Segment Leq : 60.12 dBA

Total Leq All Segments: 60.12 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 67.71
                           (NIGHT): 60.12
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:35:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   89.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  25.00 / 25.00  m
Receiver height           :  45.05 / 45.05  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 72.75 + 0.00) = 72.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     89   0.00  75.00   0.00  -2.22  -0.02   0.00   0.00   0.00
72.75
-------------------------------------------------------------------------
--

Segment Leq : 72.75 dBA

Total Leq All Segments: 72.75 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.16 + 0.00) = 65.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     89   0.00  67.40   0.00  -2.22  -0.02   0.00   0.00   0.00
65.16
-------------------------------------------------------------------------
--

Segment Leq : 65.16 dBA

Total Leq All Segments: 65.16 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 72.75
                           (NIGHT): 65.16
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:39:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           :   2.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  29.00 / 29.00  m
Receiver height           :  45.05 / 45.05  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  83.00 deg   Angle2 : 90.00 deg
Barrier height            :  46.53 m
Barrier receiver distance :   4.00 / 4.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (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 !       45.05 !       39.04 !        39.04

ROAD (68.66 + 48.08 + 0.00) = 68.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     2     83   0.00  75.00   0.00  -2.86  -3.47   0.00   0.00   0.00
68.66
-------------------------------------------------------------------------------
--
    83     90   0.00  75.00   0.00  -2.86 -14.10   0.00   0.00  -9.95
48.08
-------------------------------------------------------------------------------
--

Segment Leq : 68.70 dBA

Total Leq All Segments: 68.70 dBA
```

```
Results segment # 1: St Laurent (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 !       45.05 !       39.04 !        39.04

ROAD (61.07 + 40.48 + 0.00) = 61.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     2     83    0.00  67.40   0.00  -2.86  -3.47   0.00   0.00   0.00
61.07
-------------------------------------------------------------------------------
--
    83     90    0.00  67.40   0.00  -2.86 -14.10   0.00   0.00  -9.95
40.48
-------------------------------------------------------------------------------
--

Segment Leq : 61.11 dBA

Total Leq All Segments: 61.11 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 68.70
                           (NIGHT): 61.11
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:41:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   88.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  22.00 / 22.00  m
Receiver height           :   6.38 / 6.38   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 73.28 + 0.00) = 73.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     88    0.00  75.00   0.00  -1.66  -0.05   0.00   0.00   0.00
73.28
-------------------------------------------------------------------------
--

Segment Leq : 73.28 dBA

Total Leq All Segments: 73.28 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.69 + 0.00) = 65.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     88    0.00  67.40   0.00  -1.66  -0.05   0.00   0.00   0.00
65.69
-------------------------------------------------------------------------
--

Segment Leq : 65.69 dBA

Total Leq All Segments: 65.69 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 73.28
                           (NIGHT): 65.69
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:50:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   3.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  28.00 / 28.00  m
Receiver height           :  42.08 / 42.08  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -86.00 deg
Barrier height            :  46.53 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (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 !       42.08 !       37.73 !        37.73

ROAD (0.00 + 45.19 + 69.23) = 69.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -86   0.00  75.00   0.00  -2.71 -16.53   0.00   0.00 -10.56
45.19
-------------------------------------------------------------------------------
--
   -86      3   0.00  75.00   0.00  -2.71  -3.06   0.00   0.00   0.00
69.23
-------------------------------------------------------------------------------
--

Segment Leq : 69.24 dBA

Total Leq All Segments: 69.24 dBA
```

```
Results segment # 1: St Laurent (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 !       42.08 !       37.73 !        37.73

ROAD (0.00 + 37.60 + 61.63) = 61.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -86   0.00  67.40   0.00  -2.71 -16.53   0.00   0.00 -10.56
37.60
-------------------------------------------------------------------------------
--
   -86      3   0.00  67.40   0.00  -2.71  -3.06   0.00   0.00   0.00
61.63
-------------------------------------------------------------------------------
--

Segment Leq : 61.65 dBA

Total Leq All Segments: 61.65 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 69.24
                           (NIGHT): 61.65
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:52:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   89.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  24.00 / 24.00  m
Receiver height           :  42.08 / 42.08  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 72.93 + 0.00) = 72.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     89   0.00  75.00   0.00  -2.04  -0.02   0.00   0.00   0.00
72.93
-------------------------------------------------------------------------
--

Segment Leq : 72.93 dBA

Total Leq All Segments: 72.93 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 65.33 + 0.00) = 65.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     89   0.00  67.40   0.00  -2.04  -0.02   0.00   0.00   0.00
65.33
-------------------------------------------------------------------------
--

Segment Leq : 65.33 dBA

Total Leq All Segments: 65.33 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 72.93
                           (NIGHT): 65.33
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 10:54:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           :   2.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  35.00 / 35.00  m
Receiver height           :  42.08 / 42.08  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 68.21 + 0.00) = 68.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     2     90   0.00  75.00   0.00  -3.68  -3.11   0.00   0.00   0.00
68.21
-------------------------------------------------------------------------
--

Segment Leq : 68.21 dBA

Total Leq All Segments: 68.21 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 60.61 + 0.00) = 60.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     2     90   0.00  67.40   0.00  -3.68  -3.11   0.00   0.00   0.00
60.61
-------------------------------------------------------------------------
--

Segment Leq : 60.61 dBA

Total Leq All Segments: 60.61 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 68.21
                           (NIGHT): 60.61
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 11:12:15
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           : -73.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  93.00 / 93.00  m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -64.00 deg   Angle2 : 19.00 deg
Barrier height            :  43.55 m
Barrier receiver distance :  40.00 / 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: St Laurent (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 !       33.15 !       19.54 !        19.54

ROAD (54.06 + 43.71 + 63.03) = 63.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -73    -64   0.00  75.00   0.00  -7.92 -13.01   0.00   0.00   0.00
54.06
-------------------------------------------------------------------------------
--
   -64     19   0.00  75.00   0.00  -7.92  -3.36   0.00   0.00 -20.00
43.71
-------------------------------------------------------------------------------
--
    19     90   0.00  75.00   0.00  -7.92  -4.04   0.00   0.00   0.00
63.03
-------------------------------------------------------------------------------
--

Segment Leq : 63.59 dBA

Total Leq All Segments: 63.59 dBA
```

```
Results segment # 1: St Laurent (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 !       33.15 !       19.54 !        19.54

ROAD (46.46 + 36.11 + 55.43) = 56.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -73    -64    0.00  67.40   0.00  -7.92 -13.01   0.00   0.00   0.00
46.46
-------------------------------------------------------------------------------
--
   -64     19    0.00  67.40   0.00  -7.92  -3.36   0.00   0.00 -20.00
36.11
-------------------------------------------------------------------------------
--
    19     90    0.00  67.40   0.00  -7.92  -4.04   0.00   0.00   0.00
55.43
-------------------------------------------------------------------------------
--

Segment Leq : 56.00 dBA

Total Leq All Segments: 56.00 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 63.59
                           (NIGHT): 56.00
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 11:32:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent (day/night)
--------------------------------------------
Angle1   Angle2           :  17.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  99.00 / 99.00  m
Receiver height           :  33.15 / 33.15  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.88 + 0.00) = 62.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    17     90   0.00  75.00   0.00  -8.20  -3.92   0.00   0.00   0.00
62.88
-------------------------------------------------------------------------
--

Segment Leq : 62.88 dBA

Total Leq All Segments: 62.88 dBA


Results segment # 1: St Laurent (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 55.28 + 0.00) = 55.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
    17     90   0.00  67.40   0.00  -8.20  -3.92   0.00   0.00   0.00
55.28
-------------------------------------------------------------------------
--

Segment Leq : 55.28 dBA

Total Leq All Segments: 55.28 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 62.88
                           (NIGHT): 55.28
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 12:16:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent 1 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 1 (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -52.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 121.00 / 121.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -52.00 deg
Barrier height            :  34.63 m
Barrier receiver distance :  18.00 / 18.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: St Laurent 2 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 2 (day/night)
-----------------------------------------------
Angle1   Angle2           : -52.00 deg   -2.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 121.00 / 121.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -44.00 deg   Angle2 : -20.00 deg
Barrier height            :  43.55 m
Barrier receiver distance :  96.00 / 96.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: St Laurent 3 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 3: St Laurent 3 (day/night)
------------------------------------------------
Angle1   Angle2           :  -2.00 deg   43.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 121.00 / 121.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  -2.00 deg   Angle2 : 43.00 deg
Barrier height            :  43.55 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
```

```
Road data, segment # 4: St Laurent 4 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 4: St Laurent 4 (day/night)
-----------------------------------------------
Angle1   Angle2           :  43.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 121.00 / 121.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  43.00 deg   Angle2 : 90.00 deg
Barrier height            :  34.63 m
Barrier receiver distance :  33.00 / 33.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent 1 (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 !       33.15 !       28.44 !        28.44

ROAD (0.00 + 47.53 + 0.00) = 47.53 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -52   0.00  75.00   0.00  -9.07  -6.75   0.00   0.00 -11.64
47.53
-------------------------------------------------------------------------------
--

Segment Leq : 47.53 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !        8.04 !         8.04

ROAD (52.41 + 37.18 + 55.93) = 57.57 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -52    -44   0.00  75.00   0.00  -9.07 -13.52   0.00   0.00   0.00
52.41
-------------------------------------------------------------------------------
--
   -44    -20   0.00  75.00   0.00  -9.07  -8.75   0.00   0.00 -20.00
37.18
-------------------------------------------------------------------------------
--
   -20     -2   0.00  75.00   0.00  -9.07 -10.00   0.00   0.00   0.00
55.93
-------------------------------------------------------------------------------
--

Segment Leq : 57.57 dBA
```

```
Results segment # 3: St Laurent 3 (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 !       33.15 !       15.36 !        15.36

ROAD (0.00 + 39.91 + 0.00) = 39.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    -2     43   0.00  75.00   0.00  -9.07  -6.02   0.00   0.00 -20.00
39.91
-------------------------------------------------------------------------------
--

Segment Leq : 39.91 dBA

Results segment # 4: St Laurent 4 (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 !       33.15 !       24.52 !        24.52

ROAD (0.00 + 46.21 + 0.00) = 46.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    43     90   0.00  75.00   0.00  -9.07  -5.83   0.00   0.00 -13.88
46.21
-------------------------------------------------------------------------------
--

Segment Leq : 46.21 dBA

Total Leq All Segments: 58.32 dBA
```

```
Results segment # 1: St Laurent 1 (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 !       33.15 !       28.44 !        28.44

ROAD (0.00 + 39.93 + 0.00) = 39.93 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -52   0.00  67.40   0.00  -9.07  -6.75   0.00   0.00 -11.64
39.93
-------------------------------------------------------------------------------
--

Segment Leq : 39.93 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !        8.04 !         8.04

ROAD (44.81 + 29.58 + 48.33) = 49.97 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -52    -44   0.00  67.40   0.00  -9.07 -13.52   0.00   0.00   0.00
44.81
-------------------------------------------------------------------------------
--
   -44    -20   0.00  67.40   0.00  -9.07  -8.75   0.00   0.00 -20.00
29.58
-------------------------------------------------------------------------------
--
   -20     -2   0.00  67.40   0.00  -9.07 -10.00   0.00   0.00   0.00
48.33
-------------------------------------------------------------------------------
--

Segment Leq : 49.97 dBA
```

```
Results segment # 3: St Laurent 3 (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 !       33.15 !       15.36 !        15.36

ROAD (0.00 + 32.31 + 0.00) = 32.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    -2     43   0.00  67.40   0.00  -9.07  -6.02   0.00   0.00 -20.00
32.31
-------------------------------------------------------------------------------
--

Segment Leq : 32.31 dBA

Results segment # 4: St Laurent 4 (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 !       33.15 !       24.52 !        24.52

ROAD (0.00 + 38.62 + 0.00) = 38.62 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    43     90   0.00  67.40   0.00  -9.07  -5.83   0.00   0.00 -13.88
38.62
-------------------------------------------------------------------------------
--
Segment Leq : 38.62 dBA
Total Leq All Segments: 50.72 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.32
                           (NIGHT): 50.72
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 12:25:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: St Laurent 1 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 1 (day/night)
-----------------------------------------------
Angle1   Angle2           : -38.00 deg   21.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -38.00 deg   Angle2 : -5.00 deg
Barrier height            :  43.55 m
Barrier receiver distance :  70.00 / 70.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: St Laurent 2 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 2 (day/night)
------------------------------------------------
Angle1   Angle2           :  21.00 deg   76.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  21.00 deg   Angle2 : 61.00 deg
Barrier height            :  43.55 m
Barrier receiver distance :  78.00 / 78.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 3: St Laurent 3 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 3: St Laurent 3 (day/night)
-----------------------------------------------
Angle1   Angle2           :  76.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  76.00 deg   Angle2 : 90.00 deg
Barrier height            :  34.63 m
Barrier receiver distance :  15.00 / 15.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: St Laurent 4 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 4: St Laurent 4 (day/night)
-----------------------------------------------
Angle1   Angle2           : -73.00 deg   -38.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -73.00 deg   Angle2 : -50.00 deg
Barrier height            :  31.00 m
Barrier receiver distance :  59.00 / 59.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent 1 (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 !       33.15 !       11.64 !        11.64

ROAD (0.00 + 39.26 + 58.22) = 58.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -38     -5   0.00  75.00   0.00  -8.37  -7.37   0.00   0.00 -20.00
39.26
-------------------------------------------------------------------------------
--
    -5     21   0.00  75.00   0.00  -8.37  -8.40   0.00   0.00   0.00
58.22
-------------------------------------------------------------------------------
--

Segment Leq : 58.28 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !        9.18 !         9.18

ROAD (0.00 + 40.10 + 55.84) = 55.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61    0.00  75.00   0.00  -8.37  -6.53   0.00   0.00 -20.00
40.10
-------------------------------------------------------------------------------
--
    61     76    0.00  75.00   0.00  -8.37 -10.79   0.00   0.00   0.00
55.84
-------------------------------------------------------------------------------
--

Segment Leq : 55.95 dBA
```

```
Results segment # 3: St Laurent 3 (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 !       33.15 !       28.54 !        28.54

ROAD (0.00 + 46.21 + 0.00) = 46.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    76     90    0.00  75.00   0.00  -8.37 -11.09   0.00   0.00  -9.33
46.21
-------------------------------------------------------------------------------
--

Segment Leq : 46.21 dBA
```

```
Results segment # 4: St Laurent 4 (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 !       33.15 !       15.02 !        15.02

ROAD (0.00 + 37.91 + 54.87) = 54.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -73    -50   0.00  75.00   0.00  -8.37  -8.94   0.00   0.00 -19.78
37.91
-------------------------------------------------------------------------------
--
   -50    -38   0.00  75.00   0.00  -8.37 -11.76   0.00   0.00   0.00
54.87
-------------------------------------------------------------------------------
--

Segment Leq : 54.95 dBA

Total Leq All Segments: 61.53 dBA
```

```
Results segment # 1: St Laurent 1 (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 !       33.15 !       11.64 !        11.64

ROAD (0.00 + 31.66 + 50.63) = 50.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -38     -5   0.00  67.40   0.00  -8.37  -7.37   0.00   0.00 -20.00
31.66
-------------------------------------------------------------------------------
--
    -5     21   0.00  67.40   0.00  -8.37  -8.40   0.00   0.00   0.00
50.63
-------------------------------------------------------------------------------
--

Segment Leq : 50.68 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !        9.18 !         9.18

ROAD (0.00 + 32.50 + 48.24) = 48.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    21     61   0.00  67.40   0.00  -8.37  -6.53   0.00   0.00 -20.00
32.50
-------------------------------------------------------------------------------
--
    61     76   0.00  67.40   0.00  -8.37 -10.79   0.00   0.00   0.00
48.24
-------------------------------------------------------------------------------
--

Segment Leq : 48.35 dBA
```

```
Results segment # 3: St Laurent 3 (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 !       33.15 !       28.54 !        28.54

ROAD (0.00 + 38.61 + 0.00) = 38.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    76     90    0.00  67.40   0.00  -8.37 -11.09   0.00   0.00  -9.33
38.61
-------------------------------------------------------------------------------
--

Segment Leq : 38.61 dBA
```

```
Results segment # 4: St Laurent 4 (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 !       33.15 !       15.02 !        15.02

ROAD (0.00 + 30.31 + 47.27) = 47.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -73    -50    0.00  67.40   0.00  -8.37  -8.94   0.00   0.00 -19.78
30.31
-------------------------------------------------------------------------------
--
   -50    -38    0.00  67.40   0.00  -8.37 -11.76   0.00   0.00   0.00
47.27
-------------------------------------------------------------------------------
--

Segment Leq : 47.36 dBA

Total Leq All Segments: 53.93 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 61.53
                           (NIGHT): 53.93
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 12:29:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r13.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: St Laurent 1 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 1 (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -17.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -73.00 deg   Angle2 : -40.00 deg
Barrier height            :  31.00 m
Barrier receiver distance :  59.00 / 59.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: St Laurent 2 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 2 (day/night)
------------------------------------------------
Angle1   Angle2           : -17.00 deg   2.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  33.15 / 33.15  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -17.00 deg   Angle2 : 2.00 deg
Barrier height            :  43.55 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: St Laurent 1 (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 !       33.15 !       15.53 !        15.53

ROAD (56.25 + 39.39 + 57.57) = 60.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -73   0.00  75.00   0.00  -8.49 -10.25   0.00   0.00   0.00
56.25
-------------------------------------------------------------------------------
--
   -73    -40   0.00  75.00   0.00  -8.49  -7.37   0.00   0.00 -19.74
39.39
-------------------------------------------------------------------------------
--
   -40    -17   0.00  75.00   0.00  -8.49  -8.94   0.00   0.00   0.00
57.57
-------------------------------------------------------------------------------
--

Segment Leq : 60.01 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !       20.91 !        20.91

ROAD (0.00 + 36.74 + 0.00) = 36.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -17      2   0.00  75.00   0.00  -8.49  -9.77   0.00   0.00 -20.00
36.74
-------------------------------------------------------------------------------
--

Segment Leq : 36.74 dBA

Total Leq All Segments: 60.03 dBA
```

```
Results segment # 1: St Laurent 1 (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 !       33.15 !       15.53 !        15.53

ROAD (48.66 + 31.80 + 49.97) = 52.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -73   0.00  67.40   0.00  -8.49 -10.25   0.00   0.00   0.00
48.66
-------------------------------------------------------------------------------
--
   -73    -40   0.00  67.40   0.00  -8.49  -7.37   0.00   0.00 -19.74
31.80
-------------------------------------------------------------------------------
--
   -40    -17   0.00  67.40   0.00  -8.49  -8.94   0.00   0.00   0.00
49.97
-------------------------------------------------------------------------------
--

Segment Leq : 52.41 dBA
```

```
Results segment # 2: St Laurent 2 (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 !       33.15 !       20.91 !        20.91

ROAD (0.00 + 29.14 + 0.00) = 29.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -17      2   0.00  67.40   0.00  -8.49  -9.77   0.00   0.00 -20.00
29.14
-------------------------------------------------------------------------------
--

Segment Leq : 29.14 dBA

Total Leq All Segments: 52.43 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 60.03
                           (NIGHT): 52.43
```

```
STAMSON 5.0        NORMAL REPORT        Date: 20-07-2020 12:53:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14.te               Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: St Laurent 1 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 1 (day/night)
-----------------------------------------------
Angle1   Angle2           : -59.00 deg   -18.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -59.00 deg   Angle2 : -29.00 deg
Barrier height            :  43.55 m
Barrier receiver distance :  81.00 / 81.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: St Laurent 2 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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: St Laurent 2 (day/night)
-----------------------------------------------
Angle1   Angle2           : -18.00 deg   44.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -18.00 deg   Angle2 : 44.00 deg
Barrier height            :  43.55 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
```

```
Road data, segment # 3: St Laurent 3 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 3: St Laurent 3 (day/night)
-----------------------------------------------
Angle1   Angle2           :  44.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  50.00 deg   Angle2 : 90.00 deg
Barrier height            :  34.63 m
Barrier receiver distance :  18.00 / 18.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 4: St Laurent 4 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 4: St Laurent 4 (day/night)
------------------------------------------------
Angle1   Angle2           : -80.00 deg   -59.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -80.00 deg   Angle2 : -59.00 deg
Barrier height            :  31.00 m
Barrier receiver distance :  62.00 / 62.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 5: ST Laurent 5 (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  :    70 km/h
Road gradient       :     0 %
Road pavement       :     1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

    24 hr Traffic Volume (AADT or SADT):  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 # 5: ST Laurent 5 (day/night)
-----------------------------------------------
Angle1   Angle2           : -90.00 deg   -80.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :   1.50 / 1.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -81.00 deg
Barrier height            :   4.88 m
Barrier receiver distance :   3.00 / 3.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: St Laurent 1 (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 + 38.72 + 54.36) = 54.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -59    -29   0.00  75.00   0.00  -8.49  -7.78   0.00   0.00 -20.00
38.72
-------------------------------------------------------------------------------
--
   -29    -18   0.00  75.00   0.00  -8.49 -12.14   0.00   0.00   0.00
54.36
-------------------------------------------------------------------------------
--

Segment Leq : 54.48 dBA
```

```
Results segment # 2: St Laurent 2 (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 + 41.87 + 0.00) = 41.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -18     44    0.00  75.00   0.00  -8.49  -4.63   0.00   0.00 -20.00
41.87
-------------------------------------------------------------------------------
--

Segment Leq : 41.87 dBA
```

```
Results segment # 3: St Laurent 3 (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 (51.73 + 41.03 + 0.00) = 52.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    44     50   0.00  75.00   0.00  -8.49 -14.77   0.00   0.00   0.00
51.73
-------------------------------------------------------------------------------
--
    50     90   0.00  75.00   0.00  -8.49  -6.53   0.00   0.00 -18.94
41.03
-------------------------------------------------------------------------------
--

Segment Leq : 52.09 dBA
```

```
Results segment # 4: St Laurent 4 (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 + 37.30 + 0.00) = 37.30 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -80    -59   0.00  75.00   0.00  -8.37  -9.33   0.00   0.00 -20.00
37.30
-------------------------------------------------------------------------------
--

Segment Leq : 37.30 dBA
```

```
Results segment # 5: ST Laurent 5 (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 + 44.84 + 43.95) = 47.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -81   0.00  75.00   0.00  -8.49 -13.01   0.00   0.00  -8.65
44.84
-------------------------------------------------------------------------------
--
   -81    -80   0.00  75.00   0.00  -8.49 -22.55   0.00   0.00   0.00
43.95
-------------------------------------------------------------------------------
--

Segment Leq : 47.43 dBA

Total Leq All Segments: 57.15 dBA
```

```
Results segment # 1: St Laurent 1 (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 + 31.12 + 46.77) = 46.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -59    -29   0.00  67.40   0.00  -8.49  -7.78   0.00   0.00 -20.00
31.12
-------------------------------------------------------------------------------
--
   -29    -18   0.00  67.40   0.00  -8.49 -12.14   0.00   0.00   0.00
46.77
-------------------------------------------------------------------------------
--

Segment Leq : 46.88 dBA
```

```
Results segment # 2: St Laurent 2 (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 + 34.28 + 0.00) = 34.28 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -18     44    0.00  67.40   0.00  -8.49  -4.63   0.00   0.00 -20.00
34.28
-------------------------------------------------------------------------------
--

Segment Leq : 34.28 dBA
```

```
Results segment # 3: St Laurent 3 (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 (44.14 + 33.43 + 0.00) = 44.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
    44     50   0.00  67.40   0.00  -8.49 -14.77   0.00   0.00   0.00
44.14
-------------------------------------------------------------------------------
--
    50     90   0.00  67.40   0.00  -8.49  -6.53   0.00   0.00 -18.94
33.43
-------------------------------------------------------------------------------
--

Segment Leq : 44.49 dBA
```

```
Results segment # 4: St Laurent 4 (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 + 29.70 + 0.00) = 29.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -80    -59   0.00  67.40   0.00  -8.37  -9.33   0.00   0.00 -20.00
29.70
-------------------------------------------------------------------------------
--

Segment Leq : 29.70 dBA
```

```
Results segment # 5: ST Laurent 5 (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 + 37.24 + 36.35) = 39.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90    -81   0.00  67.40   0.00  -8.49 -13.01   0.00   0.00  -8.65
37.24
-------------------------------------------------------------------------------
--
   -81    -80   0.00  67.40   0.00  -8.49 -22.55   0.00   0.00   0.00
36.35
-------------------------------------------------------------------------------
--

Segment Leq : 39.83 dBA

Total Leq All Segments: 49.55 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 57.15
                           (NIGHT): 49.55
```