

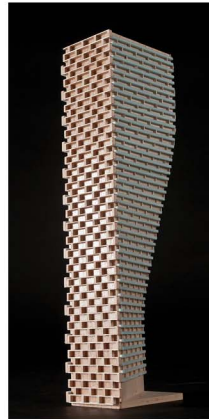
GRADIENTWIND

ENGINEERS & SCIENTISTS

TRAFFIC NOISE ASSESSMENT

Blackstone Subdivision
Ottawa, Ontario

REPORT: GWE18-196 – Traffic Noise



April 23, 2019

PREPARED FOR

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EXECUTIVE SUMMARY

This report describes a traffic noise assessment undertaken in support of site plan application for a proposed residential subdivision known as the “Blackstone South Condo Block” situated in the southwest area of Barrhaven in Ottawa, Ontario. The two-phase development comprises 18 blocks of back-to-back stacked dwellings, outdoor parking spaces, and a community park resided in the center of the site, as well as several interior roads. The development is situated on a nearly rectangular parcel of land near the intersection of Fernbank Road and Terry Fox Drive and surrounded by a future high school to the east and future park to the north. 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) site plan drawings prepared by concept plan drawing prepared by Fotenn Planning + Design, dated December 11, 2018.

The results of the current analysis indicate that noise levels will range between 55 and 74 dBA during the daytime period (07:00-23:00) and between 47 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the South façade of Block 7 and 8, which are nearest and most exposed to Fernbank Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 7. Although sound levels from the community park are marginally above (approximately 2 dBA) the ENCG sound level limits, the ENCG allows a tolerance of 5 dBA where it is not technically or economically feasible to mitigate noise levels below the criteria. The central park is already partially shielded from roadway noise by the row of proposed houses along Fernbank Road. The addition of any noise wall around the perimeter of the park would be of negligible benefit.

Building components with a higher Sound Transmission Class (STC) rating will be required for Blocks 1, 6-10, and 16-18 where exterior noise levels exceed 65 dBA, as indicated in Figure 7. Results of the calculations also indicate that these blocks will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment, as indicated in Figure 8. All other buildings in the development will require a forced air heating system with provisions for central air



conditioning. Warning Clauses¹ will also be required in all Lease, Purchase and Sale Agreements as stipulated in Section 6.

¹ City of Ottawa Environmental Noise Control Guidelines, January 2016

TABLE OF CONTENTS

1. INTRODUCTION	1
2. TERMS OF REFERENCE	1
3. OBJECTIVES	2
4. METHODOLOGY.....	2
4.1 Background.....	2
4.2 Roadway Traffic Noise	2
4.2.1 Criteria for Roadway Traffic Noise	2
4.2.2 Theoretical Roadway Noise Predictions	4
4.2.3 Roadway Traffic Volumes	4
4.3 Indoor Noise Calculations	5
5. RESULTS AND DISCUSSION	6
5.1 Roadway Traffic Noise Levels	6
5.2 Noise Control Measures	7
6. CONCLUSIONS AND RECOMMENDATIONS.....	9

FIGURES

APPENDICES

Appendix A – STAMSON 5.04 Input



1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Mattamy Homes to undertake a traffic noise assessment in support of site plan application for a proposed residential subdivision known as the “Blackstone South Condo Block” situated in the southwest area of Barrhaven 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 Ottawa² and Ministry of the Environment, Conservation and Parks (MECP)³ guidelines. Noise calculations were based on architectural drawings prepared by Fotenn Planning + Design, dated December 11, 2018, with future traffic volumes corresponding to the City of Ottawa’s Official Plan (OP) roadway classifications.

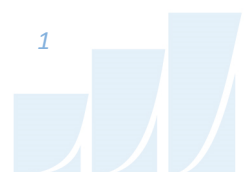
2. TERMS OF REFERENCE

The focus of this traffic noise assessment is a proposed residential subdivision known as “Blackstone South Condo Block” situated in the southwest area of Barrhaven in Ottawa, Ontario. The study site is located on a nearly rectangular parcel of land near the intersection of Fernbank Road and Terry Fox Drive and surrounded by a future high school to the east and future park to the north. The two-phase development comprises 18 blocks of back-to-back stacked dwellings, outdoor parking spaces, and a community park resided in the center of the site, as well as several interior roads.

The development will comprise of 18 three-storey back to back stacked townhouses, with 16 units per block for a total of 288 dwellings. As the town homes are back to back there is no rear yard or amenity space associated with the individual dwellings. The communal park situated in the center of the development is considered and outdoor living area and was considered in this assessment. The major sources of traffic noise on the development are Fernbank Road to the south and future Rouncey Road to the west. Figure 1 illustrates a complete site plan with surrounding context.

² City of Ottawa Environmental Noise Control Guidelines, January 2016

³ Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013



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 45 and 40 dBA for living rooms and sleeping quarters respectively for roadway as listed in Table 1.



TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)⁴

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction⁵. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment⁶. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which normally triggers the need for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, building components will require higher levels of sound attenuation⁷.

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

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

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

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

⁷ MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3



4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Receptor height was taken to be 7.5 metres above grade at the 3rd floor for the plane of the window (POW) and 1.5 metres above grade for outdoor living areas (OLA).
- Buildings adjacent to the study area boundary were considered as potential noise barriers. The cluster of buildings adjacent to Fernbank Road and Rouncey Road were treated as a row of houses within STAMSON which contributed to a partial barrier effect.
- Noise receptors were strategically placed at 19 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures 3-7.

4.2.3 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan⁸ which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

⁸ City of Ottawa Transportation Master Plan, November 2013



TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Fernbank Road	4-Lane Urban Arterial Undivided (4-UAU)	80	30,000
Rouncey Road	2-Lane Major Collector	40	12,000

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 residentially sided exterior wood stud walls have around STC 35. 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 and rail 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 procedure⁹ 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

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



Based on published research¹⁰, 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 information available at the time of the study, which was prepared for site plan approval, 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
1	1.5	OLA – Community Park	57	-
2	7.5	POW – Block 18 – South Façade	73	66
3	7.5	POW – Block 18 – East Façade	70	62
4	7.5	POW – Block 15 – South Façade	66	58
5	7.5	POW – Block 15 – East Façade	64	56
6	7.5	POW – Block 13 – South Façade	63	56
7	7.5	POW – Block 10 – South Façade	73	66
8	7.5	POW – Block 3 – South Façade	58	51
9	7.5	POW – Block 8 – South Façade	74	66
10	7.5	POW – Block 8 – West Façade	70	62
11	7.5	POW – Block 4 – South Façade	64	56
12	7.5	POW – Block 4 – West Façade	64	57

¹⁰ CMHC, Road & Rail Noise: Effects on Housing



TABLE 3 (CONTINUED): EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
13	7.5	POW – Block 2 – North Façade	55	47
14	7.5	POW – Block 7 – South Façade	74	66
15	7.5	POW – Block 7 – West Façade	70	63
16	7.5	POW – Block 6 – South Façade	66	58
17	7.5	POW – Block 6 – West Façade	68	61
18	7.5	POW – Block 1 – South Façade	65	56
19	7.5	POW – Block 1 – West Façade	67	60

The results of the current analysis indicate that noise levels will range between 55 and 74 dBA during the daytime period (07:00-23:00) and between 47 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the South façade of Block 7 and 8, which is nearest and most exposed to Fernbank Road. Although sound levels from the community park are marginally above (approximately 2 dBA) the ENCG sound level limits, the ENCG allows a tolerance of 5 dBA where it is not technically or economically feasible to mitigate noise levels below the criteria. The central park is already partially shielded from roadway noise by the row of proposed houses along Fernbank Road. The addition of any noise wall around the perimeter of the park would be of negligible benefit.

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 7):



For Blocks 7-10, 16-18 (see Figure 7):

- **Bedroom Windows**
 - (i) Bedroom windows facing south will require a minimum STC of 37
 - (ii) Bedroom windows facing east and west will require a minimum STC of 33
 - (iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements
- **Living Room Windows**
 - (i) Living room windows facing south will require a minimum STC of 32
 - (ii) Living room windows facing east and west will require a minimum STC of 28
 - (iii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements
- **Exterior Walls**
 - (i) Exterior wall components on the east, south and west façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data¹¹

For Blocks 1, 6 and 15 (see Figure 7):

- **Bedroom Windows**
 - (i) Bedroom windows facing west and/or south will require a minimum STC of 33
 - (ii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements
- **Living Room Windows**
 - (i) Living room windows facing west and/or south will require a minimum STC of 28
 - (ii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements
- **Exterior Walls**
 - (i) Exterior wall components on the east, south and west façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data¹²

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

¹² J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.



The STC requirements apply to windows and doors. Exterior wall components on these façades are recommended to have a minimum STC of 45. A review of window supplier literature indicates that the specified STC ratings can be 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 dwellings will require internal acoustic mitigation methods as a result of traffic noise. Blocks with dwellings expected to require central air conditioning are Blocks 1, 6-10, and 15-18 as sound pressure levels are expected to exceed 65dBA. These dwellings are outlined in Figure 8 by the hatched areas, where the remaining dwellings will require forced air heating with provisions for central air conditioning. This will allow occupants to keep windows closed and maintain a comfortable living environment. 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 55 and 74 dBA during the daytime period (07:00-23:00) and between 47 and 66 dBA during the nighttime period (23:00-07:00). The highest noise level (74 dBA) occurs at the South façade of Block 7 and 8, which are nearest and most exposed to Fernbank Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 7. Although sound levels from the community park are marginally above (approximately 2 dBA) the ENCG sound level limits, the ENCG allows a tolerance of 5 dBA where it is not technically or economically feasible to mitigate noise levels below the criteria. The central park is already partially shielded from roadway noise by the row of proposed houses along Fernbank Road. The addition of any noise wall around the perimeter of the park would be of negligible benefit.



Results of the calculations also indicate that units facing south in Block 7-10,16-18 as well as west facing units of Block 1 and 6, as well as south facing units of Block 15 will require central air conduiting to allow building occupants to keep windows closed to maintain a comfortable indoor living environment. All other dwellings will require forced air heating systems with provisions for central air conditioning.

The following Warning Clause¹³ will also be required be placed on all Lease, Purchase and Sale Agreements of Blocks 7-10, 16-18 (South facing units), as summarized below:

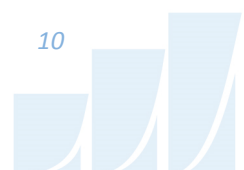
“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants, as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change. To help address the need for sound attenuation, this development includes:

- *STC rated multi-pane glazing elements and spandrel panels*
 - *South façade bedroom/living room: 37/32*
 - *East and west façade bedroom/living room: STC 33/28*
- *STC rated exterior walls*
 - *East, south and west façade: STC 45*
- *A communal outdoor living area shielded from roadway noise by a row of houses.*

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

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

¹³ City of Ottawa Environmental Noise Control Guidelines, January 2016



The following Warning Clause¹⁴ will also be required be placed on all Lease, Purchase and Sale Agreements of Blocks 1, 6 (west facing units) and 15 (south facing units), 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 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 the Environment and Climate Change. To help address the need for sound attenuation, this development includes:

- *STC rated multi-pane glazing elements and spandrel panels*
 - *West and/or South façade bedroom/living room: STC 33/28*
- *STC rated exterior walls*
 - *East, south and west façade: STC 45*
- *A communal outdoor living area shielded from roadway noise by a row of houses*

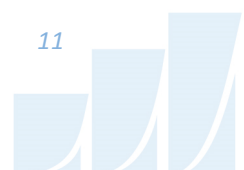
To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features.”

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

The following Warning Clause¹⁵ will also be required be placed on all Lease, Purchase and Sale Agreements for the remaining dwellings (Blocks 2-5, 11-14 and non west facing units Block 1 & 6, non south facing units Block 15, 7-10, 16-18):

¹⁴ City of Ottawa Environmental Noise Control Guidelines, January 2016

¹⁵ City of Ottawa Environmental Noise Control Guidelines, January 2016



"Purchasers/tenants are advised that due to increasing roadway traffic may occasionally interfere with some outdoor activities as the sound levels exceed the sound level limits of the City and the Ministry of the Environment, Conservation and Parks. To help address the need for sound attenuation, this development includes:

- A communal outdoor living area shielded from roadway noise by a row of houses*

To help address the need for sound attenuation, this dwelling unit has also been designed with provisions for forced air heating. This 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 the Environment, Conservation and Parks.

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

This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.



Giuseppe Garro, MAsc.,
Junior Environmental Scientist
GWE18-196



Joshua Foster, P.Eng.
Principal



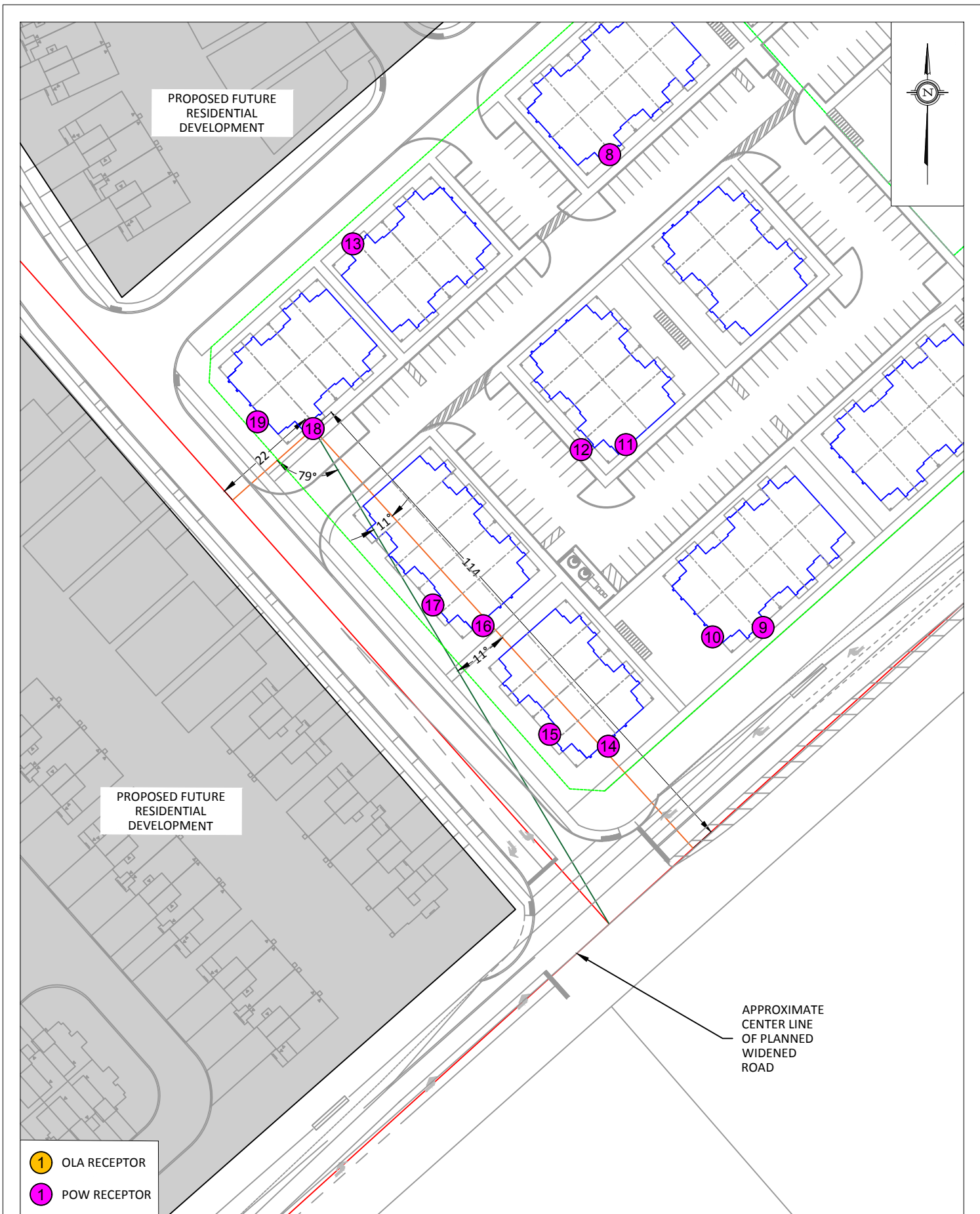




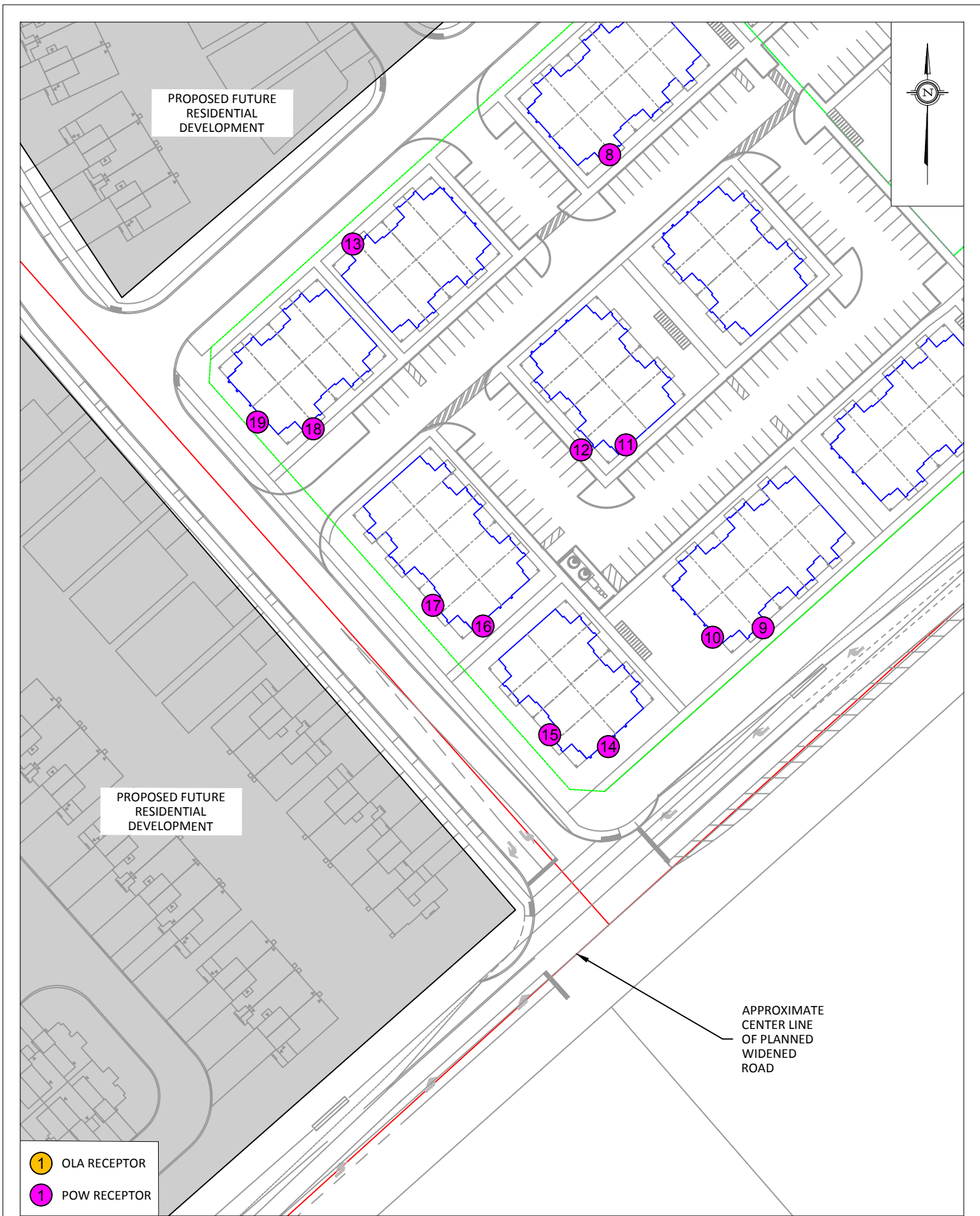
GRADIENTWIND ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT		BLACKSTONE SOUTH CONDO BLOCK - TRAFFIC NOISE STUDY		DESCRIPTION FIGURE 3: RECEPTOR 1-9 STAMSON INPUT
	SCALE	1:1800 (APPROX.)	DRAWING NO.	GWE18-196	
	DATE	DECEMBER 12, 2018	DRAWN BY	G.G.	



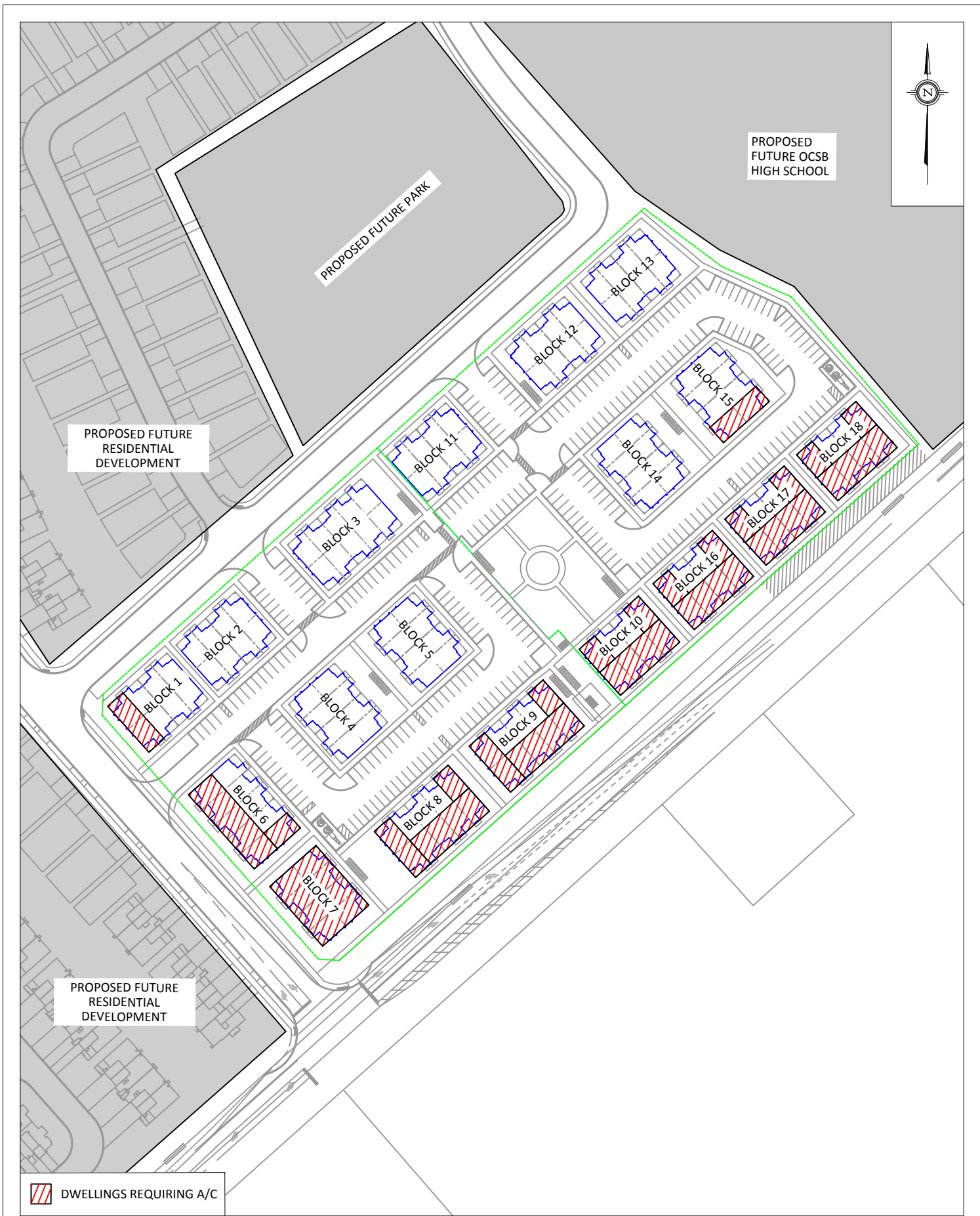
<div>GRADIENTWIND</div> <div>ENGINEERS & SCIENTISTS</div> <div>127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM</div>	PROJECT		BLACKSTONE SOUTH CONDO BLOCK - TRAFFIC NOISE STUDY		DESCRIPTION FIGURE 4: RECEPTOR 10, 11, 13, 14 STAMSON INPUT
	SCALE		DRAWING NO.		
	1:1800 (APPROX.)		GWE18-196		
	DATE		DRAWN BY		
	DECEMBER 12, 2018		G.G.		



<div>GRADIENTWIND</div> <div>ENGINEERS & SCIENTISTS</div> <div>127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM</div>	PROJECT BLACKSTONE SOUTH CONDO BLOCK - TRAFFIC NOISE STUDY				DESCRIPTION FIGURE 5: RECEPTOR 12, 15, 17, 18 STAMSON INPUT
	SCALE 1:1000 (APPROX.)		DRAWING NO. GWE18-196		
	DATE DECEMBER 12, 2018		DRAWN BY G.G.		

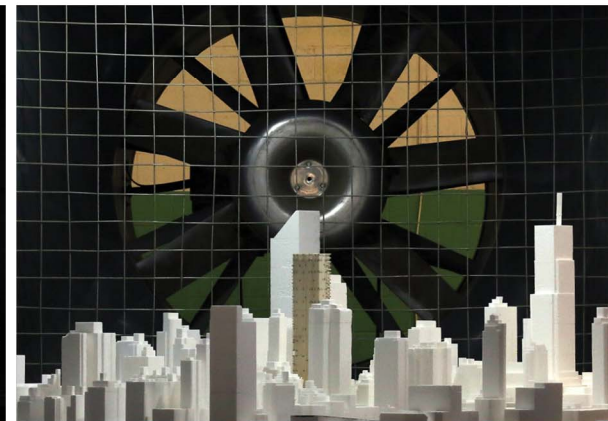
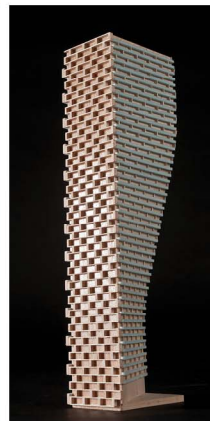






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APPENDIX A

STAMSON 5.04 INPUT AND OUTPUT PARAMETERS

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 56.89 + 0.00) = 56.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.66	75.50	0.00	-11.31	-1.46	0.00	-5.84	0.00
56.89									

Segment Leq : 56.89 dBA

Total Leq All Segments: 56.89 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 49.30 + 0.00) = 49.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.66	67.90	0.00	-11.31	-1.46	0.00	-5.84	0.00
49.30									

Segment Leq : 49.30 dBA

Total Leq All Segments: 49.30 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 56.89
(NIGHT): 49.30

#

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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 10:57:57
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 24.00 / 21.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 73.46 + 0.00) = 73.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	75.50	0.00	-2.04	0.00	0.00	0.00	0.00
73.46									

Segment Leq : 73.46 dBA

Total Leq All Segments: 73.46 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 66.44 + 0.00) = 66.44 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	67.90	0.00	-1.46	0.00	0.00	0.00	0.00
66.44									

Segment Leq : 66.44 dBA

Total Leq All Segments: 66.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.46

(NIGHT): 66.44

#

#



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 10:58:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 69.62 + 0.00) = 69.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	0	0.00	75.50	0.00	-2.86	-3.01	0.00	0.00	0.00
69.62									

Segment Leq : 69.62 dBA

Total Leq All Segments: 69.62 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 62.03 + 0.00) = 62.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	0	0.00	67.90	0.00	-2.86	-3.01	0.00	0.00	0.00
62.03									

Segment Leq : 62.03 dBA

Total Leq All Segments: 62.03 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.62
(NIGHT): 62.03

#

GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 10:58:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume	:	24288/2112	veh/TimePeriod	*
Medium truck volume	:	1932/168	veh/TimePeriod	*
Heavy truck volume	:	1380/120	veh/TimePeriod	*
Posted speed limit	:	80 km/h		
Road gradient	:	0 %		
Road pavement	:	1 (Typical asphalt or concrete)		

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

24 hr Traffic Volume (AADT or SADT):	30000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1	Angle2	:	-53.00 deg	82.00 deg
Wood depth		:	0	(No woods.)
No of house rows		:	1 / 1	
House density		:	74 %	
Surface		:	2	(Reflective ground surface)
Receiver source distance		:	61.00 / 61.00 m	
Receiver height		:	7.50 / 7.50 m	
Topography		:	1	(Flat/gentle slope; no barrier)
Reference angle		:	0.00	

#

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

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: Fernbank Rd (day/night)

```
-----
Angle1 Angle2 : -90.00 deg -53.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 61.00 / 61.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 63.08 + 0.00) = 63.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
-53 82 0.00 75.50 0.00 -6.09 -1.25 0.00 -5.08 0.00
63.08
-----
--
```

Segment Leq : 63.08 dBA

#



Results segment # 2: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	-53	0.00	75.50	0.00	-6.09	-6.87	0.00	0.00	0.00
62.53									

Segment Leq : 62.53 dBA

Total Leq All Segments: 65.82 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.48 + 0.00) = 55.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-53	82	0.00	67.90	0.00	-6.09	-1.25	0.00	-5.08	0.00
55.48									

Segment Leq : 55.48 dBA

#

Results segment # 2: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.94 + 0.00) = 54.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	-53	0.00	67.90	0.00	-6.09	-6.87	0.00	0.00	0.00
54.94									

Segment Leq : 54.94 dBA

Total Leq All Segments: 58.23 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.82
(NIGHT): 58.23

#

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	5.06	5.06

ROAD (63.64 + 43.03 + 0.00) = 63.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	-36	0.00	75.50	0.00	-6.63	-5.23	0.00	0.00	0.00
-36	0	0.00	75.50	0.00	-6.63	-6.99	0.00	0.00	-18.85

63.64

43.03

Segment Leq : 63.68 dBA

Total Leq All Segments: 63.68 dBA

#

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	5.06	5.06

ROAD (56.04 + 35.43 + 0.00) = 56.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	-36	0.00	67.90	0.00	-6.63	-5.23	0.00	0.00	0.00
-36	0	0.00	67.90	0.00	-6.63	-6.99	0.00	0.00	-18.85

SubLeq

56.04

35.43

Segment Leq : 56.08 dBA

Total Leq All Segments: 56.08 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.68
(NIGHT): 56.08

#

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

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: Fernbank Rd (day/night)

```
-----
Angle1 Angle2 : -90.00 deg -15.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 114.00 / 114.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 53.31 + 0.00) = 53.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
-15 47 0.00 75.50 0.00 -8.81 -4.63 0.00 -8.75 0.00
53.31
-----
--
```

Segment Leq : 53.31 dBA

#



Results segment # 2: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 62.89 + 0.00) = 62.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	-15	0.00	75.50	0.00	-8.81	-3.80	0.00	0.00	0.00
62.89									

Segment Leq : 62.89 dBA

Total Leq All Segments: 63.34 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 45.72 + 0.00) = 45.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-15	47	0.00	67.90	0.00	-8.81	-4.63	0.00	-8.75	0.00
45.72									

Segment Leq : 45.72 dBA

#



Results segment # 2: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.29 + 0.00) = 55.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-90	-15	0.00	67.90	0.00	-8.81	-3.80	0.00	0.00	0.00
55.29									

Segment Leq : 55.29 dBA

Total Leq All Segments: 55.74 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.34
(NIGHT): 55.74

#

GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 10:59:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 24.00 / 23.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 73.46 + 0.00) = 73.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	75.50	0.00	-2.04	0.00	0.00	0.00	0.00
73.46									

Segment Leq : 73.46 dBA

Total Leq All Segments: 73.46 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 66.04 + 0.00) = 66.04 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	67.90	0.00	-1.86	0.00	0.00	0.00	0.00
66.04									

Segment Leq : 66.04 dBA

Total Leq All Segments: 66.04 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.46
(NIGHT): 66.04

#

GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 10:59:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

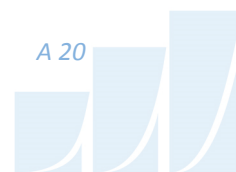
24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 115.00 / 115.00 m
Receiver height : 7.50 / 7.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 70.00 deg
Barrier height : 12.00 m
Barrier receiver distance : 73.00 / 73.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

#

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1   Angle2           : -48.00 deg   41.00 deg
Wood depth           : 0               (No woods.)
No of house rows     : 2 / 2
House density        : 76 %
Surface              : 2               (Reflective ground surface)
Receiver source distance : 103.00 / 103.00 m
Receiver height      : 7.50 / 7.50    m
Topography           : 1               (Flat/gentle slope; no barrier)
Reference angle      : 0.00
```

#

#



Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	3.69	3.69

ROAD (0.00 + 50.73 + 57.11) = 58.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	70	0.00	75.50	0.00	-8.85	-0.51	0.00	0.00	-15.41
50.73									

70	90	0.00	75.50	0.00	-8.85	-9.54	0.00	0.00	0.00
57.11									

Segment Leq : 58.01 dBA

Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 47.61 + 0.00) = 47.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-48	41	0.00	65.72	0.00	-8.37	-3.06	0.00	-6.68	0.00
47.61									

Segment Leq : 47.61 dBA

Total Leq All Segments: 58.39 dBA

#

#



Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	3.69	3.69

ROAD (0.00 + 43.14 + 49.51) = 50.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	70	0.00	67.90	0.00	-8.85	-0.51	0.00	0.00	-15.41
-----	----	------	-------	------	-------	-------	------	------	--------

70	90	0.00	67.90	0.00	-8.85	-9.54	0.00	0.00	0.00
----	----	------	-------	------	-------	-------	------	------	------

Segment Leq : 50.41 dBA

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 40.01 + 0.00) = 40.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-48	41	0.00	58.12	0.00	-8.37	-3.06	0.00	-6.68	0.00
-----	----	------	-------	------	-------	-------	------	-------	------

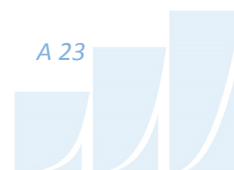
Segment Leq : 40.01 dBA

Total Leq All Segments: 50.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 58.39
(NIGHT): 50.79

#

#



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:00:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 23.00 / 24.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1  Angle2      : -21.00 deg  0.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 63.00 / 63.00 m
Receiver height      : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle      : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

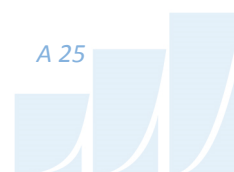
ROAD (0.00 + 73.64 + 0.00) = 73.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
-90    90    0.00  75.50   0.00  -1.86   0.00   0.00   0.00   0.00
73.64
-----
--
```

Segment Leq : 73.64 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 50.15 + 0.00) = 50.15 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-21	0	0.00	65.72	0.00	-6.23	-9.33	0.00	0.00	0.00
50.15									

Segment Leq : 50.15 dBA

Total Leq All Segments: 73.66 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 65.86 + 0.00) = 65.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	67.90	0.00	-2.04	0.00	0.00	0.00	0.00
65.86									

Segment Leq : 65.86 dBA

#



Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 42.55 + 0.00) = 42.55 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-21	0	0.00	58.12	0.00	-6.23	-9.33	0.00	0.00	0.00
42.55									

Segment Leq : 42.55 dBA

Total Leq All Segments: 65.88 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.66
(NIGHT): 65.88

#

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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -29.00 deg  73.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 1 / 1
House density       : 76 %
Surface            : 2          (Reflective ground surface)
Receiver source distance : 54.00 / 54.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 69.62 + 0.00) = 69.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
0      90      0.00  75.50   0.00  -2.86  -3.01   0.00   0.00   0.00
69.62
-----
--
```

Segment Leq : 69.62 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 52.30 + 0.00) = 52.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-29	73	0.00	65.72	0.00	-5.56	-2.47	0.00	-5.38	0.00
52.30									

Segment Leq : 52.30 dBA

Total Leq All Segments: 69.70 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 62.03 + 0.00) = 62.03 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

0	90	0.00	67.90	0.00	-2.86	-3.01	0.00	0.00	0.00
62.03									

Segment Leq : 62.03 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 44.70 + 0.00) = 44.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
	-29	73	0.00	58.12	0.00	-5.56	-2.47	0.00	-5.38
	44.70								

Segment Leq : 44.70 dBA

Total Leq All Segments: 62.11 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.70
(NIGHT): 62.11

#

#



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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:00:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

```

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

```

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

```

Car traffic volume      : 24288/2112   veh/TimePeriod   *
Medium truck volume    : 1932/168     veh/TimePeriod   *
Heavy truck volume     : 1380/120     veh/TimePeriod   *
Posted speed limit     :      80 km/h
Road gradient          :      0 %
Road pavement          :      1 (Typical asphalt or concrete)

```

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

24 hr Traffic Volume (AADT or SADT):	30000
Percentage of Annual Growth	: 0.00
Number of Years of Growth	: 0.00
Medium Truck % of Total Volume	: 7.00
Heavy Truck % of Total Volume	: 5.00
Day (16 hrs) % of Total Volume	: 92.00

Data for Segment # 1: Fernbank Rd (day/night)

```

Angle1      Angle2      : -90.00 deg    90.00 deg
Wood depth   :          0          (No woods.)
No of house rows :          1 / 1
House density :          74 %
Surface      :          2          (Reflective ground surface)
Receiver source distance : 69.00 / 69.00 m
Receiver height :          7.50 / 7.50 m
Topography   :          1          (Flat/gentle slope; no barrier)
Reference angle :          0.00

```

#

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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -46.00 deg  64.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 1 / 1
House density       : 76 %
Surface            : 2          (Reflective ground surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 63.82 + 0.00) = 63.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.00	75.50	0.00	-6.63	0.00	0.00	-5.05	0.00

```
-----
SubLeq
--
63.82
-----
--
```

Segment Leq : 63.82 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 51.76 + 0.00) = 51.76 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-46	64	0.00	65.72	0.00	-6.50	-2.14	0.00	-5.31	0.00
51.76									

Segment Leq : 51.76 dBA

Total Leq All Segments: 64.08 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 56.22 + 0.00) = 56.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	67.90	0.00	-6.63	0.00	0.00	-5.05	0.00
56.22									

Segment Leq : 56.22 dBA

#



Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 44.16 + 0.00) = 44.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--	-46	64	0.00	58.12	0.00	-6.50	-2.14	0.00	-5.31	0.00
44.16										

Segment Leq : 44.16 dBA

Total Leq All Segments: 56.48 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 64.08
(NIGHT): 56.48

#

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 veh/TimePeriod *
Posted speed limit : 40 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): 12000
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: Rouncey Rd (day/night)

Angle1 Angle2 : -52.00 deg 66.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 59.00 / 59.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#

#



Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	3.85	3.85

ROAD (60.48 + 43.34 + 59.99) = 63.30 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

0	28	0.00	75.50	0.00	-6.93	-8.08	0.00	0.00	0.00
60.48									

28	65	0.00	75.50	0.00	-6.93	-6.87	0.00	0.00	-18.36
43.34									

65	90	0.00	75.50	0.00	-6.93	-8.57	0.00	0.00	0.00
59.99									

Segment Leq : 63.30 dBA

Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 52.59 + 0.00) = 52.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-52	66	0.00	65.72	0.00	-5.95	-1.83	0.00	-5.35	0.00
52.59									

Segment Leq : 52.59 dBA

Total Leq All Segments: 63.65 dBA



Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	7.50	3.85	3.85

ROAD (52.89 + 35.74 + 52.40) = 55.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

0	28	0.00	67.90	0.00	-6.93	-8.08	0.00	0.00	0.00
52.89									

28	65	0.00	67.90	0.00	-6.93	-6.87	0.00	0.00	-18.36
35.74									

65	90	0.00	67.90	0.00	-6.93	-8.57	0.00	0.00	0.00
52.40									

Segment Leq : 55.70 dBA

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 50.34 + 0.00) = 50.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-52	66	0.00	58.12	0.00	-5.95	-1.83	0.00	0.00	0.00
50.34									

Segment Leq : 50.34 dBA

Total Leq All Segments: 56.81 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.65
(NIGHT): 56.81



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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:01:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 veh/TimePeriod *
Posted speed limit : 40 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): 12000
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: Rouncey Rd (day/night)

Angle1 Angle2 : -53.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 52.00 / 52.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#

Results segment # 1: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 55.01 + 0.00) = 55.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-53	0	0.00	65.72	0.00	-5.40	-5.31	0.00	0.00	0.00
55.01									

Segment Leq : 55.01 dBA

Total Leq All Segments: 55.01 dBA

Results segment # 1: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 47.41 + 0.00) = 47.41 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-53	0	0.00	58.12	0.00	-5.40	-5.31	0.00	0.00	0.00
47.41									

Segment Leq : 47.41 dBA

Total Leq All Segments: 47.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.01

(NIGHT): 47.41

#

#



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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:01:23
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl4.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

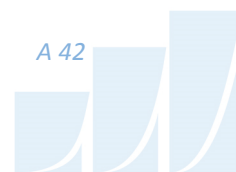
* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 24.00 / 27.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -49.00 deg  0.00 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     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 73.46 + 0.00) = 73.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
-90    90    0.00  75.50   0.00  -2.04   0.00   0.00   0.00   0.00
73.46
-----
--
```

Segment Leq : 73.46 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 58.40 + 0.00) = 58.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-49	0	0.00	65.72	0.00	-1.66	-5.65	0.00	0.00	0.00
58.40									

Segment Leq : 58.40 dBA

Total Leq All Segments: 73.59 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 65.35 + 0.00) = 65.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-90	90	0.00	67.90	0.00	-2.55	0.00	0.00	0.00	0.00
65.35									

Segment Leq : 65.35 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 50.80 + 0.00) = 50.80 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-49	0	0.00	58.12	0.00	-1.66	-5.65	0.00	0.00	0.00
50.80									

Segment Leq : 50.80 dBA

Total Leq All Segments: 65.50 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.59

(NIGHT): 65.50

#

#



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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:01:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl5.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 36.00 / 36.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -66.00 deg  84.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 16.00 / 16.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

ROAD (0.00 + 68.68 + 0.00) = 68.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
0      90      0.00  75.50   0.00  -3.80  -3.01   0.00   0.00   0.00
68.68
-----
--
```

Segment Leq : 68.68 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 64.64 + 0.00) = 64.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-66	84	0.00	65.72	0.00	-0.28	-0.79	0.00	0.00	0.00
64.64									

Segment Leq : 64.64 dBA

Total Leq All Segments: 70.12 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 61.09 + 0.00) = 61.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

0	90	0.00	67.90	0.00	-3.80	-3.01	0.00	0.00	0.00
61.09									

Segment Leq : 61.09 dBA

#



Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 57.05 + 0.00) = 57.05 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--	-66	84	0.00	58.12	0.00	-0.28	-0.79	0.00	0.00	0.00
57.05										

Segment Leq : 57.05 dBA

Total Leq All Segments: 62.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.12
(NIGHT): 62.53

#

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STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:01:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl6.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : 24.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 1
House density : 20 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 62.00 / 62.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#

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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume : 552/48     veh/TimePeriod *
Posted speed limit : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -71.00 deg  0.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 21.00 / 21.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

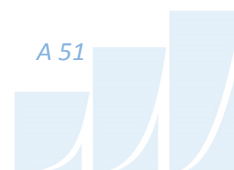
ROAD (0.00 + 64.98 + 0.00) = 64.98 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
24      90      0.00  75.50   0.00  -6.16  -4.36   0.00   0.00   0.00
64.98
-----
--
```

Segment Leq : 64.98 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 60.22 + 0.00) = 60.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-71	0	0.00	65.72	0.00	-1.46	-4.04	0.00	0.00	0.00
60.22									

Segment Leq : 60.22 dBA

Total Leq All Segments: 66.23 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 56.48 + 0.00) = 56.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
24	90	0.00	67.90	0.00	-6.16	-4.36	0.00	-0.90	0.00
56.48									

Segment Leq : 56.48 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 52.62 + 0.00) = 52.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-71	0	0.00	58.12	0.00	-1.46	-4.04	0.00	0.00	0.00
52.62									

Segment Leq : 52.62 dBA

Total Leq All Segments: 57.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.23

(NIGHT): 57.98

#

#



GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:02:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl7.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

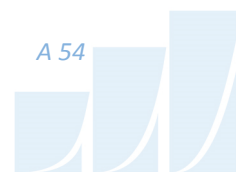
* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 72.00 / 72.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -77.00 deg  83.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface             : 2          (Reflective ground surface)
Receiver source distance : 16.00 / 16.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

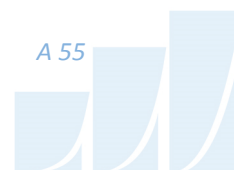
ROAD (0.00 + 65.67 + 0.00) = 65.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
0      90      0.00  75.50   0.00  -6.81  -3.01   0.00   0.00   0.00
65.67
-----
--
```

Segment Leq : 65.67 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 64.92 + 0.00) = 64.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-77	83	0.00	65.72	0.00	-0.28	-0.51	0.00	0.00	0.00
64.92									

Segment Leq : 64.92 dBA

Total Leq All Segments: 68.32 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 58.08 + 0.00) = 58.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
0	90	0.00	67.90	0.00	-6.81	-3.01	0.00	0.00	0.00
58.08									

Segment Leq : 58.08 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 57.33 + 0.00) = 57.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-77	83	0.00	58.12	0.00	-0.28	-0.51	0.00	0.00	0.00
57.33									

Segment Leq : 57.33 dBA

Total Leq All Segments: 60.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.32
(NIGHT): 60.73

#

#

GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:02:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r18.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : 11.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 2
House density : 20 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 114.00 / 114.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -79.00 deg  0.00 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     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

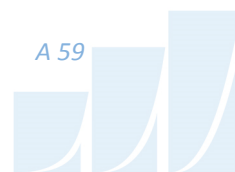
ROAD (0.00 + 63.11 + 0.00) = 63.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
11      90      0.00  75.50   0.00  -8.81  -3.58   0.00   0.00   0.00
63.11
-----
--
```

Segment Leq : 63.11 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 60.48 + 0.00) = 60.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
--	-79	0	0.00	65.72	0.00	-1.66	-3.58	0.00	0.00
60.48									

Segment Leq : 60.48 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 53.12 + 0.00) = 53.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
--	11	90	0.00	67.90	0.00	-8.81	-3.58	0.00	-2.40
53.12									

Segment Leq : 53.12 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 52.88 + 0.00) = 52.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

--									
-79	0	0.00	58.12	0.00	-1.66	-3.58	0.00	0.00	0.00
52.88									

Segment Leq : 52.88 dBA

Total Leq All Segments: 56.01 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 56.01

#

GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0 NORMAL REPORT Date: 02-01-2019 11:03:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rl9.te Time Period: Day/Night 16/8 hours
Description:

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

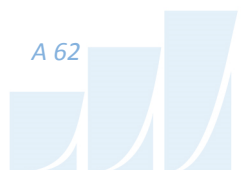
* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Fernbank Rd (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 123.00 / 123.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

#



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

```
-----
Car traffic volume : 9715/845   veh/TimePeriod *
Medium truck volume : 773/67    veh/TimePeriod *
Heavy truck volume  : 552/48    veh/TimePeriod *
Posted speed limit  : 40 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): 12000
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: Rouncey Rd (day/night)

```
-----
Angle1 Angle2      : -83.00 deg  80.00 deg
Wood depth          : 0          (No woods.)
No of house rows    : 0 / 0
Surface            : 2          (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height     : 7.50 / 7.50 m
Topography          : 1          (Flat/gentle slope; no barrier)
Reference angle     : 0.00
```

Results segment # 1: Fernbank Rd (day)

Source height = 1.50 m

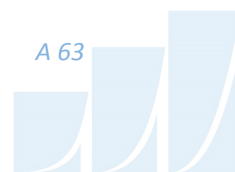
ROAD (0.00 + 63.35 + 0.00) = 63.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

```
-----
--
0      90      0.00  75.50   0.00  -9.14  -3.01   0.00   0.00   0.00
63.35
-----
--
```

Segment Leq : 63.35 dBA

#



Results segment # 2: Rouncey Rd (day)

Source height = 1.50 m

ROAD (0.00 + 65.29 + 0.00) = 65.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

-83	80	0.00	65.72	0.00	0.00	-0.43	0.00	0.00	0.00
65.29									

Segment Leq : 65.29 dBA

Total Leq All Segments: 67.44 dBA

Results segment # 1: Fernbank Rd (night)

Source height = 1.50 m

ROAD (0.00 + 55.75 + 0.00) = 55.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
SubLeq									

0	90	0.00	67.90	0.00	-9.14	-3.01	0.00	0.00	0.00
55.75									

Segment Leq : 55.75 dBA

#

Results segment # 2: Rouncey Rd (night)

Source height = 1.50 m

ROAD (0.00 + 57.69 + 0.00) = 57.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
--------	--------	-------	--------	-------	-------	-------	-------	-------	-------

SubLeq

--									
	-83	80	0.00	58.12	0.00	0.00	-0.43	0.00	0.00
57.69									

Segment Leq : 57.69 dBA

Total Leq All Segments: 59.84 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.44
(NIGHT): 59.84