

REPORT
Project: 137404-6.04

NOISE CONTROL FEASIBILITY STUDY URBANDALE CORPORATION 1515 EARL ARMSTRONG ROAD



Prepared for URBANDALE CORPORATION
by IBI GROUP

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1 Introduction

IBI Group (IBI) was retained by Urbandale Corporation to undertake a Noise Control Feasibility Study in support of a Draft Plan of Subdivision application for a proposed development to be located at 1515 Earl Armstrong Road, Ottawa. The property is presently zoned for General Mixed (GM) Use.

The objective of this study is to conduct a preliminary review of the internal and external transportation (dynamic) noise impacts to the site through the use of noise contour lines. A cursory review of on- and off-site potential stationary noise sources was evaluated as part of this study as well. This evaluation will help inform preliminary recommendations regarding the usage of any required noise control measures or warning clauses in the Agreement of Purchase and Sale or Tenancy Agreement for any 'noise-sensitive' land uses for further investigation during the detailed design stage.

The subject site occupies the northwestern quadrant of the Earl Armstrong & Limebank intersection and is bound by Earl Armstrong Road to the south, Limebank Road to the east, as well as a stormwater pond and an existing low-rise residential uses to the north and west.

The site location and its surrounding context is illustrated in **Figure 1** below.

Figure 1 – Site Location



2 Background

2.1 Noise Sources

2.1.1 Dynamic Noise

The proposed development is primarily subjected to traffic noise externally from its boundary streets: Earl Armstrong Road and Limebank Road. As part of the Draft Plan of Subdivision application process, a public road with an 18-metre right-of-way is planned through the subject lands. Given that this facility will be classified as a local road and will primarily serve as a means for access for the future sub-divided parcels within the subject lands, it is not considered as a significant noise source.

The site is located entirely within the Airport Vicinity Development Zone (AVDZ), as shown on Schedule C-14 of the 2021 Draft Official Plan, therefore aircraft noise will be considered in this study.

There are no rail lines within 500 metres of the site. As such, no consideration has been given to noise impacts from rail traffic in accordance with the *City of Ottawa Environmental Noise Control (ENC) Guidelines*, dated January 2016. It should be noted that the O-Train Trillium Line Extension is slated for completion in late 2023 and is separated from the subject site by at least 350 metres, significantly exceeding the maximum separation of 100 metres required for the consideration of light rail transit corridors as a transportation noise source.

2.1.2 Stationary Noise

With consideration of off-site noise sources in the surrounding areas, the site is immediately adjacent to low-rise residential units to the north and west which are considered 'noise sensitive uses' in the ENC Guidelines and therefore would not be expected to generate any stationary noise sources of significance.

Potential on-site stationary noise sources, including chillers, generators, commercial air-conditioners, make-up air units or frequently-used loading docks for deliveries or waste collection will be considered as the proposed development plans are refined through the City's Site Plan Control application process.

It is important to note that both on- and off-site surface parking lots are generally not considered as a stationary noise source.

2.2 Sound Level Limits for Road Traffic

Sound level criteria for road traffic is referenced from the ENC Guidelines and the *Ministry of the Environment Publication NPC-300 (August 2013)*, hereafter referred to as NPC-300. Noise levels are expressed in the form Leq (T) which refers to a weighted level of a steady sound carrying the same total energy in the time period T (in hours) as the observed fluctuation sound.

2.2.1 Indoor Sound Level Criterion

For 'noise-sensitive' land uses, the sound level limits for Indoor Living Areas from Table 2.2b (NPC-300, Table C-2) of the ENC Guidelines are as follows:

- Nighttime – sleeping quarters – 23:00 to 07:00 – 40 dBA Leq (8)
- Daytime – living areas, den areas, hospitals, nursing homes (excludes schools or daycares) – 07:00 to 23:00 – 45 dBA Leq (16)

The sound levels are based on the windows and doors to an indoor space being closed.

For the purpose of assessing indoor sound levels, receptors are located at the building facade to align with the plan of the window 1.5 metres above the ground for daytime noise and at the plane of the bedroom window 4.5 metres above the ground for nighttime noise.

As per NPC-300 C7.1.2.1 and C7.1.2.2, when the outdoor noise levels at the plane of the window are greater than 55 dBA and less than or equal to 65 dBA (daytime) and/or greater than 50 dBA and less than or equal to 60 dBA (nighttime), then a warning clause is required along with forced air heating and a provision for central air conditioning.

Should the outdoor noise levels exceed 65 dBA at the living room and/or exceed 60 dBA at the bedroom, then central air conditioning is mandatory and a warning clause is required.

2.2.2 Outdoor Sound Level Criterion

As per Table 2.2a of NPC-300, the sound level criteria for the outdoor living area (OLA) during the daytime period between 07:00 and 23:00 hours is 55 dBA Leq (16). Sound levels for the OLA are typically calculated 3 metres from the building face at the centre of the façade or within the centre of the OLA at a height of 1.5 metres above the ground.

If the Leq sound level is less than or equal to the above criteria, then no further action is required by the proponent. If the sound level exceeds the criteria by less than 5 dBA then the proponent may, with City approval, either provide a warning clause to prospective purchasers/tenants or install physical attenuation. For sound levels greater than 5 dBA above the criteria control measures are required to reduce the noise levels as close to 55 dBA as technically, economically and administratively possible. Should the sound levels with the barrier in place exceed 55 dBA, a warning clause is also required.

2.2.3 Indoor Sound Level Criterion – Building Components

As per NPC-300 C7.1.3, when the outdoor sound levels are less than or equal to 65 dBA at the 'daytime' window and/or less than or equal to 60 dBA at the 'nighttime' window, then the building must be compliant with the Ontario Building Code. Should the outdoor sound levels exceed this criteria, then the building component (walls, windows etc.) must be designed to achieve indoor sound level criteria.

2.3 Sound Level Limits for Aircraft Noise

Aircraft noise impact assessment is based on the Noise Exposure Forecast (NEF) and Noise Exposure Projection (NEP) methods approved by Transport Canada. The noise contours were used to define the Airport Operating Influence Zone (AOIZ) and Airport Vicinity Development Zone (AVDZ), as indicated on Schedule C-14 of the 2021 Draft Official Plan.

No new noise sensitive developments are permitted within the AOIZ. Noise sensitive development is permitted within the AVDZ and outside of the AOIZ subject to a noise study or under the Prescribed Measures for Aircraft Noise in Part 6 of the ENC Guidelines, while indoor and outdoor sound level limits for aircraft noise are included in Table 4.2a.

3 Roadway Noise

3.1 Road Traffic Data

The major sources of traffic noise are expected to originate from the segments of the adjacent road network directly abutting the site and are described in **Table 3.1 below**.

Table 1.1 - Existing Roadways

NAME	CLASS	JURISDICTION	ORIENTATION & EXTENTS	CROSS-SECTION	ROW (m)	SPEED LIMIT (km/h)
Earl Armstrong Road	Arterial	City of Ottawa	East-West, River Road to High Road	4-Lane, Urban, Divided	44.5	80
Limebank Road	Arterial	City of Ottawa	North-South, River Road to Mitch Owens Road	4-Lane, Urban, Divided	44.5	80

Based on the four-lane, divided arterial road cross-section of both Earl Armstrong and Limebank, **Table 3.2** below summarizes the corresponding traffic and road parameters prescribed in Appendix B of the ENC Guidelines.

Table 3.2 – Traffic and Roadway Summary Data

PARAMETER	EARL ARMSTRONG ROAD & LIMEBANK ROAD (4-UAD)
Annual Average Daily Traffic (AADT)	35,000
Posted Speed Limit (km/h)	80
% Medium Trucks	7%
% Heavy Trucks	5%
% Daytime Traffic	92%

3.2 Calculation Methods

The roadway noise analysis for this study was conducted using STAMSON v5.04, an industry-standard software program developed by the Ontario Ministry of the Environment (MOE).

Noise contours were developed to establish the limits of both the indoor and outdoor noise criteria and were conservatively based on the capacity of each road, as discussed previously in Section 3.1.

Details pertaining to the noise criteria of interest are outlined below:

- The limits of requirements pertaining to a building component review, mandatory air conditioning and a Type 'D' warning clause, the 65 dBA (daytime) and 60 dBA (nighttime) noise contours were analysed at the building face.

- To determine the limits of forced air heating, provision for central air-conditioning and a Type 'C' warning clause, the 55 dBA (daytime) and 50 dBA (nighttime) noise contours were evaluated at the building face.
- The noise criteria limits for the outdoor living areas (OLAs) at 60 dBA and 55 dBA were evaluated under daytime conditions only.

The off-set distances presented in **Table 3.2** below were measured from the right-of-way centreline or from the centre of the right-of-way protection for each roadway identified for inclusion in the noise analysis, as discussed in the preceding section.

TABLE 3.2: NOISE CONTOUR OFFSETS

NOISE CRITERIA		DISTANCE FROM CENTRELINE (M)
		LIMEBANK & EARL ARMSTRONG (4-UAD 80)
Indoor Daytime	65 dBA	57.69
	55 dBA	230.98
Indoor Nighttime	60 dBA	43.54
	50 dBA	188.80
Outdoor Living Area (Daytime Only)	60 dBA	115.41
	55 dBA	230.98

Based on **Table 3.2** above for the indoor noise evaluation, the daytime contours for arterial roads are further from centreline than the nighttime levels for each criterion. As such, only the daytime levels will be considered in the noise analysis for this study. Noise contours for both indoor (daytime only) and outdoor noise evaluation are shown in **Figure 2**. These contours have not been adjusted to reflect screening from proposed buildings. For clarity purposes, the noise contours have not been extended beyond the contours of an intersecting road.

4 Stationary Noise

In terms of stationary noise, any noise sources of significance identified in the ENC Guidelines will be considered in the detailed noise analysis undertaken as part of the Site Plan Control application process and may include any on-site sources such as frequently-used loading docks or mechanical equipment (e.g. emergency generators) or off-site sources which have the potential to negatively impact any potential 'noise-sensitive land uses' within the subject lands.

5 Results

5.1 Indoor Sound Levels

The 55 dBA (daytime) contours shown on **Figure 2** represent the limit in which a Type 'C' warning clause and forced air heating with provision for central air conditioning are required for the 'noise-sensitive' indoor uses. Similarly, the 65 dBA (daytime) contours represent the limit in which a Type 'D' warning clause, central air conditioning and an acoustical review/design of the building components are required. As noted in Section 3.2, the noise contours have not been adjusted to account for screening by the proposed buildings. The exact number of units that exceed either the 65 dBA or 55 dBA thresholds will be determined during detailed design phase.

A summary of the results of each roadway is as follows:

Earl Armstrong Road & Limebank Road (4-UAD 80km/h) – For either major arterial roadway, the 65 dBA noise contour will extend approximately 57.7 metres from the right-of-way centreline (or approximately 34.5 metres from the edge of the property line). As such, it is expected that only 'noise-sensitive' land uses within closest proximity to either road will require a Type 'D' warning clause or accompanying noise abatement measures.

The 55 dBA noise contour, extending approximately 231.0 metres beyond the right-of-way centreline for both arterial roads encompasses the entirety of the subject property and a portion of the existing single-family homes backing onto the subject site from the north. Therefore, the remaining Indoor Living Areas on-site may require warning clause Type 'C'. It should be noted, however, that this analysis does not take into consideration any screening from any future buildings on the subject site which can reasonably be expected to reduce the receptor noise levels for the abutting residential uses to within the acceptable 55 dBA (daytime) threshold limit.

Warning clauses for indoor noise are as follows:

Type 'C'

"This dwelling unit has been fitted with a forced air heating system and the ducting, etc. was sized to accommodate central air conditioning. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria. (Note: The location and installation of the outdoor air conditioning device should be done so as to comply with noise criteria of MOE Publication NPC-216, Residential Air Conditioning Devices and thus minimize the noise impacts both on and in the immediate vicinity of the subject property."

Type 'D'

"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City's and the Ministry of the Environment's noise criteria."

5.1.1 Sound Transmission Class (STC) Ratings

All dwelling units requiring a Type 'D' warning clause shall have mandatory central air conditioning and acoustical review of building components. Sound Transmission Class (STC) ratings for windows and glazed doors will be required for any 'noise sensitive' uses with the highest exposure to either Earl Armstrong Road or Limebank Road.

5.2 Outdoor Sound Levels

The outdoor 60 dBA contour on **Figure 2** represents the limit in which physical attenuation is required in the outdoor living areas (OLAs) for 'noise-sensitive' uses. For OLA receptor locations

between the 60 dBA and 55 dBA contours, physical attenuation may not be required but should be considered as stated in Part 4, Section 3.4 of the ENC Guidelines. As noted in Section 3.2, the noise contours have not been adjusted to account for screening by the proposed buildings.

A summary of the results for each roadway is as follows:

Earl Armstrong Road & Limebank Road (4-UAD 80km/h) – The 60 dBA noise criteria was determined to be 115.4 metres from the roadway centreline (or 93.2 metres from the right-of-way limits) for either arterial road, therefore any outdoor living areas (OLAs) in this range may require physical attenuation.

Similar to the Indoor Noise Analysis, the 55 dBA noise contour extends approximately 231.0 metres beyond the right-of-way centreline for both arterial roads encompasses the entirety of the subject property and a portion of the existing single-family homes backing onto the subject site from the north. As such, any 'noise-sensitive' OLAs beyond the 60 dBA threshold may still require the application of warning clause Type 'A'.

Warning clauses for outdoor noise are as follows:

Type 'A'

“Purchasers/tenants are advised that sound levels due to increasing Earl Armstrong Road and Limebank Road traffic volumes may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the City’s and the Ministry of the Environment’s noise criteria.”

Type 'B'

“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 Earl Armstrong Road and Limebank Road traffic volumes may on occasion interfere with some activities of the dwelling occupants as the sound levels exceed the City’s and the Ministry of the Environment’s noise criteria.”

5.3 Aircraft Noise

Given that the site is entirely located within the Airport Vicinity Development Zone (ADVZ), the following warning clause will apply to Indoor or Outdoor Living Areas which conform to the City’s criteria for 'noise-sensitive' land uses, as prescribed in the ENC Guidelines.

The standard warning clause for aircraft noise is as follows:

“Purchasers/tenants are advised that due to the proximity of the Ottawa Macdonald-Cartier International Airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities”.

6 Conclusion

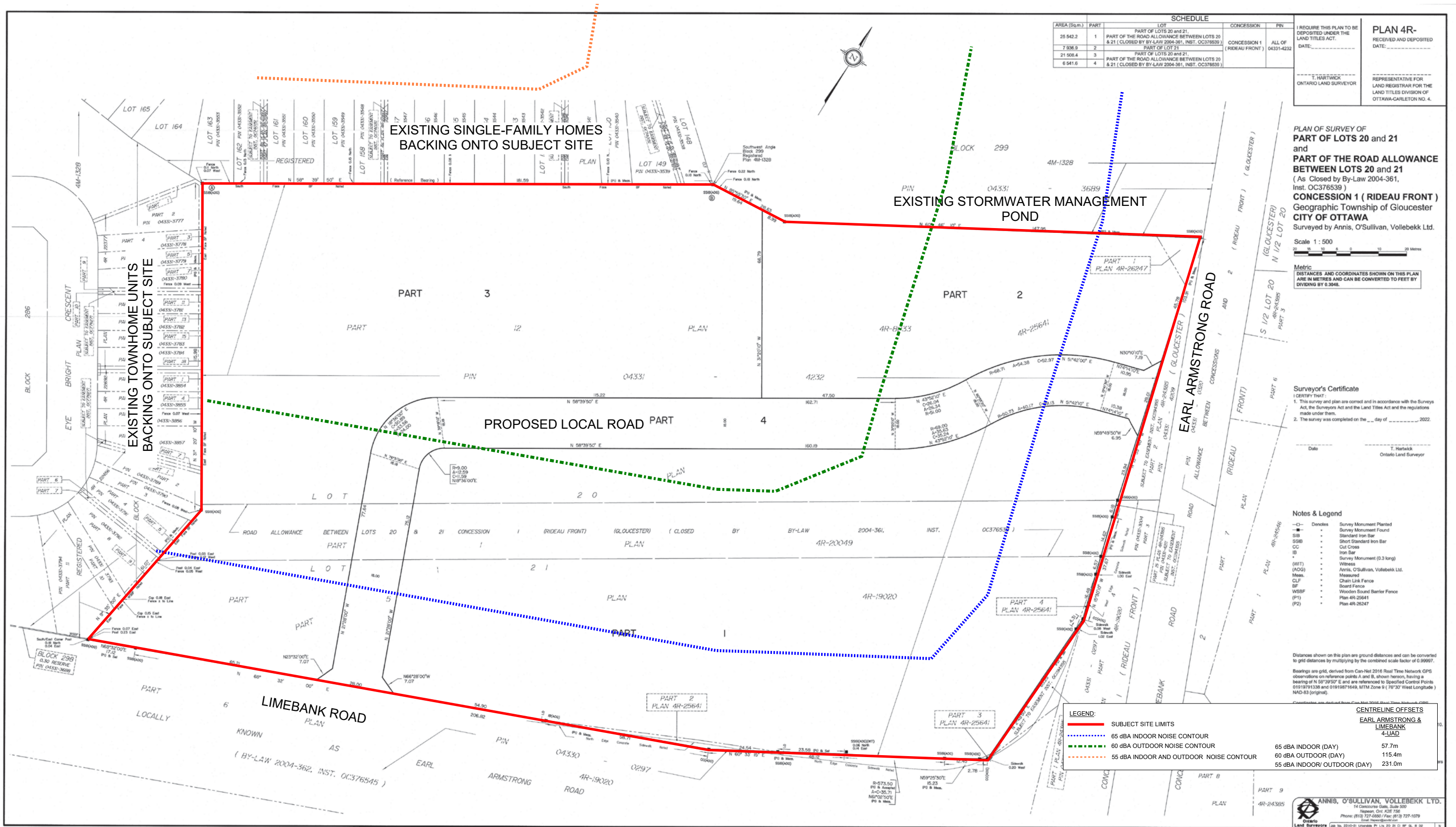
IBI Group (IBI) was retained by Urbandale Corporation to undertake a Noise Control Feasibility Study in support of a Draft Plan of Subdivision application for the proposed development to be located at 1515 Earl Armstrong Road, Ottawa. In terms of stationary noise, a preliminary review did not identify any off-site noise sources within the study area, while on-site noise sources will require further review as the proposed development plans are further refined through the Site Plan Control (SPC) application process. Any 'noise-sensitive' land uses proposed on-site will be further investigated, following Draft Plan approval for the subject property. Detailed noise analysis will be conducted, as required, to inform the recommendations for appropriate warning clauses, Sound Transmission Class (STC) ratings for windows/doors or physical attenuation with respect to either aircraft or traffic noise in support of the SPC application submission package.

7 Professional Authorization

Prepared By:



Ben Pascolo-Neveu, P.Eng.



Filename: 4-UAD.te Time Period: Day/Night 16/8 hours
Description: 4-UAD 65 dBA (day)/ 60 dBA (night)

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: 4-UAD (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.69 / 43.54 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: 4-UAD (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: 4-UAD (day/night)

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Angle1  Angle2      : -90.00 deg  90.00 deg
Wood depth      :      0      (No woods.)
No of house rows :      0 / 0
Surface         :      1      (Absorptive ground surface)
Receiver source distance : 57.69 / 43.54 m
Receiver height  : 1.50 / 4.50 m
Topography      :      1      (Flat/gentle slope; no barrier)
Reference angle  : 0.00
  
```

Results segment # 1: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 61.99 + 0.00) = 61.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-9.71	-1.46	0.00	0.00	0.00	61.99

Segment Leq : 61.99 dBA

Results segment # 2: 4-UAD (day)

Source height = 1.50 m

ROAD (0.00 + 61.99 + 0.00) = 61.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-9.71	-1.46	0.00	0.00	0.00	61.99

Segment Leq : 61.99 dBA

Total Leq All Segments: 65.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-7.27	-1.30	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

Results segment # 2: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-7.27	-1.30	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

Total Leq All Segments: 60.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.00
(NIGHT): 60.00

Filename: 4uad.te Time Period: Day/Night 16/8 hours
Description: 4uad 60 dba (day) / 50 dba (night)

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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 115.41 / 188.80 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00



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

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 115.41 / 188.80 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

RF

Results segment # 1: (day)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-14.71	-1.46	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

RF

Results segment # 2: (day)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-14.71	-1.46	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

Total Leq All Segments: 60.00 dBA

RF

Results segment # 1: (night)

Source height = 1.50 m

ROAD (0.00 + 46.99 + 0.00) = 46.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-17.27	-1.30	0.00	0.00	0.00	46.99

Segment Leq : 46.99 dBA

RF

Results segment # 2: (night)

Source height = 1.50 m

ROAD (0.00 + 46.99 + 0.00) = 46.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-17.27	-1.30	0.00	0.00	0.00	46.99

Segment Leq : 46.99 dBA

Total Leq All Segments: 50.00 dBA

RF

TOTAL Leq FROM ALL SOURCES (DAY): 60.00
(NIGHT): 50.00

Filename: 4-UAD.te Time Period: Day/Night 16/8 hours
Description: 4-UAD 55 dBA (day)/ 60 dBA (night)

Road data, segment # 1: 4-UAD (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: 4-UAD (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 230.98 / 43.54 m
Receiver height : 1.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: 4-UAD (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 17500
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: 4-UAD (day/night)

 Angle1 Angle2 : -90.00 deg 90.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 230.98 / 43.54 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: 4-UAD (day)

 Source height = 1.50 m

ROAD (0.00 + 51.99 + 0.00) = 51.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-19.71	-1.46	0.00	0.00	0.00	51.99

Segment Leq : 51.99 dBA

Results segment # 2: 4-UAD (day)

 Source height = 1.50 m

ROAD (0.00 + 51.99 + 0.00) = 51.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.66	73.16	0.00	-19.71	-1.46	0.00	0.00	0.00	51.99

Segment Leq : 51.99 dBA

Total Leq All Segments: 55.00 dBA

Results segment # 1: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-7.27	-1.30	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

Results segment # 2: 4-UAD (night)

Source height = 1.50 m

ROAD (0.00 + 56.99 + 0.00) = 56.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.57	65.56	0.00	-7.27	-1.30	0.00	0.00	0.00	56.99

Segment Leq : 56.99 dBA

Total Leq All Segments: 60.00 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.00
(NIGHT): 60.00