



1850
Walkley
Road

March 28

2018

Zodiac Light Waves Inc.

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**NOISE IMPACT
ASSESSMENT
FOR THE PROPOSED
RESIDENTIAL DEVELOPMENT
TO BE LOCATED AT
1850 Walkley Road**

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1.0 INTRODUCTION AND SUMMARY

Zodiac Light Waves Inc. was retained to investigate the potential impact of environmental noise and vibration on the proposed development located at 1850 Walkley Road situated close to the intersection of Walkley Road and Don Reid Drive, Ottawa, Ontario.

The assessment is based on the proposed development, existing and future noise and vibration sources, and the environmental noise and vibration guidelines of the Ministry of Environment and Climate Change ("MOECC") and the City of Ottawa Environmental Noise Control Guideline ("ENCG"). A noise and vibration study is required by the municipality as part of the planning and approvals process.

The proposed development consists of a restaurant building and an office tower, located at 1850 Walkley Road. In addition, there is the area at the back of the proposed restaurant which was identified as an amenity area. This study will evaluate this area as outdoor living area (OLA) to include potential variations in the design of the development. The site is bounded by Commercial properties and trees to the east, west and south.

Figure 1 shows the proposed site including the surrounding area. Zoning maps for the surrounding area are attached in Appendix A.

2.0 OBJECTIVE

The main goals of this work are to: (i) calculate the future noise levels on the study building produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in this report.

3.0 ENVIRONMENTAL NOISE ASSESSMENT

The main environmental noise sources external to the project which were identified and have the potential to adversely affect the development are motor vehicle traffic noise on Walkley Road which is considered arterial road in City of Ottawa Transportation master plan.

3.1 Traffic Noise Sources

3.1.1 Road Traffic

The traffic counts for Walkley Road was obtained from the City of Ottawa Environmental Noise Study Guideline. Based on the physical location and density of the neighborhood, it was conservatively assumed the minimum traffic counts available in modeling software as recommended by the City of Ottawa "Environmental Noise Control Guidelines." In addition, a yearly growth rate of 2.5% was used to calculate the traffic data. In order to calculate the fully developed road traffic volumes, numbers were grown to the year 2028. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa "Environmental Noise Control Guidelines." Posted speed limits were used in the analysis. Data used in the noise modelling are found in Table 1.

Table 1: Road Traffic Data Used in Analysis

Street	Time of the Day	Vehicles	Medium Trucks	Heavy Trucks
Walkley Road	0700-2300	30000	7%	5%

3.1.2 Rail Traffic

There is no rail traffic within the zone of influence as per City of Ottawa Noise Protocol. Therefore, no further assessment was performed.

3.1.3 Air Traffic

Proposed project is located out of the zone of influence from the Airport Operating Influence Zone (AOIZ) and NEF/NEP contours lines. Therefore, no further assessment was performed.

2.2 Stationary Noise Sources

Based on investigation of the surrounding areas, there are no potential stationary industrial sources of noise in the vicinity of the proposed development. The City of Ottawa Environmental Noise Control Guideline ("ENCG") were utilised as guidance for recommended separation distances and other control measures for land use planning proposals to prevent or minimize 'adverse effects' from the encroachment of incompatible land uses where a facility either exists or is proposed. Since no industrial sources are located in the vicinity of the proposed development, it was not considered further in this study.

3.0 TRAFFIC NOISE IMPACT

3.1 Applicable Noise Guideline

The City of Ottawa Environmental Noise Control Guideline ("ENCG") for transportation noise impacting residential developments was utilised for this study. A summary of the City of Ottawa noise requirements is provided Table 2 below.

Table 2: City of Ottawa Noise Control Guidelines – Road Traffic Noise Requirements

Receiver Category	Time Period	Road Traffic		Requirements
		Criterion Averaged over Time Period ^[1]		
		Leq (dBA)	Applies at	
Outdoor	0700-2300	55 ^[2]	OLA	None
		56 to 60		Warning Clause
		> 60		Alternative Land Use Alternative Layout Berm or barrier Possible Warning Clause
Plane of Window	0700-2300	55 to 65	Plane of Window	Provision for central air conditioning + warning clause
		> 65 ^[3]		Central air conditioning is required.
	2300-0700	50 to 60 ^[3]	Plane of Window	Provision for central air conditioning + warning clause
		> 60 ^[3]		Central air conditioning + warning clause
Indoor	0700-2300	45	Living Area	If Central AC is required, facade must be designed to meet these levels
	2300-0700	40	Sleeping Area	

Notes: [1] Cumulative Impacts

[2] The criterion may be exceeded by an amount not greater than 5 dBA, subject to justification and use of a Warning Clause.

For OLAs, a design goal of 55 dBA LEQ,day is required. An unmitigated sound exposure due to road traffic of up to 60 dBA is considered a minor excess and is permissible, provided a warning clause advising the occupant of the potential noise levels is used. A sound exposure greater than 60 dBA must be reduced to 60 dBA or less using physical mitigation methods such as berms or barriers, or combination of both.

A central air conditioning system as an alternative means of ventilation to open windows is required for dwellings where night-time sound levels outside bedroom windows exceed 60 dBA or where daytime sound levels outside living room windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when night-time sound levels at bedroom windows are in the range of 51 to 60 dBA or when daytime sound levels at living room windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise and when the plane of window sound level is greater than 55 dBA due to rail traffic noise. The use of warning clauses to notify future residents of possible excesses is also recommended.

3.2 Traffic Noise Impact Assessment

LEQ_{night} and LEQ_{day} attributable to Walkley Road were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. Since the City of Ottawa requires projected sound exposures be based on ultimate traffic volumes for roadways, sound exposure levels were based on 2028 (future) road traffic predictions. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The proposed development will have two building with multi floors. It was assumed, that if the noise impact levels at the ground floors are acceptable (floors with larger exposure to Walkley Road traffic), the other floors will be satisfied as well.

Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed development which is the ground floor windows facing north. Sample sound exposure calculation and analysis assumptions are included in Appendix C.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

Floor	Façade	Street	Sound Level (dBA)	Total Sound Level (dBA)
			0700-2300	2300-0700
Ground floor restaurant	North facade	Walkley Road	61	59

4.0 VIBRATION IMPACT

4.1 Applicable Vibration Guideline

Since the Environmental Assessment Act and the Ministry of the Environment and Climate Change guidelines do not provide distance setbacks within or beyond which vibration assessments are to be prepared, the City is recommending that the necessary submissions address the vibration potential due to Light Rail Transit undertakings based on the following minimum areas of influence containing vibration sensitive receptors measured from the corridor right-of-way:

- 75 metres for its ground-borne vibration assessment

Generally, vibration assessment of the LRT is based on a set of draft protocols developed by the combined efforts of the Ministry of the Environment and Climate Change (MOECC) and the Toronto Transit Commission (TTC). The vibration impact criteria attempt to address two potential impacts from vibration generated by the LRT.

- First, the criteria consider perceptible vibration levels which address vibration that can be felt by occupants in a building. The limit for perceptible vibration levels has been set to 0.10 mm/s rms (root-mean-square) velocity.
- Secondly, the criteria document also mentions the sound from vibration (vibration induced noise) but does not set a limit.

4.2 Vibration Impact Assessment

Since the proposed development is located in the area with no Light Rail Transit. It was assumed that vibration levels are insignificant, and no further analysis was performed.

5.0 DISCUSSION AND RECOMMENDATION

5.1 Outdoor Living Areas (OLA)

The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, backyard, terrace, or other area where passive recreation is expected to occur, provided that it has a minimum depth of 4 m, and is outside the exterior building façade and unenclosed.

As per the site plans received from LRL Engineering Inc., dated February 2018 there is a parking lot area which represent the OLA as part of a proposed future development. Parking area is shielded by surrounding tall neighbour commercial buildings and trees that can wave the necessity of noise investigation in the backyard. To prove it, new receptor was added in the middle of OLA area and as show in appendix F, the sound levels are less than minimum limit of 55dBA.

5.2 Indoor Living Area

All floors of the proposed development have predicted night-time sound levels that are greater than 55 dBA but less than 65 dBA. To address these excesses, the City of Ottawa "Environmental Noise Control Guidelines" and MOE guidelines recommend that these dwelling units be equipped with a forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

Window or through-the-wall air conditioning units are not recommended for any residential units because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MOE publication NPC-216, Residential Air Conditioning Devices.

5.3 Building Façade Construction

All floors in the development will have night-time sound levels at the façade that are less than 60 dBA and daytime sound levels at the façade that are less than 65 dBA.

Therefore, any exterior wall, and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the dwelling units.

5.4 Provision of Air Condition Installation

The results of the current analysis indicate that noise levels will range between 55 and 65 dBA during the daytime period (07:00-23:00) and less than 60 dBA during the nighttime period (23:00-07:00). Therefore, minimum building construction in all areas is required to satisfy the Ontario Building Code. Results of the calculations also indicate that the development will require forced air heating with provision for central air conditioning (or similar mechanical systems). In addition to ventilation requirements, the following Warning Clause will also be required to be placed on all Lease, Purchase and Sale Agreements.

5.5 Warning Clauses

The City of Ottawa "Environmental Noise Control Guidelines" and MOE guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for dwelling units with anticipated traffic sound level excesses. Suggested wording, to be on title, for future dwelling units is given 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 ensure that provincial sound level limits are not exceeded, this dwelling unit has been designed with forced air heating and the provision for central air conditioning (or similar mechanical systems). The installation of central air conditioning will allow windows and exterior doors to remain closed, thereby

ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment and Climate Change."

6.0 CONCLUSION

The noise feasibility study was conducted to meet the noise guidelines developed by City of Ottawa Environmental Noise Control Guideline ("ENCG") and the MOE under Guideline NPC-300. Noise impacts at the proposed development have been evaluated and are predicted to meet MOE and City of Ottawa noise requirements. Noise abatement measures are not required to mitigate potential impacts. However, warning clauses advising the future occupants of the potential noise impacts will be required. Similarly, the vibration feasibility study was conducted to meet the MOE and TTC draft protocol. It was determined that no further vibration abatement measures are required to mitigate potential impacts.

The development is considered feasible from an environmental noise and vibration impact perspective.

This concludes our 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,

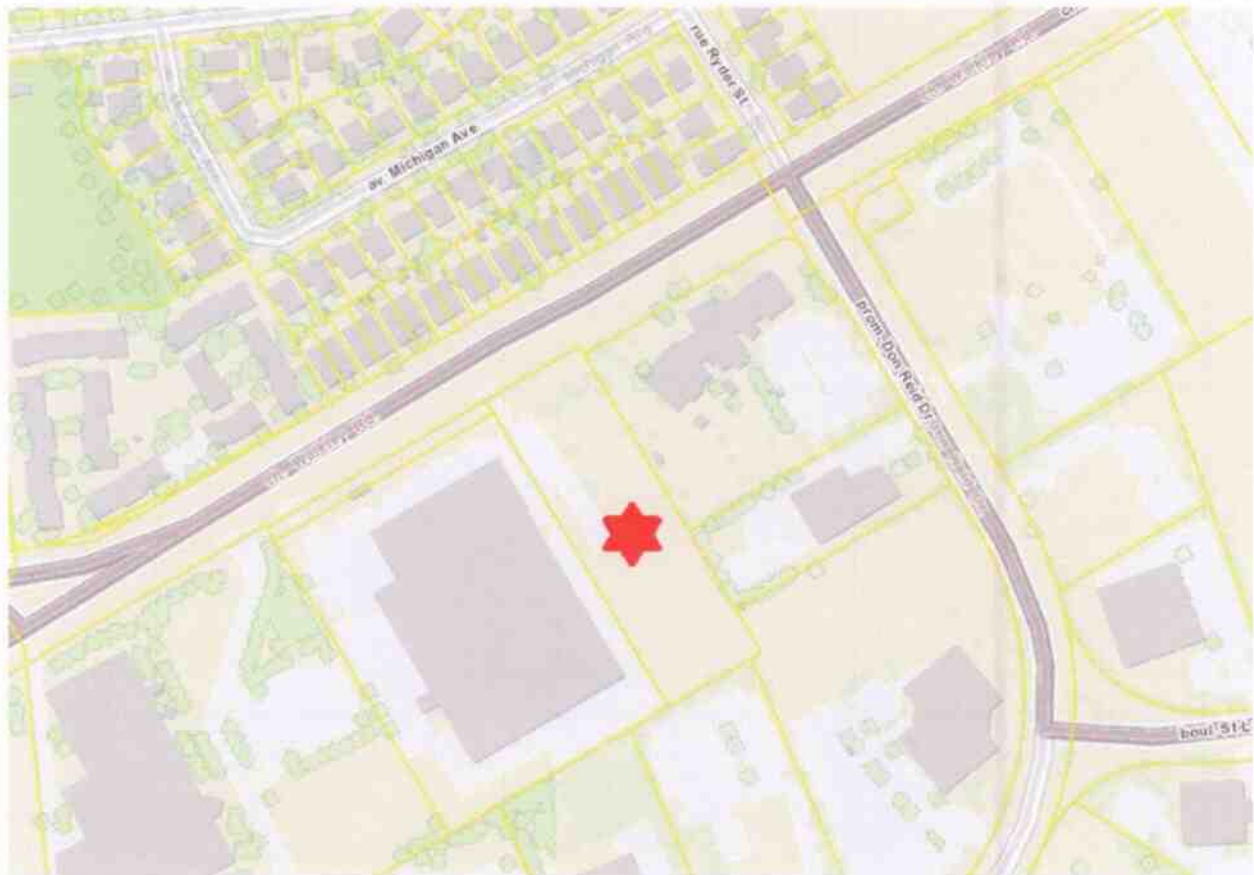


Hesam Mahdavi, P.Eng.

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Figure 1

Proposed Development Site Location



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Appendix A

Land-Use Zoning Maps



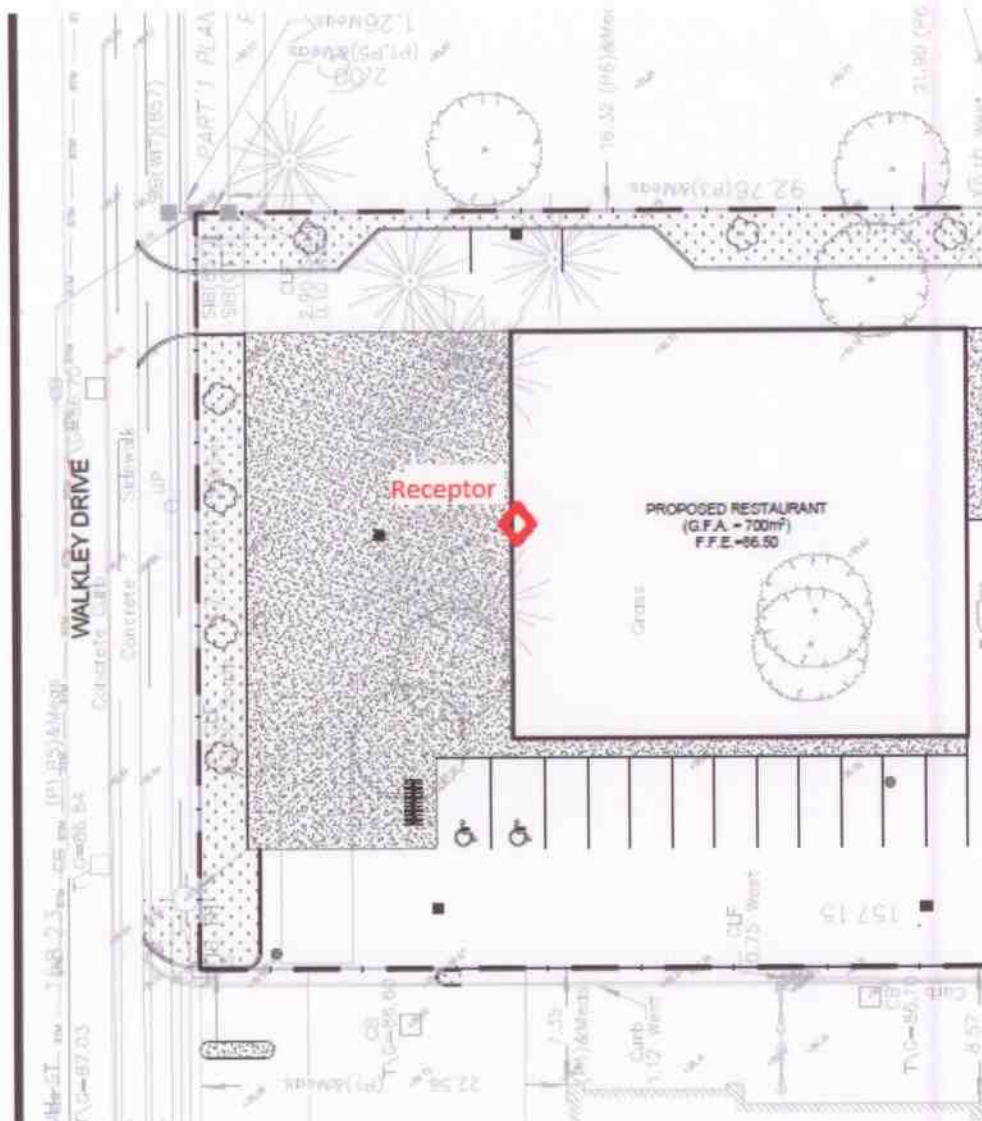
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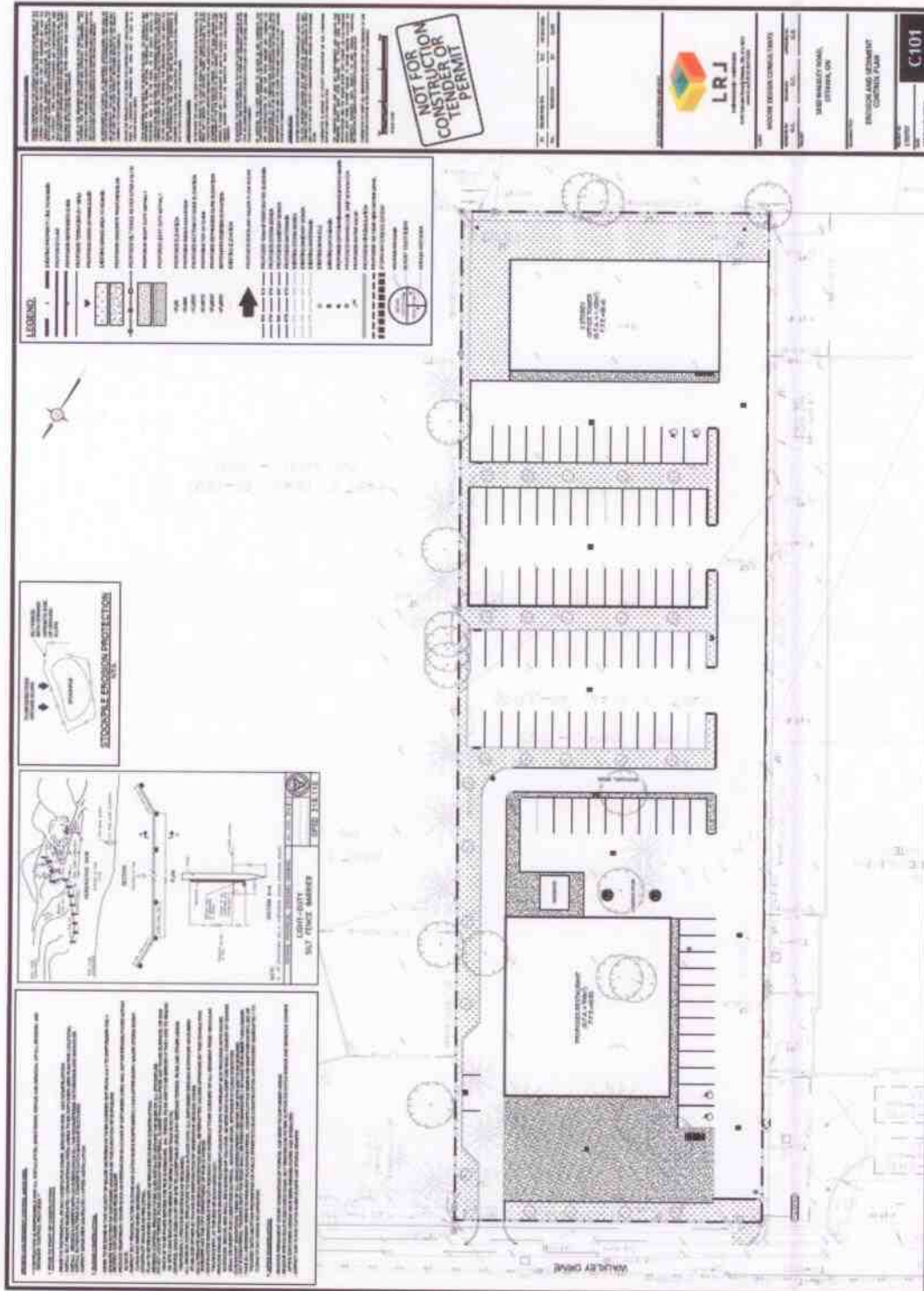
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CRITICAL RECEPTOR LOCATION



Appendix B

PROPOSED DEVELOPMENT FLOOR AND ELEVATION PLANS

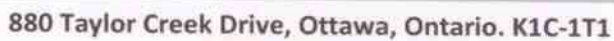


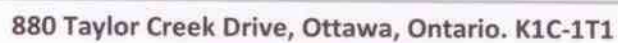
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Appendix C

STAMSON 5.0 NORMAL REPORT Date: 14-03-2018 15:12:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: Time Period: Day/Night 16/8 hours
Description:

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

```
-----
Car traffic volume   : 22531/11264 veh/TimePeriod *
Medium truck volume : 1792/896   veh/TimePeriod *
Heavy truck volume  : 1280/640   veh/TimePeriod *
Posted speed limit  :    50 km/h
Road gradient       :     0 %
Road pavement      :     1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 30000
Percentage of Annual Growth       : 2.50
Number of Years of Growth         : 10.00
Medium Truck % of Total Volume    : 7.00
Heavy Truck % of Total Volume     : 5.00
Day (16 hrs) % of Total Volume    : 66.67
```

Data for Segment # 1: Walkley (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 : 50.00 / 50.00 m
Receiver height     : 2.00 / 2.00 m
Topography          :      1       (Flat/gentle slope; no
barrier)
Reference angle     :      0.00
```


Results segment # 1: Walkley (day)

Source height = 1.50 m

ROAD (0.00 + 61.13 + 0.00) = 61.13 dBA

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

-90	90	0.65	71.16	0.00	-8.60	-1.43	0.00	0.00	0.00
61.13									

Segment Leq : 61.13 dBA

Total Leq All Segments: 61.13 dBA

Results segment # 1: Walkley (night)

Source height = 1.50 m

ROAD (0.00 + 61.13 + 0.00) = 61.13 dBA

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

-90	90	0.65	71.16	0.00	-8.60	-1.43	0.00	0.00	0.00
61.13									

Segment Leq : 59.56 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.13
(NIGHT): 59.56