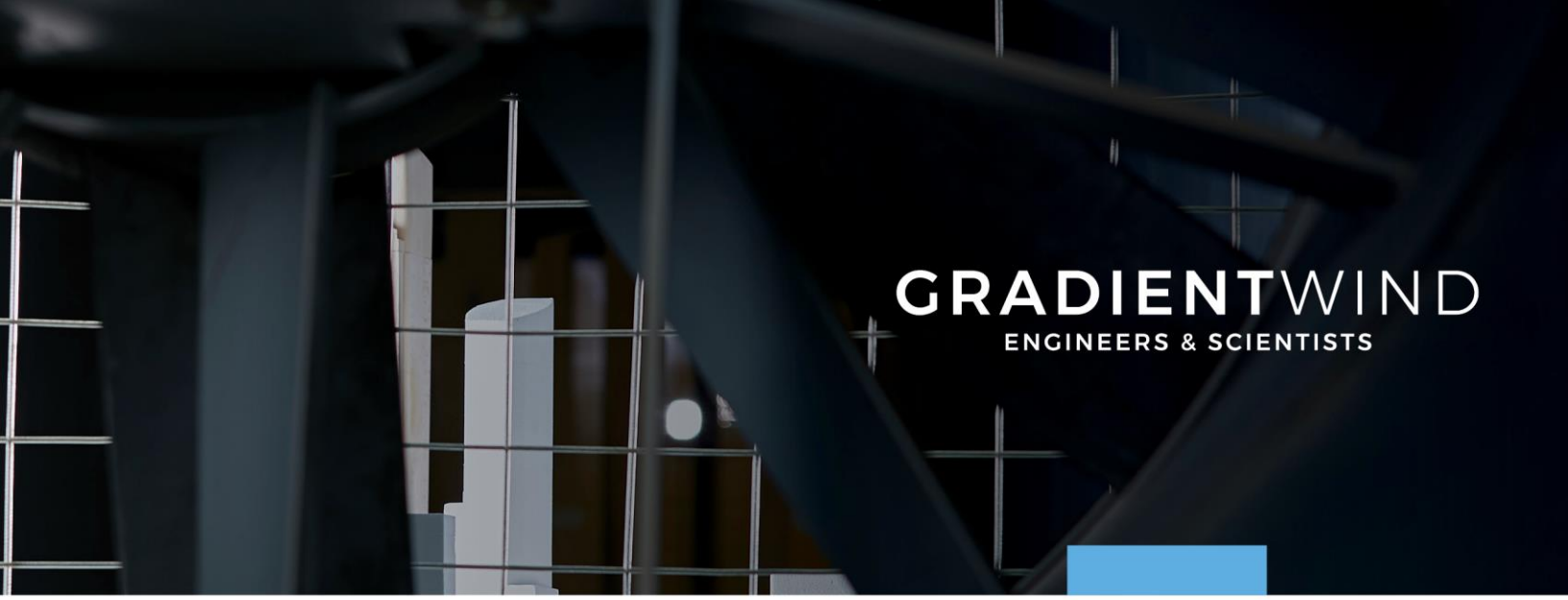

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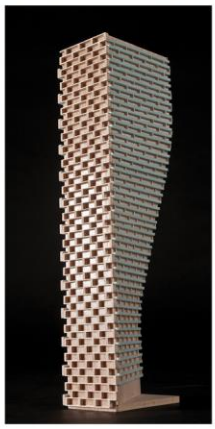
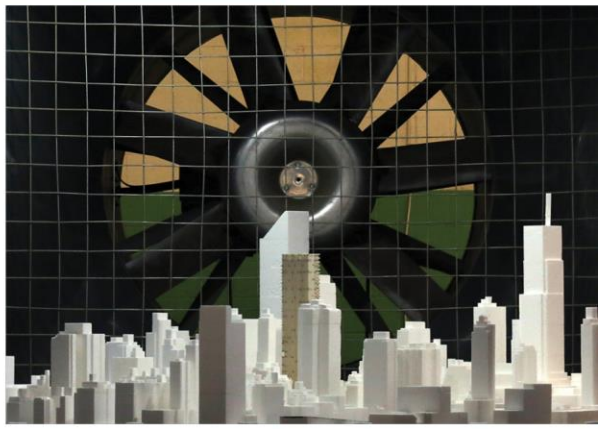
ENGINEERS & SCIENTISTS

TRANSPORATION NOISE FEASIBILITY ASSESSMENT

1824 Bank Street
Ottawa, Ontario

Report: 24-150-Noise





October 10, 2024

PREPARED FOR
Sun Life Assurance Company of Canada
c/o BentallGreenOak (Canada) LP
1 York Street, Suite 1100
Toronto, ON M5J 0B6

PREPARED BY
Sergio Nunez Andres, B.A.Sc., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes an environmental noise assessment undertaken to satisfy Official Plan and Zoning By-law Amendment application submission requirements for the proposed mixed-use residential development located at 1824 Bank Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). This study aims to analyze the sound pressure levels in the area of interest.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300, and City of Ottawa Environmental Noise Control Guidelines (ENCG) guidelines; (ii) future vehicular traffic volumes corresponding to roadway classification obtained from the City of Ottawa.

The results of the roadway traffic noise calculations are summarized in Table 3. The results of the current analysis indicate that noise levels for POW receptors will range between 55 and 68 dBA during the daytime period (07:00-23:00) and between 47 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the south façade of Building 2, which is directly exposed to the noise generated by Bank Street. Noise contours for the roadway traffic noise calculations are shown in Figures 3 and 4 for the daytime and nighttime periods, respectively.

Upgraded building components, such as higher STC-rated windows will be required for Buildings 1, 2, and 3 as the noise levels exceed the 65 dBA criteria at POW receptors. Results also indicate that the buildings will require central air conditioning or a similar mechanical system, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type D warning clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Ontario Building Code (OBC 2020) compliant building components will be sufficient for Building 4. The building should be designed with the provision for adding central air conditioning. However, it is anticipated that central air conditioning or a similar mechanical system will be provided for residential units. For Building 4, a Type C warning Clause will be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Regarding stationary noise sources, there are no stationary noise sources that may impact the proposed development in the vicinity of the subject site. The noise from small mechanical equipment located on the rooftops of neighbouring low-rise commercial buildings can be mitigated by OBC-compliant building components. Stationary noise impacts from the development onto the surroundings can be minimized by judicious placement of mechanical equipment or the incorporation of silencers and noise screens as necessary. It is also recommended that any large pieces of HVAC equipment, which is required to be situated outdoors, be placed closer to the penthouse avoiding the line of sight with the surrounding noise-sensitive buildings.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc was retained by BentallGreenOak (Canada) LP on behalf of Sun Life Assurance Company of Canada to undertake an environmental noise assessment for the proposed mixed-use residential development located at 1824 Bank Street in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300, Ministry of Transportation Ontario (MTO), and City of Ottawa Environmental Noise Control Guidelines (ENCG) guidelines. Noise calculations were based on site plan drawings provided by Hobin Architecture Incorporated, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities, and recent satellite imagery.

2. TERMS OF REFERENCE

The subject site is located at 1824 Bank Street in Ottawa, situated at the northwest corner of the intersection of Bank Street and Walkley Road, bordered by a commercial plaza and surface parking to the north, Bank Street to the east, Walkley Road to the south, and low-rise residential buildings to the west.

The proposed development comprises four buildings: Building 1 (24-storey tower atop a 4-storey podium) located at the southwest corner of the subject site fronting Walkley Road; Building 2 (39-storey tower atop a 5-storey podium) located at the southeast corner fronting Walkley Road and Bank Street; Building 3 (33-storey tower atop a 4-storey podium) located along the east perimeter fronting Bank Street; and Building 4 (33-storey tower atop a 4-storey podium) located along the north elevation. The four proposed buildings are positioned around a central open green space along the west elevation. The public street connects the private drive aisle and the underground parking entrances of Buildings 1 and 4 to Walkley Road. An additional private drive aisle extends east along the north elevation of Building 3 to connect the subject site to Bank Street. Drop-off areas are located along the private drive aisle along the central open space. Privately owned Publicly Accessible Spaces (POPS) are located to the east of Building 2 fronting the intersection of Bank Street and Walkley Road, at the southwest corner of the subject site, and at the northeast corner of the subject site.

Balconies and private terraces of less then 4 m in depth are not considered as outdoor living areas (OLA), as per the ENCG. There is the potential for roof top common amenity spaces on all Buildings which were considered as OLA. The terrace on west side of Building 1 at Level 5 and on the east side of Building 2 at Level 6 were also treated as OLA as their depth was more then 4 m.

Building 1 includes an underground parking entrance along the west elevation. The ground floor is programmed for residential use and includes a lobby at the northeast corner, a loading bay and garbage room along the east elevation, and an amenity terrace to the west which is accessible through indoor amenities along the west elevation. The mezzanine includes an indoor amenity with balconies along the north elevation and along the east elevation, storage at the southeast corner, and bicycle storage along the south and west elevations.

The ground floor of Building 2 includes a residential lobby with indoor amenities along the north elevation, a loading bay and a bicycle lobby along the west elevation, and additional amenity space fronting Bank Street along the east elevation. Shared building support spaces are located along the south elevation. The mezzanine includes additional indoor amenity space at the northwest corner and bicycle storage along the south elevation.

The ground floor of Building 3 is programmed for mixed-use and includes a residential lobby at the southwest corner, indoor amenities along the south and west elevations, a garbage room and loading bay along the north elevation, and commercial space fronting Bank Street along the east elevation. The mezzanine includes indoor amenities along the west and north elevations and storage to the south.

Building 4 includes a parking entrance along the west elevation. The ground floor includes a residential lobby and loading bay along the south elevation, amenity space to the west and residential units to the north.

Buildings 1-4 include amenity terraces at their respective mechanical penthouse (MPH) levels. Canopies extend over the MPH-level amenity terraces from the adjoining MPHs as well as from the four podia above the ground-level residential primary access points.

The primary sources of noise impacting the site are Bank St and Walkley Road. Figure 1 illustrates the site plan and surrounding context.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local roadway traffic, and (ii) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines as outlined in Section 5.1 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 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 during daytime and sleeping quarters during nighttime, respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [1]

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window can provide a minimum 20 dBA noise reduction2. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment. Therefore, where noise levels exceed 55 dBA during daytime and 50 dBA at nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[3].

The objective sound level for Outdoor Living Areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). Predicted noise levels at the outdoor living areas dictate the action required to achieve the recommended sound levels. According to the ENCG, if an area is to be used as an OLA, noise control measures are recommended where technical and administratively feasible to reduce the L_{eq} to 55 dBA. Where noise levels exceed 60 dBA noise mitigation is required. Mitigation measures include earth berms, noise barriers, or a combination of both for at-grade OLAs. Parapet walls, solid glass screens, planters, or

[1] Adapted from ENCG 2016 – Tables 2.2b and 2.2c
[2] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[2] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[3] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

a combination of these noise barriers can be used for terraces. If mitigation measures for OLAs are not provided, prospective purchasers or tenants should be informed of potential noise problems by a warning clause.

As such, when noise levels at the POWs and OLAs exceed the criteria, specific Warning Clause requirements may apply.

4.3 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by computer modelling. Transportation noise source modelling is based on the software program *Predictor-Lima* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model is also being accepted in the updated Environmental Guide for Noise of Ontario, 2022 by the Ministry of Transportation (MTO)[4]. This computer program can represent three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. Calculations, to represent the correlation between STAMSON and the *Predictor-Lima* TNM, were performed for three (3) receptors (R1, 3, and 4). The results of this calculation can be seen in Section 5.

A total of eighteen (18) receptor locations were identified around the site, as illustrated in Figure 2. Roadway noise calculations were performed by treating each road segment as separate line sources of noise, and by using existing and proposed building locations as noise barriers. 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 was taken to be 92% / 8% respectively for all streets.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Default ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Ten (10) Plane of Window (POW) receptors at different heights, representative of the different levels on the building, were strategically placed as well as eight (8) Outdoor Living Area (OLA) receptors throughout the study area.

[4] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022

4.4 Roadway Traffic Noise Levels

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development, The future public road is excluded as it is considered a local road. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[5] 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.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Bank Street	4-Lane Urban Arterial Divided (4-UAD)	50	**35,000**
Walkley Road	4-Lane Urban Arterial Divided (4-UAD)	50	**35,000**
Alta Vista Drive	2-Lane Major Collector	40	**12,000**

5. ROADWAY TRAFFIC NOISE RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3. The results of the current analysis indicate that noise levels for POW receptors will range between 55 and 68 dBA during the daytime period (07:00-23:00) and between 47 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the south façade of Building 2, which is directly exposed to the noise generated by Bank Street. Noise contours for the roadway traffic noise calculations are shown in Figures 3 and 4 for the daytime and nighttime periods, respectively.

[5] City of Ottawa Transportation Master Plan, November 2013

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor / Receptor Type	Location	Receptor Height (m)	Noise Level (dBA)	
			Day	Night
R01 / POW	Building 1 South Facade	4	67	60
R02 / POW	Building 1 East Facade	4	58	51
R03 / POW	Building 2 South Facade	4	68	60
		50	67	60
		120	67	60
R04 / POW	Building 2 East Facade	4	67	59
R05 / POW	Building 2 North Facade	50	55	47
R06 / POW	Building 3 South Facade	4	62	54
R07 / POW	Building 3 East Facade	4	68	60
		80	67	60
R08 / POW	Building 3 North Facade	4	60	52
R09 / POW	Building 4 East Façade	4	60	53

*Noise levels during the nighttime are not considered for OLAs

CONTINUATION TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor / Receptor Type	Location	Receptor Height (m)	Noise Level (dBA)	
			Day	Night
R10 / POW	Building 4 South Facade	50	57	49
		80	57	49
R11 / OLA	Building 4 East Roof	15	58	N/A
R12 / OLA	Building 4 Tower Roof	102	47	N/A
R13 / OLA	At-grade Open Space	4	55	N/A
R14 / OLA	Building 3 Tower Roof	102	50	N/A
R15 / OLA	Building 2 Tower Roof	119	42	N/A
R16 / OLA	Building 1 Tower Roof	74	44	N/A
R17 / OLA	Building 1 South West (Level 5)	14	61	N/A
R18 / OLA	Building 2 North East (Level 6)	18	66	N/A

*Noise levels during the nighttime are not considered for OLAs

Table 4 shows a comparison of Predictor and STAMSON calculation results. Noise levels calculated in STAMSON were found to have a good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±0-3 dBA.

TABLE 4: RESULTS CORRELATION WITH STAMSON

Receptor ID	Receptor Location	Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R1	Building 1 South Façade	4	70	63	67	60
R3	Building 2 South Façade	4	71	63	68	60
R4	Building 2 East Façade	4	70	62	67	59

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the roadway traffic noise calculations are summarized in Table 3. The results of the current analysis indicate that noise levels for POW receptors will range between 55 and 68 dBA during the daytime period (07:00-23:00) and between 47 and 60 dBA during the nighttime period (23:00-07:00). The highest noise level (68 dBA) occurs at the south façade of Building 2, which is directly exposed to the noise generated by Bank Street. Noise contours for the roadway traffic noise calculations are shown in Figures 3 and 4 for the daytime and nighttime periods, respectively.

Upgraded building components will be required for Buildings 1, 2, and 3 as the noise levels exceed the 65 dBA criteria at POW receptors. Results also indicate that the buildings will require central air conditioning or a similar mechanical system, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, a Type D warning clause will also be required in all Lease, Purchase and Sale Agreements, for Buildings 1, 2, and 3 as summarized below:

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 sound level limits of the Municipality and the Ministry of the Environment."*

Ontario Building Code (OBC 2020) compliant building components will be sufficient for Building 4. The building should be designed with the provision for adding central air conditioning. However, it is anticipated that central air conditioning or a similar mechanical system will be provided for residential units. If air conditioning is provided, then the Type D warning clause, noted above, would also apply to Building 4.

This sample clause is provided only as example and can be modified by the owner's legal representative, in consultation with the City, in order to suit site-specific requirements.

Regarding stationary noise sources, there are no stationary noise sources that may impact the proposed development in the vicinity of the subject site. The noise from small mechanical equipment located on the rooftops of neighbouring low-rise commercial buildings can be mitigated by OBC-compliant building components. Stationary noise impacts from the development onto the surroundings can be minimized by judicious placement of mechanical equipment or the incorporation of silencers and noise screens as necessary. It is also recommended that any large pieces of HVAC equipment, which is required to be situated outdoors, be placed closer to the penthouse avoiding the line of sight with the surrounding noise-sensitive buildings.

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.

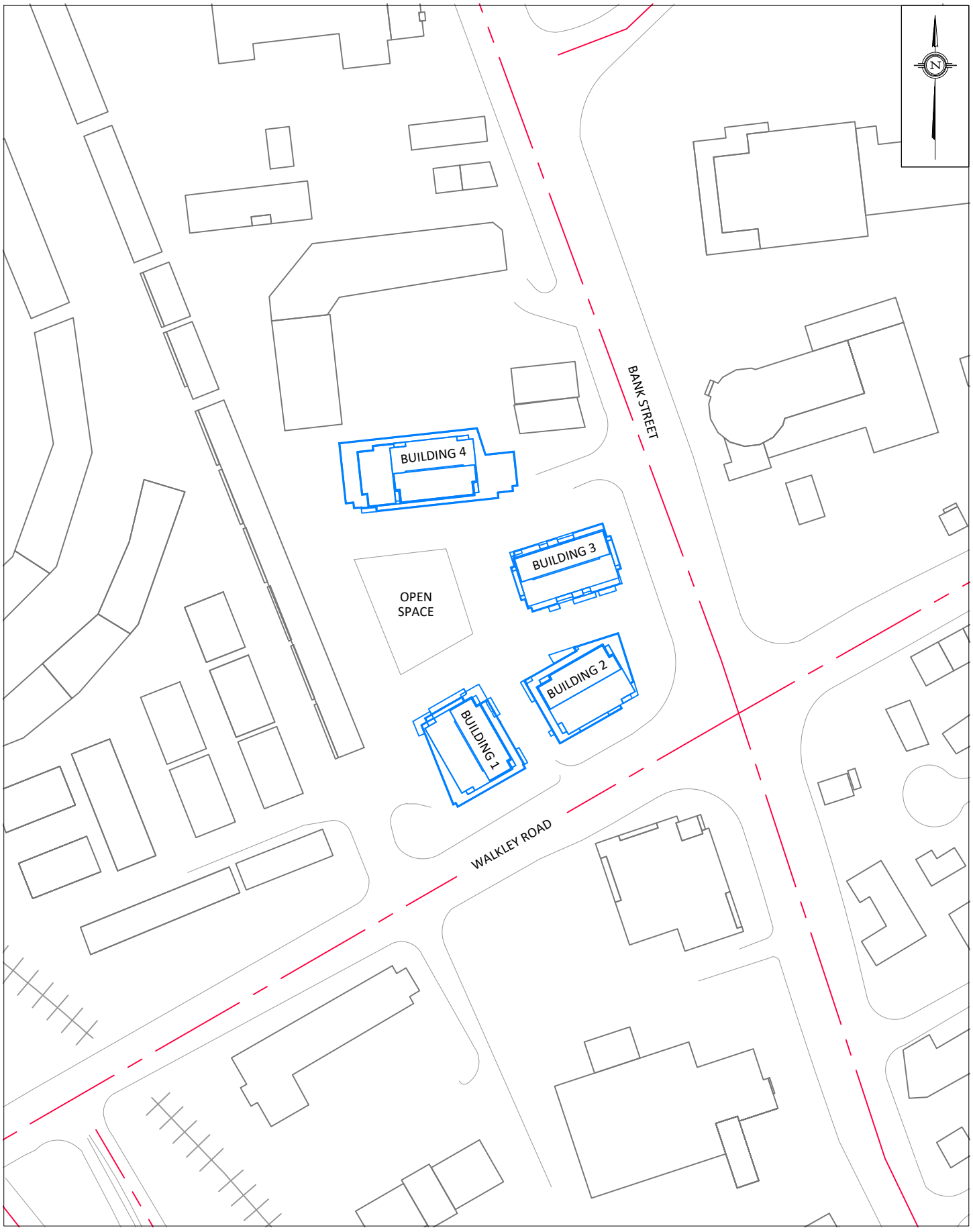
Sincerely,

Gradient Wind Engineering Inc.

Sergio Nunez Andres

Sergio Nunez Andres B.A.Sc.
Junior Environmental Scientist

Joshua Foster., P.Eng.
Lead Engineer



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ENGINEERS & SCIENTISTS
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613 836 0934 • GRADIENTWIND.COM

PROJECT	1824 BANK ST, OTTAWA, ONTARIO ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW24-150 - 1
DATE	SEPTEMBER 25, 2024	DRAWN BY	S.N

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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PROJECT	BANK STREET , OTTAWA , ONTARIO ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW24-150 - 2
DATE	SEPTEMBER 25, 2024	DRAWN BY	S.N.

FIGURE 2:
RECEPTOR LOCATIONS

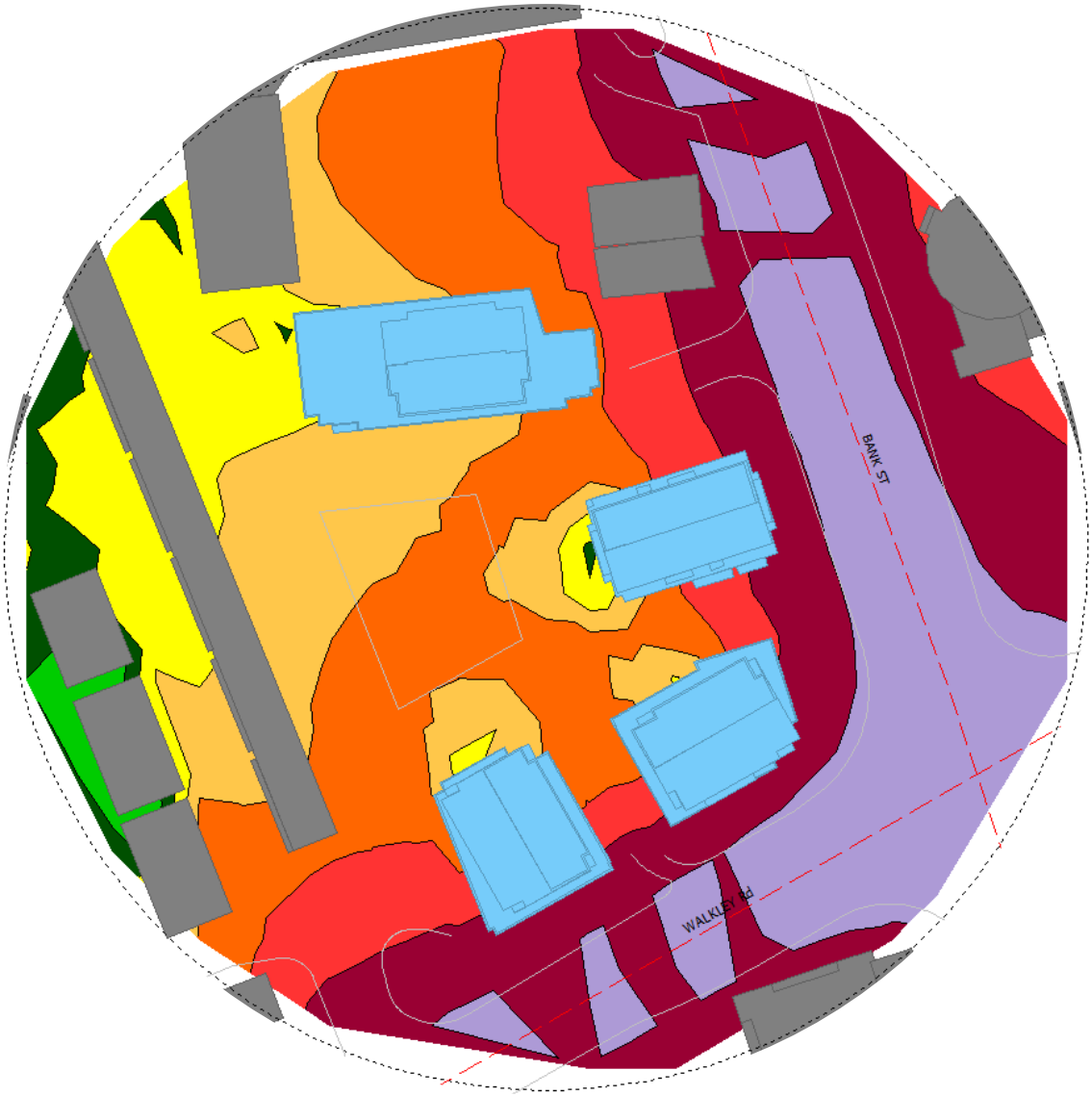
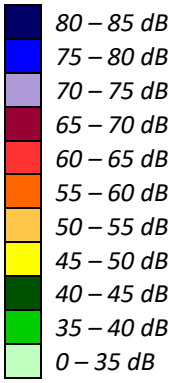


FIGURE 3: DAYTIME NOISE CONTOURS (4.5 M ABOVE GRADE)



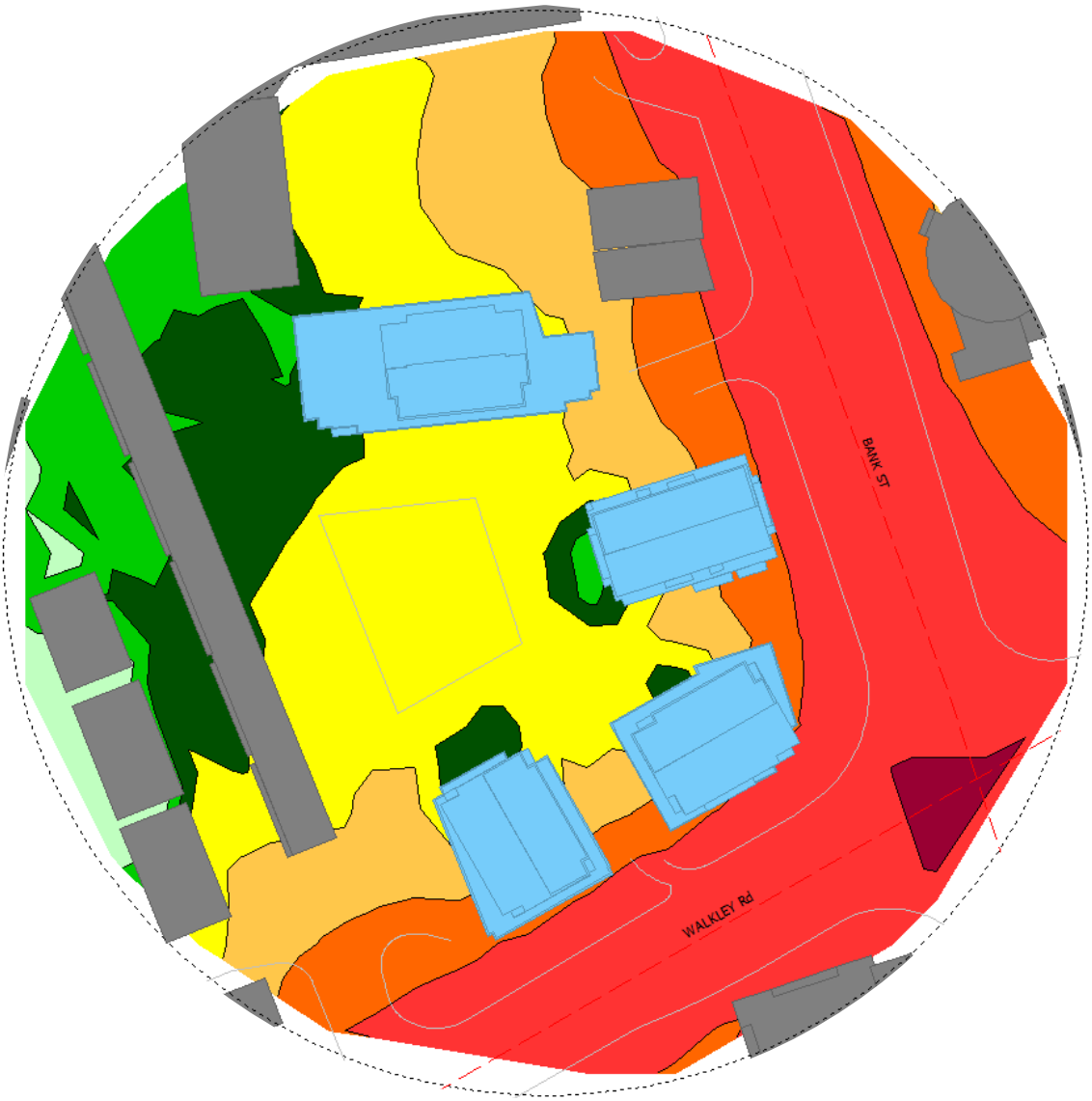


FIGURE 4: NIGHTTIME NOISE CONTOURS (4.5 M ABOVE GRADE)

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
GRADIENTWIND.COM

STAMSON 5.0 NORMAL REPORT Date: 27-09-2024 12:37:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Walkley 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 / 24.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Bank St (day/night)

Angle1 Angle2 : -11.00 deg 26.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 102.00 / 102.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Walkley Rd (day)

Source height = 1.50 m

ROAD (0.00 + 70.12 + 0.00) = 70.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	-2.04	0.00	0.00	0.00	0.00	70.12

Segment Leq : 70.12 dBA

Results segment # 2: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 56.96 + 0.00) = 56.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	26	0.00	72.16	0.00	-8.33	-6.87	0.00	0.00	0.00	56.96

Segment Leq : 56.96 dBA

Total Leq All Segments: 70.32 dBA

Results segment # 1: Walkley Rd (night)

Source height = 1.50 m

ROAD (0.00 + 62.52 + 0.00) = 62.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	64.56	0.00	-2.04	0.00	0.00	0.00	0.00	62.52

Segment Leq : 62.52 dBA

Results segment # 2: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 49.37 + 0.00) = 49.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	26	0.00	64.56	0.00	-8.33	-6.87	0.00	0.00	0.00	49.37

Segment Leq : 49.37 dBA

Total Leq All Segments: 62.73 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.32
(NIGHT): 62.73

STAMSON 5.0 NORMAL REPORT Date: 27-09-2024 12:27:05
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Walkley 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 : 25.00 / 25.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Bank St (day/night)

Angle1 Angle2 : -11.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 54.00 / 54.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Walkley Rd (day)

Source height = 1.50 m

ROAD (0.00 + 69.94 + 0.00) = 69.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	-2.22	0.00	0.00	0.00	0.00	69.94

Segment Leq : 69.94 dBA

Results segment # 2: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 64.09 + 0.00) = 64.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	90	0.00	72.16	0.00	-5.56	-2.51	0.00	0.00	0.00	64.09

Segment Leq : 64.09 dBA

Total Leq All Segments: 70.94 dBA

Results segment # 1: Walkley Rd (night)

Source height = 1.50 m

ROAD (0.00 + 62.34 + 0.00) = 62.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	64.56	0.00	-2.22	0.00	0.00	0.00	0.00	62.34

Segment Leq : 62.34 dBA

Results segment # 2: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 56.49 + 0.00) = 56.49 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-11	90	0.00	64.56	0.00	-5.56	-2.51	0.00	0.00	0.00	56.49

Segment Leq : 56.49 dBA

Total Leq All Segments: 63.34 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.94
(NIGHT): 63.34

STAMSON 5.0 NORMAL REPORT Date: 27-09-2024 12:28:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

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

Angle1 Angle2 : -90.00 deg 12.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 39.00 / 39.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 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): 35000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: Bank St (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 : 35.00 / 54.00 m
Receiver height : 4.00 / 4.00 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Walkley Rd (day)

Source height = 1.50 m

ROAD (0.00 + 65.54 + 0.00) = 65.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	12	0.00	72.16	0.00	-4.15	-2.47	0.00	0.00	0.00	65.54

Segment Leq : 65.54 dBA

Results segment # 2: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 68.48 + 0.00) = 68.48 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	72.16	0.00	-3.68	0.00	0.00	0.00	0.00	68.48

Segment Leq : 68.48 dBA

Total Leq All Segments: 70.26 dBA

Results segment # 1: Walkley Rd (night)

Source height = 1.50 m

ROAD (0.00 + 57.95 + 0.00) = 57.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	12	0.00	64.56	0.00	-4.15	-2.47	0.00	0.00	0.00	57.95

Segment Leq : 57.95 dBA

Results segment # 2: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 59.00 + 0.00) = 59.00 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.00	64.56	0.00	-5.56	0.00	0.00	0.00	0.00	59.00

Segment Leq : 59.00 dBA

Total Leq All Segments: 61.52 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.26
(NIGHT): 61.52