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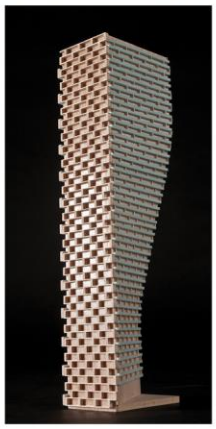
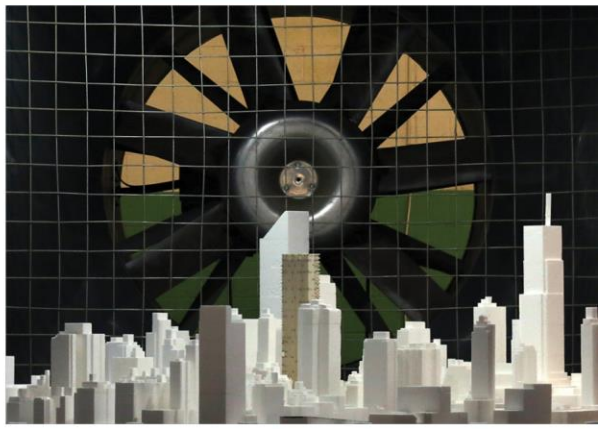
ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT

1887 St Joseph Boulevard
Ottawa, Ontario

Report: 23-117- Traffic Noise Feasibility





July 10th, 2023

PREPARED FOR
Sobeys Capital Limited
4980 Tahoe Boulevard
Mississauga, ON L4W 0C7

PREPARED BY
Essraa Alqassab, BASc., Junior Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken to satisfy the requirements for a Zoning By-law Amendment (ZBA) application submission for a proposed multi-building development located at 1887 St. Joseph Boulevard in Ottawa, Ontario. The proposed development comprises seven mixed-use and residential buildings. The primary sources of roadway traffic noise include St Joseph Boulevard, Jeanne D'Arc Boulevard, and Youville Drive. It should be noted that the study site is not within 75 m of any existing or proposed light rail transit system or a rail corridor; as such, a ground vibration assessment is not required. 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 provided by Figurr Architects Collective dated May 2023.

The results of the current analysis indicate that noise levels at the building façades will range between 46 and 65 dBA during the daytime period (07:00-23:00) and between 39 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the south corner of the site nearest and most exposed to St Joseph Boulevard.

Standard building components in compliance with the Ontario Building Code are sufficient, as noise levels do not exceed 65 dBA. Results of the calculations also indicate that all buildings will require forced air heating with provisions for air conditioning, or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, it is expected that air conditioning will be provided. Warning Clauses will also be required be placed on all Lease, Purchase and Sale Agreements for all buildings.

Noise levels at the rooftop amenity areas are expected to be between 43 dBA and 59 dBA. The highest noise level at an outdoor amenity area occurs at the Building B2 rooftop terrace. The Building A2 Level 7 outdoor amenity area, B1 rooftop terrace and C2 rooftop terrace also experience noise levels above 55 dBA, as such, noise mitigation will be required, in the form of noise barriers.

A detailed noise assessment will be required at the time of site plan approval to determine specific noise control measures for each building.

The site is surrounded by small commercial buildings and low-rise residential dwellings, which are served by small air handling units. As the site is not near any large mechanical equipment, negative stationary noise impacts onto the study site are not anticipated.

With regard to stationary noise impacts from the development onto the environment, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed buildings become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed block on surrounding noise sensitive areas. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to be negligible. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Sobeys Capital Limited to undertake a roadway traffic noise feasibility assessment, to satisfy the requirements for a Zoning By-law Amendment (ZBA) application submission, for a proposed multi-building development located at 1887 St Joseph Boulevard in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on architectural drawings provided by Figurr Architects dated May 2023, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The subject site is located at 1887 St. Joseph Boulevard in Ottawa, situated approximately 90 metres (m) to the northwest of the intersection of St. Joseph Boulevard and Marenger Street, on a parcel of land bounded by St. Joseph Boulevard to the south, low-rise buildings with parking lots from the west clockwise to the east, and a mid-rise building to the southeast.

The proposed development comprises seven buildings: Building A1 (18 storeys), Building A2 (16 storeys), Building B1 (nine storeys), Building B2 (seven storeys), Building C1 (nine storeys), Building C2 (nine storeys), and Building D (18 storeys). Buildings A1 and A2 are situated at the southwest and southeast corners of the subject site, respectively, Buildings B1 and C1 are to the west, Buildings B2 and C2 are to the east, and Building D is to the north. A potential public street extends along the west elevation, a potential private street extends east-west to the south of Building D, and a potential private street extends along the east elevation of the subject site. A future park area is provided to the west. All buildings are topped with a mechanical penthouse (MPH). Buildings A1, A2, B1, B2, C1, and C2 share a below-grade parking level which is accessed by parking ramps situated to the north of Buildings A2, B2, and C2 from

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

the potential private street along the east elevation of the subject site. Building D includes its own below-grade parking level which is accessed by a parking ramp at the northeast corner from the potential private street to the south of Building D.

The ground floor of Building A1 comprises a near rectangular planform and includes a residential main entrance at the southeast corner, retail spaces at the southwest corner, an indoor amenity to the west, residential units to the north, and an indoor bike storage and mail/parcel space to the east. Levels 2-18 are reserved for residential use. The building steps back from the west elevation at Level 2 and from all elevations at Level 7. The MPH level includes an indoor amenity to the south and a mechanical space to the north. This level is served by an amenity terrace to the south.

The ground floor of Building A2 comprises a nominally 'L'-shaped planform, with its long axis-oriented along St. Joseph Boulevard, and includes a residential main entrance at the southeast corner, retail spaces to the south, an indoor amenity to the west, residential units to the north, and a commercial garbage space and mail/parcel space to the east. An outdoor amenity is provided to the northwest. Levels 2-16 are reserved for residential use. The building steps back from all elevations and includes an amenity terrace to the north at Level 7. The MPH level includes an indoor amenity to the south and a mechanical space to the north. This level is served by an amenity terrace to the south.

The ground floor of Building B1 comprises a nominally rectangular planform and includes a residential main entrance, a bike room, and shared building support spaces at the southwest corner, an indoor amenity at the southeast corner, and residential units throughout the remainder of the level. Levels 2-9 are reserved for residential use. The MPH level includes an indoor amenity along the west and north elevations and a mechanical space throughout the remainder of the level. This level is served by an amenity terrace extending along the west and north elevations.

The ground floor of Building B2 comprises a nominally 'L'-shaped planform, with its long axis-oriented along the eastern potential private street and includes a residential main entrance at the southeast corner, shared building support spaces at the southeast corner and central to the building, and residential units throughout the remainder of the level. An outdoor amenity is provided to the southwest. Levels 2-7 are reserved for residential use. The building steps back from the east and west elevations and extends from the north elevation at Level 6. This level is served by an amenity terrace to the west. The MPH level

includes an indoor amenity to the south and mechanical space to the north. This level is served by an amenity terrace to the south.

The ground floor of Building C1 comprises a nominally 'L'-shaped planform, with its short axis-oriented along the western potential public street and includes a residential main entrance and shared building support spaces at the southwest corner, a bike room at the inner southeast corner, and residential units throughout the remainder of the level. An outdoor amenity is provided to the southeast. Levels 2-9 are reserved for residential use. The building steps back from all elevations and includes an amenity terrace to the south at Level 7. The MPH level includes an indoor amenity along the south and west elevations and a mechanical space throughout the remainder of the level. This level is served by an amenity terrace along the south and east perimeters.

The ground floor of Building C2 comprises a nominally rectangular planform and includes a residential main entrance and shared building support spaces at the southeast corner, a bike room at the southwest corner, and residential units throughout the remainder of the level. An outdoor amenity is provided to the southwest. Levels 2-9 are reserved for residential use. The building extends from the west elevation at Levels 3 and 4 to link to Building C1. The building steps back from the east and west elevations and includes an amenity terrace to the west at Level 5. The MPH level includes an indoor amenity to the east and a mechanical space along the south and west elevations. This level is served by an amenity terrace extending along the north and east elevations.

The ground floor of Building D comprises a nominally rectangular planform with an inset at the southeast corner and includes a residential main entrance and a bike storage space to the south, an indoor amenity at the southeast corner, and residential units throughout the remainder of the level. An outdoor amenity is provided to the north. Levels 2-18 are reserved for residential use. The building steps back from the southeast corner at Level 2 and from all elevations at Level 7. An amenity terrace is provided to the east at Level 7. The MPH level includes a mechanical space at the southeast corner and an indoor amenity throughout the remainder of the level. This level is served by an amenity terrace extending along the west and north elevations.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans become available. This study would assess impacts of stationary

noise from rooftop mechanical units serving the proposed block on surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to be negligible. In the event that noise levels exceed the ENCG criteria, noise impacts can generally be minimized by judicious selection and placement of the equipment.

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) explore potential noise mitigation options, where required.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's

Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail space, living rooms and sleeping quarters, respectively, for roadway traffic as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)[3]

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, 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[6].

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

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

4.2.2 Roadway Traffic Volumes

The ENCG dictates that noise calculations should consider future sound levels based on a roadway's classification at the mature state of development. Therefore, traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[7] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
St Joseph Boulevard	4-Lane Arterial Undivided	50	**30,000**
Jeanne-d'Arc Boulevard	4-Lane Arterial Undivided	50	**30,000**
Youville Drive	2-Lane Collector	40	**8,000**

4.2.3 Theoretical Roadway Noise Predictions

Noise predictions were determined by computer modelling using two programs: Predictor-Lima and STAMSON 5.04. To provide a general understanding of noise across the site, the employed software program was Predictor-Lima, which incorporates the United States Federal Highway Administration's (FHWA) Transportation Noise Model (TNM) 2.5. This computer program is capable of representing three-dimensional surface and first reflections of sound waves over a suitable spectrum for human hearing. A receptor grid was placed across the subject site, along with a number of discrete receptors at key sensitive areas. Although this program is useful for outputting noise contours, it is not the approved calculation method for roadway predictions by the City of Ottawa. Therefore, the results were confirmed by performing discrete noise calculations with the MECP computerized noise assessment program, STAMSON 5.04, at three sample receptor locations. Receptor distances and exposure angles are illustrated in Figure 3 and 4. Appendix A includes the STAMSON 5.04 input and output data.

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

Roadway noise calculations were performed by treating each road segment as a separate line source of noise, and by using existing buildings as noise barriers. In addition to the traffic volumes summarized in Table 1, theoretical noise predictions were based on the following parameters:

- The day/night split was taken to be 92%/8% respectively for all streets.
- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be flat/gentle slope surrounding the subject site.
- For select sources where appropriate, the receptors considered the proposed buildings and surrounding, existing buildings as barriers, partially or fully obstructing exposure to the source.
- Noise receptors were strategically placed at 37 locations around the study area, see Figure 2.

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the current analysis indicate that noise levels at the building façades will range between 46 and 65 dBA during the daytime period (07:00-23:00) and between 39 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the south corner of the site nearest and most exposed to St Joseph Boulevard. Figures 3 and 4 illustrate daytime and nighttime noise contours throughout the site 20 m above grade.

The noise levels predicted due to roadway traffic do not exceed the criteria listed in Section 4.2 for building components. Therefore, standard building components in compliance with the Ontario Building Code are sufficient in attenuating noise. Results also indicate that all seven buildings will require forced air heating with provisions for central air conditioning, or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, it is expected that due to the size of the buildings, air conditioning will be provided. In addition to ventilation requirements, Warning Clauses will also be required to be placed on all Lease, Purchase, and Sale Agreements. Specific noise control measures can be developed once the design of the buildings has progressed sufficiently, typically at the time of the site plan control application.

The results indicate that noise levels at the rooftop amenity areas are expected to be between 43 dBA and 59 dBA. The highest noise level at an outdoor amenity area occurs at the Building B2 rooftop terrace. The Building A2 Level 7 outdoor amenity area, B1 rooftop terrace and C2 rooftop terrace also experience noise levels above 55 dBA, as such, noise mitigation will be required, in the form of noise barriers. Specific noise control measures will be determined at the site plan approval stage.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC

Receptor Number	Absolute Receptor Height (m)	Receptor Location	Noise Level (dBA)	
			Day	Night
Building A1				
R1	52.5	POW / Level 18 South Façade	65	57
R2	52.5	POW / Level 18 West Façade	62	54
R3	52.5	POW / Level 18 East Façade	62	55
R4	52.5	POW / Level 18 North Façade	53	46
R5	1.5*	OLA / Rooftop Terrace	54	N/A
Building A2				
R6	45.5	POW / Level 9 South Facade	65	57
R7	45.5	POW / Level 9 West Façade	62	54
R8	45.5	POW / Level 9 East Façade	63	56
R9	45.5	POW / Level 9 North Façade	52	44
R10	1.5*	OLA / Rooftop terrace	54	N/A
R11	1.5*	OLA / Level 7 Outdoor Amenity Area	56	N/A
R12	1.5	Ground Level Seating Area	26	N/A
Building B2				
R13	19.5	POW / Level 7 East Façade	59	51
R14	19.5	POW / Level 7 North Façade	48	41
R15	19.5	POW / Level 7 West Façade	47	40
R16	1.5*	OLA / Level 7 Outdoor Amenity Area	46	N/A
R17	1.5*	OLA / Rooftop Terrace	59	N/A
Building B1				
R18	25.5	POW / Level 9 West Façade	56	49
R19	1.5*	OLA / Rooftop terrace	54	N/A
R20	1.5*	OLA / Rooftop Terrace	56	N/A
Building C1 / Building C2				
R21	25.5	POW / Level 9 C1 West Facade	53	46
R22	25.5	POW / Level 9 C1 North Façade	52	45
R23	25.5	POW / Level 9 C2 North Façade	55	47
R24	25.5	POW / Level 9 C2 East Facade	57	49
R25	1.5*	OLA / C1 Level 7 Outdoor Amenity Area	52	N/A
R26	1.5*	OLA / C1 Rooftop Terrace	53	N/A
R27	1.5*	OLA / C1/C2 Level 5 Outdoor Amenity Area	43	N/A
R28	1.5*	OLA / C2 Rooftop Terrace	56	N/A

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC (CONTD.)

Receptor Number	Absolute Receptor Height (m)	Receptor Location	Noise Level (dBA)	
			Day	Night
Building D				
R29	52.5	POW / Level 18 North Façade	58	50
R30	52.5	POW / Level 18 West Façade	56	49
R31	52.5	POW / Level 18 East Façade	59	51
R32	52.5	OLA / Level 18 South Façade	55	N/A
R33	1.5*	OLA / Level 7 Outdoor Amenity Area	55	N/A
R34	1.5*	OLA / Rooftop Terrace	52	N/A
R35	1.5	OLA / Ground Level Outdoor Amenity Area	48	N/A
Additional Ground Level Outdoor Amenity Areas				
R36	1.5	Building C1/C2 Ground Level Amenity	41	N/A
R37	1.5	Building B2 Ground Level Amenity	46	N/A

*Above rooftop

Table 4 below shows a comparison between the calculated noise levels using Predictor-Lima and STAMSON. Noise levels calculated in STAMSON were found to have good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±1-3dBA. Appendix A includes the STAMSON 5.04 input and output data. Receptor distances and exposure angles used in the STAMSON calculations are illustrated in Figure 5.

TABLE 4: RESULT CORRELATION BETWEEN PREDICTOR AND STAMSON

Receptor Number	Receptor Location	Absolute Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R2	Building A1 Level 18 West Façade	52.5	65	57	62	54
R7	Building A2 Level 9 West Façade	45.5	64	57	62	54

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels at the building façades will range between 46 and 65 dBA during the daytime period (07:00-23:00) and between 39 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (65 dBA) occurs at the south corner of the site nearest and most exposed to St Joseph Boulevard.

Results show that standard building components in compliance with the Ontario Building Code are sufficient in attenuating noise. Results also indicate that all seven buildings will require forced air heating with provisions for central air conditioning, or a similar ventilation system, which will allow occupants to keep windows closed and maintain a comfortable living environment. However, it is expected that due to the size of the buildings, air conditioning will be provided. A Type D Warning Clause will be required to be placed on all Lease, Purchase, and Sale Agreements, as seen 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 City of Ottawa."*

Noise levels at the rooftop amenity areas are expected to be between 43 dBA and 59 dBA. The highest noise level at an outdoor amenity area occurs at the Building B2 rooftop terrace. The Building A2 Level 7 outdoor amenity area, B1 rooftop terrace and C2 rooftop terrace also experience noise levels above 55 dBA, as such, noise mitigation will be required, typically in the form of noise barriers.

A detailed noise assessment will be required at the time of site plan approval to determine specific noise control measures for each building.

The site is surrounded by small commercial buildings and low-rise residential dwellings, which are served by small air handling units. As the site is not in close proximity to any large mechanical equipment, negative stationary noise impacts onto the study site are not anticipated.

With regard to stationary noise impacts from the development onto the environment, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed

buildings become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed block on surrounding noise sensitive areas. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to be negligible. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

This concludes our roadway traffic noise feasibility 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.

Essraa Alqassab, BASc
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File 23-117- Traffic Noise Feasibility

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127 WALGREEN ROAD , OTTAWA, ON
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PROJECT	1887 ST JOSEPH BOULEVARD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GW23-117-01
DATE	JULY 4, 2023
DRAWN BY	E.A.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT

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PROJECT	1887 ST JOSEPH BOULEVARD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW23-117-02
DATE	JULY 4, 2023	DRAWN BY	E.A.

FIGURE 2:
RECEPTOR LOCATIONS

FIGURE 3: DAYTIME TRAFFIC NOISE CONTOURS (20M ABOVE GRADE)

- *80 – 85 dB*
- *75 – 80 dB*
- *70 – 75 dB*
- *65 – 70 dB*
- *60 – 65 dB*
- *55 – 60 dB*
- *50 – 55 dB*
- *45 – 50 dB*
- *40 – 45 dB*
- *35 – 40 dB*
- *0 – 35 dB*

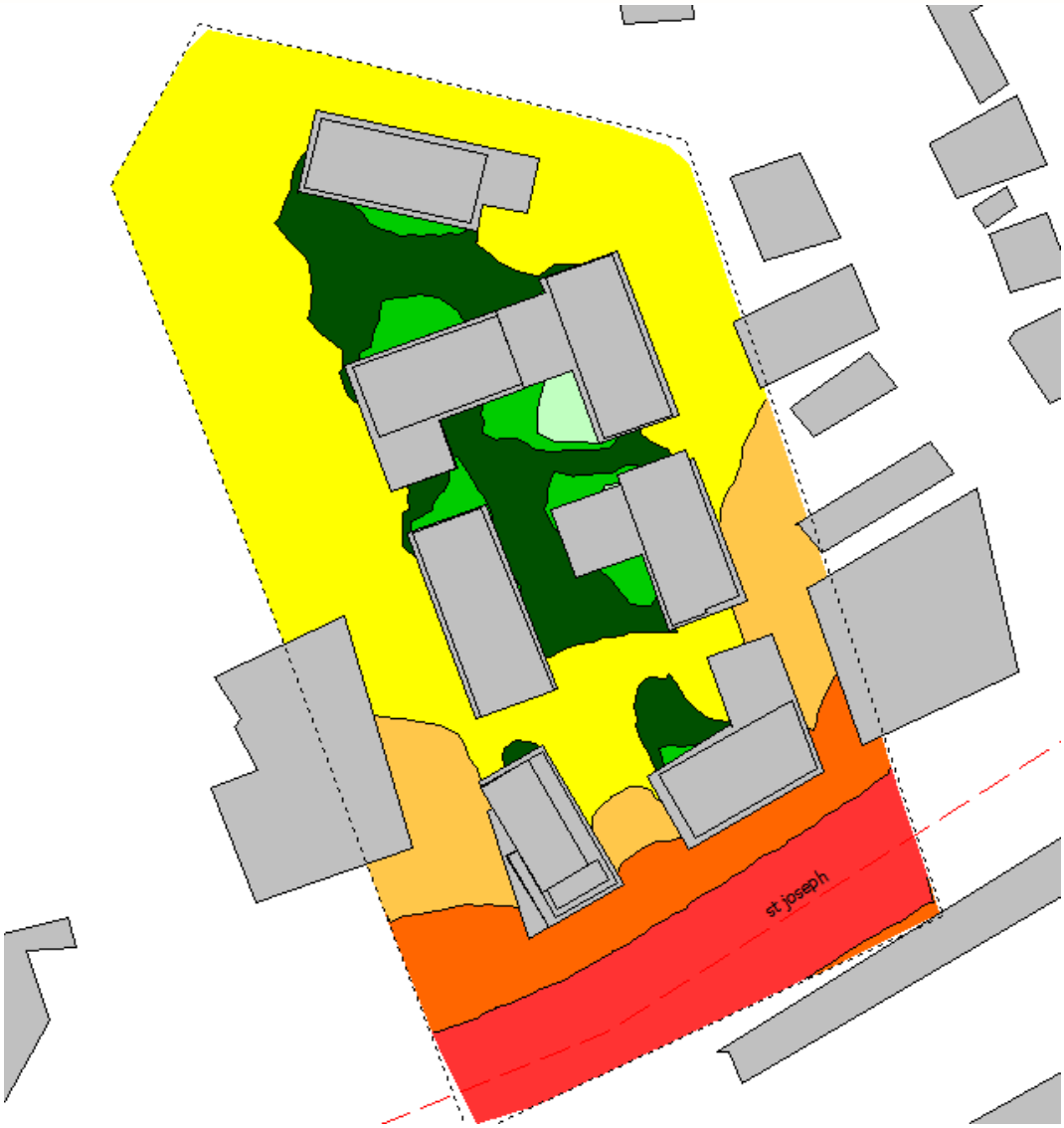

FIGURE 4: NIGHTTIME TRAFFIC NOISE CONTOURS (20 M ABOVE GRADE)

- *80 – 85 dB*
- *75 – 80 dB*
- *70 – 75 dB*
- *65 – 70 dB*
- *60 – 65 dB*
- *55 – 60 dB*
- *50 – 55 dB*
- *45 – 50 dB*
- *40 – 45 dB*
- *35 – 40 dB*
- *0 – 35 dB*

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PROJECT	1887 ST JOSEPH BOULEVARD, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO. GW23-117-05	FIGURE 5: STAMSON PARAMETERS
DATE	JULY 4, 2023	DRAWN BY E.A.	

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APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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```
STAMSON 5.0        NORMAL REPORT        Date: 03-07-2023 20:58:51
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: ST JOSEPH (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  :    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        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: ST JOSEPH (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  :  35.00 / 35.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: ST JOSEPH (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.80 + 0.00) = 64.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  71.49   0.00  -3.68  -3.01   0.00   0.00   0.00
64.80
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 64.80 dBA

Total Leq All Segments: 64.80 dBA


Results segment # 1: ST JOSEPH (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.20 + 0.00) = 57.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  63.89   0.00  -3.68  -3.01   0.00   0.00   0.00
57.20
-------------------------------------------------------------------------
--

Segment Leq : 57.20 dBA

Total Leq All Segments: 57.20 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 64.80
                           (NIGHT): 57.20
```

```
STAMSON 5.0        NORMAL REPORT        Date: 03-07-2023 20:59:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R7.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: ST JOSEPH (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  :    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        :   0.00
    Number of Years of Growth          :   0.00
    Medium Truck % of Total Volume     :   7.00
    Heavy Truck  % of Total Volume     :   5.00
    Day (16 hrs) % of Total Volume     :  92.00

Data for Segment # 1: ST JOSEPH (day/night)
--------------------------------------------
Angle1   Angle2           :   0.00 deg   75.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      2       (Reflective ground surface)
Receiver source distance  :  32.00 / 32.00  m
Receiver height           :  52.50 / 52.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: ST JOSEPH (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.40 + 0.00) = 64.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     75   0.00  71.49   0.00  -3.29  -3.80   0.00   0.00   0.00
64.40
```

```
-------------------------------------------------------------------------------
--

Segment Leq : 64.40 dBA

Total Leq All Segments: 64.40 dBA


Results segment # 1: ST JOSEPH (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.80 + 0.00) = 56.80 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     75   0.00  63.89   0.00  -3.29  -3.80   0.00   0.00   0.00
56.80
-------------------------------------------------------------------------------
--

Segment Leq : 56.80 dBA

Total Leq All Segments: 56.80 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 64.40
                           (NIGHT): 56.80
```