

ENVIRONMENTAL NOISE ASSESSMENT REPORT

For
3055 Richmond Road, Ottawa

Prepared by:

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1. INTRODUCTION

W. Elias & Associates Consulting Engineers was retained by Soma Studio Architect Inc. to investigate the potential impact of environmental noise on proposed development located at 3055 Richmond Road, Ottawa, Ontario. The development is situated close to the intersection of Dumaurier Avenue and Richmond Road, Ottawa, Ontario. The noise assessment is requested as part of site plan application for proposed development. The proposed development consists of four story, residential building, located at 3055 Richmond Road, Ottawa, Ontario. The site is bounded by residential to the east and south. Refer to appendixes for site detail including the surrounding area, zoning, etc.

2. TERMS OF REFERENCE

Our assessment is based on the proposed development architectural drawings prepared by Soma Studio Architect Inc., existing and future noise and vibration sources, and based on 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”) which is more stringent version of MOECC.

3. OBJECTIVES

The principal objectives of this study are to

- (i) Calculate the future noise levels on the study buildings produced by local transportation traffic,
- (ii) Ensure that interior and exterior noise levels do not exceed the allowable limits specified by the Ministry of Environment and Climate Change (“MOECC”), and the City of Ottawa’s Environmental Noise Control Guidelines.

4. TRAFFIC NOISE ASSESSMENT

4.1. CRITERIA FOR TRANSPORTATION TRAFIC NOISE

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

| Type of Space | Time Period | L _{eq} (dBA) |
|---|---------------|-----------------------|
| | | Road |
| 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. As per MOECP, Environmental Noise Guidelines, NPC 300 – Part C, 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. 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 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.

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 feasible to acceptable levels at or below the criterion.

4.2. Traffic Noise Predictions

The proposed development will be primarily subjected to roadway noise from Richmond Road which is considered arterial road based on the City of Ottawa Transportation Master Plan.

4.2.1. Road Traffic

The traffic counts for Richmond Road were obtained based on the City of Ottawa Environmental Noise Study Guideline. As per the network concept plan of the City of Ottawa Transportation Master Plan, Richmond Road will be widened to 4-lane arterial road in future. The minimum traffic counts available in modeling software as recommended by the City of Ottawa “Environmental Noise Control Guidelines.” No growth rate is considered as per the direction from the City official. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa “Environmental Noise Control Guidelines.” Posted speed limits, as per the ENCG 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 |
|---------------|-----------------|----------|---------------|--------------|
| Richmond Road | 0700-2300 | 30000 | 7% | 5% |

4.2.2. 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.

4.2.3. 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 utilized 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.

5. Noise Impact Assessment

Leq,night and Leq,day attributable to Richmond Road were calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. The sound exposure levels were based on the future road traffic predictions, since the City of Ottawa official requires upcoming ultimate volume (AADT) for a 4 lanes arterial road of Richmond road based on the City of Ottawa Transportation Master Plan. Screening due to surrounding buildings and terrain was accounted for in the analysis.

The noise impact was calculated for the ground level of the building. It was assumed, that if the summation of noise impact levels at first floor on south face is acceptable (the face with larger closest exposure to Road traffic), the other faces will be satisfied as well. Point of the receptor is located at the most exposed center of window (the height of the vertical midpoint of the nearest and most exposed story). In STAMSON modeling, Richmond Road was considered as one segment. List of the receivers information are shown in table below.

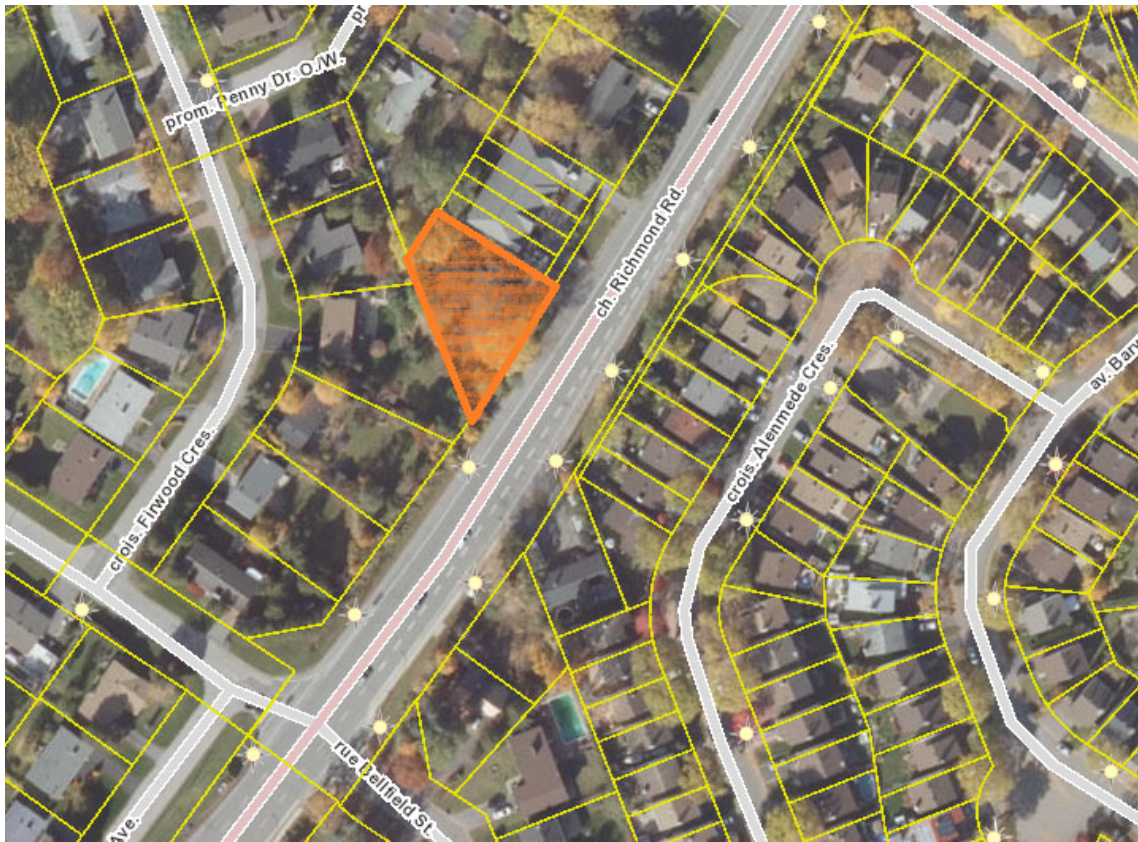
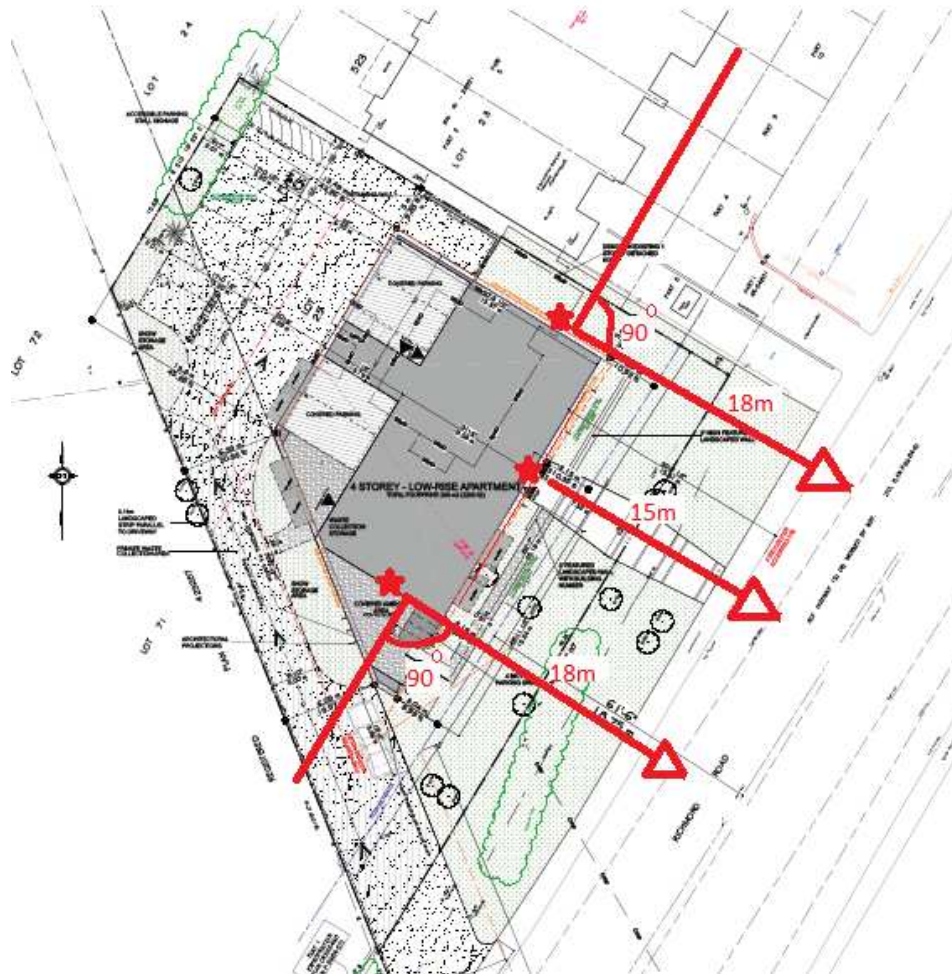


Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed development which is the first floor facing southeast. Sample sound exposure calculation and analysis assumptions are included in Appendix.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

| Floor | Façade | Sound Level (dBA) | STC Requirement = 45 dBA | Total Sound Level (dBA) | STC Requirement = 40 dBA |
|-----------------------|--------|-------------------|--------------------------|-------------------------|--------------------------|
| | | 0700-2300 | | 2300-0700 | |
| 1 st floor | South | 70 | 25 | 62 | 22 |
| 1 st floor | East | 67 | 22 | 59 | 19 |
| 1 st floor | West | 67 | 22 | 59 | 19 |



Receptor Locations, Angle of Exposure and Source Distances

6. Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4 for building components. As discussed the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below:

STC Requirement for all windows

- Windows will require a minimum STC of $(70 - 45) = 25$

The STC requirements would apply to windows, doors, panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 25, where a window /wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing.

We have specified an example window configuration, however several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required and placed on all Lease, Purchase and Sale Agreements, as summarized in Section 7.

7. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range around 70 dBA during the daytime period (07:00-23:00) and 62 dBA during the nighttime period (23:00-07:00).

The highest noise levels (i.e. 68 dBA) occur along the development's south façade, which is nearest and most exposed to Richmond Road. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 45 dBA.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause will also be required and placed on all Lease, Purchase and Sale Agreements, as summarized below:

“Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants as the sound levels exceed the sound

level limits of the City and the Ministry of the Environment and Climate Change. To help address the need for sound attenuation, this development includes:

STC rated for all facades : STC 25

This dwelling unit has also been designed with air conditioning. 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 of Ottawa and the Ministry of the Environment and Climate Change. To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features “

This concludes our assessment and report. Should you have any questions or concerns, please do not hesitate to contact us.

Sincerely,



Yours truly,
Wissam Elias, P. Eng
Senior Project Manager

Appendix A

Stampson Calculation

STAMSON 5.0 NORMAL REPORT Date: 29-12-2022 23:54:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Richmond (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: Richmond (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 : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Results segment # 1: Richmond (day)

Source height = 1.50 m

ROAD (0.00 + 70.03 + 0.00) = 70.03 dBA

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

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-----
-----
-90      90      0.66  71.49   0.00   0.00  -1.46   0.00   0.00
0.00  70.03
-----
-----

```

Segment Leq : 70.03 dBA

Total Leq All Segments: 70.03 dBA

Results segment # 1: Richmond (night)

Source height = 1.50 m

ROAD (0.00 + 62.44 + 0.00) = 62.44 dBA

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

```

-----
-----
-90      90      0.66  63.89   0.00   0.00  -1.46   0.00   0.00
0.00  62.44
-----
-----

```

Segment Leq : 62.44 dBA

Total Leq All Segments: 62.44 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.03
 (NIGHT): 62.44

STAMSON 5.0 NORMAL REPORT Date: 30-12-2022 00:17:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Results segment # 1: Richmond (day)

Source height = 1.50 m

ROAD (0.00 + 67.02 + 0.00) = 67.02 dBA

| Angle1 B.Adj | Angle2 SubLeq | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj |
|-----------------|------------------|-------|--------|-------|-------|-------|-------|-------|
| 0 | 90 | 0.66 | 71.49 | 0.00 | 0.00 | -4.47 | 0.00 | 0.00 |
| 0.00 | 67.02 | | | | | | | |

Segment Leq : 67.02 dBA

Total Leq All Segments: 67.02 dBA

Results segment # 1: Richmond (night)

Source height = 1.50 m

ROAD (0.00 + 59.43 + 0.00) = 59.43 dBA

| Angle1 B.Adj | Angle2 SubLeq | Alpha | RefLeq | P.Adj | D.Adj | F.Adj | W.Adj | H.Adj |
|-----------------|------------------|-------|--------|-------|-------|-------|-------|-------|
| 0 | 90 | 0.66 | 63.89 | 0.00 | 0.00 | -4.47 | 0.00 | 0.00 |
| 0.00 | 59.43 | | | | | | | |

Segment Leq : 59.43 dBA

Total Leq All Segments: 59.43 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.02
(NIGHT): 59.43

STAMSON 5.0 NORMAL REPORT Date: 30-12-2022 00:15:38
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Results segment # 1: Richmond (day)

Source height = 1.50 m

ROAD (0.00 + 67.02 + 0.00) = 67.02 dBA

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

| | | | | | | | | |
|------|-------|------|-------|------|------|-------|------|------|
| -90 | 0 | 0.66 | 71.49 | 0.00 | 0.00 | -4.47 | 0.00 | 0.00 |
| 0.00 | 67.02 | | | | | | | |

Segment Leq : 67.02 dBA

Total Leq All Segments: 67.02 dBA

Results segment # 1: Richmond (night)

Source height = 1.50 m

ROAD (0.00 + 59.43 + 0.00) = 59.43 dBA

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

| | | | | | | | | |
|------|-------|------|-------|------|------|-------|------|------|
| -90 | 0 | 0.66 | 63.89 | 0.00 | 0.00 | -4.47 | 0.00 | 0.00 |
| 0.00 | 59.43 | | | | | | | |

Segment Leq : 59.43 dBA

Total Leq All Segments: 59.43 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.02
(NIGHT): 59.43

Appendix B

Architectural Drawings