April 29, 2020

Conseil des écoles catholiques du Centre-Est
4000 Rue Labelle
Ottawa, ON K1J 1A1

Attn: Jonathan Bruneau
brunej@ecolecatholique.ca

Dear Mr. Bruneau:

Re: Noise Brief
Deschâtelets Building/225 Scholastic Drive, Ottawa
Gradient Wind File # 20-079-Noise Brief

1. INTRODUCTION AND TERMS OF REFERENCE

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Conseil des écoles catholiques du Centre-Est to undertake a noise brief assessment to satisfy the requirements for a Zoning By-law Amendment (ZBA) application for the proposed institutional re-development, referred to as the Deschâtelets building, located at 225 Scholastic Drive in Ottawa, Ontario. The school board plans to repurpose the building for a new school. The nearest sources of roadway traffic noise on the development are Main Street (arterial) to the west and Highway 417 (The Queensway) to the north. Both of theses roadways are near or beyond 100 and 500 metres (m) from the development. Furthermore, noise impacts from potential sources of stationary noise, such as nearby existing roof top units, were also investigated.

The noise assessment was performed on the basis of theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines, and Gradient Wind's experience on previous projects. Our study was based on a site plan drawing prepared by Hobin Architecture, supporting information provided via email communication with Conseil des écoles

[1] City of Ottawa – Environmental Noise Control Guidelines, January 2016
[2] Ministry of the Environment and Climate Change (MOECC) – Environmental Noise Guideline, Publication NPC-300, August 2013

catholiques du Centre-Est on March 30, 2020, and future traffic volumes corresponding to the City of Ottawa's Official Plan (OP).

The development features an existing mid-rise building featuring a rectangular planform. The development is bound by Oblate Avenue to the north and west, Scholastic Drive to the east, and Deschateletes Avenue to the south, overlooking the Rideau River, on an approximate parallelogram parcel of land. An additional exterior play area is proposed at the rear of the building for daycare activities. Half of Floor one (1) and Floors two-three (2-3) are reserved for equal parts educational space. The remaining floors will be reserved for residential units as part of a future phase.

2. OBJECTIVES

The main goals of this work are to: (i) calculate the future noise levels on the study building produced by local roadway traffic noise, and (ii) qualitatively assess potential impacts from nearby stationary noise sources.

3. METHODOLOGY

3.1 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.

3.2 Roadway Traffic Noise

3.2.1 Criteria for Roadway Traffic Noise

For vehicle traffic, 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.

Predicted noise levels at the plane of window (POW) and outdoor living area (OLA) dictate the action required to achieve the recommended indoor and OLA sound levels, as specified in the ENCG. When noise levels at these areas meet or exceed the ENCG objective limit of 55 dBA, specific outdoor, ventilation and Warning Clause requirements may apply. In addition, where noise levels exceed 65 dBA, upgraded building components must be designed to ensure indoor sound level limits can be met.

3.2.2 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[3] which provides 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 1 (below) summarizes the AADT values used for the roadway included in this assessment. Main Street is located more than 200 m west of the development and has been excluded from the analysis.

TABLE 1: ROADWAY TRAFFIC DATA

Roadway	Roadway Class	Speed Limit (km/h)	Official Plan AADT
Highway 417	6-Lane Freeway	100	**110,000**

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

3.2.3 Theoretical Roadway Traffic Noise Predictions

Noise predictions were performed with the aid of the MECP computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

Roadway traffic noise calculations were performed by treating each roadway segment as separate line sources of noise, and by using existing building locations as noise barriers. In addition to the traffic volumes summarized in Table 1, 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. Bus traffic is included within medium and heavy vehicles.
- The day/night split was taken to be 92% / 8% respectively for all streets.
- Absorptive intermediate ground surfaces are used to account for the environmental losses due to the existing buildings between the source and receiver.
- The study site was treated as having flat or gently sloping topography.
- An existing noise barrier (2.5 m in height) has been considered along portion of Highway 417.
- One noise receptor was strategically placed at a worst-case scenario at the upper floor of the proposed building along the northern façade (14 m above local grade).

4. RESULTS AND CONCLUSIONS

4.1 Roadway Traffic Noise

The results of the roadway traffic noise calculations are summarized in Table 2 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

TABLE 2: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Plane of Window Receptor Location	Noise Level (dBA)	
		Day	Night
1	POW – 14 m above grade – North Façade	55	47

The results of the current study indicate that noise levels are expected to reach 55 dBA during the daytime period (07:00-23:00) and 47 dBA during the nighttime period (23:00-07:00). The highest noise levels will occur along the north façade, which is nearest and most exposed to Highway 417. Noise levels do not exceed the ENCG objective limit of 55 dBA. As such, noise control measures and further analysis will not be required.

4.2 Stationary Noise

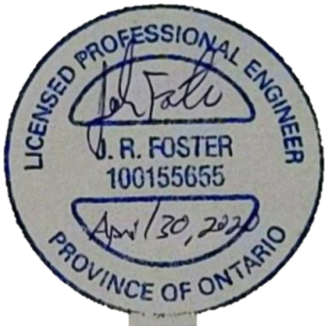
Gradient Wind investigated the potential impacts from proposed rooftop mechanical equipment on nearby noise-sensitive buildings. Proposed rooftop mechanical equipment must be selected with maximum permissible sound power levels to ensure the plane of window sound levels on surrounding mid-rise buildings with exposure to the rooftop do not exceed the ENCG criteria for stationary noise. This can be achieved by locating the units at the centre of the roof and away from residential buildings. The sound power ratings of the units should be in the range of 80 to 90 dBA (referenced to 1 picowatt). In some cases, a noise screen or silencer may be required. Gradient Wind will conduct a more detailed stationary noise analysis as the mechanical design develops.

Impacts from existing and future stationary noise sources surrounding the school are expected to be minimal. There are no existing significant sources of stationary noise. Future sources on the study building (such as rooftop units) as well as on surrounding proposed buildings will be appropriately designed to ensure off-site and on-site noise levels fall below ENCG criteria. As a result, the proposed development is expected to be compatible with the future proposed noise sensitive land uses.

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,

Gradient Wind Engineering Inc.



Michael Lafortune, C.E.T.
Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #20-079-Noise Brief

RETIREMENT HOME
7 STORY

FUTURE DEVELOPMENT AREA

FUTURE DEVELOPMENT AREA

FUTURE DEVELOPMENT AREA

FUTURE DEVELOPMENT AREA

DESCHATELETS BLDG
EXISTING
1598 m² Footprint / 4538.5 m² GFA ZBL
82589

EARLY CHILDHOOD ED.
PLAY YARD

BELOW GRADE HYDRO VAULT

FIRE ROUTE

FIRE ROUTE

FUTURE PARK

EDGE OF EXISTING CHAPEL

EDGE OF EXISTING CHAPEL

PROPERTY LINE

SSIB(AOG)

IB(AOG)

NORTH

DESCHATELETS BUILDING

PROPOSED SCHOOL - OPTION 1

HOBIN
ARCHITECTURE

SITEPLAN

SCALE 1:500

April 9, 2020

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: 17-04-2020 13:52:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: 417 (day/night)
---------------------------------------
Car traffic volume  : 89056/7744  veh/TimePeriod  *
Medium truck volume :  7084/616   veh/TimePeriod  *
Heavy truck volume  :  5060/440   veh/TimePeriod  *
Posted speed limit  :   100 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): 110000
    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: 417 (day/night)
-------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      3 / 3
House density             :     80 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 500.00 / 500.00 m
Receiver height           :  14.00 / 14.00  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   2.50 m
Barrier receiver distance : 480.00 / 480.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: 417 (day)
------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       14.00 !        2.00 !         2.00

ROAD (0.00 + 52.04 + 52.04) = 55.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.29  83.16   0.00 -19.57  -3.75   0.00  -7.80   0.00
52.04
   -90      0   0.14  83.16   0.00 -17.29  -3.39   0.00   0.00  -5.22
57.27
-------------------------------------------------------------------------------
--
     0     90   0.29  83.16   0.00 -19.57  -3.75   0.00  -7.80   0.00
52.04
-------------------------------------------------------------------------------
--

Segment Leq : 55.05 dBA

Total Leq All Segments: 55.05 dBA
```

```
Results segment # 1: 417 (night)
---------------------------------

Source height = 1.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       1.50 !       14.00 !        2.00 !         2.00

ROAD (0.00 + 44.44 + 44.44) = 47.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90      0   0.29  75.56   0.00 -19.57  -3.75   0.00  -7.80   0.00
44.44
   -90      0   0.14  75.56   0.00 -17.29  -3.39   0.00   0.00  -5.22
49.67
-------------------------------------------------------------------------------
--
     0     90   0.29  75.56   0.00 -19.57  -3.75   0.00  -7.80   0.00
44.44
-------------------------------------------------------------------------------
--

Segment Leq : 47.45 dBA

Total Leq All Segments: 47.45 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 55.05
                           (NIGHT): 47.45
```