January 23, 2020

2361212 Ontario Ltd.
Attn: Domenic Santaguida
3625 Rivergate Way
Ottawa, ON
K1V 2A4

Dear Mr. Santaguida:

Re: Noise Brief
35-37 William Street, Ottawa ON
Gradient Wind File # 19-238 –Noise Brief

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 2361212 Ontario Ltd. c/o KWC Architects Inc. to undertake a noise brief assessment to satisfy the requirements for a site plan control application for the proposed development located at 35-37 William Street in Ottawa, Ontario. The study was requested by the City of Ottawa, as the subject property is within 100 meters (m) from nearby traffic noise sources. 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 drawings provided by KWC Architects Inc. dated December 2, 2019, future traffic volumes corresponding to the City of Ottawa's Official Plan (OP), and CAD mapping obtained through the City of Ottawa.

[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

2. TERMS OF REFERENCE

The focus of this noise assessment is a proposed 4-storey 'L-shaped' mixed-use building comprising a restaurant at grade and residential units at the levels above. The development site is bounded by William Street to the west, the 54 and 62 York Street properties to the north, a parking lot to the east, the 87 George Street property to the southeast and the 41 and 41½ William Street properties to the south.

The basement level comprises storage and restaurant support space. The ground floor level comprises a restaurant and kitchen accessed by a main entrance at the west side from William Street, as well as a residential lobby at the northeast corner. At grade, a courtyard is situated at the southeast corner of the site and a narrow pedestrian walkway is located along the building's north elevation. Levels 2 to 4 are reserved for residential occupancy. At Level 2, the floorplate extends at the north side to cover the pedestrian walkway below. At Level 3 and 4, the floorplate sets back at the west elevation to accommodate private terraces serving the residential units. Figure 1 illustrates the site plan with surrounding context.

3. 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.

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 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.

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[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. The nearest sources of transportation noise just within 100 m from the development is Dalhousie Street, where 100 m is the proximity limit for local roadway traffic noise. Local roadway traffic noise beyond 100 m is considered an insignificant source of transportation noise, however for conservatism Murray Street was also included in the assessment.

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

TABLE 1: ROADWAY TRAFFIC DATA

Roadway	Roadway Class	Speed Limit (km/h)	Official Plan AADT
Dalhousie Street	2-Lane Urban Collector (2-UCU)	50	**8,000**
Murray Street	2-Lane Urban Arterial Undivided (2-UAU)	50	**15,000**

4.2.3 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
- 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
- Blockage from adjacent Intervening buildings considered as barriers
- The buildings between Murray Street and the study building were modelled as “2 rows of houses” with a density of 92%
- One noise receptor was strategically placed as a worst-case scenario on the study building (refer to Figure 2 for receptor location)
- Receptor distances and exposure angles are illustrated in Figure 3

5. RESULTS AND CONCLUSIONS

5.1 Roadway Traffic Noise

The results of the roadway traffic noise calculations are summarized in Table 5 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

TABLE 5: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Plane of Window Receptor Location	Noise Level (dBA)	
		Day	Night
1	POW – 4th Floor East Façade	51	43

The results of the current study indicate that noise levels are expected to reach 51 dBA during the daytime period (07:00-23:00) and 43 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the east façade, which is nearest and most exposed nearby roadway sources (Dalhousie Street and Murray Street). Since noise levels are below the ENCG objective limit of 55 dBA, the study site will not require mitigation to address roadway traffic noise.

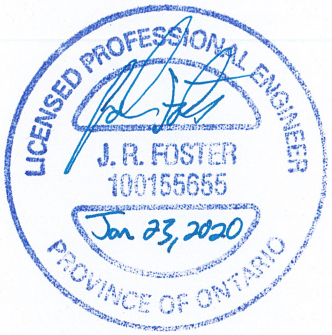
5.2 Stationary Noise

Gradient Wind investigated the potential impacts from nearby stationary noise sources, such as rooftop mechanical equipment, onto the study site. After review of the site, noise levels due to mechanical equipment from individual properties are not expected to exceed ambient noise levels produced from other adjacent properties. 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,

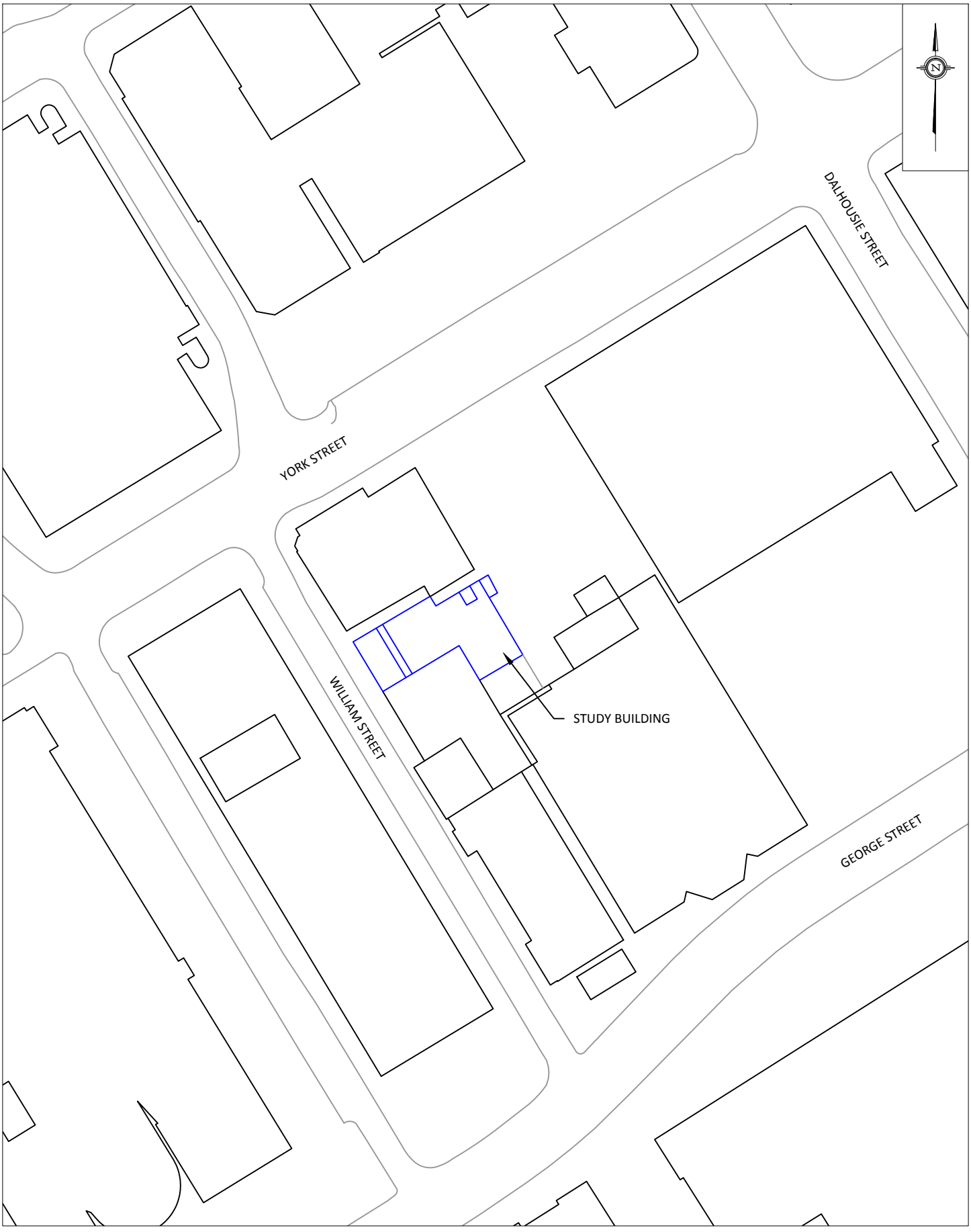
Gradient Wind Engineering Inc.



Giuseppe Garro, MASc.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File #19-238 – Noise Brief



GRADIENTWIND
ENGINEERS & SCIENTISTS
127 WALGREEN ROAD , OTTAWA, ON
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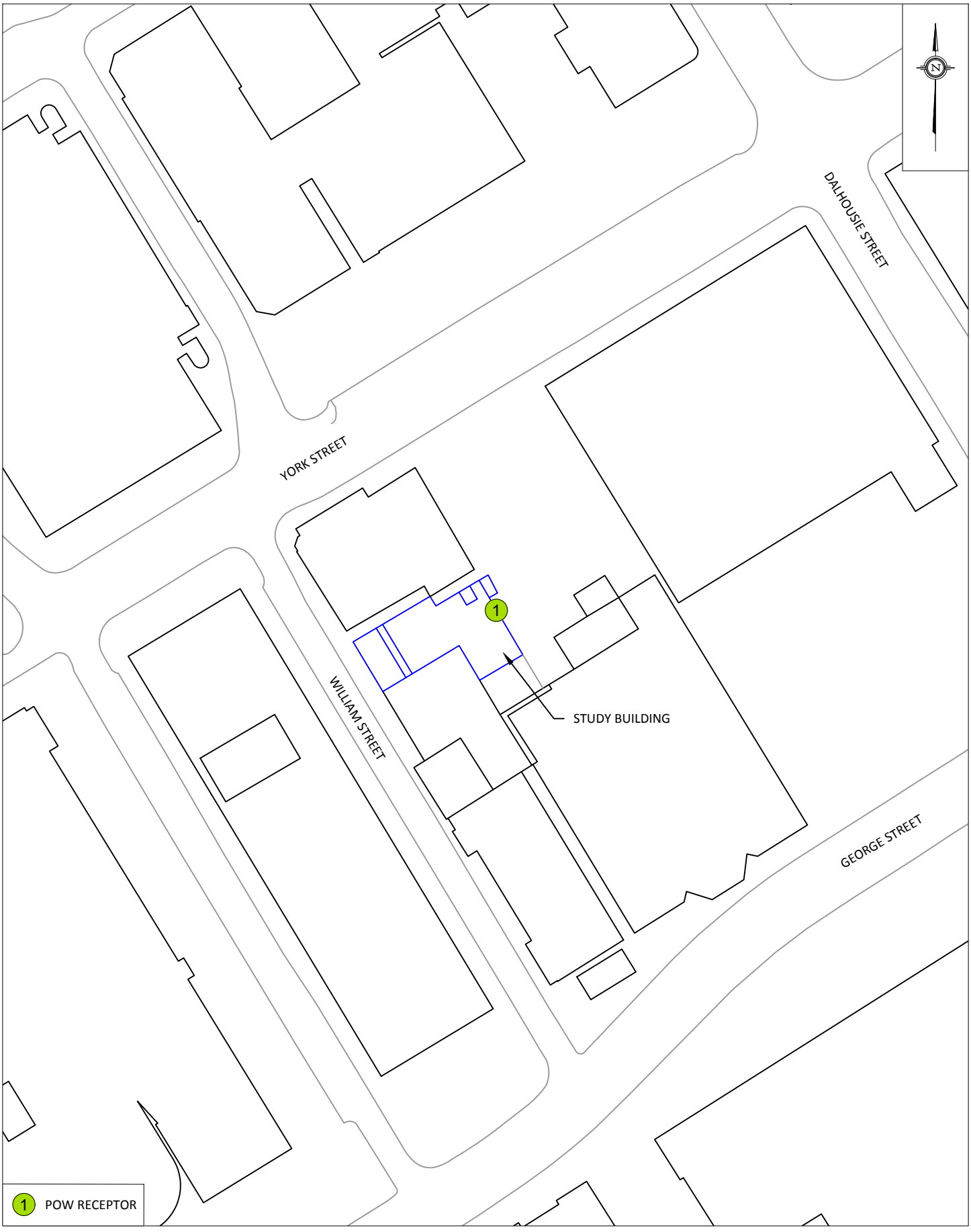
PROJECT	35-37 WILLIAM STREET, OTTAWA TRAFFIC NOISE IMPACT BRIEF
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE19-238-1
DATE	JANUARY 7, 2020
DRAWN BY	G.G.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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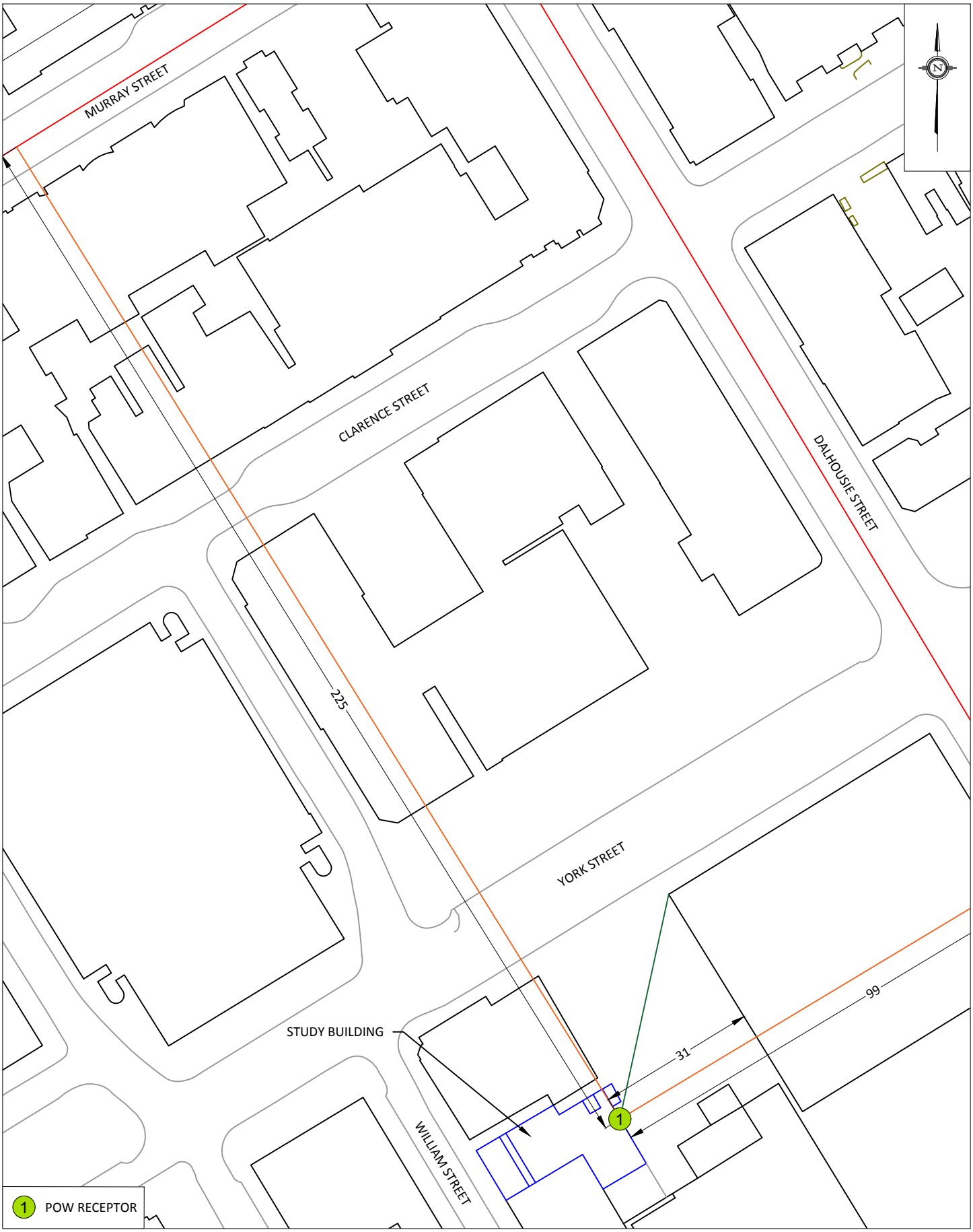
DRAWING NO.	GWE19-238-2
DATE	JANUARY 7, 2020
DRAWN BY	G.G.

DESCRIPTION

FIGURE 2:
TRAFFIC NOISE RECEPTOR LOCATIONS



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PROJECT	35-37 WILLIAM STREET, OTTAWA TRAFFIC NOISE IMPACT BRIEF		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GWE19-238-3
DATE	JANUARY 7, 2020	DRAWN BY	G.G.

FIGURE 3:
RECEPTOR 1 STAMSON INPUT PARAMETERS

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

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```
STAMSON 5.0        NORMAL REPORT        Date: 09-01-2020 15:56:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Dalhousie St (day/night)
-----------------------------------------------
Car traffic volume  :  6477/563   veh/TimePeriod  *
Medium truck volume :   515/45    veh/TimePeriod  *
Heavy truck volume  :   368/32    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):   8000
    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: Dalhousie St (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  :  99.00 / 99.00  m
Receiver height           :  11.95 / 11.95  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -31.00 deg   Angle2 : 90.00 deg
Barrier height            :  13.00 m
Barrier receiver distance :  31.00 / 31.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00


Road data, segment # 2: Murray St (day/night)
-----------------------------------------------
Car traffic volume  : 12144/1056  veh/TimePeriod  *
Medium truck volume :   966/84    veh/TimePeriod  *
Heavy truck volume  :   690/60    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):  15000
    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: Murray St (day/night)
-------------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     93 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 225.00 / 225.00 m
Receiver height           :  11.95 / 11.95  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Dalhousie St (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 !       11.95 !        8.68 !         8.68

ROAD (48.51 + 44.29 + 0.00) = 49.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -31   0.35  65.75   0.00 -11.04  -6.20   0.00   0.00   0.00
48.51
-------------------------------------------------------------------------
--
   -31     90   0.00  65.75   0.00  -8.20  -1.72   0.00   0.00 -11.54
44.29
-------------------------------------------------------------------------
--

Segment Leq : 49.91 dBA
```

```
Results segment # 2: Murray St (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 42.78 + 0.00) = 42.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.35  68.48   0.00 -15.84  -0.87   0.00  -8.99   0.00
42.78
-------------------------------------------------------------------------
--

Segment Leq : 42.78 dBA

Total Leq All Segments: 50.68 dBA


Results segment # 1: Dalhousie St (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 !       11.95 !        8.68 !         8.68

ROAD (40.92 + 36.70 + 0.00) = 42.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90    -31   0.35  58.16   0.00 -11.04  -6.20   0.00   0.00   0.00
40.92
-------------------------------------------------------------------------
--
   -31     90   0.00  58.16   0.00  -8.20  -1.72   0.00   0.00 -11.54
36.70
-------------------------------------------------------------------------
--

Segment Leq : 42.31 dBA
```

```
Results segment # 2: Murray St (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 35.19 + 0.00) = 35.19 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.35  60.88   0.00 -15.84  -0.87   0.00  -8.99   0.00
35.19
-------------------------------------------------------------------------------
--

Segment Leq : 35.19 dBA

Total Leq All Segments: 43.08 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 50.68
                           (NIGHT): 43.08
```