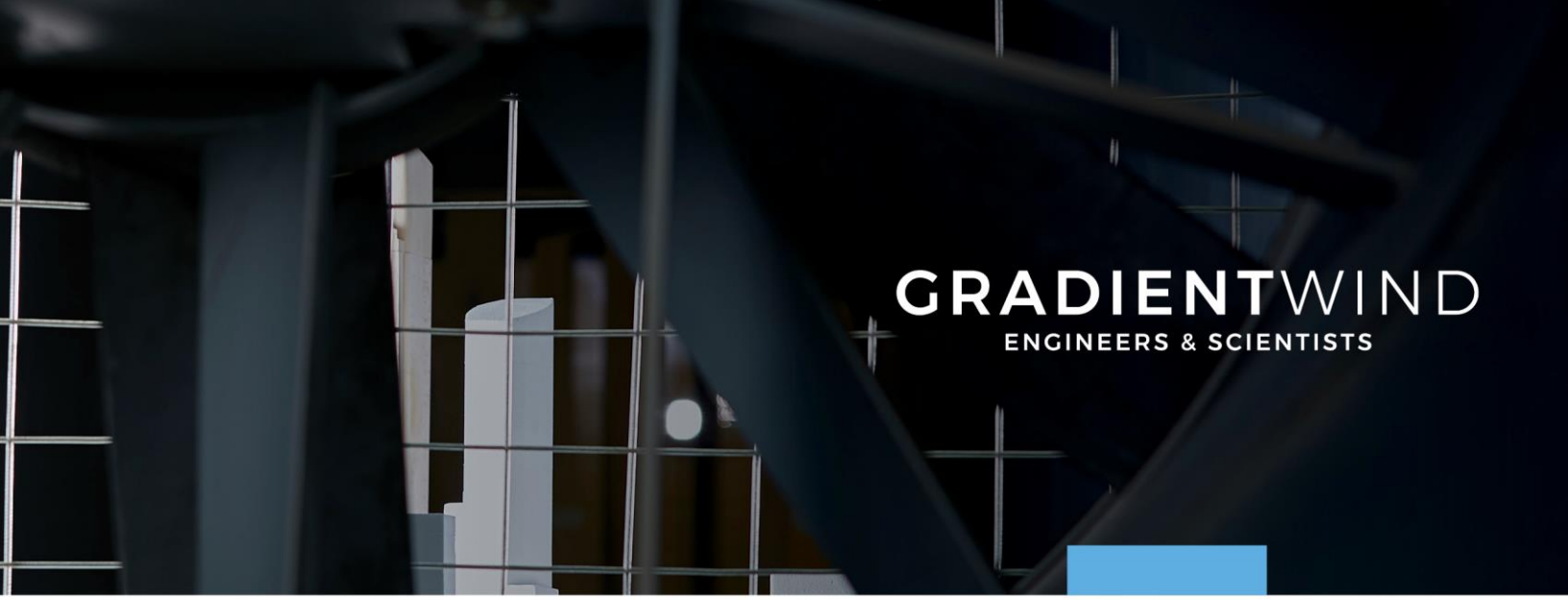

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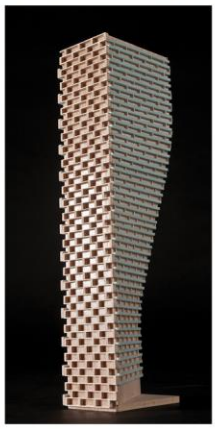
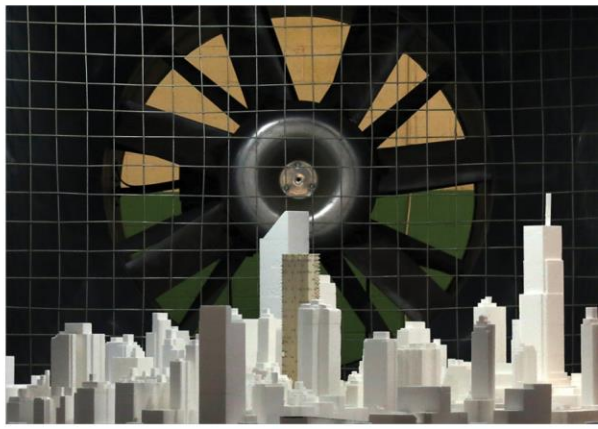
TRANSPORTATION NOISE ASSESSMENT

5969 Ottawa Street
Richmond, Ontario

Report: 21-235-Transportation Noise





October 4, 2021

PREPARED FOR
Al Roberts
61 Strachan Street
Richmond, Ontario K0A 2Z0

PREPARED BY
Caleb Alexander, B.Eng., Junior Environmental Scientist
Joshua Foster, P.Eng., Principal

EXECUTIVE SUMMARY

This report describes a transportation noise assessment performed for a proposed mixed-use development located at 5969 Ottawa Street in Richmond, Ontario. The development comprises of a 2-storey building. The source of roadway noise is Ottawa Street to the south, and the VIA railway northwest of the proposed development is a railway noise source. 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); (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) architectural drawings prepared by Hatch in June 2021.

The results of the current analysis indicate that noise levels will range between 56 and 61 dBA during the daytime period (07:00-23:00) and between 54 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (i.e., 61 dBA) occurs along the development's south façade, which is nearest and most exposed to Ottawa Street.

The noise levels predicted due to roadway and railway traffic do not exceed the criteria listed in Section 4.2 for building components, therefore, standard building components will provide sufficient attenuation to control indoor sound levels. Noise levels at the outdoor living area (OLA) reaches 60 dBA, therefore, mitigation is recommended, but it is not required for these areas if it is not feasible for technical or administrative reasons. If mitigation is not provided a specific Warning Clause will be necessary on all Lease, Purchase, and Sale Agreements, as specified in Section 6 of this report.

Results of the calculations indicate that the proposed building 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 at the occupant's discretion. Additionally, Type C Warning Clauses will also be required in all Lease, Purchase and Sale Agreements as summarized in Section 6.

Since the proposed dog runs are more then 100 m from an adjacent dwelling, a kennel noise study is not required.

The surrounding of the site includes an auto-mechanic garage and forest/farm fields. The garage doors of the auto-mechanic garage face away from the proposed building. As such, there are no significant existing stationary noise sources impacting the site.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Mr. Al Roberts to undertake a transportation noise assessment for the proposed residential development located at 5969 Ottawa Street in Richmond, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation.

The 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. Noise calculations were based on site plan drawings prepared by Hatch, dated June 2021.

2. TERMS OF REFERENCE

The focus of this transportation noise assessment is a proposed mixed-use development located at 5969 Ottawa Street in Richmond, Ontario. The proposed development comprises a 446 square metre two-storey building with a kennel, personal shop, and caretaker's dwelling. The proposed kennel will be for 3-5 dogs for service dog training and the two-storey prefab building will be used for various uses: first floor kennel and personal shop, second storey caretaker's residence. An enclosed dog run is proposed at the rear of the building.

The major source of roadway noise is Ottawa Street to the south. The railway noise source is the VIA railway that is northwest of the proposed development. Collector and arterial roadways located more than 100 m from the site are considered to be insignificant sources of roadway traffic noise as per ENCG. The site is surrounded by an auto-mechanic garage and forest/farm fields. Figure 1 illustrates the site location with surrounding context.

[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

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local roadway traffic, and (ii) determine whether exterior noise levels exceed the allowable limits specified by the MECP Noise Control Guidelines – NPC-300 as outlined in Section 4.2 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 Transportation Noise

4.2.1 Criteria for Transportation Traffic Noise

For vehicular 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. The NPC-300 guidelines specify that the recommended indoor noise limit ranges (that are relevant to this study) are 50, 45 and 40 dBA for retail space, living rooms, and sleeping quarters, respectively, as listed in Table 1. However, to account for deficiencies in building construction and to control peak noise, these levels should be targeted toward 47, 42, and 37 dBA.

TABLE 1: INDOOR SOUND LEVEL CRITERIA

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[3]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[4]. 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 normally triggers the need for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, building components will require higher levels of sound attenuation[5].

The sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. When noise levels at the OLA exceed 60 dBA if mitigation needs to be provided were technically and administratively achievable.

[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125
[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Theoretical Transportation 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. 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 for all streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be absorptive due to the presence of soft ground (grass/farm field).
- Topography was assumed to be flat/gentle slope.
- For select receptors, the proposed building was considered as a noise barrier partially obstructing exposure to the roadway (Figures 3-7).
- Noise receptors were strategically placed at 5 locations around the study area (see Figure 1).
- Receptor distances and exposure angles are illustrated in Figures 3-7.
- The forest area on the subject property between the proposed building and the railway is assumed to provide some noise attenuation which will be reflected in STAMSON calculations.

4.2.3 Roadway and Railway 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, roadway traffic volumes are based on the roadway classifications outlined in the City of Ottawa's Official Plan (OP) and Transportation Master Plan[6] 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.

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

The railway traffic volumes were obtained by analyzing the arrival/departure information for a nearby VIA rail station and projection the traffic volumes into the future assuming a growth rate of 2.5% over 10 years. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY AND RAILWAY TRAFFIC DATA

Segment	Traffic Data	Speed Limit (km/h)	Traffic Volumes
Ottawa Street	2-Lane Urban Collector (2-UCU)	50	**8,000**
VIA Rail	Railway	150	**18/6***

*Daytime/Nighttime traffic volumes

5. TRANSPORTATION NOISE RESULTS

5.1 Transportation Noise Levels

The results of the current analysis indicate that noise levels will range between 56 and 60 dBA during the daytime period (07:00-23:00) and between 54 and 57 dBA during the nighttime period (23:00-07:00). The highest noise level (i.e., 60 dBA) occurs along the development's south façade, which is nearest and most exposed to Ottawa Street.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORTATION SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	Roadway Noise Level (dBA)		Railway Noise Level (dBA)		Combined Noise Level (dBA)	
			Day	Night	Day	Night	Day	Night
R1	4.5	POW – North Façade	48	43	57	55	57	55
R2	4.5	POW – East Façade	53	45	54	53	56	54
R3	4.5	POW – South Façade	58	51	55	53	60	55
R4	4.5	POW – West Façade	54	47	56	54	58	55
R5	1.5	OLA – Dog Run	50	42	58	55	59	55

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the noise study indicate that noise levels do not exceed 60 dBA during the daytime period, and do not exceed 55 dBA during the nighttime period, therefore, building components with a higher Sound Transmission Class (STC) rating will not be required. Noise levels at the outdoor living areas (OLA) do not exceed 55 dBA, therefore mitigation is recommended if it is technically and administratively feasible. Since noise levels do not exceed 60 dBA mitigation is not required. If mitigation for the OLA is not provided, the following warning clause will be required on all Lease, Purchase, and Sale Agreements.

Type A

> *"Purchasers/tenants are advised that sound levels due to increasing roadway and railway traffic may occasionally 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.*

Results of the calculations also indicate that all buildings in the development 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 at the occupant's discretion. The following Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized below:

Type C

> *"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central 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 Ministry of the Environment."*

As the development is within 300 metres of the VIA Rail line, the following Warning Clause will also be included in all Agreements of Lease, Purchase, and Sale:

> *"VIA Rail Canada or their assigns or successors in interest have rights-of-way within 300 metres from the land subject hereof. There may be alteration to or expansions of the railway facilities on*

such rights-of-way in the future including the possibility that the railway or its assigns or successors as aforesaid may expand its operations, which expansion may affect the living environment of the residents in the vicinity, not withstanding the inclusion of any noise and vibration attenuating measures in the design of the development and individual dwellings. The railways will not be responsible for any complaints or claims arising from use of such facilities and/or operations on, over or under the aforesaid rights-of-way."

Since the proposed dog runs are more then 100 m from an adjacent dwelling, a kennel noise study is not required.

The surrounding of the site includes an auto-mechanic garage and forest/farm fields. The garage doors of the auto-mechanic garage face away from the proposed building. As such, there are no significant existing stationary noise sources impacting the site.

This concludes our transportation 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.

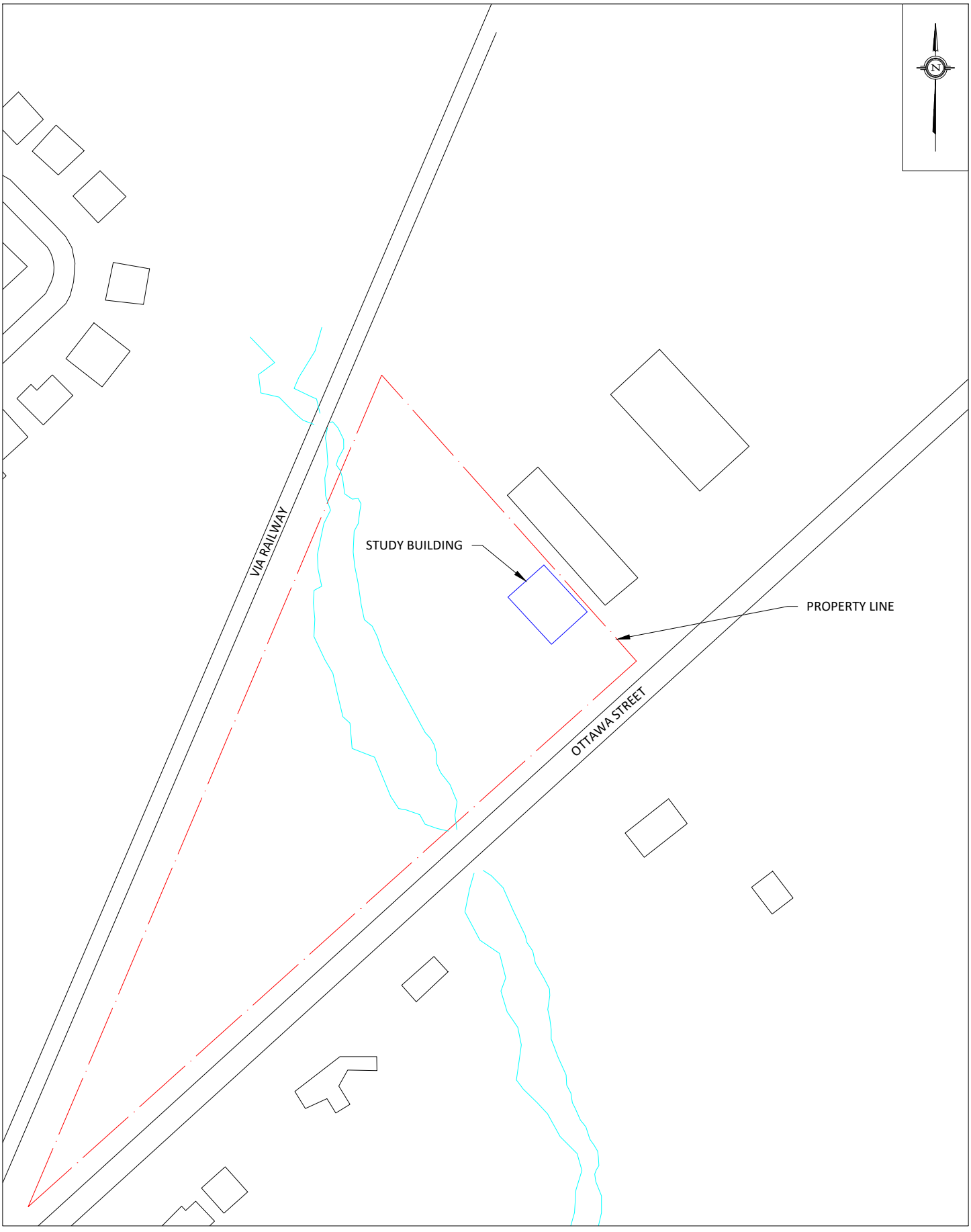
Sincerely,

Gradient Wind Engineering Inc.

Caleb Alexander, B.Eng.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Principal

Gradient Wind File 21-235-Transportation Noise



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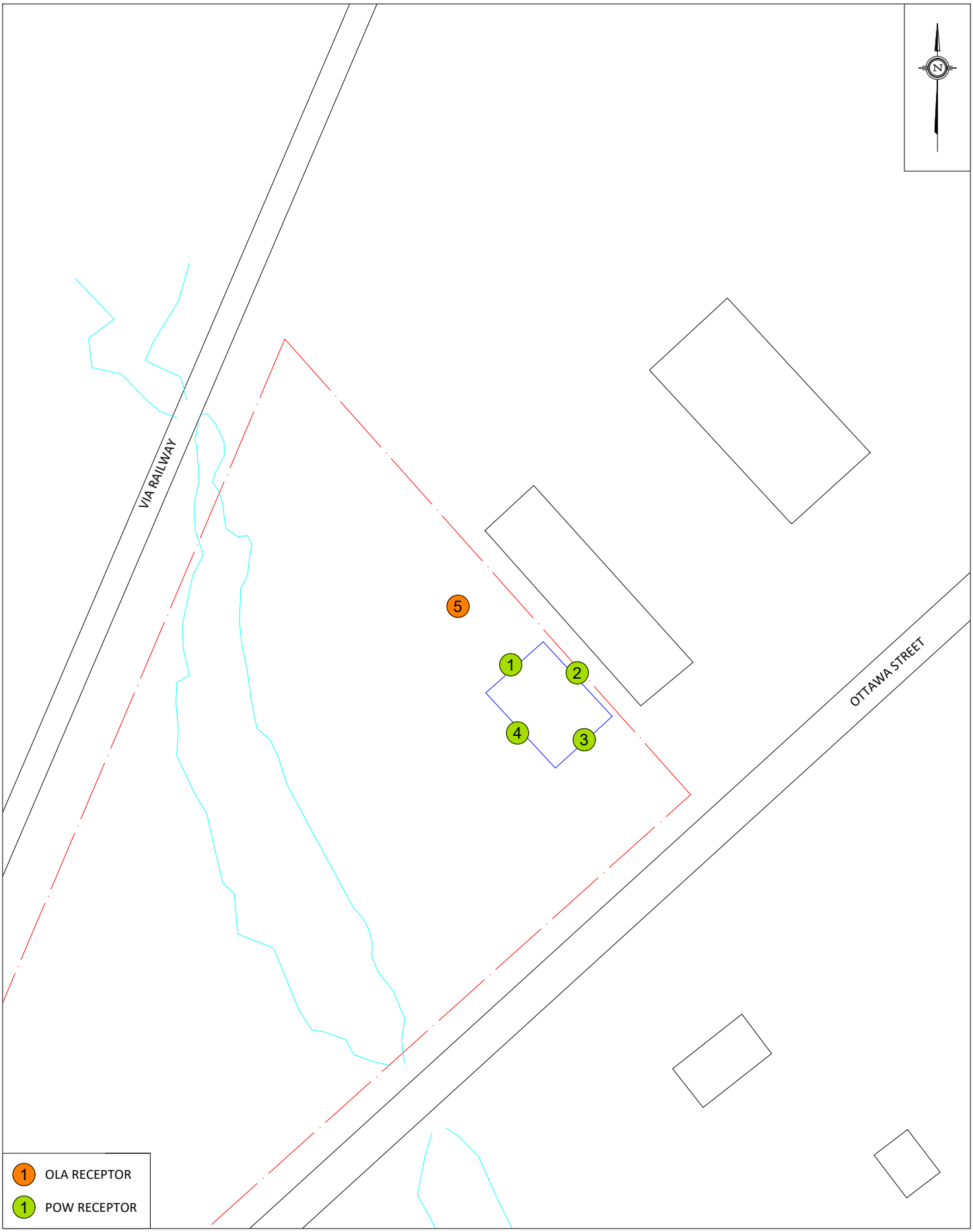
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO.	GWE21-235-1
DATE	AUGUST 25, 2021	DRAWN BY	C.A.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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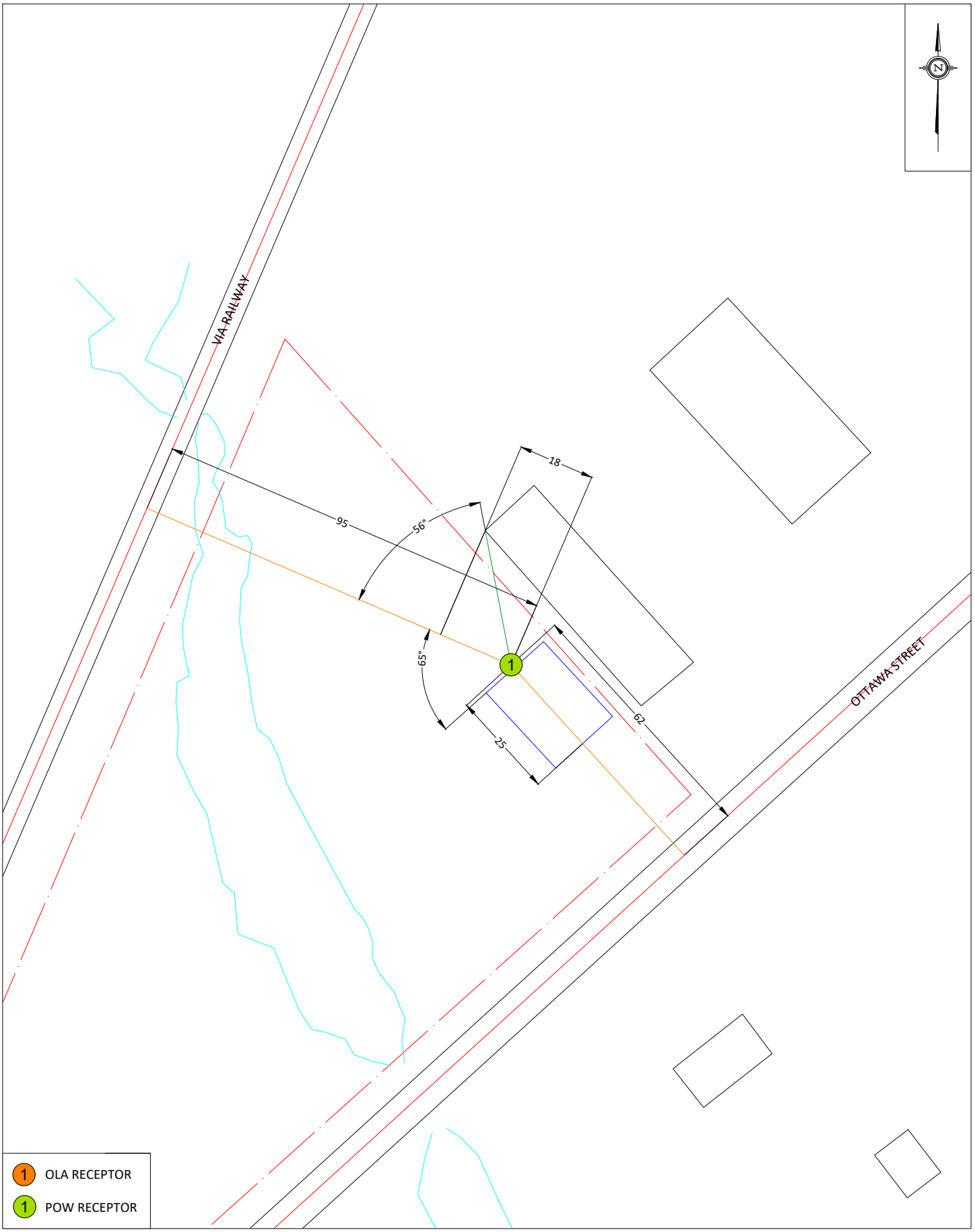
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE21-235-2
DATE	AUGUST 25, 2021
DRAWN BY	C.A.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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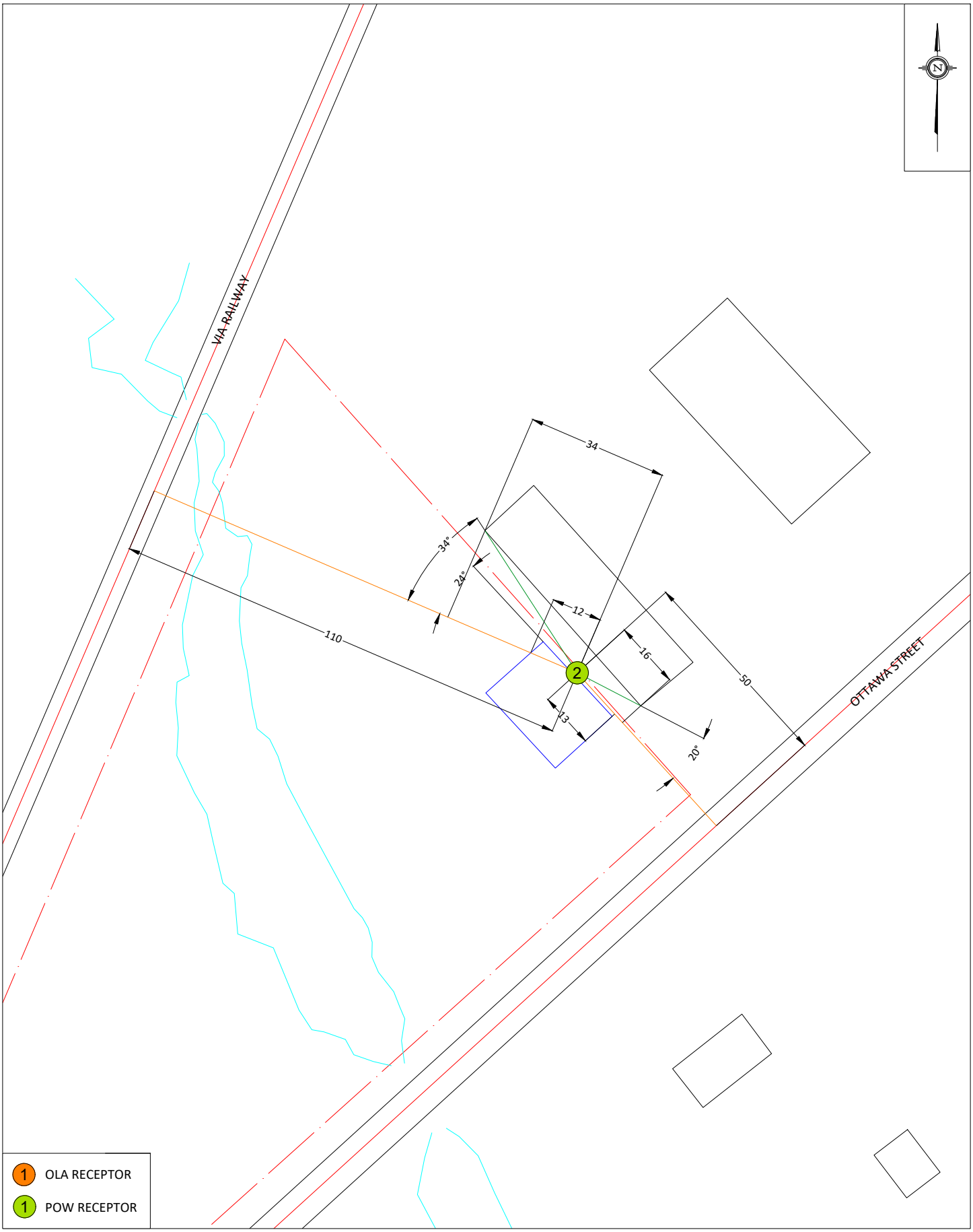
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO. GWE21-235-3	FIGURE 3: RECEPTOR 1
DATE	AUGUST 25, 2021	DRAWN BY C.A.	



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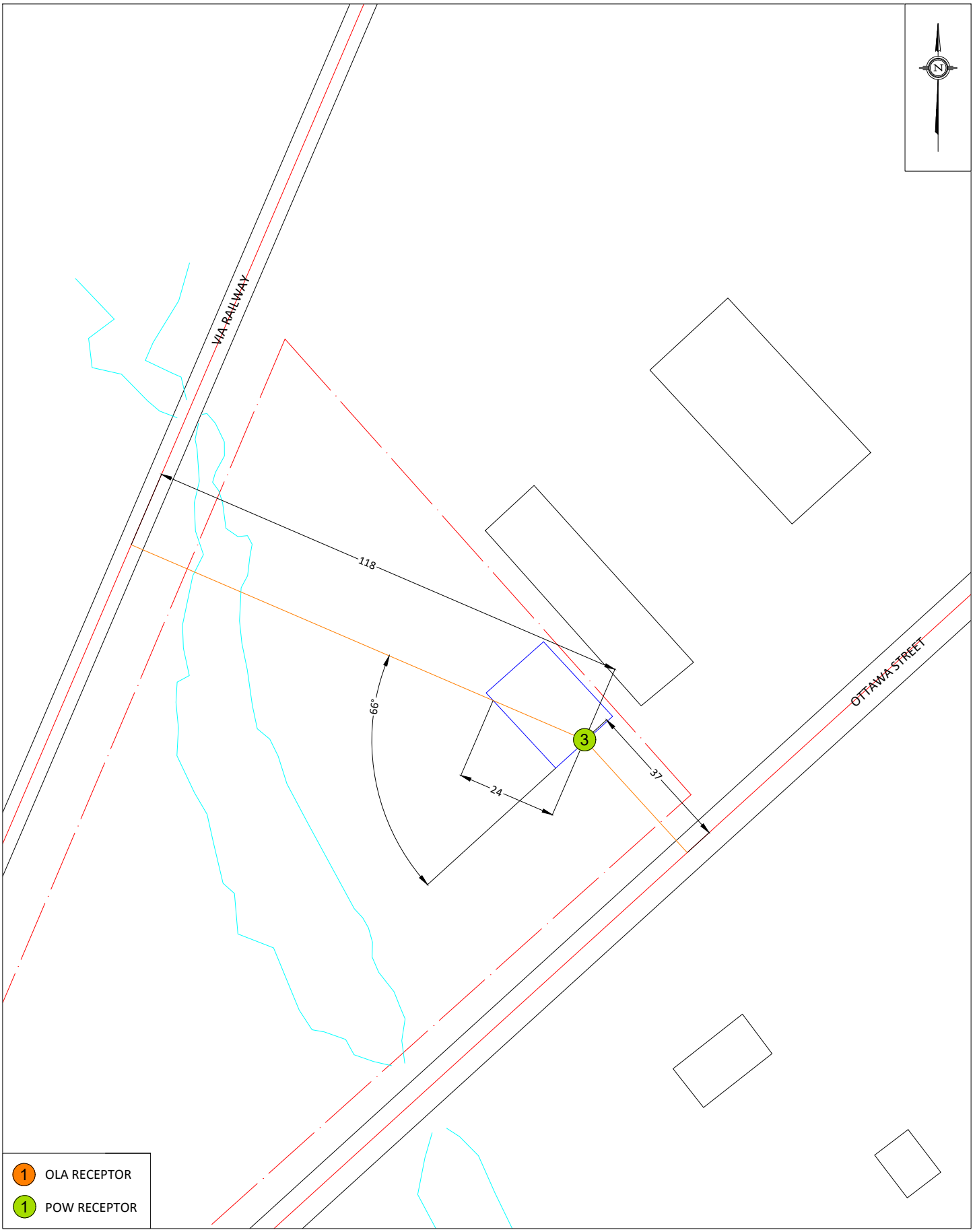
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO. GWE21-235-4	FIGURE 4: RECEPTOR 2
DATE	AUGUST 25, 2021	DRAWN BY C.A.	



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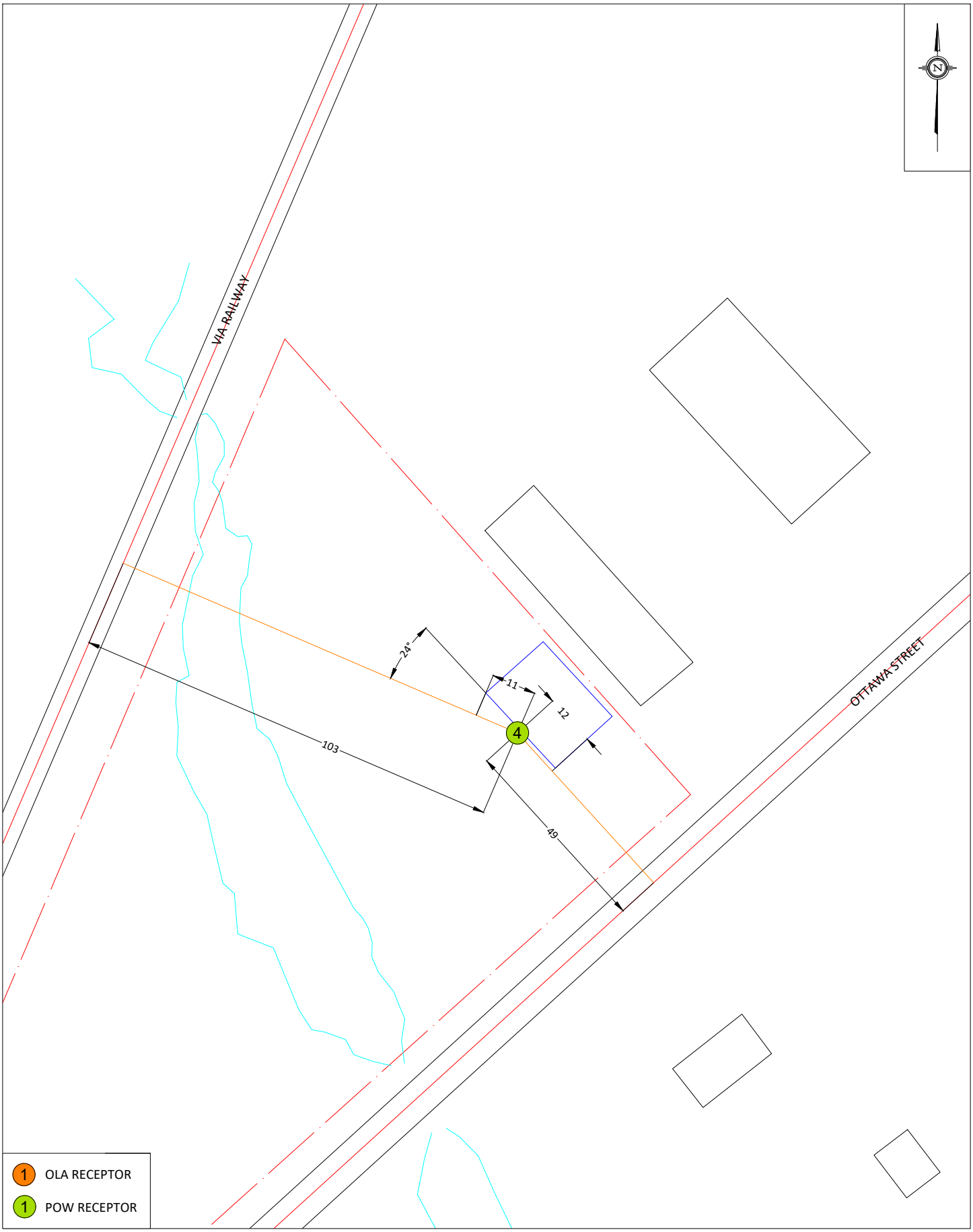
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE21-235-5
DATE	AUGUST 25, 2021
DRAWN BY	C.A.

DESCRIPTION

FIGURE 5:
RECEPTOR 3



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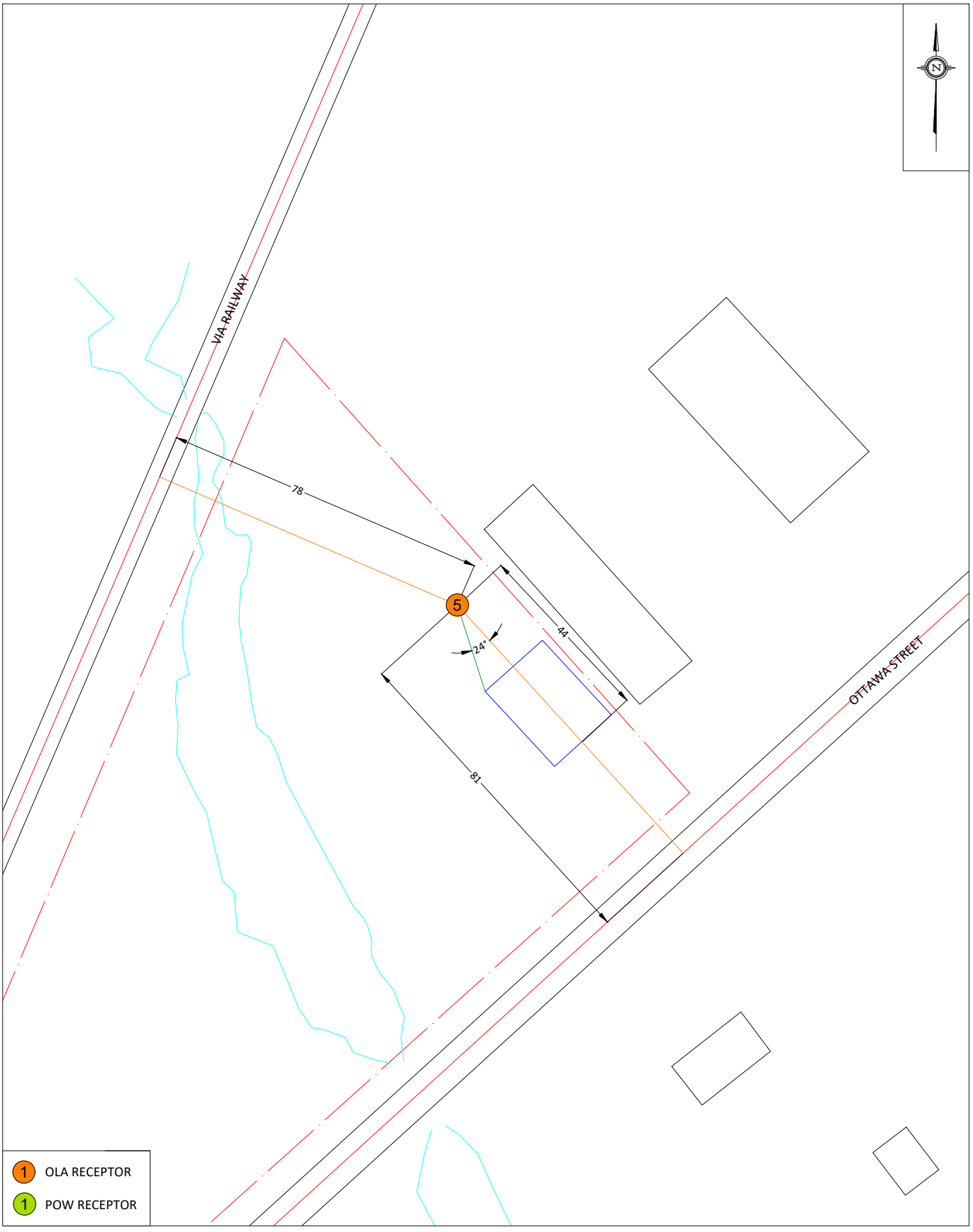
PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE21-235-6
DATE	AUGUST 25, 2021
DRAWN BY	C.A.

DESCRIPTION

FIGURE 6:
RECEPTOR 4



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PROJECT	5969 OTTAWA STREET, RICHMOND, ON TRANSPORTATION NOISE ASSESSMENT
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE21-235-7
DATE	AUGUST 25, 2021
DRAWN BY	C.A.

DESCRIPTION

FIGURE 7:
RECEPTOR 5

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: 25-08-2021 09:50:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Rail data, segment # 1: VIA 1 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel!  No

Data for Segment # 1: VIA 1 (day/night)
---------------------------------------
Angle1   Angle2           : -65.00 deg   56.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00

Rail data, segment # 2: VIA 2 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel!  No

Data for Segment # 2: VIA 2 (day/night)
---------------------------------------
Angle1   Angle2           :  56.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  95.00 / 95.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  56.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  18.00 / 18.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
Results segment # 1: VIA 1 (day)
---------------------------------
```

```
LOCOMOTIVE (0.00 + 55.17 + 0.00) = 55.17 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -65     56   0.19  71.65  -9.58  -1.91  -5.00   0.00   0.00  55.17
-------------------------------------------------------------------------

WHEEL (0.00 + 47.95 + 0.00) = 47.95 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -65     56   0.30  65.37 -10.42  -2.00  -5.00   0.00   0.00  47.95
-------------------------------------------------------------------------

Segment Leq : 55.92 dBA


Results segment # 2: VIA 2 (day)
--------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.41 !         4.41
       0.50 !        4.50 !        3.74 !         3.74

LOCOMOTIVE (0.00 + 48.42 + 0.00) = 48.42 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    56     90   0.19  71.65  -9.58  -8.47   0.00   0.00  -5.18  48.42
-------------------------------------------------------------------------

WHEEL (0.00 + 40.12 + 0.00) = 40.12 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    56     90   0.30  65.37 -10.42  -9.09   0.00   0.00  -5.74  40.12
-------------------------------------------------------------------------

Segment Leq : 49.02 dBA

Total Leq All Segments: 56.73 dBA
```

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

LOCOMOTIVE (0.00 + 53.41 + 0.00) = 53.41 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -65     56   0.19  69.89  -9.58  -1.91  -5.00   0.00   0.00  53.41
-------------------------------------------------------------------------

WHEEL (0.00 + 46.19 + 0.00) = 46.19 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -65     56   0.30  63.61 -10.42  -2.00  -5.00   0.00   0.00  46.19
-------------------------------------------------------------------------

Segment Leq : 54.16 dBA


Results segment # 2: VIA 2 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.41 !         4.41
       0.50 !        4.50 !        3.74 !         3.74

LOCOMOTIVE (0.00 + 46.66 + 0.00) = 46.66 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    56     90   0.19  69.89  -9.58  -8.47   0.00   0.00  -5.18  46.66
-------------------------------------------------------------------------

WHEEL (0.00 + 38.36 + 0.00) = 38.36 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    56     90   0.30  63.61 -10.42  -9.09   0.00   0.00  -5.74  38.36
-------------------------------------------------------------------------

Segment Leq : 47.26 dBA

Total Leq All Segments: 54.97 dBA
```

```
Road data, segment # 1: Ottawa 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: Ottawa 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  :  62.00 / 15.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  25.00 / 10.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Ottawa 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 !        4.50 !        3.29 !         3.29

ROAD (0.00 + 48.34 + 0.00) = 48.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.21  65.75   0.00  -7.46  -0.56   0.00   0.00  -9.39  48.34
-------------------------------------------------------------------------------

Segment Leq : 48.34 dBA

Total Leq All Segments: 48.34 dBA
```

```
Results segment # 1: Ottawa 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 !        4.50 !        2.50 !         2.50

ROAD (0.00 + 42.50 + 0.00) = 42.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.21  58.16   0.00   0.00  -0.56   0.00   0.00 -15.09  42.50
-------------------------------------------------------------------------------

Segment Leq : 42.50 dBA

Total Leq All Segments: 42.50 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 57.31
                           (NIGHT): 55.21
```

```
STAMSON 5.0        NORMAL REPORT        Date: 25-08-2021 09:51:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA 1 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/1.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 1: VIA 1 (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   24.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 110.00 / 110.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -90.00 deg   Angle2 : 24.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  12.00 / 12.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Rail data, segment # 2: VIA 2 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 2: VIA 2 (day/night)
---------------------------------------
Angle1   Angle2           :  24.00 deg   34.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 110.00 / 110.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00


Rail data, segment # 3: VIA 3 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 3: VIA 3 (day/night)
---------------------------------------
Angle1   Angle2           :  34.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 110.00 / 110.00 m
Receiver height           :   1.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  34.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  34.00 / 34.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.45 !         4.45
       0.50 !        4.50 !        4.06 !         4.06

LOCOMOTIVE (0.00 + 51.64 + 0.00) = 51.64 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.19  71.65 -10.34  -2.40  -5.00   0.00   0.00  53.91
   -90     24   0.14  71.65  -9.82  -2.28   0.00   0.00  -7.91  51.64
-------------------------------------------------------------------------

WHEEL (0.00 + 40.26 + 0.00) = 40.26 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.30  62.37 -11.25  -2.59  -5.00   0.00   0.00  43.53
   -90     24   0.24  62.37 -10.73  -2.48   0.00   0.00  -8.90  40.26
-------------------------------------------------------------------------

Segment Leq : 51.95 dBA


Results segment # 2: VIA 2 (day)
---------------------------------

LOCOMOTIVE (0.00 + 43.64 + 0.00) = 43.64 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     34   0.19  71.65 -10.34 -12.67  -5.00   0.00   0.00  43.64
-------------------------------------------------------------------------

WHEEL (0.00 + 33.39 + 0.00) = 33.39 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     34   0.30  62.37 -11.25 -12.73  -5.00   0.00   0.00  33.39
-------------------------------------------------------------------------

Segment Leq : 44.03 dBA
```

Results segment # 3: VIA 3 (day)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	1.50	2.27	2.27
0.50	1.50	1.19	1.19

LOCOMOTIVE (0.00 + 46.69 + 0.00) = 46.69 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.28	71.65	-11.12	-6.27	-5.00	0.00	0.00	49.27
34	90	0.28	71.65	-11.12	-6.27	0.00	0.00	-7.58	46.69

WHEEL (0.00 + 34.70 + 0.00) = 34.70 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
34	90	0.39	62.37	-12.03	-6.65	-5.00	0.00	0.00	38.69
34	90	0.39	62.37	-12.03	-6.65	0.00	0.00	-8.99	34.70

Segment Leq : 46.96 dBA

Total Leq All Segments: 53.65 dBA

Results segment # 1: VIA 1 (night)

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
4.00	4.50	4.45	4.45
0.50	4.50	4.06	4.06

LOCOMOTIVE (0.00 + 42.10 + 0.00) = 42.10 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	24	0.19	62.11	-10.34	-2.40	-5.00	0.00	0.00	44.37
-90	24	0.14	62.11	-9.82	-2.28	0.00	0.00	-7.91	42.10

WHEEL (0.00 + 30.71 + 0.00) = 30.71 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	24	0.30	52.83	-11.25	-2.59	-5.00	0.00	0.00	33.99
-90	24	0.24	52.83	-10.73	-2.48	0.00	0.00	-8.90	30.71

Segment Leq : 42.40 dBA

```
Results segment # 2: VIA 2 (night)
----------------------------------

LOCOMOTIVE (0.00 + 41.88 + 0.00) = 41.88 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     34   0.19  69.89 -10.34 -12.67  -5.00   0.00   0.00  41.88
-------------------------------------------------------------------------

WHEEL (0.00 + 31.63 + 0.00) = 31.63 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     34   0.30  60.61 -11.25 -12.73  -5.00   0.00   0.00  31.63
-------------------------------------------------------------------------

Segment Leq : 42.27 dBA


Results segment # 3: VIA 3 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.35 !         4.35
       0.50 !        4.50 !        3.26 !         3.26

LOCOMOTIVE (0.00 + 48.42 + 0.00) = 48.42 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    34     90   0.19  69.89 -10.34  -5.91  -5.00   0.00   0.00  48.64
    34     90   0.19  69.89 -10.34  -5.91   0.00   0.00  -5.21  48.42
-------------------------------------------------------------------------

WHEEL (0.00 + 36.76 + 0.00) = 36.76 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    34     90   0.30  60.61 -11.25  -6.32  -5.00   0.00   0.00  38.04
    34     90   0.30  60.61 -11.25  -6.32   0.00   0.00  -6.28  36.76
-------------------------------------------------------------------------

Segment Leq : 48.71 dBA

Total Leq All Segments: 50.36 dBA
```

```
Road data, segment # 1: Ottawa St1 (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: Ottawa St1 (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   -20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -20.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  16.00 / 16.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Ottawa St2 (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 # 2: Ottawa St2 (day/night)
--------------------------------------------
Angle1   Angle2           : -20.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  50.00 / 50.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 3: Ottawa St3 (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 # 3: Ottawa St3 (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  :  50.00 / 50.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :   0.00 deg   Angle2 : 90.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  13.00 / 13.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Ottawa St1 (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 !        4.50 !        3.54 !         3.54

ROAD (0.00 + 47.01 + 0.00) = 47.01 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -20   0.27  65.75   0.00  -6.64  -5.02   0.00   0.00  -7.08  47.01
-------------------------------------------------------------------------------

Segment Leq : 47.01 dBA


Results segment # 2: Ottawa St2 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 47.95 + 0.00) = 47.95 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -20      0   0.57  65.75   0.00  -8.21  -9.59   0.00   0.00   0.00  47.95
-------------------------------------------------------------------------------

Segment Leq : 47.95 dBA
```

```
Results segment # 3: Ottawa St3 (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 !        4.50 !        3.72 !         3.72

ROAD (0.00 + 48.25 + 0.00) = 48.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.27  65.75   0.00  -6.64  -3.71   0.00   0.00  -7.15  48.25
-------------------------------------------------------------------------------

Segment Leq : 48.25 dBA

Total Leq All Segments: 52.54 dBA


Results segment # 1: Ottawa St1 (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 !        4.50 !        3.54 !         3.54

ROAD (0.00 + 39.42 + 0.00) = 39.42 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90    -20   0.27  58.16   0.00  -6.64  -5.02   0.00   0.00  -7.08  39.42
-------------------------------------------------------------------------------

Segment Leq : 39.42 dBA
Results segment # 2: Ottawa St2 (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 40.35 + 0.00) = 40.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -20      0   0.57  58.16   0.00  -8.21  -9.59   0.00   0.00   0.00  40.35
-------------------------------------------------------------------------------

Segment Leq : 40.35 dBA
```

```
Results segment # 3: Ottawa St3 (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 !        4.50 !        3.72 !         3.72

ROAD (0.00 + 40.65 + 0.00) = 40.65 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.27  58.16   0.00  -6.64  -3.71   0.00   0.00  -7.15  40.65
-------------------------------------------------------------------------------

Segment Leq : 40.65 dBA

Total Leq All Segments: 44.94 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 56.14
                           (NIGHT): 51.45
```

```
STAMSON 5.0        NORMAL REPORT        Date: 25-08-2021 09:51:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA 1 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 1: VIA 1 (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   -66.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 118.00 / 118.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00
```

```
Rail data, segment # 2: VIA 2 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 2: VIA 2 (day/night)
---------------------------------------
Angle1   Angle2           : -66.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 118.00 / 118.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            : -66.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  24.00 / 24.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

LOCOMOTIVE (0.00 + 45.68 + 0.00) = 45.68 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -66   0.19  71.65 -10.70 -10.27  -5.00   0.00   0.00  45.68
-------------------------------------------------------------------------

WHEEL (0.00 + 34.69 + 0.00) = 34.69 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -66   0.30  62.37 -11.65 -11.04  -5.00   0.00   0.00  34.69
-------------------------------------------------------------------------

Segment Leq : 46.01 dBA


Results segment # 2: VIA 2 (day)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.40 !         4.40
       0.50 !        4.50 !        3.69 !         3.69

LOCOMOTIVE (0.00 + 53.60 + 0.00) = 53.60 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -66     90   0.19  71.65 -10.70  -1.01  -5.00   0.00   0.00  54.93
   -66     90   0.14  71.65 -10.17  -0.90   0.00   0.00  -6.98  53.60
-------------------------------------------------------------------------

WHEEL (0.00 + 41.73 + 0.00) = 41.73 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -66     90   0.30  62.37 -11.65  -1.20  -5.00   0.00   0.00  44.53
   -66     90   0.24  62.37 -11.11  -1.09   0.00   0.00  -8.44  41.73
-------------------------------------------------------------------------

Segment Leq : 53.87 dBA

Total Leq All Segments: 54.53 dBA
```

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

LOCOMOTIVE (0.00 + 43.92 + 0.00) = 43.92 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -66   0.19  69.89 -10.70 -10.27  -5.00   0.00   0.00  43.92
-------------------------------------------------------------------------

WHEEL (0.00 + 32.93 + 0.00) = 32.93 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90    -66   0.30  60.61 -11.65 -11.04  -5.00   0.00   0.00  32.93
-------------------------------------------------------------------------

Segment Leq : 44.25 dBA


Results segment # 2: VIA 2 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.40 !         4.40
       0.50 !        4.50 !        3.69 !         3.69

LOCOMOTIVE (0.00 + 51.84 + 0.00) = 51.84 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -66     90   0.19  69.89 -10.70  -1.01  -5.00   0.00   0.00  53.17
   -66     90   0.14  69.89 -10.17  -0.90   0.00   0.00  -6.98  51.84
-------------------------------------------------------------------------

WHEEL (0.00 + 39.97 + 0.00) = 39.97 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -66     90   0.30  60.61 -11.65  -1.20  -5.00   0.00   0.00  42.77
   -66     90   0.24  60.61 -11.11  -1.09   0.00   0.00  -8.44  39.97
-------------------------------------------------------------------------

Segment Leq : 52.11 dBA

Total Leq All Segments: 52.77 dBA
```

```
Road data, segment # 1: Ottawa St1 (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: Ottawa St1 (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  :  37.00 / 37.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Ottawa St1 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 58.29 + 0.00) = 58.29 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  65.75   0.00  -6.16  -1.30   0.00   0.00   0.00  58.29
-------------------------------------------------------------------------------

Segment Leq : 58.29 dBA

Total Leq All Segments: 58.29 dBA


Results segment # 1: Ottawa St1 (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.70 + 0.00) = 50.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     90   0.57  58.16   0.00  -6.16  -1.30   0.00   0.00   0.00  50.70
-------------------------------------------------------------------------------

Segment Leq : 50.70 dBA

Total Leq All Segments: 50.70 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 59.81
                           (NIGHT): 54.87
```

```
STAMSON 5.0        NORMAL REPORT        Date: 25-08-2021 09:51:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA 1 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 1: VIA 1 (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   24.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00
```

```
Rail data, segment # 2: VIA 2 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 2: VIA 2 (day/night)
---------------------------------------
Angle1   Angle2           :  24.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
No Whistle
Barrier angle1            :  24.00 deg   Angle2 : 90.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  11.00 / 11.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

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

LOCOMOTIVE (0.00 + 54.25 + 0.00) = 54.25 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.19  71.65 -10.00  -2.40  -5.00   0.00   0.00  54.25
-------------------------------------------------------------------------

WHEEL (0.00 + 43.90 + 0.00) = 43.90 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.30  62.37 -10.88  -2.59  -5.00   0.00   0.00  43.90
-------------------------------------------------------------------------

Segment Leq : 54.63 dBA


Results segment # 2: VIA 2 (day)
---------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.45 !         4.45
       0.50 !        4.50 !        4.07 !         4.07

LOCOMOTIVE (0.00 + 49.91 + 0.00) = 49.91 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     90   0.19  71.65 -10.00  -5.08  -5.00   0.00   0.00  51.57
    24     90   0.14  71.65  -9.50  -4.87   0.00   0.00  -7.37  49.91
-------------------------------------------------------------------------

WHEEL (0.00 + 38.56 + 0.00) = 38.56 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     90   0.30  62.37 -10.88  -5.43  -5.00   0.00   0.00  41.06
    24     90   0.24  62.37 -10.38  -5.23   0.00   0.00  -8.21  38.56
-------------------------------------------------------------------------

Segment Leq : 50.22 dBA

Total Leq All Segments: 55.97 dBA
```

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

LOCOMOTIVE (0.00 + 52.49 + 0.00) = 52.49 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.19  69.89 -10.00  -2.40  -5.00   0.00   0.00  52.49
-------------------------------------------------------------------------

WHEEL (0.00 + 42.14 + 0.00) = 42.14 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -90     24   0.30  60.61 -10.88  -2.59  -5.00   0.00   0.00  42.14
-------------------------------------------------------------------------

Segment Leq : 52.87 dBA


Results segment # 2: VIA 2 (night)
----------------------------------

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       4.00 !        4.50 !        4.45 !         4.45
       0.50 !        4.50 !        4.07 !         4.07

LOCOMOTIVE (0.00 + 48.15 + 0.00) = 48.15 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     90   0.19  69.89 -10.00  -5.08  -5.00   0.00   0.00  49.81
    24     90   0.14  69.89  -9.50  -4.87   0.00   0.00  -7.37  48.15
-------------------------------------------------------------------------

WHEEL (0.00 + 36.79 + 0.00) = 36.79 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
    24     90   0.30  60.61 -10.88  -5.43  -5.00   0.00   0.00  39.30
    24     90   0.24  60.61 -10.38  -5.23   0.00   0.00  -8.21  36.79
-------------------------------------------------------------------------

Segment Leq : 48.46 dBA

Total Leq All Segments: 54.21 dBA
```

```
Road data, segment # 1: Ottawa St1 (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: Ottawa St1 (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  :  49.00 / 49.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 0.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  12.00 / 12.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Ottawa St2 (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 # 2: Ottawa St2 (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  :  49.00 / 49.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Ottawa St1 (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 !        4.50 !        3.76 !         3.76

ROAD (0.00 + 46.27 + 0.00) = 46.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.21  65.75   0.00  -6.22  -3.57   0.00   0.00  -9.69  46.27
-------------------------------------------------------------------------------

Segment Leq : 46.27 dBA


Results segment # 2: Ottawa St2 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.36 + 0.00) = 53.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.57  65.75   0.00  -8.07  -4.31   0.00   0.00   0.00  53.36
-------------------------------------------------------------------------------

Segment Leq : 53.36 dBA

Total Leq All Segments: 54.14 dBA
```

```
Results segment # 1: Ottawa St1 (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 !        4.50 !        3.76 !         3.76

ROAD (0.00 + 38.68 + 0.00) = 38.68 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90      0   0.21  58.16   0.00  -6.22  -3.57   0.00   0.00  -9.69  38.68
-------------------------------------------------------------------------------

Segment Leq : 38.68 dBA


Results segment # 2: Ottawa St2 (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 45.77 + 0.00) = 45.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     90   0.57  58.16   0.00  -8.07  -4.31   0.00   0.00   0.00  45.77
-------------------------------------------------------------------------------

Segment Leq : 45.77 dBA

Total Leq All Segments: 46.55 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 58.16
                           (NIGHT): 54.90
```

```
STAMSON 5.0        NORMAL REPORT        Date: 25-08-2021 09:51:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te                Time Period: Day/Night 16/8 hours
Description:


Rail data, segment # 1: VIA 1 (day/night)
-----------------------------------------
Train            ! Trains      ! Speed !# loc !# Cars! Eng  !Cont
Type             !             !(km/h) !/Train!/Train! type !weld
-----------------+-------------+-------+------+------+------+----
  1.             !  18.0/6.0   ! 150.0 !  2.0 ! 10.0 !Diesel! Yes

Data for Segment # 1: VIA 1 (day/night)
---------------------------------------
Angle1   Angle2           : -90.00 deg   90.00 deg
Wood depth                :      1       (Wood depth 30 to less than 60
metres)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  78.00 / 103.00 m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
No Whistle
Reference angle           :   0.00
```

Results segment # 1: VIA 1 (day)

LOCOMOTIVE (0.00 + 57.57 + 0.00) = 57.57 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.19	71.65	-8.56	-0.52	-5.00	0.00	0.00	57.57

WHEEL (0.00 + 47.29 + 0.00) = 47.29 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.30	62.37	-9.31	-0.77	-5.00	0.00	0.00	47.29

Segment Leq : 57.96 dBA

Total Leq All Segments: 57.96 dBA

Results segment # 1: VIA 1 (night)

LOCOMOTIVE (0.00 + 54.37 + 0.00) = 54.37 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.19	69.89	-10.00	-0.52	-5.00	0.00	0.00	54.37

WHEEL (0.00 + 43.96 + 0.00) = 43.96 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.30	60.61	-10.88	-0.77	-5.00	0.00	0.00	43.96

Segment Leq : 54.75 dBA

Total Leq All Segments: 54.75 dBA

```
Road data, segment # 1: Ottawa St1 (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: Ottawa St1 (day/night)
--------------------------------------------
Angle1   Angle2           : -90.00 deg   24.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  81.00 / 81.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 24.00 deg
Barrier height            :   6.00 m
Barrier receiver distance :  44.00 / 44.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Ottawa St2 (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 # 2: Ottawa St2 (day/night)
--------------------------------------------
Angle1   Angle2           :  24.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  81.00 / 81.00  m
Receiver height           :   4.50 / 4.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Results segment # 1: Ottawa St1 (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 !        4.50 !        2.87 !         2.87

ROAD (0.00 + 44.70 + 0.00) = 44.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     24   0.21  65.75   0.00  -8.86  -2.43   0.00   0.00  -9.76  44.70
-------------------------------------------------------------------------------

Segment Leq : 44.70 dBA


Results segment # 2: Ottawa St2 (day)
-------------------------------------

Source height = 1.50 m

ROAD (0.00 + 48.04 + 0.00) = 48.04 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    24     90   0.57  65.75   0.00 -11.50  -6.21   0.00   0.00   0.00  48.04
-------------------------------------------------------------------------------

Segment Leq : 48.04 dBA

Total Leq All Segments: 49.69 dBA
```

```
Results segment # 1: Ottawa St1 (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 !        4.50 !        2.87 !         2.87

ROAD (0.00 + 37.11 + 0.00) = 37.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     24   0.21  58.16   0.00  -8.86  -2.43   0.00   0.00  -9.76  37.11
-------------------------------------------------------------------------------

Segment Leq : 37.11 dBA


Results segment # 2: Ottawa St2 (night)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 40.45 + 0.00) = 40.45 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    24     90   0.57  58.16   0.00 -11.50  -6.21   0.00   0.00   0.00  40.45
-------------------------------------------------------------------------------

Segment Leq : 40.45 dBA

Total Leq All Segments: 42.10 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 58.56
                           (NIGHT): 54.98
```