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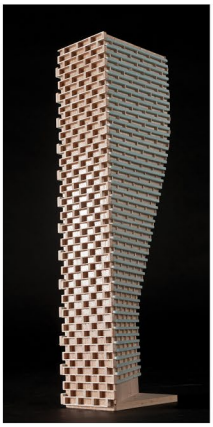
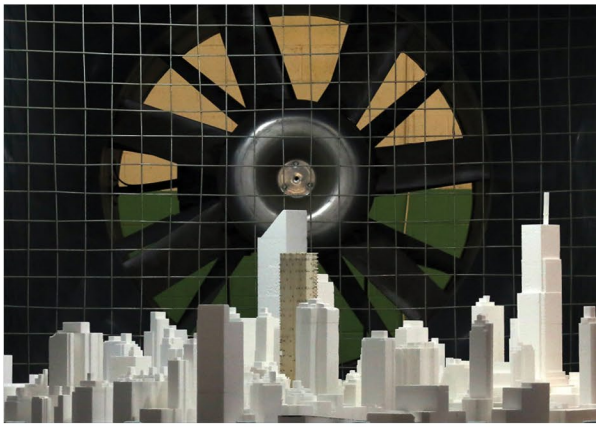
ROADWAY TRAFFIC NOISE ASSESSMENT

1600 James Naismith Drive (Phase 2)
Ottawa, Ontario

REPORT: 22-051 – Traffic Noise





January 16, 2026

DRAFT

PREPARED FOR
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PREPARED BY
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise assessment undertaken to satisfy the requirements for a Site Plan Control (SPC) application submission for a proposed development of five townhome blocks located at 1600 James Naismith Drive in Ottawa, Ontario. The proposed development comprises five townhome blocks. Blocks 2A, 2C, and 2B are all 3.5 storeys tall and Blocks 2B and 2D are 6 storeys tall. This represents Phase 2 of a 3 Phase masterplan and is the focus of this assessment. The primary source of roadway traffic noise is the Queensway (Highway 174). Figure 1 illustrates a complete site plan with the surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) drawings provided by Figurr Architect Collective in December 2025.

The results of the current analysis indicate that noise levels will range between 53 and 72 dBA during the daytime period (07:00-23:00) and between 45 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north façade of Block 2B, which is nearest and most exposed to the Queensway. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

Results of the calculations also indicate that the blocks closest to the Queensway, Blocks 2A and 2B will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The remaining Blocks (2C, 2D, and 2E) will require a provision for forced air heating to accommodate the potential future installation of central air conditioning. A Type D Warning Clause for Blocks 2A and 2B, and a Type C Warning Clause for Blocks 2C, 2D, and 2E will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6 of this report.

With regards to on-site stationary noise impacts of surroundings onto the study site, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. The surrounding consists of low rise residential, and mechanical equipment on the existing Phase 1 building are shielded from line of site to the proposed development. Noise from the adjacent Queensway is expected to mask any residual stationary noise impacts.

Regarding stationary noise impacts of the study site on its surroundings, the development's nature as a development of townhome blocks means that these that expected pieces of equipment would be small residential furnaces and air conditioners.

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1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by 1600 James Naismith LP to undertake a roadway traffic noise assessment to satisfy the requirements for a Site Plan Control (SPC) application submission for a proposed development of five townhome blocks located at 1600 James Naismith Drive in Ottawa, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on drawings provided by Figurr Architects Collective. in December 2025, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise assessment is a portion of the west parking area of 1600 James Naismith Drive that is sectioned off for Phase 2 development. Phase 2 will comprise several stacked townhouse buildings along the west half of the overall site. Phase 1 represents the conversion of the existing development located at 1600 James Naismith Drive in Ottawa, Ontario. The development in Phase 1 comprises an existing eight-storey commercial building with an irregular planform and outdoor parking to the east, north and west. The building will be converted into a residential space. Phase 3 will comprise a residential building with two 18-storey towers connected by a shared podium to the north of Phase 1.

The proposed development comprises of five townhouse blocks of various storeys. The two blocks along the west and the one block in the south sides of Phase 2 have 6 bays, 28 units, and are 3.5 storeys tall (the half storey is in reference to units in the basement level). The two townhouse blocks to the east of the development have 6 bays, 56 units and are 6 storeys tall. The first floor contains a mix of residential units, an indoor amenity room, bike storage, and a garbage room. The remaining above ground storeys comprise of residential units. These two blocks also share an underground parking garage.

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

The primary source of roadway traffic noise is the Queensway (Highway 417). Figure 1 illustrates a complete site plan with the surrounding context. The development is surrounded by low-rise residential buildings to the west, the Queensway to the north, commercially zoned land to the east, and parkland to the south.

No outdoor amenity space with the development would be considered as a designed for the quite enjoyment of the outdoor and thus qualify as an outdoor living area.

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) ensure that interior and exterior noise levels do not exceed the allowable limits specified by the City of Ottawa's Environmental Noise Control Guidelines 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 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways,

the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms, and sleeping quarters, respectively, as listed in Table 1.

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

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[6].

The sound level criterion for outdoor living areas (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

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

technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved. However, it should be noted there are no OLA associated with this development.

4.2.2 Theoretical Roadway 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 source 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 grass and small trees between the Queensway and the study site.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Noise receptors were strategically placed at 14 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in FiguresA1-A5
- The existing 5m noise wall north of Eugene Street was considered in the analysis.

4.2.3 Roadway Traffic Volumes

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

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Queensway (Highway 174) West Bound	Freeway	100	**36,666**
Queensway (Highway 174) East Bound	Freeway	100	**36,666**

4.3 Indoor Noise Calculations

The difference between outdoor and indoor noise levels is the noise attenuation provided by the building envelope. According to common industry practice, complete walls and individual wall elements are rated according to the Sound Transmission Class (STC). The STC ratings of common residential walls built in conformance with the Ontario Building Code (2012) typically exceed STC 35, depending on exterior cladding, thickness and interior finish details. For example, brick veneer walls can achieve STC 50 or more. Standard commercially sided exterior metal stud walls have around STC 45. Standard good quality double-glazed non-operable windows can have STC ratings ranging from 25 to 40, depending on the window manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak point in a partition.

As per Section 4.2, when daytime noise levels from road sources at the plane of the window exceed 65 dBA, calculations must be performed to evaluate the sound transmission quality of the building components to ensure acceptable indoor noise levels. The calculation procedure[8] considers:

- Window type and total area as a percentage of total room floor area
- Exterior wall type and total area as a percentage of the total room floor area
- Acoustic absorption characteristics of the room
- Outdoor noise source type and approach geometry
- Indoor sound level criteria, which varies according to the intended use of a space

Based on published research[9], exterior walls possess specific sound attenuation characteristics that are used as a basis for calculating the required STC ratings of windows in the same partition. Due to the limited information available at the time of the study, which was prepared for site plan approval, detailed floor layouts and building elevations have not been finalized; therefore, detailed STC calculations could not be performed at this time. As a guideline, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels + safety factor).

[8] Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985
[9] CMHC, Road & Rail Noise: Effects on Housing

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below. A complete set of input and output data from all STAMSON 5.04 calculations are available in Appendix A.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROAD TRAFFIC

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	9.3	Block 2A North Façade – Level 3	70	62
2	17.1	Block 2B North Façade – Level 6	72	64
3	17.1	Block 2B East Façade – Level 6	67	60
4	9.3	Block 2A West Façade – Level 3	68	60
5	17.1	Block 2B North of West Façade – Level 6	69	62
6	9.3	Block 2A East Façade – Level 3	60	53
7	17.1	Block 2B Middle of West Façade – Level 6	68	60
8	17.1	Block 2D West Façade – Level 6	64	56
9	9.3	Block 2C West Façade – Level 3	63	55
10	9.3	Block 2C East Façade – Level 3	56	48
11	17.1	Block 2D North Façade – Level 6	65	58
12	17.1	Block 2D East Façade – Level 6	65	57
13	9.3	Block 2B North Façade – Level 3	53	45
14	9.3	Block 2B West Façade – Level 3	60	53

The results of the current analysis indicate that noise levels will range between 53 and 72 dBA during the daytime period (07:00-23:00) and between 45 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north façade of Block 2B, which is nearest and most exposed to the Queensway, and has minimal exposure to the pre-existing 5 m noise barrier.

5.2 Noise Control Measures

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. As discussed in Section 4.3, the anticipated STC requirements for windows have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels + safety factor). As per city of Ottawa requirements, detailed STC calculations will be required to be completed prior to building permit application for each unit type. The STC requirements for the windows are summarized below for various units within the development (see Figure 3):

- **Bedroom Windows**

(i) Bedroom windows facing north façades of Blocks 2A and 2B will require a minimum STC of 35.

(ii) Bedroom windows facing west façade of Block 2A and the west and eats façades of Block 2B will require a minimum STC of 30.

(iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2024) requirements.

- **Living Room Windows**

(iv) Bedroom windows facing north façades of Blocks 2A and 2B will require a minimum STC of 35.

(v) Bedroom windows facing west façade of Block 2A and the west and eats façades of Block 2B will require a minimum STC of 30

(vi) All other living room windows are to satisfy Ontario Building Code (OBC 2024) requirements.

- **Exterior Walls**

(i) All exterior wall components will require a minimum STC of 45, in-line with NRC test data[10].

The STC requirements apply to windows, doors, spandrel panels and curtainwall elements. Exterior wall components on these façades are recommended to have a minimum STC of 45, where a punch window and wall system may be used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. We have specified an example window configuration, however, several manufacturers and various combinations of window components, such as those proposed, will offer the necessary sound

[10] J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

attenuation rating. It is the responsibility of the manufacturer to ensure that the specified window achieves the required STC. This can only be assured by using window configurations that have been certified by laboratory testing. The requirements for STC ratings assume that the remaining components of the building are constructed and installed according to the minimum standards of the Ontario Building Code. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that due to exceedances of 65 dBA at the POW, Blocks 2A and 2B will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Due to exceedances of 55 dBA at the POW, Blocks 2C, 2D, and 2E will require a provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 53 and 72 dBA during the daytime period (07:00-23:00) and between 45 and 64 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the north façade of Block 2B, which is nearest and most exposed to the Queensway, and has minimal exposure to the pre-existing 5 m noise barrier. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA, as indicated in Figure 3.

The results indicate that Blocks 2C, 2D, and 2E will require a provision for central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Thus, the following Type C Warning Clause will be required on all Lease, Purchase and Sale Agreements for Blocks 2C, 2D, and 2E, as summarized on the proceeding page:

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 by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

Moreover, the results of the calculations also indicate that Blocks 2A and 2B will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Type D Warning Clause will also be required on the Lease, Purchase and Sale Agreements for all units in Blocks 2A and 2B, as summarized below:

Type D:

> *"This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

With regards to on-site stationary noise impacts of surroundings onto the study site, Gradient Wind conducted a survey of the site using aerial imagery and no significant off-site sources of stationary noise were identified. The surrounding consists of low rise residential, and mechanical equipment on the existing Phase 1 building are shielded from line of site to the proposed development. Noise from the adjacent Queensway is expected to mask any residual stationary noise impacts.

Regarding stationary noise impacts of the study site on its surroundings, the development's nature as a development of townhome blocks means that these

This concludes our traffic 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,

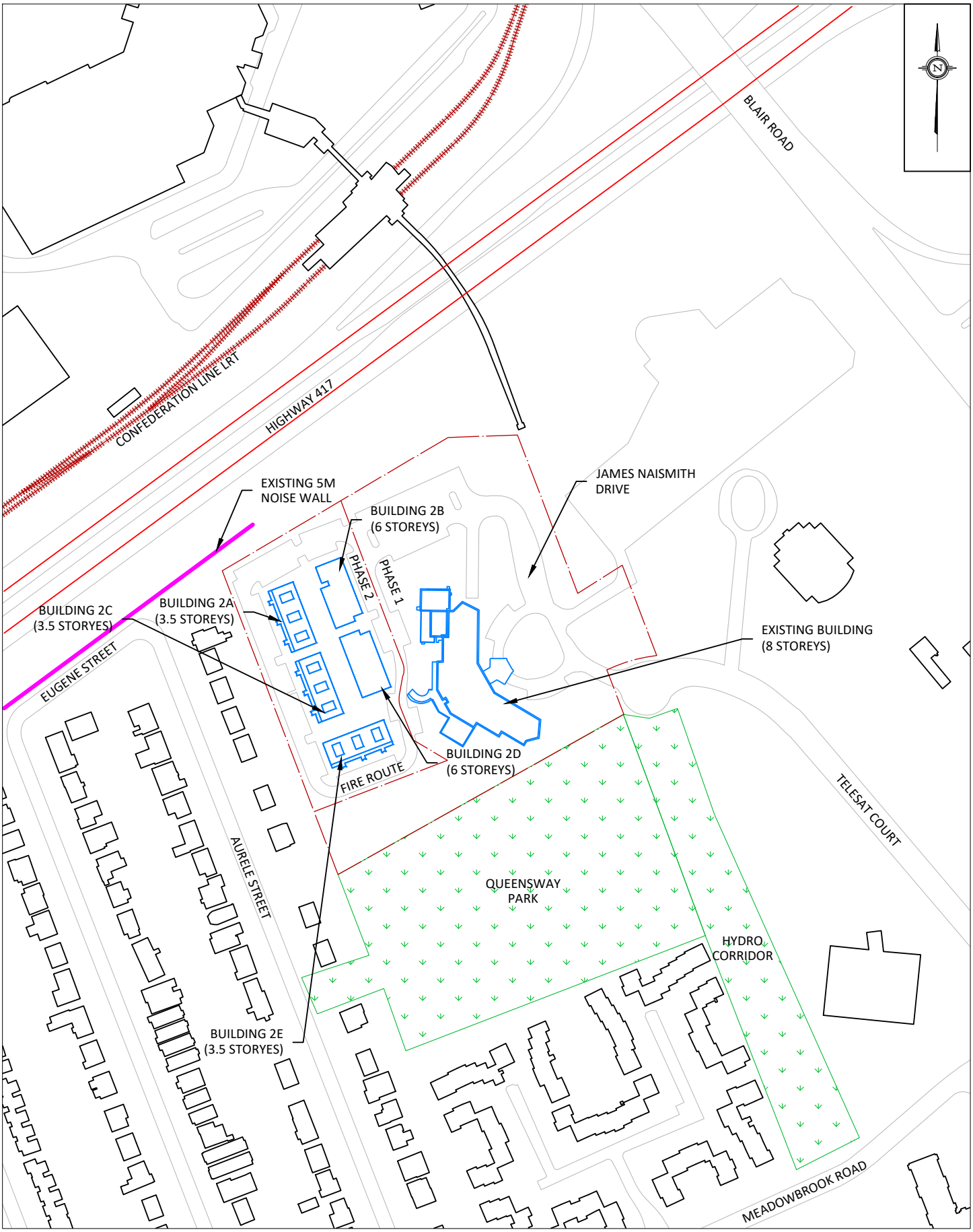
Gradient Wind Engineering Inc.

DRAFT

Michael Pantano, MASc.
Junior Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File #22-051-Traffic Noise



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PROJECT	1600 JAMES NAISMITH DRIVE PHASE 2, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT		DESCRIPTION
SCALE	1:3000 (APPROX.)	DRAWING NO. 22-051-P2-1	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT
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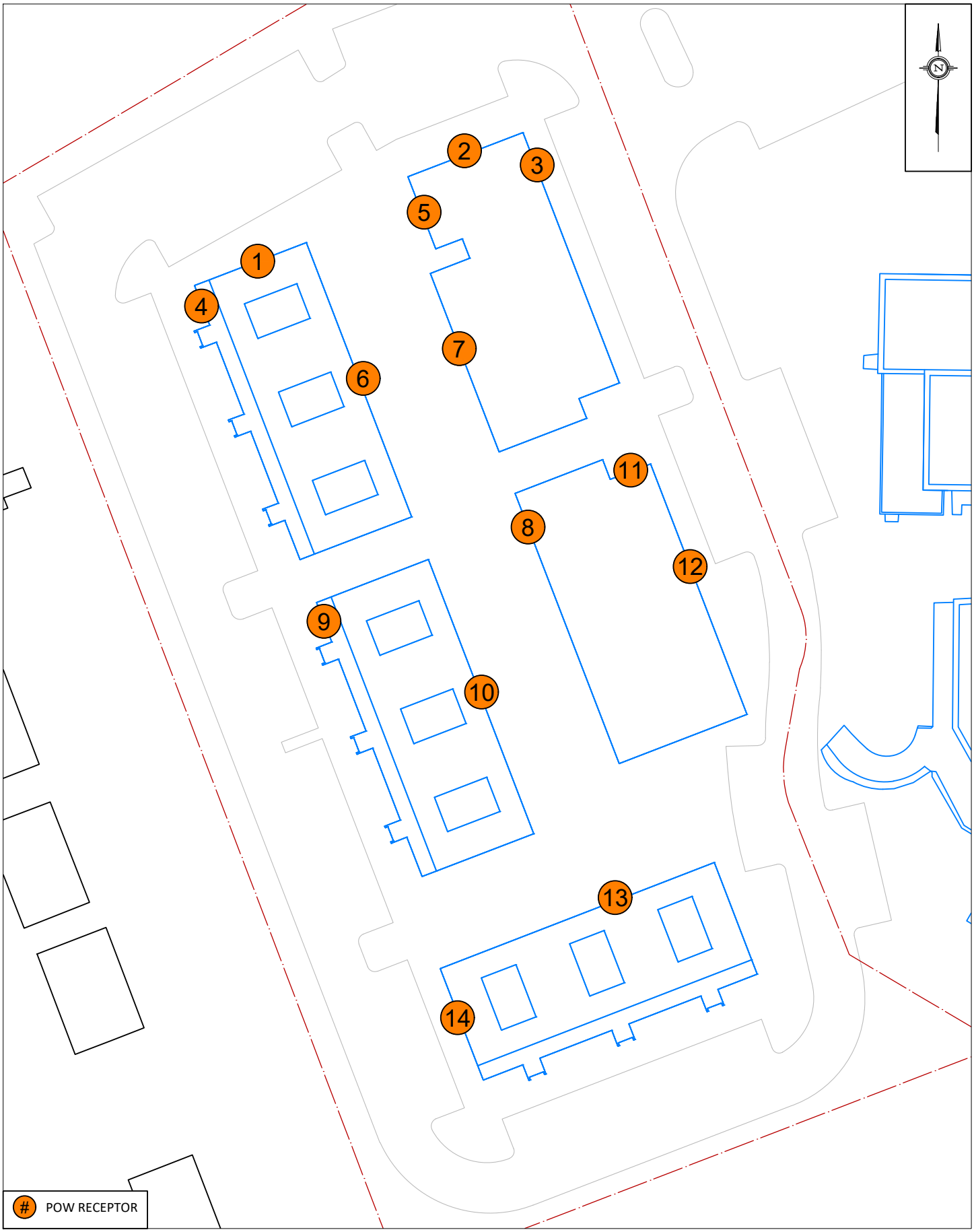

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SCALE	3:2000 (APPROX.)	DRAWING NO. GW22-051-P2-2	FIGURE 2: RECEPTOR LOCATIONS
DATE	JANUARY 15, 2026	DRAWN BY M.P.	

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SCALE	3:2000 (APPROX.)	DRAWING NO. GW22-051-P2-3	FIGURE 3: WINDOW STC REQUIREMENTS
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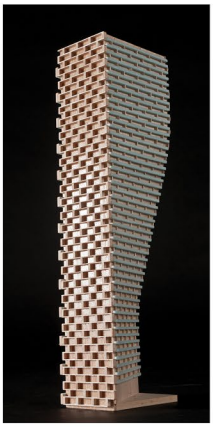

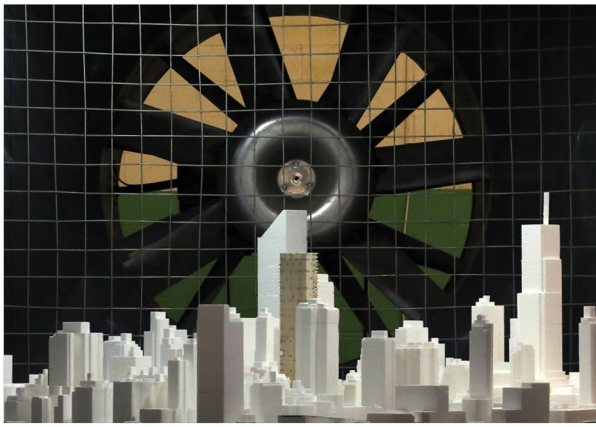

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

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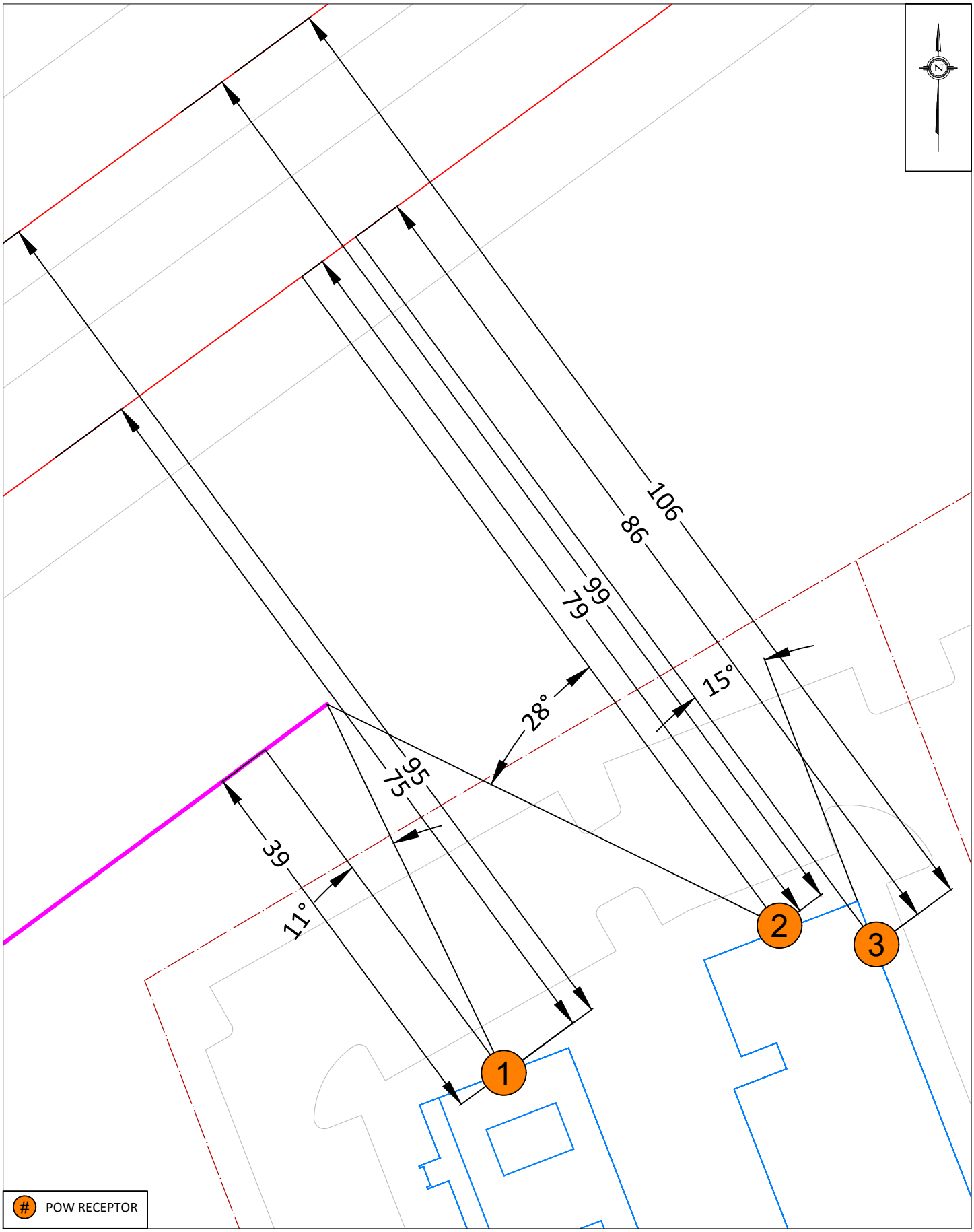

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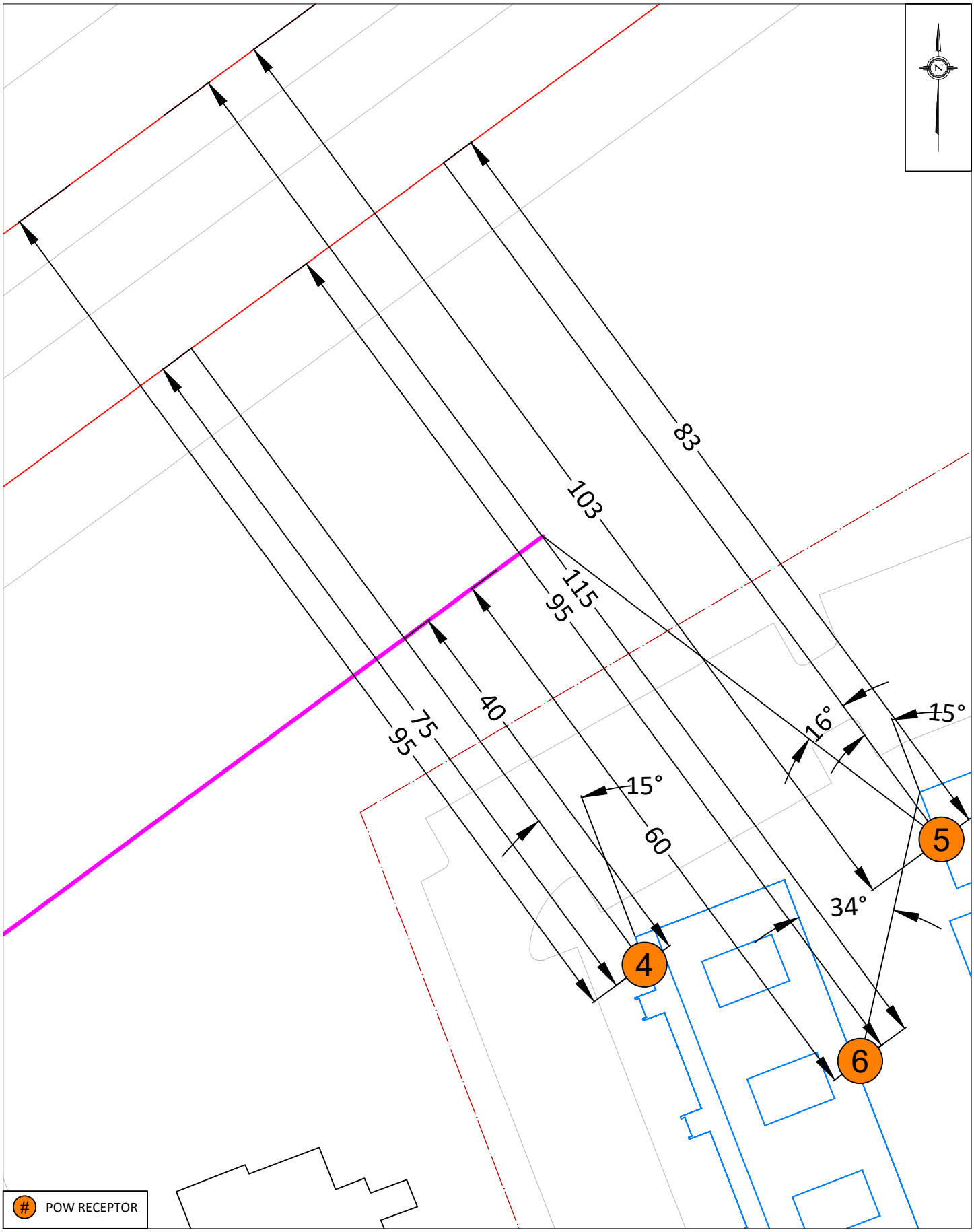
DRAWING NO.	GW22-051-P2-A1
DATE	JANUARY 15, 2026
DRAWN BY	M.P.
DESCRIPTION	FIGURE A1: STAMSON INPUT PARAMETERS: R1,2,3



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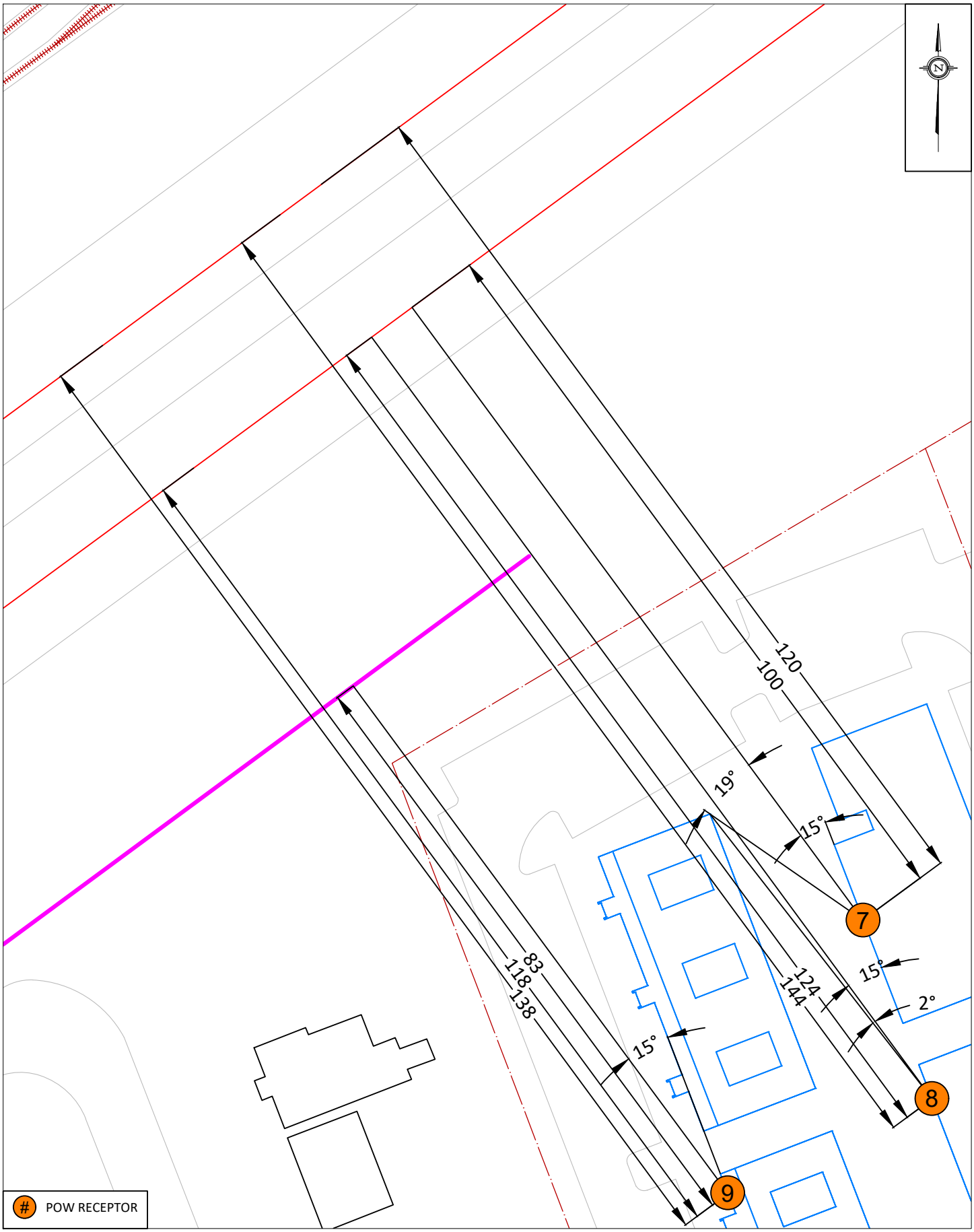
DRAWING NO.	GW22-051-P2-A2
DATE	JANUARY 15, 2026
DRAWN BY	M.P.
DESCRIPTION	FIGURE A2: STAMSON INPUT PARAMETERS: R4,5,6



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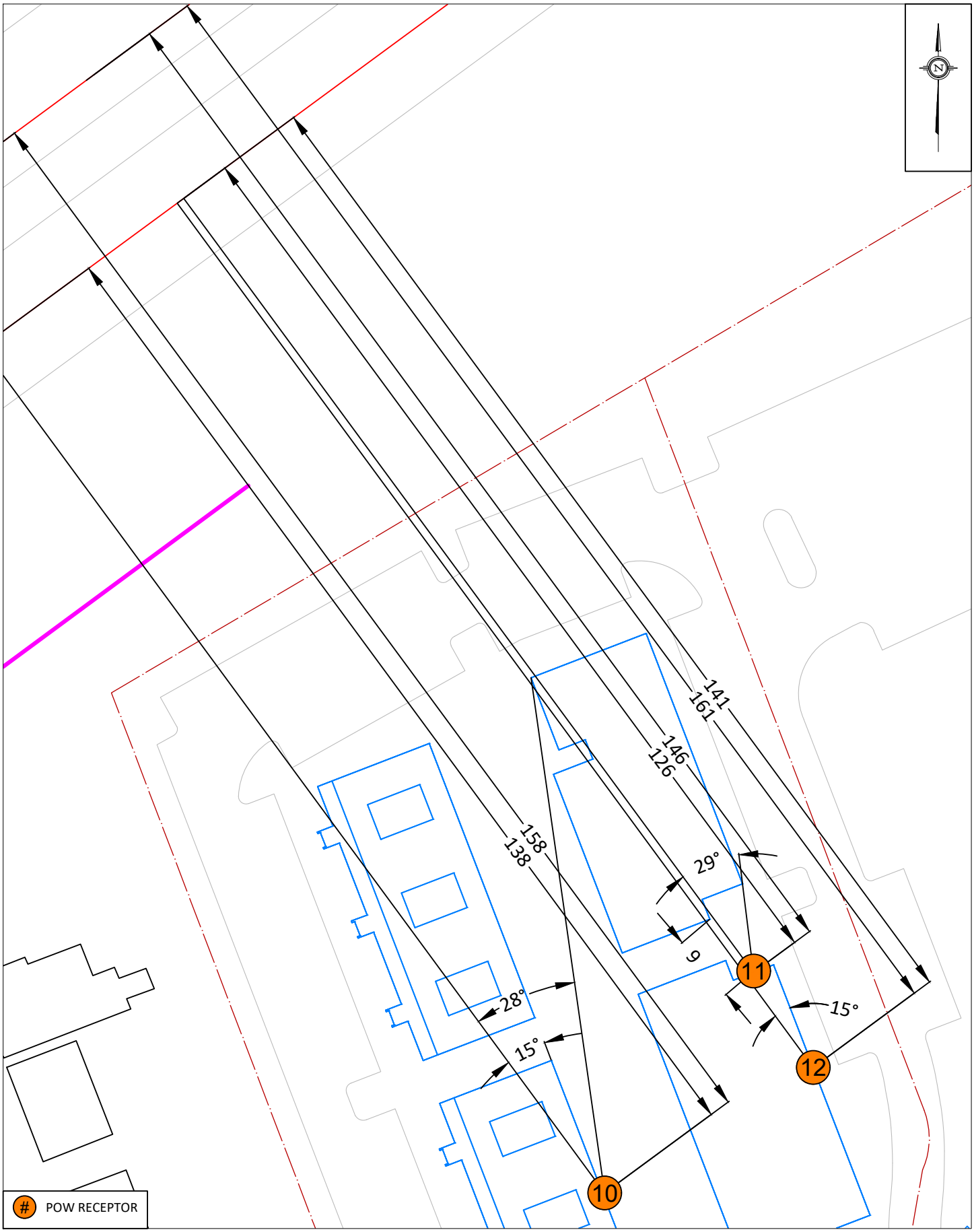

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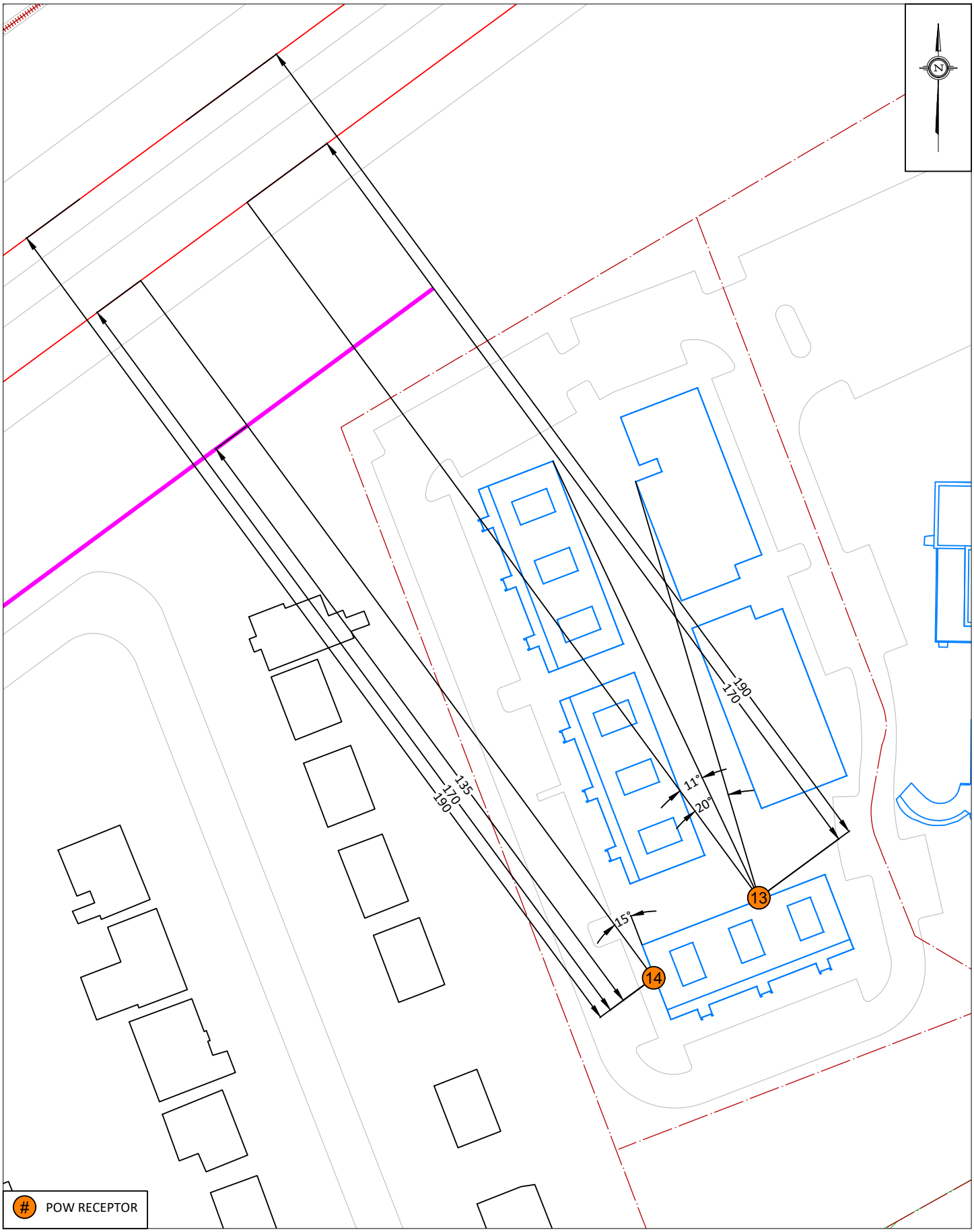
DATE	JANUARY 15, 2026
DRAWN BY	M.P.
DESCRIPTION	FIGURE A4: STAMSON INPUT PARAMETERS: R10,11,12



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PROJECT	1600 JAMES NAISMITH DRIVE PHASE 2, OTTAWA ROADWAY TRAFFIC NOISE ASSESSMENT
SCALE	3:2000 (APPROX.)
DRAWING NO.	GW22-051-P2-A5
DATE	JANUARY 15, 2026
DRAWN BY	M.P.
DESCRIPTION	FIGURE A5: STAMSON INPUT PARAMETERS: R13,14

STAMSON 5.0 NORMAL REPORT Date: 15-01-2026 12:47:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

```
Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (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  :  75.00 / 75.00  m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 11.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  39.00 / 39.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (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  :  95.00 / 95.00  m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 11.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  39.00 / 39.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !        9.30 !        5.24 !         5.24

ROAD (0.00 + 65.00 + 63.64) = 67.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     11   0.13  78.39   0.00  -7.87  -2.82   0.00   0.00  -4.94  62.75*
   -90     11   0.43  78.39   0.00  -9.97  -3.42   0.00   0.00   0.00  65.00
--------------------------------------------------------------------------------
    11     90   0.43  78.39   0.00  -9.97  -4.77   0.00   0.00   0.00  63.64
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 67.38 dBA

Results segment # 2: Queensway W (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 !        9.30 !        6.10 !         6.10

ROAD (0.00 + 63.53 + 62.18) = 65.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     11   0.13  78.39   0.00  -9.03  -2.82   0.00   0.00  -3.95  62.58*
   -90     11   0.43  78.39   0.00 -11.43  -3.42   0.00   0.00   0.00  63.53
--------------------------------------------------------------------------------
    11     90   0.43  78.39   0.00 -11.43  -4.77   0.00   0.00   0.00  62.18
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 65.92 dBA

Total Leq All Segments: 69.72 dBA
```

```
Results segment # 1: Queensway E (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 !        9.30 !        5.24 !         5.24

ROAD (0.00 + 57.40 + 56.05) = 59.79 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     11   0.13  70.79   0.00  -7.87  -2.82   0.00   0.00  -4.94  55.15*
   -90     11   0.43  70.79   0.00  -9.97  -3.42   0.00   0.00   0.00  57.40
--------------------------------------------------------------------------------
    11     90   0.43  70.79   0.00  -9.97  -4.77   0.00   0.00   0.00  56.05
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 59.79 dBA

Results segment # 2: Queensway W (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 !        9.30 !        6.10 !         6.10

ROAD (0.00 + 55.94 + 54.59) = 58.33 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     11   0.13  70.79   0.00  -9.03  -2.82   0.00   0.00  -3.95  54.99*
   -90     11   0.43  70.79   0.00 -11.43  -3.42   0.00   0.00   0.00  55.94
--------------------------------------------------------------------------------
    11     90   0.43  70.79   0.00 -11.43  -4.77   0.00   0.00   0.00  54.59
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 58.33 dBA

Total Leq All Segments: 62.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.72
                          (NIGHT): 62.13
```

STAMSON 5.0 NORMAL REPORT Date: 15-01-2026 12:47:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

```
Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (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  :  79.00 / 79.00  m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -28.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (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           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -28.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !       17.10 !        9.20 !         9.20

ROAD (0.00 + 64.40 + 67.55) = 69.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -28   0.00  78.39   0.00  -7.22  -4.63   0.00   0.00  -0.29  66.25*
   -90    -28   0.19  78.39   0.00  -8.60  -5.39   0.00   0.00   0.00  64.40
--------------------------------------------------------------------------------
   -28     90   0.19  78.39   0.00  -8.60  -2.23   0.00   0.00   0.00  67.55
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 69.27 dBA

Results segment # 2: Queensway W (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 !       17.10 !       10.80 !        10.80

ROAD (0.00 + 63.23 + 66.38) = 68.10 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -28   0.00  78.39   0.00  -8.20  -4.63   0.00   0.00  -0.18  65.38*
   -90    -28   0.19  78.39   0.00  -9.77  -5.39   0.00   0.00   0.00  63.23
--------------------------------------------------------------------------------
   -28     90   0.19  78.39   0.00  -9.77  -2.23   0.00   0.00   0.00  66.38
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 68.10 dBA

Total Leq All Segments: 71.73 dBA
```

```
Results segment # 1: Queensway E (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 !       17.10 !        9.20 !         9.20

ROAD (0.00 + 56.80 + 59.96) = 61.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -28   0.00  70.79   0.00  -7.22  -4.63   0.00   0.00  -0.29  58.66*
   -90    -28   0.19  70.79   0.00  -8.60  -5.39   0.00   0.00   0.00  56.80
--------------------------------------------------------------------------------
   -28     90   0.19  70.79   0.00  -8.60  -2.23   0.00   0.00   0.00  59.96
--------------------------------------------------------------------------------
 * Bright Zone !

Segment Leq : 61.67 dBA

Results segment # 2: Queensway W (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 !       17.10 !       10.80 !        10.80

ROAD (0.00 + 55.64 + 58.79) = 60.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -28   0.00  70.79   0.00  -8.20  -4.63   0.00   0.00  -0.18  57.79*
   -90    -28   0.19  70.79   0.00  -9.77  -5.39   0.00   0.00   0.00  55.64
--------------------------------------------------------------------------------
   -28     90   0.19  70.79   0.00  -9.77  -2.23   0.00   0.00   0.00  58.79
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 60.50 dBA

Total Leq All Segments: 64.13 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 71.73
                          (NIGHT): 64.13
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 12:47:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  86.00 / 86.00  m
Receiver height           :  17.10 / 17.10  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 106.00 / 106.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Queensway E (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 64.91 + 0.00) = 64.91 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    15     90   0.19  78.39   0.00  -9.04  -4.43   0.00   0.00   0.00  64.91
--------------------------------------------------------------------------
Segment Leq : 64.91 dBA

Results segment # 2: Queensway W (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 63.83 + 0.00) = 63.83 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    15     90   0.19  78.39   0.00 -10.12  -4.43   0.00   0.00   0.00  63.83
--------------------------------------------------------------------------
Segment Leq : 63.83 dBA

Total Leq All Segments: 67.41 dBA
```

```
Results segment # 1: Queensway E (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.32 + 0.00) = 57.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     90   0.19  70.79   0.00  -9.04  -4.43   0.00   0.00   0.00  57.32
--------------------------------------------------------------------------------

Segment Leq : 57.32 dBA

Results segment # 2: Queensway W (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.24 + 0.00) = 56.24 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     90   0.19  70.79   0.00 -10.12  -4.43   0.00   0.00   0.00  56.24
--------------------------------------------------------------------------------

Segment Leq : 56.24 dBA

Total Leq All Segments: 59.82 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 67.41
                         (NIGHT): 59.82
```

STAMSON 5.0 NORMAL REPORT Date: 15-01-2026 13:15:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

```
Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  75.00 / 75.00  m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 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           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !        9.30 !        5.14 !         5.14

ROAD (0.00 + 65.20 + 0.00) = 65.20 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00  -7.87  -2.64   0.00   0.00  -4.98  62.89*
   -90     15   0.43  78.39   0.00  -9.97  -3.21   0.00   0.00   0.00  65.20
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 65.20 dBA

Results segment # 2: Queensway W (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 !        9.30 !        6.01 !         6.01

ROAD (0.00 + 63.74 + 0.00) = 63.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00  -9.03  -2.64   0.00   0.00  -4.11  62.60*
   -90     15   0.43  78.39   0.00 -11.43  -3.21   0.00   0.00   0.00  63.74
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 63.74 dBA

Total Leq All Segments: 67.54 dBA
```

```
Results segment # 1: Queensway E (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 !        9.30 !        5.14 !         5.14

ROAD (0.00 + 57.61 + 0.00) = 57.61 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00  -7.87  -2.64   0.00   0.00  -4.98  55.30*
   -90     15   0.43  70.79   0.00  -9.97  -3.21   0.00   0.00   0.00  57.61
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 57.61 dBA

Results segment # 2: Queensway W (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 !        9.30 !        6.01 !         6.01

ROAD (0.00 + 56.15 + 0.00) = 56.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00  -9.03  -2.64   0.00   0.00  -4.11  55.01*
   -90     15   0.43  70.79   0.00 -11.43  -3.21   0.00   0.00   0.00  56.15
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 56.15 dBA

Total Leq All Segments: 59.95 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 67.54
                         (NIGHT): 59.95
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 13:33:52
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  83.00 / 83.00  m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -16.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 103.00 / 103.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -16.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  40.00 / 40.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !       17.10 !        9.58 !         9.58

ROAD (0.00 + 65.03 + 61.88) = 66.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -16   0.00  78.39   0.00  -7.43  -3.86   0.00   0.00  -0.21  66.88*
   -90    -16   0.19  78.39   0.00  -8.86  -4.50   0.00   0.00   0.00  65.03
--------------------------------------------------------------------------------
   -16     15   0.19  78.39   0.00  -8.86  -7.65   0.00   0.00   0.00  61.88
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 66.75 dBA

Results segment # 2: Queensway W (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 !       17.10 !       11.04 !        11.04

ROAD (0.00 + 63.91 + 60.76) = 65.63 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -16   0.00  78.39   0.00  -8.37  -3.86   0.00   0.00  -0.14  66.02*
   -90    -16   0.19  78.39   0.00  -9.98  -4.50   0.00   0.00   0.00  63.91
--------------------------------------------------------------------------------
   -16     15   0.19  78.39   0.00  -9.98  -7.65   0.00   0.00   0.00  60.76
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 65.63 dBA

Total Leq All Segments: 69.24 dBA
```

```
Results segment # 1: Queensway E (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 !       17.10 !        9.58 !         9.58

ROAD (0.00 + 57.44 + 54.29) = 59.15 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -16   0.00  70.79   0.00  -7.43  -3.86   0.00   0.00  -0.21  59.29*
   -90    -16   0.19  70.79   0.00  -8.86  -4.50   0.00   0.00   0.00  57.44
--------------------------------------------------------------------------------
   -16     15   0.19  70.79   0.00  -8.86  -7.65   0.00   0.00   0.00  54.29
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 59.15 dBA

Results segment # 2: Queensway W (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 !       17.10 !       11.04 !        11.04

ROAD (0.00 + 56.32 + 53.17) = 58.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -16   0.00  70.79   0.00  -8.37  -3.86   0.00   0.00  -0.14  58.42*
   -90    -16   0.19  70.79   0.00  -9.97  -4.50   0.00   0.00   0.00  56.32
--------------------------------------------------------------------------------
   -16     15   0.19  70.79   0.00  -9.97  -7.65   0.00   0.00   0.00  53.17
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 58.03 dBA

Total Leq All Segments: 61.64 dBA
```

```
TOTAL Leq FROM ALL SOURCES (DAY): 69.24
                         (NIGHT): 61.64
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 14:10:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   49.00 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           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  15.00 deg   Angle2 : 49.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 115.00 / 115.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  15.00 deg   Angle2 : 49.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  60.00 / 60.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !        9.30 !        4.37 !         4.37

ROAD (0.00 + 56.64 + 0.00) = 56.64 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    15     49   0.13  78.39   0.00  -9.03  -7.34   0.00   0.00  -5.38  56.64
--------------------------------------------------------------------------

Segment Leq : 56.64 dBA

Results segment # 2: Queensway W (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 !        9.30 !        5.23 !         5.23

ROAD (0.00 + 58.19 + 0.00) = 58.19 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    15     49   0.13  78.39   0.00  -9.96  -7.34   0.00   0.00  -4.96  56.13*
    15     49   0.43  78.39   0.00 -12.62  -7.58   0.00   0.00   0.00  58.19
--------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 58.19 dBA

Total Leq All Segments: 60.49 dBA
```

```
Results segment # 1: Queensway E (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 !        9.30 !        4.37 !         4.37

ROAD (0.00 + 49.05 + 0.00) = 49.05 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     49   0.13  70.79   0.00  -9.03  -7.34   0.00   0.00  -5.38  49.05
--------------------------------------------------------------------------------

Segment Leq : 49.05 dBA

Results segment # 2: Queensway W (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 !        9.30 !        5.23 !         5.23

ROAD (0.00 + 50.60 + 0.00) = 50.60 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     49   0.13  70.79   0.00  -9.96  -7.34   0.00   0.00  -4.96  48.53*
    15     49   0.43  70.79   0.00 -12.62  -7.58   0.00   0.00   0.00  50.60
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 50.60 dBA

Total Leq All Segments: 52.90 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 60.49
                         (NIGHT): 52.90
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:11:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7_1.te              Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   -19.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -19.00 deg
Barrier height            :  14.00 m
Barrier receiver distance :  20.00 / 20.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   -19.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -19.00 deg
Barrier height            :  14.00 m
Barrier receiver distance :  20.00 / 20.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Queensway E (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 !       17.10 !       13.98 !        13.98

ROAD (0.00 + 61.11 + 0.00) = 61.11 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -19   0.00  78.39   0.00  -8.24  -4.04   0.00   0.00  -5.00  61.11
--------------------------------------------------------------------------------

Segment Leq : 61.11 dBA
```

```
Results segment # 2: Queensway W (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 !       17.10 !       14.50 !        14.50

ROAD (0.00 + 62.92 + 0.00) = 62.92 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -19   0.00  78.39   0.00  -9.03  -4.04   0.00   0.00  -4.78  60.53*
   -90    -19   0.19  78.39   0.00 -10.77  -4.71   0.00   0.00   0.00  62.92
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 62.92 dBA

Total Leq All Segments: 65.12 dBA

Results segment # 1: Queensway E (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 !       17.10 !       13.98 !        13.98

ROAD (0.00 + 53.51 + 0.00) = 53.51 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -19   0.00  70.79   0.00  -8.24  -4.04   0.00   0.00  -5.00  53.51
--------------------------------------------------------------------------------

Segment Leq : 53.51 dBA
```

```
Results segment # 2: Queensway W (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 !       17.10 !       14.50 !        14.50

ROAD (0.00 + 55.32 + 0.00) = 55.32 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90    -19   0.00  70.79   0.00  -9.03  -4.04   0.00   0.00  -4.78  52.94*
   -90    -19   0.19  70.79   0.00 -10.77  -4.71   0.00   0.00   0.00  55.32
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 55.32 dBA

Total Leq All Segments: 57.52 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.12
                         (NIGHT): 57.52
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:16:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7_2.te              Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -19.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 100.00 / 100.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -19.00 deg   Angle2 : -5.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  64.00 / 64.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -19.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 120.00 / 120.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -19.00 deg   Angle2 : -5.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  64.00 / 64.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Results segment # 1: Queensway E (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 !       17.10 !        7.11 !         7.11

ROAD (0.00 + 57.45 + 59.01) = 61.31 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -19     -5   0.00  78.39   0.00  -8.24 -11.09   0.00   0.00   0.00  59.06*
   -19     -5   0.19  78.39   0.00  -9.82 -11.11   0.00   0.00   0.00  57.45
--------------------------------------------------------------------------------
    -5     15   0.19  78.39   0.00  -9.82  -9.55   0.00   0.00   0.00  59.01
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 61.31 dBA

Results segment # 2: Queensway W (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 !       17.10 !        8.78 !         8.78

ROAD (0.00 + 56.51 + 58.07) = 60.37 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -19     -5   0.00  78.39   0.00  -9.03 -11.09   0.00   0.00   0.00  58.26*
   -19     -5   0.19  78.39   0.00 -10.77 -11.11   0.00   0.00   0.00  56.51
--------------------------------------------------------------------------------
    -5     15   0.19  78.39   0.00 -10.77  -9.55   0.00   0.00   0.00  58.07
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 60.37 dBA

Total Leq All Segments: 63.88 dBA
```

```
Results segment # 1: Queensway E (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 !       17.10 !        7.11 !         7.11

ROAD (0.00 + 49.86 + 51.42) = 53.72 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -19     -5   0.00  70.79   0.00  -8.24 -11.09   0.00   0.00   0.00  51.46*
   -19     -5   0.19  70.79   0.00  -9.82 -11.11   0.00   0.00   0.00  49.86
--------------------------------------------------------------------------------
    -5     15   0.19  70.79   0.00  -9.82  -9.55   0.00   0.00   0.00  51.42
--------------------------------------------------------------------------------
 * Bright Zone !

Segment Leq : 53.72 dBA

Results segment # 2: Queensway W (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 !       17.10 !        8.78 !         8.78

ROAD (0.00 + 48.91 + 50.48) = 52.78 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -19     -5   0.00  70.79   0.00  -9.03 -11.09   0.00   0.00   0.00  50.67*
   -19     -5   0.19  70.79   0.00 -10.77 -11.11   0.00   0.00   0.00  48.91
--------------------------------------------------------------------------------
    -5     15   0.19  70.79   0.00 -10.77  -9.55   0.00   0.00   0.00  50.48
--------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 52.78 dBA

Total Leq All Segments: 56.29 dBA


TOTAL Leq FROM ALL SOURCES (DAY): 63.88
                         (NIGHT): 56.29
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:34:02
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 124.00 / 124.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -2.00 deg
Barrier height            :  14.00 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: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 144.00 / 144.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : -2.00 deg
Barrier height            :  14.00 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
```

```
Results segment # 1: Queensway E (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 !       17.10 !       11.56 !        11.56

ROAD (0.00 + 58.66 + 57.19) = 61.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     -2   0.00  78.39   0.00  -9.17  -3.11   0.00   0.00  -7.44  58.66
--------------------------------------------------------------------------
    -2     15   0.19  78.39   0.00 -10.94 -10.26   0.00   0.00   0.00  57.19
--------------------------------------------------------------------------

Segment Leq : 61.00 dBA

Results segment # 2: Queensway W (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 !       17.10 !       12.33 !        12.33

ROAD (0.00 + 59.19 + 56.42) = 61.03 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     -2   0.00  78.39   0.00  -9.82  -3.11   0.00   0.00  -6.26  59.19
--------------------------------------------------------------------------
    -2     15   0.19  78.39   0.00 -11.71 -10.26   0.00   0.00   0.00  56.42
--------------------------------------------------------------------------

Segment Leq : 61.03 dBA

Total Leq All Segments: 64.03 dBA
```

```
Results segment # 1: Queensway E (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 !       17.10 !       11.56 !        11.56

ROAD (0.00 + 51.07 + 49.60) = 53.41 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     -2   0.00  70.79   0.00  -9.17  -3.11   0.00   0.00  -7.44  51.07
--------------------------------------------------------------------------
    -2     15   0.19  70.79   0.00 -10.94 -10.26   0.00   0.00   0.00  49.60
--------------------------------------------------------------------------

Segment Leq : 53.41 dBA

Results segment # 2: Queensway W (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 !       17.10 !       12.33 !        12.33

ROAD (0.00 + 51.60 + 48.83) = 53.44 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     -2   0.00  70.79   0.00  -9.82  -3.11   0.00   0.00  -6.26  51.60
--------------------------------------------------------------------------
    -2     15   0.19  70.79   0.00 -11.71 -10.26   0.00   0.00   0.00  48.83
--------------------------------------------------------------------------

Segment Leq : 53.44 dBA

Total Leq All Segments: 56.44 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 64.03
                         (NIGHT): 56.44
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:42:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te                 Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 118.00 / 118.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  83.00 / 83.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 138.00 / 138.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance :  83.00 / 83.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Queensway E (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 !        9.30 !        3.81 !         3.81

ROAD (0.00 + 59.73 + 0.00) = 59.73 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00 -10.09  -2.64   0.00   0.00  -5.93  59.73
--------------------------------------------------------------------------

Segment Leq : 59.73 dBA
```

```
Results segment # 2: Queensway W (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 !        9.30 !        4.61 !         4.61

ROAD (0.00 + 59.81 + 0.00) = 59.81 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00 -10.85  -2.64   0.00   0.00  -5.08  59.81
--------------------------------------------------------------------------

Segment Leq : 59.81 dBA

Total Leq All Segments: 62.78 dBA

Results segment # 1: Queensway E (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 !        9.30 !        3.81 !         3.81

ROAD (0.00 + 52.14 + 0.00) = 52.14 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00 -10.09  -2.64   0.00   0.00  -5.92  52.14
--------------------------------------------------------------------------

Segment Leq : 52.14 dBA
```

```
Results segment # 2: Queensway W (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 !        9.30 !        4.61 !         4.61

ROAD (0.00 + 52.21 + 0.00) = 52.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00 -10.85  -2.64   0.00   0.00  -5.08  52.21
--------------------------------------------------------------------------------

Segment Leq : 52.21 dBA

Total Leq All Segments: 55.19 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 62.78
                         (NIGHT): 55.19
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:46:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   28.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 138.00 / 138.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   28.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 158.00 / 158.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00


Results segment # 1: Queensway E (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 53.09 + 0.00) = 53.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     28   0.43  78.39   0.00 -13.74 -11.55   0.00   0.00   0.00  53.09
--------------------------------------------------------------------------------

Segment Leq : 53.09 dBA
```

```
Results segment # 2: Queensway W (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.25 + 0.00) = 52.25 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     28   0.43  78.39   0.00 -14.58 -11.55   0.00   0.00   0.00  52.25
--------------------------------------------------------------------------------

Segment Leq : 52.25 dBA

Total Leq All Segments: 55.70 dBA

Results segment # 1: Queensway E (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 45.50 + 0.00) = 45.50 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     28   0.43  70.79   0.00 -13.74 -11.55   0.00   0.00   0.00  45.50
--------------------------------------------------------------------------------

Segment Leq : 45.50 dBA

Results segment # 2: Queensway W (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 44.66 + 0.00) = 44.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     28   0.43  70.79   0.00 -14.58 -11.55   0.00   0.00   0.00  44.66
--------------------------------------------------------------------------------

Segment Leq : 44.66 dBA

Total Leq All Segments: 48.11 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 55.70
                         (NIGHT): 48.11
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:51:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (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  : 126.00 / 126.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 29.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (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  : 146.00 / 146.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 29.00 deg
Barrier height            :  20.00 m
Barrier receiver distance :   9.00 / 9.00   m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Queensway E (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 !       17.10 !       15.99 !        15.99

ROAD (0.00 + 53.29 + 61.90) = 62.46 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     29   0.00  78.39   0.00  -9.24  -1.80   0.00   0.00 -14.05  53.29
--------------------------------------------------------------------------
    29     90   0.19  78.39   0.00 -11.02  -5.47   0.00   0.00   0.00  61.90
--------------------------------------------------------------------------
Segment Leq : 62.46 dBA
```

```
Results segment # 2: Queensway W (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 !       17.10 !       16.14 !        16.14

ROAD (0.00 + 52.95 + 61.14) = 61.75 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     29   0.00  78.39   0.00  -9.88  -1.80   0.00   0.00 -13.76  52.95
--------------------------------------------------------------------------
    29     90   0.19  78.39   0.00 -11.78  -5.47   0.00   0.00   0.00  61.14
--------------------------------------------------------------------------

Segment Leq : 61.75 dBA

Total Leq All Segments: 65.13 dBA

Results segment # 1: Queensway E (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 !       17.10 !       15.99 !        15.99

ROAD (0.00 + 45.70 + 54.30) = 54.87 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     29   0.00  70.79   0.00  -9.24  -1.80   0.00   0.00 -14.05  45.70
--------------------------------------------------------------------------
    29     90   0.19  70.79   0.00 -11.02  -5.47   0.00   0.00   0.00  54.30
--------------------------------------------------------------------------

Segment Leq : 54.87 dBA
```

```
Results segment # 2: Queensway W (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 !       17.10 !       16.14 !        16.14

ROAD (0.00 + 45.35 + 53.54) = 54.16 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     29   0.00  70.79   0.00  -9.88  -1.80   0.00   0.00 -13.76  45.35
--------------------------------------------------------------------------
    29     90   0.19  70.79   0.00 -11.78  -5.47   0.00   0.00   0.00  53.54
--------------------------------------------------------------------------

Segment Leq : 54.16 dBA

Total Leq All Segments: 57.54 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 65.13
                         (NIGHT): 57.54
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:53:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r12.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 141.00 / 141.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           :  15.00 deg   90.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 161.00 / 161.00 m
Receiver height           :  17.10 / 17.10  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Queensway E (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 62.35 + 0.00) = 62.35 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     90   0.19  78.39   0.00 -11.60  -4.43   0.00   0.00   0.00  62.35
--------------------------------------------------------------------------------

Segment Leq : 62.35 dBA

Results segment # 2: Queensway W (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 61.67 + 0.00) = 61.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     90   0.19  78.39   0.00 -12.29  -4.43   0.00   0.00   0.00  61.67
--------------------------------------------------------------------------------

Segment Leq : 61.67 dBA

Total Leq All Segments: 65.03 dBA

Results segment # 1: Queensway E (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.76 + 0.00) = 54.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    15     90   0.19  70.79   0.00 -11.60  -4.43   0.00   0.00   0.00  54.76
--------------------------------------------------------------------------------

Segment Leq : 54.76 dBA
```

```
Results segment # 2: Queensway W (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.07 + 0.00) = 54.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    15     90   0.19  70.79   0.00 -12.29  -4.43   0.00   0.00   0.00  54.07
--------------------------------------------------------------------------

Segment Leq : 54.07 dBA

Total Leq All Segments: 57.44 dBA




TOTAL Leq FROM ALL SOURCES (DAY): 65.03
                         (NIGHT): 57.44
```

```
STAMSON 5.0        NORMAL REPORT        Date: 15-01-2026 15:58:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r13.te                Time Period: Day/Night 16/8 hours
Description:


Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           :  11.00 deg   20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 170.00 / 170.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           :  11.00 deg   20.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 190.00 / 190.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: Queensway E (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.27 + 0.00) = 50.27 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    11     20   0.43  78.39   0.00 -15.04 -13.08   0.00   0.00   0.00  50.27
--------------------------------------------------------------------------------

Segment Leq : 50.27 dBA

Results segment # 2: Queensway W (day)
--------------------------------------

Source height = 1.50 m

ROAD (0.00 + 49.58 + 0.00) = 49.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    11     20   0.43  78.39   0.00 -15.73 -13.08   0.00   0.00   0.00  49.58
--------------------------------------------------------------------------------

Segment Leq : 49.58 dBA

Total Leq All Segments: 52.95 dBA

Results segment # 1: Queensway E (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 42.67 + 0.00) = 42.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
    11     20   0.43  70.79   0.00 -15.04 -13.08   0.00   0.00   0.00  42.67
--------------------------------------------------------------------------------

Segment Leq : 42.67 dBA
```

```
Results segment # 2: Queensway W (night)
----------------------------------------

Source height = 1.50 m

ROAD (0.00 + 41.99 + 0.00) = 41.99 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
    11     20   0.43  70.79   0.00 -15.73 -13.08   0.00   0.00   0.00  41.99
--------------------------------------------------------------------------

Segment Leq : 41.99 dBA

Total Leq All Segments: 45.35 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 52.95
                         (NIGHT): 45.35
```

STAMSON 5.0 NORMAL REPORT Date: 15-01-2026 15:54:26
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r14.te Time Period: Day/Night 16/8 hours
Description:

```
Road data, segment # 1: Queensway E (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway E (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 170.00 / 170.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance : 135.00 / 135.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00
```

```
Road data, segment # 2: Queensway W (day/night)
-----------------------------------------------
Car traffic volume  : 29685/2581  veh/TimePeriod  *
Medium truck volume :  2361/205   veh/TimePeriod  *
Heavy truck volume  :  1687/147   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):  36666
    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: Queensway W (day/night)
---------------------------------------------
Angle1   Angle2           : -90.00 deg   15.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  : 190.00 / 190.00 m
Receiver height           :   9.30 / 9.30   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -90.00 deg   Angle2 : 15.00 deg
Barrier height            :   5.00 m
Barrier receiver distance : 135.00 / 135.00 m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: Queensway E (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 !        9.30 !        3.10 !         3.10

ROAD (0.00 + 57.02 + 0.00) = 57.02 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00 -11.87  -2.64   0.00   0.00  -6.85  57.02
--------------------------------------------------------------------------

Segment Leq : 57.02 dBA
```

```
Results segment # 2: Queensway W (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 !        9.30 !        3.75 !         3.75

ROAD (0.00 + 57.66 + 0.00) = 57.66 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  78.39   0.00 -12.42  -2.64   0.00   0.00  -5.66  57.66
--------------------------------------------------------------------------

Segment Leq : 57.66 dBA

Total Leq All Segments: 60.36 dBA

Results segment # 1: Queensway E (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 !        9.30 !        3.10 !         3.10

ROAD (0.00 + 49.43 + 0.00) = 49.43 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00 -11.87  -2.64   0.00   0.00  -6.85  49.43
--------------------------------------------------------------------------

Segment Leq : 49.43 dBA
```

```
Results segment # 2: Queensway W (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 !        9.30 !        3.76 !         3.76

ROAD (0.00 + 50.07 + 0.00) = 50.07 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
--------------------------------------------------------------------------------
   -90     15   0.13  70.79   0.00 -12.42  -2.64   0.00   0.00  -5.66  50.07
--------------------------------------------------------------------------------

Segment Leq : 50.07 dBA

Total Leq All Segments: 52.77 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 60.36
                         (NIGHT): 52.77
```