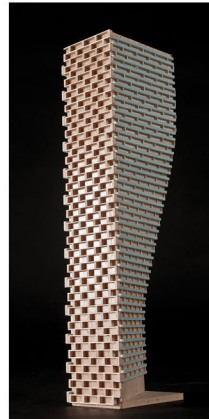


**TRANSPORTATION NOISE  
ASSESSMENT**

116 Beech Street  
Ottawa, Ontario

REPORT: 24-066 – Transportation Noise



December 12, 2025

PREPARED FOR

**Katasa Groupe Développement**  
69 rue Jean-Proulx, unite #301  
Gatineau, QC J8Z 1W2

PREPARED BY

Sunny Kang, B.A.S., Project Coordinator  
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## EXECUTIVE SUMMARY

This report describes a transportation noise assessment undertaken in support of a site plan application for a proposed development located at 116 Beech Street in Ottawa, Ontario. The proposed development comprises a 25-storey building atop a 6-storey podium. The primary sources of transportation noise are the Queensway and the Trillium light rail line. As the light rail line is beyond 75 m away from the study site, ground vibration impacts are insignificant<sup>1</sup>. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by MECP's and the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) architectural drawings by Project1 Studio Inc., provided in December 2025.

The results of the current analysis indicate that plane of window noise levels will range between 36 and 71 dBA during the daytime period (07:00-23:00) and between 30 and 63 dBA during the nighttime period (23:00-07:00). The highest noise level (71 dBA) occurs at the north façade, which is closest 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 (see Section 5.2). As noise levels are between 55 and 60 dBA at the level 7 outdoor amenity area, noise barriers are not required. However, a Type A Warning Clause is required in all Agreements of Purchase and Sale and Lease, as summarized in Section 6.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. A Type D<sup>2</sup> will also be required be placed on all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Stationary noise impacts from existing buildings onto the proposed development are expected to be minimal. Noise from the mechanical equipment servicing near-by buildings is expected to be sufficiently attenuated by the setback distance.

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<sup>1</sup> City of Ottawa Official Plan, Section 10

<sup>2</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016



With regard to stationary noise impacts of the development on the surroundings and itself, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed building become available. The stationary noise study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. Noise impacts can generally be minimized by judicious selection and placement of the equipment.

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## 1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Katasa Groupe Développement to undertake a transportation noise assessment in support of a proposed residential development located at 116 Beech Street 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 and the light rail line.

Our work is based on theoretical noise calculation methods conforming to the City of Ottawa<sup>3</sup> and Ministry of the Environment, Conservation and Parks (MECP)<sup>4</sup> noise guidelines. Noise calculations were based on architectural drawings by Project1 Studio Incorporated, provided in December 2025, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

## 2. TERMS OF REFERENCE

The subject site is located at 116 Beech Street to the north of a rectangular parcel of land bounded by Beech Street to the north, Champagne Avenue South to the east, Hickory Street to the south, and Loretta Avenue South to the west. The proposed development comprises a 25-storey building with a 6-storey podium.

At the ground floor, the proposed development includes building entrances to the north and west, a parkland dedication to the northeast, and surface parking to the south. Access to the noted surface parking is provided by a drive aisle at the southwest corner from Loretta Avenue South, while access to the parking garage is provided at the southeast corner of the subject site from Champagne Avenue South.

The building steps back from the northwest elevation at Level 5, from all elevations at Level 7, and from the west elevation at Level 13. The only Outdoor Living Area (OLA) identified in this development is the Level 7 outdoor amenity area.

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<sup>3</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

<sup>4</sup> Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013



### **3. OBJECTIVES**

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings produced by local transportation 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 and the MECP 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 ( $2 \times 10^{-5}$  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 for roadway as listed in Table 1.

**TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD)<sup>5</sup>**

Type of Space	Time Period	L <sub>eq</sub> (dBA)
General offices, reception areas, <b>retail stores</b> , etc.	07:00 – 23:00	50
Living/dining/den areas of <b>residences</b> , 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 <b>residences</b> , 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<sup>6</sup>. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment<sup>7</sup>. 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<sup>8</sup>.

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

<sup>5</sup> Adapted from ENCG 2016 – Tables 2.2b and 2.2c

<sup>6</sup> Burberry, P.B. (2014). Mitchell’s Environment and Services. Routledge, Page 125

<sup>7</sup> MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8

<sup>8</sup> MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

## 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.

Transportation noise calculations were performed by treating each roadway segment as separate line sources of noise. In addition to the traffic volumes summarized in Table 2, theoretical noise predictions were based on the following parameters:

- Truck traffic on all roadways was assumed 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 reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building.
- For select receptors where appropriate, the proposed building was assumed to act as a barrier partially or fully obstructing exposure to the source as illustrated by exposure angles in Figures A1 – A4.
- Noise receptors were placed at 8 locations around the study area (see Figure 2).
- Receptor distances and exposure angles are illustrated in Figures A1-A4.
- The rail line was considered to be in an 8 m deep trench.

## 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<sup>9</sup> 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. Volumes for the Trillium Line is based on Gradient Wind's experience with this rail line in other projects. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

---

<sup>9</sup> City of Ottawa Transportation Master Plan, November 2013

**TABLE 2: TRANSPORTATION TRAFFIC DATA**

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Queensway (Highway 417)	Freeway	100	<b>146,664</b>
Trillium Line	Light Rail Transit	70	<b>192/24*</b>

\*Day/Night Volumes

### 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 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<sup>10</sup> considers:

- Indoor sound level criteria, which varies according to the intended use of a space
- 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

<sup>10</sup> Building Practice Note: Controlling Sound Transmission into Buildings by J.D. Quirt, National Research Council of Canada, September 1985

Based on published research<sup>11</sup>, 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 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).

## 5. RESULTS AND DISCUSSION

### 5.1 Roadway Transportation Noise Levels

The results of the transportation 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 TRANSPORTATION TRAFFIC**

Receptor Number	Receptor Height Above Grade (m)	Receptor Location	STAMSON 5.04 Noise Level (dBA)	
			Day	Night
1	10.5	POW – North Façade, 4-Storey Podium	62	54
2	16.5	POW – North Façade, 6-Storey Podium	63	55
3	73.5	POW – North Façade, 25-Storey Building	71	63
4	73.5	POW – East Façade, 25-Storey Building	68	60
5	73.5	POW – South Façade, 25-Storey Building	36	30
6	37.5	POW – West Façade, 13-Storey Section	62	54
7	73.5	POW – West Façade, 25-Storey Building	68	54
8	19.5	OLA – Level 7 Outdoor Amenity Area	59	N/a*

\*Noise levels during the nighttime are not considered as per ENCG

The results of the current analysis indicate that plane of window noise levels will range between 36 and 71 dBA during the daytime period (07:00-23:00) and between 30 and 63 dBA during the nighttime period (23:00-07:00). The highest noise level (71 dBA) occurs at the north façade, which is closest and most

<sup>11</sup> CMHC, Road & Rail Noise: Effects on Housing

exposed to the Queensway. As noise levels are under 60 dBA at the level 7 outdoor amenity area, but above 55 dBA, noise barriers are not required. However, a Type A Warning Clause is required in all Agreements of Purchase and Sale and Lease, as summarized in Section 6.

## 5.2 Noise Control Measures

The noise levels predicted due to transportation sources 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:

- **Bedroom Windows**
  - (i) Bedroom windows of the facing north will require a minimum STC of 34
  - (ii) Bedroom windows of the facing east and west will require a minimum STC of 34
  - (iii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2020) requirements.
  
- **Living Room Windows**
  - (i) Living room windows facing north will require a minimum STC of 34
  - (ii) Living room windows facing east and west will require a minimum STC of 34
  - (iii) All other living room windows are to satisfy Ontario Building Code (OBC 2020) requirements.
  
- **Exterior Walls**
  - (i) Exterior wall components on the north and east façades will require a minimum STC of 45, which will be achieved with brick cladding or an acoustical equivalent according to NRC test data<sup>12</sup>

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 window/wall system is used. A review of window supplier literature indicates that the specified STC ratings can be

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<sup>12</sup> J.S. Bradley and J.A. Birta. Laboratory Measurements of the Sound Insulation of Building Façade Elements, National Research Council October 2000.

achieved by a variety of window systems having a combination of glass thickness and inter-pane spacing. The specified STC requirements also apply to swinging and/or sliding patio doors.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required in all Agreements of Purchase and Sale and Lease, as summarized in Section 6.

## **6. CONCLUSIONS AND RECOMMENDATIONS**

The results of the current analysis indicate that plane of window noise levels will range between 36 and 71 dBA during the daytime period (07:00-23:00) and between 30 and 63 dBA during the nighttime period (23:00-07:00). The highest noise level (71 dBA) occurs at the north façade, which is closest 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 Section 5.2.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. The following Warning Clause<sup>13</sup> will also be required be placed on all Lease, Purchase and Sale Agreements, 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."*

The unmitigated noise level at the level 7 outdoor amenity area is between 55 and 60 dBA. Therefore, noise barriers are not required. However, a Type A Warning Clause is required in all Agreements of Purchase and Sale and Lease, as summarized below:

---

<sup>13</sup> City of Ottawa Environmental Noise Control Guidelines, January 2016

**Type A:**

*"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."*

Stationary noise impacts from existing buildings onto the proposed development are expected to be minimal. Noise from the mechanical equipment servicing near-by buildings is expected to be sufficiently attenuated by the setback distance.

With regard to stationary noise impacts, a stationary noise study should be performed for the site during the detailed design once mechanical plans for the proposed building become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. Noise impacts can generally be minimized by judicious selection and placement of the equipment. The building is much taller than the surroundings so by placing large pieces of equipment, such as cooling towers, condensers, and air handling equipment on the centre of the roof or in a mechanical penthouse, the surrounding points of reception will be shielded by the building massing. Where necessary noise screens and silencers can be placed into the design.

This concludes our roadway transportation noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

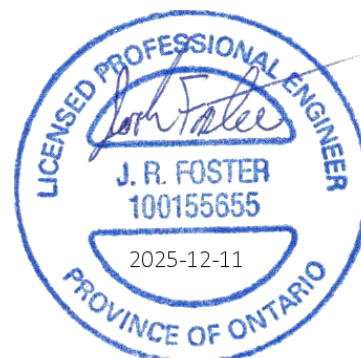
Sincerely,

**Gradient Wind Engineering Inc.**



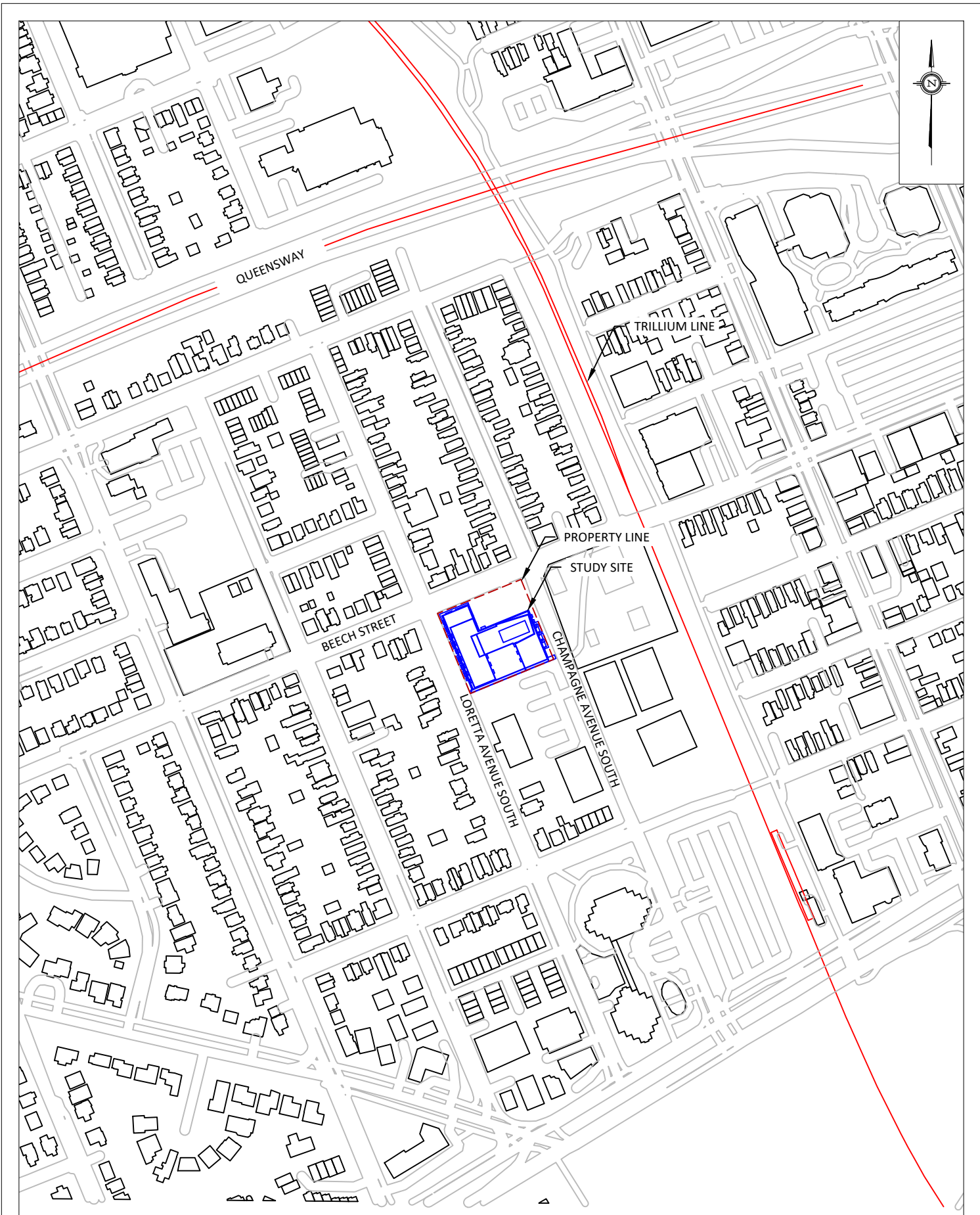
Sunny Kang, B.A.S.  
Project Coordinator

*Gradient Wind File #24-066-Traffic Noise*



Joshua Foster, P.Eng.  
Lead Engineer





**GRADIENTWIND**

ENGINEERS & SCIENTISTS

127 WALGREEN ROAD, OTTAWA, ON  
613 836 0934 • GRADIENTWIND.COM

PROJECT

116 BEECH STREET, OTTAWA  
TRANSPORTATION NOISE ASSESSMENT

SCALE

1:4,000 (APPROX.)

DRAWING NO.

GW24-066-1

DATE

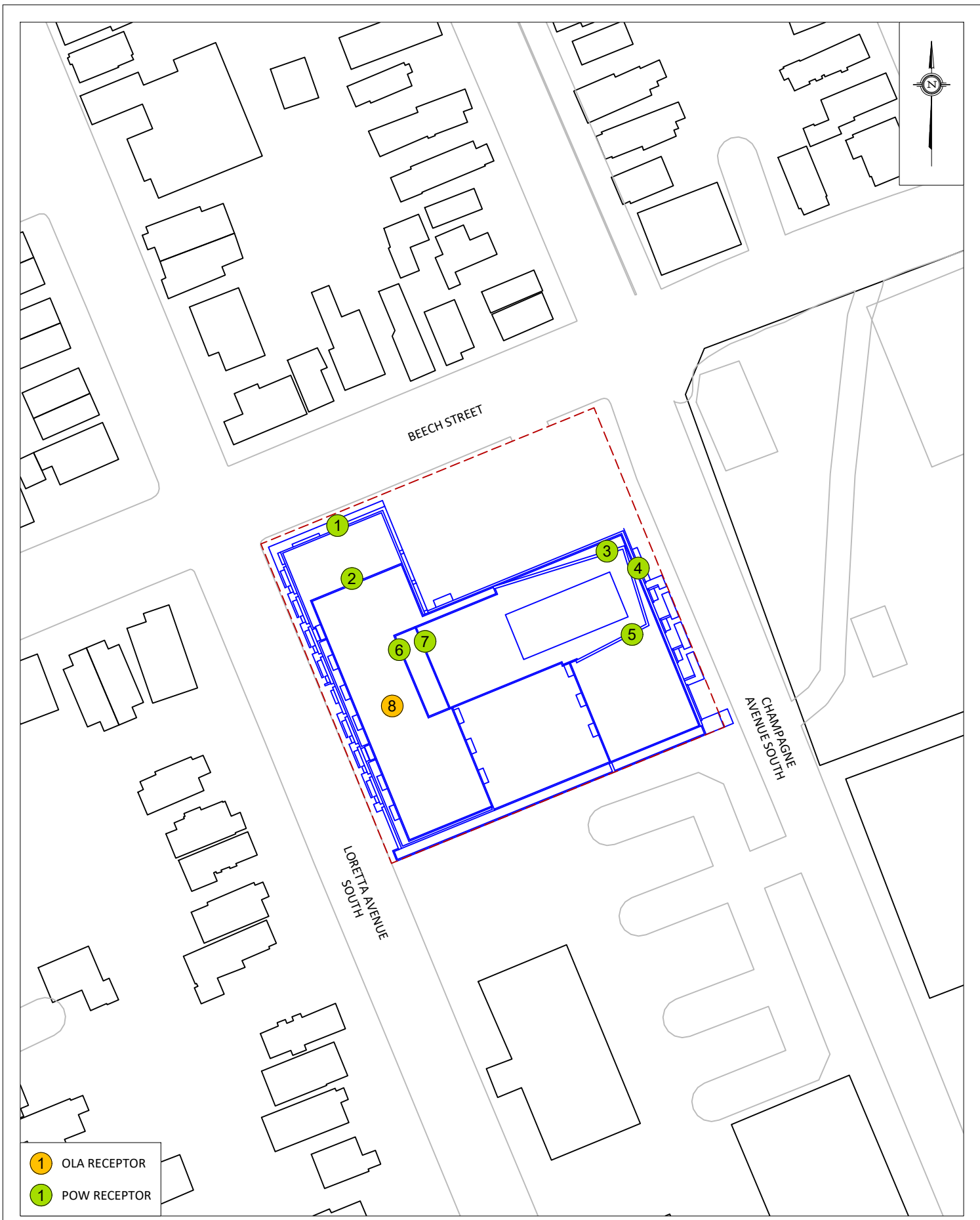
APRIL 30, 2024

DRAWN BY

E.A.

DESCRIPTION

FIGURE 1:  
SITE PLAN AND SURROUNDING CONTEXT



- 1 OLA RECEPTOR
- 1 POW RECEPTOR

<b>GRADIENTWIND</b> ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT <b>116 BEECH STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT</b>		DESCRIPTION  <b>FIGURE 2: RECEPTOR LOCATIONS</b>
	SCALE <b>1:1,000 (APPROX.)</b>	DRAWING NO. <b>GW24-066-2</b>	
	DATE <b>APRIL 30, 2024</b>	DRAWN BY <b>E.A.</b>	

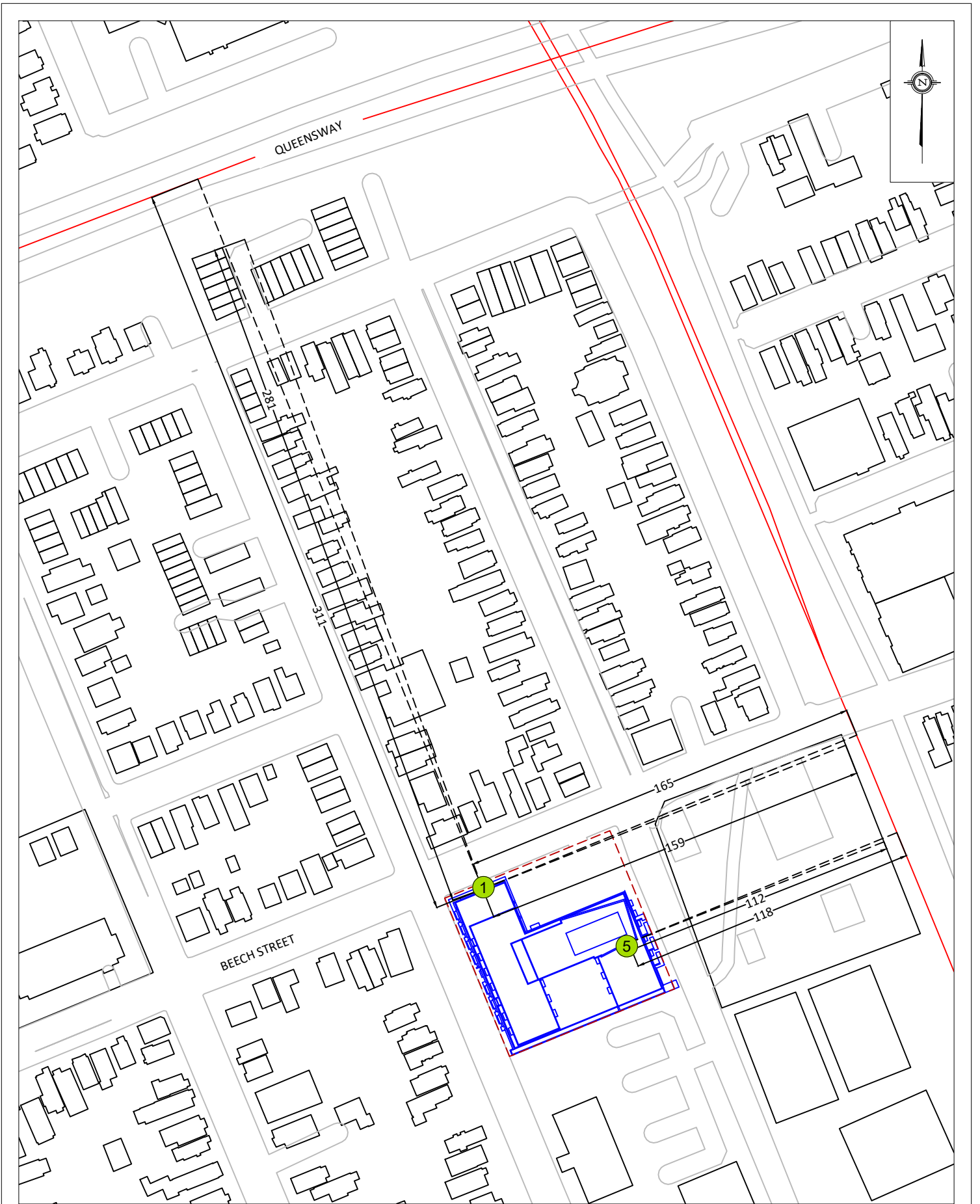
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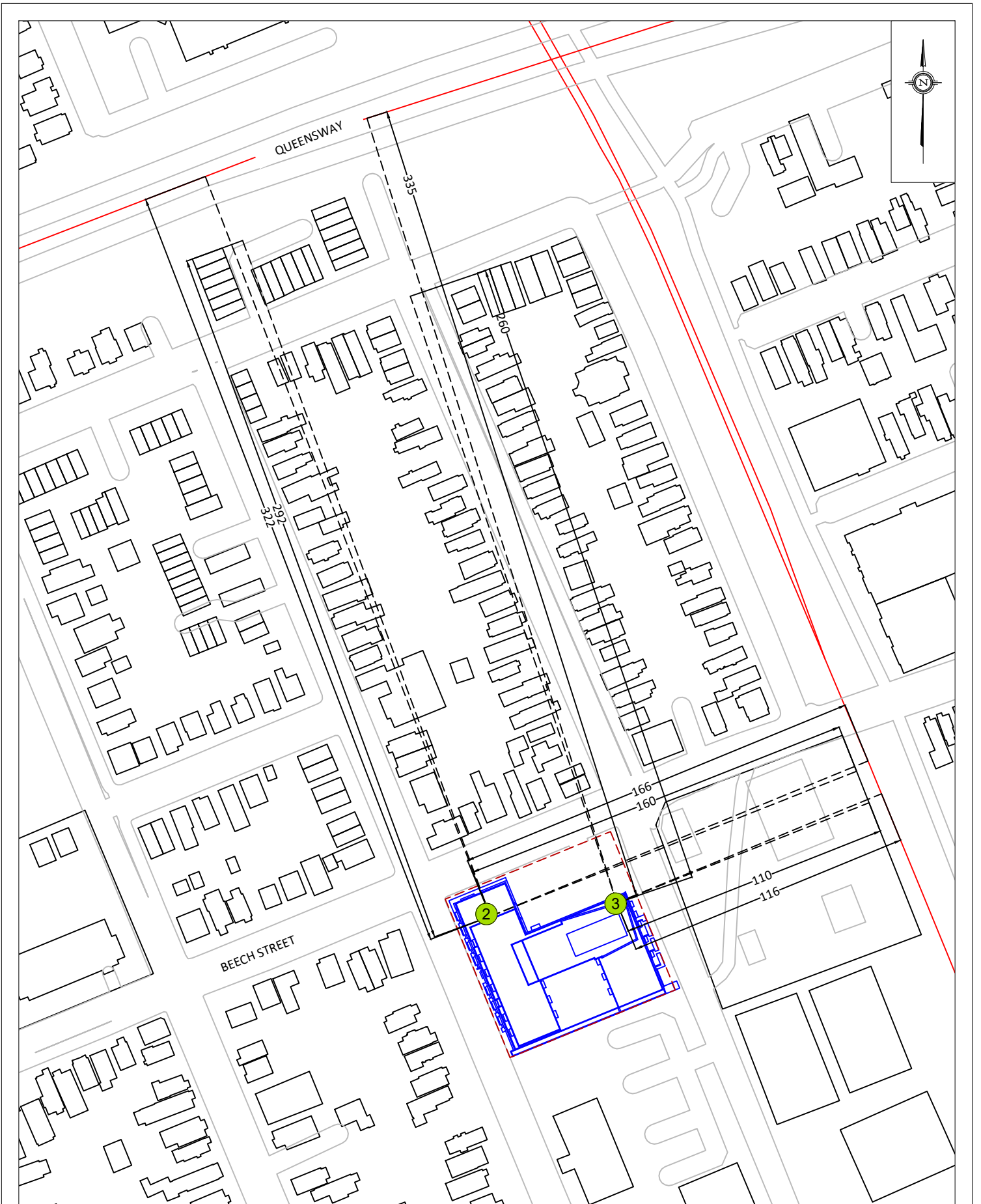


## APPENDIX A

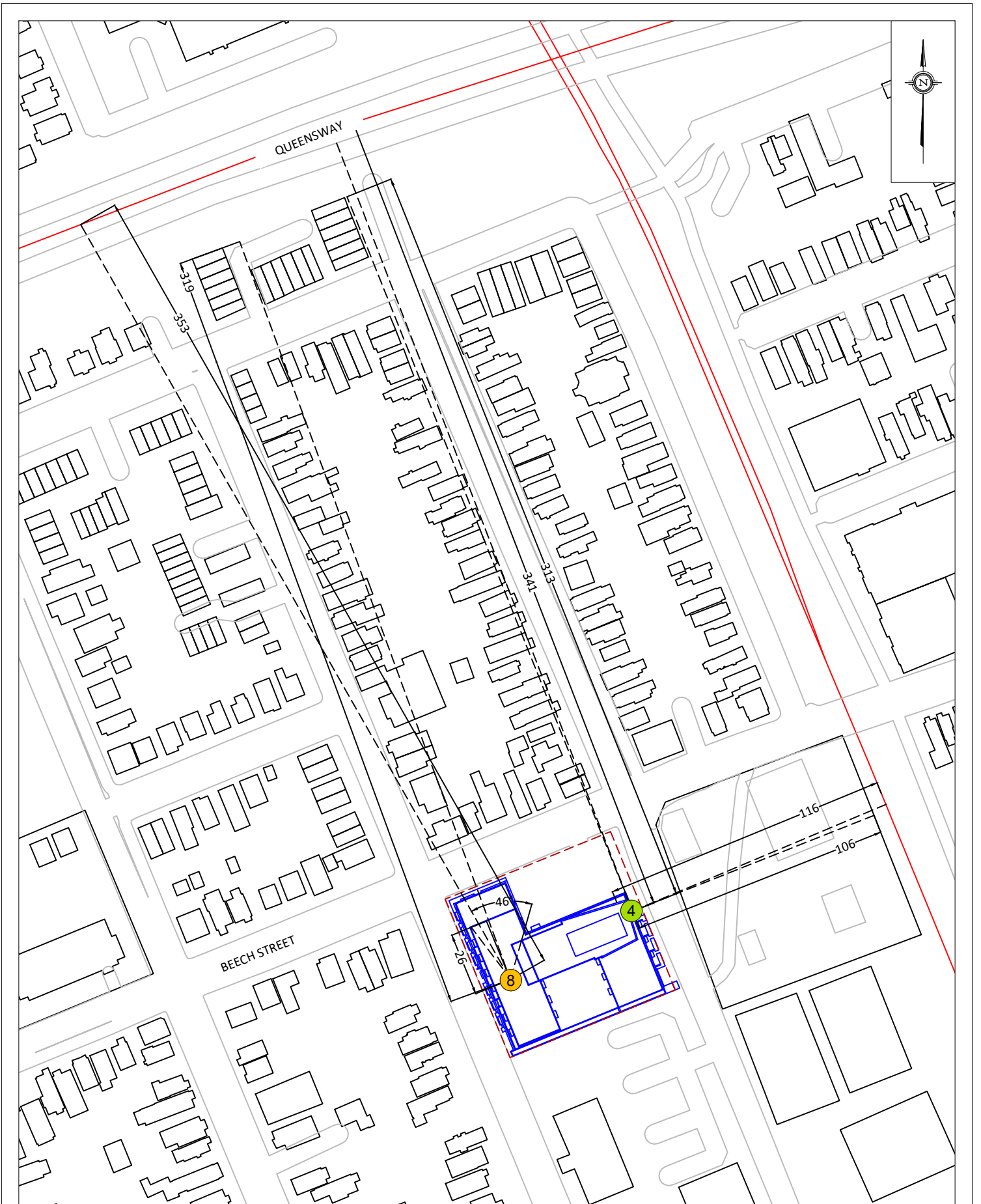
### STAMSON INPUTS AND OUTPUTS



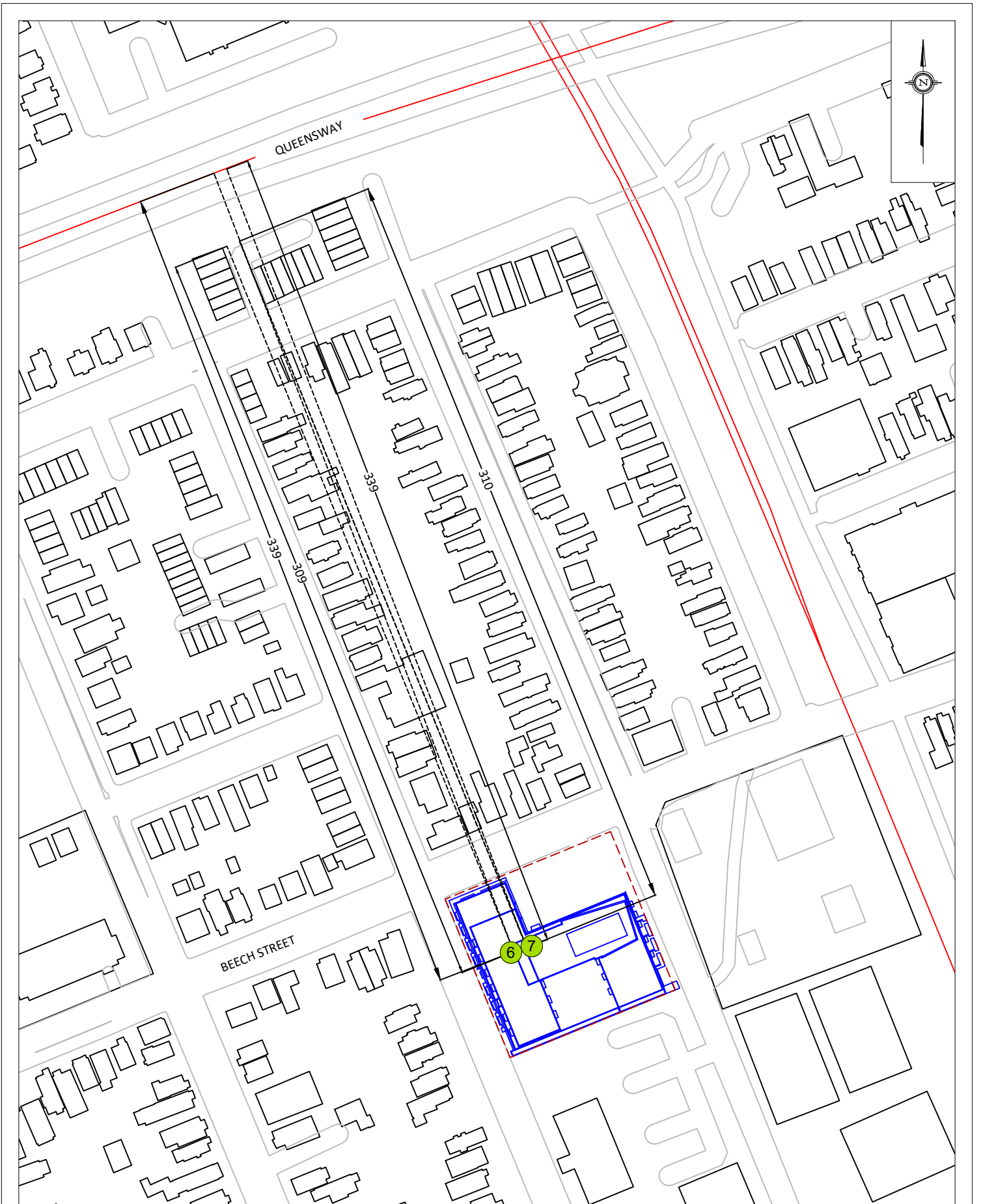
<b>GRADIENTWIND</b> ENGINEERS & SCIENTISTS 127 WALGREEN ROAD, OTTAWA, ON 613 836 0934 • GRADIENTWIND.COM	PROJECT 116 BEECH STREET, OTTAWA TRANSPORTATION NOISE ASSESSMENT		DESCRIPTION  FIGURE A1: STAMSON PARAMETERS
	SCALE 1:2,000 (APPROX.)	DRAWING NO. GW24-066-A1	
	DATE APRIL 30, 2024	DRAWN BY E.A.	



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	SCALE <b>1:2,000 (APPROX.)</b>	DRAWING NO. <b>GW24-066-A2</b>	
	DATE <b>APRIL 30, 2024</b>	DRAWN BY <b>E.A.</b>	



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	SCALE <b>1:2,000 (APPROX.)</b>	DRAWING NO. <b>GW24-066-A3</b>	
	DATE <b>APRIL 30, 2024</b>	DRAWN BY <b>E.A.</b>	



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	SCALE 1:2,000 (APPROX.)	DRAWING NO. GW24-066-A4	
	DATE APRIL 30, 2024	DRAWN BY E.A.	

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STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 13:35:04  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

-----  
Angle1    Angle2                      : -90.00 deg    90.00 deg  
Wood depth                            :        0        (No woods.)  
No of house rows                      :        0 / 0  
Surface                                :        2            (Reflective ground surface)  
Receiver source distance : 311.00 / 311.00 m  
Receiver height                        : 10.50 / 10.50 m  
Topography                             :        2            (Flat/gentle slope; with  
barrier)  
Barrier angle1                         : -90.00 deg    Angle2 : 90.00 deg  
Barrier height                         :        6.00 m  
Barrier receiver distance : 281.00 / 281.00 m  
Source elevation                        :        0.00 m  
Receiver elevation                      :        0.00 m  
Barrier elevation                        :        0.00 m  
Reference angle                         :        0.00

Results segment # 1: Queensway (day)

-----  
Source height = 1.50 m



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Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	10.50	2.36	2.36

ROAD (0.00 + 61.88 + 0.00) = 61.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.00	84.41	0.00	-13.17	0.00	0.00	0.00	-9.36

SubLeq	61.88
--------	-------

Segment Leq : 61.88 dBA

Total Leq All Segments: 61.88 dBA

Results segment # 1: Queensway (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	10.50	2.36	2.36

ROAD (0.00 + 54.29 + 0.00) = 54.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj
-90	90	0.00	76.81	0.00	-13.17	0.00	0.00	0.00	-9.36

SubLeq	54.29
--------	-------

Segment Leq : 54.29 dBA

Total Leq All Segments: 54.29 dBA



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RT/Custom data, segment # 1: LRT (day/night)

1 - 4-car SRT:

Traffic volume : 192/24 veh/TimePeriod  
 Speed : 70 km/h

Data for Segment # 1: LRT (day/night)

```

-----
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth           :           0   (No woods.)
No of house rows     :           0 / 0
Surface              :           2   (Reflective ground surface)
Receiver source distance : 165.00 / 165.00 m
Receiver height       :   10.50 / 10.50 m
Topography           :           2   (Flat/gentle slope; with
barrier)
Barrier angle1       : -90.00 deg   Angle2 : 0.00 deg
Barrier height        :     8.00 m
Barrier receiver distance : 159.00 / 159.00 m
Source elevation      :    -8.00 m
Receiver elevation    :     0.00 m
Barrier elevation     :    -8.00 m
Reference angle       :     0.00
    
```

Results segment # 1: LRT (day)

Source height = 0.50 m

Barrier height for grazing incidence

```

-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          0.50 !      10.50 !       1.15 !       -6.85
    
```

RT/Custom (0.00 + 28.69 + 0.00) = 28.69 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	58.95	-10.41	-3.01	0.00	0.00	-16.84	28.69

Segment Leq : 28.69 dBA

Total Leq All Segments: 28.69 dBA

Results segment # 1: LRT (night)



# GRADIENTWIND

ENGINEERS & SCIENTISTS

-----  
 Source height = 0.50 m

Barrier height for grazing incidence  
 -----

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
0.50	!	10.50	!
		1.15	!
			-6.85

RT/Custom (0.00 + 22.66 + 0.00) = 22.66 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	52.93	-10.41	-3.01	0.00	0.00	-16.84	22.66

Segment Leq : 22.66 dBA

Total Leq All Segments: 22.66 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.88  
 (NIGHT): 54.29



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 16:16:16  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

-----  
Angle1    Angle2                      : -90.00 deg    90.00 deg  
Wood depth                            : 0                      (No woods.)  
No of house rows                      : 0 / 0  
Surface                                : 2                      (Reflective ground surface)  
Receiver source distance : 322.00 / 322.00 m  
Receiver height                        : 16.50 / 16.50 m  
Topography                            : 2                      (Flat/gentle slope; with  
barrier)  
Barrier angle1                        : -90.00 deg    Angle2 : 90.00 deg  
Barrier height                         : 6.00 m  
Barrier receiver distance : 292.00 / 292.00 m  
Source elevation                       : 0.00 m  
Receiver elevation                     : 0.00 m  
Barrier elevation                      : 0.00 m  
Reference angle                        : 0.00

Results segment # 1: Queensway (day)

-----  
Source height = 1.50 m



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Barrier height for grazing incidence

```

-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.50 !      16.50 !      2.89 !      2.89
  
```

ROAD (0.00 + 62.51 + 0.00) = 62.51 dBA

```

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

```

-----
-90     90    0.00  84.41   0.00 -13.32  0.00   0.00   0.00  -8.58
62.51
-----
  
```

Segment Leq : 62.51 dBA

Total Leq All Segments: 62.51 dBA

Results segment # 1: Queensway (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 !      16.50 !      2.89 !      2.89
  
```

ROAD (0.00 + 54.91 + 0.00) = 54.91 dBA

```

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

```

-----
-90     90    0.00  76.81   0.00 -13.32  0.00   0.00   0.00  -8.58
54.91
-----
  
```

Segment Leq : 54.91 dBA

Total Leq All Segments: 54.91 dBA



# GRADIENTWIND

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RT/Custom data, segment # 1: LRT (day/night)

1 - 4-car SRT:

Traffic volume : 192/24 veh/TimePeriod  
 Speed : 70 km/h

Data for Segment # 1: LRT (day/night)

```

-----
Angle1   Angle2           : -90.00 deg   0.00 deg
Wood depth           :          0   (No woods.)
No of house rows    :          0 / 0
Surface              :          2   (Reflective ground surface)
Receiver source distance : 166.00 / 166.00 m
Receiver height      :  16.50 / 16.50 m
Topography           :          2   (Flat/gentle slope; with
barrier)
Barrier angle1      : -90.00 deg   Angle2 : 0.00 deg
Barrier height       :    8.00 m
Barrier receiver distance : 160.00 / 160.00 m
Source elevation     :   -8.00 m
Receiver elevation   :    0.00 m
Barrier elevation    :   -8.00 m
Reference angle      :    0.00
    
```

Results segment # 1: LRT (day)

Source height = 0.50 m

Barrier height for grazing incidence

```

-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          0.50 !         16.50 !          1.37 !          -6.63
    
```

RT/Custom (0.00 + 28.86 + 0.00) = 28.86 dBA

```

-----
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj  SubLeq
-----
   -90     0   0.00  58.95 -10.44  -3.01   0.00   0.00 -16.63  28.86
-----
    
```

Segment Leq : 28.86 dBA

Total Leq All Segments: 28.86 dBA



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Results segment # 1: LRT (night)

-----  
 Source height = 0.50 m

Barrier height for grazing incidence

-----  
 Source ! Receiver ! Barrier ! Elevation of  
 Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)  
 -----+-----+-----+-----  
 0.50 ! 16.50 ! 1.37 ! -6.63

RT/Custom (0.00 + 22.84 + 0.00) = 22.84 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	52.93	-10.44	-3.01	0.00	0.00	-16.63	22.84

-----

Segment Leq : 22.84 dBA

Total Leq All Segments: 22.84 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 62.51  
 (NIGHT) : 54.91



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 13:35:58  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

-----  
Angle1 Angle2 : -90.00 deg 90.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 335.00 / 335.00 m  
Receiver height : 73.50 / 73.50 m  
Topography : 2 (Flat/gentle slope; with  
barrier)  
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg  
Barrier height : 6.00 m  
Barrier receiver distance : 260.00 / 260.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

Results segment # 1: Queensway (day)

-----  
Source height = 1.50 m



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
1.50	!	73.50	!
		17.62	!
			17.62

ROAD (0.00 + 70.92 + 0.00) = 70.92 dBA

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

-90	90	0.00	84.41	0.00	-13.49	0.00	0.00	0.00	-0.07
70.84*									
-90	90	0.00	84.41	0.00	-13.49	0.00	0.00	0.00	0.00
70.92									

\* Bright Zone !

Segment Leq : 70.92 dBA

Total Leq All Segments: 70.92 dBA

Results segment # 1: Queensway (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	! Receiver Height (m)	! Barrier Height (m)	! Elevation of Barrier Top (m)
1.50	!	73.50	!
		17.62	!
			17.62

ROAD (0.00 + 63.32 + 0.00) = 63.32 dBA

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

-90	90	0.00	76.81	0.00	-13.49	0.00	0.00	0.00	-0.07
63.25*									
-90	90	0.00	76.81	0.00	-13.49	0.00	0.00	0.00	0.00
63.32									



\* Bright Zone !

Segment Leq : 63.32 dBA

Total Leq All Segments: 63.32 dBA

RT/Custom data, segment # 1: LRT (day/night)

-----  
1 - 4-car SRT:

Traffic volume : 192/24 veh/TimePeriod  
Speed : 70 km/h

Data for Segment # 1: LRT (day/night)

-----  
Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 116.00 / 116.00 m  
Receiver height : 73.50 / 73.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
Barrier height : 8.00 m  
Barrier receiver distance : 110.00 / 110.00 m  
Source elevation : -8.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : -8.00 m  
Reference angle : 0.00

Results segment # 1: LRT (day)

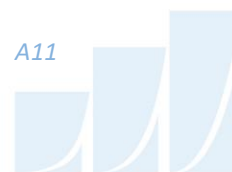
-----  
Source height = 0.50 m

Barrier height for grazing incidence

-----  
Source ! Receiver ! Barrier ! Elevation of  
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)  
-----+-----+-----+-----  
0.50 ! 73.50 ! 4.69 ! -3.31

RT/Custom (0.00 + 36.19 + 0.00) = 36.19 dBA

-----  
Angle1 Angle2 Alpha RefLeq D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq  
-----  
-90 0 0.00 58.95 -8.88 -3.01 0.00 0.00 -10.86 36.19



# GRADIENTWIND

ENGINEERS & SCIENTISTS

-----  
Segment Leq : 36.19 dBA

Total Leq All Segments: 36.19 dBA

Results segment # 1: LRT (night)  
-----

Source height = 0.50 m

Barrier height for grazing incidence  
-----

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	73.50	4.69	-3.31

RT/Custom (0.00 + 30.17 + 0.00) = 30.17 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	52.93	-8.88	-3.01	0.00	0.00	-10.86	30.17

-----

Segment Leq : 30.17 dBA

Total Leq All Segments: 30.17 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.92  
(NIGHT): 63.32



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 13:43:06  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

-----

Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

-----

Angle1    Angle2                      :    0.00 deg    90.00 deg  
Wood depth                            :        0        (No woods.)  
No of house rows                     :        0 / 0  
Surface                                :        2        (Reflective ground surface)  
Receiver source distance : 341.00 / 341.00 m  
Receiver height                       :    73.50 / 73.50 m  
Topography                            :        2        (Flat/gentle slope; with  
barrier)  
Barrier angle1                        :    0.00 deg    Angle2 : 90.00 deg  
Barrier height                         :        6.00 m  
Barrier receiver distance : 313.00 / 313.00 m  
Source elevation                      :        0.00 m  
Receiver elevation                    :        0.00 m  
Barrier elevation                      :        0.00 m  
Reference angle                       :        0.00

## Results segment # 1: Queensway (day)

-----

Source height = 1.50 m



# GRADIENTWIND

ENGINEERS & SCIENTISTS

Barrier height for grazing incidence

```

-----
Source      ! Receiver      ! Barrier      ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.50 !       73.50 !       7.41 !       7.41
  
```

ROAD (0.00 + 67.83 + 0.00) = 67.83 dBA

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

```

-----
-----
      0      90      0.00      84.41      0.00      -13.57      -3.01      0.00      0.00      -3.53
64.30*
      0      90      0.00      84.41      0.00      -13.57      -3.01      0.00      0.00      0.00
67.83
-----
-----
  
```

\* Bright Zone !

Segment Leq : 67.83 dB

Total Leq All Segments: 67.83 dBA

Results segment # 1: Queensway (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 !       73.50 !       7.41 !       7.41
  
```

ROAD (0.00 + 60.23 + 0.00) = 60.23 dBA

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

```

-----
-----
      0      90      0.00      76.81      0.00      -13.57      -3.01      0.00      0.00      -3.53
56.70*
      0      90      0.00      76.81      0.00      -13.57      -3.01      0.00      0.00      0.00
60.23
  
```



# GRADIENTWIND

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-----  
 -----  
 \* Bright Zone !

Segment Leq : 60.23 dBA

Total Leq All Segments: 60.23 dBA

RT/Custom data, segment # 1: LRT (day/night)

1 - 4-car SRT:

Traffic volume : 192/24 veh/TimePeriod  
 Speed : 70 km/h

Data for Segment # 1: LRT (day/night)

-----  
 Angle1 Angle2 : -90.00 deg 0.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 116.00 / 116.00 m  
 Receiver height : 73.50 / 73.50 m  
 Topography : 2 (Flat/gentle slope; with barrier)  
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
 Barrier height : 8.00 m  
 Barrier receiver distance : 106.00 / 106.00 m  
 Source elevation : -8.00 m  
 Receiver elevation : 0.00 m  
 Barrier elevation : -8.00 m  
 Reference angle : 0.00

Results segment # 1: LRT (day)

-----  
 Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
0.50	73.50	7.48	-0.52

RT/Custom (0.00 + 41.79 + 0.00) = 41.79 dBA

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



# GRADIENTWIND

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-90	0	0.00	58.95	-8.88	-3.01	0.00	0.00	-5.26	41.79
-----	---	------	-------	-------	-------	------	------	-------	-------

Segment Leq : 41.79 dBA

Total Leq All Segments: 41.79 dBA

Results segment # 1: LRT (night)

Source height = 0.50 m

Barrier height for grazing incidence

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
0.50	!	73.50	!
		7.48	!
			-0.52

RT/Custom (0.00 + 35.77 + 0.00) = 35.77 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	52.93	-8.88	-3.01	0.00	0.00	-5.26	35.77

Segment Leq : 35.77 dBA

Total Leq All Segments: 35.77 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.84  
(NIGHT): 60.25



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 13:43:49  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

RT/Custom data, segment # 1: LRT (day/night)

-----  
 1 - 4-car SRT:

Traffic volume       :     192/24       veh/TimePeriod  
 Speed                 :       70 km/h

Data for Segment # 1: LRT (day/night)

-----  
 Angle1   Angle2               :     0.00 deg     90.00 deg  
 Wood depth                 :       0           (No woods.)  
 No of house rows           :       0 / 0  
 Surface                     :       2           (Reflective ground surface)  
 Receiver source distance   : 118.00 / 118.00 m  
 Receiver height            :     73.50 / 73.50 m  
 Topography                 :       2           (Flat/gentle slope; with  
 barrier)  
 Barrier angle1             :     0.00 deg     Angle2 : 90.00 deg  
 Barrier height             :     8.00 m  
 Barrier receiver distance   : 112.00 / 112.00 m  
 Source elevation            :     -8.00 m  
 Receiver elevation          :     0.00 m  
 Barrier elevation           :     -8.00 m  
 Reference angle            :     0.00

Results segment # 1: LRT (day)

-----  
 Source height = 0.50 m

Barrier height for grazing incidence

-----  

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
0.50 !	73.50 !	4.62 !	-3.38

RT/Custom (0.00 + 35.96 + 0.00) = 35.96 dBA

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



# GRADIENTWIND

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0      90      0.00    58.95    -8.96    -3.01    0.00    0.00    -11.02    35.96

---

Segment Leq : 35.96 dBA

Total Leq All Segments: 35.96 dBA

Results segment # 1: LRT (night)

---

Source height = 0.50 m

Barrier height for grazing incidence

---

Source Height (m)	! Receiver ! Height (m)	! Barrier ! Height (m)	! Elevation of ! Barrier Top (m)
0.50	!	73.50	!
		4.62	!
			-3.38

RT/Custom (0.00 + 29.94 + 0.00) = 29.94 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.00	52.93	-8.96	-3.01	0.00	0.00	-11.02	29.94

---

Segment Leq : 29.94 dBA

Total Leq All Segments: 29.94 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 35.96  
(NIGHT): 29.94



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 14:00:42  
 MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

---

Car traffic volume : 118739/10325 veh/TimePeriod \*  
 Medium truck volume : 9445/821 veh/TimePeriod \*  
 Heavy truck volume : 6747/587 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): 146664  
 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 (day/night)

---

Angle1 Angle2 : -90.00 deg 0.00 deg  
 Wood depth : 0 (No woods.)  
 No of house rows : 0 / 0  
 Surface : 2 (Reflective ground surface)  
 Receiver source distance : 339.00 / 339.00 m  
 Receiver height : 37.50 / 37.50 m  
 Topography : 2 (Flat/gentle slope; with barrier)  
 Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
 Barrier height : 6.00 m  
 Barrier receiver distance : 309.00 / 309.00 m  
 Source elevation : 0.00 m  
 Receiver elevation : 0.00 m  
 Barrier elevation : 0.00 m  
 Reference angle : 0.00

Results segment # 1: Queensway (day)

---

Source height = 1.50 m

Barrier height for grazing incidence

---

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	37.50	4.68	4.68



# GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 61.93 + 0.00) = 61.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	84.41	0.00	-13.54	-3.01	0.00	0.00	-5.93	61.93

Segment Leq : 61.93 dBA

Total Leq All Segments: 61.93 dBA

Results segment # 1: Queensway (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	37.50	4.68	4.68

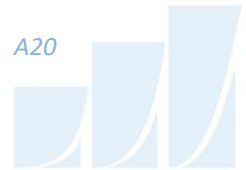
ROAD (0.00 + 54.33 + 0.00) = 54.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	76.81	0.00	-13.54	-3.01	0.00	0.00	-5.93	54.33

Segment Leq : 54.33 dBA

Total Leq All Segments: 54.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.93  
(NIGHT): 54.33



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 30-04-2024 14:02:55  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te                      Time Period: Day/Night 16/8 hours  
Description:

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

---

Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

---

Angle1 Angle2 : -90.00 deg 0.00 deg  
Wood depth : 0 (No woods.)  
No of house rows : 0 / 0  
Surface : 2 (Reflective ground surface)  
Receiver source distance : 339.00 / 339.00 m  
Receiver height : 73.50 / 37.50 m  
Topography : 2 (Flat/gentle slope; with barrier)  
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg  
Barrier height : 6.00 m  
Barrier receiver distance : 309.00 / 309.00 m  
Source elevation : 0.00 m  
Receiver elevation : 0.00 m  
Barrier elevation : 0.00 m  
Reference angle : 0.00

## Results segment # 1: Queensway (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	!	73.50	!	7.87	!	7.87



# GRADIENTWIND

ENGINEERS & SCIENTISTS

ROAD (0.00 + 67.86 + 0.00) = 67.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	84.41	0.00	-13.54	-3.01	0.00	0.00	-2.18	65.68*
-90	0	0.00	84.41	0.00	-13.54	-3.01	0.00	0.00	0.00	67.86

\* Bright Zone !

Segment Leq : 67.86 dBA

Total Leq All Segments: 67.86 dBA

Results segment # 1: Queensway (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	37.50	4.68	4.68

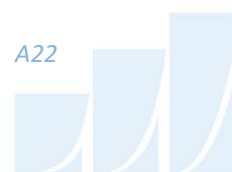
ROAD (0.00 + 54.33 + 0.00) = 54.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.00	76.81	0.00	-13.54	-3.01	0.00	0.00	-5.93	54.33

Segment Leq : 54.33 dBA

Total Leq All Segments: 54.33 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 67.86  
(NIGHT) : 54.33



# GRADIENTWIND

ENGINEERS & SCIENTISTS

STAMSON 5.0                      NORMAL REPORT                      Date: 01-05-2024 14:06:45  
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

-----  
Car traffic volume : 118739/10325 veh/TimePeriod \*  
Medium truck volume : 9445/821 veh/TimePeriod \*  
Heavy truck volume : 6747/587 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): 146664  
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 (day/night)

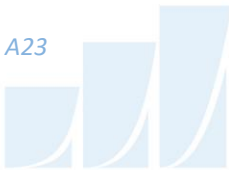
-----  
Angle1    Angle2                      : -90.00 deg    46.00 deg  
Wood depth                            :            0            (No woods.)  
No of house rows                     :            0 / 0  
Surface                                :            1            (Absorptive ground surface)  
Receiver source distance              : 353.00 / 353.00 m  
Receiver height                        :    1.50 / 1.50    m  
Topography                            :            2            (Flat/gentle slope; with barrier)  
Barrier angle1                         : -90.00 deg    Angle2 : 46.00 deg  
Barrier height                         :    0.00 m  
Barrier receiver distance              : 26.00 / 26.00 m  
Source elevation                        :    0.00 m  
Receiver elevation                      :    18.00 m  
Barrier elevation                       :    18.00 m  
Reference angle                        :    0.00

Results segment # 1: Queensway (day)

-----  
Source height = 1.50 m

Barrier height for grazing incidence

-----  
Source            ! Receiver            ! Barrier            ! Elevation of



# GRADIENTWIND

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```

Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
-----+-----+-----+-----
          1.50 !          1.50 !          0.17 !          18.17
  
```

ROAD (0.00 + 59.38 + 0.00) = 59.38 dBA

```

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

```

-----
--
-90      46    0.66  84.41   0.00 -22.77  -2.26   0.00   0.00  -4.98
54.41*
-90      46    0.66  84.41   0.00 -22.77  -2.26   0.00   0.00   0.00
59.38
  
```

\* Bright Zone !

Segment Leq : 59.38 dBA

Total Leq All Segments: 59.38 dBA

Results segment # 1: Queensway (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 !          1.50 !          0.17 !          18.17
  
```

ROAD (0.00 + 51.79 + 0.00) = 51.79 dBA

```

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

```

-----
--
-90      46    0.66  76.81   0.00 -22.77  -2.26   0.00   0.00  -4.98
46.81*
-90      46    0.66  76.81   0.00 -22.77  -2.26   0.00   0.00   0.00
51.79
  
```

\* Bright Zone !

Segment Leq : 51.79 dBA



Total Leq All Segments: 51.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 59.38  
(NIGHT): 51.79