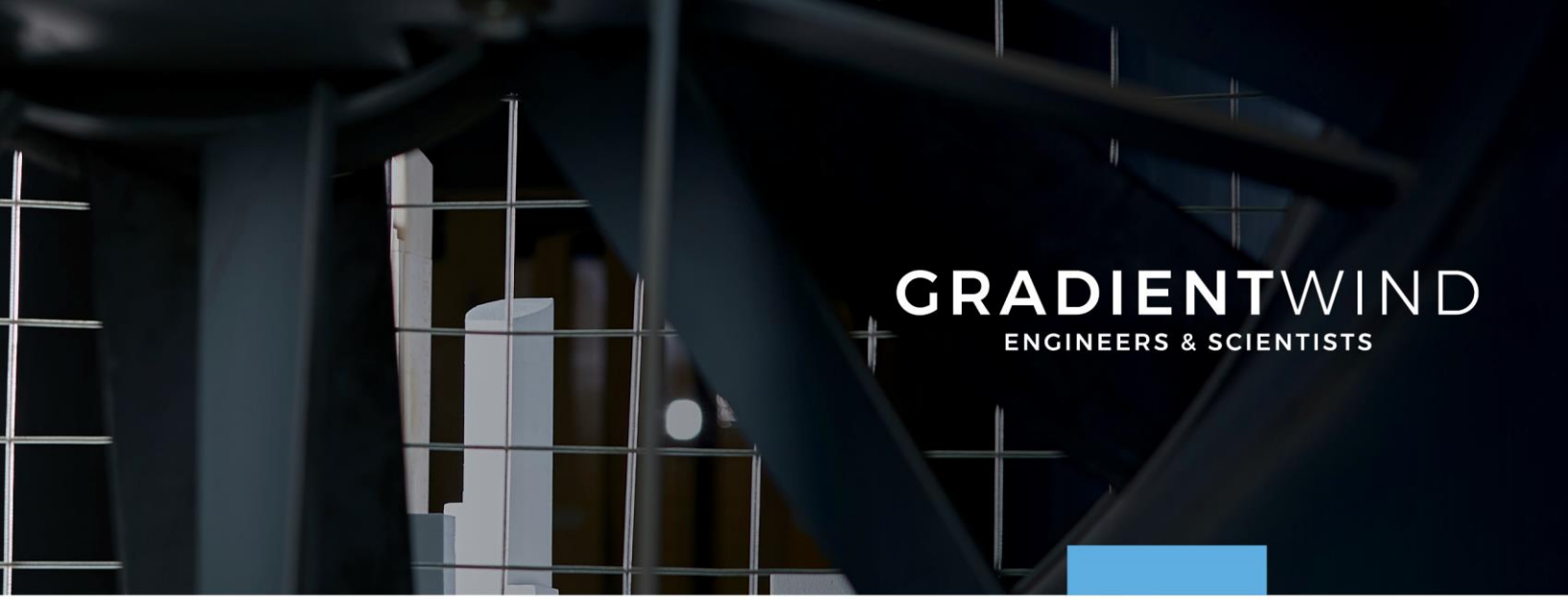

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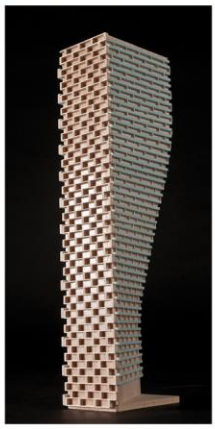
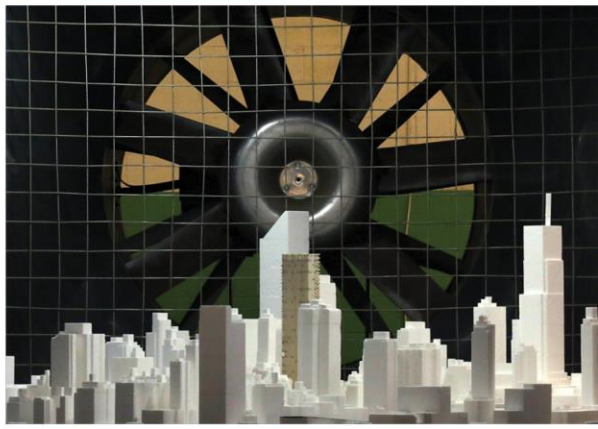
ROADWAY TRAFFIC NOISE ASSESSMENT

2829 Dumaurier Avenue
Ottawa, Ontario

Report: 20-150 – Detailed Traffic Noise





July 8, 2021

PREPARED FOR

Brigil
98 rue Lois
Gatineau, Québec J8Y 3R7

PREPARED BY

Efser Kara, MSc, LEED GA, Acoustic Scientist
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EXECUTIVE SUMMARY

This report describes a detailed roadway traffic noise assessment performed in support of a Zoning By-Law Amendment (ZBA) and Site Plan Control (SPA) applications for the proposed mixed-use development located at 2829 Dumaurier Avenue in Ottawa, Ontario. The building is located to the west of Dumaurier Avenue at the northwest corner of Dumaurier Avenue and Ramsey Crescent intersection. The proposed development comprises a 30-storey rectangular tower rising on a 6-storey podium. The podium forms an L-shape going clockwise from south to east. This study is based on drawings prepared by RLA Architecture, dated November 30, 2020.

The major source of roadway traffic noise is Highway 417 which is located to the south of the study site. Future LRT was not included in the assessment as it is located more than 100 metres away from the study site. The site is surrounded by low to high-rise residential and commercial buildings from south to north clockwise. Dumaurier Park is located to the west of the study site just across Dumaurier Avenue. Figure 1 illustrates the 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 prepared by RLA Architecture, dated November 30, 2020.

The results of the current analysis indicate that noise levels will range between 53 and 70 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 45 and 63 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the south façade, which is most exposed to Highway 417.

The results of the calculations indicate that the south and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for north and west facades.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. In addition to ventilation requirements, warning clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Noise levels at the podium rooftop receptors (Receptors 5 and 6) are expected to exceed the 55 dBA criterion during the daytime period. If these areas are to be used as outdoor living areas, noise control measures are required to reduce the L_{eq} to 55 dBA, where technically and administratively feasible. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the walking surface. Results of the investigation proved that noise levels can only be reduced to 59 and 60 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise barrier and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible.

With regards to stationary noise impacts, a stationary noise study is required to be performed once mechanical plans for the proposed building become available. This study should assess the stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study would include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. As the proposed building is much taller than the surroundings, locating larger pieces of outdoor mechanical equipment, such as cooling towers, and emergency generators on the roof will help attenuate noise emissions from these and similar pieces of equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Brigil to undertake a roadway traffic noise assessment for the proposed mixed-use development located at 2829 Dumaurier Avenue in Ottawa, Ontario. This report summarizes the methodology, results and recommendations related to the assessment of exterior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the City of Ottawa[1] and the Ministry of the Environment, Conservation and Parks (MECP)[2] guidelines. Noise calculations were based on drawings prepared by RLA Architecture, dated November 30, 2020, with future traffic volumes corresponding to the City of Ottawa's Official Plan (OP) roadway classifications.

2. TERMS OF REFERENCE

The study site is a high-rise mixed-use development located at 2829 Dumaurier Avenue. The building is located to the west of Dumaurier Avenue at the northwest corner of Dumaurier Avenue and Ramsey Crescent intersection. The proposed development comprises a 30-storey rectangular tower rising on a 6-storey podium and topped with a mechanical penthouse. The podium forms an L-shape going clockwise from south to east. The building has two levels of underground parking. Access to the parking levels is provided with a ramp through the northwest corner of the building.

The ground floor comprises commercial retail units, a lobby area and amenity spaces. Level 7 will is also reserved as an amenity floor. The remaining levels (2-6, 8-30) comprise residential dwellings. The tower rises on the south wing of the 6-storey podium leaving the north podium rooftop area free to be used as an outdoor amenity space. Level 7 also sets back on the south, east, and west sides providing terrace areas on the podium rooftop. The floor plate of the tower is cantilevered on all sides between Levels 8 and 28. The floor plate sets back again on the north, east, and west sides on Level 29. The south and north podium rooftop areas were considered as Outdoor Living Areas (OLA) in this study and included in the calculations. Other balconies and terraces are not considered in the study as only balconies and terraces with a minimum

[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

depth of 4 metres are considered as Outdoor Living Areas (OLA) as per the ENCG. This study is based on drawings prepared by RLA Architecture, dated November 30, 2020.

The primary sources of roadway traffic noise are Highway 417 and Dumaurier Avenue which are located to the south and east of the study site, respectively. Future LRT was not included in the assessment as it is located more than 100 metres away from the study site. The site is surrounded by low to high-rise residential and commercial buildings from south to north clockwise. Dumaurier Park is located to the west of the study site. Figure 1 illustrates the site plan with the surrounding context.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study buildings 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 (ENCG) 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 level 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 sound pressure 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 vehicular traffic, the equivalent sound energy level, L_{eq}, provides a measure of the time-varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time-varying noise level over a period of time. For roadways and LRT, 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) for roadways is 45 and 40 dBA for living rooms and sleeping quarters, respectively, and 50 for retail stores as listed in Table 1. Based on Gradient Wind's experience, more comfortable indoor noise levels should be targeted, towards 42 and 37, respectively, to control peak noise and deficiencies in building envelope construction.

TABLE 1: INDOOR SOUND LEVEL CRITERIA

Type of Space	Time Period	Leq (dBA)
General offices, reception areas, **retail stores**, etc.	07:00 – 23:00	50
Living/dining/den areas of residences, hospitals, schools, nursing/retirement homes, day-care centres, theatres, places of worship, libraries, individual or semi-private offices, conference rooms, etc.	07:00 – 23:00	45
Sleeping quarters of hotels/motels	23:00 – 07:00	45
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	23:00 – 07:00	40

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window is capable of providing a minimum 20 dBA noise reduction[3]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor

[3] Burberry, P.B. (2014). Mitchell's Environment and Services. Routledge, Page 125

environment[4]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which 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[5].

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 55 dBA, mitigation must be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion.

4.2.2 Theoretical Roadway Noise Predictions

Noise predictions were performed with the aid of the Ministry of the Environment, Conservations and Parks' (MECP) computerized noise assessment program, STAMSON 5.04, for road analysis. Appendix A includes the STAMSON 5.04 input and output data.

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

- Truck traffic on all roadways was taken to comprise 5% heavy trucks and 7% medium trucks, as per ENCG requirements for noise level predictions.
- The day/night split for all roads was taken to be 92% / 8%, respectively.
- Ground surfaces were taken to be absorptive due to the presence of soft ground (grass, park areas).
- Topography was assumed to be a flat/gentle slope surrounding the study site.
- A total of eight (8) receptor locations were chosen around the study site; 6 of them are at the facades of the building as Plane of Window (POW) receptors and 2 of them are on the rooftop terraces as Outdoor Living Area (OLA) receptors.

[4] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.8
[5] MECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

- POW receptor heights were taken to be at the centre of the highest-level windows of the related façade. The OLA receptor heights were taken at 19.5 m above grade, 1.5 metres above the 6-floor podium rooftop.
- The receptor distances to roadway traffic and exposure angles are illustrated in Figures 3-8.

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[6] which provide additional details on future roadway expansions. Average Annual Daily Traffic (AADT) volumes are then based on data in Table B1 of the ENCG for each roadway classification. Table 2 (below) summarizes the AADT values used for each roadway included in this assessment.

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Dumaurier Avenue	2-Lane Urban Collector (2-UCU)	40	**8,000**
Highway 417	8-Freeway	100	**146,664**

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

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

manufacturer, pane thickness and inter-pane spacing. As previously mentioned, the windows are the known weak points 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 are achieved. The calculation procedure[7] 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[8], 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 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).

5. ROADWAY TRAFFIC NOISE 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.

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

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	91.2	POW South Façade – Level 29	70	63
2	85.2	POW East Façade – Level 28	70	63
3	85.2	POW North Façade – Level 28	53	45
4	85.2	POW West Façade – Level 28	62	55
5	21.5	OLA – North – 6-Storey Podium Rooftop	67	N/A*
6	21.5	OLA – South – 6-Storey Podium Rooftop	69	N/A*
7	18.5	POW South Façade – 6-Storey Podium	67	60
8	18.5	POW East Façade – 6-Storey Podium	68	60

* OLA noise levels during the nighttime are not considered, as per the ENCG.

The results of the current analysis indicate that noise levels will range between 53 and 70 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 45 and 63 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the south façade, which is most exposed to Highway 417. The noise levels at the rooftop areas (Receptors 5 and 6) exceed the 55 dBA criterion; if these areas are to be used for quiet enjoyment of the outdoors, noise mitigation measures are required.

The results of the calculations indicate that the south and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for north and west facades.

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 and walls have been estimated based on the overall noise reduction required for each intended use of space (STC = outdoor noise level – targeted indoor noise levels). As per the City of Ottawa requirements, detailed STC

calculations will be required to be completed prior to building permit application. The STC requirements for the windows are summarized below for various units within the development (see Figure 7):

- **Bedroom Windows**

(i) Bedroom windows facing south and east will require a minimum STC of 33

(ii) All other bedroom windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Living Room Windows**

(i) Living room windows facing south and east will require a minimum STC of 28

(ii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Retail Windows**

(i) Retail windows facing south and east will require a minimum STC of 23

(ii) All other living room windows are to satisfy Ontario Building Code (OBC 2012) requirements

- **Exterior Walls**

(i) Exterior wall components on the south 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[9]

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 punched window and wall system is used. A review of window supplier literature indicates that the specified STC ratings can be achieved by a variety of window systems that have a combination of glass thickness and inter-pane spacing. 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.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and

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

maintain a comfortable working environment. In addition to ventilation requirements, warning clauses will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

5.3 Noise Barrier Calculation

Noise levels at the podium rooftop receptors (Receptors 5 and 6) are expected to exceed the 55 dBA criterion during the daytime period. If these areas are to be used as outdoor living areas, noise control measures are required to reduce the L_{eq} to 55 dBA, where technically and administratively feasible. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the walking surface. Results of the investigation proved that noise levels can only be reduced to 59 and 60 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise barrier and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible. Table 4 summarizes the results of the barrier investigation.

TABLE 4: RESULTS OF NOISE BARRIER INVESTIGATION

Reference Receptor	Barrier Height Above Walking Surface (m)	Receptor Location	Daytime L_{eq} Noise Levels (dBA)	
			With Barrier	Without Barrier
5	1.1	OLA – North – 6-Storey Podium Rooftop	63	67
	1.5		63	
	2.0		62	
	2.5		60	
	3.0		59	
6	1.1	OLA – South – 6-Storey Podium Rooftop	69	69
	1.5		66	
	2.0		64	
	2.5		62	
	3.0		60	

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 53 and 70 dBA at Plane of Window (POW) receptors during the daytime period (07:00-23:00) and 45 and 63 dBA during the nighttime period (23:00-07:00). The highest noise levels occur along the south façade, which is most exposed to Highway 417.

The results of the calculations indicate that the south and east facades of the building will require upgraded building components. Building components compliant with the Ontario Building Code (OBC 2012) will be sufficient for north and west facades.

Noise levels at the podium rooftop receptors (Receptors 5 and 6) are expected to exceed 55 dBA criterion during the daytime period. If these areas are to be used as outdoor living areas, noise control measures are required to reduce the L_{eq} to 55 dBA. Further analysis investigated the noise mitigating impact of raising the north and west perimeter guards from a standard height of 1.1 m (base case) to 3.0 m above the walking surface. Results of the investigation proved that noise levels can only be reduced to 59 and 60 dBA at Receptors 5 and 6, respectively. This marginal improvement would not justify the cost of installing such a high rail guard/noise barrier and reducing noise levels to 55 dBA would require excessive barrier heights that would not be feasible.

The results of the calculations also indicate that the building will require central air conditioning, or a similar ventilation system for the residential units, which will allow occupants to keep windows closed and maintain a comfortable working environment. The following Warning Clause[10] will also be required to be placed on all Lease, Purchase and Sale Agreements, as summarized below:

> *"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing roadway traffic may, on occasion, interfere with some activities of the dwelling occupants, as the sound levels exceed the sound level limits of the City and the Ministry of the Environment and Climate Change. To help address the need for sound attenuation, this development includes:*

[10] City of Ottawa Environmental Noise Control Guidelines, January 2016

- *STC rated multi-pane glazing elements and spandrel panels*
    - *South and east façade bedroom/living room: STC 33/28*
- *STC rated exterior walls*
    - *South and east façades: STC 45*

This dwelling unit has also been designed with air conditioning. Air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment and Climate Change.

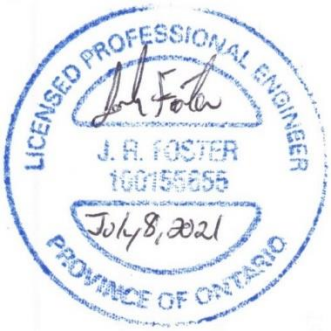
To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features."

With regards to stationary noise impacts, a stationary noise study is required to be performed once mechanical plans for the proposed building become available. This study should assess the stationary noise impacts from rooftop mechanical units serving the proposed building on surrounding noise-sensitive areas. This study would include recommendations for any noise control measures that may be necessary to ensure noise levels fall below ENCG limits. As the proposed building is much taller than the surroundings, locating larger pieces of outdoor mechanical equipment, such as cooling towers, and emergency generators on the roof will help attenuate noise emissions from these and similar pieces of equipment.

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.



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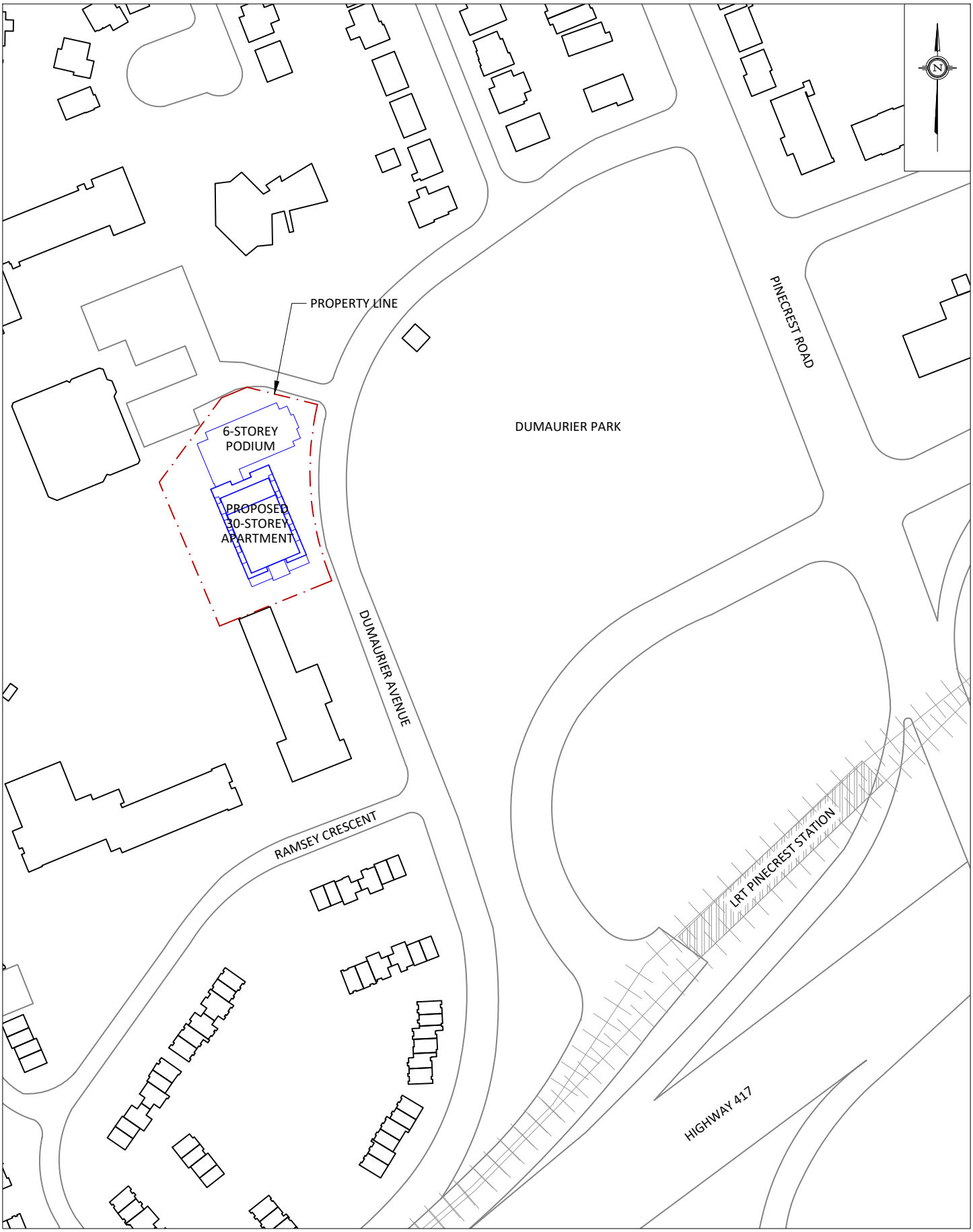
Principal

Gradient Wind File #20-150 – Detailed Traffic Noise



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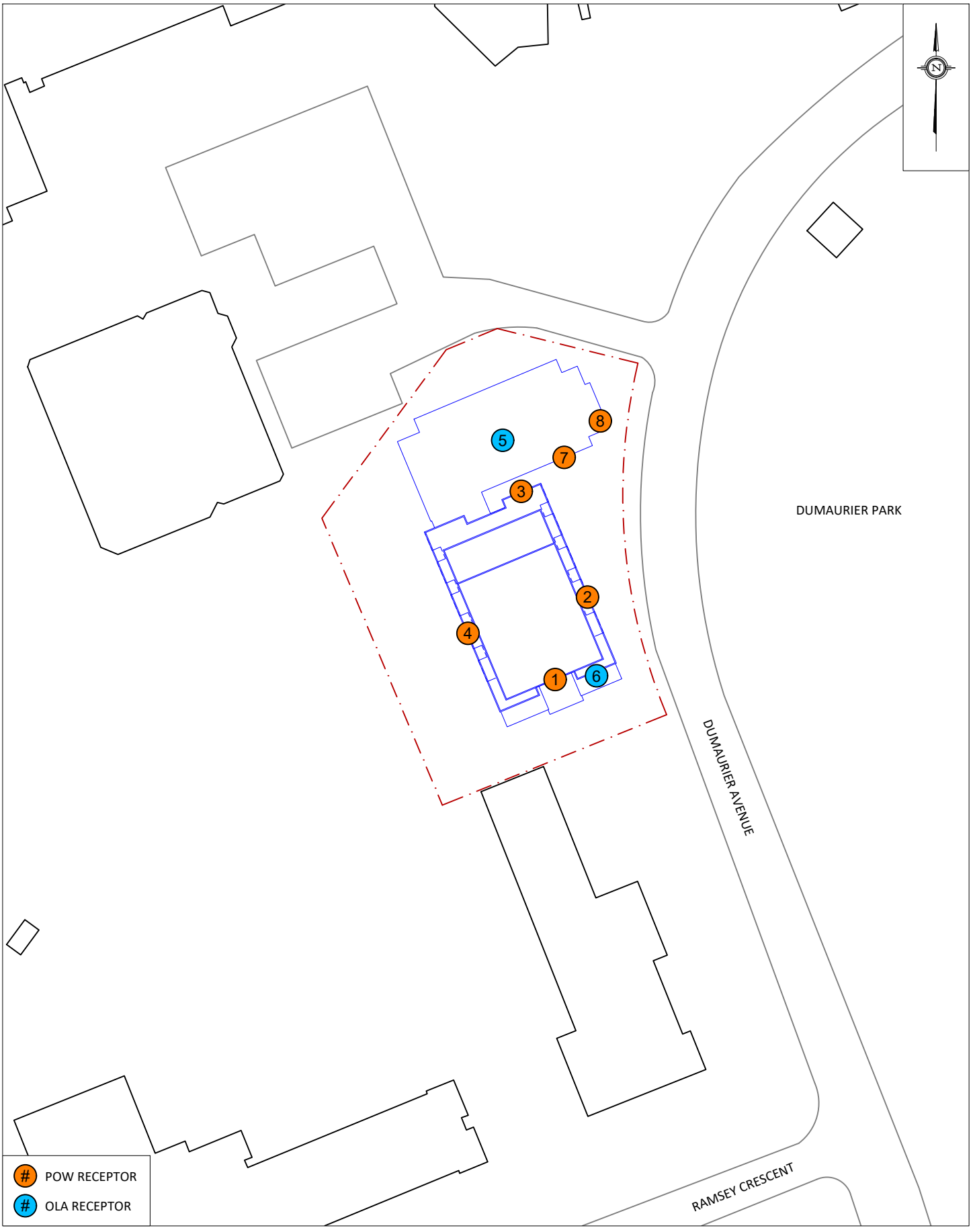
PROJECT	2829 DUMAURIER AVENUE, OTTAWA TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-1
DATE	JANUARY 4, 2021
DRAWN BY	O.R. & E.K.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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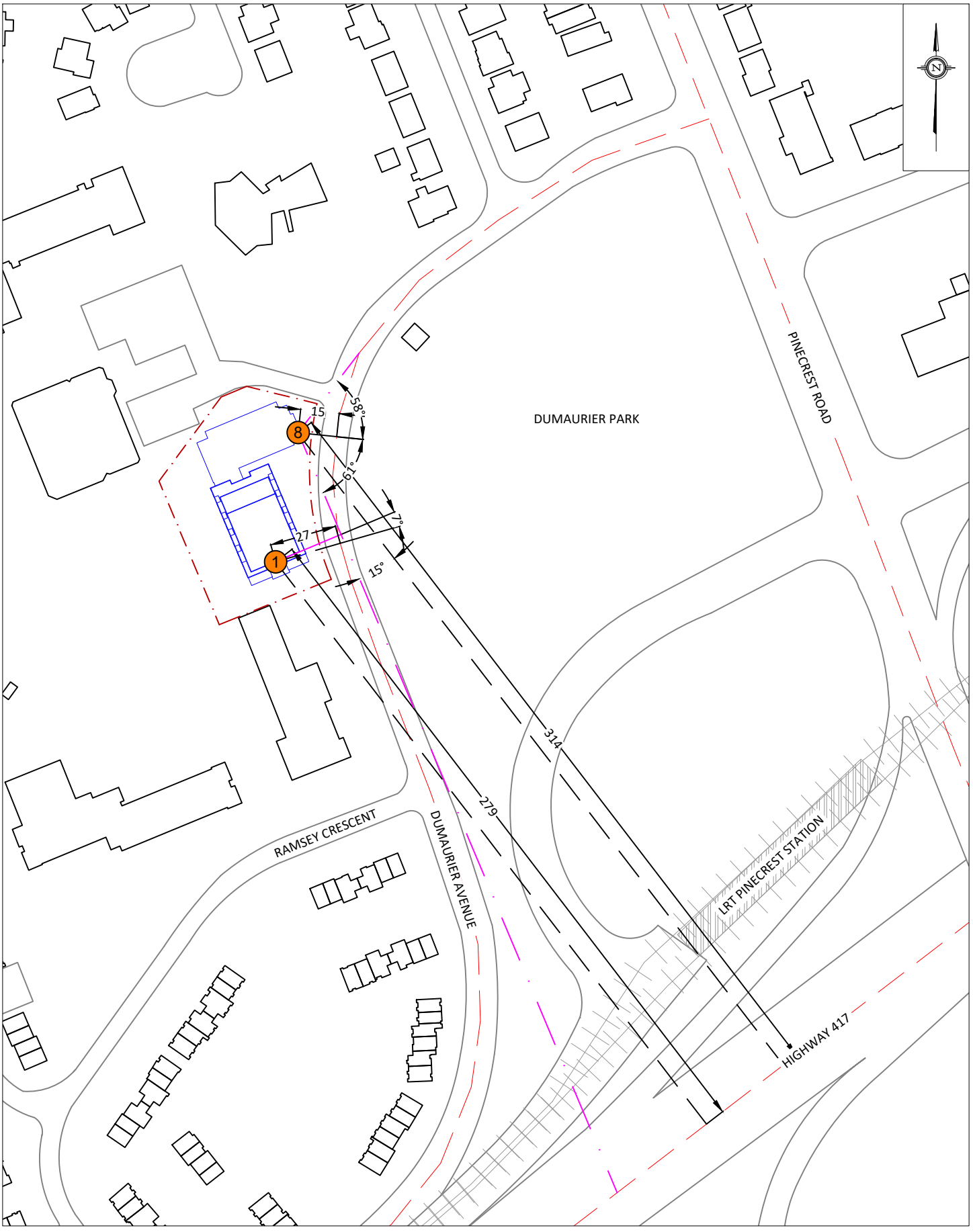
SCALE	1:1000 (APPROX.)
DRAWING NO.	GWE20-150-2
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS



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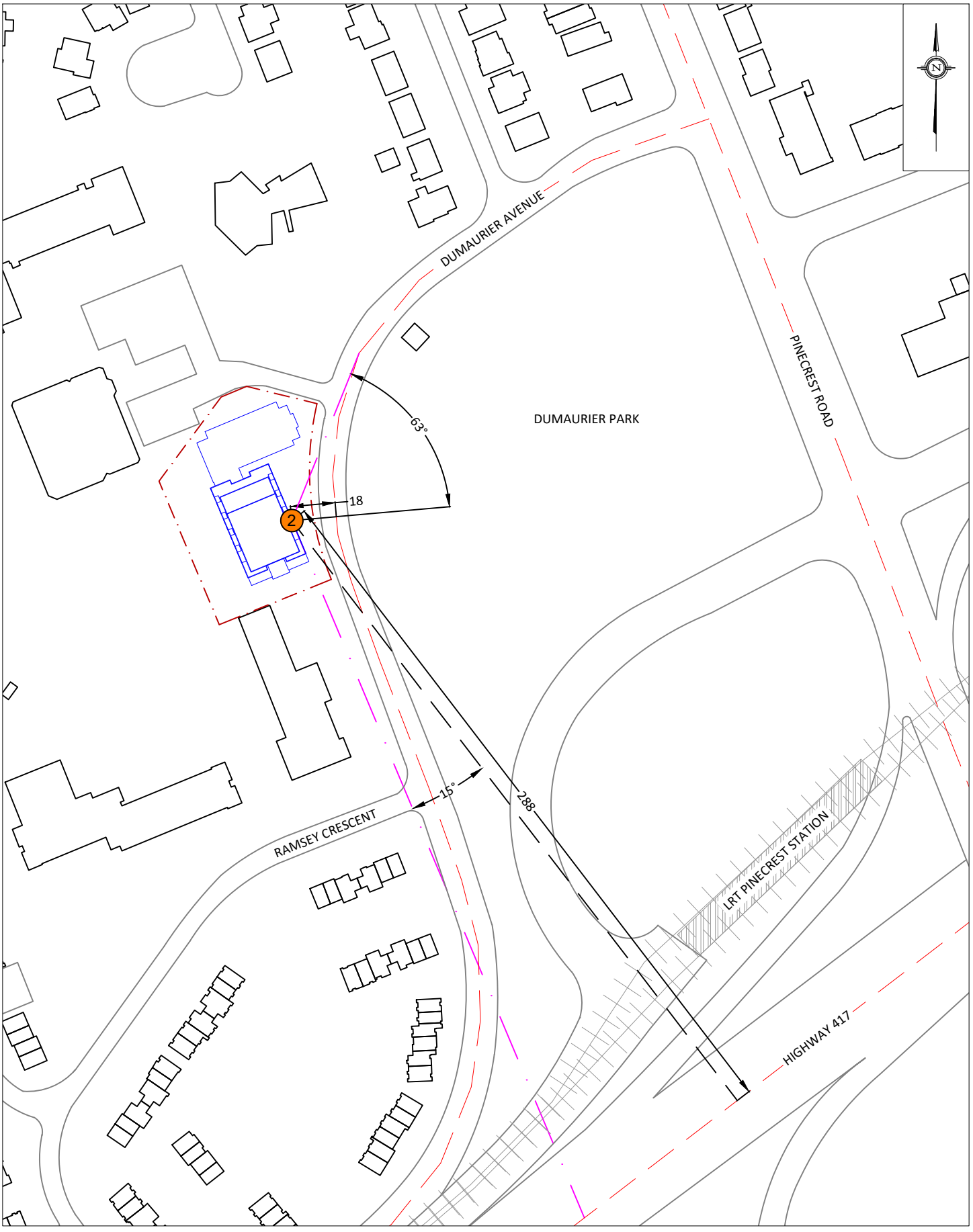
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-3
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 3:
STAMSON INPUT DATA FOR RECEPTORS 1 & 8



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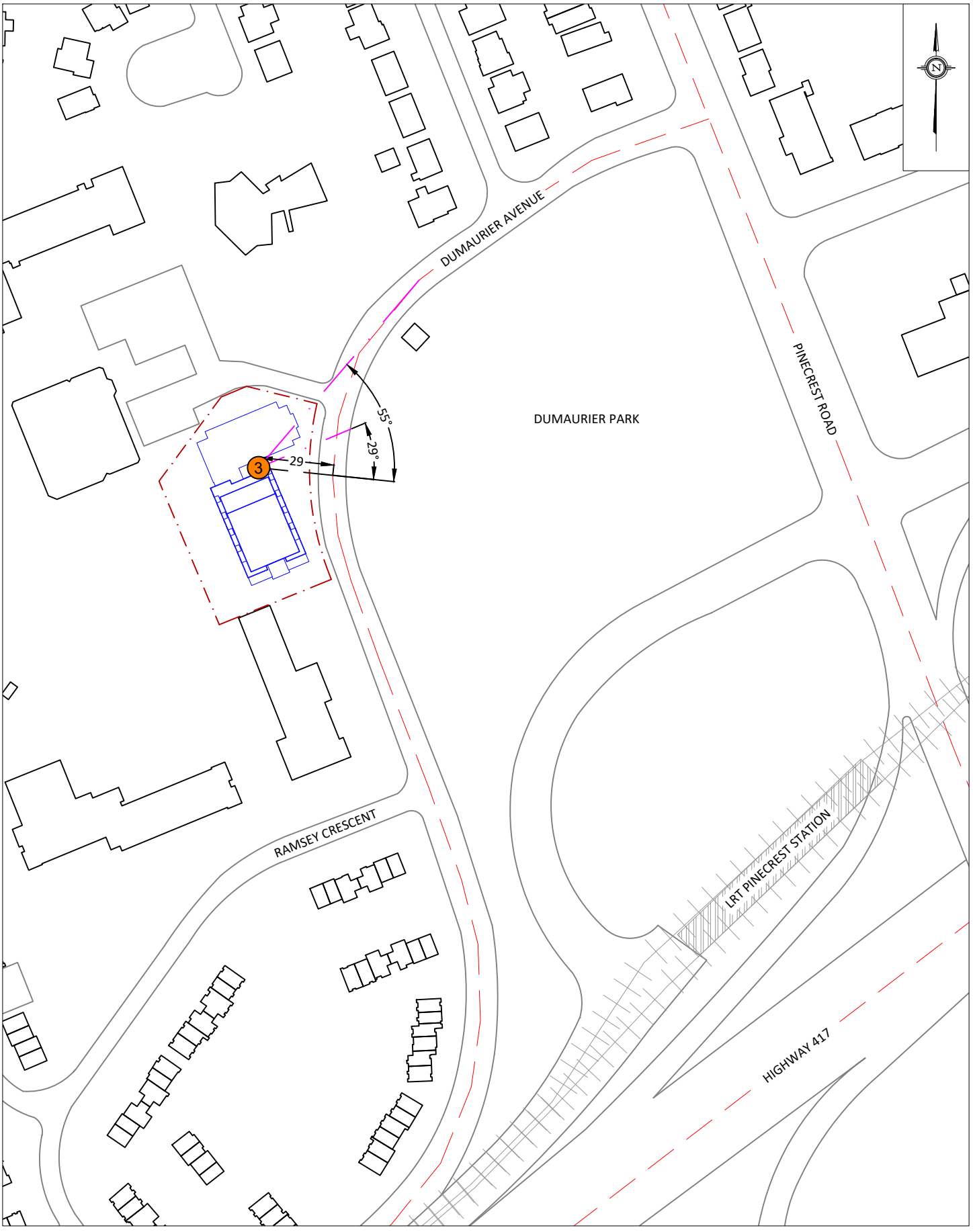
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-4
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 4:
STAMSON INPUT DATA FOR RECEPTOR 2



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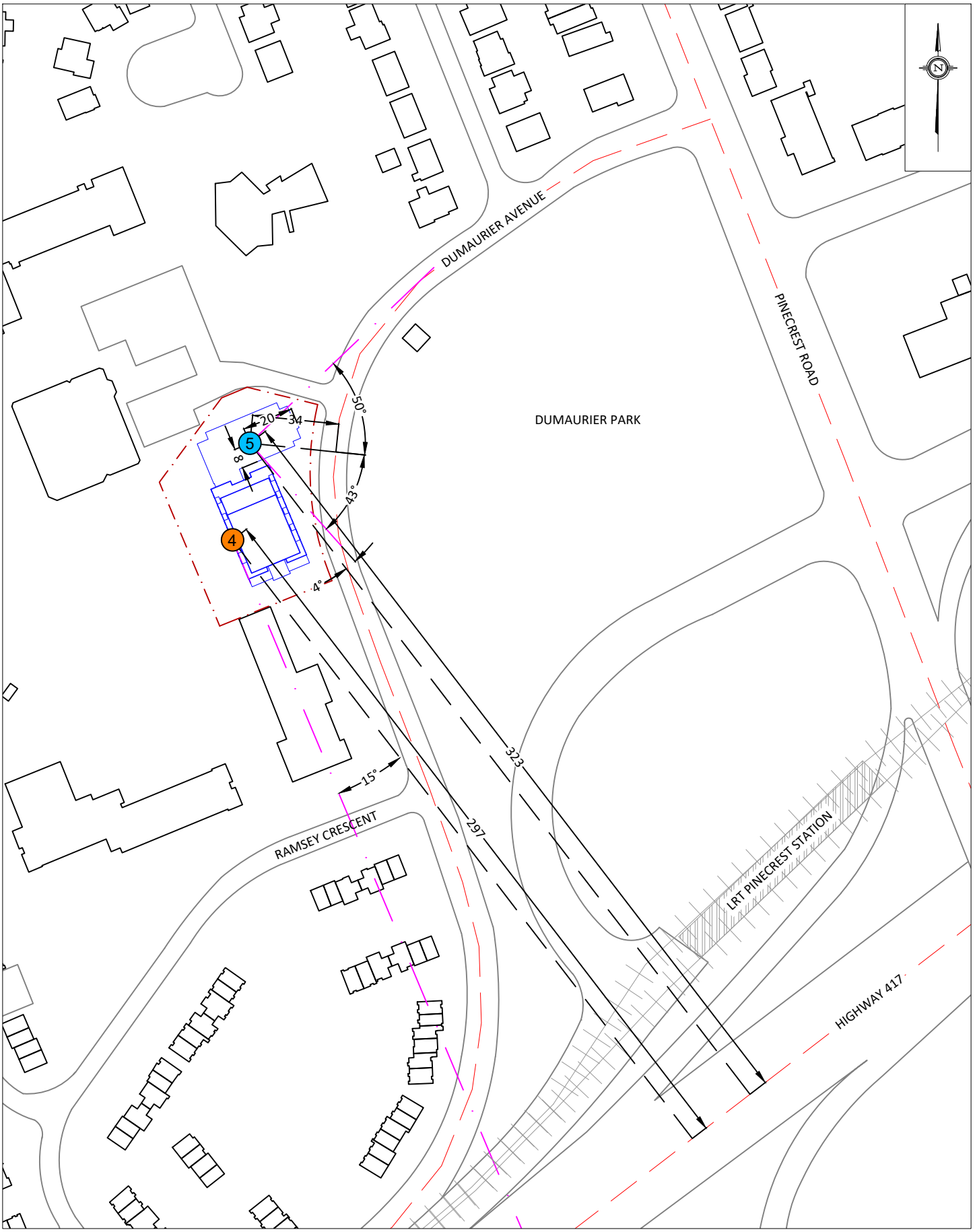
DRAWING NO.	GWE20-150-5
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 5:
STAMSON INPUT DATA FOR RECEPTOR 3



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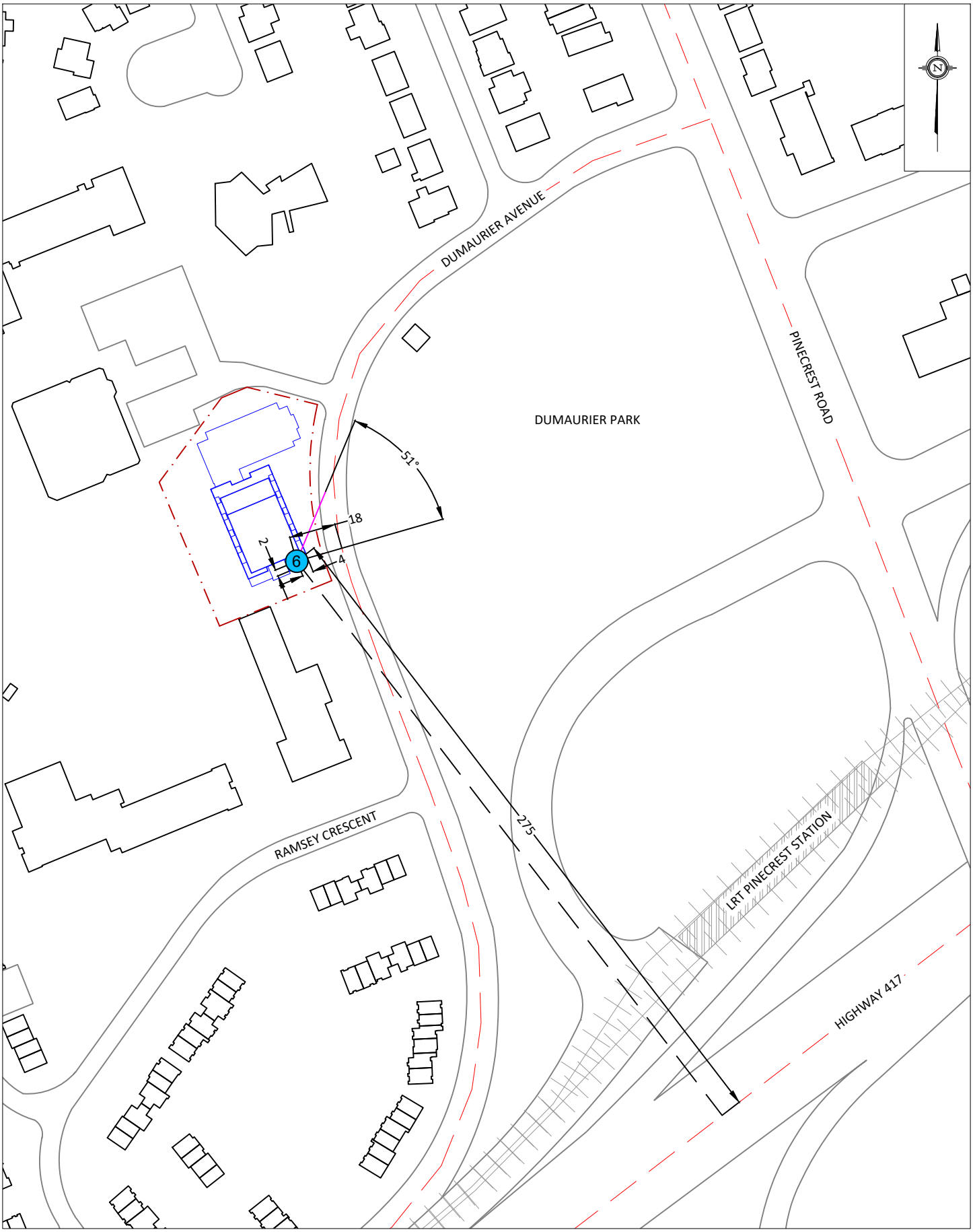
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-6
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 6:
STAMSON INPUT DATA FOR RECEPTORS 4 & 5



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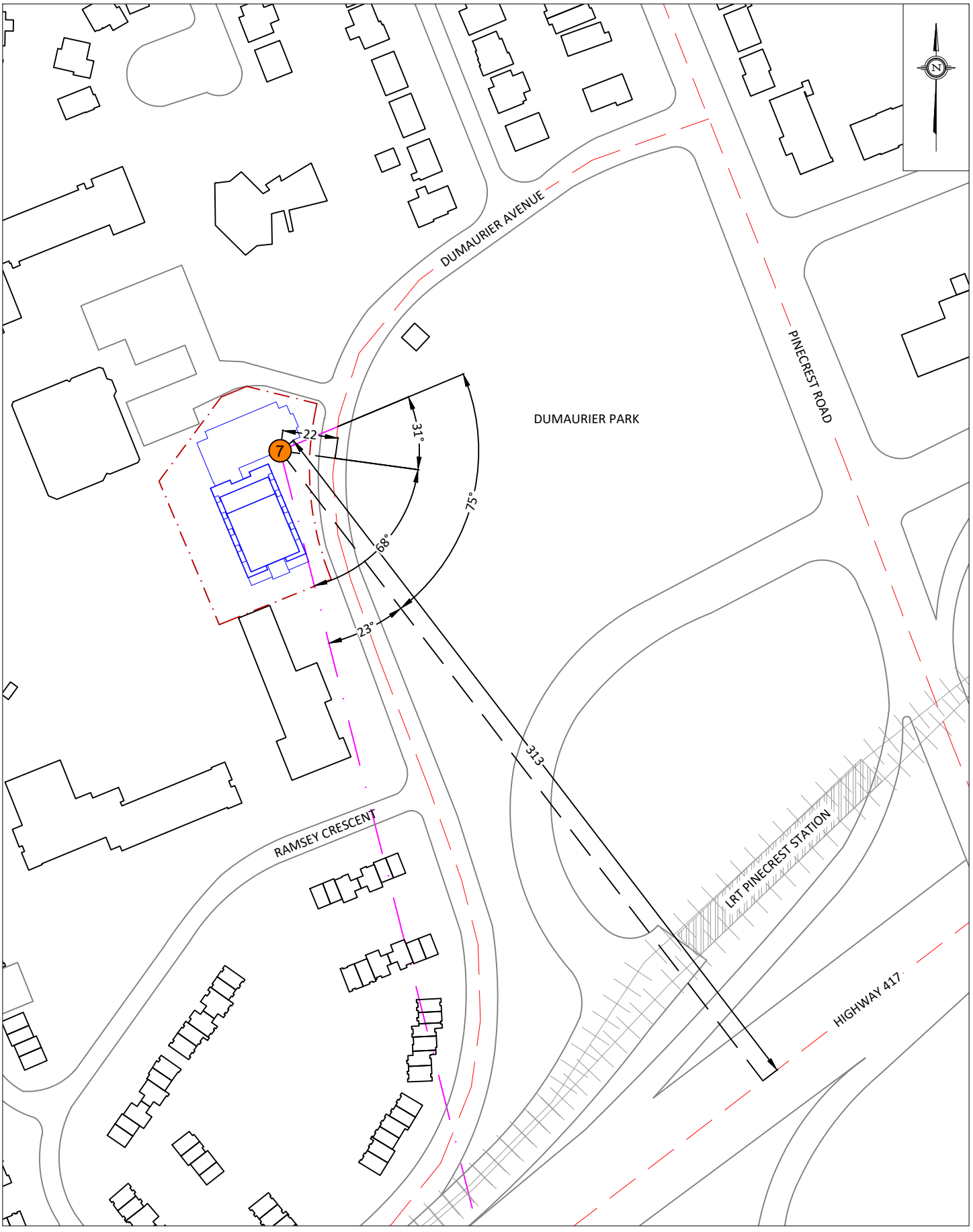
PROJECT	2829 DUMAURIER AVENUE, OTTAWA TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-7
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 7:
STAMSON INPUT DATA FOR RECEPTOR 6



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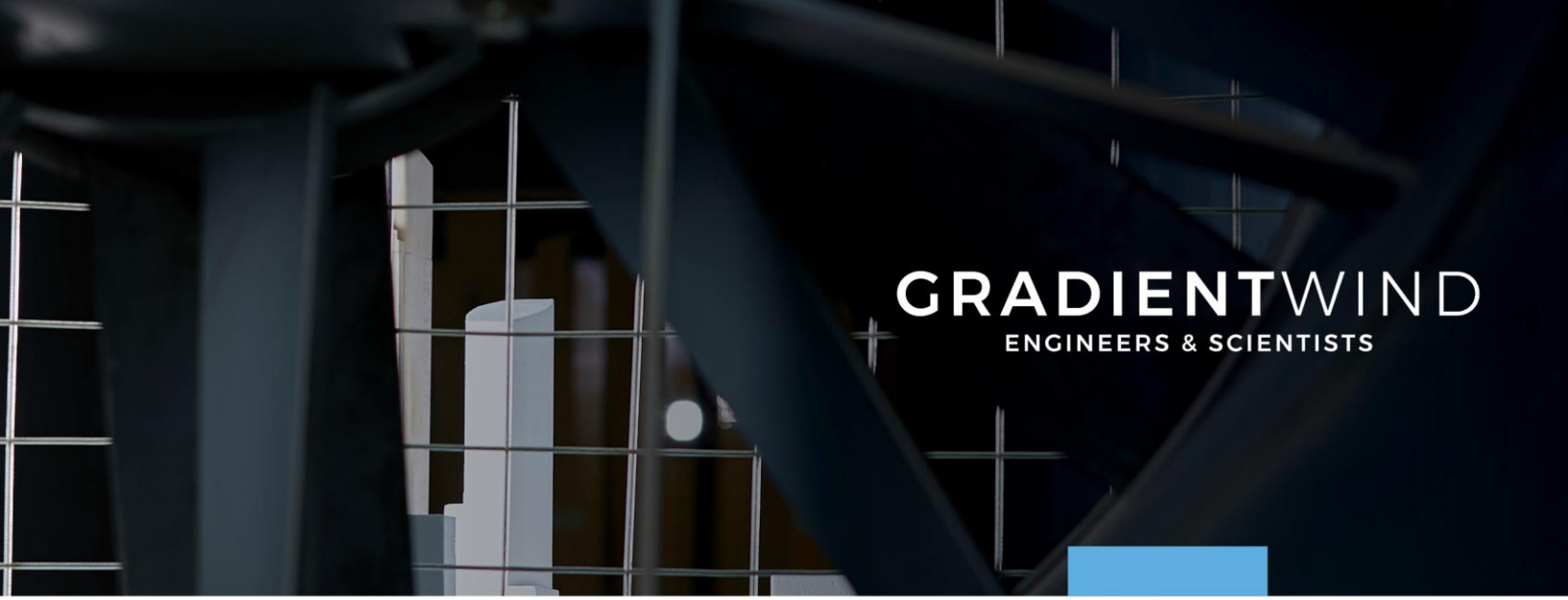
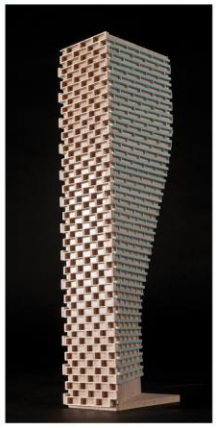
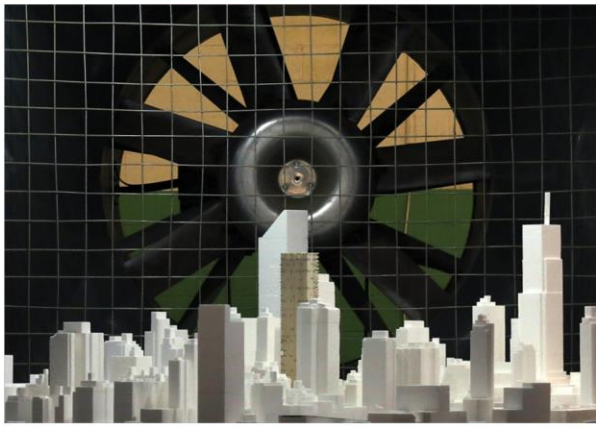
PROJECT	2829 DUMAURIER AVENUE, OTTAWA TRAFFIC NOISE ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GWE20-150-8
DATE	JANUARY 4, 2021
DRAWN BY	E.K.

DESCRIPTION

FIGURE 8:
STAMSON INPUT DATA FOR RECEPTOR 7







APPENDIX A

STAMSON INPUT-OUTPUT DATA

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STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 14:47:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -7.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 27.00 / 27.00 m
Receiver height : 91.20 / 91.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Highway417-1 (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 # 2: Highway417-1 (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 279.00 / 279.00 m
Receiver height : 91.20 / 91.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Highway417-2 (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 # 3: Highway417-2 (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 4 / 4
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 279.00 / 279.00 m
Receiver height : 91.20 / 91.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (day)

Source height = 1.50 m

ROAD (0.00 + 58.72 + 0.00) = 58.72 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-7 90 0.00 63.96 0.00 -2.55 -2.69 0.00 0.00 0.00 58.72

Segment Leq : 58.72 dBA

Results segment # 2: Highway417-1 (day)

Source height = 1.50 m

ROAD (0.00 + 68.70 + 0.00) = 68.70 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 -12.70 -3.01 0.00 0.00 0.00 68.70

Segment Leq : 68.70 dBA

Results segment # 3: Highway417-2 (day)

Source height = 1.50 m

ROAD (0.00 + 63.40 + 0.00) = 63.40 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 -12.70 -3.01 0.00 -5.30 0.00 63.40

Segment Leq : 63.40 dBA

Total Leq All Segments: 70.15 dBA

Results segment # 1: Dumaurier Rd (night)

Source height = 1.50 m

ROAD (0.00 + 51.12 + 0.00) = 51.12 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-7 90 0.00 56.36 0.00 -2.55 -2.69 0.00 0.00 0.00 51.12

Segment Leq : 51.12 dBA

Results segment # 2: Highway417-1 (night)

Source height = 1.50 m

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	0	0.00	76.81	0.00	-12.70	-3.01	0.00	0.00	0.00	61.11

Segment Leq : 61.11 dBA

Results segment # 3: Highway417-2 (night)

Source height = 1.50 m

ROAD (0.00 + 55.81 + 0.00) = 55.81 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	-12.70	-3.01	0.00	-5.30	0.00	55.81

Segment Leq : 55.81 dBA

Total Leq All Segments: 62.56 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.15
(NIGHT): 62.56

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 14:48:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -63.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 85.20 / 85.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Highway 417 (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 # 2: Highway 417 (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 : 288.00 / 288.00 m
Receiver height : 85.20 / 85.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (day)

Source height = 1.50 m

ROAD (0.00 + 62.46 + 0.00) = 62.46 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	90	0.00	63.96	0.00	-0.79	-0.71	0.00	0.00	0.00	62.46

Segment Leq : 62.46 dBA

Results segment # 2: Highway 417 (day)

Source height = 1.50 m

ROAD (0.00 + 69.23 + 0.00) = 69.23 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	15	0.00	84.41	0.00	-12.83	-2.34	0.00	0.00	0.00	69.23

Segment Leq : 69.23 dBA

Total Leq All Segments: 70.06 dBA

Results segment # 1: Dumaurier Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.86 + 0.00) = 54.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-63	90	0.00	56.36	0.00	-0.79	-0.71	0.00	0.00	0.00	54.86

Segment Leq : 54.86 dBA

Results segment # 2: Highway 417 (night)

Source height = 1.50 m

ROAD (0.00 + 61.64 + 0.00) = 61.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	15	0.00	76.81	0.00	-12.83	-2.34	0.00	0.00	0.00	61.64

Segment Leq : 61.64 dBA

Total Leq All Segments: 62.47 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.06
(NIGHT): 62.47

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 14:53:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -55.00 deg -29.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 29.00 / 29.00 m
Receiver height : 85.20 / 85.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (day)

Source height = 1.50 m

ROAD (0.00 + 52.69 + 0.00) = 52.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	-29	0.00	63.96	0.00	-2.86	-8.40	0.00	0.00	0.00	52.69

Segment Leq : 52.69 dBA

Total Leq All Segments: 52.69 dBA

Results segment # 1: Dumaurier Rd (night)

Source height = 1.50 m

ROAD (0.00 + 45.10 + 0.00) = 45.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	-29	0.00	56.36	0.00	-2.86	-8.40	0.00	0.00	0.00	45.10

Segment Leq : 45.10 dBA

Total Leq All Segments: 45.10 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.69
(NIGHT): 45.10

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 14:54:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

Road data, segment # 1: Highway 417 (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: Highway 417 (day/night)

Angle1 Angle2 : 15.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 4 / 4
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 297.00 / 297.00 m
Receiver height : 85.20 / 85.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Highway 417 (day)

Source height = 1.50 m

ROAD (0.00 + 62.34 + 0.00) = 62.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	84.41	0.00	-12.97	-3.80	0.00	-5.30	0.00	62.34

Segment Leq : 62.34 dBA

Total Leq All Segments: 62.34 dBA

Results segment # 1: Highway 417 (night)

Source height = 1.50 m

ROAD (0.00 + 54.74 + 0.00) = 54.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
15	90	0.00	76.81	0.00	-12.97	-3.80	0.00	-5.30	0.00	54.74

Segment Leq : 54.74 dBA

Total Leq All Segments: 54.74 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.34
(NIGHT): 54.74

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 15:01:58
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -50.00 deg 43.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 34.00 / 34.00 m
Receiver height : 21.50 / 21.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -50.00 deg Angle2 : 43.00 deg
Barrier height : 20.00 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: Highway 417 (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 # 2: Highway 417 (day/night)

Angle1 Angle2 : -90.00 deg 4.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 323.00 / 323.00 m
Receiver height : 21.50 / 21.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 4.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 8.00 / 8.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (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 ! 21.50 ! 9.73 ! 9.73

ROAD (0.00 + 37.53 + 0.00) = 37.53 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-50 43 0.00 63.96 0.00 -3.55 -2.87 0.00 0.00 -20.00 37.53

Segment Leq : 37.53 dBA

Results segment # 2: Highway 417 (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 21.50 ! 21.00 ! 21.00

ROAD (0.00 + 67.29 + 0.00) = 67.29 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 4 0.00 84.41 0.00 -13.33 -2.82 0.00 0.00 -1.86 66.39*
-90 4 0.06 84.41 0.00 -14.13 -2.99 0.00 0.00 0.00 67.29
---

* Bright Zone !

Segment Leq : 67.29 dBA

Total Leq All Segments: 67.29 dBA

Results segment # 1: Dumaurier Rd (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 ! 21.50 ! 9.73 ! 9.73

ROAD (0.00 + 29.94 + 0.00) = 29.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-50 43 0.00 56.36 0.00 -3.55 -2.87 0.00 0.00 -20.00 29.94

Segment Leq : 29.94 dBA

Results segment # 2: Highway 417 (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source ! Receiver ! Barrier ! Elevation of
Height (m) ! Height (m) ! Height (m) ! Barrier Top (m)
---+---+---+---
1.50 ! 21.50 ! 21.00 ! 21.00

ROAD (0.00 + 59.69 + 0.00) = 59.69 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 4 0.00 76.81 0.00 -13.33 -2.82 0.00 0.00 -1.86 58.80*
-90 4 0.06 76.81 0.00 -14.13 -2.99 0.00 0.00 0.00 59.69
---

* Bright Zone !

Segment Leq : 59.69 dBA

Total Leq All Segments: 59.69 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.29
(NIGHT): 59.69

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 15:08:11
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -51.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 21.50 / 21.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -51.00 deg Angle2 : 90.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 4.00 / 4.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 2: Highway417-1 (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 # 2: Highway417-1 (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 275.00 / 275.00 m
Receiver height : 21.50 / 21.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 2.00 / 2.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 3: Highway417-2 (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 # 3: Highway417-2 (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 4 / 4
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 275.00 / 275.00 m
Receiver height : 21.50 / 21.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 90.00 deg
Barrier height : 20.00 m
Barrier receiver distance : 2.00 / 2.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (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 ! 21.50 ! 17.05 ! 17.05

ROAD (0.00 + 49.54 + 0.00) = 49.54 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-51 90 0.00 63.96 0.00 -0.79 -1.06 0.00 0.00 -12.57 49.54

Segment Leq : 49.54 dBA

Results segment # 2: Highway417-1 (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 ! 21.50 ! 21.35 ! 21.35

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
---
-90 0 0.00 84.41 0.00 -12.63 -3.01 0.00 0.00 -0.21 68.56*
-90 0 0.06 84.41 0.00 -13.39 -3.18 0.00 0.00 0.00 67.83
---

* Bright Zone !

Segment Leq : 67.83 dBA

Results segment # 3: Highway417-2 (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 ! 21.50 ! 21.35 ! 21.35

ROAD (0.00 + 62.53 + 0.00) = 62.53 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
0 90 0.06 84.41 0.00 -13.39 -3.18 0.00 -5.30 0.00 62.53
0 90 0.00 84.41 0.00 -12.63 -3.01 0.00 0.00 -0.21 68.56*
0 90 0.06 84.41 0.00 -13.39 -3.18 0.00 0.00 0.00 67.83
---

* Bright Zone !

Segment Leq : 62.53 dBA

Total Leq All Segments: 69.00 dBA

Results segment # 1: Dumaurier Rd (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 ! 21.50 ! 17.05 ! 17.05

ROAD (0.00 + 41.94 + 0.00) = 41.94 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-51 90 0.00 56.36 0.00 -0.79 -1.06 0.00 0.00 -12.57 41.94

Segment Leq : 41.94 dBA

Results segment # 2: Highway417-1 (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 ! 21.50 ! 21.35 ! 21.35

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
---
-90 0 0.00 76.81 0.00 -12.63 -3.01 0.00 0.00 -0.21 60.96*
-90 0 0.06 76.81 0.00 -13.39 -3.18 0.00 0.00 0.00 60.23
---

* Bright Zone !

Segment Leq : 60.23 dBA

Results segment # 3: Highway417-2 (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 ! 21.50 ! 21.35 ! 21.35

ROAD (0.00 + 54.93 + 0.00) = 54.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.06	76.81	0.00	-13.39	-3.18	0.00	-5.30	0.00	54.93
0	90	0.00	76.81	0.00	-12.63	-3.01	0.00	0.00	-0.21	60.96*
0	90	0.06	76.81	0.00	-13.39	-3.18	0.00	0.00	0.00	60.23

* Bright Zone !

Segment Leq : 54.93 dBA

Total Leq All Segments: 61.40 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.00
(NIGHT): 61.40

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 15:11:53
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -31.00 deg 68.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.00 / 22.00 m
Receiver height : 18.50 / 18.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Highway 417 (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 # 2: Highway 417 (day/night)

Angle1 Angle2 : -75.00 deg 23.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 313.00 / 313.00 m
Receiver height : 18.50 / 18.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (day)

Source height = 1.50 m

ROAD (0.00 + 59.31 + 0.00) = 59.31 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-31 68 0.15 63.96 0.00 -1.91 -2.73 0.00 0.00 0.00 59.31

Segment Leq : 59.31 dBA

Results segment # 2: Highway 417 (day)

Source height = 1.50 m

ROAD (0.00 + 66.41 + 0.00) = 66.41 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-75 23 0.15 84.41 0.00 -15.18 -2.82 0.00 0.00 0.00 66.41

Segment Leq : 66.41 dBA

Total Leq All Segments: 67.18 dBA

Results segment # 1: Dumaurier Rd (night)

Source height = 1.50 m

ROAD (0.00 + 51.72 + 0.00) = 51.72 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-31 68 0.15 56.36 0.00 -1.91 -2.73 0.00 0.00 0.00 51.72

Segment Leq : 51.72 dBA

Results segment # 2: Highway 417 (night)

Source height = 1.50 m

ROAD (0.00 + 58.82 + 0.00) = 58.82 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-75 23 0.15 76.81 0.00 -15.18 -2.82 0.00 0.00 0.00 58.82

Segment Leq : 58.82 dBA

Total Leq All Segments: 59.59 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.18
(NIGHT): 59.59

STAMSON 5.0 NORMAL REPORT Date: 12-01-2021 15:12:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 40 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: Dumaurier Rd (day/night)

Angle1 Angle2 : -58.00 deg 61.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 18.50 / 18.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Highway 417 (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 # 2: Highway 417 (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 : 314.00 / 314.00 m
Receiver height : 18.50 / 18.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Dumaurier Rd (day)

Source height = 1.50 m

ROAD (0.00 + 62.03 + 0.00) = 62.03 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-58 61 0.15 63.96 0.00 0.00 -1.93 0.00 0.00 0.00 62.03

Segment Leq : 62.03 dBA

Results segment # 2: Highway 417 (day)

Source height = 1.50 m

ROAD (0.00 + 66.52 + 0.00) = 66.52 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 15 0.15 84.41 0.00 -15.19 -2.69 0.00 0.00 0.00 66.52

Segment Leq : 66.52 dBA

Total Leq All Segments: 67.84 dBA

Results segment # 1: Dumaurier Rd (night)

Source height = 1.50 m

ROAD (0.00 + 54.43 + 0.00) = 54.43 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-58 61 0.15 56.36 0.00 0.00 -1.93 0.00 0.00 0.00 54.43

Segment Leq : 54.43 dBA

Results segment # 2: Highway 417 (night)

Source height = 1.50 m

ROAD (0.00 + 58.93 + 0.00) = 58.93 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 15 0.15 76.81 0.00 -15.19 -2.69 0.00 0.00 0.00 58.93

Segment Leq : 58.93 dBA

Total Leq All Segments: 60.25 dBA

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