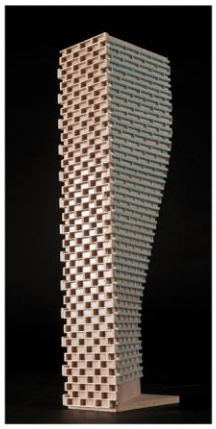
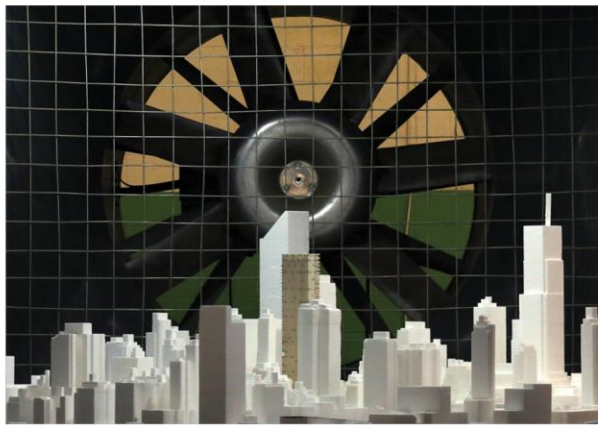
GRADIENTWIND
ENGINEERS & SCIENTISTS

TRANSPORATION S NOISE ASSESSMENT

1440 Blair Towers Place
Ottawa, Ontario

REPORT: 24-160 – Noise





September 12, 2024

DRAFT

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EXECUTIVE SUMMARY

This report describes an environmental noise assessment undertaken to satisfy Site Plan Control application submission requirements for the proposed mixed-use residential development, referred to as "Blair and Ogilvie," located at 1440 Blair Towers Place in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). The objective of this study is to analyze the sound pressure levels in the area of interest and propose the necessary mitigation measures to ensure proper acoustic insulation.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300, and City of Ottawa Environmental Noise Control Guidelines (ENCG) guidelines; (ii) future vehicular traffic volumes corresponding to roadway classification obtained from the City of Ottawa.

The results of the traffic noise analysis indicate that noise levels will range between 55 and 67 dBA during the daytime period (07:00-23:00) and between 49 and 59 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA). As a result, upgraded building components and central air conditioning will be required, as noise levels predicted due to roadway traffic exceed the criteria of 65 dBA during the daytime period, as listed in ENCG. Windows with a rating of STC 30 are required along all façades, to reduce indoor noise levels at or below the ENCG indoor sound criteria for noise-sensitive spaces. All units will require air conditioning. In addition, A Type D Warning Clause will also be required to be placed on all Lease, Purchase and Sale Agreements for all units.

The results also indicate that outdoor noise levels at the terrace are expected to be between 52 dBA and 60 dBA. Noise barriers are not required but should be considered where noise levels exceed 55 dBA. As discussed in Section 5.1, noise mitigation at the OLAs is recommended where technically and administratively feasible. Detailed mitigation measures would be explored during the site plan approval stage.

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1. INTRODUCTION

Gradient Wind Engineering Inc was retained by Le Groupe Maurice to undertake an environmental noise assessment for a proposed subdivision development known as "Blair and Ogilvie" and located at 1440 Blair Towers Place in Ottawa, Ontario (hereinafter referred to as "subject site" or "proposed development"). This report summarizes the methodology, results, and recommendations related to the assessment of exterior and interior noise levels generated by local roadway traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP) NPC-300[1], Ministry of Transportation Ontario (MTO)[2], and City of Ottawa Environmental Noise Control Guidelines (ENCG)[3] guidelines. Noise calculations were based on site plan drawings provided by Le Groupe Maurice, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities, and recent satellite imagery.

2. TERMS OF REFERENCE

The subject site is located at 1440 Blair Towers Place in Ottawa, situated to the southeast at the intersection of Blair Road and Ogilvie Road on a parcel of land bordered by Ogilvie Road to the northwest, a low-rise commercial building to the northeast, Blair Towers Place and a parking garage to the southeast, and Blair Road and Blair Towers Place to the southwest.

The proposed development comprises a North Tower (18 storeys) and a South Tower (22 storeys), both topped with a mechanical penthouse (MPH), rising above a common 6-storey podium. A parkland is provided to the north of the subject site, a fitness lawn and a fitness patio are to the east of the North Tower, a private rear courtyard is to the southeast of the subject site, an employee terrace is at the southeast corner of the South Tower, and a seating area is located at the northwest corner of the North Tower. A drive aisle extending from Blair Towers Place provides access to surface parking to the west of the subject site, with additional surface parking located along Blair Towers Place, and a parking ramp

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[2] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022
[3] City of Ottawa Environmental Noise Control Guidelines, January 2016

leading to the two underground parking levels shared by the towers is situated at the southeast corner of the South Tower.

Above the underground parking, the ground floor of the proposed development comprises a 'Z'-shaped planform and includes a main entrance and drop-off areas to the west, various retail spaces at the southwest corner, and mostly various indoor amenities throughout the level. The remaining podium levels (Levels 2-6) are reserved for residential use. The building steps back from the northwest and east elevations at Level 2 and a common amenity terrace is provided atop the podium between the North and South Towers at Level 7. Levels 7-17 of the North Tower and Levels 7-22 of the South Tower comprise near trapezoidal planforms and are reserved for residential occupancy. Level 18 of the North Tower includes an indoor amenity to the north and residential units throughout the remainder of the level. The primary sources of noise impacting the site are Blair Road, an arterial roadway to the west; Ogilvie Road, and arterial road to the north; and Highway 174, a freeway to the south. Figure 1 illustrates site plan and 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 as outlined in Section 5.1 of this report.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a

3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. The City of Ottawa's Environmental Noise Control Guidelines (ENCG) specifies that the recommended indoor noise limit range (that is relevant to this study) is 45 and 40 dBA for living rooms and sleeping quarters, respectively, as listed in Table 1.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (ROAD) [4]

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

Predicted noise levels at the plane of window (POW) dictate the action required to achieve the recommended sound levels. An open window is considered to provide a 10 dBA reduction in noise, while a standard closed window can provide a minimum 20 dBA noise reduction[5]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[6]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the

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

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[7].

The objective sound level for Outdoor Living Areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00).. Predicted noise levels at the outdoor living areas dictate the action required to achieve the recommended sound levels. According to the ENCG, if an area is to be used as an OLA, noise control measures are recommended where technical and administratively feasible to reduce the L_{eq} to 55 dBA. Where noise levels exceed 60 dBA noise measure are required if feasible.

As such, when noise levels at the POWs and OLAs exceed the criteria, specific Warning Clause requirements may apply.

4.3 Theoretical Roadway Noise Predictions

The impact of transportation noise sources on the development was determined by computer modelling. Transportation noise source modelling is based on the software program *Predictor-Lima* which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model is also being accepted in the updated Environmental Guide for Noise of Ontario, 2022 by the Ministry of Transportation (MTO)[8]. This computer program can represent three-dimensional surfaces and first reflections of sound waves over a suitable spectrum for human hearing. A total of ten receptors locations were identified around the site, as illustrated in Figure 2.

Roadway noise calculations were performed by treating each road segment as separate line sources of noise, and by using existing and proposed building locations as noise barriers. 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 was taken to be 92% / 8% respectively for all streets.

[7] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3
[8] Ministry of Transportation Ontario, "*Environmental Guide for Noise*", February 2022

- Topography was assumed to be a flat/gentle slope surrounding the study building.
- Default ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- 10 receptors at different heights representative of the different levels on the building were strategically placed throughout the study area.

4.4 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[9] 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
Ogilvie Road	4-Lane Urban Arterial Divided (4-UAD)	60	**35,000**
Blair Road	4-Lane Urban Arterial Divided (4-UAD)	50	**35,000**
Highway 174	Freeway 4 lanes	100	**73,332**
On and Off ramps to 174	Urban Collector	50	**8,000**

5. ROADWAY TRAFFIC NOISE RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3. The results of the current analysis indicate that noise levels will range between 56 and 67 dBA during the daytime period (07:00-23:00) and between 49 and 59 dBA during the nighttime period (23:00-07:00). The highest noise level (67

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

dBA) occurs at the south of the development, which is directly exposed to the noise generated by the Queensway (Highway 174). Noise contours for the roadway traffic noise calculations covering the entire study site are shown in Figures 3 and 4 for the daytime and nighttime periods, respectively.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO TRANSPORATION SOURCES

Receptor	Location	Receptor Height (m)	Noise Level (dBA)	
			Day	Night
1	POW	2.5	66	59
2	POW	4.5	64	56
		25.5	64	57
		50	64	57
3	POW	4.5	57	49
		25.5	58	50
		50	59	51
4	POW	4.5	56	49
5	POW	4.5	63	55
		25.5	66	59
		50	67	59
6	POW	4.5	64	57
		25.5	66	58
		50	65	58
7	POW	4.5	63	55
8	POW	4.5	63	56
		25.5	64	56
		50	64	56
9	POW	2.5	66	59
10-OLA_A	OLA*	19.6	60	N/A

*Noise levels during the nighttime are not considered for OLAs

As a result, upgraded building components and central air conditioning will be required, as noise levels predicted due to roadway traffic exceed the criteria of 65 dBA during the daytime listed in ENCG. As noise levels just exceed 65 dBA during the daytime, windows with a rating of STC 30 are required. This will be sufficient in reducing indoor noise levels at or below the ENCG criterion for noise-sensitive spaces. All units will require air conditioning. In addition, A Type D Warning Clause will also be required to be placed on all Lease, Purchase and Sale Agreements for all units.

The results also indicate that noise levels at the terrace are expected to approach 60 dBA, as such noise barriers are not required. However, during the site plan stage further mitigation can be explored if desirable to reduce noise levels below 55 dBA. If it is not possible to reduce noise levels to be low 55 dBA a Type A warning clause will be required on purchase sale and lease agreements.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 56 and 67 dBA during the daytime period (07:00-23:00) and between 49 and 59 dBA during the nighttime period (23:00-07:00). The highest noise level (67 dBA) occurs at the south of the development, which is directly exposed to the noise generated by the Queensway. The following noise control measures will be required for the building:

1. Bedroom and Living room windows on all facades will require a minimum Sound Transmission Class Rating of 30.

2. The building will require air condition inside the suites to allow widows to remain closed thereby proving a quiet and comfortable living space.

3. The following Type D warning clause will be required to be placed on all purchase, sale, and lease agreements:

   "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 City of Ottawa and the Ministry of the Environment."

   Since noise levels on the terrace range between 55 dBA and 60 dBA the following Type A warning clause is also required on purchase sale and lease agreements, if a noise barrier is not provided to reduce noise levels to below 55 dBA:

   "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 City of Ottawa and the Ministry of the Environment."

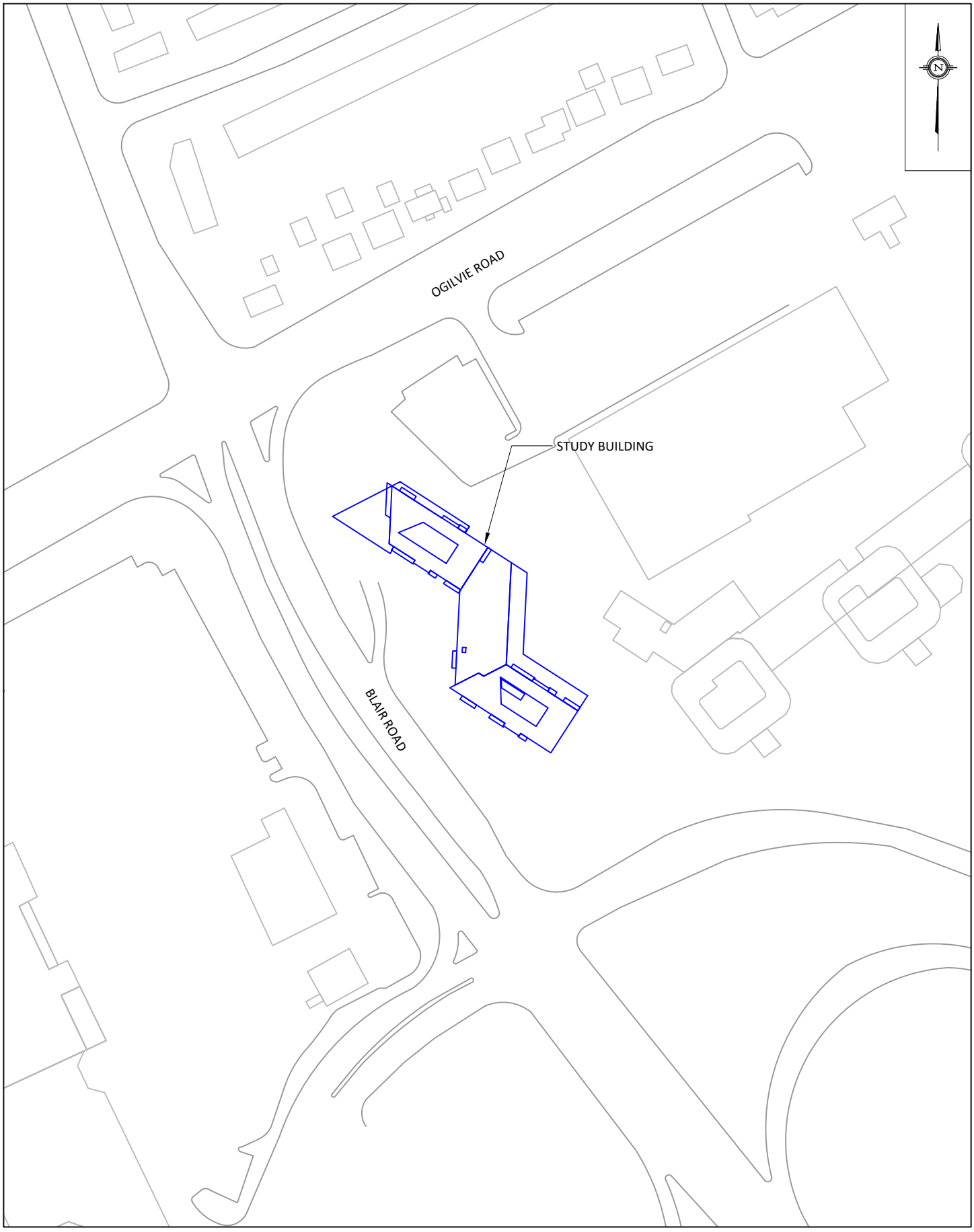
This concludes our traffic noise assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.

Sergio Nunez Andres B.A.Sc.
Junior Environmental Scientist

Joshua Foster., P.Eng.
Lead Engineer



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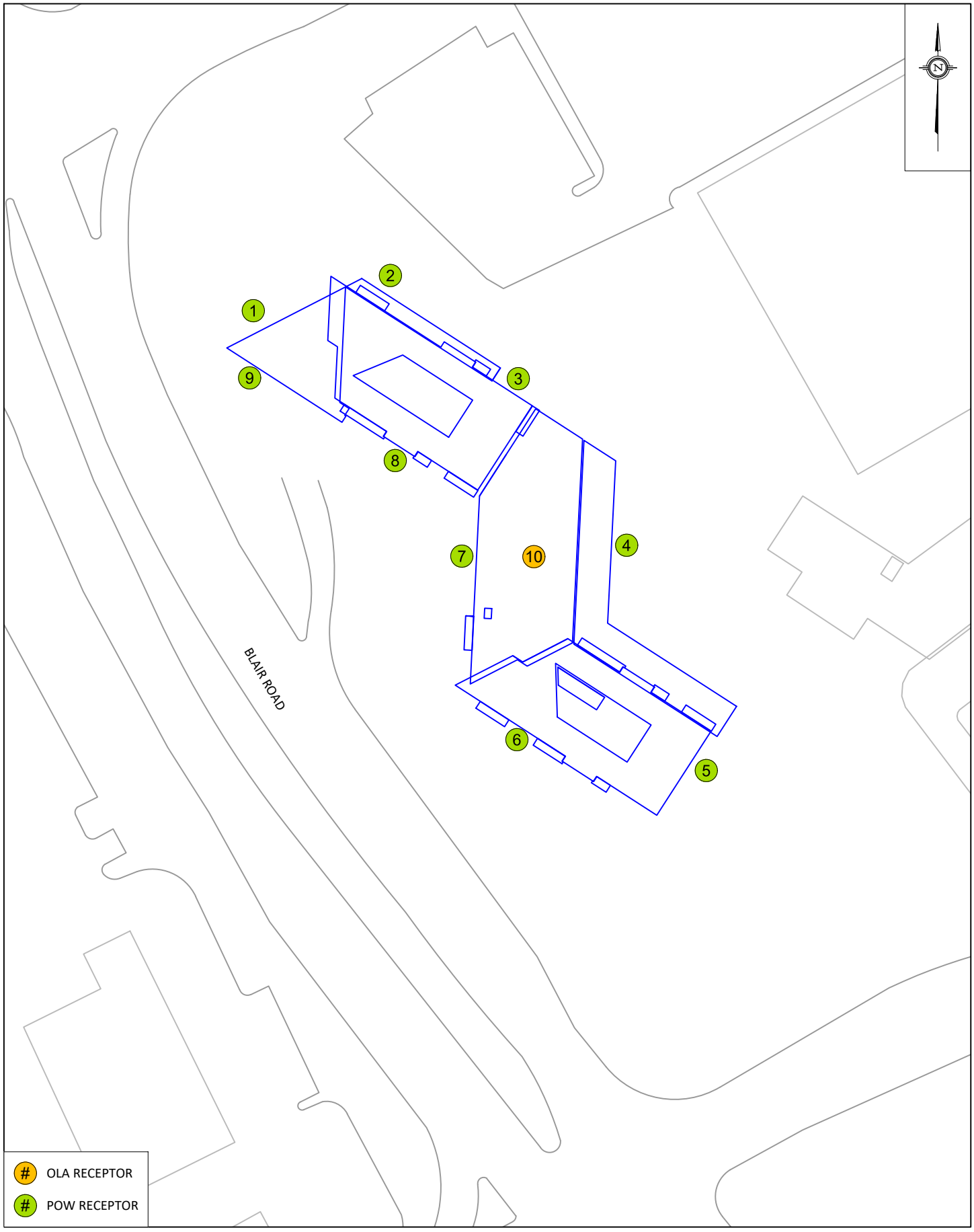
PROJECT	1440 BLAIR TOWERS PLACE, OTTAWA TRANSPORTATION NOISE FEASIBILITY STUDY
SCALE	1:2000
DRAWING NO.	24-160-NOISE-FIG1
DATE	SEPTEMBER 09, 2024
DRAWN BY	S.N.

DESCRIPTION

FIGURE 1:
PROPOSED SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	1440 BLAIR TOWERS PLACE, OTTAWA TRANSPORTATION NOISE FEASIBILITY STUDY
SCALE	1:500
DRAWING NO.	24-160-NOISE-FIG2
DATE	SEPTEMBER 06, 2024
DRAWN BY	S.N.

DESCRIPTION

FIGURE 2:
RECEPTOR LOCATIONS

FIGURE 3: DAYTIME NOISE CONTOURS (4.5M ABOVE GRADE)

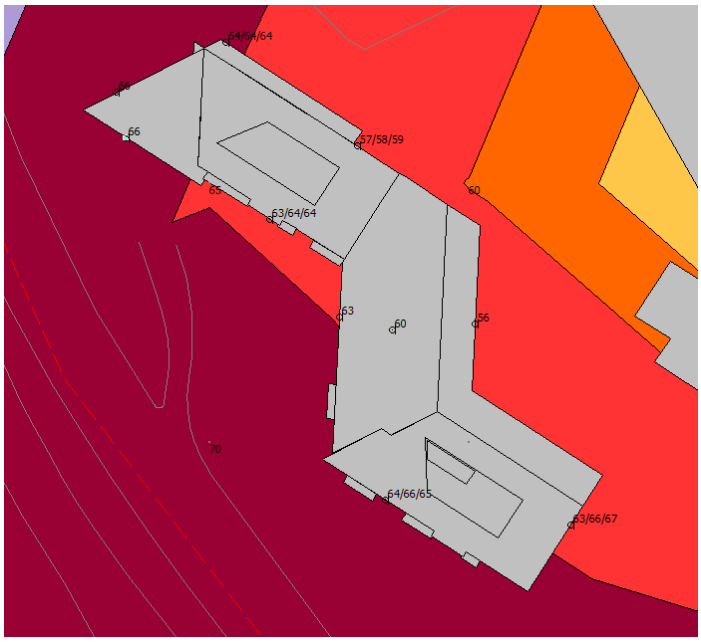

FIGURE 4: NIGHTTIME NOISE CONTOURS (4.5M ABOVE GRADE)