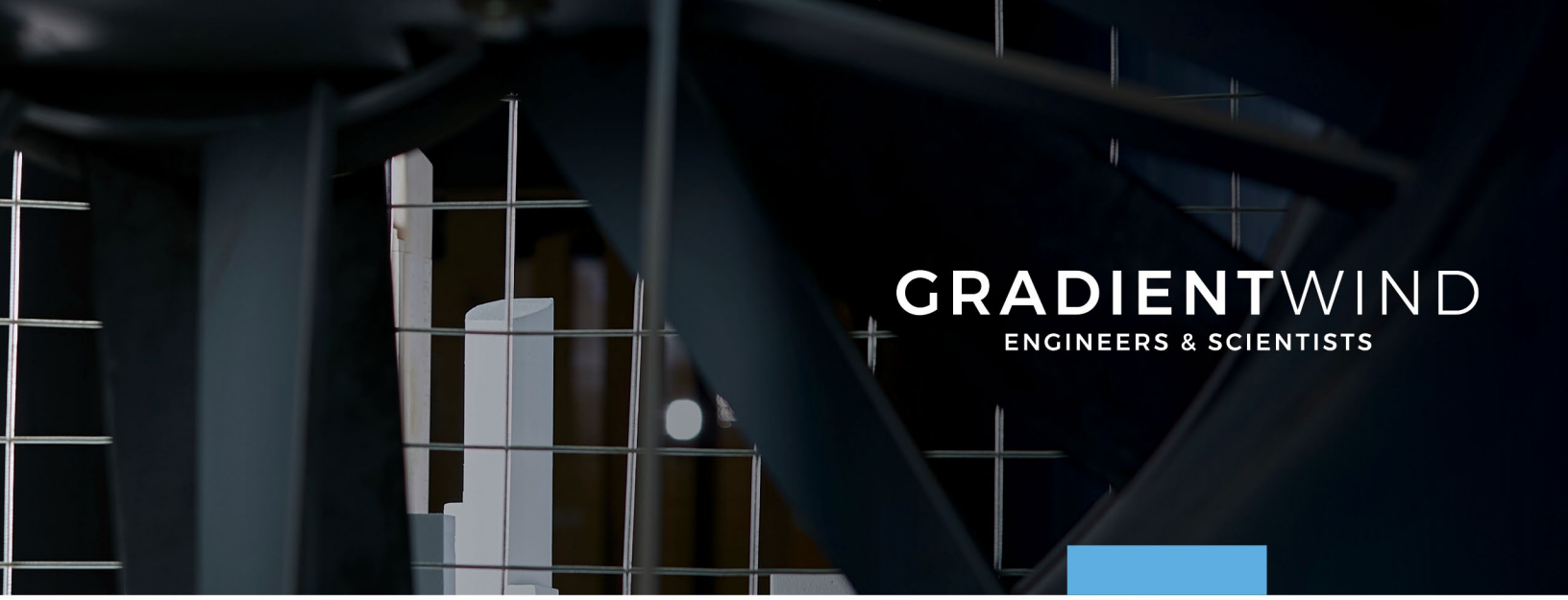
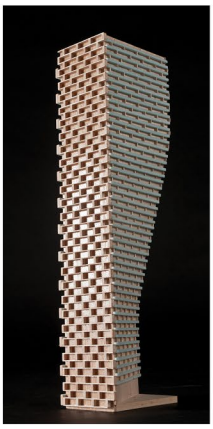


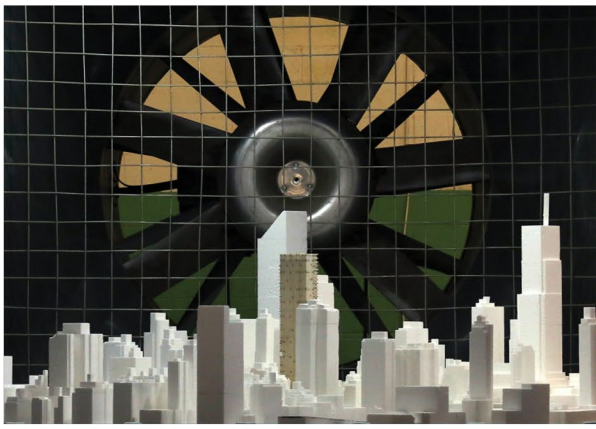
GRADIENTWIND
ENGINEERS & SCIENTISTS

ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT

4099 Erin Mills Parkway
Mississauga, Ontario

Report: 22-008- Traffic Noise Feasibility





September 12, 2022

PREPARED FOR

Queenscorp (Erin Mills) Inc.
2 Queen Elizabeth Boulevard
Toronto, Ontario
M8Z 1L8

PREPARED BY

Giuseppe Garro, MASc., Environmental Scientist
Joshua Foster, P.Eng., Lead Engineer

EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken to satisfy the requirements for a Zoning By-law Amendment (ZBA) and Official Plan Amendment application submission for a proposed mixed-use, multi-building development located at 4099 Erin Mills Parkway in Mississauga, Ontario. The proposed development comprises five buildings (Buildings A-E) and seven blocks of townhouses. The primary source of roadway traffic noise includes Erin Mills Parkway. 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) NPC-300 and Ministry of Transportation of Ontario (MTO) guidelines; (ii) future vehicular traffic volumes corresponding to roadway classification and theoretical capacities; and (iii) architectural drawings provided by Turner Fleischer Architects Inc. in May 2022 and August 2022.

It should be noted that the acoustic model used in this report was based on drawings received in May 2022. Gradient Wind has since received updated architectural drawings which introduce negligible changes to the site plan from an acoustics perspective. As such the results and recommendations in this feasibility assessment remain unchanged. Figures 1, 2, and 5 have be updated to reflect the minor changes to the design.

The results of the current analysis indicate that noise levels will range between 40 and 72 dBA during the daytime period (07:00-23:00) and between 33 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the south façades of Building A and D, which are nearest and most exposed to Erin Mills Parkway.

As such, upgraded building components and air conditioning will be required for Building A, Building D, and the Townhouse block nearest to Erin Mills Parkway, which experience noise levels above 65 dBA during the daytime as noise levels predicted due to transportation traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Standard double pane windows with a minimum STC of 35 would be sufficient, however it is recommended that detailed review of the building components be undertaken

during Site Plan approval or Detailed Design. A Type D Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Similarly, buildings that experience noise levels greater than 55 dBA and less or equal to 65 dBA will require forced air heating with the provision for central air conditioning. These buildings include Building B, Building C, Building E, and the second and third Townhouse Blocks nearest to Erin Mills Parkway. This will allow occupants to keep windows closed and maintain a comfortable living environment. A Type C Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

The results also indicate that noise levels for the amenity spaces (Receptor 13, 17-20) are expected to exceed the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2. Therefore, noise control measures will be required to reduce the L_{eq} at or below 55 dBA. Noise control is typically achieved with noise barriers surrounding the OLA. Given the layout of the communal amenity space in the center of the development, a barrier is not considered technically and administratively feasible, therefore it is not recommended. A detailed transportation noise study will be required by a qualified engineer at the time of Site Plan approval to determine specific noise control measures for the development.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the Detailed Design stage once mechanical plans for the proposed block become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed blocks on surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to be negligible. In the event that noise levels exceed the NPC-300 criteria, noise impacts can generally be minimized by judicious selection and placement of the equipment.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Queenscorp (Erin Mills) Inc. to undertake a roadway traffic noise feasibility assessment, to satisfy the requirements for a Zoning By-law Amendment (ZBA) and Official Plan Amendment application submission, for a proposed mixed-use, multi-building development located at 4099 Erin Mills Parkway in Mississauga, Ontario. This report summarizes the methodology, results, and recommendations related to the assessment of exterior noise levels generated by local transportation traffic.

This assessment is based on theoretical noise calculation methods conforming to the Ministry of the Environment, Conservation and Parks (MECP)[1] and Ministry of Transportation of Ontario (MTO)[2] guidelines. Noise calculations were based on architectural drawings provided by Turner Fleischer Architects Inc. in May 2022 and August 2022, with future traffic volumes corresponding to roadway classification and theoretical roadway capacities.

2. TERMS OF REFERENCE

The focus of this roadway traffic noise feasibility assessment is a proposed mixed-use, multi-building development located at 4099 Erin Mills Parkway in Mississauga, Ontario. The subject site is located on a nearly rectangular parcel of land along the south side of Folkway Drive, between Sawmill Valley Drive to the east, and Erin Mills Parkway to the west.

The development comprises Buildings A-E and seven blocks of townhouses. Buildings A (10-storeys) and B (six-storeys) are L-shaped, located along the northwest and northeast corners of the site, respectively. Along the east and south ends of the site are located three and four blocks of four-storey townhouses, respectively, and to the west is Building D (8-storeys). Within the interior of the site, encircled by an interior driveway, Buildings C and E (6-storeys) are arranged to the north and south, with an outdoor amenity located between them. A walkway passes north-south through Building C.

[1] Ontario Ministry of the Environment and Climate Change – Environmental Noise Guidelines, Publication NPC-300, Queens Printer for Ontario, Toronto, 2013
[2] Environmental Guide for Noise, February 2022. Ministry of Transportation Ontario

At grade, retail space is located at the south end of Building A and the north end of Building D, with the remaining floorspace occupied by a mix of indoor amenity use, residential units, and residential lobbies. Lobby entrances are located at the northwest corner and internal east elevation of Building A, east and internal west elevations of Building B, north and internal east elevations of Building C, west and east elevations of Building D, and the north and south elevations of Building E. Levels above grade contain residential occupancy. Setbacks accommodate private terraces at Levels 5, 6, 7, and 9, with larger terraces located at Level 5 at the south and east ends of Buildings B and E, respectively, at Level 7 at the south ends of Buildings A and D, and at Level 9 at the east end of Building A. Above each building, setbacks at the rooftop level meet a mechanical penthouse.

The site is surrounded by low-rise suburban buildings in all directions. The primary source of roadway traffic noise includes Erin Mills Parkway. Roadway noise along Highway 403 to the north was measured to be approximately 610 m from the center of the Highway to the nearest property line. As this separation distance exceeds the minimum separation distance criteria[3], noise generated from this source is considered negligible. Figure 1 illustrates a complete site plan with surrounding context.

At the time of the Site Plan Application (SPA), an updated detailed traffic noise assessment would be conducted, if necessary. Based on noise levels at the building façades, the update will include an evaluation of indoor noise levels for comparison against indoor noise criteria. This would be performed for a typical unit, assuming building wall details satisfy the minimum Ontario Building Code (OBC) requirements. For areas where the indoor noise criteria are not met, construction details such as the required sound transmission class (STC) rating for windows would be specified to ensure comfort of indoor living areas. Furthermore, ventilation requirements and warning clauses will be provided.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed blocks onto surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to

[3] MECP, Environmental Noise Guidelines, NPC 300

be negligible. In the event that noise levels exceed the NPC-300 criteria, noise impacts can generally be minimized by judicious selection and placement of the equipment.

3. OBJECTIVES

The principal objectives of this study are to (i) calculate the future noise levels on the study building produced by local transportation sources, and (ii) explore potential noise mitigation where required as per NPC-300 guidelines and the City of Mississauga Terms of Reference/ Guidelines.

4. METHODOLOGY

4.1 Background

Noise can be defined as any obtrusive sound. It is created at a source, transmitted through a medium, such as air, and intercepted by a receiver. Noise may be characterized in terms of the power of the source or the sound pressure at a specific distance. While the power of a source is characteristic of that particular source, the sound pressure depends on the location of the receiver and the path that the noise takes to reach the receiver. Measurement of noise is based on the decibel unit, dBA, which is a logarithmic ratio referenced to a standard noise level (2×10^{-5} Pascals). The 'A' suffix refers to a weighting scale, which better represents how the noise is perceived by the human ear. With this scale, a doubling of power results in a 3 dBA increase in measured noise levels and is just perceptible to most people. An increase of 10 dBA is often perceived to be twice as loud.

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

For surface roadway traffic noise, the equivalent sound energy level, L_{eq}, provides a measure of the time varying noise levels, which is well correlated with the annoyance of sound. It is defined as the continuous sound level, which has the same energy as a time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of a 16-hour (L_{eq16}) daytime (07:00-23:00) / 8-hour (L_{eq8}) nighttime (23:00-07:00) split to assess its impact on residential buildings. NPC-300 specifies that the recommended indoor noise limit range (that is relevant to this study) is 50, 45 and 40 dBA for retail space, living rooms, and sleeping quarters, respectively, as listed in Table 1. However, to account for deficiencies

in building construction and to control peak noise, these levels should be targeted toward 47, 42, and 37 dBA.

TABLE 1: INDOOR SOUND LEVEL CRITERIA (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 is capable of providing 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 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 sound level criterion for outdoor living areas (OLA) is 55 dBA, which applies during the daytime (07:00 to 23:00). When noise levels exceed 55 dBA, mitigation should be provided to reduce noise levels where technically and administratively feasible to acceptable levels at or below the criterion. Furthermore, noise levels at the OLA must not exceed 60 dBA if mitigation can be technically and administratively achieved.

[4] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Table C-9
[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
[7] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.2 Roadway Traffic Volumes

NPC-300 dictates that noise calculations should consider future sound levels based on a roadway's mature state of development. As a conservative approach, traffic volumes have been considered for the mature state of development based on roadway classifications obtained from the City of Toronto Transportation Master Plan and theoretical maximum capacities for each roadway type. 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
Erin Mills Parkway	6-Lane Arterial (Divided)	70	**50,000**

4.2.3 Theoretical Roadway Traffic Noise Predictions

The impact of transportation noise sources on the development was determined by two computer modelling programs. To provide a general sense of noise across the site, the employed software program was Predictor-Lima which utilizes the United States Federal Highway Administration's Traffic Noise Model (TNM) to represent the roadway line sources. The TNM model has been accepted as the preferred model as per the revised guideline titled "*Environmental Guide for Noise*" prepared by the Ministry of Transportation Ontario (MTO)[8]. This computer program can represent three-dimensional surfaces and the first reflections of sound waves over a suitable spectrum for human hearing. A set of comparative calculations were performed in the current Ontario traffic noise prediction model, STAMSON, for comparisons to Predictor simulation results.

The STAMSON model is, however, older and requires each receptor to be calculated separately. STAMSON also does not accurately account for building reflections and multiple screening elements, and curved road geometry. A total of 20 receptor locations were identified around the site, as illustrated in Figure 2.

[8] Environmental Guide for Noise, February 2022. Ministry of Transportation Ontario

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 a conservative 5% heavy trucks and 7% medium trucks.
- The day/night split for all streets was taken to be 90%/10%, respectively.
- Default 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.
- Noise receptors were strategically placed at 20 locations around the study area (see Figure 2).
- Massing associated with the study site was included as potential noise screening elements.
- Receptor distances and exposure angles, used in STAMSON calculations, are illustrated in Appendix A.

5. RESULTS

5.1 Roadway Traffic Noise Levels

The results of the roadway traffic noise calculations are summarized in Table 3 below.

TABLE 3: EXTERIOR NOISE LEVELS DUE TO ROADWAY TRAFFIC SOURCES

Receptor Number	Receptor Height Above Grade/Roof (m)	Receptor Location	Roadway Noise Level (dBA)	
			Day	Night
R1_A	1.5	POW - Townhouse – South Façade	72	65
R1_B	7.5	POW - Townhouse – South Façade	71	65
R2_A	1.5	POW - Townhouse – East Façade	63	57
R2_B	7.5	POW - Townhouse – East Façade	65	58
R3_A	1.5	POW - Townhouse – West Façade	64	57
R3_B	7.5	POW - Townhouse – West Façade	64	57
R4_A	1.5	POW – Building D – South Façade	71	65
R4_B	7.5	POW – Building D – South Façade	71	64
R4_C	22.5	POW – Building D – South Façade	70	63
R5_A	1.5	POW – Building D – West Façade	65	59
R5_B	7.5	POW – Building D – West Façade	65	58
R5_C	22.5	POW – Building D – West Façade	64	57
R6_A	1.5	POW – Building A – South Façade	71	65
R6_B	7.5	POW – Building A – South Façade	71	64
R6_C	22.5	POW – Building A – South Façade	70	64
R6_D	30	POW – Building A – South Façade	70	63
R7_A	1.5	POW – Building A – West Façade	64	58
R7_B	7.5	POW – Building A – West Façade	64	58
R7_C	22.5	POW – Building A – West Façade	65	58
R7_D	30	POW – Building A – West Façade	64	58
R8_A	1.5	POW – Building B – South Façade	57	50
R8_B	7.5	POW – Building B – South Façade	58	51

R8_C	20.5	POW – Building B – South Façade	60	54
R9_A	1.5	POW – Building B – West Façade	58	52
R9_B	7.5	POW – Building B – West Façade	59	53
R9_C	20.5	POW – Building B – West Façade	61	54
R10_A	1.5	POW – Building C – West Façade	41	34
R10_B	7.5	POW – Building C – West Façade	52	45
R10_C	20.5	POW – Building C – West Façade	56	49
R11_A	1.5	POW – Building C – South Façade	57	50
R11_B	7.5	POW – Building C – South Façade	56	49
R11_C	20.5	POW – Building C – South Façade	58	51
R12_A	1.5	POW – Building C – East Façade	54	48
R12_B	7.5	POW – Building C – East Façade	53	47
R12_C	20.5	POW – Building C – East Façade	54	48
R13_A	1.5	OLA – At-Grade Outdoor Amenity Space	56	N/A*
R14_A	1.5	POW – Building E – West Façade	53	46
R14_B	7.5	POW – Building E – West Façade	52	46
R14_C	20.5	POW – Building E – West Façade	53	47
R15_A	1.5	POW – Building E – South Façade	40	33
R15_B	7.5	POW – Building E – South Façade	50	43
R15_C	20.5	POW – Building E – South Façade	60	54
R16_A	1.5	POW – Building E – East Façade	54	48
R16_B	7.5	POW – Building E – East Façade	53	47
R16_C	20.5	POW – Building E – East Façade	61	54
R17_A	1.5	OLA – Rooftop Terrace	69	N/A*
R18_A	1.5	OLA – Level 7 Terrace	63	N/A*
R19_A	1.5	OLA – Level 7 Terrace	60	N/A*
R20_A	1.5	OLA – Level 9 Terrace	59	N/A*

*Noise levels during the nighttime are not considered for OLAs

The results of the current analysis indicate that noise levels will range between 40 and 72 dBA during the daytime period (07:00-23:00) and between 33 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the south façades of Building A and D, which are nearest and most exposed to Erin Mills Parkway. Figure 3 and 4 illustrate daytime and nighttime noise contours of the site 1.5m above grade.

Table 4 shows a comparison in results between Predictor-Lima and STAMSON. Noise levels calculated in STAMSON were found to have a good correlation with Predictor-Lima and variability between the two programs was within an acceptable level of ±0-3 dBA. Sample calculations are presented in Appendix A.

TABLE 4: RESULTS OF STAMSON/PREDICTOR-LIMA CORRELATION

Receptor ID	Receptor Location	Receptor Height (m)	STAMSON 5.04 Noise Level (dBA)		PREDICTOR-LIMA Noise Level (dBA)	
			Day	Night	Day	Night
R5_B	POW – Building D – West Façade	7.5	68	61	65	58
R6_B	POW – Building A – South Façade	7.5	74	67	71	64
R7_D	POW – Building A – West Façade	30	67	61	64	58

5.1.1 Noise Control Measures

The results indicate that upgraded building components and air conditioning will be required for Building A, Building D, and the Townhouse block nearest to Erin Mills Parkway, which experience noise levels above 65 dBA during the daytime as noise levels predicted due to transportation traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Standard double pane windows with a minimum STC of 35 would be sufficient, however it is recommended that detailed review of the building components be undertaken during Site Plan approval or Detailed Design. A Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6.

Similarly, buildings that experience noise levels greater than 55 dBA and less or equal to 65 dBA will require forced air heating with the provision for central air conditioning. These buildings include Building B, Building C, Building E, and the second and third Townhouse Blocks nearest to Erin Mills Parkway. This

will allow occupants to keep windows closed and maintain a comfortable living environment. A Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized in Section 6. Figure 5 outlines the ventilation requirements for the proposed development.

The results also indicate that noise levels for the amenity spaces (Receptor 13, 17-20) are expected to exceed the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2. Therefore, noise control measures will be required to reduce the L_{eq} at or below 55 dBA. Noise control is typically achieved with noise barriers surrounding the OLA. Given the layout of the communal amenity space in the center of the development, a barrier is not considered technically and administratively feasible, therefore it is not recommended.

A detailed transportation noise study will be required by a qualified engineer at the time of Site Plan approval to determine specific noise control measures for the development.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 40 and 72 dBA during the daytime period (07:00-23:00) and between 33 and 65 dBA during the nighttime period (23:00-07:00). The highest noise level (72 dBA) occurs at the south façades of Building A and D, which are nearest and most exposed to Erin Mills Parkway.

As such, upgraded building components and air conditioning will be required for Building A, Building D, and the Townhouse block nearest to Erin Mills Parkway, which experience noise levels above 65 dBA during the daytime as noise levels predicted due to transportation traffic exceed the criteria listed in NPC-300 for building components. This will allow occupants to keep windows closed and maintain a comfortable living environment. Standard double pane windows with a minimum STC of 35 would be sufficient, however it is recommended that detailed review of the building components be undertaken during Site Plan approval or Detailed Design. A Type D Warning Clause will also be required in 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, Conservation and Parks."*

Similarly, buildings that experience noise levels greater than 55 dBA and less or equal to 65 dBA will require forced air heating with the provision for central air conditioning. These buildings include Building B, Building C, Building E, and the second and third Townhouse Blocks nearest to Erin Mills Parkway. This will allow occupants to keep windows closed and maintain a comfortable living environment. A Type C Warning Clause will also be required in all Lease, Purchase and Sale Agreements, as summarized below:

Type C:

> *" This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

The results also indicate that noise levels for the amenity spaces (Receptor 13, 17-20) are expected to exceed the criteria listed in NPC-300 for outdoor living areas, as discussed in Section 4.2. Therefore, noise control measures will be required to reduce the L_{eq} at or below 55 dBA. Noise control is typically achieved with noise barriers surrounding the OLA. Given the layout of the communal amenity space in the center of the development, a barrier is not considered technically and administratively feasible, therefore it is not recommended.

A detailed transportation noise study will be required by a qualified engineer at the time of Site Plan approval to determine specific noise control measures for the development.

With regard to stationary noise impacts, a stationary noise study is recommended for the site during the detailed design once mechanical plans for the proposed block become available. This study would assess

impacts of stationary noise from rooftop mechanical units serving the proposed blocks on surrounding noise sensitive areas. This study will include recommendations for any noise control measures that may be necessary to ensure noise levels fall below NPC-300 limits. As the mechanical equipment will primarily reside in the mechanical level located on the high roof, noise levels on the surrounding noise sensitive properties are expected to be negligible. In the event that noise levels exceed the NPC-300 criteria, noise impacts can generally be minimized by judicious selection and placement of the equipment.

This concludes our roadway traffic noise feasibility 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.

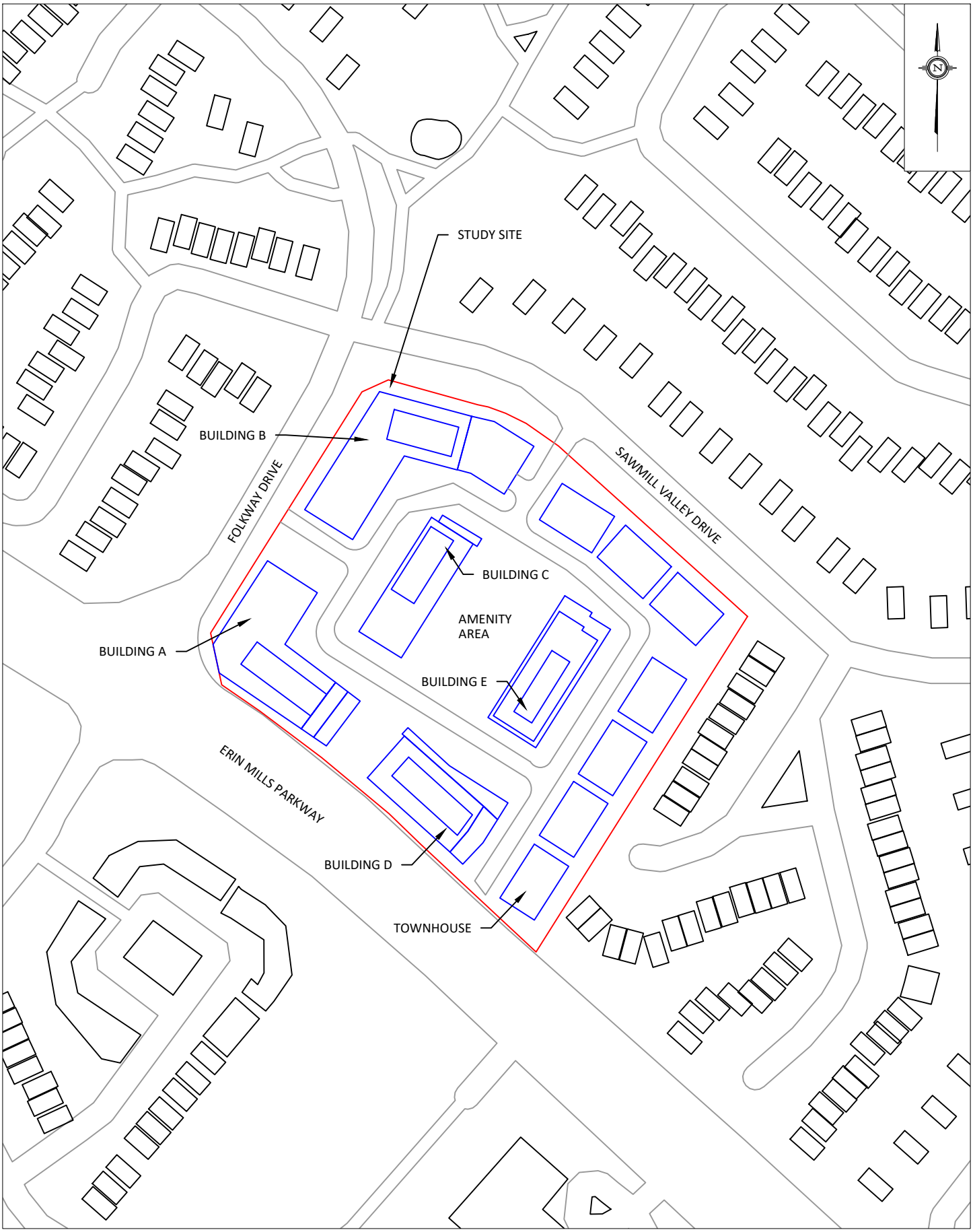
Sincerely,

Gradient Wind Engineering Inc.

Giuseppe Garro, MASc.
Environmental Scientist

Joshua Foster, P.Eng.
Lead Engineer

Gradient Wind File 22-008



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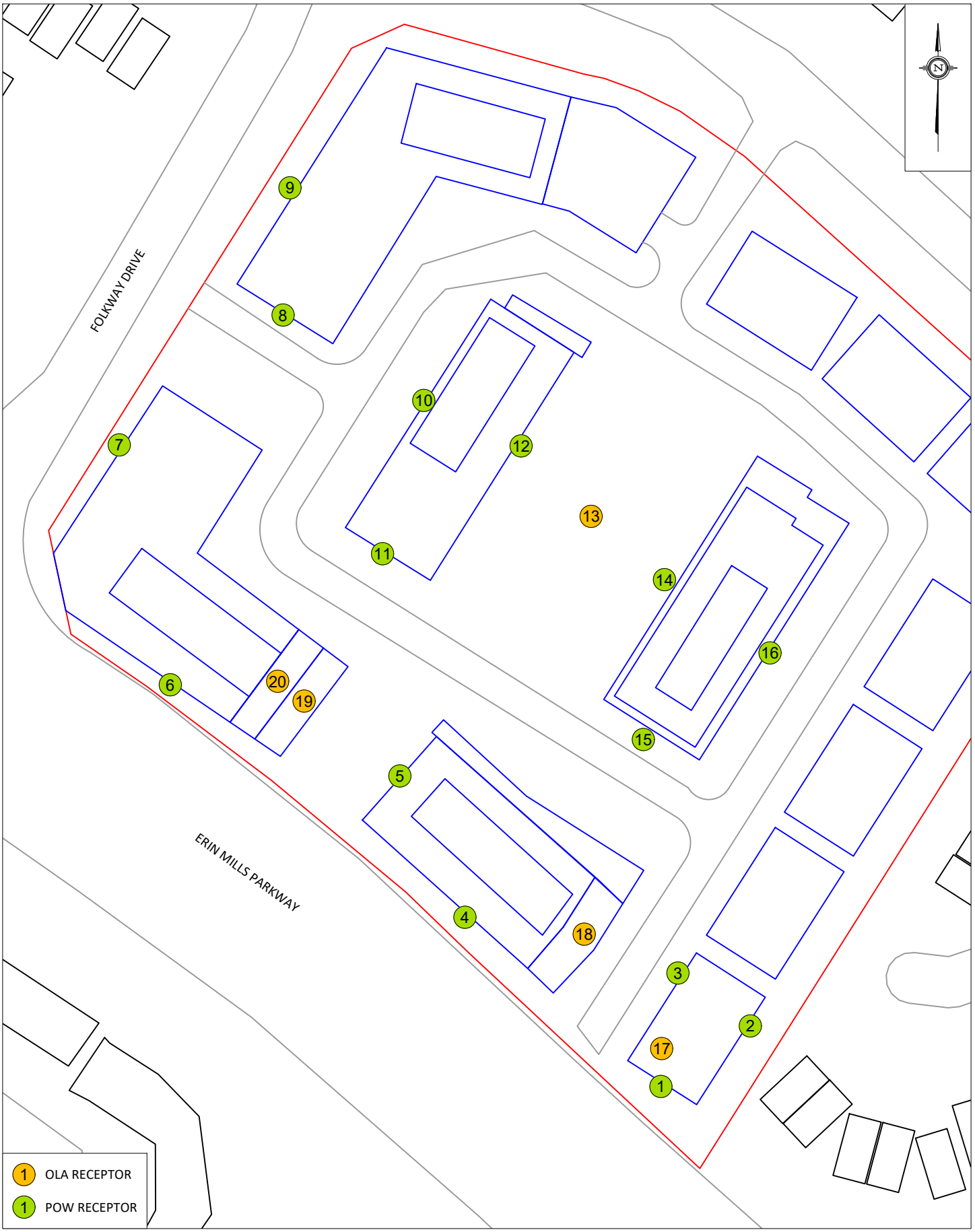
PROJECT	4099 ERIN MILLS PARKWAY, MISSISSAUGA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW22-008-1
DATE	SEPTEMBER 12, 2022	DRAWN BY	G.G.

DESCRIPTION

FIGURE 1:
SITE PLAN AND SURROUNDING CONTEXT



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PROJECT	4099 ERIN MILLS PARKWAY, MISSISSAUGA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-008-2
DATE	SEPTEMBER 12, 2022	DRAWN BY	G.G.

FIGURE 2:
RECEPTOR LOCATIONS

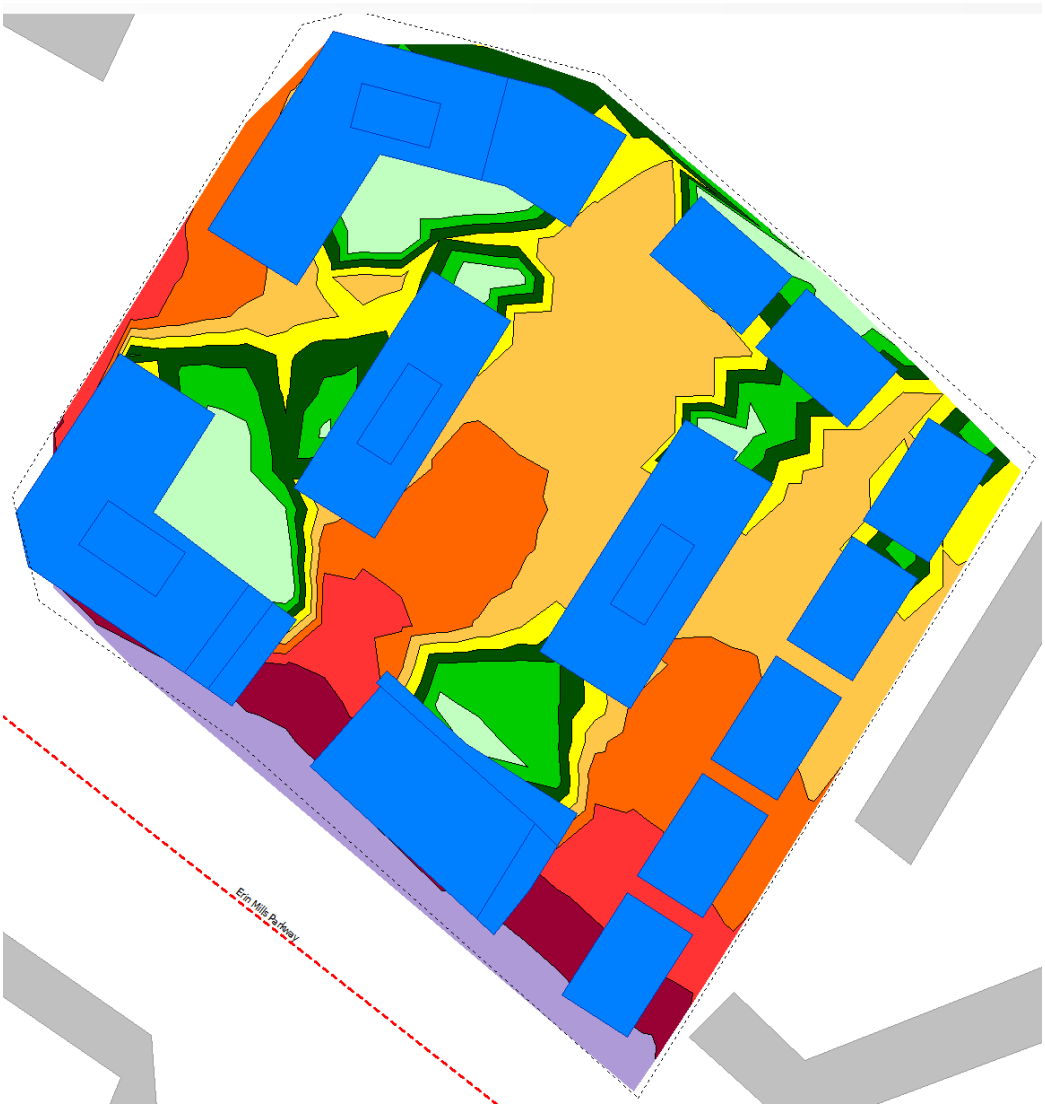

FIGURE 3: DAYTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

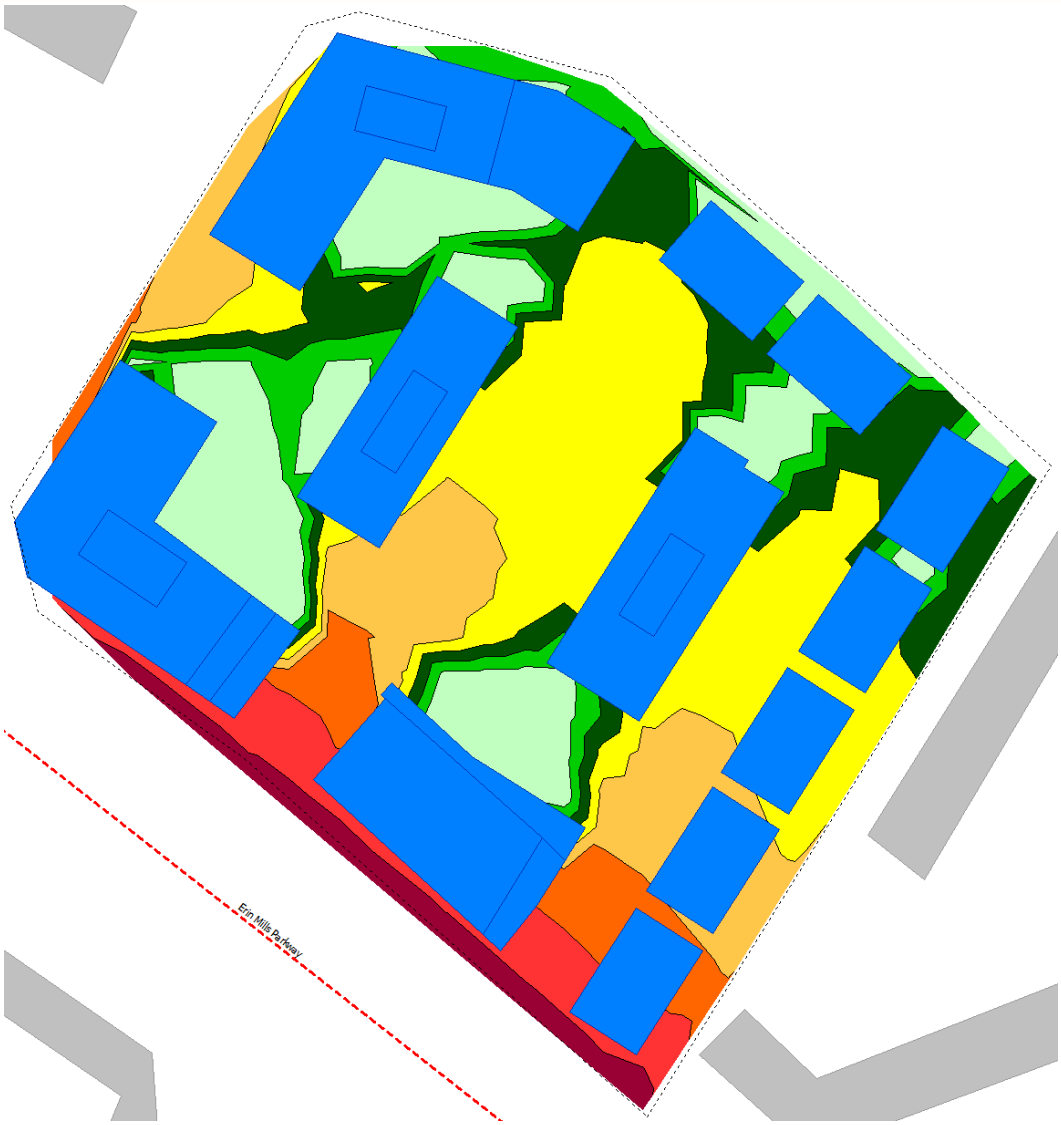

FIGURE 4: NIGHTTIME TRAFFIC NOISE CONTOURS (1.5 M ABOVE GRADE)

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PROJECT	4099 ERIN MILLS PARKWAY, MISSISSAUGA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1500 (APPROX.)	DRAWING NO.	GW22-008-5
DATE	SEPTEMBER 12, 2022	DRAWN BY	G.G.

FIGURE 5:
POTENTIAL VENTILATION REQUIREMENTS

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

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```
 STAMSON 5.0        NORMAL REPORT        Date: 14-07-2022 14:20:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: EMP (day/night)
---------------------------------------
Car traffic volume  : 39600/4400  veh/TimePeriod  *
Medium truck volume :  3150/350   veh/TimePeriod  *
Heavy truck volume  :  2250/250   veh/TimePeriod  *
Posted speed limit  :    70 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):  50000
    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     :  90.00

Data for Segment # 1: EMP (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  :  42.00 / 42.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            :  70.00 deg   Angle2 : 90.00 deg
Barrier height            :  32.00 m
Barrier receiver distance :  12.00 / 12.00  m
Source elevation          :   0.00 m
Receiver elevation        :   0.00 m
Barrier elevation         :   0.00 m
Reference angle           :   0.00

Results segment # 1: EMP (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)
------------+-------------+-------------+--------------
```

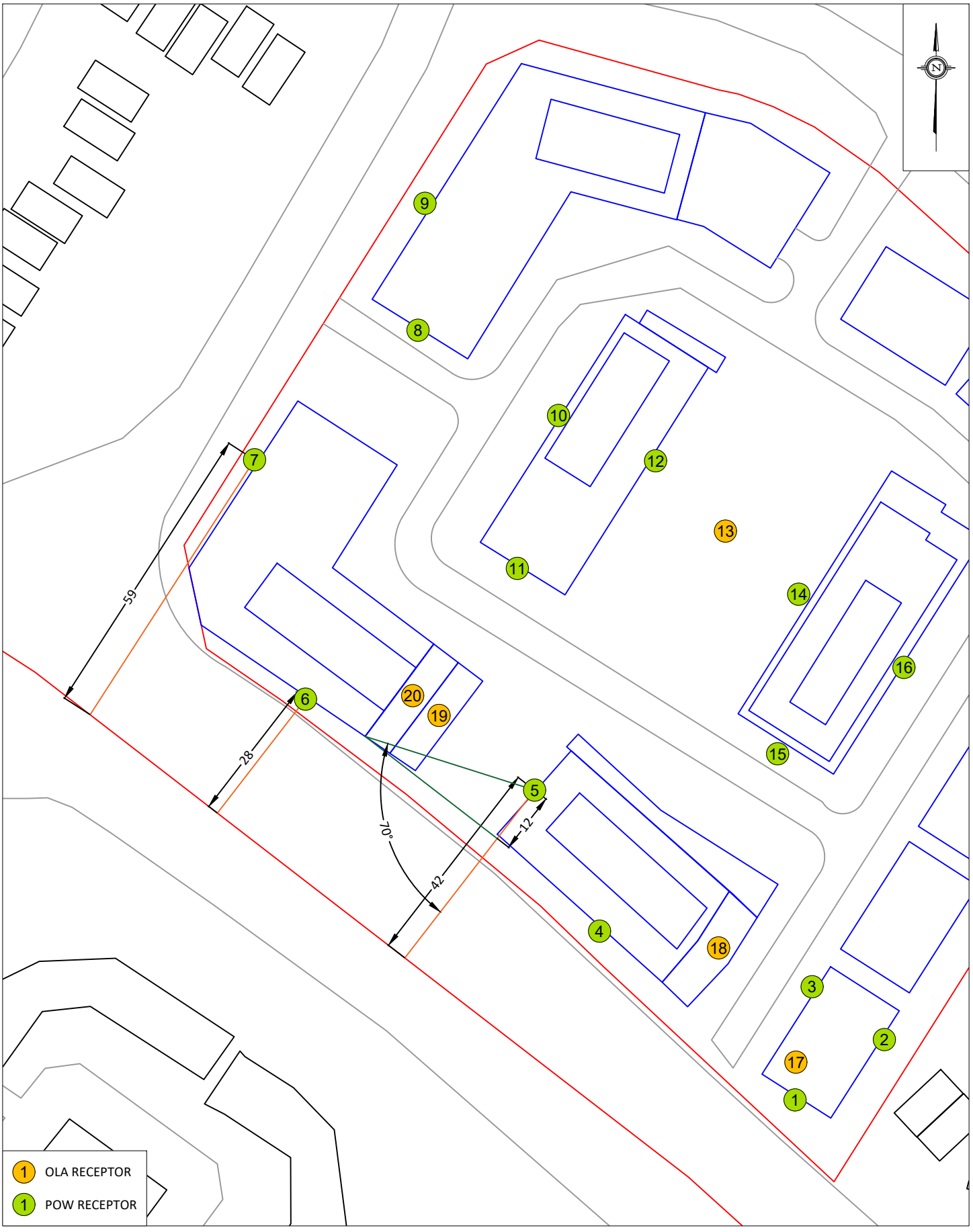
```
       1.50 !        7.50 !        5.78 !         5.78

ROAD (67.88 + 44.23 + 0.00) = 67.89 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     70   0.00  76.45   0.00  -4.47  -4.10   0.00   0.00   0.00
67.88
-------------------------------------------------------------------------
--
    70     90   0.00  76.45   0.00  -4.47  -9.54   0.00   0.00 -18.20
44.23
-------------------------------------------------------------------------
--
Segment Leq : 67.89 dBA

Total Leq All Segments: 67.89 dBA


Results segment # 1: EMP (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 !        7.50 !        5.78 !         5.78

ROAD (61.34 + 37.70 + 0.00) = 61.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     70   0.00  69.92   0.00  -4.47  -4.10   0.00   0.00   0.00
61.34
-------------------------------------------------------------------------
--
    70     90   0.00  69.92   0.00  -4.47  -9.54   0.00   0.00 -18.20
37.70
-------------------------------------------------------------------------

Segment Leq : 61.36 dBA

Total Leq All Segments: 61.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.89
                           (NIGHT): 61.36
```

```
STAMSON 5.0        NORMAL REPORT        Date: 14-07-2022 14:20:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: EMP (day/night)
---------------------------------------
Car traffic volume  : 39600/4400  veh/TimePeriod  *
Medium truck volume :  3150/350   veh/TimePeriod  *
Heavy truck volume  :  2250/250   veh/TimePeriod  *
Posted speed limit  :    70 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):  50000
    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     :  90.00

Data for Segment # 1: EMP (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  :  28.00 / 28.00  m
Receiver height           :   7.50 / 7.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: EMP (day)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 73.74 + 0.00) = 73.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
   -90     90   0.00  76.45   0.00  -2.71   0.00   0.00   0.00   0.00
73.74
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 73.74 dBA

Total Leq All Segments: 73.74 dBA

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

Source height = 1.50 m

ROAD (0.00 + 67.21 + 0.00) = 67.21 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
   -90     90   0.00  69.92   0.00  -2.71   0.00   0.00   0.00   0.00
67.21
-------------------------------------------------------------------------
--

Segment Leq : 67.21 dBA

Total Leq All Segments: 67.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.74
                           (NIGHT): 67.21
```

```
STAMSON 5.0        NORMAL REPORT        Date: 14-07-2022 14:20:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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


Road data, segment # 1: EMP (day/night)
---------------------------------------
Car traffic volume  : 39600/4400  veh/TimePeriod  *
Medium truck volume :  3150/350   veh/TimePeriod  *
Heavy truck volume  :  2250/250   veh/TimePeriod  *
Posted speed limit  :    70 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):  50000
    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     :  90.00

Data for Segment # 1: EMP (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  :  59.00 / 59.00  m
Receiver height           :  30.00 / 30.00  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

Results segment # 1: EMP (day)
------------------------------

Source height = 1.50 m

ROAD (0.00 + 67.49 + 0.00) = 67.49 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------------
--
     0     90   0.00  76.45   0.00  -5.95  -3.01   0.00   0.00   0.00
67.49
-------------------------------------------------------------------------------
--
```

```
Segment Leq : 67.49 dBA

Total Leq All Segments: 67.49 dBA

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

Source height = 1.50 m

ROAD (0.00 + 60.96 + 0.00) = 60.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj
SubLeq
-------------------------------------------------------------------------
--
     0     90   0.00  69.92   0.00  -5.95  -3.01   0.00   0.00   0.00
60.96
-------------------------------------------------------------------------
--

Segment Leq : 60.96 dBA

Total Leq All Segments: 60.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.49
                           (NIGHT): 60.96
```



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ENGINEERS & SCIENTISTS

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PROJECT	4099 ERIN MILLS PARKWAY, MISSISSAUGA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO.	GW22-008-A1
DATE	SEPTEMBER 12, 2022	DRAWN BY	G.G.

APPENDIX A1:
RECEPTOR LOCATIONS