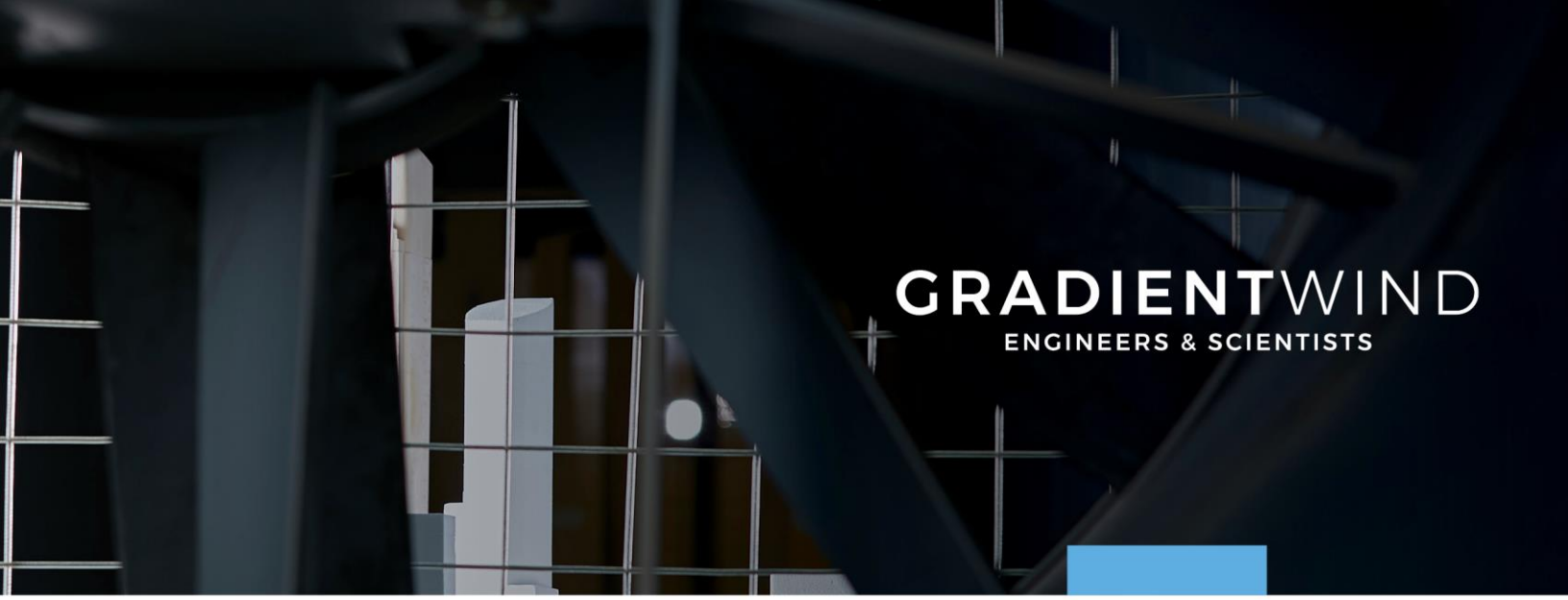

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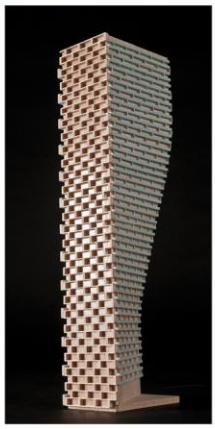
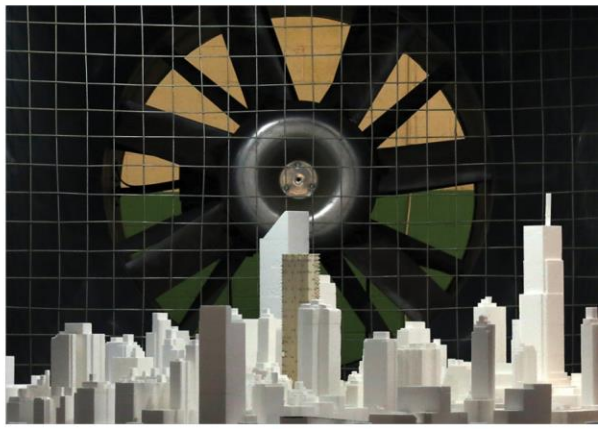
ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT

30-48 Chamberlain Avenue
Ottawa, Ontario

Report: 20-098-T.Noise Feasibility





October 22, 2020

PREPARED FOR
Scarabelli Realties Inc.
44 Chamberlain Avenue
Ottawa, ON K1S 1V9

PREPARED BY
Efser Kara, MSc, LEED GA, Acoustic Scientist
Samantha Phillips, B.Eng., Environmental Scientist
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EXECUTIVE SUMMARY

This report describes a roadway traffic noise feasibility assessment undertaken to satisfy the requirements for a Zoning By-law Amendment (ZBA) application submission for a proposed mixed-use development located at 30-48 Chamberlain Avenue in Ottawa, Ontario. The development comprises a 15-storey, trapezoidal planform building with a 3-storey, rectangular planform podium. The ground floor contains commercial space, a lobby, residential units and back-of-house/storage space, while all levels above are reserved for residential occupancy. At Level 4, the floorplate sets back at the west side to accommodate outdoor amenity space and create a trapezoidal floorplan. Levels 5 through 15 rise with a uniform planform. The major sources of roadway traffic noise are Chamberlain Avenue, Bank Street and Highway 417. Figure 1 illustrates a complete site plan with surrounding context.

The assessment is based on (i) theoretical noise prediction methods that conform to the Ministry of the Environment, Conservation and Parks (MECP) and City of Ottawa requirements; (ii) noise level criteria as specified by the City of Ottawa's Environmental Noise Control Guidelines (ENCG); (iii) future vehicular traffic volumes based on the City of Ottawa's Official Plan roadway classifications; and (iv) architectural drawings prepared by Hobin Architecture in August 2020.

The results of the current analysis indicate that noise levels will range between 62 and 77 dBA during the daytime period (07:00-23:00) and between 55 and 70 dBA during the nighttime period (23:00-07:00). The highest noise level (77 dBA) occurs at the north façade, which is nearest and most exposed to Highway 417.

The noise levels predicted due to roadway traffic exceed the criteria listed in the ENCG for upgraded building components. Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA. Due to the limited information available at the time of the study, which was prepared for a ZBA application submission, detailed STC calculations could not be performed at this time. A detailed review of window and wall assemblies should be performed by a qualified engineer with expertise in acoustics during the detailed design stage of the development.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements.

The noise levels at the podium rooftop outdoor amenity area are expected to approach 71 dBA during the daytime. Therefore, noise control measures will be required to reduce the L_{eq} to below 55 dBA if feasibly possible. This is typically achieved with noise barriers surrounding the OLA. However, consideration should also be given to relocation of the OLA away from roadway sources or shielding the OLA with building massing. A detailed barrier investigation will be performed in the subsequent detailed noise study at the time of site plan control application. The detailed study will also address building components, ventilation and warning clauses.

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 building become available. This study would assess impacts of stationary noise from rooftop mechanical units serving the proposed building 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 ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary noise screens and silencers can be incorporated into the design.

Following the completion of the study, we understand the architectural drawings for the development have been updated (ref. 30-48 Chamberlain Ave. Plans, Views & Development Stats issued in September 2020). The notable changes to the building massing relevant to the traffic noise impacts include:

- An increase in height from 15 stories to 16 stories.
- The floorplate has extended slightly towards the west and south resulting in an increase in floor area of Level 4 by approximately 700 ft^2 and Levels 5 to 15 by approximately 800 ft^2.

For the purpose of our work, the general massing of the updated design is similar to the previous design. As such, the noise levels from the local roadway sources are expected to be similar to the original predictions achieved for the previous design. The subsequent detailed roadway traffic noise study, to be performed at the time of site plan approval, will reflect the current massing.

TABLE OF CONTENTS

1. INTRODUCTION

Gradient Wind Engineering Inc. (Gradient Wind) was retained by Quantum Project Management Services Inc. on behalf of Scarabelli Realties Inc. to undertake a roadway traffic noise feasibility assessment to satisfy the requirements for a Zoning By-law Amendment (ZBA) application submission for a proposed mixed-use development located at 30-48 Chamberlain 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.

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

2. TERMS OF REFERENCE

The focus of this roadway traffic noise feasibility assessment is a proposed mixed-use development located at 30-48 Chamberlain Avenue in Ottawa, Ontario. The subject site is located on the north edge of a parcel of land bounded by Bank Street to the east, Chamberlain Avenue to the north, Rosebery Avenue to the south, and Lyon Street to the west.

Rendering, Northwest Perspective
(Courtesy of Hobin Architecture)

The development comprises a 15-storey, trapezoidal planform building with a 3-storey, rectangular planform podium. The ground floor contains commercial space, a lobby, residential units and back-of-house/storage space. A driveway along the west side of the site provides access to surface parking and a ramp to two levels of

[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

below-grade parking from Chamberlain Avenue. At Level 2, the floorplate extends at the west side to cover the northbound lane of the driveway below. All levels above grade are reserved for residential occupancy, with indoor amenity space provided at the west side of Level 4. At Level 4, the floorplate sets back at the west side to accommodate outdoor amenity space and create a trapezoidal floorplan. Levels 5 through 15 continue to rise with a uniform planform. As the balconies serving the residential units extend less than 4 metres from the façade, they do not require consideration as outdoor living areas (OLA) in this study.

The site is surrounded by low-rise residential and commercial buildings in all directions, with elevated Highway 417 to the north, Patterson's Creek Park to the southeast, Central Park to the south and Chamberlain Park to the west. The major sources of traffic noise are Chamberlain Avenue, Bank Street and Highway 174. Figure 1 illustrates a complete site plan with 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) explore potential noise mitigation options, where required.

4. METHODOLOGY

4.1 Background

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

4.2 Roadway Traffic Noise

4.2.1 Criteria for Roadway Traffic Noise

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

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

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[4]. A closed window due to a ventilation requirement will bring noise levels down to achieve an acceptable indoor environment[5]. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the need for having windows and doors closed, which triggers the need

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

for forced air heating with provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, air conditioning will be required and building components will require higher levels of sound attenuation[6].

The sound level criterion for outdoor living areas 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 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 streets was taken to be 92%/8%, respectively.
- Ground surfaces were taken to be reflective due to the presence of hard (paved) ground.
- Topography was assumed to be a flat/gentle slope surrounding the study building. Highway 417 was considered to be elevated approximately 5 metres (m) above local grade.
- A 3-metre tall noise barrier was considered along the south perimeter of Highway 417.
- For select sources where appropriate, the proposed building as well as existing surrounding buildings were considered as barriers, partially or fully obstructing exposure to the source as illustrated by exposure angles in Figures 3-5.
- Noise receptors were strategically placed at five (5) locations around the study area, see Figure 2.
- Receptor distances and exposure angles are illustrated in Figures 3-5.

[6] MOECP, Environmental Noise Guidelines, NPC 300 – Part C, Section 7.1.3

4.2.3 Roadway Traffic Volumes

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

TABLE 2: ROADWAY TRAFFIC DATA

Segment	Roadway Traffic Data	Speed Limit (km/h)	Traffic Volumes
Highway 417	6-Lane Freeway	100	**110,000**
Chamberlain Avenue	2-Lane Urban Arterial	50	**15,000**
Bank Street	4-Lane Urban Arterial Undivided	50	**30,000**

5. RESULTS AND DISCUSSION

5.1 Roadway Traffic Noise Levels

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

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

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	46.2	POW – North Façade	77	70
2	46.2	POW – West Façade	72	65
3	46.2	POW – East Façade	74	66
4	46.2	POW – South Façade	62	55
5	13.9	OLA – Podium Rooftop Amenity Area	71	N/A*

*Noise levels at OLAs during the nighttime are not considered, as per the ENCG.

The results of the current analysis indicate that noise levels will range between 62 and 77 dBA during the daytime period (07:00-23:00) and between 55 and 70 dBA during the nighttime period (23:00-07:00). The highest noise level (77 dBA) occurs at the north façade, which is nearest and most exposed to Highway 417.

The noise levels predicted due to roadway traffic exceed the criteria listed in Section 4.2 for building components. Upgraded building components, including STC rated glazing elements and exterior walls, will be required where noise levels due to roadway traffic exceed 65 dBA, as discussed in Section 4.2.1. Results of the calculations also indicated that the building will require air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. In addition to ventilation requirements, Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements. Specific noise control measures can be developed once the design of the building has progressed sufficiently, typically at the time of site plan approval.

The noise levels at the podium rooftop OLA (receptor 5) are expected to approach 71 dBA during the daytime. Therefore, noise control measures will be required to reduce the L_{eq} to below 60 dBA and as close to 55 dBA as feasibility possible.

6. CONCLUSIONS AND RECOMMENDATIONS

The results of the current analysis indicate that noise levels will range between 62 and 77 dBA during the daytime period (07:00-23:00) and between 55 and 70 dBA during the nighttime period (23:00-07:00). Building components with a higher Sound Transmission Class (STC) rating will be required where exterior noise levels exceed 65 dBA. Due to the limited information available at the time of the study, which was prepared for a Zoning By-law Amendment application submission, detailed STC calculations could not be performed at this time. A detailed review of window and wall assemblies should be performed by a qualified engineer with expertise in acoustics during the detailed design stage of the development.

Results of the calculations also indicate that the development will require central air conditioning, which will allow occupants to keep windows closed and maintain a comfortable living environment. Warning Clauses will also be required to be placed on all Lease, Purchase and Sale Agreements.

The noise levels at the podium rooftop OLA (receptor 5) are expected to approach 71 dBA during the daytime. Therefore, noise control measures will be required to reduce the L_{eq} to below 55 dBA as feasibly possible. This is typically achieved with noise barriers surrounding the OLA. However, consideration should also be given to relocation of the OLA away from roadway sources or shielding the OLA with building massing. A detailed barrier investigation will be performed in the subsequent detailed noise study. The detailed study will also address building components, ventilation and warning clauses.

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 building become available. This study would assess the impacts of stationary noise from rooftop mechanical units serving the proposed building 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 ENCG limits. Noise impacts can generally be minimized by judicious selection and placement of the equipment. Where necessary noise screens and silencers can be incorporated into the design.

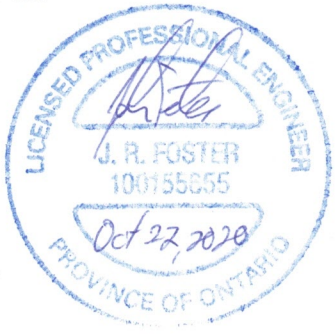
This concludes our roadway traffic noise feasibility assessment and report. If you have any questions or wish to discuss our findings, please advise us. In the interim, we thank you for the opportunity to be of service.

Sincerely,

Gradient Wind Engineering Inc.

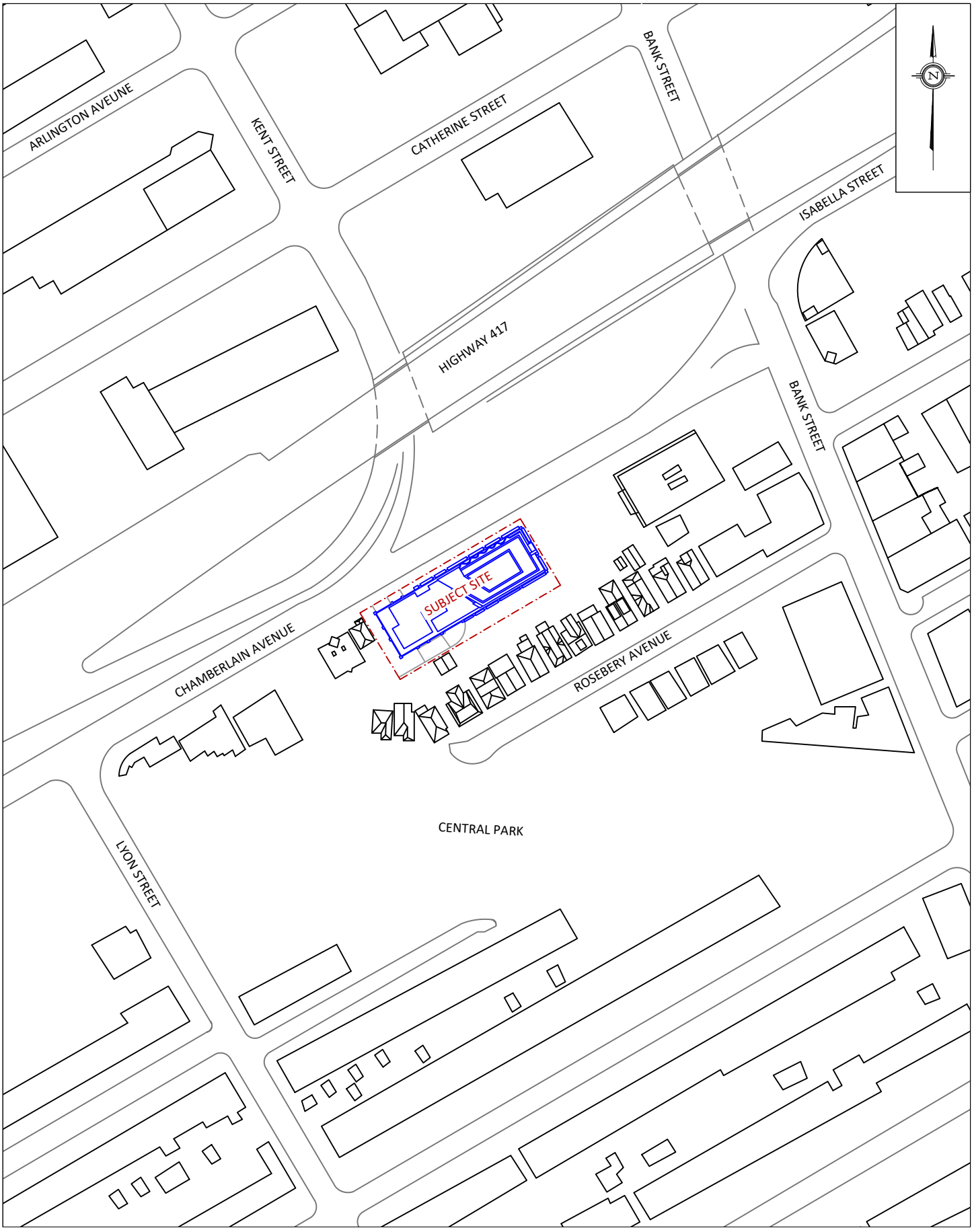
Efser Kara, MSc, LEED GA
Acoustic Scientist

Samantha Phillips, B.Eng.
Environmental Scientist



Joshua Foster, P.Eng.
Principal

Gradient Wind File 20-098-T.Noise Feasibility



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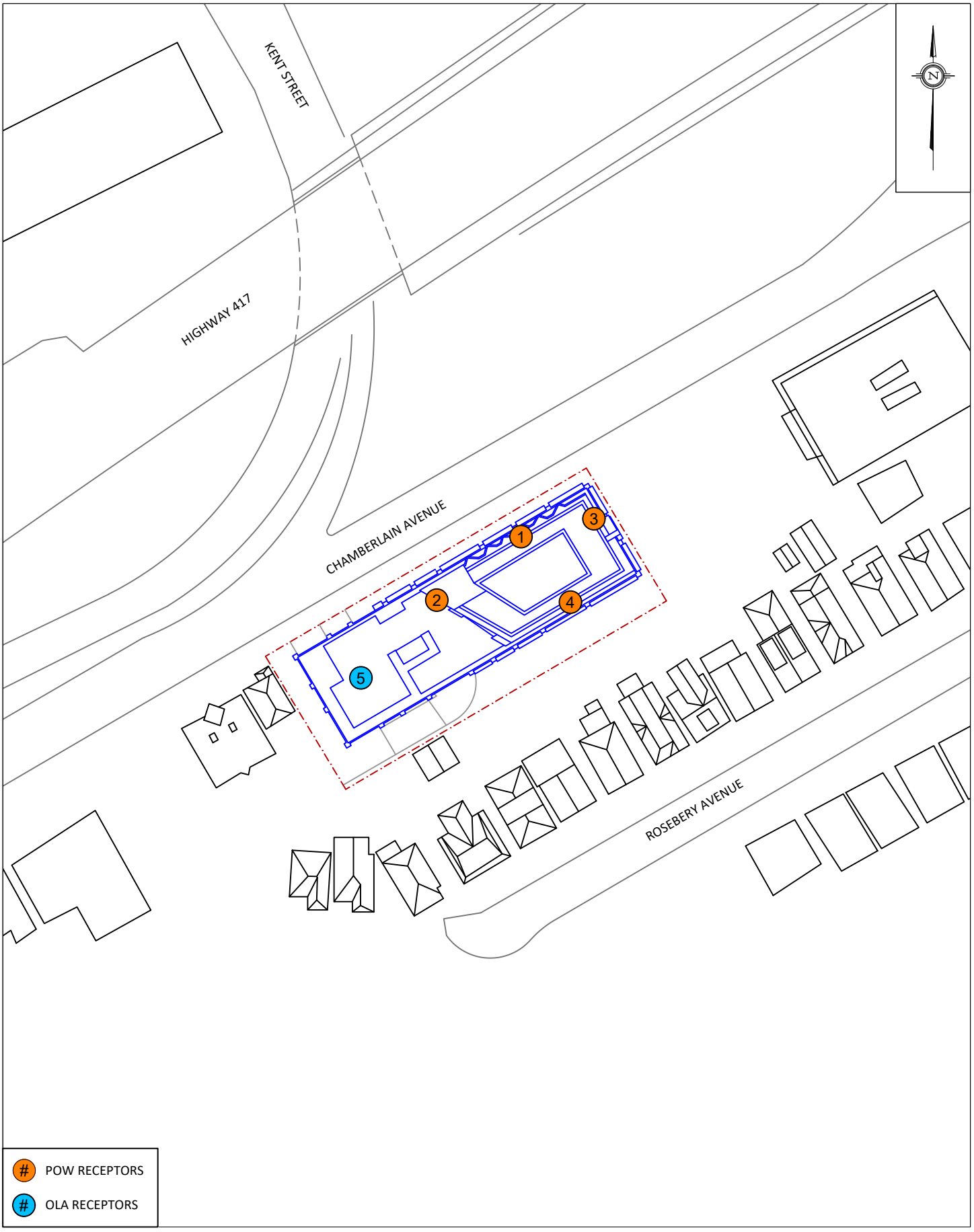
PROJECT	30-48 CHAMBERLAIN AVENUE, OTTAWA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO. GW20-098-1	FIGURE 1: SITE PLAN AND SURROUNDING CONTEXT
DATE	SEPTEMBER 22, 2020	DRAWN BY S.P.	



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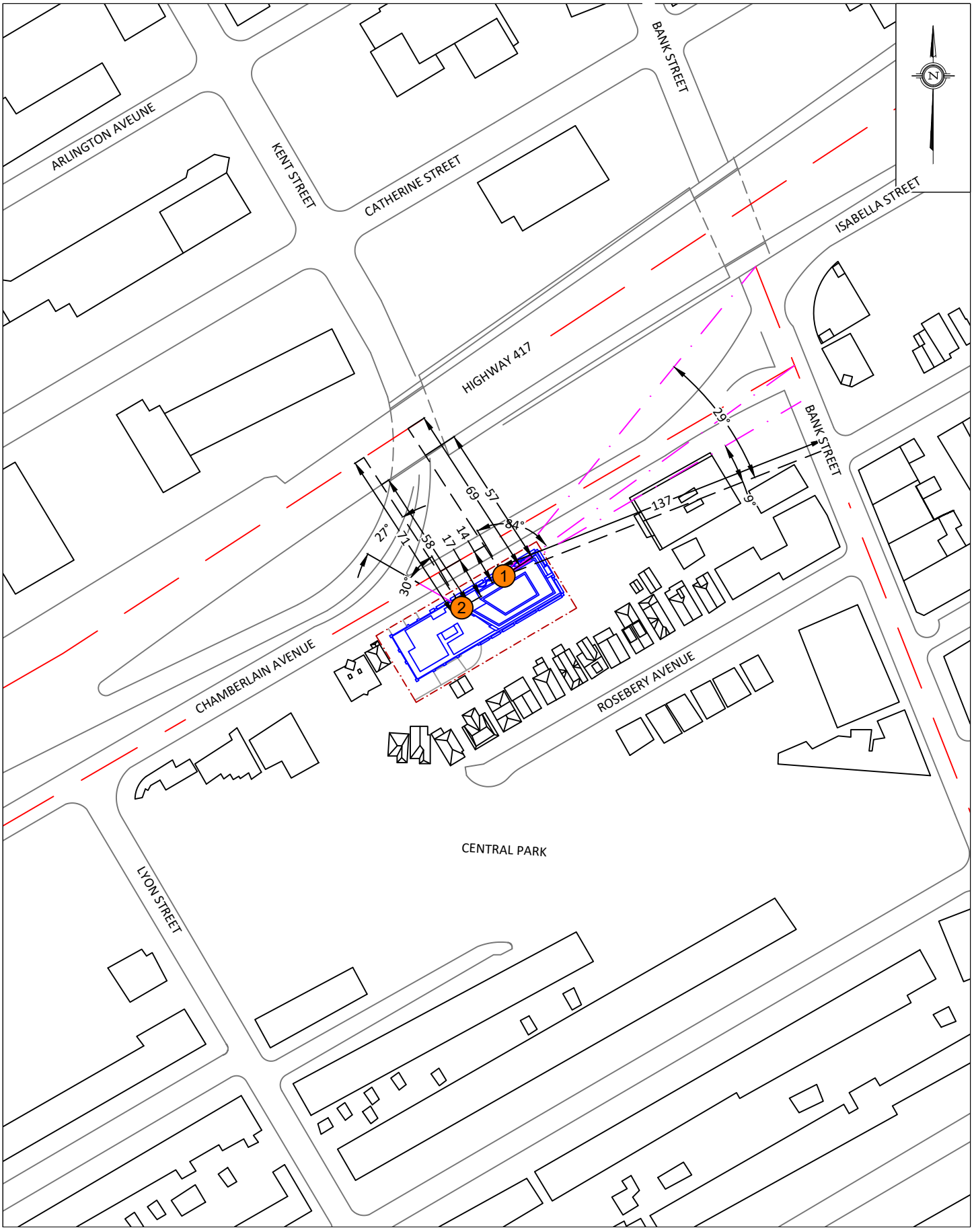
PROJECT	30-48 CHAMBERLAIN AVENUE, OTTAWA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:1000 (APPROX.)	DRAWING NO. GW20-098-2	FIGURE 2: RECEPTOR LOCATIONS
DATE	SEPTEMBER 22, 2020	DRAWN BY S.P.	



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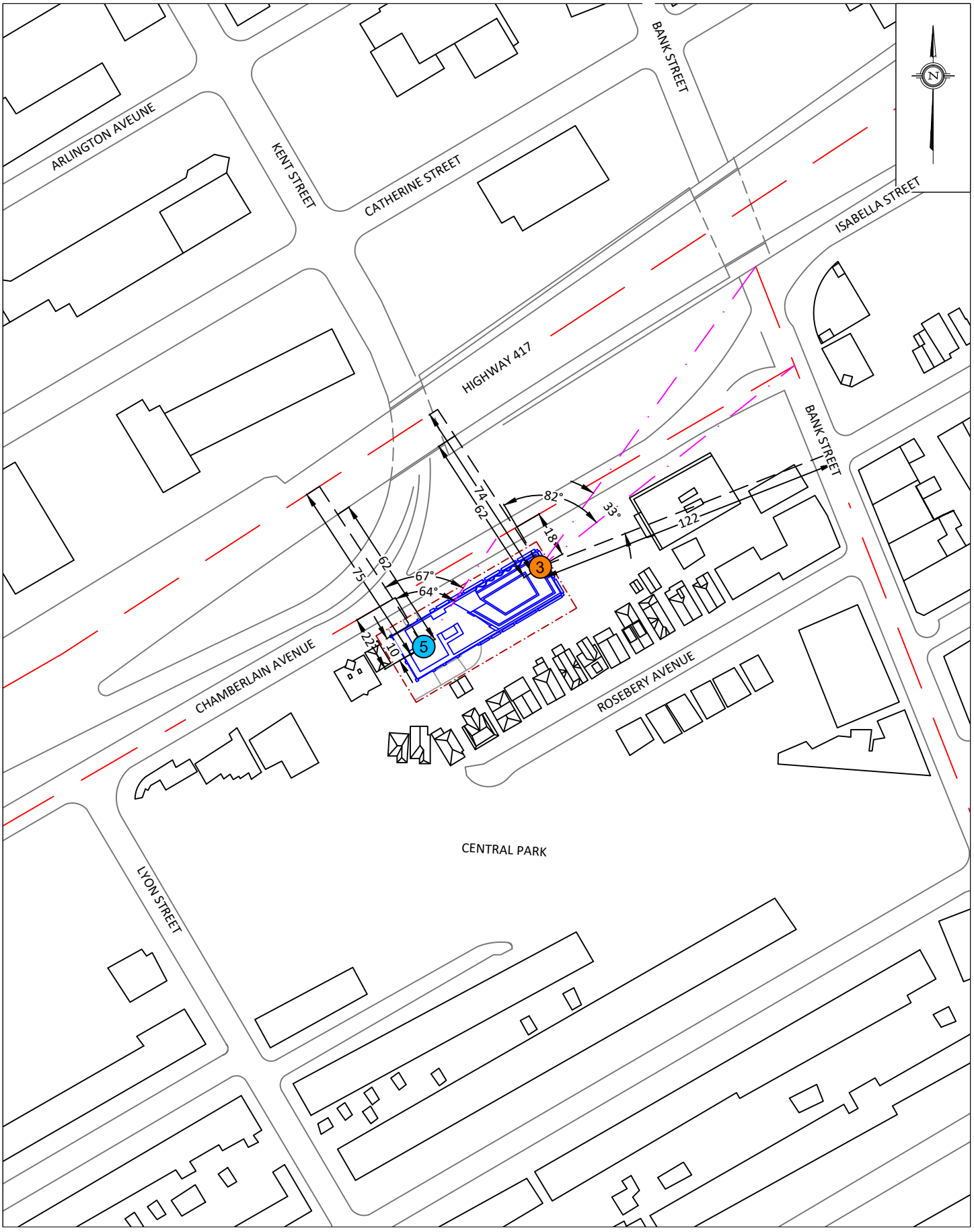
PROJECT	30-48 CHAMBERLAIN AVENUE, OTTAWA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT
SCALE	1:2000 (APPROX.)
DRAWING NO.	GW20-098-3
DATE	SEPTEMBER 22, 2020
DRAWN BY	S.P.

DESCRIPTION

FIGURE 3:
STAMSON INPUT PARAMETERS - RECEPTORS 1 & 2



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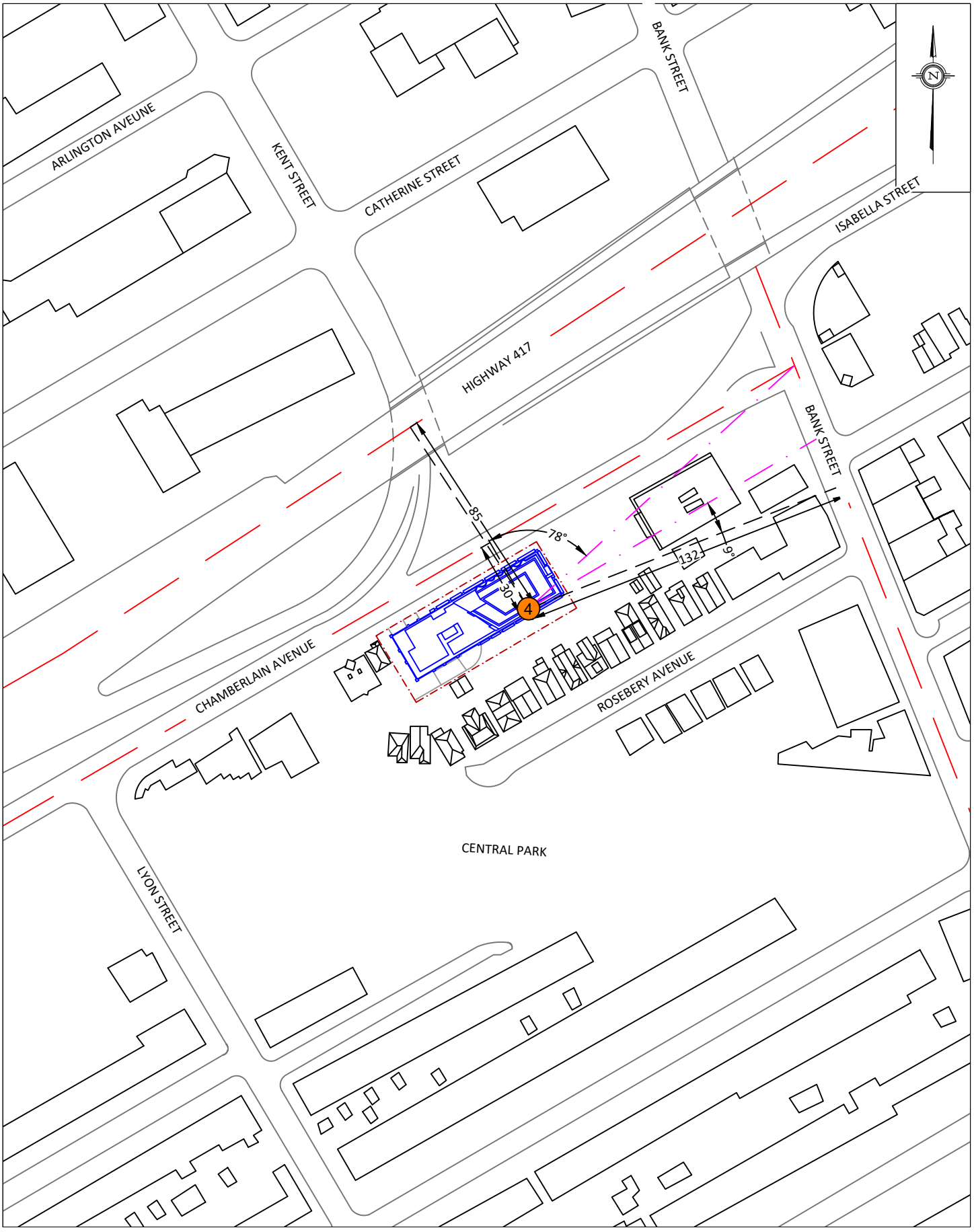
PROJECT	30-48 CHAMBERLAIN AVENUE, OTTAWA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW20-098-4
DATE	SEPTEMBER 22, 2020	DRAWN BY	S.P.

FIGURE 4:
STAMSON INPUT PARAMETERS - RECEPTORS 3 & 5



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PROJECT	30-48 CHAMBERLAIN AVENUE, OTTAWA ROADWAY TRAFFIC NOISE FEASIBILITY ASSESSMENT		DESCRIPTION
SCALE	1:2000 (APPROX.)	DRAWING NO.	GW20-098-5
DATE	SEPTEMBER 22, 2020	DRAWN BY	S.P.

FIGURE 5:
STAMSON INPUT PARAMETERS - RECEPTOR 4

APPENDIX A

STAMSON 5.04 – INPUT AND OUTPUT DATA

127 WALGREEN ROAD, OTTAWA, ON, CANADA K0A 1L0 | 613 836 0934
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STAMSON 5.0 NORMAL REPORT Date: 21-09-2020 21:40:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 89056/7744 veh/TimePeriod *
Medium truck volume : 7084/616 veh/TimePeriod *
Heavy truck volume : 5060/440 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): 110000
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 : -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 : 69.00 / 69.00 m
Receiver height : 46.20 / 46.20 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 8.00 m
Barrier receiver distance : 57.00 / 57.00 m
Source elevation : 5.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 50 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): 15000
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: Chamberlain (day/night)

Angle1 Angle2 : -90.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Bank St (day/night)

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 50 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): 30000
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: Bank St (day/night)

Angle1 Angle2 : -29.00 deg -9.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 137.00 / 137.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 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 ! 46.20 ! 13.40 ! 13.40

ROAD (0.00 + 76.53 + 0.00) = 76.53 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 83.16 0.00 -6.63 0.00 0.00 0.00 -0.07 76.46*
-90 90 0.00 83.16 0.00 -6.63 0.00 0.00 0.00 0.00 76.53
---

* Bright Zone !

Segment Leq : 76.53 dBA

Results segment # 2: Chamberlain (day)

Source height = 1.50 m

ROAD (0.00 + 68.33 + 0.00) = 68.33 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	84	0.00	68.48	0.00	0.00	-0.15	0.00	0.00	0.00	68.33

Segment Leq : 68.33 dBA

Results segment # 3: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 52.34 + 0.00) = 52.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-29	-9	0.00	71.49	0.00	-9.61	-9.54	0.00	0.00	0.00	52.34

Segment Leq : 52.34 dBA

Total Leq All Segments: 77.16 dBA

Results segment # 1: 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 ! 46.20 ! 13.40 ! 13.40

ROAD (0.00 + 68.93 + 0.00) = 68.93 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 75.56 0.00 -6.63 0.00 0.00 0.00 -0.07 68.86*
-90 90 0.00 75.56 0.00 -6.63 0.00 0.00 0.00 0.00 68.93
---

* Bright Zone !

Segment Leq : 68.93 dBA

Results segment # 2: Chamberlain (night)

Source height = 1.50 m

ROAD (0.00 + 60.74 + 0.00) = 60.74 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 84 0.00 60.88 0.00 0.00 -0.15 0.00 0.00 0.00 60.74

Segment Leq : 60.74 dBA

Results segment # 3: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 44.74 + 0.00) = 44.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-29	-9	0.00	63.89	0.00	-9.61	-9.54	0.00	0.00	0.00	44.74

Segment Leq : 44.74 dBA

Total Leq All Segments: 69.56 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 77.16
(NIGHT): 69.56

STAMSON 5.0 NORMAL REPORT Date: 21-09-2020 21:40:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 89056/7744 veh/TimePeriod *
Medium truck volume : 7084/616 veh/TimePeriod *
Heavy truck volume : 5060/440 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): 110000
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 : -90.00 deg -27.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 71.00 / 71.00 m
Receiver height : 46.20 / 46.20 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : -27.00 deg
Barrier height : 8.00 m
Barrier receiver distance : 58.00 / 58.00 m
Source elevation : 5.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 50 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): 15000
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: Chamberlain (day/night)

Angle1 Angle2 : -90.00 deg -30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 17.00 / 17.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 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 ! 46.20 ! 13.77 ! 13.77

ROAD (0.00 + 71.85 + 0.00) = 71.85 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -27 0.00 83.16 0.00 -6.75 -4.56 0.00 0.00 -0.10 71.75*
-90 -27 0.00 83.16 0.00 -6.75 -4.56 0.00 0.00 0.00 71.85
---

* Bright Zone !

Segment Leq : 71.85 dBA

Results segment # 2: Chamberlain (day)

Source height = 1.50 m

ROAD (0.00 + 63.17 + 0.00) = 63.17 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -30 0.00 68.48 0.00 -0.54 -4.77 0.00 0.00 0.00 63.17

Segment Leq : 63.17 dBA

Total Leq All Segments: 72.40 dBA

Results segment # 1: 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 ! 46.20 ! 13.77 ! 13.77

ROAD (0.00 + 64.25 + 0.00) = 64.25 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -27 0.00 75.56 0.00 -6.75 -4.56 0.00 0.00 -0.10 64.15*
-90 -27 0.00 75.56 0.00 -6.75 -4.56 0.00 0.00 0.00 64.25
---

* Bright Zone !

Segment Leq : 64.25 dBA

Results segment # 2: Chamberlain (night)

Source height = 1.50 m

ROAD (0.00 + 55.57 + 0.00) = 55.57 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 -30 0.00 60.88 0.00 -0.54 -4.77 0.00 0.00 0.00 55.57

Segment Leq : 55.57 dBA

Total Leq All Segments: 64.80 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 72.40
(NIGHT): 64.80

STAMSON 5.0 NORMAL REPORT Date: 21-09-2020 21:17:35
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 89056/7744 veh/TimePeriod *
Medium truck volume : 7084/616 veh/TimePeriod *
Heavy truck volume : 5060/440 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): 110000
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 : 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 : 74.00 / 74.00 m
Receiver height : 46.20 / 46.20 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 0.00 deg Angle2 : 90.00 deg
Barrier height : 8.00 m
Barrier receiver distance : 62.00 / 62.00 m
Source elevation : 5.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 50 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): 15000
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: Chamberlain (day/night)

Angle1 Angle2 : 0.00 deg 82.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.00 / 18.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: Bank St (day/night)

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 50 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): 30000
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: Bank St (day/night)

Angle1 Angle2 : -33.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 122.00 / 122.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 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 ! 46.20 ! 12.93 ! 12.93

ROAD (0.00 + 73.22 + 0.00) = 73.22 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
0 90 0.00 83.16 0.00 -6.93 -3.01 0.00 0.00 -0.09 73.13*
0 90 0.00 83.16 0.00 -6.93 -3.01 0.00 0.00 0.00 73.22
---

* Bright Zone !

Segment Leq : 73.22 dBA

Results segment # 2: Chamberlain (day)

Source height = 1.50 m

ROAD (0.00 + 64.27 + 0.00) = 64.27 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
0 82 0.00 68.48 0.00 -0.79 -3.41 0.00 0.00 0.00 64.27

Segment Leq : 64.27 dBA

Results segment # 3: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 60.73 + 0.00) = 60.73 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-33 90 0.00 71.49 0.00 -9.10 -1.65 0.00 0.00 0.00 60.73

Segment Leq : 60.73 dBA

Total Leq All Segments: 73.95 dBA

Results segment # 1: 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 ! 46.20 ! 12.93 ! 12.93

ROAD (0.00 + 65.62 + 0.00) = 65.62 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
0 90 0.00 75.56 0.00 -6.93 -3.01 0.00 0.00 -0.09 65.53*
0 90 0.00 75.56 0.00 -6.93 -3.01 0.00 0.00 0.00 65.62
---

* Bright Zone !

Segment Leq : 65.62 dBA

Results segment # 2: Chamberlain (night)

Source height = 1.50 m

ROAD (0.00 + 56.68 + 0.00) = 56.68 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.00	60.88	0.00	-0.79	-3.41	0.00	0.00	0.00	56.68

Segment Leq : 56.68 dBA

Results segment # 3: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 53.14 + 0.00) = 53.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-33	90	0.00	63.89	0.00	-9.10	-1.65	0.00	0.00	0.00	53.14

Segment Leq : 53.14 dBA

Total Leq All Segments: 66.35 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.95
(NIGHT): 66.35

STAMSON 5.0 NORMAL REPORT Date: 21-09-2020 21:33:04
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 : 89056/7744 veh/TimePeriod *
Medium truck volume : 7084/616 veh/TimePeriod *
Heavy truck volume : 5060/440 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): 110000
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 : -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 : 85.00 / 85.00 m
Receiver height : 46.20 / 46.20 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 90.00 deg
Barrier height : 48.60 m
Barrier receiver distance : 0.05 / 0.05 m
Source elevation : 5.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 50 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): 15000
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: Chamberlain (day/night)

Angle1 Angle2 : -90.00 deg 78.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 46.20 / 46.20 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 78.00 deg
Barrier height : 48.60 m
Barrier receiver distance : 0.05 / 0.05 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Road data, segment # 3: Bank St (day/night)

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 50 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): 30000
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: Bank St (day/night)

Angle1 Angle2 : -9.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 132.00 / 132.00 m
Receiver height : 46.20 / 46.20 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: 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 ! 46.20 ! 46.18 ! 46.18

ROAD (0.00 + 58.49 + 0.00) = 58.49 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 83.16 0.00 -7.53 0.00 0.00 0.00 -17.13 58.49

Segment Leq : 58.49 dBA

Results segment # 2: Chamberlain (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 ! 46.20 ! 46.13 ! 46.13

ROAD (0.00 + 46.66 + 0.00) = 46.66 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 78 0.00 68.48 0.00 -3.01 -0.30 0.00 0.00 -18.51 46.66

Segment Leq : 46.66 dBA

Results segment # 3: Bank St (day)

Source height = 1.50 m

ROAD (0.00 + 59.45 + 0.00) = 59.45 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-9 90 0.00 71.49 0.00 -9.44 -2.60 0.00 0.00 0.00 59.45

Segment Leq : 59.45 dBA

Total Leq All Segments: 62.13 dBA

Results segment # 1: 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 ! 46.20 ! 46.18 ! 46.18

ROAD (0.00 + 50.90 + 0.00) = 50.90 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 90 0.00 75.56 0.00 -7.53 0.00 0.00 0.00 -17.13 50.90

Segment Leq : 50.90 dBA

Results segment # 2: Chamberlain (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 ! 46.20 ! 46.13 ! 46.13

ROAD (0.00 + 39.07 + 0.00) = 39.07 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 78 0.00 60.88 0.00 -3.01 -0.30 0.00 0.00 -18.51 39.07

Segment Leq : 39.07 dBA

Results segment # 3: Bank St (night)

Source height = 1.50 m

ROAD (0.00 + 51.85 + 0.00) = 51.85 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-9 90 0.00 63.89 0.00 -9.44 -2.60 0.00 0.00 0.00 51.85

Segment Leq : 51.85 dBA

Total Leq All Segments: 54.54 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.13
(NIGHT): 54.54

STAMSON 5.0 NORMAL REPORT Date: 21-09-2020 21:41:31
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Car traffic volume : 89056/7744 veh/TimePeriod *
Medium truck volume : 7084/616 veh/TimePeriod *
Heavy truck volume : 5060/440 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): 110000
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 : -90.00 deg 67.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 13.90 / 13.90 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 67.00 deg
Barrier height : 8.00 m
Barrier receiver distance : 62.00 / 62.00 m
Source elevation : 5.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

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

Car traffic volume : 12144/1056 veh/TimePeriod *
Medium truck volume : 966/84 veh/TimePeriod *
Heavy truck volume : 690/60 veh/TimePeriod *
Posted speed limit : 50 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): 15000
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: Chamberlain (day/night)

Angle1 Angle2 : -90.00 deg 64.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 22.00 / 22.00 m
Receiver height : 13.90 / 13.90 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 64.00 deg
Barrier height : 12.40 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 0.00 m
Receiver elevation : 0.00 m
Barrier elevation : 0.00 m
Reference angle : 0.00

Results segment # 1: 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 ! 13.90 ! 7.78 ! 7.78

ROAD (0.00 + 70.49 + 0.00) = 70.49 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 67 0.00 83.16 0.00 -6.99 -0.59 0.00 0.00 -5.08 70.49

Segment Leq : 70.49 dBA

Results segment # 2: Chamberlain (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 ! 13.90 ! 8.26 ! 8.26

ROAD (0.00 + 51.34 + 0.00) = 51.34 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 64 0.00 68.48 0.00 -1.66 -0.68 0.00 0.00 -14.80 51.34

Segment Leq : 51.34 dBA

Total Leq All Segments: 70.54 dBA

Results segment # 1: 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 ! 13.90 ! 7.78 ! 7.78

ROAD (0.00 + 62.90 + 0.00) = 62.90 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 67 0.00 75.56 0.00 -6.99 -0.59 0.00 0.00 -5.08 62.90

Segment Leq : 62.90 dBA

Results segment # 2: Chamberlain (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 ! 13.90 ! 8.26 ! 8.26

ROAD (0.00 + 43.74 + 0.00) = 43.74 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj SubLeq
---
-90 64 0.00 60.88 0.00 -1.66 -0.68 0.00 0.00 -14.80 43.74

Segment Leq : 43.74 dBA

Total Leq All Segments: 62.95 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.54
(NIGHT): 62.95