Geotechnical Engineering

Environmental Engineering

Hydrogeology

Geological Engineering

Materials Testing

Building Science

Noise and Vibration Studies

patersongroup

Environmental Noise Control Study

Proposed 20-Storey Apartment Building
337 Montgomery Street, Ottawa

Prepared For

SerCo Realty Group

August 18, 2021

Report: PG5944-1

Paterson Group Inc.
Consulting Engineers
154 Colonnade Road South
Ottawa (Nepean), Ontario
Canada K2E 7J5

Tel: (613) 226-7381
Fax: (613) 226-6344
www.patersongroup.ca

Table of Contents

PAGE

Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by SerCo Realty Group to conduct an environmental noise control study for the proposed 20-storey high-rise apartment building to be located at 337 Montgomery Street, in the City of Ottawa.

The objective of the current study is to:

- Determine the primary noise sources impacting the site and compare the projected sound levels to guidelines set out by the Ministry of Environment and Climate Change (MOECC) and the City of Ottawa.

- Review the projected noise levels and offer recommendations regarding warning classes, construction materials or alternative sound barriers.

The following report has been prepared specifically and solely for the aforementioned project which is described herein. It contains our findings and includes acoustical recommendations pertaining to the design and construction of the subject development as they are understood at the time of writing this report.

This study has been conducted according to City of Ottawa document - Engineering Noise Control Guidelines (ENCG), dated January 2016, and the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Proposed Development

It is understood that the proposed residential development will consist of twenty (20) storey apartment building and rise approximately 60 metres above grade. Two (2) levels of basement are anticipated at the building, consisting of bike room, parking areas, mechanical and electrical rooms. A total of 203 units are expected at the building. Associated at-grade landscaped areas and walkways are also anticipated. A terrace at 8th floor rooftop that will serve as an Outdoor Living Area (OLA) is further anticipated at the building.

3.0 Methodology and Noise Assessment Criteria

The City of Ottawa outlines three (3) sources of environmental noise that must be analyzed separately:

- Surface Transportation Noise
- Stationary Noise
  - new noise-sensitive development applications (noise receptors) in proximity to existing or approved stationary sources of noise, and
  - new stationary sources of noise (noise generating) in proximity to existing or approved noise-sensitive developments
- Aircraft Noise

Surface Transportation Noise

Surface roadway traffic noise, equivalent to sound level energy L_{eq}, provides a measure of the time varying noise level over a period of time. For roadways, the L_{eq} is commonly calculated on the basis of 16-hour (L_{eq16}) daytime (07:00-23:00) and 8-hour (L_{eq8}) nighttime (23:00-7:00) split to assess its impact on residential, commercial and institutional buildings.

The City of Ottawa's Official Plan dictates that the influence area must contain any of following conditions to classify as a surface transportation noise source for a subject site:

- Within 100 m of the right-of-way of an existing or proposed arterial, collector or major collector road; a light rail transit corridor; bus rapid transit, or transit priority corridor
- Within 250 m of the right-of-way for an existing or proposed highway or secondary rail line
- Within 300 m from the right of way of a proposed or existing rail corridor or a secondary main railway line
- Within 500 m of an existing 400 series provincial highway, freeway or principle main railway line.

The Environmental Noise Guidelines for Stationary and Transportation Sources – NPC-300 outlines the limitations of noise levels in relation to the location of the receptors. These can be found in the following tables:

Table 1 – Noise Level Limit for Outdoor Living Areas

Time Period	L_{eq} Level (dBA)
Daytime, 7:00-23:00	55

- Standard taken from Table 2.2a; Sound Level Limit for Outdoor Living Areas – Road and Rail

Table 2 – Noise Level Limits for Indoor Living Areas

Type of Space	Time Period	L_{eq} Level (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	Daytime 7:00-23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes, schools, day-care centres	Daytime 7:00-23:00	45	40
Living/dining/den areas of **residences**, hospitals, nursing/retirement homes etc. (except schools or day-care centres)	Nighttime 23:00-7:00	45	40
Sleeping quarters of hotels/motels	Nighttime 23:00-7:00	45	40
Sleeping quarters of **residences**, hospitals, nursing/retirement homes, etc.	Nighttime 23:00-7:00	40	35

- Standards taken from Table 2.2b, Sound Level Limit for Indoor Living Areas – Road and Rail and Table 2.2c, Supplementary Sound Level Limits for Indoor Spaces – Road and Rail

Predicted noise levels at the pane of window dictate the action required to achieve recommended noise levels. It is noted in ENCG that the limits outlined in Table 2 are for the noise levels on the interior of the window glass pane. An open window is considered to provide a 10 dBA noise reduction, while a standard closed window is capable to provide a minimum 20 dBA noise reduction. Therefore, where noise levels exceed 55 dBA daytime and 50 dBA nighttime, the ventilation for the building should consider the provision for central air conditioning. Where noise levels exceed 65 dBA daytime and 60 dBA nighttime, central air conditioning will be required, and the building components will require higher levels of sound attenuation.

If the noise level limits are exceeded, the following Warning Clauses should be included in related deeds of sale:

Table 3 – Warning Clauses for Noise Level Exceedances

Warning Clause	Description
Warning Clause Type A	"Purchasers/tenants are advised that sound levels due to increasing road traffic (rail traffic) (air traffic) may occasionally interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause Type B	"Purchasers/tenants are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic (rail traffic) (air traffic) may on occasions interfere with some activities of the dwelling occupants as the sound levels exceed the sound level limits of the Municipality and the Ministry of the Environment."
Warning Clause 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."
Warning Clause 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."
➢ Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - NPC-300	

Stationary Noise

Stationary noise sources include sources or facilities that are fixed or mobile and can cause a combination of sound and vibration levels emitted beyond the property line. These sources may include commercial air conditioner units, generators and fans. Facilities that may contribute to stationary noise may include car washes, snow disposal sites, transit stations and manufacturing facilities.

The subject site is not in proximity to existing or approved stationary sources of noise. Therefore, a stationary noise analysis will not be required.

Aircraft / Airport Noise

The subject site is not located within the Airport Vicinity Development Zone. Therefore this project will not require an aircraft/airport noise analysis. No warning clauses regarding aircraft or airport noise will be required.

4.0 Analysis

Surface Transportation Noise

The subject building is bordered to the north by Selkirk Street followed by residential dwellings and Palace Street, to the east by residential dwellings, Gardner Street and Vanier Parkway, to the south by Montgomery Street followed by residential dwellings, commercial buildings, Mayfield Street, and McArthur Avenue, to the west by Montgomery Street followed by residential dwellings, commercial buildings, and Dundas Street. Selkirk Street, Palace Street, Gardner Street, Vanier Parkway, Montgomery Street, Mayfield Street, McArthur Avenue and Dundas Street are identified within the 100 m radius of proposed building.

Based on the City of Ottawa's Official Plan, Schedule F, Vanier Parkway is considered a 4 lane urban arterial divided road (4-UAD), and McArthur Avenue is considered a 2 lane urban arterial road (2-UAU). Other roads within the 100 m radius of the proposed development are not classified as either arterial, collector or major collector roads and therefore are not included in this study. The major sources of traffic noise are due to the Vanier Parkway and the McArthur Avenue to the east and south of the proposed building.

All noise sources are presented in Drawing PG5944-3 - Site Geometry located in Appendix 1.

The noise levels from road traffic are provided by the City of Ottawa, taking into consideration the right-of-way width and the implied roadway classification. It is understood that these values represent the maximum allowable capacity of the proposed roadways. The parameters to be used for sound level predictions can be found below.

Table 4 – Traffic and Road Parameters

Segment	Roadway Classification	AADT Veh/Day	Speed Limit (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Vanier Parkway	4-UAD	35000	60	92/8	7	5
McArthur Avenue	2-UAU	15000	50	92/8	7	5
➢ Data obtained from the City of Ottawa document ENCG						

Three (3) levels of reception points were selected for this analysis. The following elevations were selected from the heights provided on the survey plan for the subject building addition.

Table 5 – Elevations of Reception Points			
Floor Number	**Elevation at Centre of Window (m)**	**Floor Use**	**Daytime / Nighttime Analysis**
First Floor	1.5	Living Area/Bedroom	Daytime / Nighttime
Twentieth Floor	58.5	Living Area/Bedroom	Daytime / Nighttime
Eighth Floor Rooftop Terrace	25.5	Outdoor Living Area	Daytime / Nighttime

For this analysis, a reception point was taken at the centre of each floor, at the first floor and top floor. An Outdoor Living Area - terrace is anticipated at eighth floor rooftop of the proposed building. A reception point in the centre of eighth floor rooftop terrace, 25.5 m high, was selected for the analysis of this area. Reception points are detailed on Drawing PG5944-2 - Receptor Locations presented in Appendix 1.

All horizontal distances have been measured from the reception point to the edge of the right-of-way. The roadway was analyzed where it intersected the 100 m buffer zone, which is reflected in the local angles described in Paterson Drawings PG5944-3A to 3I - Site Geometry in Appendix 1.

Table 7 - Summary of Reception Points and Geometry, located in Appendix 1, provides a summary of the points of reception and their geometry with respect to the noise sources. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENGC.

The subject site is relatively level and at grade with the neighbouring roads within 100 m radius.

The analysis was completed using STAMSON version 5.04, a computer program which uses the road and rail traffic noise prediction methods using ORNAMENT (Ontario Road Noise Analysis Method for Environment and Transportation) and STEAM (Sound from Trains Environment Analysis Method), publications from the Ontario Ministry of Environment and Energy.

5.0 Results

Surface Transportation Noise

The primary descriptors are the 16-hour daytime (7:00-23:00) and the 8-hour nighttime (23:00-7:00) equivalent sound levels, $L_{eq(16)}$ and $L_{eq(8)}$ for City roads.

The exterior noise levels due to roadway traffic sources were analyzed with the STAMSON version 5.04 software at all reception points. The input and output data of the STAMSON modeling can be found in Appendix 2, and the summary of the results can be found in Table 6.

Table 6: Exterior Noise Levels due to Roadway Traffic Sources

Reception Point	Height Above Grade (m)	Receptor Location	Daytime $L_{eq(16)}$ (dBA)	Nighttime $L_{eq(8)}$ (dBA)
REC 1-1	1.5	Northern Elevation, 1st Floor	50	43
REC 1-20	58.5	Northern Elevation, 20th Floor	56	48
REC 2-1	1.5	Eastern Elevation, 1st Floor	55	47
REC 2-20	58.5	Eastern Elevation, 20th Floor	60	52
REC 3-1	1.5	Southern Elevation, 1st Floor	55	48
REC 3-20	58.5	Southern Elevation, 20th Floor	60	52
REC 4-1	1.5	Western Elevation, 1st Floor	50	43
REC 4-20	58.5	Western Elevation, 20th Floor	57	49
REC 5	25.5	OLA – 8th Floor Rooftop Terrace	61	N/A*

*Nighttime noise levels at OLA are not considered as per ENCG

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

There is a rooftop terrace that will serve as an Outdoor Living Area (OLA). One (1) receptor point (REC 5) was selected in the centre of eighth floor rooftop of proposed building. It is assumed that the rooftop terrace will only be utilized as an Outdoor Living Area (OLA) provided that the proposed building is constructed. The noise levels at the rooftop terrace will be 61 dBA during the daytime period (7:00-23:00), which exceed the 55 dBA threshold value specified by the ENCG.

Investigation has been made for the application of exterior cladding, including the 1 m solid railing around the perimeter of the rooftop terrace, to provide noise relief to the rooftop terrace. The results of STAMSON modeling indicate that the application of exterior cladding at the perimeter of the building could reduce the anticipated noise levels at rooftop terrace to 56 dBA during the daytime period (7:00-23:00). This exceedance in noise levels is considered acceptable provided that a Warning Clause Type A is provided on all deeds of sale.

6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicate that the noise levels will range between 50 dBA and 60 dBA during the daytime period (07:00-23:00) and between 43 dBA and 52 dBA during the nighttime period (23:00-7:00). The noise levels on the northern, eastern, southern, and western elevations will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. Therefore, all units of this building should be designed with the provision for adding a central air conditioning unit, along with the warning clause Type C, as outlined in Table 3. It is also noted that the results of STAMSON modeling indicate that the noise levels will be below 65 dBA, and therefore standard building materials are acceptable to provide adequate soundproofing.

7.0 Summary of Findings

The subject site is located at 337 Montgomery Street, in the City of Ottawa. It is understood that the proposed development will consist of twenty (20) storey apartment building and rise approximately 60 metres above grade. There are two major sources of surface transportation noise to the proposed building: Vanier Parkway and McArthur Avenue.

Several reception points were selected for the surface transportation noise analysis, consisting of the centre of first level and top level. The results of STAMSON modeling indicate that the northern, eastern, southern, and western elevations of the proposed building are expected to exceed the 55 dBA threshold specified by the ENCG. Therefore, all units of the proposed building should be designed with the provision for adding a central air conditioning unit, along with a warning clause Type C. A review of the proposed building materials on the northern and eastern elevations will also need to be completed.

The surface transportation noise analysis was completed at the Outdoor Living Area – third floor rooftop terrace as well. The results of STAMSON modeling indicate that the noise levels at the rooftop terrace is expected to exceed 60 dBA during the daytime period. According to ENCG, noise control measures (barriers) are required to reduce the L_{eq} to 55 dBA where technically and administratively feasible. Investigation into application of the exterior cladding, including the 1 m solid railing around the perimeter of the rooftop terrace, found that the noise levels can be reduce to 56 dBA. This exceedance in noise level is considered acceptable provided that the warning clause Type A is included on all deeds of sale.

The following warning clause is to be included on all Offers of Purchase and Sale and/or lease agreements:

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

8.0 Statement of Limitations

The recommendations made in this report are in accordance with our present understanding of the project. Our recommendations should be reviewed when the project drawings and specifications are complete.

The present report applies only to the project described in this document. Use of this report for purposes other than those described herein or by person(s) other than SerCo Realty Group or their agent(s) is not authorized without review by this firm for the applicability of our recommendations to the altered use of the report.

Paterson Group Inc.

October 20, 2021

Yolanda Tang, M.Sc.Eng

Stephanie A. Boisvenue, P.Eng.

Report Distribution:

- ❑ SerCo Realty Group (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

TABLE 7 - SUMMARY OF RECEPTION POINTS AND GEOMETRY

DRAWING PG5944-1 - SITE PLAN

DRAWING PG5944-2 - RECEPTOR LOCATION PLAN

DRAWING PG5944-3 – SITE GEOMETRY

DRAWING PG5944-3A - SITE GEOMETRY (REC 1-1)

DRAWING PG5944-3B - SITE GEOMETRY (REC 1-20)

DRAWING PG5944-3C - SITE GEOMETRY (REC 2-1)

DRAWING PG5944-3D - SITE GEOMETRY (REC 2-20)

DRAWING PG5944-3E - SITE GEOMETRY (REC 3-1)

DRAWING PG5944-3F - SITE GEOMETRY (REC 3-20)

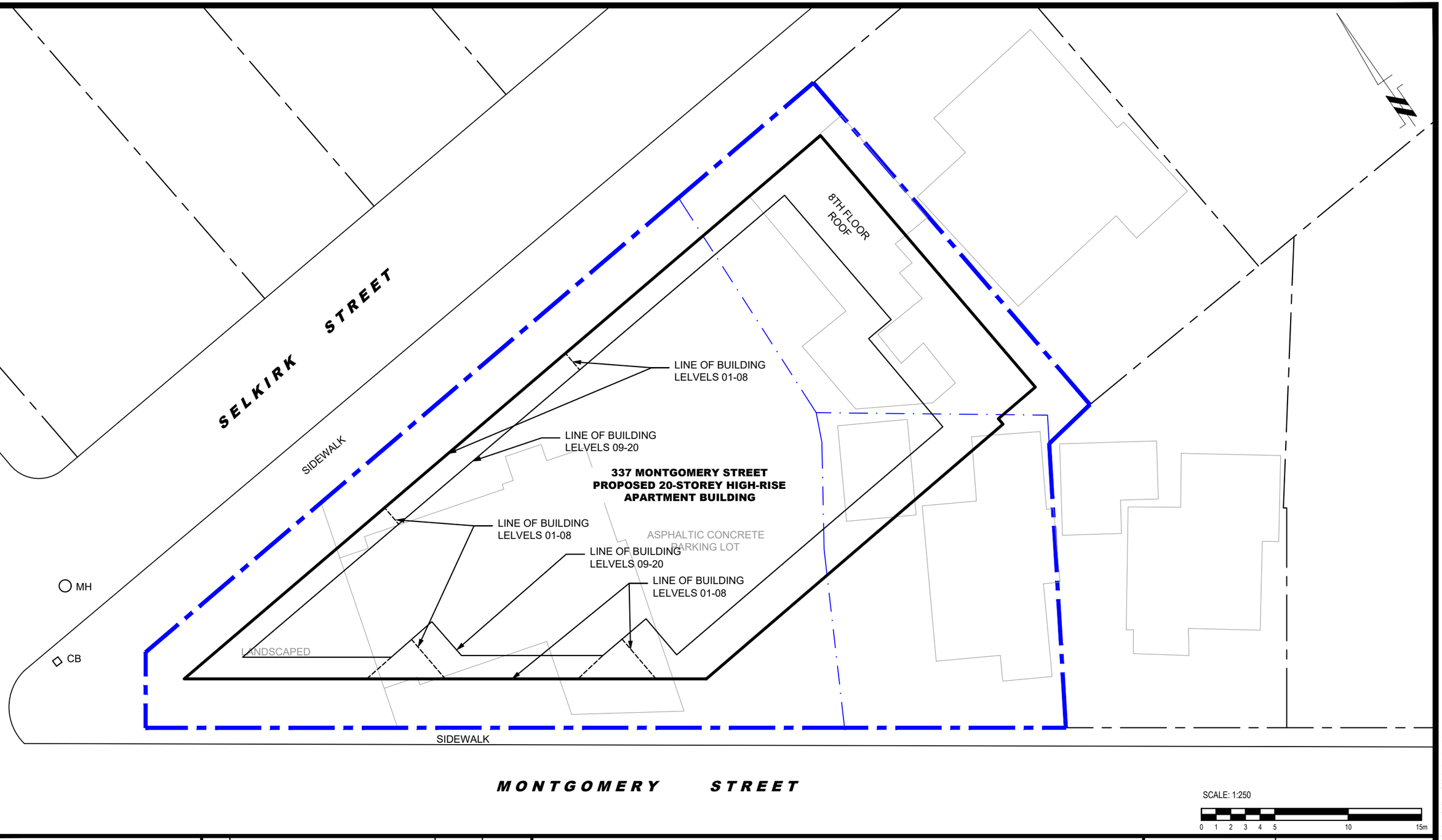
DRAWING PG5944-3G - SITE GEOMETRY (REC 4-1)

DRAWING PG5944-3H - SITE GEOMETRY (REC 4-20)

DRAWING PG5944-3I - SITE GEOMETRY (REC 5)

Table 7 - Summary of Reception Points and Geometry
337 Montgomery Street

Point of Reception	Location	Leq Day (dBA)	Vanier Parkway						McArthur Avenue					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Northern Elevation, 1st Floor	50	95	1.5	95.0	-43, 0	2	40	n/a	n/a	n/a	n/a	n/a	n/a
REC 1-20	Northern Elevation, 20th Floor	56	95	58.5	111.6	-43, 0	2	40	n/a	n/a	n/a	n/a	n/a	n/a
REC 2-1	Eastern Elevation, 1st Floor	55	85	1.5	85.0	-56, 38	2	40	85	1.5	85.0	-40, 0	2	40
REC 2-20	Eastern Elevation, 20th Floor	60	90	58.5	107.3	-52, 37	2	40	90	58.5	107.3	-42, 0	2	40
REC 3-1	Southern Elevation, 1st Floor	55	95	1.5	95.0	0, 31	1	20	80	1.5	80.0	-50, 49	1	20
REC 3-20	Southern Elevation, 20th Floor	60	100	58.5	115.9	0, 30	1	20	85	58.5	103.2	-50, 47	1	20
REC 4-1	Western Elevation, 1st Floor	50	n/a	n/a	n/a	n/a	n/a	n/a	85	1.5	85.0	-90, -6	1	20
REC 4-20	Western Elevation, 20th Floor	57	n/a	n/a	n/a	n/a	n/a	n/a	85	58.5	103.2	-90, -5	1	20
REC 5	8th Floor Rooftop Terrace	61	87	25.5	90.7	-55, 38	2	40	87	25.5	90.7	-41, 27	1	20



SCALE: 1:250

0 1 2 3 4 5 10 15m

patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

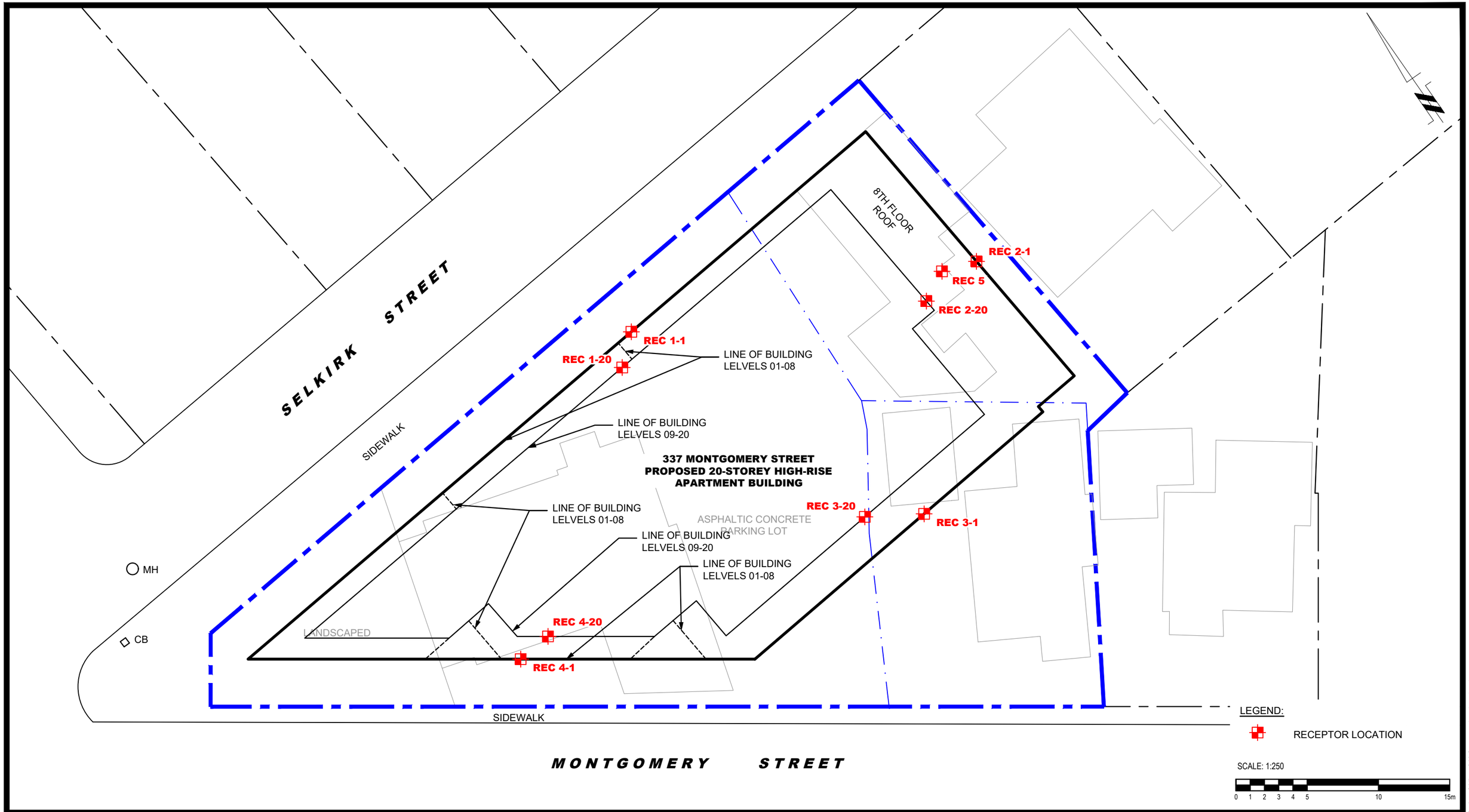
OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-1
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-1-site plan.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

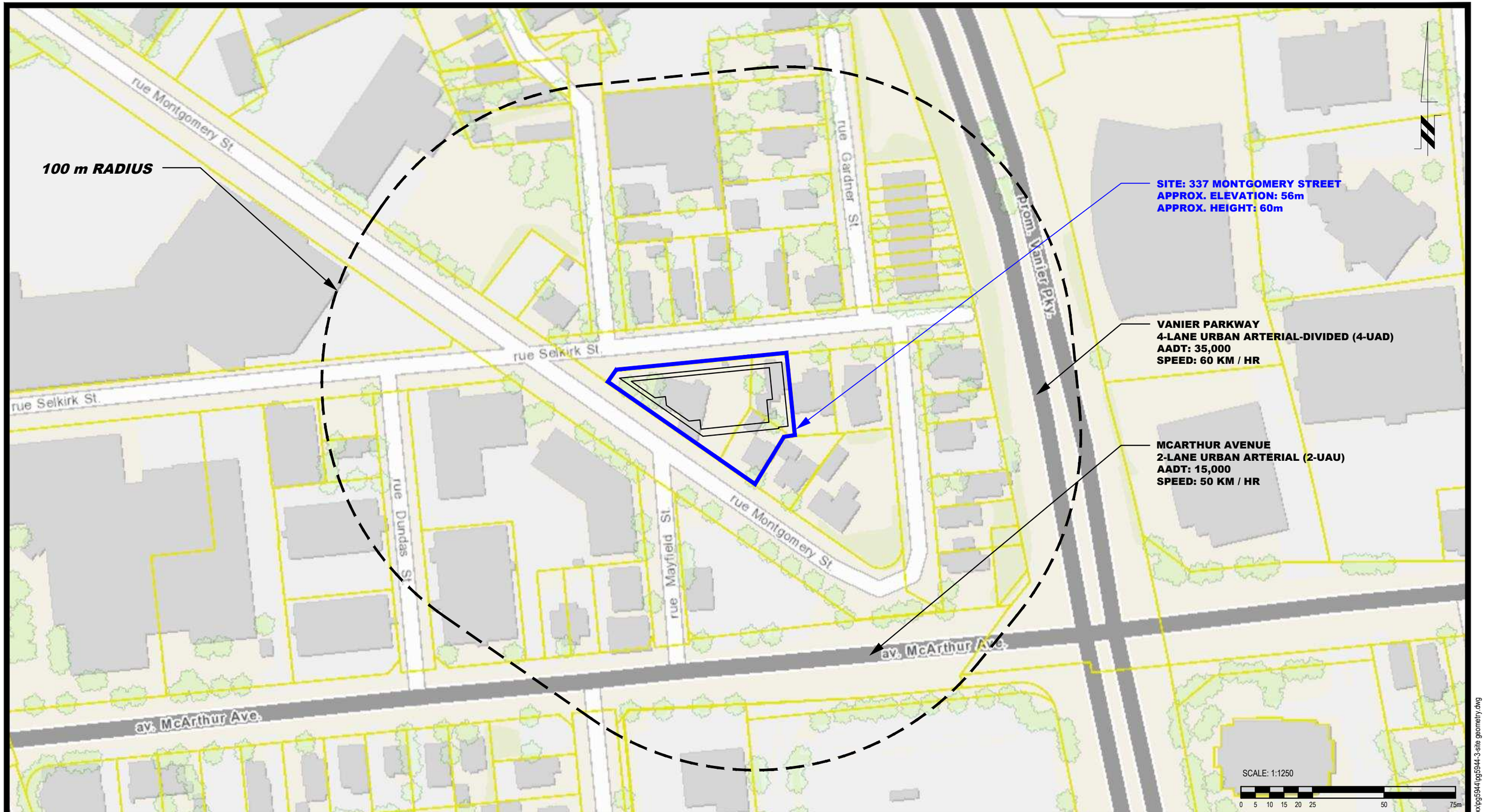
OTTAWA, ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-2
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-2-receptor location plan.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

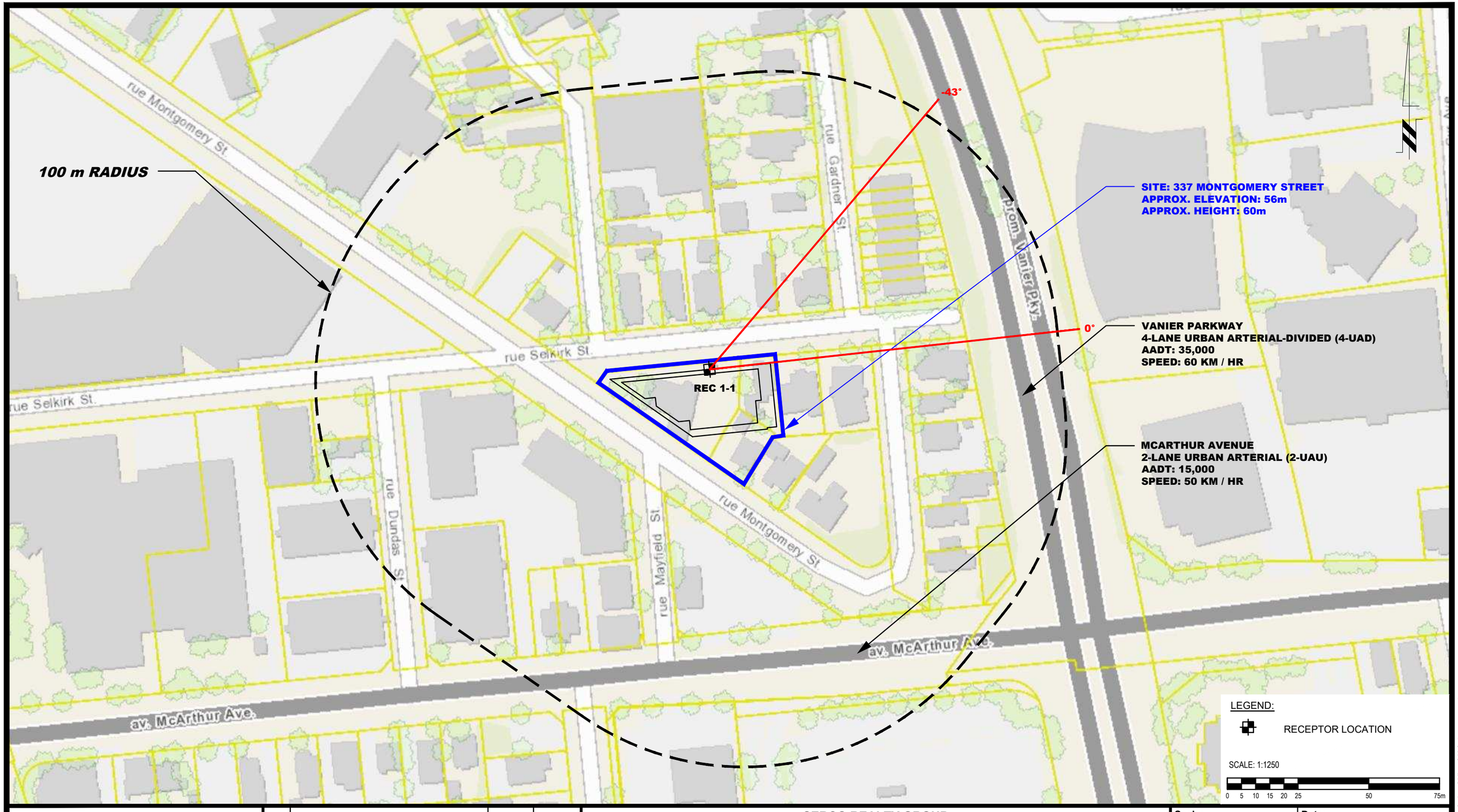
OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

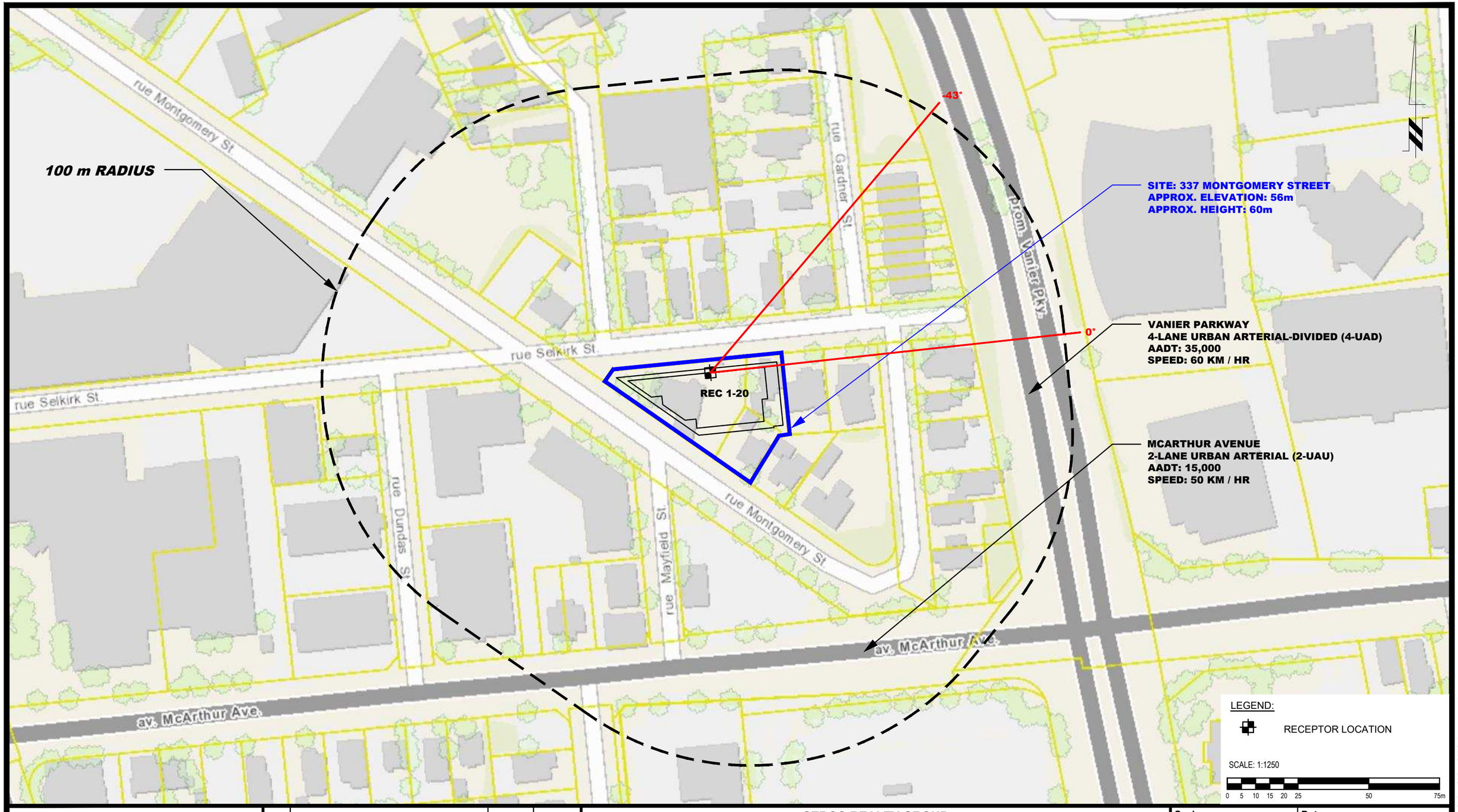
NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 1-1

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3A
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

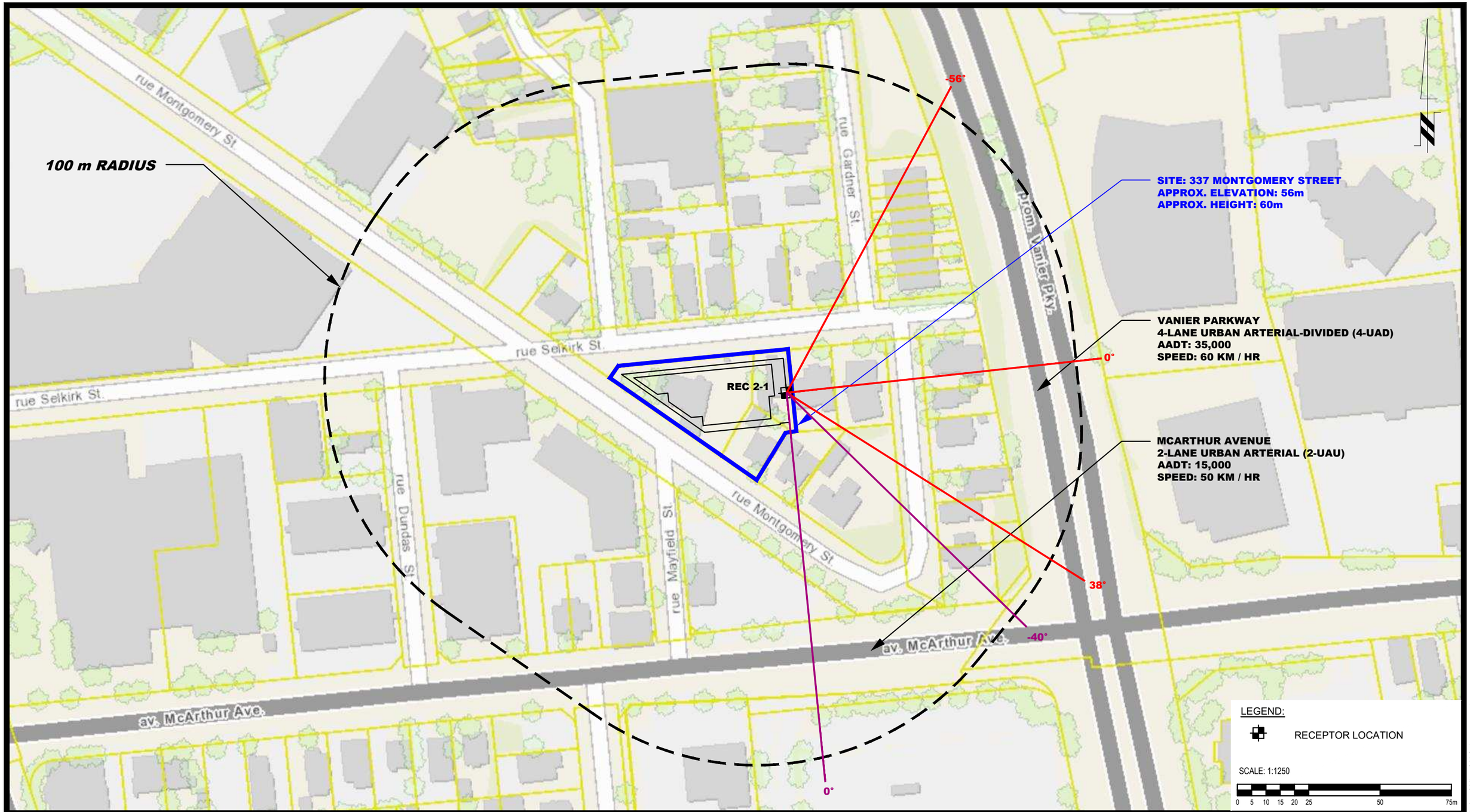
NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 1-20

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3B
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

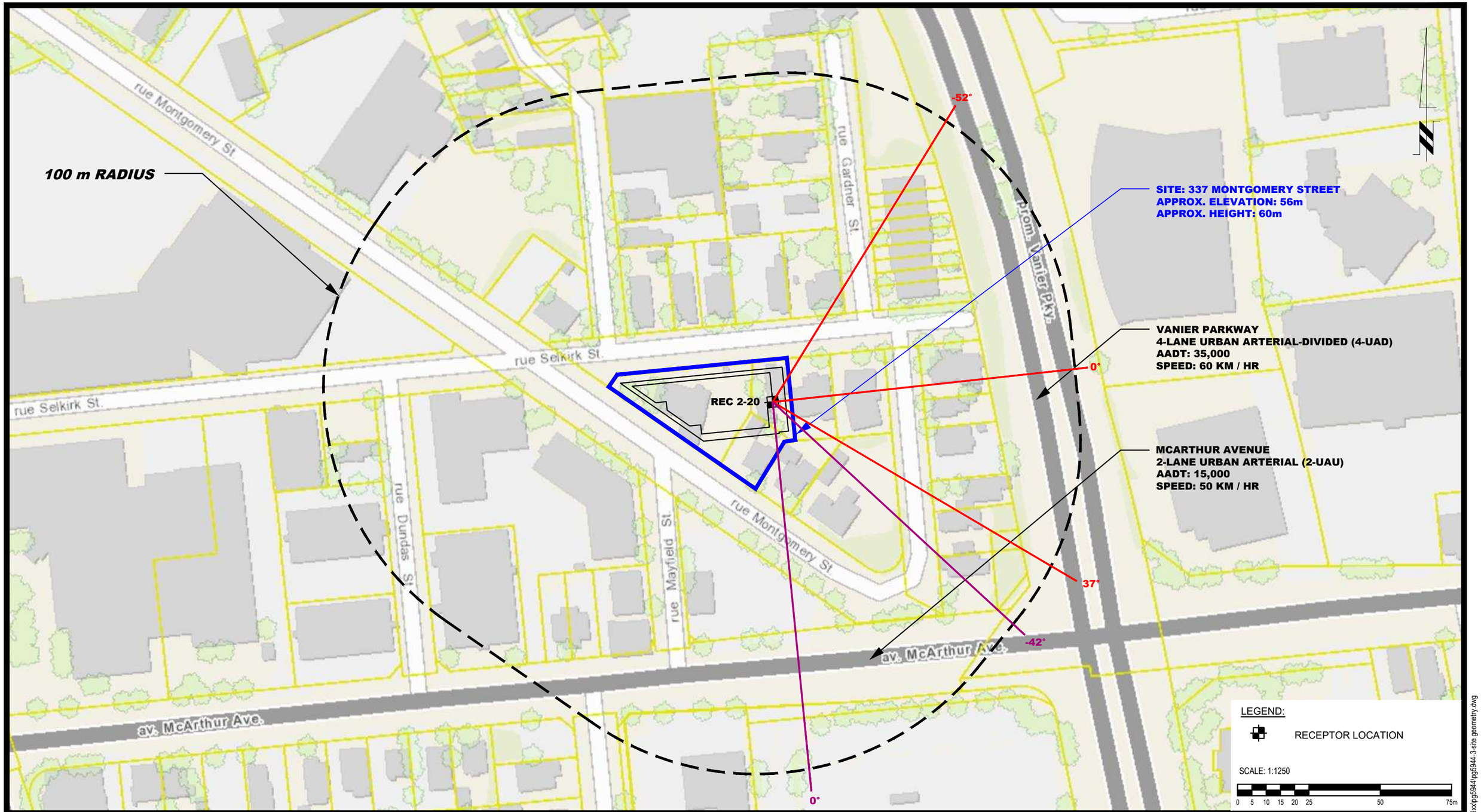
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 2-1

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3C
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

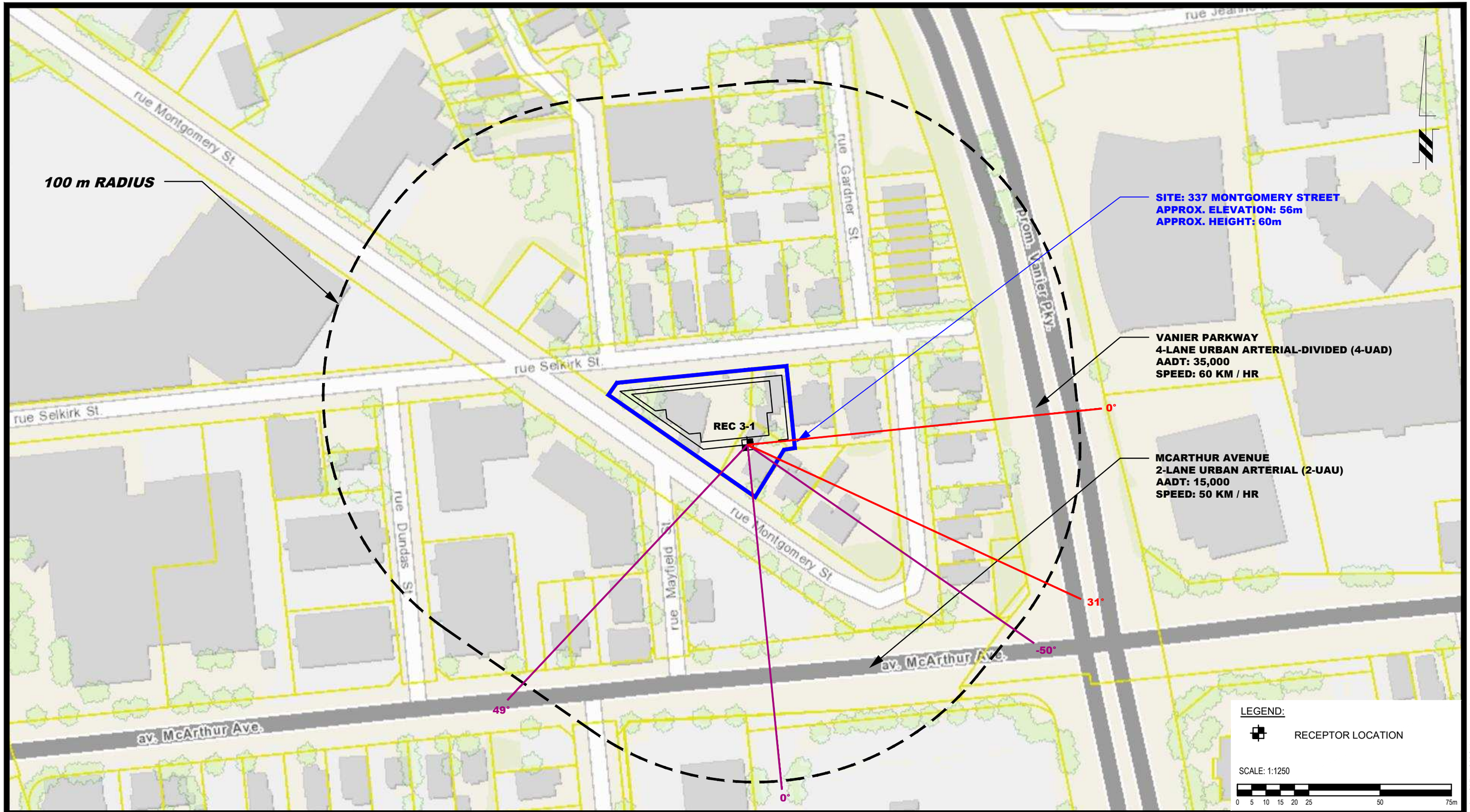
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 2-20

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3D
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

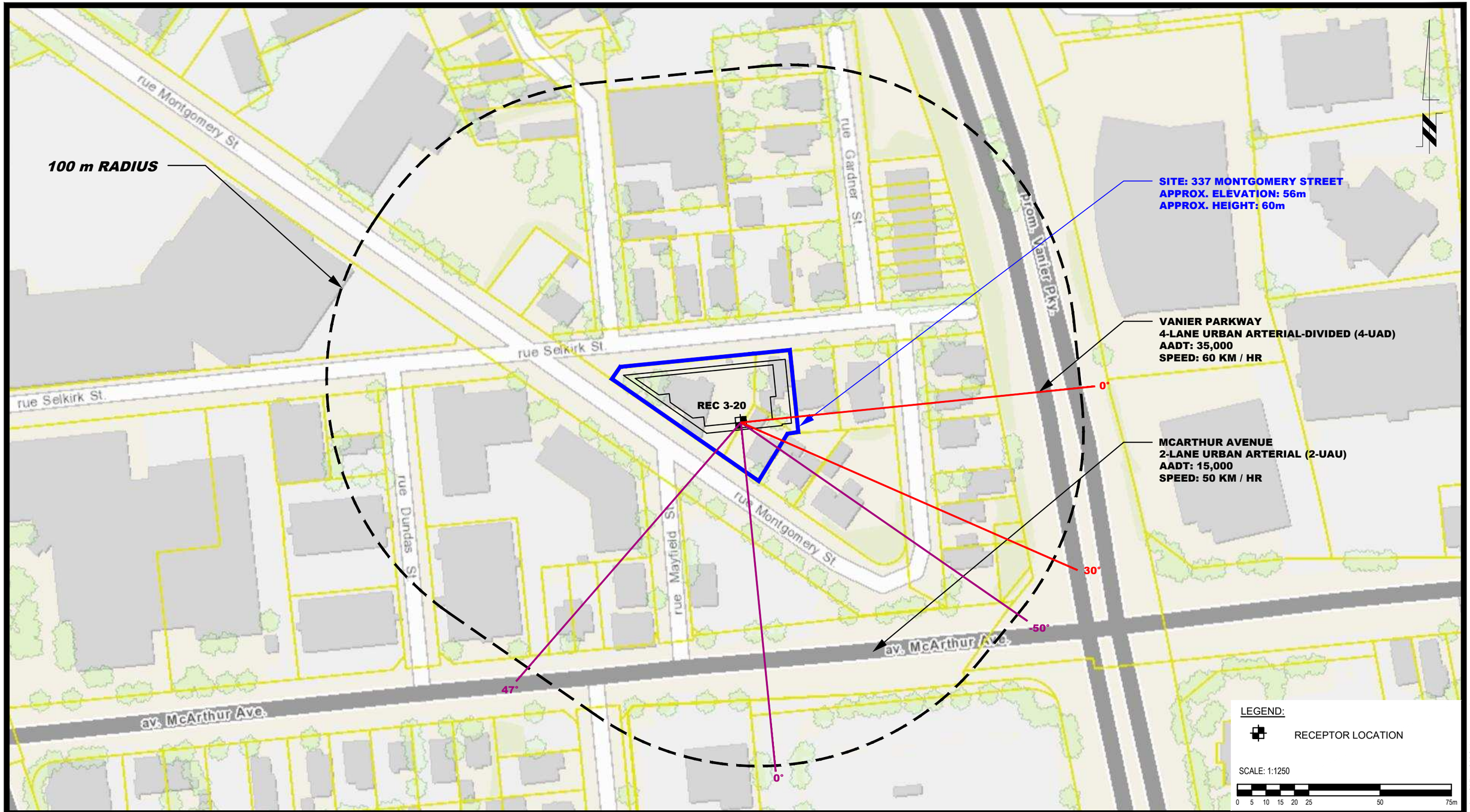
NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 3-1

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3E
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

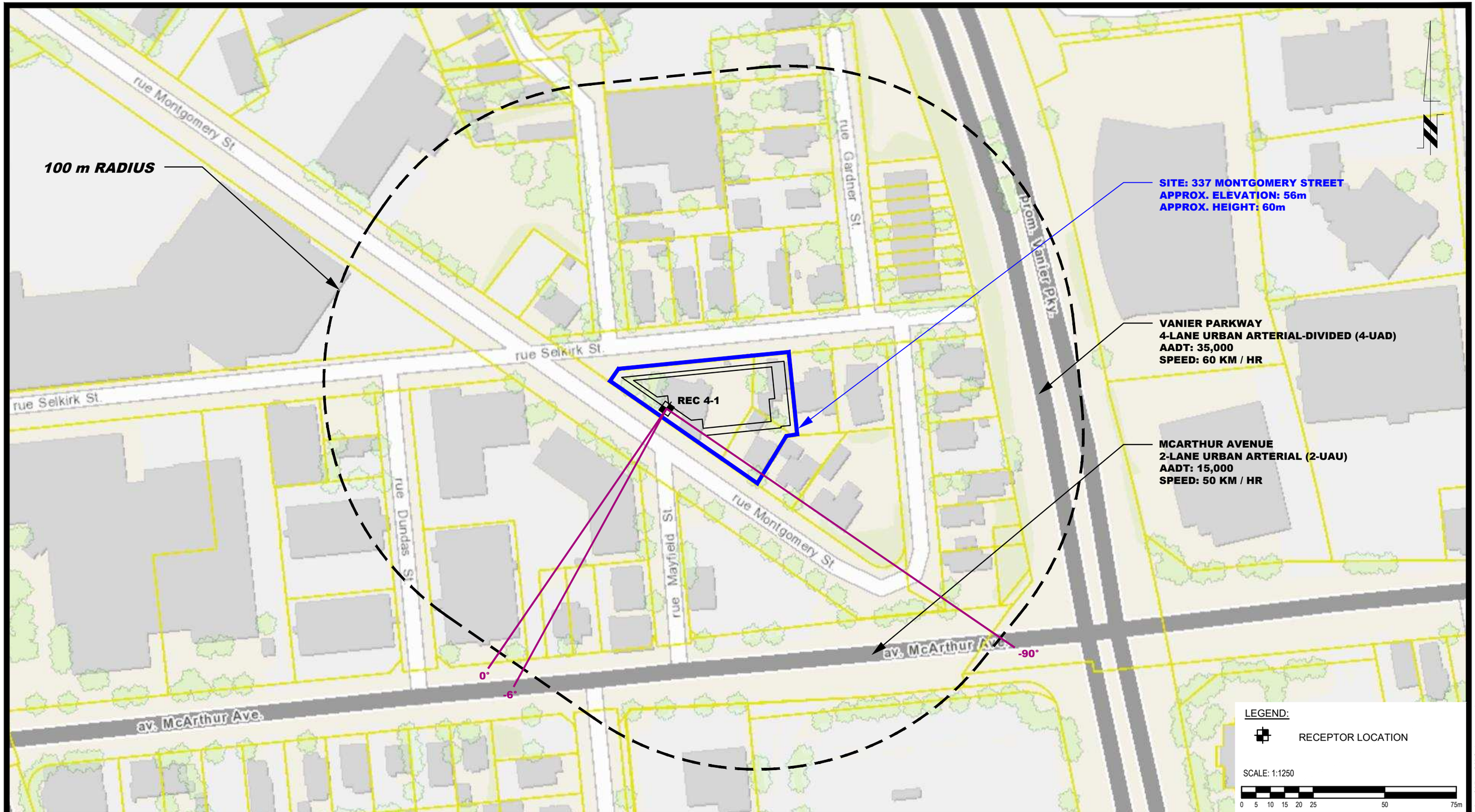
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 3-20

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3F
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

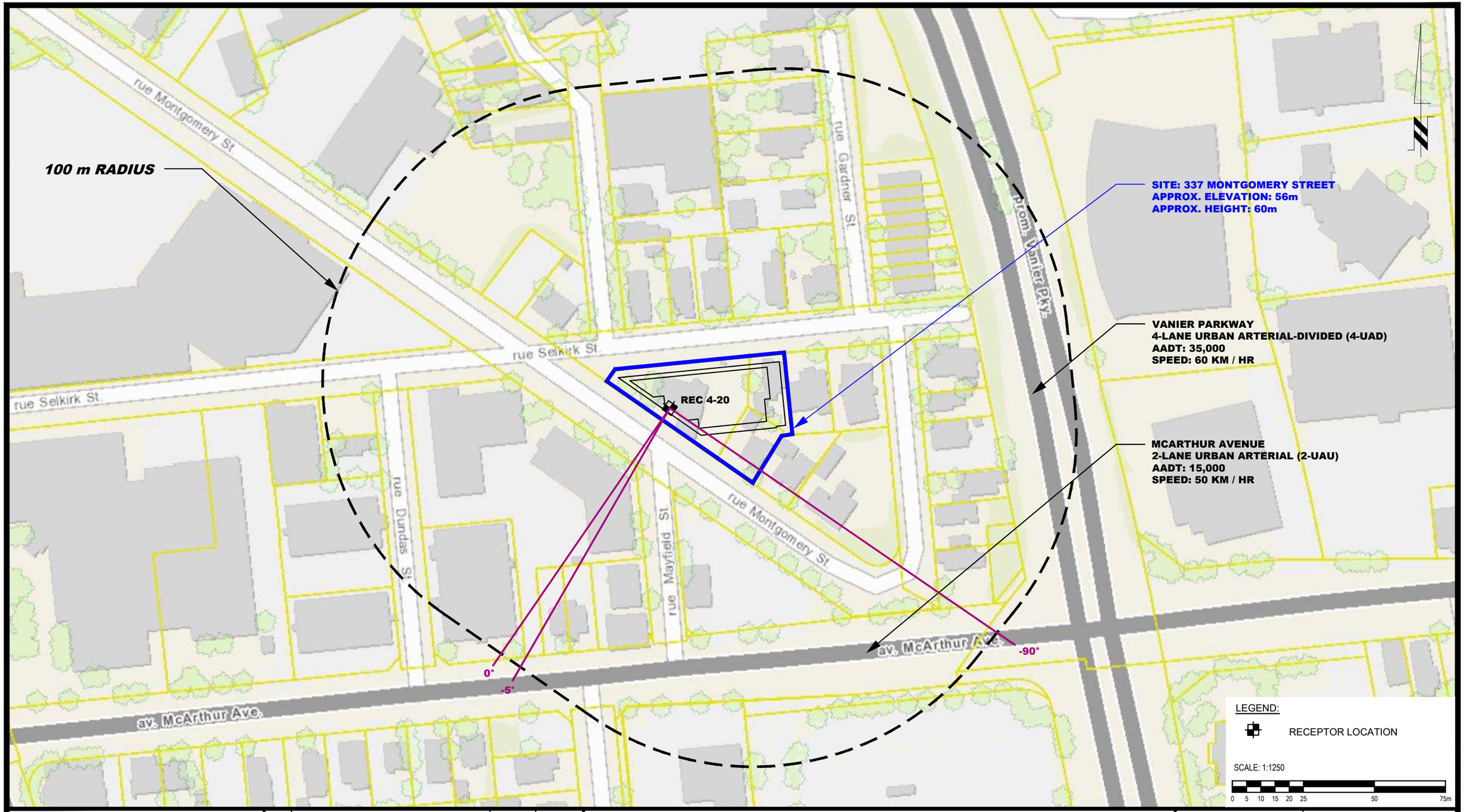
NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:
SITE GEOMETRY - REC 4-1

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3G
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

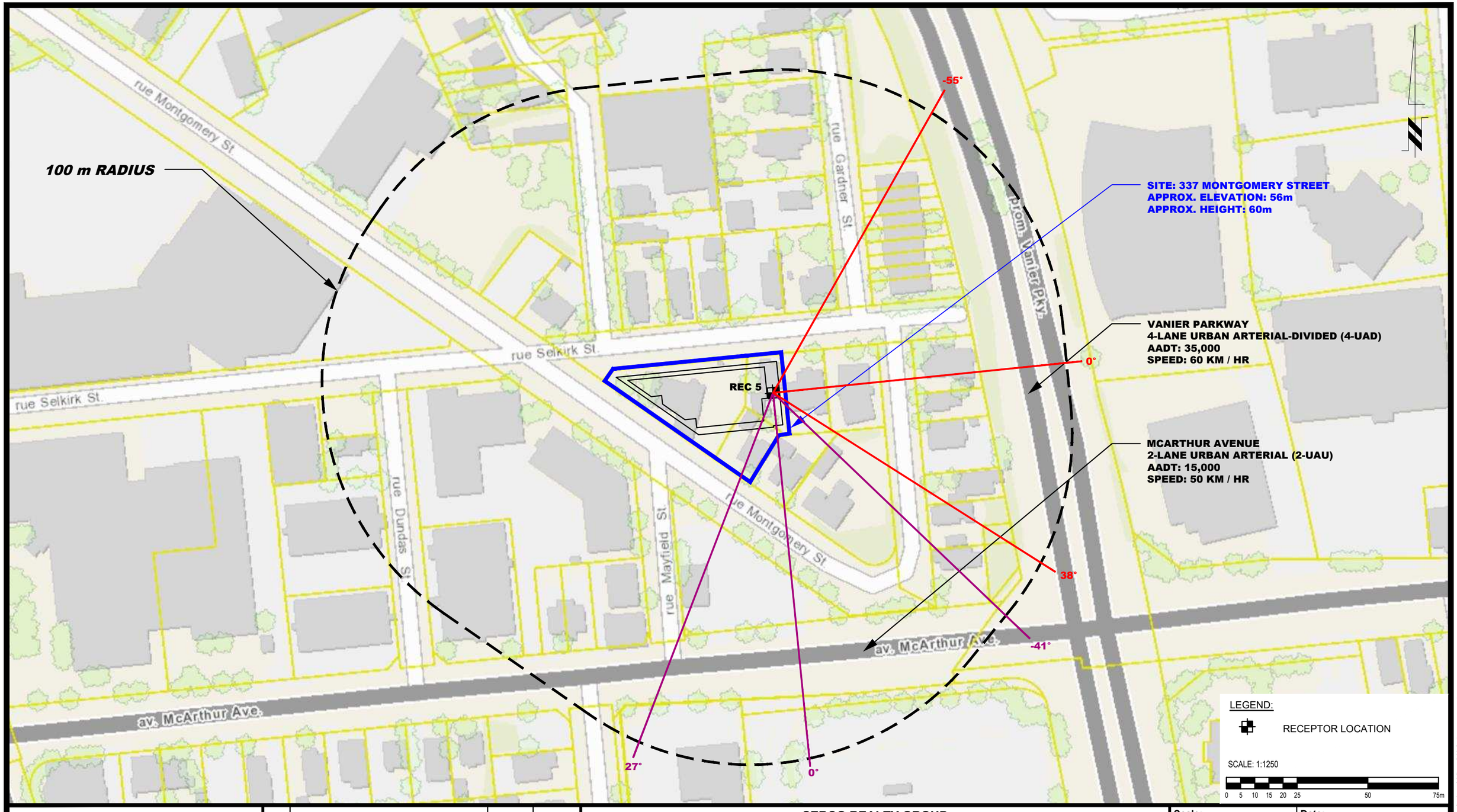
SERCO REALTY GROUP
NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET
OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 4-20

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3H
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg



patersongroup
consulting engineers

154 Colonnade Road South
Ottawa, Ontario K2E 7J5
Tel: (613) 226-7381 Fax: (613) 226-6344

NO.	REVISIONS	DATE	INITIAL

SERCO REALTY GROUP

NOISE ATTENUATION STUDY
PROPOSED 20-STOREY HIGH-RISE APARTMENT BUILDING
337 MONTGOMERY STREET

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 5

Scale: 1:1250	Date: 08/2021
Drawn by: YA	Report No.: PG5944-1
Checked by: YT	Dwg. No.: PG5944-3I
Approved by: SB	Revision No.:

p:\autocad drawings\geotechnical\pg59xx\pg5944\pg5944-3-site geometry.dwg

APPENDIX 2

STAMSON RESULTS

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 08:53:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-1

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -43.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Vanier Pkwy (day)

Source height = 1.50 m

ROAD (0.00 + 50.37 + 0.00) = 50.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.66	73.68	0.00	-13.31	-6.50	0.00	-3.50	0.00	50.37

Segment Leq : 50.37 dBA

Total Leq All Segments: 50.37 dBA

↟
Results segment # 1: Vanier Pkwy (night)

Source height = 1.50 m

ROAD (0.00 + 42.78 + 0.00) = 42.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.66	66.08	0.00	-13.31	-6.50	0.00	-3.50	0.00	42.78

Segment Leq : 42.78 dBA

Total Leq All Segments: 42.78 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 50.37
(NIGHT): 42.78

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 08:56:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec120.te Time Period: Day/Night 16/8 hours
Description: Reception Point 1-20

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -43.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 58.50 / 58.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Vanier Pkwy (day)

Source height = 1.50 m

ROAD (0.00 + 55.94 + 0.00) = 55.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.00	73.68	0.00	-8.02	-6.22	0.00	-3.50	0.00	55.94

Segment Leq : 55.94 dBA

Total Leq All Segments: 55.94 dBA

↟
Results segment # 1: Vanier Pkwy (night)

Source height = 1.50 m

ROAD (0.00 + 48.34 + 0.00) = 48.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-43	0	0.00	66.08	0.00	-8.02	-6.22	0.00	-3.50	0.00	48.34

Segment Leq : 48.34 dBA

Total Leq All Segments: 48.34 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 55.94
(NIGHT): 48.34
↟
↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 09:10:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec21.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-1

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -56.00 deg 38.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -40.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     40 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Vanier Pkwy (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 54.48 + 0.00) = 54.48 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -56     38   0.66  73.68   0.00 -12.51  -3.20   0.00  -3.50   0.00  54.48
-------------------------------------------------------------------------------

Segment Leq : 54.48 dBA

↟
Results segment # 2: McArthur Ave (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 45.70 + 0.00) = 45.70 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -40      0   0.66  68.48   0.00 -12.51  -6.77   0.00  -3.50   0.00  45.70
-------------------------------------------------------------------------------

Segment Leq : 45.70 dBA

Total Leq All Segments: 55.02 dBA

↟
Results segment # 1: Vanier Pkwy (night)
```

Source height = 1.50 m

ROAD (0.00 + 46.88 + 0.00) = 46.88 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-56	38	0.66	66.08	0.00	-12.51	-3.20	0.00	-3.50	0.00	46.88

Segment Leq : 46.88 dBA

↟

Results segment # 2: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 38.11 + 0.00) = 38.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-40	0	0.66	60.88	0.00	-12.51	-6.77	0.00	-3.50	0.00	38.11

Segment Leq : 38.11 dBA

Total Leq All Segments: 47.42 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 55.02
(NIGHT): 47.42

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 09:16:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec220.te Time Period: Day/Night 16/8 hours
Description: Reception Point 2-20

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -52.00 deg 37.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 58.50 / 58.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -42.00 deg   0.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      2 / 2
House density             :     40 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  90.00 / 90.00  m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Vanier Pkwy (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 59.34 + 0.00) = 59.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -52     37   0.00  73.68   0.00  -7.78  -3.06   0.00  -3.50   0.00  59.34
-------------------------------------------------------------------------------

Segment Leq : 59.34 dBA

↟
Results segment # 2: McArthur Ave (day)
-----------------------------------

Source height = 1.50 m

ROAD (0.00 + 50.88 + 0.00) = 50.88 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -42      0   0.00  68.48   0.00  -7.78  -6.32   0.00  -3.50   0.00  50.88
-------------------------------------------------------------------------------

Segment Leq : 50.88 dBA

Total Leq All Segments: 59.92 dBA

↟
Results segment # 1: Vanier Pkwy (night)
```

Source height = 1.50 m

ROAD (0.00 + 51.74 + 0.00) = 51.74 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-52	37	0.00	66.08	0.00	-7.78	-3.06	0.00	-3.50	0.00	51.74

Segment Leq : 51.74 dBA

↟

Results segment # 2: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 43.28 + 0.00) = 43.28 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-42	0	0.00	60.88	0.00	-7.78	-6.32	0.00	-3.50	0.00	43.28

Segment Leq : 43.28 dBA

Total Leq All Segments: 52.32 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 59.92
(NIGHT): 52.32

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 09:35:17
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec31.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-1

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : 0.00 deg 31.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 95.00 / 95.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟
Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -50.00 deg   49.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  80.00 / 80.00  m
Receiver height           :   1.50 / 1.50   m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Vanier Pkwy (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 51.69 + 0.00) = 51.69 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     31   0.66  73.68   0.00 -13.31  -7.78   0.00  -0.90   0.00  51.69
-------------------------------------------------------------------------------

Segment Leq : 51.69 dBA

↟
Results segment # 2: McArthur Ave (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 52.54 + 0.00) = 52.54 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -50     49   0.66  68.48   0.00 -12.07  -2.97   0.00  -0.90   0.00  52.54
-------------------------------------------------------------------------------

Segment Leq : 52.54 dBA

Total Leq All Segments: 55.15 dBA

↟
Results segment # 1: Vanier Pkwy (night)
```

Source height = 1.50 m

ROAD (0.00 + 44.09 + 0.00) = 44.09 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	31	0.66	66.08	0.00	-13.31	-7.78	0.00	-0.90	0.00	44.09

Segment Leq : 44.09 dBA

↟

Results segment # 2: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 44.95 + 0.00) = 44.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	49	0.66	60.88	0.00	-12.07	-2.97	0.00	-0.90	0.00	44.95

Segment Leq : 44.95 dBA

Total Leq All Segments: 47.55 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 55.15
(NIGHT): 47.55

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 09:38:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec320.te Time Period: Day/Night 16/8 hours
Description: Reception Point 3-20

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : 0.00 deg 30.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 58.50 / 58.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -50.00 deg   47.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  85.00 / 85.00  m
Receiver height           :  58.50 / 58.50  m
Topography                :      1       (Flat/gentle slope; no barrier)
Reference angle           :   0.00

↟
Results segment # 1: Vanier Pkwy (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 56.76 + 0.00) = 56.76 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
     0     30   0.00  73.68   0.00  -8.24  -7.78   0.00  -0.90   0.00  56.76
-------------------------------------------------------------------------------

Segment Leq : 56.76 dBA

↟
Results segment # 2: McArthur Ave (day)
---------------------------------------

Source height = 1.50 m

ROAD (0.00 + 57.36 + 0.00) = 57.36 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -50     47   0.00  68.48   0.00  -7.53  -2.69   0.00  -0.90   0.00  57.36
-------------------------------------------------------------------------------

Segment Leq : 57.36 dBA

Total Leq All Segments: 60.08 dBA

↟
Results segment # 1: Vanier Pkwy (night)
```

Source height = 1.50 m

ROAD (0.00 + 49.16 + 0.00) = 49.16 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	30	0.00	66.08	0.00	-8.24	-7.78	0.00	-0.90	0.00	49.16

Segment Leq : 49.16 dBA

↟

Results segment # 2: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 49.77 + 0.00) = 49.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-50	47	0.00	60.88	0.00	-7.53	-2.69	0.00	-0.90	0.00	49.77

Segment Leq : 49.77 dBA

Total Leq All Segments: 52.49 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 60.08
(NIGHT): 52.49

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 10:10:33
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec41.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-1

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

Angle1 Angle2 : -90.00 deg -6.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟
Results segment # 1: McArthur Ave (day)

Source height = 1.50 m

ROAD (0.00 + 50.18 + 0.00) = 50.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.66	68.48	0.00	-12.51	-4.89	0.00	-0.90	0.00	50.18

Segment Leq : 50.18 dBA

Total Leq All Segments: 50.18 dBA

↟
Results segment # 1: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 42.59 + 0.00) = 42.59 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-6	0.66	60.88	0.00	-12.51	-4.89	0.00	-0.90	0.00	42.59

Segment Leq : 42.59 dBA

Total Leq All Segments: 42.59 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 50.18
(NIGHT): 42.59
↟
↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 10:12:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec420.te Time Period: Day/Night 16/8 hours
Description: Reception Point 4-20

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

Angle1 Angle2 : -90.00 deg -5.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 85.00 / 85.00 m
Receiver height : 58.50 / 58.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↑
Results segment # 1: McArthur Ave (day)

Source height = 1.50 m

ROAD (0.00 + 56.79 + 0.00) = 56.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-5	0.00	68.48	0.00	-7.53	-3.26	0.00	-0.90	0.00	56.79

Segment Leq : 56.79 dBA

Total Leq All Segments: 56.79 dBA

↟
Results segment # 1: McArthur Ave (night)

Source height = 1.50 m

ROAD (0.00 + 49.19 + 0.00) = 49.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-5	0.00	60.88	0.00	-7.53	-3.26	0.00	-0.90	0.00	49.19

Segment Leq : 49.19 dBA

Total Leq All Segments: 49.19 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 56.79
(NIGHT): 49.19
↟
↟

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 10:02:47
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -55.00 deg 38.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 87.00 / 87.00 m
Receiver height : 25.50 / 25.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 38.00 deg
Barrier height : 24.00 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 56.00 m
Receiver elevation : 56.00 m
Barrier elevation : 56.00 m
Reference angle : 0.00

↑
Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -41.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  87.00 / 87.00  m
Receiver height           :  25.50 / 25.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -41.00 deg   Angle2 : 27.00 deg
Barrier height            :  24.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :  56.00 m
Receiver elevation        :  56.00 m
Barrier elevation         :  56.00 m
Reference angle           :   0.00

♠
Results segment # 1: Vanier Pkwy (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 !       25.50 !       24.12 !        80.12

ROAD (0.00 + 59.67 + 0.00) = 59.67 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -55     38   0.00  73.68   0.00  -7.63  -2.87   0.00  -3.50   0.00  59.67
   -55     38   0.00  73.68   0.00  -7.63  -2.87   0.00   0.00  -4.94  58.24*
   -55     38   0.00  73.68   0.00  -7.63  -2.87   0.00   0.00   0.00  63.17
-------------------------------------------------------------------------------
```

 * Bright Zone !

Segment Leq : 59.67 dBA

↟
Results segment # 2: McArthur Ave (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	25.50	24.12	80.12

ROAD (0.00 + 55.72 + 0.00) = 55.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-41	27	0.00	68.48	0.00	-7.63	-4.23	0.00	-0.90	0.00	55.72
-41	27	0.00	68.48	0.00	-7.63	-4.23	0.00	0.00	-4.93	51.69*
-41	27	0.00	68.48	0.00	-7.63	-4.23	0.00	0.00	0.00	56.62

 * Bright Zone !

Segment Leq : 55.72 dBA

Total Leq All Segments: 61.14 dBA

↟
Results segment # 1: Vanier Pkwy (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	25.50	24.12	80.12

ROAD (0.00 + 52.08 + 0.00) = 52.08 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	38	0.00	66.08	0.00	-7.63	-2.87	0.00	-3.50	0.00	52.08
-55	38	0.00	66.08	0.00	-7.63	-2.87	0.00	0.00	-4.94	50.64*

```
   -55     38   0.00  66.08   0.00  -7.63  -2.87   0.00   0.00   0.00  55.58
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 52.08 dBA

↟
Results segment # 2: McArthur Ave (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 !       25.50 !       24.12 !        80.12

ROAD (0.00 + 48.12 + 0.00) = 48.12 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     27   0.00  60.88   0.00  -7.63  -4.23   0.00  -0.90   0.00  48.12
   -41     27   0.00  60.88   0.00  -7.63  -4.23   0.00   0.00  -4.93  44.09*
   -41     27   0.00  60.88   0.00  -7.63  -4.23   0.00   0.00   0.00  49.02
-------------------------------------------------------------------------------

 * Bright Zone !

Segment Leq : 48.12 dBA

Total Leq All Segments: 53.55 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 61.14
                           (NIGHT): 53.55
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 13-08-2021 10:03:50
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec5tr.te Time Period: Day/Night 16/8 hours
Description: Reception Point 5tr

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

Car traffic volume : 28336/2464 veh/TimePeriod *
Medium truck volume : 2254/196 veh/TimePeriod *
Heavy truck volume : 1610/140 veh/TimePeriod *
Posted speed limit : 60 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): 35000
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: Vanier Pkwy (day/night)

Angle1 Angle2 : -55.00 deg 38.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 40 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 87.00 / 87.00 m
Receiver height : 25.50 / 25.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -55.00 deg Angle2 : 38.00 deg
Barrier height : 25.00 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 56.00 m
Receiver elevation : 56.00 m
Barrier elevation : 56.00 m
Reference angle : 0.00

↑
Road data, segment # 2: McArthur Ave (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: McArthur Ave (day/night)
-----------------------------------------------
Angle1   Angle2           : -41.00 deg   27.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      1 / 1
House density             :     20 %
Surface                   :      1       (Absorptive ground surface)
Receiver source distance  :  87.00 / 87.00  m
Receiver height           :  25.50 / 25.50  m
Topography                :      2       (Flat/gentle slope; with barrier)
Barrier angle1            : -41.00 deg   Angle2 : 27.00 deg
Barrier height            :  25.00 m
Barrier receiver distance :   5.00 / 5.00   m
Source elevation          :  56.00 m
Receiver elevation        :  56.00 m
Barrier elevation         :  56.00 m
Reference angle           :   0.00

↟
Results segment # 1: Vanier Pkwy (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 !       25.50 !       24.12 !        80.12

ROAD (0.00 + 55.39 + 0.00) = 55.39 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -55     38   0.00  73.68   0.00  -7.63  -2.87   0.00  -3.50   0.00  59.67
   -55     38   0.00  73.68   0.00  -7.63  -2.87   0.00   0.00  -7.79  55.39
-------------------------------------------------------------------------------
```

Segment Leq : 55.39 dBA

↟
Results segment # 2: McArthur Ave (day)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	25.50	24.12	80.12

ROAD (0.00 + 48.69 + 0.00) = 48.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-41	27	0.00	68.48	0.00	-7.63	-4.23	0.00	-0.90	0.00	55.72
-41	27	0.00	68.48	0.00	-7.63	-4.23	0.00	0.00	-7.93	48.69

Segment Leq : 48.69 dBA

Total Leq All Segments: 56.23 dBA

↟
Results segment # 1: Vanier Pkwy (night)

Source height = 1.50 m

Barrier height for grazing incidence

Source Height (m)	Receiver Height (m)	Barrier Height (m)	Elevation of Barrier Top (m)
1.50	25.50	24.12	80.12

ROAD (0.00 + 47.79 + 0.00) = 47.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-55	38	0.00	66.08	0.00	-7.63	-2.87	0.00	-3.50	0.00	52.08
-55	38	0.00	66.08	0.00	-7.63	-2.87	0.00	0.00	-7.79	47.79

Segment Leq : 47.79 dBA

↟
Results segment # 2: McArthur Ave (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 !       25.50 !       24.12 !        80.12

ROAD (0.00 + 41.09 + 0.00) = 41.09 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -41     27   0.00  60.88   0.00  -7.63  -4.23   0.00  -0.90   0.00  48.12
   -41     27   0.00  60.88   0.00  -7.63  -4.23   0.00   0.00  -7.93  41.09
-------------------------------------------------------------------------------

Segment Leq : 41.09 dBA

Total Leq All Segments: 48.63 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 56.23
                           (NIGHT): 48.63
↟
↟
```