PATERSON GROUP

Environmental Noise Control Study
Proposed Residential Development

3317 Navan Road
Ottawa, Ontario

Prepared for Renfoe Land Management

Report PG6556-1 Revision 1 dated October 20, 2023

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1.0 Introduction

Paterson Group (Paterson) was commissioned by Renfoe Land Management to conduct an environmental noise control study for the proposed residential development at 3317 Navan Road, in the City of Ottawa, Ontario.

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).

- 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 the Ontario Ministry of the Environment Guideline NPC-300.

2.0 Proposed Development

It is understood that the proposed development will consist of three (3) four storey residential buildings (Building A, Building B, Building C), each with one level of basement. The buildings will extend 13 m above grade. Each building will consist of 164 units. Associated walkways, driveways, and landscaped areas are further anticipated. Outdoor living areas - rooftop terraces at all three residential buildings, and a private at-grade amenity space at Building B were identified on the proposed site plan.

3.0 Methodology and Noise Assessment Criteria

The MOECC 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 NPC-300 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. The noise level limits of residential building are 45 dBA daytime and 40 dBA nighttime. 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.

When the noise levels are equal to or less than the specified criteria, no noise attenuation (control) measures are required.

When the exceedance of the recommended noise level limits is between 1 dBA and 5 dBA for outdoor living areas (55 dBA < Leq ≤ 60 dBA), the proposed development can be completed with no noise control measures incorporated into the site, but the prospective purchasers / tenants should be made aware by suitable Warning Clauses. When the exceedance of recommended noise level limits is more than 5 dBA for outdoor living areas (Leq > 60 dBA), noise control measures are required to reduce Leq to below 60 dBA and as close as 55 dBA as it is technically and economically feasible.

Noise attenuation (control) measures include any or all the following:

- Noise attenuation barrier
- Provisions for the installation of central air conditioning
- Central air conditioning
- Architectural components designed to provide additional acoustic insulation

In addition to the implementation of noise attenuation features, if required, the following Warning Clauses may be recommended to advise the prospective purchasers / tenants of affected units of potential environmental noise problem:

Table 3 – Warning Clauses for Outdoor Living Areas

Leq (dBA)	Warning Clause	Description
55 dBA < $L_{eq(16)}$ ≤ 60 dBA	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."
60 dBA < $L_{eq(16)}$	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."

- Clauses taken from section C8 Warning Clauses; Environmental Noise Guidelines for Stationary and Transportation Sources - NPC-300

Table 4 – Warning Clauses for Indoor Living Areas		
Leq (dBA)	**Warning Clause**	**Description**
55 dBA < $L_{eq(16)}$ ≤ 65 dBA 50 dBA < $L_{eq(8)}$ ≤ 60 dBA	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."
65 dBA < $L_{eq(16)}$ 60 dBA < $L_{eq(8)}$	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 existing Waste Connections of Canada – Ottawa Landfill is located south of the proposed development. The ENGCC states that any stationary noise sources located within 100 m of the development will need to be reviewed. It is noted that the Ottawa landfill is located further than 100 m away from the proposed residential development and therefore is not considered a stationary noise for the proposed development. 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 development is bordered to the north by residential dwellings, Glenlivet Avenue, Birkhill Place, and Cardoness Private. It is bordered to the east by undeveloped grassed area, residential dwellings, and Markinch Road. It is bordered to the south by Navan Road followed by an undeveloped grassed area and construction site. It is bordered to the west by a construction area, residential dwellings, Navan Road, Bon Temps Way, and Broadridge Crescent. Glenlivet Avenue, Birkhill Place, Cardoness Private, Markinch Road, Navan Road, Bon Temps Way, and Broadridge Crescent are identified within the 100 m radius of proposed residential development.

Based on the City of Ottawa's Official Plan, Schedule E, Navan Road is considered 4-lane urban arterial road (4-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 source of traffic noise is due to the Navan Road to the south of the proposed residential development.

All noise sources are presented in Drawing PG6556-1 – Site Plan located in Appendix 1.

The noise levels for 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 roadway. The parameters to be used for sound level predictions can be found below.

Table 5 – Traffic and Road Parameters

Segment	Roadway Classification	AADT Veh/Day	Speed Limit (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Navan Road	4-UAU	30,000	50	92/8	7	5

➢ Data obtained from the City of Ottawa document ENCG

The subject site is sloping down to the south and at grade with the neighbouring roads within the 100 m radius.

Four (4) levels of reception points were selected for this analysis. The following elevations were selected from assumed buildings heights.

Table 6 – 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
Fourth Floor	10.5	Living Area/Bedroom	Daytime / Nighttime
Rooftop Terrace	14.5	--	Outdoor Living Area
Private Amenity Space	1.5	--	Outdoor Living Area

For this analysis, a reception point was taken at the centre of each floor, at the first floor and top floor. Outdoor living areas – rooftop terraces at all three residential buildings, and a private at-grade amenity space at Building B are anticipated at the proposed development. Three receptors (REC 8, REC9, REC 10) were selected in the centre of rooftop terraces, 14.5 m. One receptor (REC 11) was selected in the centre of private amenity space. Reception points are detailed on Drawing PG6556-2 - 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 PG6556-3A to 3K - Site Geometry in Appendix 1.

Table 8 - 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 the building facade are considered, as stipulated by the ENGC.

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. The analysis is completed so that no effects of sound reflection off of the building facade are considered, as stipulated by the ENGC.

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 7.

Table 7: 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	Building C, East Elevation, 1st Floor	62	54
REC 1-4	10.5	Building C, East Elevation, 4th Floor	63	56
REC 2-1	1.5	Building C, South Elevation, 1st Floor	68	60
REC 2-4	10.5	Building C, South Elevation, 4th Floor	69	61
REC 3-1	1.5	Building C, West Elevation, 1st Floor	62	54
REC 3-4	10.5	Building C, West Elevation, 4th Floor	63	56
REC 4-1	1.5	Building B, South Elevation, 1st Floor	58	51
REC 4-4	10.5	Building B, South Elevation, 4th Floor	60	53
REC 5-1	1.5	Building B, West Elevation, 1st Floor	58	51
REC 5-4	10.5	Building B, West Elevation, 4th Floor	60	53
REC 6-1	1.5	Building A, South Elevation, 1st Floor	50	42
REC 6-4	10.5	Building A, South Elevation, 4th Floor	52	44
REC 7-1	1.5	Building A, West Elevation, 1st Floor	43	36
REC 7-4	10.5	Building A, West Elevation, 4th Floor	46	39
REC 8	14.5	Building A, Rooftop Terrace	55	--
REC 9	14.5	Building B, Rooftop Terrace	55	--
REC 10	14.5	Building C, Rooftop Terrace	56	--
REC 11	1.5	Building B, Private Amenity Space	61	--

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

Outdoor living areas – rooftop terraces at all three residential buildings, and a private at-grade amenity space at Building B are anticipated at the proposed development. Four (4) receptor points were selected for the analysis at outdoor living areas (REC 8 to REC 11). It is assumed that the rooftop terraces and the private amenity space will only be utilized as outdoor living areas provided that the proposed buildings are constructed. Utilizing the exteriors of proposed buildings as noise barriers, the proposed Leq(16) at the rooftop terraces of Building A and Building B will be 55 dBA, which are equal to the 55 dBA threshold value specified by the ENCG. Therefore, no noise attenuation feature is required. However, the noise level at the rooftop terrace of Building C will be 56 dBA, which slightly exceeds the 55 dBA threshold value specified by the ENCG. This exceedance is acceptable provided that Warning Clause A is included on all deeds of sale.

Utilizing the exteriors of proposed buildings as noise barriers, the proposed Leq(16) at the private amenity space at Building B will be 61 dBA, which exceeds the 55 dBA threshold value specified by the ENCG. Therefore, a noise attenuation feature will be required to reduce the noise level at this outdoor living area. A 2.5 m high acoustic fence (solid wooden fence with no gaps) is proposed to be located at the perimeter of amenity space. The analysis including the new noise barrier is presented as REC 11TR in Appendix 2. The result of STAMSON modeling indicates that the 2.5 m high noise barrier would reduce the anticipated noise level at amenity space to 55 dBA during the daytime period (7:00-23:00), which is equal to the 55 dBA threshold value specified by the ENCG. A figure indicating the placement of this noise attenuation feature can be found in Appendix 1, Drawing PG6556-4 Noise Barrier Plan. Therefore, further noise attenuation measure is not required.

6.2 Indoor Living Areas and Ventilation

The results of the STAMSON modeling indicate that the noise levels at proposed Building A will go up to 52 dBA during the daytime period (07:00-23:00) and 44 dBA during the nighttime period (23:00-07:00). The noise levels at proposed Building B will go up to 60 dBA during the daytime period (07:00-23:00) and 53 dBA during the nighttime period (23:00-07:00). The noise levels at proposed Building C will go up to 69 dBA during the daytime period (07:00-23:00) and 61 dBA during the nighttime period (23:00-07:00). It is noted that the noise levels at Building A are below the 55 dBA threshold. Therefore, no noise attenuation feature is required for Building A. The noise levels on the southern and western elevations of Building B and the eastern, southern, and western elevations of Building C will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. The noise level at the southern elevation of Building C will also exceed the 65 dBA threshold. Therefore, the units on the southern and western elevations of Building B should be designed with the provision of a central air conditioning unit, along with the warning clause Type C, as outlined in Table 4. Also, the units on the eastern, southern, and western elevations of Building C should be supplied with a central air conditioning unit, along with the warning clause Type D, as outlined in Table 4.

Building C does exceed the 65 dBA threshold for noise on the southern elevation. Therefore, an analysis of the building materials at Building C will be required. However, at this time the building materials and exterior wall construction details have not been finalized. Therefore, a review of the proposed building materials on the southern elevation will need to be completed.

Proposed Construction Specifications

It is understood that typical window and wall details are proposed for the residential buildings. The effectiveness of the noise insulation can be expressed as the Acoustical Insulation Factor (AIF), calculated as follows:

$$AIF = L_{eq(16)(Exterior)} - L_{eq(16)(Interior)} + 10\log_{10}(N) + 2 \text{ dBA}$$

Where:

$L_{eq(16)(Exterior)}$ = Calculated value at the window pane
$L_{eq(16)(Interior)}$ = 45 dBA
N = number of components in the room

No floor plans or detailed design drawings were provided for this portion of the review. A conservative approach is to assume that there are 2 components per room. Therefore, the AIF would need to be at least 29 dBA.

A conversion from AIF to a Standard Transmission Class (STC) rating will require the knowledge of room dimensions in addition to the wall and window dimensions. However, a conservative approach would be to increase the AIF factor by 3. **Therefore, provided the building materials of either the windows and/or exterior walls have an STC rating of 32 or higher, this would be a sufficient noise attenuation device.**

A review of industry standards for construction material indicates that, provided the exterior cladding of the southern elevation consist of brick or concrete panels and that all windows consist of double pane glass, these materials have an STC rating of greater than 32 and are considered acceptable. If alternative materials are to be utilized on the southern elevation, then a review will need to be completed once design details are finalized.

7.0 Summary of Findings

The subject site at 3317 Navan Road is located at the City of Ottawa, Ontario. It is understood that the proposed development will consist of three (3) four storey residential buildings (Building A, Building B, Building C). The buildings will rise 13 metres above grade. There is one major source of surface transportation noise to the proposed development: Navan Road.

Outdoor living area – rooftop terraces and private amenity space are anticipated at the proposed building. Utilizing the exteriors of proposed residential building as noise barriers, the results of STAMSON modeling indicate that the noise levels at the rooftop terraces of Building A and Building B are expected to be 55 dBA during daytime period (7:00-23:00), which are equal to the 55 dBA threshold value specified by the ENCG. Therefore, no noise attenuation feature is required for the rooftop terraces at Building A and Building B. However, the noise level at the rooftop terrace of Building C is expected to be 56 dBA during daytime period, which slightly exceeds the 55 dBA threshold value specified by the ENCG. This exceedance is considered acceptable provided that the warning clause Type A is included on all deeds of sale.

The result of STAMSON modeling also indicate that the noise level at the private amenity space of Building B is expected to be 61 dBA during daytime period (7:00-23:00). According to ENCG, noise control measures (i.e. barriers) are required to reduce the Leq to 55 dBA where technically and economically feasible. Based on the results of STAMSON modeling, we recommend the installation of a 2.5 metres acoustic fence (solid wood fence with no gaps) at the perimeter of amenity space. The revised analysis taking into consideration the proposed noise barrier indicates that the noise level at amenity space can be reduced to 55 dBA, which is equal to the 55 dBA threshold value specified by the ENCG. Therefore, no further noise attenuation measures are required.

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 noise levels at Building A are below the 55 dBA threshold. Therefore, no noise attenuation feature is required for Building A. The results also indicate that noise levels on the southern and western elevations of Building B and the eastern, southern, and western elevations of Building C are expected to exceed the 55 dBA threshold specified by the ENCG. It is also noted that the noise level on the southern elevation of Building C will exceed 65 dBA. Therefore, design with the provision for a central air conditioning unit, along with a warning clause Type C, will be required for the units in Building B.

Also, the installation of a central air conditioning unit, along with a warning clause Type D, will be required for the units in Building C. A review of industry standards for construction material indicates that, provided the exterior cladding of the southern elevation of Building C consist of brick or concrete panels and that all windows consist of double pane glass, these materials have an STC rating of greater than 30 and are considered acceptable.

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

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

The following warning clauses are to be included on all Offers of Purchase and Sale and/or lease agreements of units in Building C:

> "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."

> “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.”

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 Renfoe Land Management 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.

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Report Distribution:

- ❑ Renfoe Land Management (email copy)
- ❑ Paterson Group (1 copy)

APPENDIX 1

Table 8 - Summary of Reception Points and Geometry

Drawing PG6556-1 - Site Plan

Drawing PG6556-2 - Receptor Location Plan

Drawing PG6556-3 - Site Geometry

Drawing PG6556-3A - Site Geometry (REC 1-1 and REC 1-4)

Drawing PG6556-3B - Site Geometry (REC 2-1 and REC 2-4)

Drawing PG6556-3C - Site Geometry (REC 3-1 and REC 3-4)

Drawing PG6556-3D - Site Geometry (REC 4-1 and REC 4-4)

Drawing PG6556-3E – Site Geometry (REC 5-1 and REC 5-4)

Drawing PG6556-3F - Site Geometry (REC 6-1 and REC 6-4)

Drawing PG6556-3G – Site Geometry (REC 7-1 and REC 7-4)

Drawing PG6556-3H – Site Geometry (REC 8)

Drawing PG6556-3I – Site Geometry (REC 9)

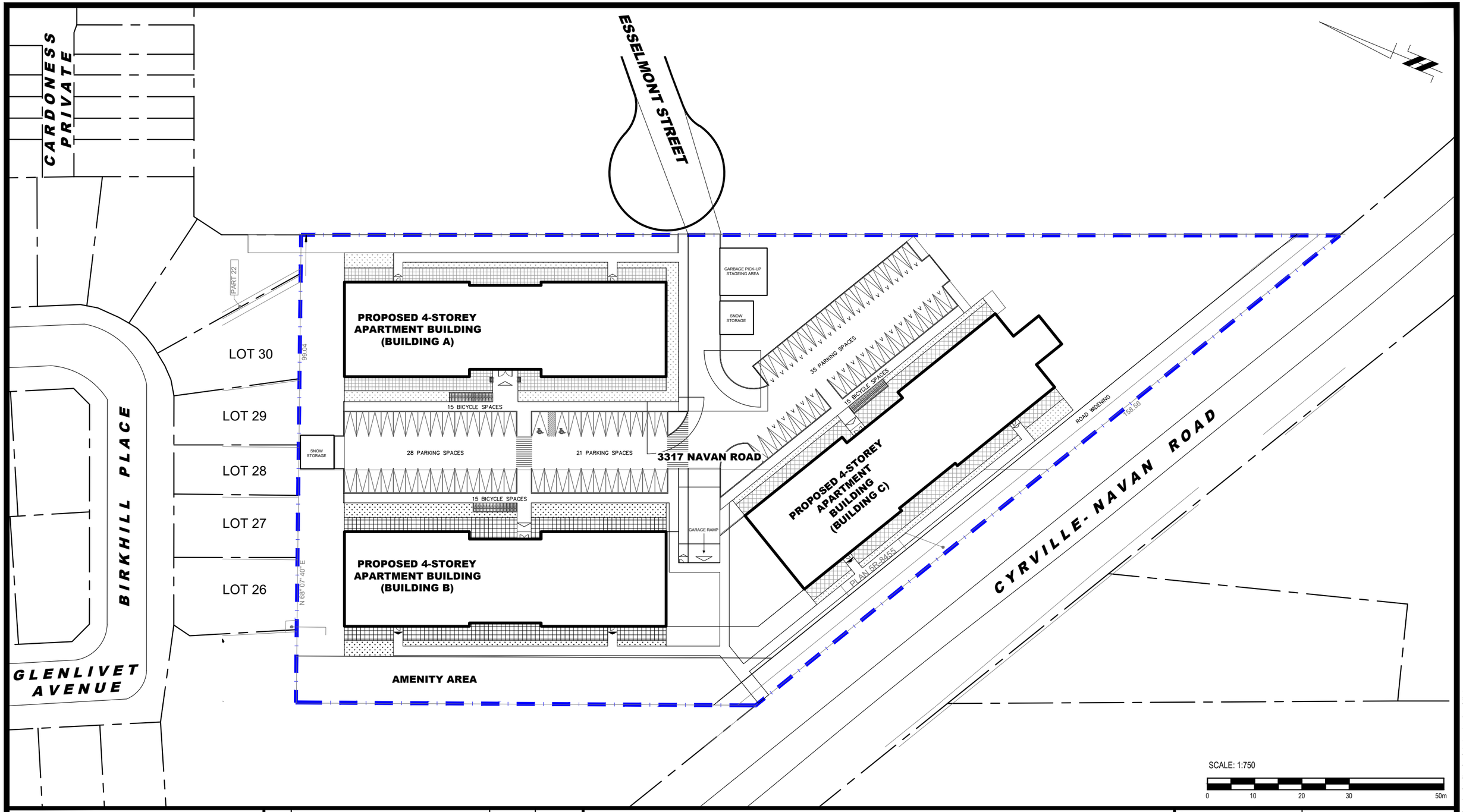
Drawing PG6556-3J – Site Geometry (REC 10)

Drawing PG6556-3K – Site Geometry (REC 11)

Drawing PG6556-4 – Noise Barrier Plan

Table 8 - Summary of Reception Points and Geometry
3317 Navan Road

Point of Reception	Location	Leq Day (dBA)	Navan Road					
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)
REC 1-1	Building C: East Elevation, 1st Floor	62	30	1.5	30.0	-85, 0	n/a	n/a
REC 1-4	Building C: East Elevation, 4th Floor	63	30	10.5	31.8	-85, 0	n/a	n/a
REC 2-1	Building C: South Elevation, 1st Floor	68	20	1.5	20.1	-89, 87	n/a	n/a
REC 2-4	Building C: South Elevation, 4th Floor	69	20	10.5	22.6	-89, 87	n/a	n/a
REC 3-1	Building C: West Elevation, 1st Floor	62	30	1.5	30.0	0, 84	n/a	n/a
REC 3-4	Building C: West Elevation, 4th Floor	63	30	10.5	31.8	0, 84	n/a	n/a
REC 4-1	Building B: South Elevation, 1st Floor	58	50	1.5	50.0	-90, 0	n/a	n/a
REC 4-4	Building B: South Elevation, 4th Floor	60	50	10.5	51.1	-90, 0	n/a	n/a
REC 5-1	Building B: West Elevation, 1st Floor	58	65	1.5	65.0	-90, 31	n/a	n/a
REC 5-4	Building B: West Elevation, 4th Floor	60	65	10.5	65.8	-90, 31	n/a	n/a
REC 6-1	Building A: South Elevation, 1st Floor	50	100	1.5	100.0	-28, 0	n/a	n/a
REC 6-4	Building A: South Elevation, 4th Floor	52	100	10.5	100.6	-28, 0	n/a	n/a
REC 7-1	Building A: West Elevation, 1st Floor	43	120	1.5	120.0	-57, -45	n/a	n/a
REC 7-4	Building A: West Elevation, 4th Floor	46	120	10.5	120.5	-57, -45	n/a	n/a
REC 8	Building A: Rooftop Terrace	55	120	14.5	120.9	-90, 21	n/a	n/a
REC 9	Building B: Rooftop Terrace	55	50	14.5	52.1	-30, 90	n/a	n/a
REC 10	Building C: Rooftop Terrace	56	30	14.5	33.3	-85, 84	n/a	n/a
REC 11	Building B: Private Amenity Space	61	40	1.5	40.0	-90, 34	n/a	n/a



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NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY

PROPOSED DEVELOPMENT

OTTAWA, 3317 NAVAN ROAD ONTARIO

Title: **SITE PLAN**

Scale: 1:750	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: **PG6556-1**
Approved by: SB	Revision No.: 1

11x17

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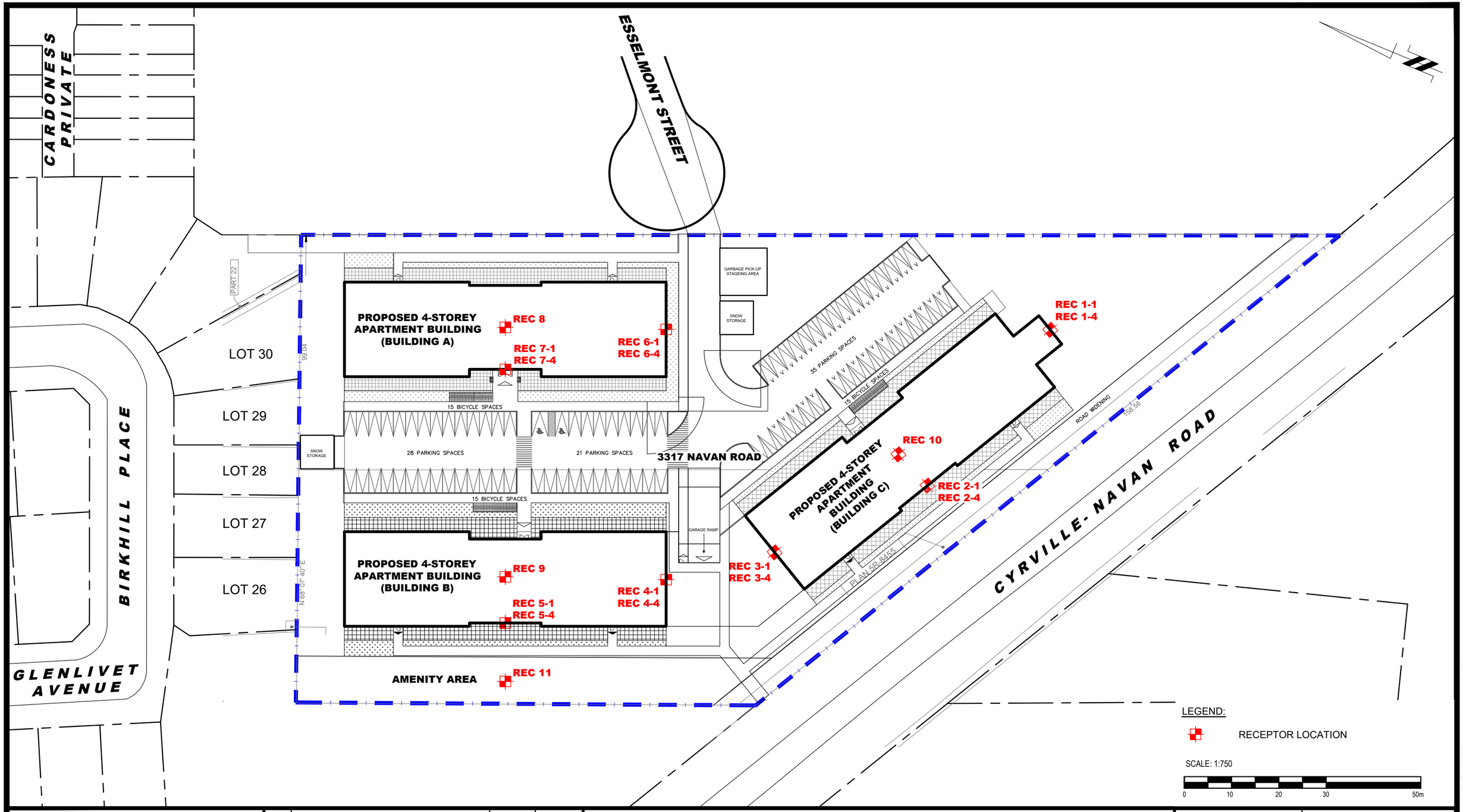

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NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY

PROPOSED DEVELOPMENT

OTTAWA, 3317 NAVAN ROAD ONTARIO

Title:

RECEPTOR LOCATION PLAN

Scale: 1:750	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-2
Approved by: SB	Revision No.: 1

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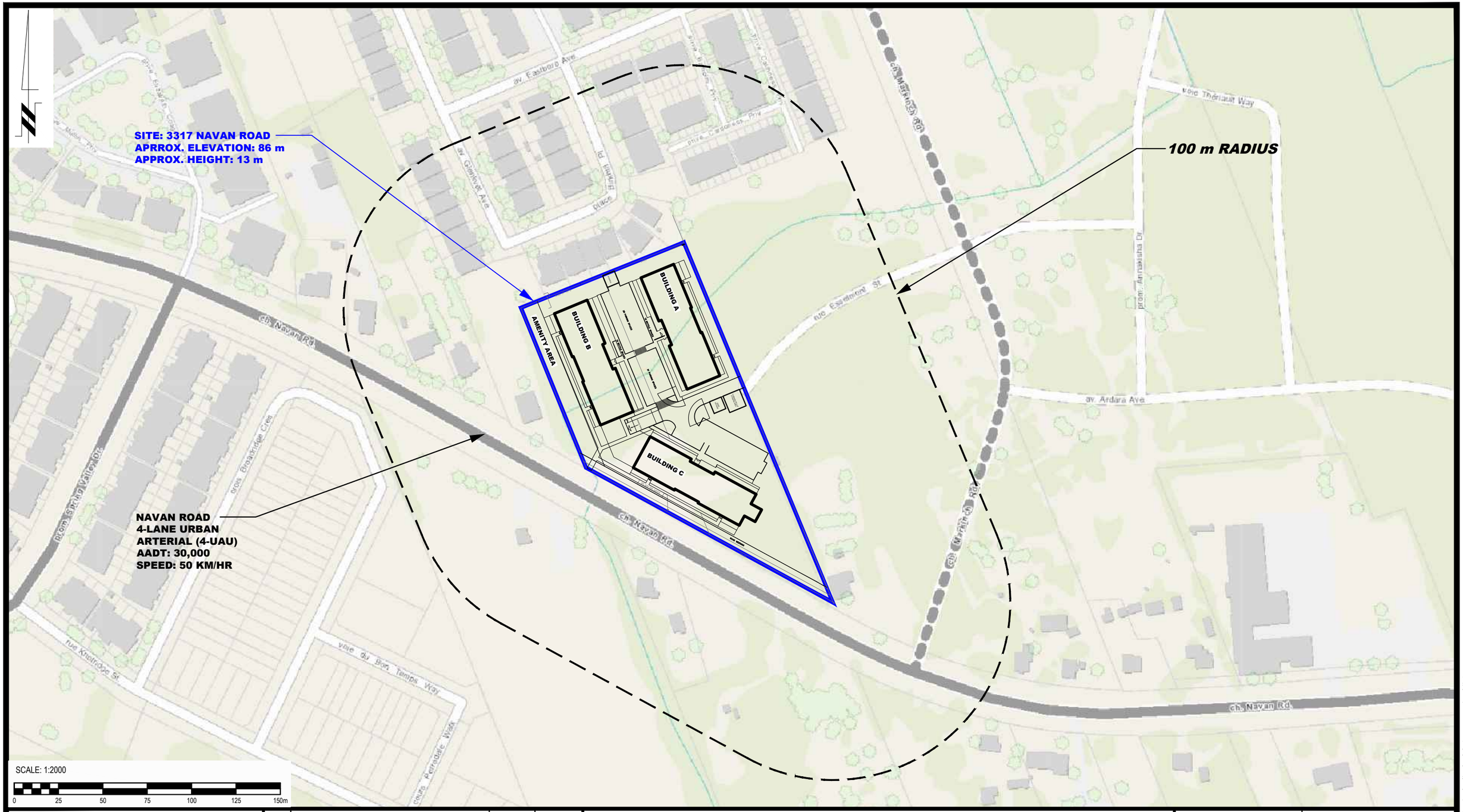
11x17



PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3
Approved by: SB	Revision No.: 1

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11x17

SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 1-1
REC 1-4

BUILDING A
BUILDING B
BUILDING C
AMENITY AREA

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

-85°

0°

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 1-1 AND REC 1-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3A
Approved by: SB	Revision No.: 1

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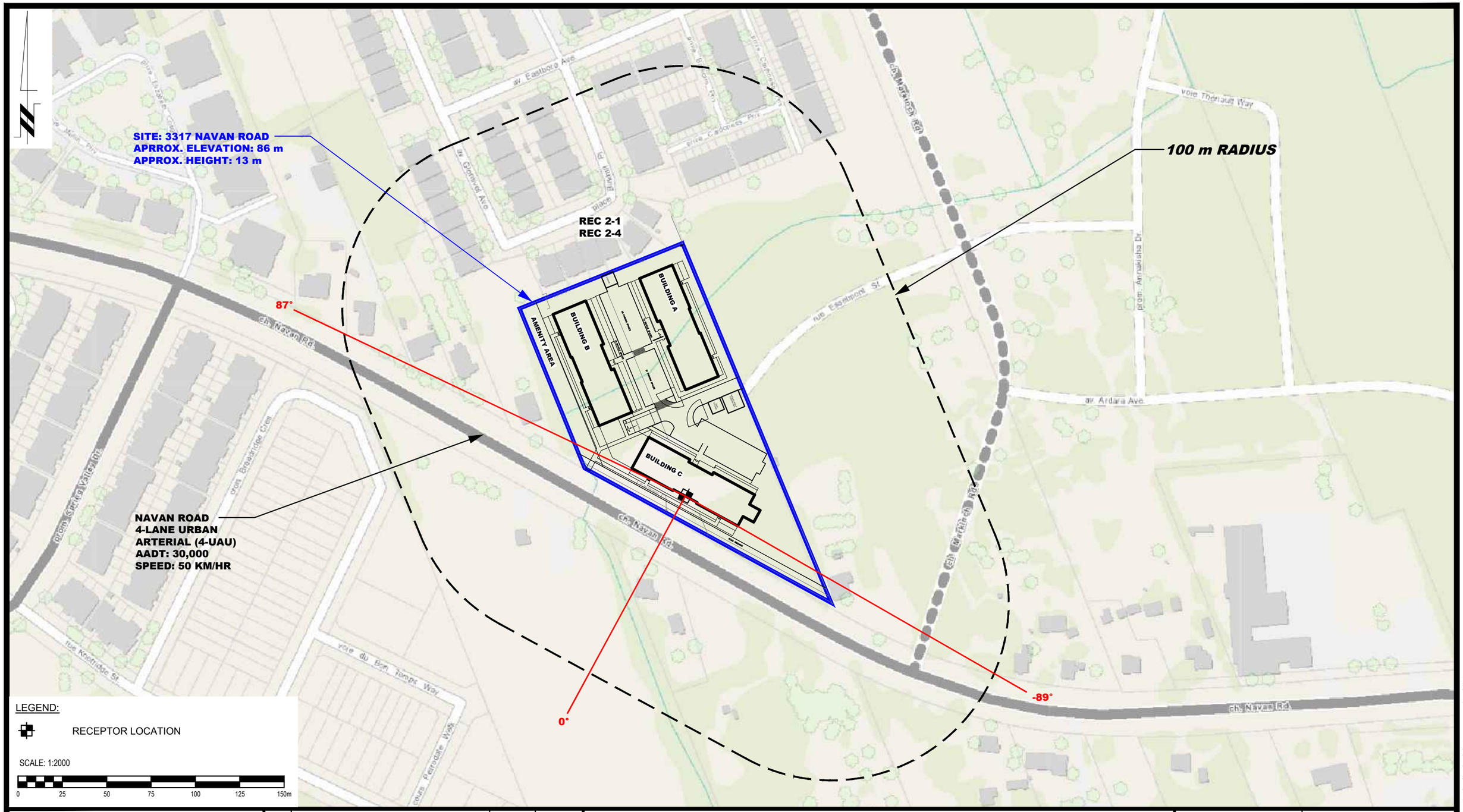

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 2-1 AND REC 2-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3B
Approved by: SB	Revision No.: 1

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11x17

SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 3-1
REC 3-4

83°

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

0°

BUILDING A
BUILDING B
BUILDING C
AMENITY AREA

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 3-1 AND REC 3-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3C
Approved by: SB	Revision No.: 1

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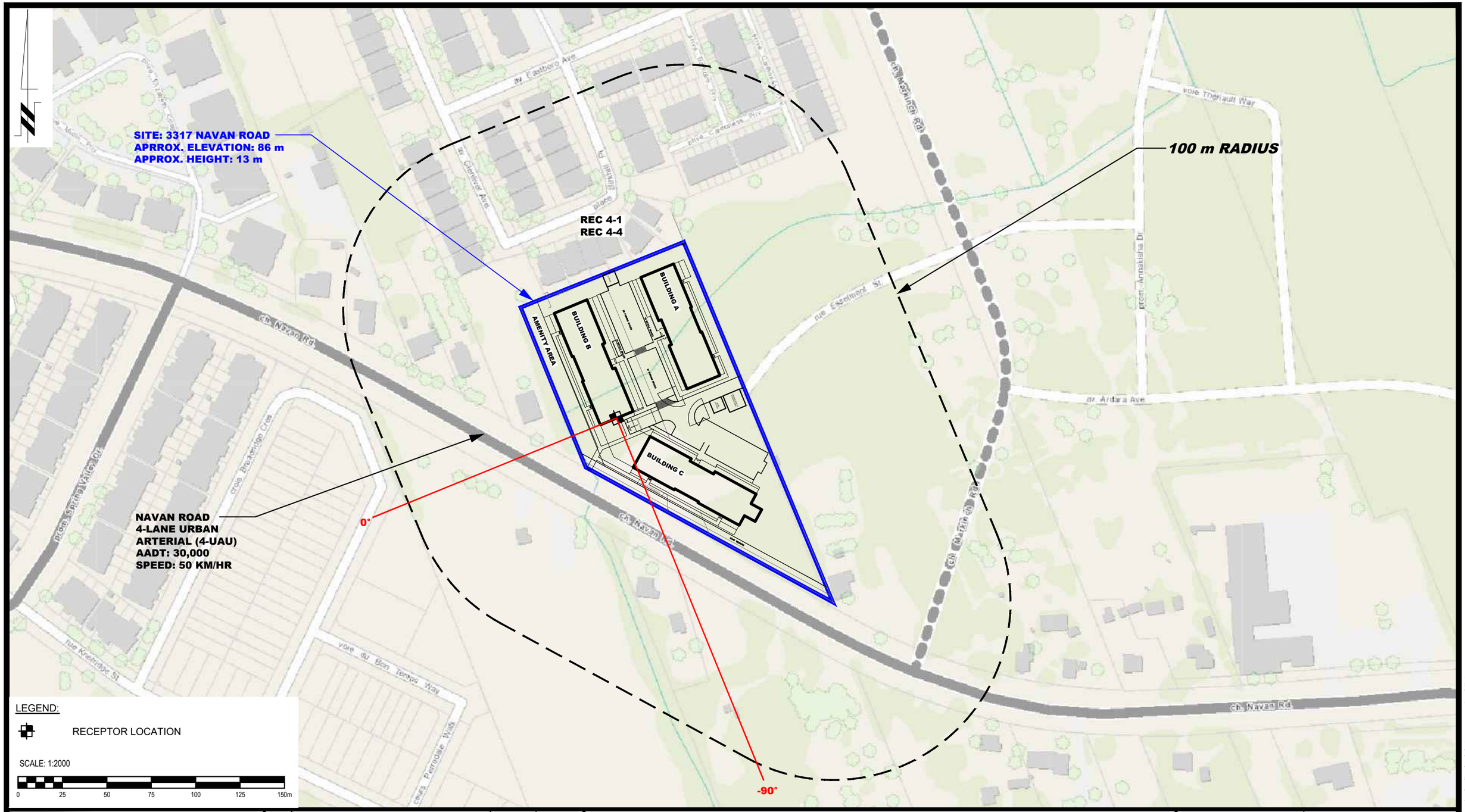

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 4-1 AND REC 4-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3D
Approved by: SB	Revision No.: 1

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11x17

SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 5-1
REC 5-4

BUILDING A
BUILDING B
BUILDING C
AMENITY AREA

31°
0°
-90°

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 5-1 AND REC 5-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3E
Approved by: SB	Revision No.: 1

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11x17

SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 6-1
REC 6-4

BUILDING A
BUILDING B
BUILDING C
AMENITY AREA

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

0°

-29°

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 6-1 AND REC 6-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3F
Approved by: SB	Revision No.: 1

11x17

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SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 7-1
REC 7-4

BUILDING A
BUILDING B
BUILDING C
AMENITY AREA

0°

-45°

-57°

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 7-1 AND REC 7-4

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3G
Approved by: SB	Revision No.: 1

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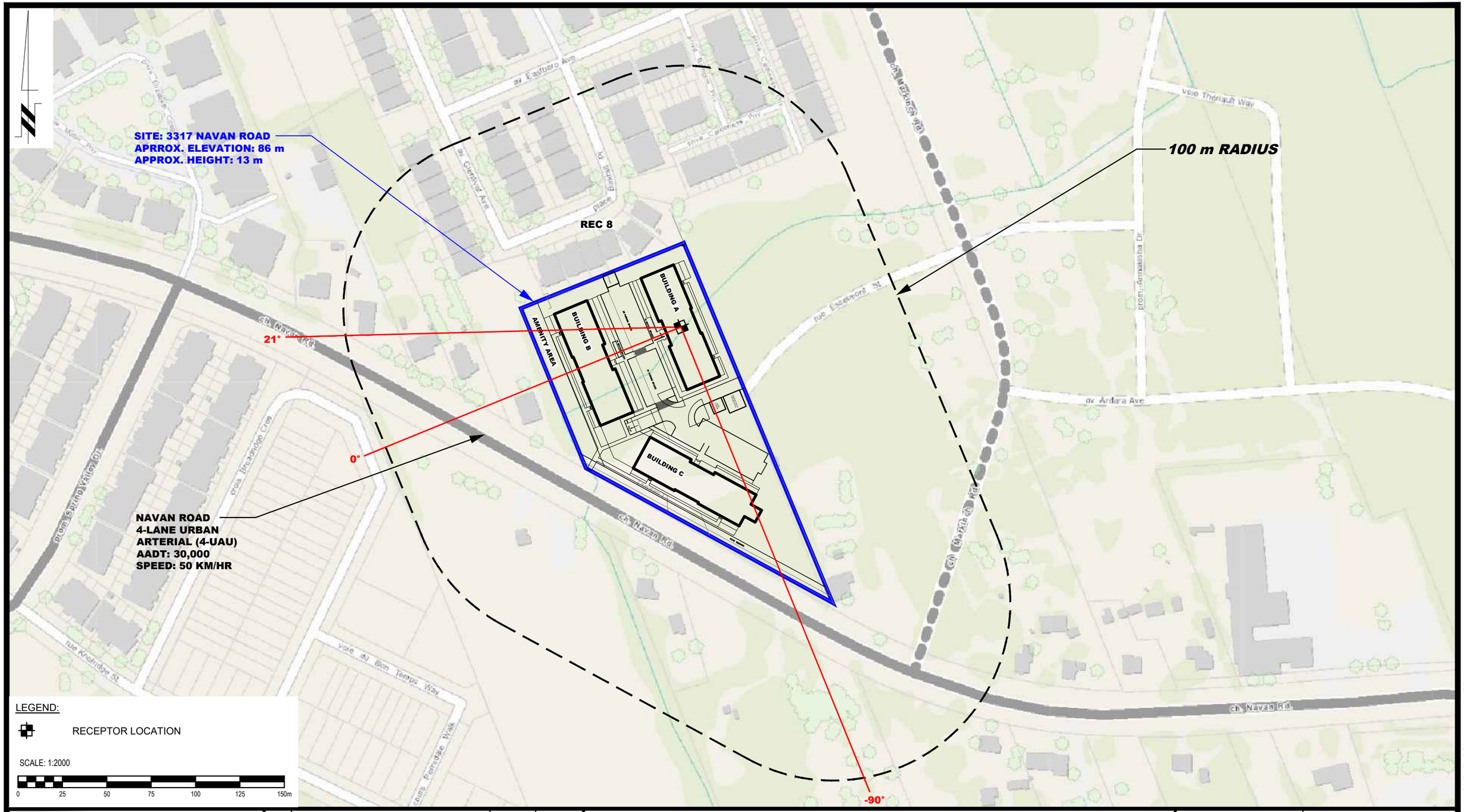

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 8

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3H
Approved by: SB	Revision No.: 1

11x17

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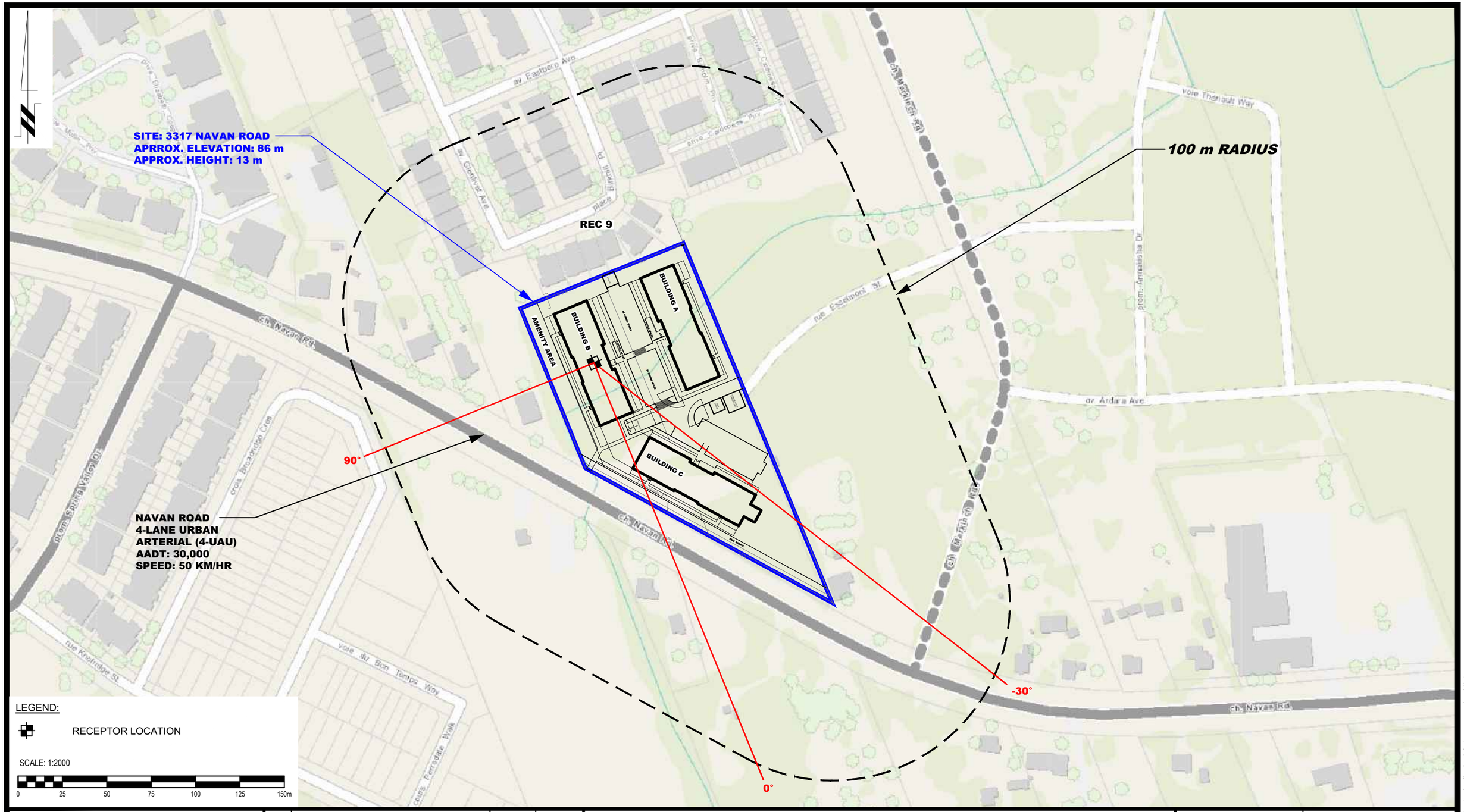

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 9

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3I
Approved by: SB	Revision No.: 1

11x17

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SITE: 3317 NAVAN ROAD
APRROX. ELEVATION: 86 m
APPROX. HEIGHT: 13 m

100 m RADIUS

REC 10

84°

NAVAN ROAD
4-LANE URBAN
ARTERIAL (4-UAU)
AADT: 30,000
SPEED: 50 KM/HR

0°

-85°

LEGEND:

RECEPTOR LOCATION

SCALE: 1:2000

0 25 50 75 100 125 150m

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 10

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3J
Approved by: SB	Revision No.: 1

11x17

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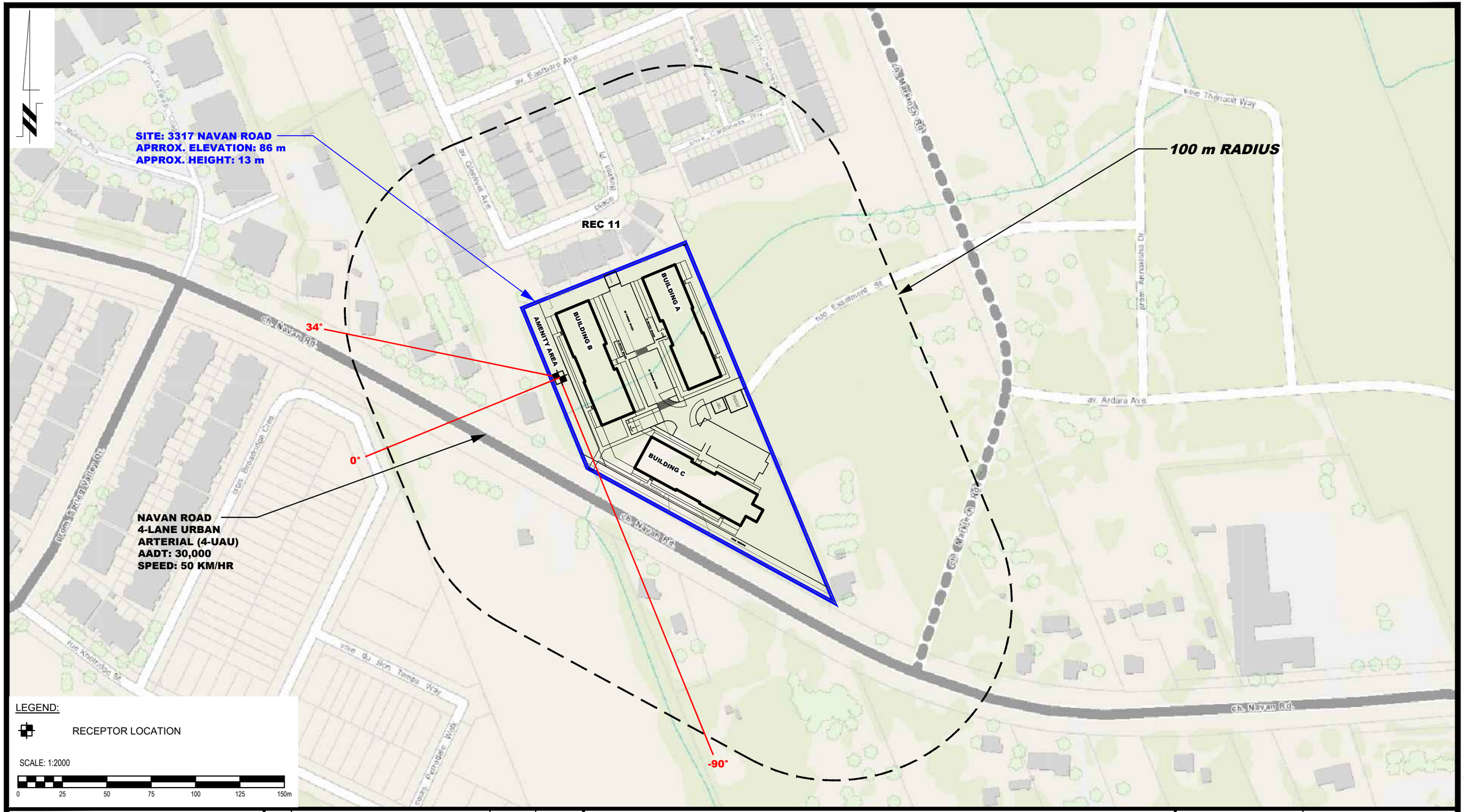

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY
PROPOSED DEVELOPMENT
3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 11

Scale: 1:2000	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-3K
Approved by: SB	Revision No.: 1

11x17

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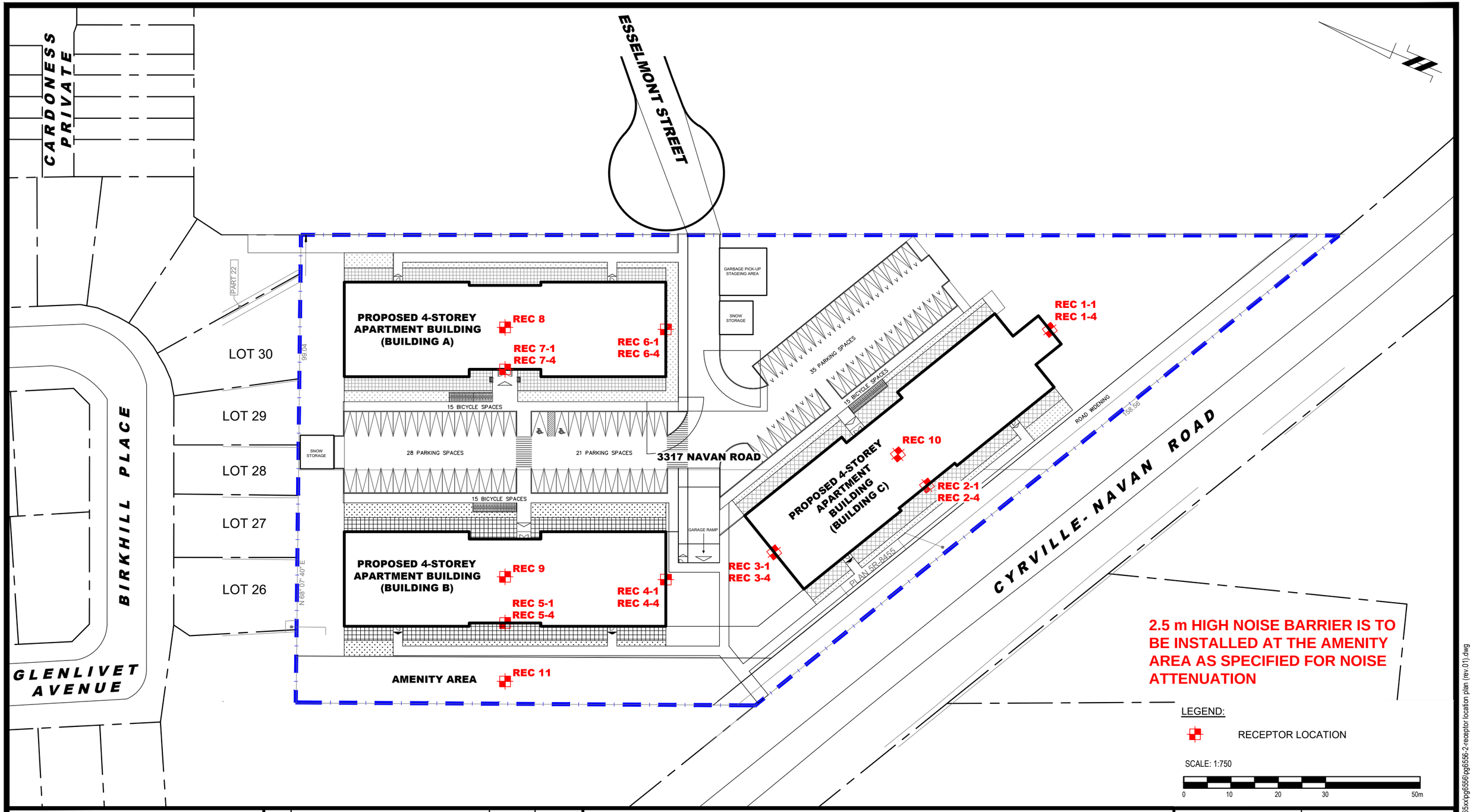

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED TO NEW CONCEPTUAL PLAN	20/10/2023	YT

RENFROE LAND MANAGEMENT

NOISE ATTENUATION STUDY

PROPOSED DEVELOPMENT

3317 NAVAN ROAD

OTTAWA, ONTARIO

Title:

NOISE BARRIER PLAN

Scale: 1:750	Date: 06/2023
Drawn by: YA	Report No.: PG6556-1
Checked by: YT	Dwg. No.: PG6556-4
Approved by: SB	Revision No.: 1

11x17

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APPENDIX 2

STAMSON RESULTS

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 15:54:25
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -85.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 61.99 + 0.00) = 61.99 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	0	0.66	71.49	0.00	-5.00	-4.51	0.00	0.00	0.00	61.99

Segment Leq : 61.99 dBA

Total Leq All Segments: 61.99 dBA

↟

Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 54.39 + 0.00) = 54.39 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	0	0.66	63.89	0.00	-5.00	-4.51	0.00	0.00	0.00	54.39

Segment Leq : 54.39 dBA

Total Leq All Segments: 54.39 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 61.99
(NIGHT): 54.39

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 15:55:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec14.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 1-4

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

Angle1 Angle2 : -85.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 63.25 + 0.00) = 63.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	0	0.39	71.49	0.00	-4.18	-4.06	0.00	0.00	0.00	63.25

Segment Leq : 63.25 dBA

Total Leq All Segments: 63.25 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 55.65 + 0.00) = 55.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-85	0	0.39	63.89	0.00	-4.18	-4.06	0.00	0.00	0.00	55.65

Segment Leq : 55.65 dBA

Total Leq All Segments: 55.65 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 63.25
(NIGHT): 55.65

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:54:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -89.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.00 / 20.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 67.95 + 0.00) = 67.95 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	87	0.66	71.49	0.00	-2.07	-1.47	0.00	0.00	0.00	67.95

Segment Leq : 67.95 dBA

Total Leq All Segments: 67.95 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 60.35 + 0.00) = 60.35 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	87	0.66	63.89	0.00	-2.07	-1.47	0.00	0.00	0.00	60.35

Segment Leq : 60.35 dBA

Total Leq All Segments: 60.35 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 67.95
(NIGHT): 60.35

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:55:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec24.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 2-4

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

Angle1 Angle2 : -89.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 20.00 / 20.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 68.77 + 0.00) = 68.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	87	0.39	71.49	0.00	-1.74	-0.99	0.00	0.00	0.00	68.77

Segment Leq : 68.77 dBA

Total Leq All Segments: 68.77 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 61.17 + 0.00) = 61.17 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-89	87	0.39	63.89	0.00	-1.74	-0.99	0.00	0.00	0.00	61.17

Segment Leq : 61.17 dBA

Total Leq All Segments: 61.17 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 68.77
(NIGHT): 61.17

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:04:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : 0.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 61.97 + 0.00) = 61.97 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	84	0.66	71.49	0.00	-5.00	-4.52	0.00	0.00	0.00	61.97

Segment Leq : 61.97 dBA

Total Leq All Segments: 61.97 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 54.37 + 0.00) = 54.37 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	84	0.66	63.89	0.00	-5.00	-4.52	0.00	0.00	0.00	54.37

Segment Leq : 54.37 dBA

Total Leq All Segments: 54.37 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 61.97
(NIGHT): 54.37

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:06:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec34.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 3-4

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

Angle1 Angle2 : 0.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 63.22 + 0.00) = 63.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	84	0.39	71.49	0.00	-4.18	-4.08	0.00	0.00	0.00	63.22

Segment Leq : 63.22 dBA

Total Leq All Segments: 63.22 dBA

↟

Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 55.63 + 0.00) = 55.63 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	84	0.39	63.89	0.00	-4.18	-4.08	0.00	0.00	0.00	55.63

Segment Leq : 55.63 dBA

Total Leq All Segments: 55.63 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 63.22
(NIGHT): 55.63

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:07:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 58.34 + 0.00) = 58.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	71.49	0.00	-8.68	-4.47	0.00	0.00	0.00	58.34

Segment Leq : 58.34 dBA

Total Leq All Segments: 58.34 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 50.75 + 0.00) = 50.75 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	63.89	0.00	-8.68	-4.47	0.00	0.00	0.00	50.75

Segment Leq : 50.75 dBA

Total Leq All Segments: 50.75 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 58.34
(NIGHT): 50.75

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:09:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec44.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 4-4

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

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 60.25 + 0.00) = 60.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.39	71.49	0.00	-7.27	-3.97	0.00	0.00	0.00	60.25

Segment Leq : 60.25 dBA

Total Leq All Segments: 60.25 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 52.65 + 0.00) = 52.65 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.39	63.89	0.00	-7.27	-3.97	0.00	0.00	0.00	52.65

Segment Leq : 52.65 dBA

Total Leq All Segments: 52.65 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 60.25
(NIGHT): 52.65

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:11:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec51.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 5-1

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

Angle1 Angle2 : -90.00 deg 31.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 58.11 + 0.00) = 58.11 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	31	0.66	71.49	0.00	-10.57	-2.81	0.00	0.00	0.00	58.11

Segment Leq : 58.11 dBA

Total Leq All Segments: 58.11 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 50.52 + 0.00) = 50.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	31	0.66	63.89	0.00	-10.57	-2.81	0.00	0.00	0.00	50.52

Segment Leq : 50.52 dBA

Total Leq All Segments: 50.52 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 58.11
(NIGHT): 50.52

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:12:09
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec54.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 5-4

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

Angle1 Angle2 : -90.00 deg 31.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 65.00 / 65.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 60.19 + 0.00) = 60.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	31	0.39	71.49	0.00	-8.85	-2.44	0.00	0.00	0.00	60.19

Segment Leq : 60.19 dBA

Total Leq All Segments: 60.19 dBA

↟

Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 52.60 + 0.00) = 52.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	31	0.39	63.89	0.00	-8.85	-2.44	0.00	0.00	0.00	52.60

Segment Leq : 52.60 dBA

Total Leq All Segments: 52.60 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 60.19
(NIGHT): 52.60

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:13:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec61.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 6-1

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

Angle1 Angle2 : -28.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 49.62 + 0.00) = 49.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	0	0.66	71.49	0.00	-13.68	-8.20	0.00	0.00	0.00	49.62

Segment Leq : 49.62 dBA

Total Leq All Segments: 49.62 dBA

↟

Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 42.02 + 0.00) = 42.02 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	0	0.66	63.89	0.00	-13.68	-8.20	0.00	0.00	0.00	42.02

Segment Leq : 42.02 dBA

Total Leq All Segments: 42.02 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 49.62
(NIGHT): 42.02

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:14:20
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec64.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 6-4

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

Angle1 Angle2 : -28.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 100.00 / 100.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 51.89 + 0.00) = 51.89 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	0	0.39	71.49	0.00	-11.45	-8.15	0.00	0.00	0.00	51.89

Segment Leq : 51.89 dBA

Total Leq All Segments: 51.89 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 44.29 + 0.00) = 44.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-28	0	0.39	63.89	0.00	-11.45	-8.15	0.00	0.00	0.00	44.29

Segment Leq : 44.29 dBA

Total Leq All Segments: 44.29 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 51.89
(NIGHT): 44.29

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:15:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec71.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 7-1

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

Angle1 Angle2 : -57.00 deg -45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 43.40 + 0.00) = 43.40 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	-45	0.66	71.49	0.00	-14.99	-13.10	0.00	0.00	0.00	43.40

Segment Leq : 43.40 dBA

Total Leq All Segments: 43.40 dBA

↟

Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 35.81 + 0.00) = 35.81 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	-45	0.66	63.89	0.00	-14.99	-13.10	0.00	0.00	0.00	35.81

Segment Leq : 35.81 dBA

Total Leq All Segments: 35.81 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 43.40
(NIGHT): 35.81

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 19-10-2023 16:16:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec74.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 7-4

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

Angle1 Angle2 : -57.00 deg -45.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 10.50 / 10.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 46.38 + 0.00) = 46.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	-45	0.39	71.49	0.00	-12.55	-12.55	0.00	0.00	0.00	46.38

Segment Leq : 46.38 dBA

Total Leq All Segments: 46.38 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 38.79 + 0.00) = 38.79 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-57	-45	0.39	63.89	0.00	-12.55	-12.55	0.00	0.00	0.00	38.79

Segment Leq : 38.79 dBA

Total Leq All Segments: 38.79 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 46.38
(NIGHT): 38.79

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:42:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec8.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 8

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

Angle1 Angle2 : -90.00 deg 21.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 14.50 / 14.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 21.00 deg
Barrier height : 13.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 86.00 m
Receiver elevation : 86.00 m
Barrier elevation : 86.00 m
Reference angle : 0.00

Results segment # 1: Navan (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 !       14.50 !       12.87 !        98.87

ROAD (0.00 + 55.34 + 0.00) = 55.34 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     21   0.00  71.49   0.00  -9.03  -2.10   0.00   0.00  -5.02  55.34
-------------------------------------------------------------------------------

Segment Leq : 55.34 dBA

Total Leq All Segments: 55.34 dBA

🠝
Results segment # 1: Navan (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 !       14.50 !       12.87 !        98.87

ROAD (0.00 + 47.74 + 0.00) = 47.74 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     21   0.00  63.89   0.00  -9.03  -2.10   0.00   0.00  -5.02  47.74
-------------------------------------------------------------------------------

Segment Leq : 47.74 dBA

Total Leq All Segments: 47.74 dBA

🠝



TOTAL Leq FROM ALL SOURCES (DAY): 55.34
                           (NIGHT): 47.74
🠝
🠝
```

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:44:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec9.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 9

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

Angle1 Angle2 : -30.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 50.00 / 50.00 m
Receiver height : 14.50 / 14.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -30.00 deg Angle2 : 90.00 deg
Barrier height : 13.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 86.00 m
Receiver elevation : 86.00 m
Barrier elevation : 86.00 m
Reference angle : 0.00

Results segment # 1: Navan (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 !       14.50 !       10.60 !        96.60

ROAD (0.00 + 54.56 + 0.00) = 54.56 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -30     90   0.00  71.49   0.00  -5.23  -1.76   0.00   0.00  -9.94  54.56
-------------------------------------------------------------------------------

Segment Leq : 54.56 dBA

Total Leq All Segments: 54.56 dBA

🠉
Results segment # 1: Navan (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 !       14.50 !       10.60 !        96.60

ROAD (0.00 + 46.96 + 0.00) = 46.96 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -30     90   0.00  63.89   0.00  -5.23  -1.76   0.00   0.00  -9.94  46.96
-------------------------------------------------------------------------------

Segment Leq : 46.96 dBA

Total Leq All Segments: 46.96 dBA

🠉



TOTAL Leq FROM ALL SOURCES (DAY): 54.56
                           (NIGHT): 46.96
🠉
🠉
```

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:53:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec10.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 10

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

Angle1 Angle2 : -85.00 deg 84.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 30.00 / 30.00 m
Receiver height : 14.50 / 14.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -85.00 deg Angle2 : 84.00 deg
Barrier height : 13.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 86.00 m
Receiver elevation : 86.00 m
Barrier elevation : 86.00 m
Reference angle : 0.00

Results segment # 1: Navan (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 !       14.50 !       10.17 !        96.17

ROAD (0.00 + 56.18 + 0.00) = 56.18 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -85     84   0.00  71.49   0.00  -3.01  -0.27   0.00   0.00 -12.02  56.18
-------------------------------------------------------------------------------

Segment Leq : 56.18 dBA

Total Leq All Segments: 56.18 dBA

Results segment # 1: Navan (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 !       14.50 !       10.17 !        96.17

ROAD (0.00 + 48.59 + 0.00) = 48.59 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -85     84   0.00  63.89   0.00  -3.01  -0.27   0.00   0.00 -12.02  48.59
-------------------------------------------------------------------------------

Segment Leq : 48.59 dBA

Total Leq All Segments: 48.59 dBA



TOTAL Leq FROM ALL SOURCES (DAY): 56.18
                           (NIGHT): 48.59
```

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 16:59:34
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 11

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

Angle1 Angle2 : -90.00 deg 34.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Navan (day)

Source height = 1.50 m

ROAD (0.00 + 60.84 + 0.00) = 60.84 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	34	0.66	71.49	0.00	-7.07	-2.68	0.00	-0.90	0.00	60.84

Segment Leq : 60.84 dBA

Total Leq All Segments: 60.84 dBA

↟
Results segment # 1: Navan (night)

Source height = 1.50 m

ROAD (0.00 + 54.14 + 0.00) = 54.14 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	34	0.66	63.89	0.00	-7.07	-2.68	0.00	0.00	0.00	54.14

Segment Leq : 54.14 dBA

Total Leq All Segments: 54.14 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 60.84
(NIGHT): 54.14

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 20-10-2023 17:02:22
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec11tr.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 11tr

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

Angle1 Angle2 : -90.00 deg 34.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 34.00 deg
Barrier height : 2.50 m
Barrier receiver distance : 5.00 / 5.00 m
Source elevation : 86.00 m
Receiver elevation : 86.00 m
Barrier elevation : 86.00 m
Reference angle : 0.00

Results segment # 1: Navan (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 !        1.50 !        1.50 !        87.50

ROAD (0.00 + 54.58 + 0.00) = 54.58 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     34   0.66  71.49   0.00  -7.07  -2.68   0.00  -0.90   0.00  60.84
   -90     34   0.51  71.49   0.00  -6.43  -2.50   0.00   0.00  -7.98  54.58
-------------------------------------------------------------------------------

Segment Leq : 54.58 dBA

Total Leq All Segments: 54.58 dBA

↟
Results segment # 1: Navan (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 !        1.50 !        1.50 !        87.50

ROAD (0.00 + 46.98 + 0.00) = 46.98 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -90     34   0.51  63.89   0.00  -6.43  -2.50   0.00   0.00  -7.98  46.98
-------------------------------------------------------------------------------

Segment Leq : 46.98 dBA

Total Leq All Segments: 46.98 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 54.58
                           (NIGHT): 46.98
↟
↟
```