Environmental Noise Control Study
Proposed Residential Development

222 Baseline Road
Ottawa, Ontario

Prepared for HP Urban

Report PG6277-1 Revision 1 dated June 9, 2023

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Appendices

1.0 Introduction

Paterson Group (Paterson) was commissioned by HP Urban to conduct an environmental noise control study for the proposed residential development to be located at 222 Baseline Road, 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 development will consist of a three-storey residential building. The building will consist of 9 or more units and rise 11 metres above grade. Associated walkways, driveways, bicycle parking area, and landscaped areas are further anticipated. Outdoor living areas – rooftop terrace and at-grade rear yard are identified on the proposed site plan.

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. 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 of 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 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 development is bordered to the north by Baseline Road followed by the Experimental Farm, to the east by residential dwellings, to the south by residential dwellings and Wilshire Avenue, and to the west by Lexington Street followed by residential dwellings. Baseline Road, Wilshire Avenue, and Lexington Street are identified within the 100 m radius of proposed development.

Based on the City of Ottawa's Official Plan, Schedule E, Baseline Road is considered a 4-lane urban arterial road - divided (4-UAD). 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 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 5 – Traffic and Road Parameters

Segment	Roadway Classification	AADT Veh/Day	Speed Limit (km/h)	Day/Night Split %	Medium Truck %	Heavy Truck %
Baseline Road	4-UAD	35,000	60	92/8	7	5
➢ Data obtained from the City of Ottawa document ENCG						

The Baseline Bus Rapid Transit (BRT) travels along the Richmond-Baseline-Heron Corridor, at grade with the neighbouring arterial roads. The transitway is currently at the draft design phase. Based on the Baseline Road Bus Rapid Transit study report, the corridor is anticipated to handle between 1,500 to 3,000 vehicles per hour two-way traffic volume during the morning and afternoon peak hours. Therefore, the AADT of Baseline BRT is assumed to be 12,000. A copy of Baseline Road BRT study report is included in Appendix 3.

The major sources of traffic noise are due to the Baseline Road and Baseline Bus Rapid Transit Corridor to the north of the proposed development.

Table 6 – Transitway Parameters			
Segment	**Maximum Speed (km/hr)**	**Number of Trips/day (Daytime)**	**Number of Trips/day (Nighttime)**
OC Transpo Bus	60	11,040	960
➢ AADT is assumed based on information provided in Baseline Road BRT study report Traffic volume day/night split % is 92/8			

All noise sources are presented in Drawing PG6277-3 - Site Geometry located in Appendix 1.

Four (4) 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.

Table 7 – 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
Third Floor	8.5	Living Area/Bedroom	Daytime / Nighttime
Rooftop Terrace	12.5	--	Outdoor Living Area
At-Grade Rear Yard	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 terrace and at-grade rear yard are anticipated at the proposed development. One receptor (REC 4) was selected in the centre of rooftop terrace, 12.5 m, and one receptor (REC 5) was selected in the centre of rear yard, 1.5 m. Reception points are detailed on Drawing PG6277-2 - 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 PG6277-3A to 3E - Site Geometry in Appendix 1.

Table 9 - 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 gently sloping down to the east and at grade with the neighbouring roads within the 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 8.

Table 8: 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	75	68
REC 1-3	8.5	Northern Elevation, 3rd Floor	76	68
REC 2-1	1.5	Western Elevation, 1st Floor	69	62
REC 2-3	8.5	Western Elevation, 3rd Floor	70	62
REC 3-1	1.5	Eastern Elevation, 1st Floor	70	63
REC 3-3	8.5	Eastern Elevation, 3rd Floor	71	63
REC 4	12.5	Rooftop Terrace	57	--
REC 5	1.5	At-Grade Rear Yard	47	--

6.0 Discussion and Recommendations

6.1 Outdoor Living Areas

Outdoor living areas – rooftop terrace and at-grade rear yard are anticipated at the proposed development. Two (2) receptor points were selected for the analysis at outdoor living areas (REC 4 and REC 5). It is assumed that both rooftop terrace and at-grade rear yard will only be utilized as outdoor living areas provided that the proposed residential building is constructed. Utilizing the exteriors of proposed residential building and adjacent existing residential building as noise barriers, the proposed Leq(16) at the rooftop terrace will be 57 dBA, which slightly exceeds the 55 dBA threshold value specified by the ENCG.

Upon review of the aforementioned result for the proposed building, a noise attenuation feature consisting of a solid glass railing surrounding the proposed rooftop terrace was considered. This solid glass railing would be considered a noise barrier and is designed to be 1 m high. This glass railing, in addition to utilizing the exterior of building as a noise barrier, was completed as REC 4TR, and is included in Appendix 2. The results of STAMSON modeling indicate that, with the combination of the application of exterior cladding and the 1 m high noise barrier, the anticipated noise level at the rooftop terrace will be 55 dBA during the daytime period (7:00-23:00), which is at the 55 dBA threshold value specified by the ENCG. Therefore, further noise attenuation measure is not required.

Utilizing the exteriors of adjacent existing residential building as noise barriers, The proposed Leq(16) at the rear yard will be 47 dBA, which is below the 55 dBA threshold value specified by the ENCG. 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 will range between 69 dBA and 76 dBA during the daytime period (07:00-23:00) and between 62 dBA and 68 dBA during the nighttime period (23:00-7:00). The noise levels on the northern, western, and eastern elevations of proposed building will exceed the limit for the exterior of the pane of glass (55 dBA) specified by the ENCG. It is also noted that the noise levels on the northern, western, and eastern elevations will exceed 65 dBA. Therefore, units on the northern, western, and eastern elevations of this building should be supplied with a central air conditioning unit, along with the warning clause Type D, as outlined in Table 3.

This building does exceed the 65 dBA threshold for noise on the northern, western, and eastern elevations. Therefore, an analysis of the building materials 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 northern, western, and eastern elevations 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 36 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 39 or higher, this would be a sufficient noise attenuation device.**

A review of industry standards for construction material indicates that, if the exterior cladding of the northern, western, and eastern elevations consist of brick or concrete panels and that all windows consist of double pane glass, these materials have an STC rating of greater than 39 and are considered acceptable. If alternative materials are to be utilized on the northern, western, and eastern elevations, then a review will need to be completed once design details are finalized.

7.0 Summary of Findings

The subject site is located at 222 Baseline Road, in the City of Ottawa. It is understood that the proposed development will consist of a three-storey residential building. The building will rise 11 metres above grade. There are two major sources of surface transportation noise to the proposed development: Baseline Road and Baseline Bus Rapid Transit Corridor.

The surface transportation noise analysis was completed at the Outdoor Living Areas – rooftop terrace and at-grade rear yard. Utilizing the exteriors of proposed residential building and adjacent existing residential building as noise barriers, the results of STAMSON modeling indicate that the noise level at the rooftop terrace is expected to be 57 dBA, during the daytime period, which slightly exceeds the 55 dBA threshold value specified by the ENCG. According to ENCG, noise control measures (i.e. barriers) are required to reduce the Leq to 55 dBA where technically and economically feasible. An investigation including noise barriers, which included both the exterior cladding of the proposed building in addition to the addition of a solid 1 m noise barrier around the perimeter of the outdoor living area found that the noise level of rooftop terrace can be reduced to 55 dBA. Therefore, no further noise attenuation measures are required. The noise level at the rear yard is expected to be 47 dBA, during the daytime period, which is below the 55 dBA threshold value specified by the ENCG. Therefore, further noise attenuation measure is not 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 northern, western, and eastern elevations of the proposed building are expected to exceed the 55 dBA threshold specified by the ENCG. It is also noted that the noise level on the northern, western, and eastern elevations will exceed 65 dBA. Therefore, the installation of a central air conditioning unit, along with a warning clause Type D, will be required for the units on the northern, western, and eastern elevations of proposed building. A review of industry standards for construction material indicates that, provided the exterior cladding of the northern, western, and eastern elevations consist of brick or concrete panels and that all windows consist of double pane glass, these materials have an STC rating of greater than 39 and are considered acceptable.

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

" This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the 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 HP Urban 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.

Yolanda Tang, M.A.Sc.

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- ❑ HP Urban (email copy)
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APPENDIX 1

TABLE 9 – Summary of Reception Points and Geometry

Drawing PG6277-1 - Site Plan

Drawing PG6277-2 - Receptor Location Plan

Drawing PG6277-3 - Site Geometry

Drawing PG6277-3A - Site Geometry (REC 1-1 and REC 1-3)

Drawing PG6277-3B - Site Geometry (REC 2-1 and REC 2-3)

Drawing PG6277-3C - Site Geometry (REC 3-1 and REC 3-3)

Drawing PG6277-3D - Site Geometry (REC 4)

Drawing PG6277-3E - Site Geometry (REC 5)

Table 9 - Summary of Reception Points and Geometry
222 Baseline Road

Point of Reception	Location	Leq Day (dBA)	Baseline Road								Bus Transitway							
			Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Barrier Height (m)	Barrier Distance (m)	Horizontal (m)	Vertical (m)	Total (m)	Local Angle (degree)	Number of Rows of Houses	Density (%)	Barrier Height (m)	Barrier Distance (m)
REC 1-1	Northern Elevation, 1st Floor	75	15	1.5	15.1	-86, 87	n/a	n/a	n/a	n/a	15	1.5	15.1	-86, 87	n/a	n/a	n/a	n/a
REC 1-3	Northern Elevation, 3rd Floor	76	15	8.5	17.2	-86, 87	n/a	n/a	n/a	n/a	15	8.5	17.2	-86, 87	n/a	n/a	n/a	n/a
REC 2-1	Western Elevation, 1st Floor	69	20	1.5	20.1	-90, 0	n/a	n/a	n/a	n/a	27	1.5	27.0	-90, 0	n/a	n/a	n/a	n/a
REC 2-3	Western Elevation, 3rd Floor	70	20	8.5	21.7	-90, 0	n/a	n/a	n/a	n/a	27	8.5	28.3	-90, 0	n/a	n/a	n/a	n/a
REC 3-1	Eastern Elevation, 1st Floor	70	15	1.5	15.1	0, 82	1	20	n/a	n/a	22	1.5	22.1	0, 82	1	20	n/a	n/a
REC 3-3	Eastern Elevation, 3rd Floor	71	15	8.5	17.2	0, 82	1	20	n/a	n/a	22	8.5	23.6	0, 82	1	20	n/a	n/a
REC 4	Rooftop Terrace	57	23	12.5	26.2	-77, 78	n/a	n/a	n/a	n/a	30	12.5	32.5	-77, 78	n/a	n/a	n/a	n/a
REC 5	At-Grade Rear Yard	47	33	1.5	33.0	38, 76	n/a	n/a	7	10	45	1.5	45.0	38, 76	n/a	n/a	7	10

ARTERIAL ROAD

BUS TRANSITWAY

BUS TRANSITWAY

ARTERIAL ROAD

SIDEWALK

LEXINGTON STREET

SIDEWALK

EXISTING BUILDING

222 BASELINE ROAD PROPOSED BUILDING

EXISTING DECK

REAR YARD

SCALE: 1:250

0 1 2 3 4 5 10 15m

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NO.	REVISIONS	DATE	INITIAL
1	UPDATED ROAD INFORMATION	20/04/2023	YT

HP URBAN

NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, **ONTARIO**

Title:

SITE PLAN

Scale: 1:250	**Date:** 06/2022
Drawn by: YA	**Report No.:** PG6277-1
Checked by: YT	**Dwg. No.:** PG6277-1
Approved by: SB	**Revision No.:** 1

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ARTERIAL ROAD

BUS TRANSITWAY

BUS TRANSITWAY

ARTERIAL ROAD

SIDEWALK

LEXINGTON STREET

SIDEWALK

REC 1-1
REC 1-3

EXISTING BUILDING

222 BASELINE ROAD
PROPOSED BUILDING

REC 3-1
REC 3-3

REC 2-1
REC 2-3

EXISTING DECK

REC 4

REAR YARD

REC 5

LEGEND:

RECEPTOR LOCATION

SCALE: 1:250

0 1 2 3 4 5 10 15m

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NO.	REVISIONS	DATE	INITIAL
1	UPDATED ROAD INFORMATION	20/04/2023	YT

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NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

SITE PLAN

Scale: 1:250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
Checked by: YT	Dwg. No.: PG6277-1
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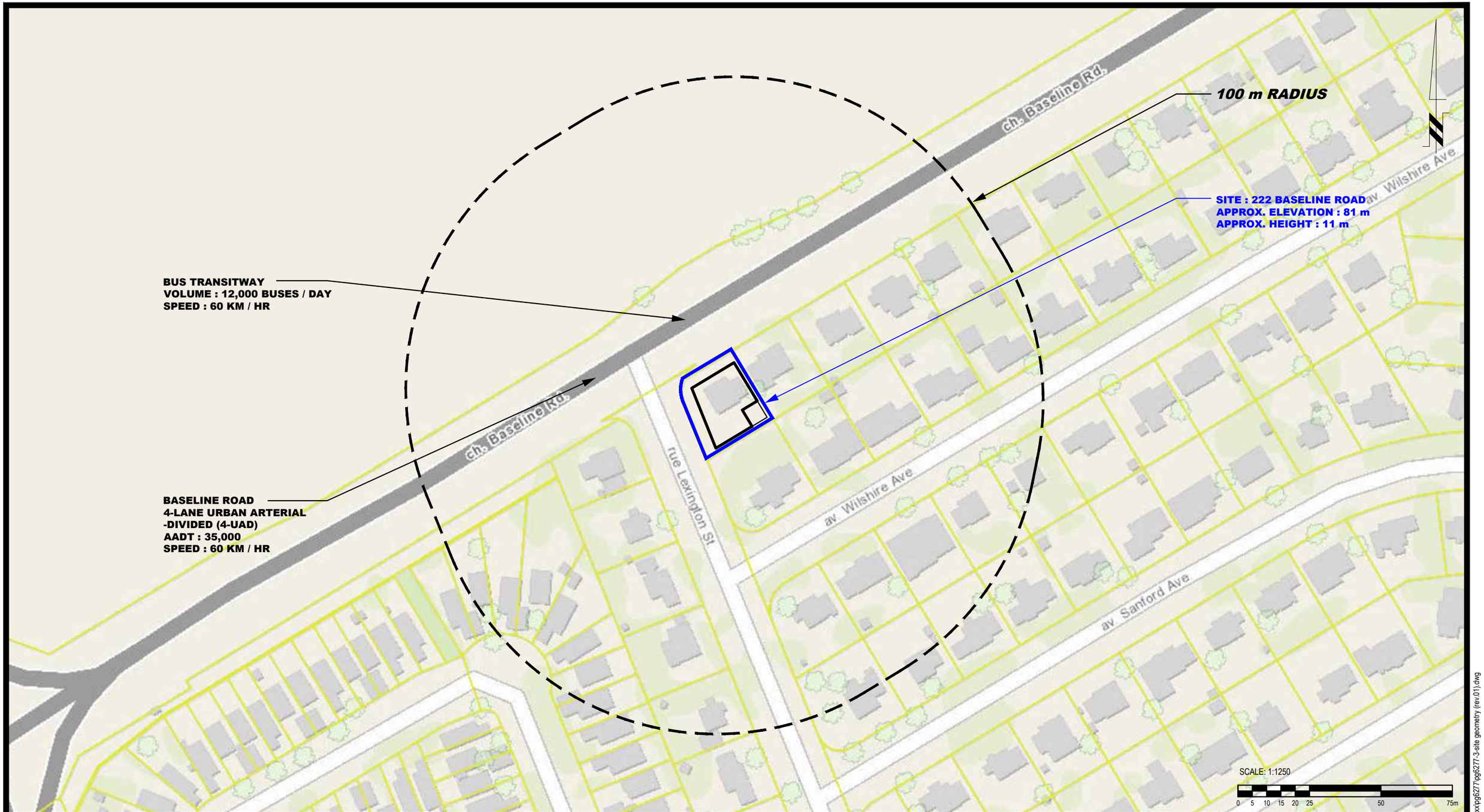

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NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY

Scale: 1:1250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
Checked by: YT	Dwg. No.: PG6277-3
Approved by: SB	Revision No.: 1

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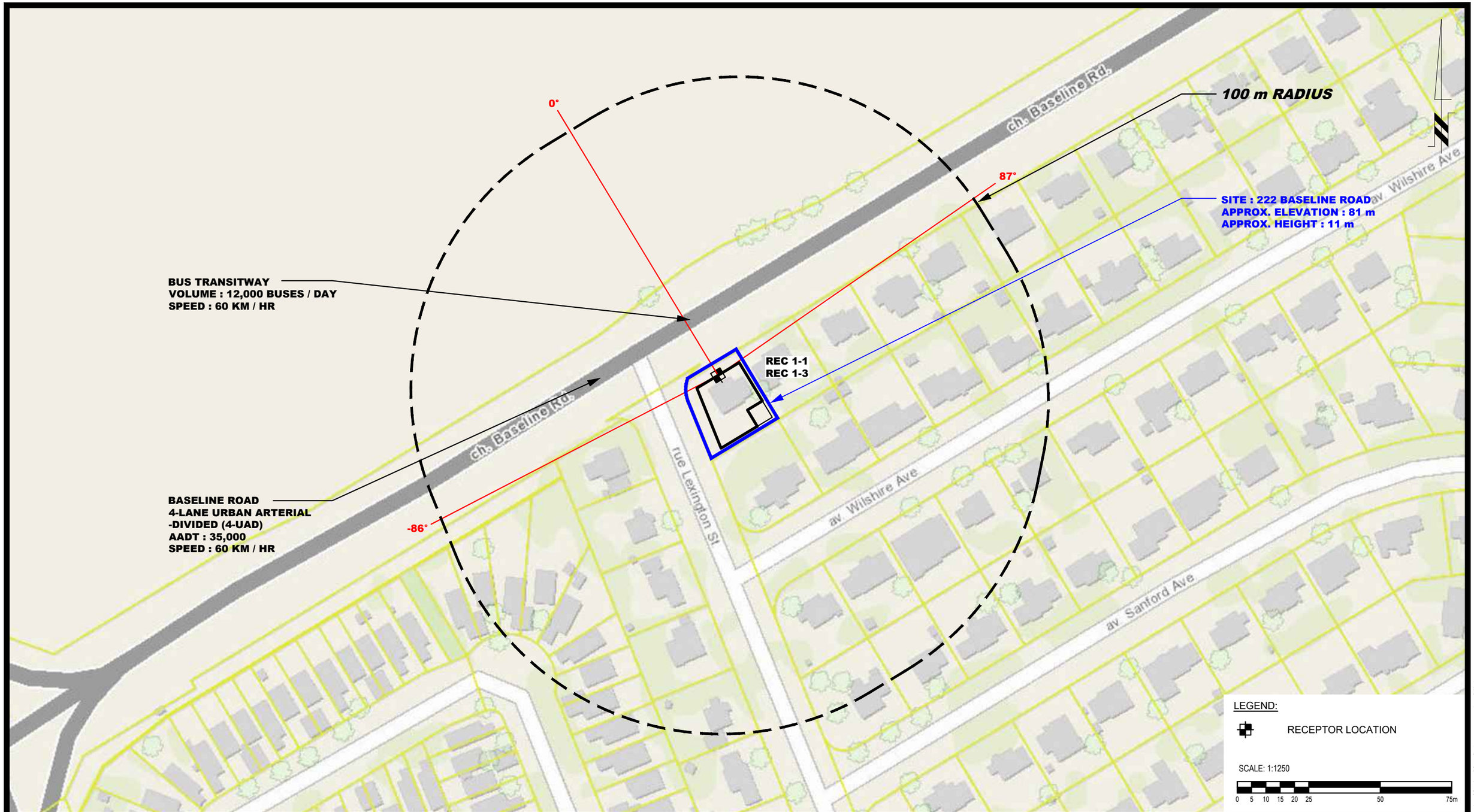

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NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

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

Scale: 1:1250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
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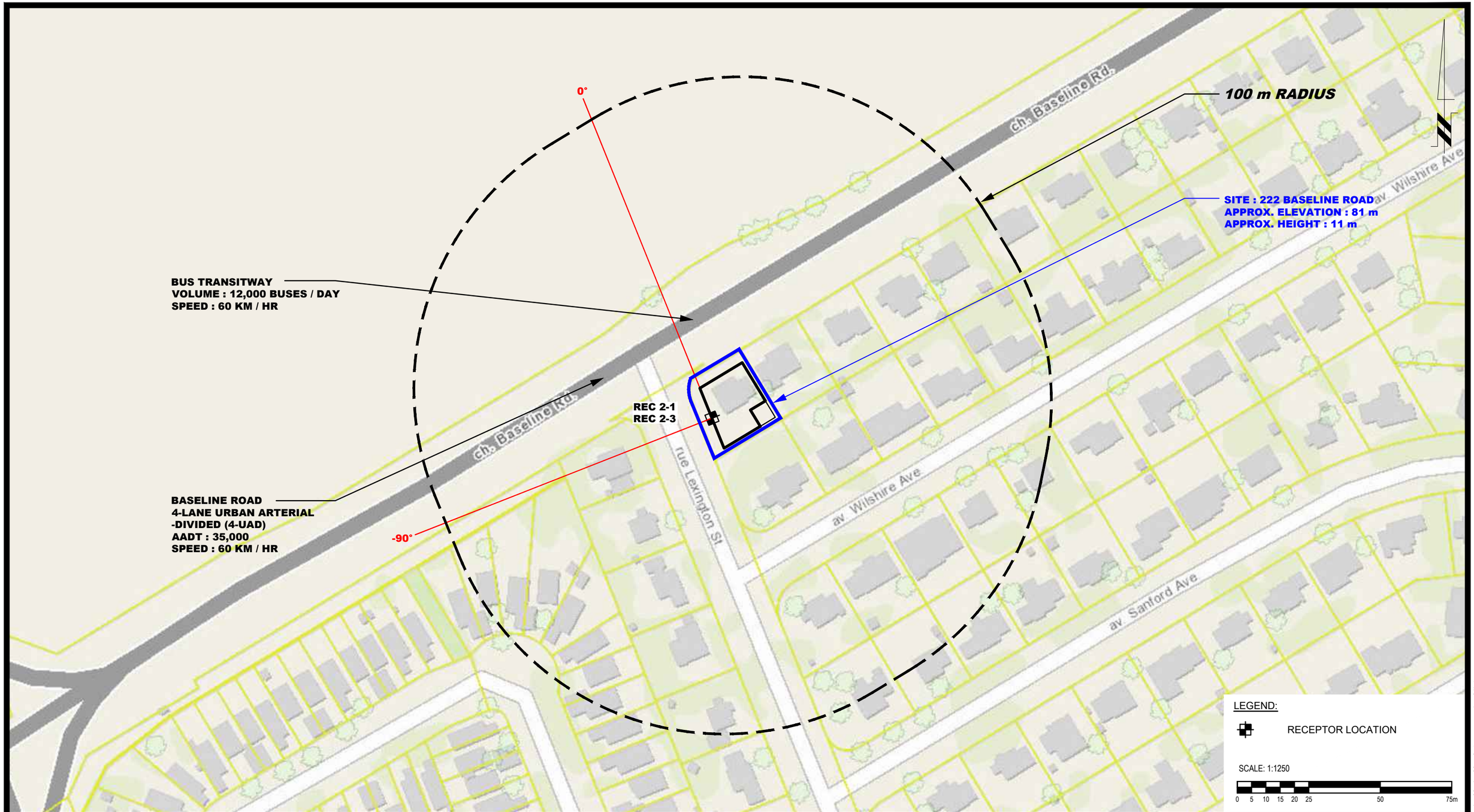

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NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 2-1 AND REC 2-3

Scale: 1:1250	Date: 06/2022
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Approved by: SB	Revision No.: 1

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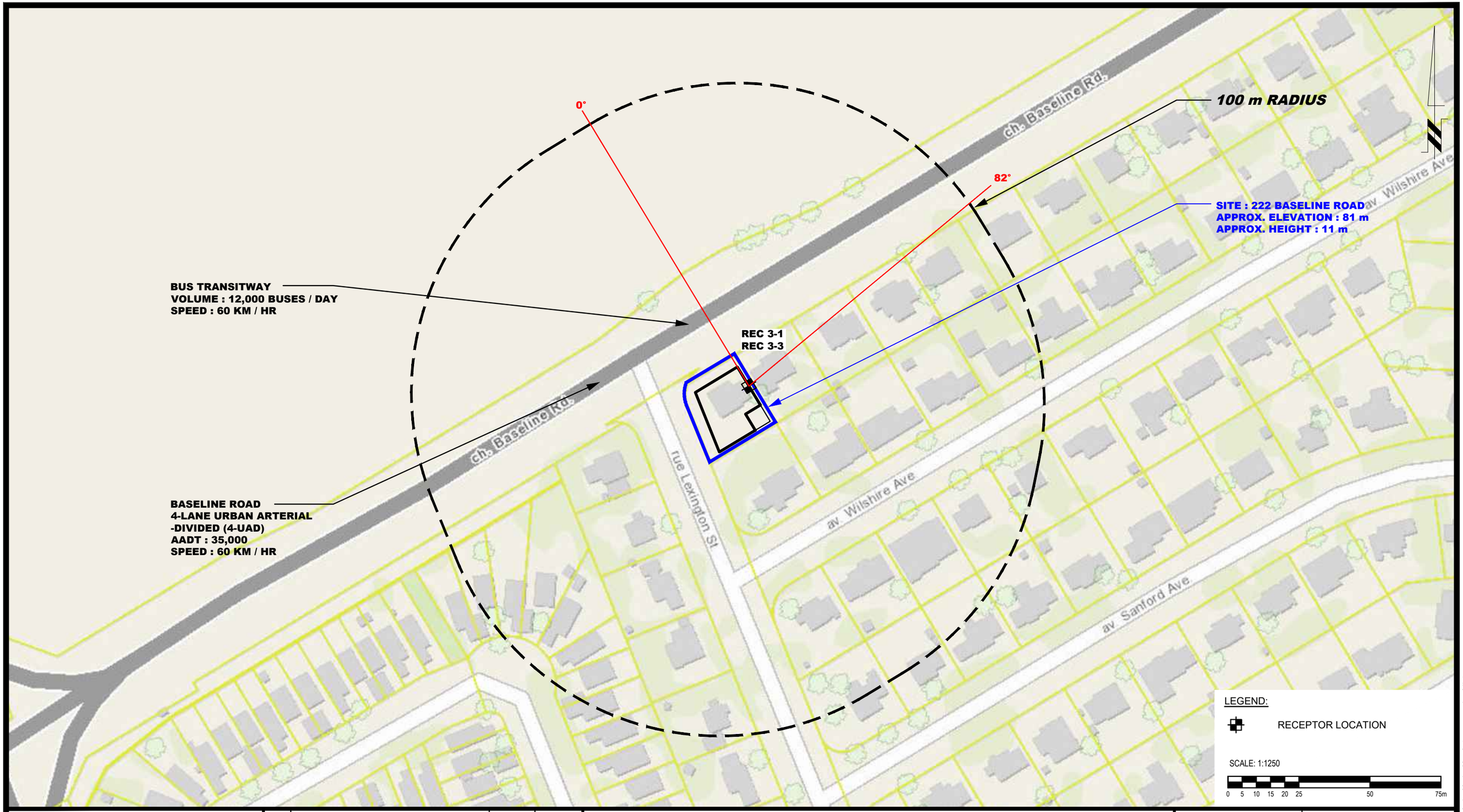

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED ROAD INFORMATION	20/04/2023	YT

HP URBAN

NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

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

Scale: 1:1250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
Checked by: YT	Dwg. No.: PG6277-3C
Approved by: SB	Revision No.: 1

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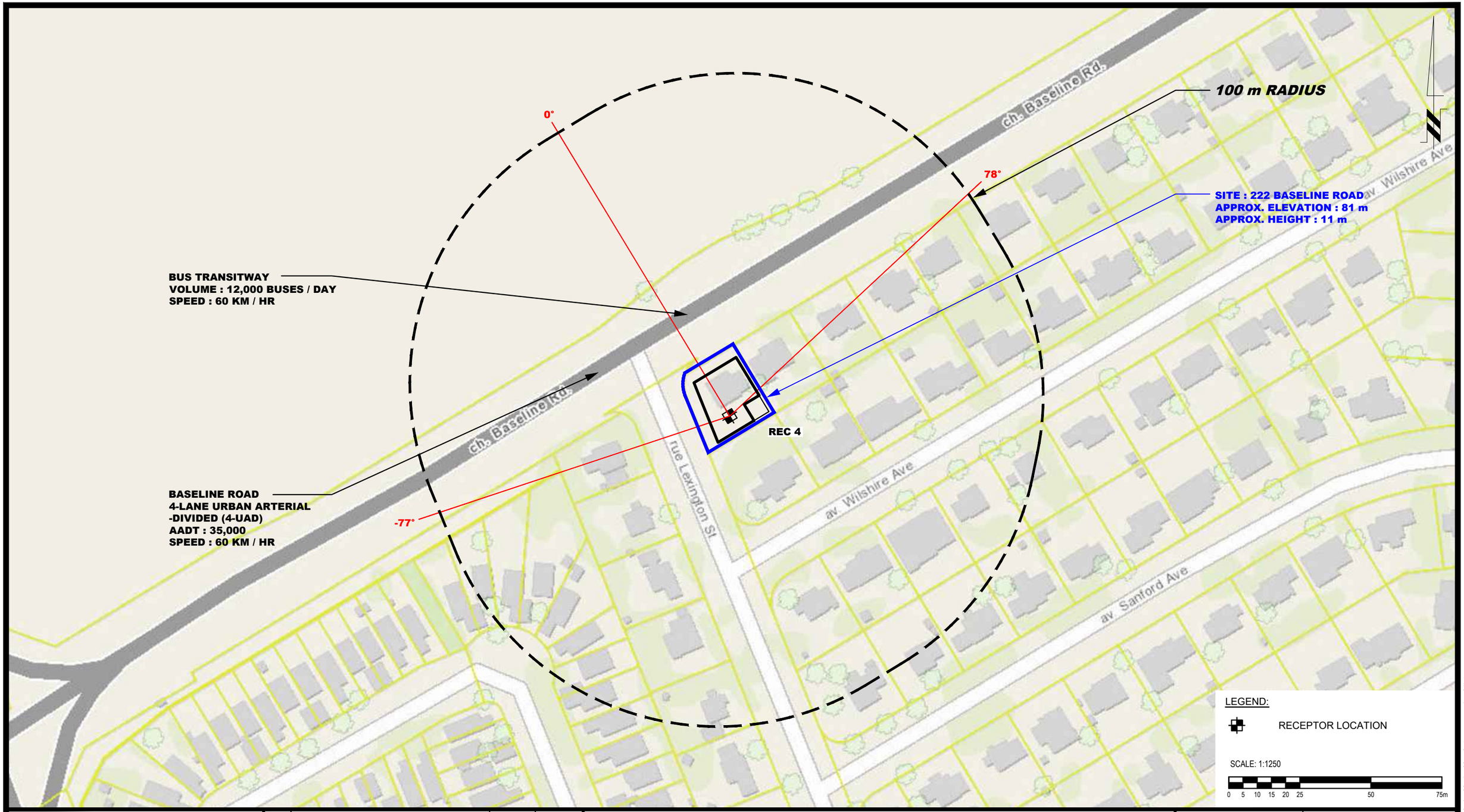

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED ROAD INFORMATION	20/04/2023	YT

HP URBAN

NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 4

Scale: 1:1250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
Checked by: YT	Dwg. No.: PG6277-3D
Approved by: SB	Revision No.: 1

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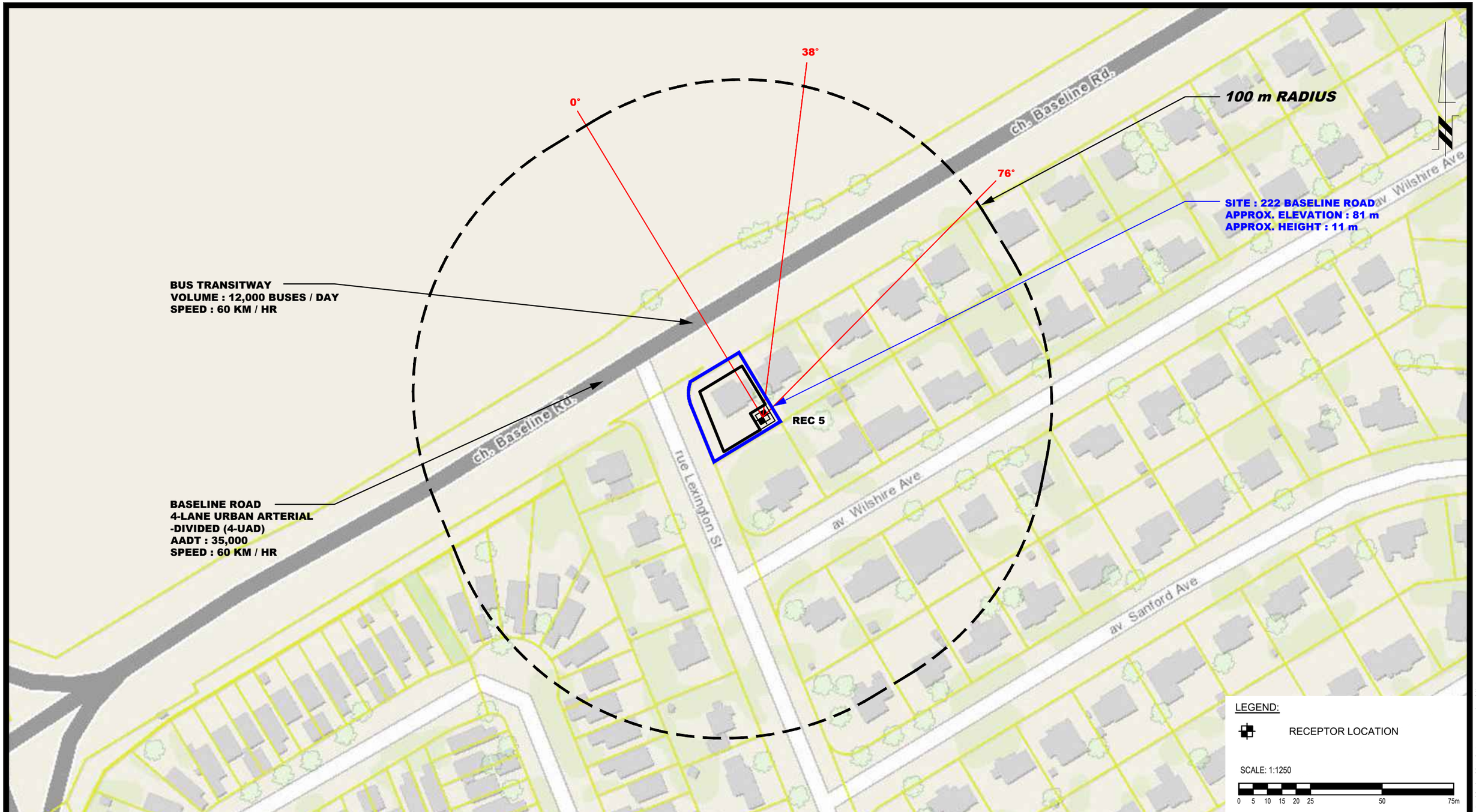

PATERSON GROUP
9 AURIGA DRIVE
OTTAWA, ON
K2E 7T9
TEL: (613) 226-7381

NO.	REVISIONS	DATE	INITIAL
1	UPDATED ROAD INFORMATION	20/04/2023	YT

HP URBAN

NOISE ATTENUATION STUDY
PROPOSED RESIDENTIAL DEVELOPMENT
222 BASELINE ROAD

OTTAWA, ONTARIO

Title:

SITE GEOMETRY - REC 5

Scale: 1:1250	Date: 06/2022
Drawn by: YA	Report No.: PG6277-1
Checked by: YT	Dwg. No.: PG6277-3E
Approved by: SB	Revision No.: 1

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APPENDIX 2

STAMSON Results

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 15:53:21
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: Baseline Rd (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: Baseline Rd (day/night)

Angle1 Angle2 : -86.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 72.20 + 0.00) = 72.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	73.68	0.00	0.00	-1.48	0.00	0.00	0.00	72.20

Segment Leq : 72.20 dBA

Total Leq All Segments: 72.20 dBA

↟

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 64.60 + 0.00) = 64.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	66.08	0.00	0.00	-1.48	0.00	0.00	0.00	64.60

Segment Leq : 64.60 dBA

Total Leq All Segments: 64.60 dBA

↟

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (day/night)

Angle1 Angle2 : -86.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟

Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 72.57 + 0.00) = 72.57 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	74.05	0.00	-1.48	0.00	0.00	0.00	72.57

Segment Leq : 72.57 dBA

Total Leq All Segments: 72.57 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 64.97 + 0.00) = 64.97 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	66.45	0.00	-1.48	0.00	0.00	0.00	64.97

Segment Leq : 64.97 dBA

Total Leq All Segments: 64.97 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 75.40
(NIGHT): 67.80

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 15:54:19
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec13.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 1-3

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

Angle1 Angle2 : -86.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 72.20 + 0.00) = 72.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	73.68	0.00	0.00	-1.48	0.00	0.00	0.00	72.20

Segment Leq : 72.20 dBA

Total Leq All Segments: 72.20 dBA

↟
Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 64.60 + 0.00) = 64.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.66	66.08	0.00	0.00	-1.48	0.00	0.00	0.00	64.60

Segment Leq : 64.60 dBA

Total Leq All Segments: 64.60 dBA

↟
RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (day/night)

Angle1 Angle2 : -86.00 deg 87.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟
Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 72.87 + 0.00) = 72.87 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.48	74.05	0.00	-1.18	0.00	0.00	0.00	72.87

Segment Leq : 72.87 dBA

Total Leq All Segments: 72.87 dBA

↟

Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 65.27 + 0.00) = 65.27 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-86	87	0.48	66.45	0.00	-1.18	0.00	0.00	0.00	65.27

Segment Leq : 65.27 dBA

Total Leq All Segments: 65.27 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 75.56
(NIGHT): 67.96

↟

↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:10:22
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: Baseline Rd (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: Baseline Rd (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 : 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: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 67.13 + 0.00) = 67.13 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	73.68	0.00	-2.07	-4.47	0.00	0.00	0.00	67.13

Segment Leq : 67.13 dBA

Total Leq All Segments: 67.13 dBA

↟

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 59.54 + 0.00) = 59.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	66.08	0.00	-2.07	-4.47	0.00	0.00	0.00	59.54

Segment Leq : 59.54 dBA

Total Leq All Segments: 59.54 dBA

↟

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (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 : 27.00 / 27.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟

Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 65.34 + 0.00) = 65.34 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	74.05	-4.24	-4.47	0.00	0.00	0.00	65.34

Segment Leq : 65.34 dBA

Total Leq All Segments: 65.34 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 57.75 + 0.00) = 57.75 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.66	66.45	-4.24	-4.47	0.00	0.00	0.00	57.75

Segment Leq : 57.75 dBA

Total Leq All Segments: 57.75 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 69.34
(NIGHT): 61.75

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:12:14
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec23.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 2-3

Road data, segment # 1: Baseline Rd (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: Baseline Rd (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 : 20.00 / 20.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 67.77 + 0.00) = 67.77 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.45	73.68	0.00	-1.81	-4.09	0.00	0.00	0.00	67.77

Segment Leq : 67.77 dBA

Total Leq All Segments: 67.77 dBA

↟

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 60.18 + 0.00) = 60.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.45	66.08	0.00	-1.81	-4.09	0.00	0.00	0.00	60.18

Segment Leq : 60.18 dBA

Total Leq All Segments: 60.18 dBA

↟

RT/Custom data, segment # 1: Transitway (day/night)

---

1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (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 : 27.00 / 27.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

↟

Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 66.12 + 0.00) = 66.12 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.48	74.05	-3.78	-4.15	0.00	0.00	0.00	66.12

Segment Leq : 66.12 dBA

Total Leq All Segments: 66.12 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 58.52 + 0.00) = 58.52 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.48	66.45	-3.78	-4.15	0.00	0.00	0.00	58.52

Segment Leq : 58.52 dBA

Total Leq All Segments: 58.52 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 70.03
(NIGHT): 62.44

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:32:05
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: Baseline Rd (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: Baseline Rd (day/night)

Angle1 Angle2 : 0.00 deg 82.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 68.22 + 0.00) = 68.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.66	73.68	0.00	0.00	-4.56	0.00	-0.90	0.00	68.22

Segment Leq : 68.22 dBA

Total Leq All Segments: 68.22 dBA

↟

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 60.62 + 0.00) = 60.62 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.66	66.08	0.00	0.00	-4.56	0.00	-0.90	0.00	60.62

Segment Leq : 60.62 dBA

Total Leq All Segments: 60.62 dBA

↟

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (day/night)

Angle1 Angle2	:	0.00 deg 82.00 deg
Wood depth	:	0 (No woods.)
No of house rows	:	1 / 1
House density	:	20 %
Surface	:	1 (Absorptive ground surface)
Receiver source distance	:	22.00 / 22.00 m
Receiver height	:	1.50 / 1.50 m
Topography	:	1 (Flat/gentle slope; no barrier)
Reference angle	:	0.00

↟

Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 65.83 + 0.00) = 65.83 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.66	74.05	-2.76	-4.56	0.00	-0.90	0.00	65.83

Segment Leq : 65.83 dBA

Total Leq All Segments: 65.83 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 58.23 + 0.00) = 58.23 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.66	66.45	-2.76	-4.56	0.00	-0.90	0.00	58.23

Segment Leq : 58.23 dBA

Total Leq All Segments: 58.23 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 70.20
(NIGHT): 62.60

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:33:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec33.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 3-3

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

Angle1 Angle2 : 0.00 deg 82.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 15.00 / 15.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Baseline Rd (day)

Source height = 1.50 m

ROAD (0.00 + 68.54 + 0.00) = 68.54 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.45	73.68	0.00	0.00	-4.23	0.00	-0.90	0.00	68.54

Segment Leq : 68.54 dBA

Total Leq All Segments: 68.54 dBA

Results segment # 1: Baseline Rd (night)

Source height = 1.50 m

ROAD (0.00 + 60.94 + 0.00) = 60.94 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.45	66.08	0.00	0.00	-4.23	0.00	-0.90	0.00	60.94

Segment Leq : 60.94 dBA

Total Leq All Segments: 60.94 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---
1 - Bus:
Traffic volume : 11040/960 veh/TimePeriod
Speed : 60 km/h

Data for Segment # 1: Transitway (day/night)

Angle1 Angle2 : 0.00 deg 82.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 20 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 22.00 / 22.00 m
Receiver height : 8.50 / 8.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: Transitway (day)

Source height = 0.50 m

RT/Custom (0.00 + 66.40 + 0.00) = 66.40 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.48	74.05	-2.46	-4.28	0.00	-0.90	0.00	66.40

Segment Leq : 66.40 dBA

Total Leq All Segments: 66.40 dBA

↟
Results segment # 1: Transitway (night)

Source height = 0.50 m

RT/Custom (0.00 + 58.81 + 0.00) = 58.81 dBA

Angle1	Angle2	Alpha	RefLeq	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	82	0.48	66.45	-2.46	-4.28	0.00	-0.90	0.00	58.81

Segment Leq : 58.81 dBA

Total Leq All Segments: 58.81 dBA

↟

TOTAL Leq FROM ALL SOURCES (DAY): 70.61
(NIGHT): 63.01

↟
↟

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:49:37
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec4.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 4

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

Angle1 Angle2 : -77.00 deg 78.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 23.00 / 23.00 m
Receiver height : 12.50 / 12.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -77.00 deg Angle2 : 78.00 deg
Barrier height : 11.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 81.00 m
Receiver elevation : 81.00 m
Barrier elevation : 81.00 m
Reference angle : 0.00

Results segment # 1: Baseline Rd (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 !       12.50 !        5.32 !        86.32

ROAD (0.00 + 52.77 + 0.00) = 52.77 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -77     78   0.00  73.68   0.00  -1.86  -0.65   0.00   0.00 -18.40  52.77
-------------------------------------------------------------------------------

Segment Leq : 52.77 dBA

Total Leq All Segments: 52.77 dBA

Results segment # 1: Baseline Rd (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 !       12.50 !        5.32 !        86.32

ROAD (0.00 + 45.17 + 0.00) = 45.17 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -77     78   0.00  66.08   0.00  -1.86  -0.65   0.00   0.00 -18.40  45.17
-------------------------------------------------------------------------------

Segment Leq : 45.17 dBA

Total Leq All Segments: 45.17 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---------------------------------------------------
1 - Bus:
Traffic volume    : 11040/960   veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 1: Transitway (day/night)
--------------------------------------------
Angle1   Angle2           : -77.00 deg   78.00 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            :  12.50 / 12.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             : -77.00 deg   Angle2 : 78.00 deg
Barrier height             :  11.00 m
Barrier receiver distance  :  15.00 / 15.00  m
Source elevation           :  81.00 m
Receiver elevation         :  81.00 m
Barrier elevation          :  81.00 m
Reference angle            :   0.00
```

Results segment # 1: Transitway (day)

```
Source height = 0.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       12.50 !        6.50 !        87.50

RT/Custom (0.00 + 54.53 + 0.00) = 54.53 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------
   -77     78   0.00  74.05  -3.01  -0.65   0.00   0.00 -15.85  54.53
-------------------------------------------------------------------------

Segment Leq : 54.53 dBA

Total Leq All Segments: 54.53 dBA
```

Results segment # 1: Transitway (night)

```
Source height = 0.50 m

Barrier height for grazing incidence
-----------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       12.50 !        6.50 !        87.50

RT/Custom (0.00 + 46.94 + 0.00) = 46.94 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
```

```
-------------------------------------------------------------------------
   -77     78   0.00  66.45  -3.01  -0.65   0.00   0.00 -15.85  46.94
-------------------------------------------------------------------------

Segment Leq : 46.94 dBA

Total Leq All Segments: 46.94 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 56.75
                           (NIGHT): 49.15
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 16:52:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: rec4tr.te Time Period: Day/Night 16/8 hours
Description: Receptor Point 4tr

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

Angle1 Angle2 : -77.00 deg 78.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 23.00 / 23.00 m
Receiver height : 12.50 / 12.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -77.00 deg Angle2 : 78.00 deg
Barrier height : 12.00 m
Barrier receiver distance : 15.00 / 15.00 m
Source elevation : 81.00 m
Receiver elevation : 81.00 m
Barrier elevation : 81.00 m
Reference angle : 0.00

Results segment # 1: Baseline Rd (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 !       12.50 !        5.32 !        86.32

ROAD (0.00 + 52.00 + 0.00) = 52.00 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -77     78   0.00  73.68   0.00  -1.86  -0.65   0.00   0.00 -19.17  52.00
-------------------------------------------------------------------------------

Segment Leq : 52.00 dBA

Total Leq All Segments: 52.00 dBA

Results segment # 1: Baseline Rd (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 !       12.50 !        5.32 !        86.32

ROAD (0.00 + 44.40 + 0.00) = 44.40 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
   -77     78   0.00  66.08   0.00  -1.86  -0.65   0.00   0.00 -19.17  44.40
-------------------------------------------------------------------------------

Segment Leq : 44.40 dBA

Total Leq All Segments: 44.40 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---------------------------------------------------
1 - Bus:
Traffic volume    : 11040/960   veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 1: Transitway (day/night)
--------------------------------------------
Angle1   Angle2           : -77.00 deg   78.00 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            :  12.50 / 12.50  m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             : -77.00 deg   Angle2 : 78.00 deg
Barrier height             :  12.00 m
Barrier receiver distance  :  15.00 / 15.00  m
Source elevation           :  81.00 m
Receiver elevation         :  81.00 m
Barrier elevation          :  81.00 m
Reference angle            :   0.00
```

🠝

```
Results segment # 1: Transitway (day)
-------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       12.50 !        6.50 !        87.50

RT/Custom (0.00 + 52.84 + 0.00) = 52.84 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------
   -77     78   0.00  74.05  -3.01  -0.65   0.00   0.00 -17.55  52.84
-----------------------------------------------------------------------

Segment Leq : 52.84 dBA

Total Leq All Segments: 52.84 dBA
```

🠝

```
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !       12.50 !        6.50 !        87.50

RT/Custom (0.00 + 45.24 + 0.00) = 45.24 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
```

```
-------------------------------------------------------------------------------
   -77     78   0.00  66.45  -3.01  -0.65   0.00   0.00 -17.55  45.24
-------------------------------------------------------------------------------

Segment Leq : 45.24 dBA

Total Leq All Segments: 45.24 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 55.45
                           (NIGHT): 47.85
↟
↟
```

STAMSON 5.0 NORMAL REPORT Date: 18-04-2023 17:32:16
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

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

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

Angle1 Angle2 : 38.00 deg 76.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 33.00 / 33.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 38.00 deg Angle2 : 76.00 deg
Barrier height : 7.00 m
Barrier receiver distance : 10.00 / 10.00 m
Source elevation : 81.00 m
Receiver elevation : 81.00 m
Barrier elevation : 81.00 m
Reference angle : 0.00

Results segment # 1: Baseline Rd (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 !        82.50

ROAD (0.00 + 44.38 + 0.00) = 44.38 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    38     76   0.24  73.68   0.00  -4.25  -7.45   0.00   0.00 -17.60  44.38
-------------------------------------------------------------------------------

Segment Leq : 44.38 dBA

Total Leq All Segments: 44.38 dBA

Results segment # 1: Baseline Rd (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 !        82.50

ROAD (0.00 + 36.79 + 0.00) = 36.79 dBA
Angle1 Angle2  Alpha RefLeq  P.Adj  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-------------------------------------------------------------------------------
    38     76   0.24  66.08   0.00  -4.25  -7.45   0.00   0.00 -17.60  36.79
-------------------------------------------------------------------------------

Segment Leq : 36.79 dBA

Total Leq All Segments: 36.79 dBA

RT/Custom data, segment # 1: Transitway (day/night)
---------------------------------------------------
1 - Bus:
Traffic volume    : 11040/960   veh/TimePeriod
Speed             :    60 km/h

Data for Segment # 1: Transitway (day/night)
--------------------------------------------
Angle1   Angle2           :  38.00 deg   76.00 deg
Wood depth                :      0       (No woods.)
No of house rows          :      0 / 0
```

```
Surface                    :      1       (Absorptive ground surface)
Receiver source distance   :  45.00 / 45.00  m
Receiver height            :   1.50 / 1.50   m
Topography                 :      2       (Flat/gentle slope; with barrier)
Barrier angle1             :  38.00 deg   Angle2 : 76.00 deg
Barrier height             :   7.00 m
Barrier receiver distance  :  10.00 / 10.00  m
Source elevation           :  81.00 m
Receiver elevation         :  81.00 m
Barrier elevation          :  81.00 m
Reference angle            :   0.00
```

🠉

```
Results segment # 1: Transitway (day)
-------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.28 !        82.28

RT/Custom (0.00 + 42.99 + 0.00) = 42.99 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
-----------------------------------------------------------------------
    38     76   0.27  74.05  -6.06  -7.53   0.00   0.00 -17.47  42.99
-----------------------------------------------------------------------

Segment Leq : 42.99 dBA

Total Leq All Segments: 42.99 dBA
```

🠉

```
Results segment # 1: Transitway (night)
---------------------------------------

Source height = 0.50 m

Barrier height for grazing incidence
------------------------------------
Source      ! Receiver    ! Barrier     ! Elevation of
Height  (m) ! Height  (m) ! Height  (m) ! Barrier Top  (m)
------------+-------------+-------------+--------------
       0.50 !        1.50 !        1.28 !        82.28

RT/Custom (0.00 + 35.39 + 0.00) = 35.39 dBA
Angle1 Angle2  Alpha RefLeq  D.Adj  F.Adj  W.Adj  H.Adj  B.Adj SubLeq
```

```
-------------------------------------------------------------------------
    38     76   0.27  66.45  -6.06  -7.53   0.00   0.00 -17.47  35.39
-------------------------------------------------------------------------

Segment Leq : 35.39 dBA

Total Leq All Segments: 35.39 dBA

↟



TOTAL Leq FROM ALL SOURCES (DAY): 46.75
                           (NIGHT): 39.16
↟
↟
```

APPENDIX 3

Baseline Road Bus Rapid Transit and Complete Street Planning and Environmental Assessment Study (Bayshore Station to Heron Station) - Recommendations - Prepared by City of Ottawa - File Number ACS2017-TSD-PLN-0003 - dated January 17, 2017

Report to
Rapport au:

Transportation Committee
Comité des transports
1 February 2017 / 1 février 2017

and Council
et au Conseil
8 February 2017 / 8 février 2017

Submitted on January 17, 2017
Soumis le 17 janvier 2017

Submitted by
Soumis par:
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Ward: BAY (7) / BAIE (7), COLLEGE (8) / COLLÈGE (8), KNOXDALE-MERIVALE (9), RIVER (16) / RIVIERE (16), CAPITAL (17) / CAPITALE (17)

File Number: ACS2017-TSD-PLN-0003

SUBJECT: Baseline Road Bus Rapid Transit and Complete Street Planning and Environmental Assessment Study (Bayshore Station to Heron Station) - Recommendations

OBJET: Étude de planification et d'évaluation environnementale du couloir de transport en commun rapide par autobus du chemin Baseline (de

la station Bayshore à la station Heron) et de la rue complète - recommandations

REPORT RECOMMENDATIONS

That the Transportation Committee recommend that Council:

1. **Approve the Functional Design for Baseline Road Bus Rapid Transit corridor (Bayshore Station to Heron Station) as described in this report and supporting documents; and,**
2. **Direct Transportation Planning staff to initiate the Transit Project Assessment Process (TPAP) in accordance with Ontario Environmental Assessment Act (Regulation 231/08), including the preparation and filing of the Environmental Project Report for final public review and comment.**

RECOMMANDATIONS DU RAPPORT

Que le Comité des transports recommande au Conseil :

1. **D'approuver la conception fonctionnelle du couloir de transport en commun rapide par autobus du chemin Baseline (de la station Bayshore à la station Heron), comme décrit dans le présent rapport et les documents à l'appui et**
2. **De demander au personnel de la Planification des transports d'amorcer le processus d'évaluation des projets de transport en commun conformément à la *Loi sur les évaluations environnementales de l'Ontario* (Règlement 231/08), y compris la préparation et le dépôt du rapport environnemental sur le projet aux fins de consultation et d'examen final par le public.**

EXECUTIVE SUMMARY

The Baseline Bus Rapid Transit (BRT) that travels along the Richmond-Baseline-Heron corridor is a strategic transit project that will expand and connect Ottawa's existing and planned Transitway and the O-Train network. It will be a cross-town transit facility that bypasses the downtown. The corridor will incorporate all elements of a complete street while also maintaining the existing general traffic lanes.

The Recommended Plan features median bus lanes for most of the 14 km corridor which will provide separation of transit from other traffic. It will improve transit travel time

and offer a reliable service that is not susceptible to traffic delays or congestion. Median transit lanes are already in service in Barrhaven (Chapman Mills Drive) as well as in other North American cities such as York Region (vivaNext), Toronto (Spadina LRT and St. Clair LRT), Cleveland (Euclid HealthLink Corridor), and elsewhere in the world.

The 24 new transit stations will provide opportunities for land use intensification and will enable continued travel growth in future as the corridor redevelops and ridership increases. The Recommended Plan also includes 23 km of sidewalks, 22 km of cycle tracks, 4 km of Multi-Use Pathway (MUP), and 1.5 km of on-road/shoulder bike lanes to encourage walking and cycling and enable an accessible, safe, and comfortable travel environment along the corridor.

Figure 1 shows the recommended alignment for the BRT facility and the proposed station locations.

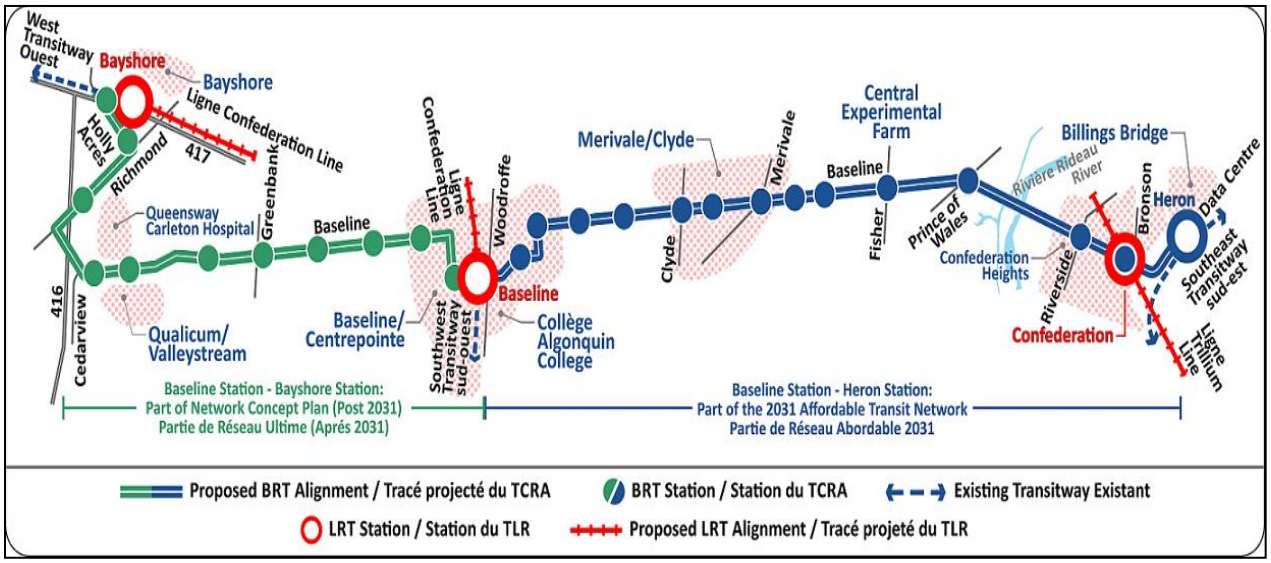

Figure 1: Recommended alignment for the Baseline Road BRT corridor

The Recommended Plan aligns with the recommended design for the future Baseline Station as identified in the completed Confederation Line West Light Rail Transit (LRT) Extension Environmental Assessment (EA) Study. Other main features of the Plan include a new signalized intersection at St. Helen's Place (in response to community feedback), noise attenuation measures at warranted locations, interim Transit Priority Measures between Baseline Station and Bayshore Station, a cycling connection between Constellation Drive and Navaho Drive along Baseline Road, and a landscaped "Shelterbelt" along the Central Experimental Farm's frontage which will provide a

specific arrangement of trees and shrubs to reduce the effects of snow-drift and erosion on the Farm's fields.

Assumptions and Analysis

The Baseline-Heron Road corridor is designated in the City's Official Plan (OP) as Urban Arterial Road. The Transportation Master Plan (TMP) identifies an at-grade Bus Rapid Transit (BRT) facility along the corridor that connects the future O-Train Confederation Line at Bayshore Station with the existing Southwest Transitway at Baseline Station, O-Train Trillium Line at Confederation Station, and Southeast Transitway at Heron Station.

Due to the existing right-of-way constraints along various sections of the corridor, the Recommended Plan has a minimal footprint ranging from 32.7 m to 36.9 m for most of the corridor. Even so, strips of land will be required from adjacent properties, as summarized below.

The project offers an opportunity to implement the City's OP policies with respect to Complete Streets by providing improved walking and cycling facilities to encourage active transportation along the corridor.

This report summarizes the findings of the study and recommends a functional design for the BRT to be included in the Environmental Project Report. The City also received $6M from the federal Public Transit Infrastructure Fund (PTIF) to initiate the detailed design as the next step towards implementation, following the completion of the EA process.

Property Requirements

The Recommended Plan requires additional right-of-way from adjacent properties to implement the project. This will affect private and publicly owned properties. The land taking requirement ranges from less than a metre to full acquisition (up to 15 private properties). A total of 232 properties are identified to be affected, which includes 222 private properties and 10 publicly owned properties. Exact property requirements will be determined during the detailed design stage of the project. Land from the National Capital Commission (NCC), Agriculture and Agri-Food Canada (AAFC), and Public Service and Procurement Canada (PSPC) is also required.

Project Cost

The TMP's Affordable Network identifies the implementation of this project as follows:

- Baseline Station to Heron Station: BRT facility, $160M; and,
- Baseline Station to Bayshore Station: Transit Priority measures, $7.3M.

The functional design cost estimate for both sections is about $148M ($140M and $8M respectively) which is well within the TMP funding envelope.

Implementation of BRT for the section from Baseline Station to Bayshore Station ($140M) is post 2031, outside of the Affordable Network.

There will also be implications for snow removal operations as there is limited space along the median bus lanes for snow storage. A minimal footprint for the corridor was developed to mitigate the impact of this project on individual properties. The snow clearing budget will be increased accordingly in future annual budgets once this transit facility is in service.

SOMMAIRE

Le couloir de transport en commun rapide par autobus (TCRA) Richmond-Baseline-Heron est un projet stratégique de transport en commun qui prolongera et reliera le réseau existant et prévu du Transitway et de l'O-Train d'Ottawa. Il s'agit d'une installation transurbaine de transport en commun qui contourne le centre-ville. Le couloir intégrera tous les éléments d'une rue complète tout en maintenant les voies de circulation générale existantes.

Le plan recommandé prévoit des voies médianes réservées aux autobus sur la plus grande partie du couloir de 14 km qui serviront à séparer les véhicules de transport en commun des autres véhicules. Ces voies médianes permettront d'améliorer les temps de déplacement en transport en commun et procureront un service fiable qui n'est pas touché par les ralentissements et la congestion de la circulation. Des voies médianes de transport en commun sont déjà en service à Barrhaven (promenade Chapman Mills) ainsi que dans d'autres villes nord-américaines, comme la région de York (vivaNext), Toronto (TLR Spadina et TLR St. Clair), Cleveland (Euclid HealthLink Corridor) et ailleurs dans le monde.

Les 24 nouvelles stations de transport en commun fourniront des possibilités de densification de l’utilisation du sol et permettront la croissance continue des déplacements à l'avenir alors que le couloir est réaménagé et que le nombre d'usagers augmente. Le plan recommandé comprend également 23 km de trottoirs, 22 km de pistes cyclables, 4 km de sentiers polyvalents et 1,5 km de voies cyclables sur route ou

sur l'accotement afin d'encourager la marche et le vélo et de permettre un environnement de déplacement accessible, sécuritaire et confortable le long du couloir.

La Figure 1 indique le tracé recommandé pour l'installation de TCRA et l'emplacement proposé des stations.

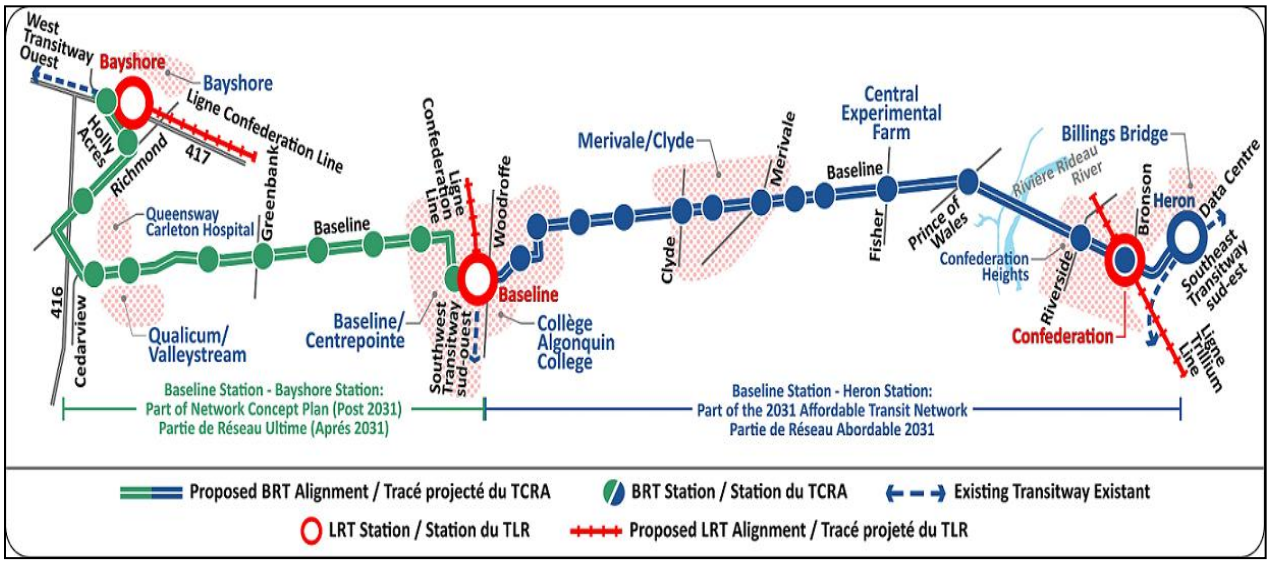

Figure 1 : Tracé recommandé pour le couloir du TCRA du chemin Baseline

Le plan recommandé respecte la conception recommandée pour la future station Baseline, comme indiqué dans l'Étude d'évaluation environnementale (ÉE) pour le prolongement vers l'ouest de la Ligne de la Confédération du train léger sur rail (TLR). Le plan prévoit également une nouvelle intersection avec feux de signalisation à la place St. Helen's (en réponse aux commentaires de la communauté), des mesures d'atténuation du bruit à certains endroits qui le justifient, des mesures intérimaires assurant la priorité aux transports en commun entre la station Baseline et la station Bayshore, un lien cyclable entre la promenade Constellation et la promenade Navaho le long du chemin Baseline, et un brise-vent paysager le long de la façade de la ferme expérimentale centrale qui comprendra un agencement précis d'arbres et d'arbustes visant à réduire les effets de l'accumulation de neige et de l'érosion sur les champs de la ferme.

Hypothèses et analyse

Le couloir du chemin Baseline-Heron est désigné dans le Plan officiel (PO) comme une artère urbaine. Le Plan directeur des transports (PDT) prévoit une installation de transport en commun rapide par autobus (TCRA) à niveau le long du couloir qui reliera la future Ligne de la Confédération de l'O-Train (station Bayshore) au Transitway Sud-

Ouest actuel (station Baseline), à la Ligne Trillium de l'O-Train (station Confédération) et au Transitway Sud-Est (station Heron).

En raison des limites de l'emprise actuelle le long de diverses sections du couloir, le plan recommandé prévoit une empreinte minimale allant de 32,7 m à 36,9 m pour la majeure partie du couloir. Malgré cela, des parcelles de terrain des propriétés adjacentes seront nécessaires, comme indiqué ci-dessous.

Le projet offre l'occasion de mettre en œuvre les politiques du PO de la Ville en ce qui a trait aux rues complètes en fournissant de meilleures infrastructures pour les cyclistes et les piétons dans le but d'encourager le transport actif le long du couloir.

Le présent rapport résume les résultats de l'étude et recommande une conception fonctionnelle pour le TCRA à inclure dans le Rapport environnemental sur le projet. La Ville a également reçu 6 millions de dollars provenant du Fonds pour l'infrastructure de transport en commun du gouvernement fédéral afin de commencer la conception détaillée comme prochaine étape vers la mise en œuvre, après l'achèvement du processus d'ÉE.

Exigences relatives à la propriété

Le plan recommandé exige d'acquérir une emprise supplémentaire des terrains adjacents afin de réaliser le projet, ce qui aura une incidence sur des propriétés publiques et privées. L'exigence de prise de possession des terrains varie de moins d'un mètre à une acquisition complète (jusqu'à 15 propriétés privées). En tout, 232 propriétés seront touchées, ce qui comprend 222 propriétés privées et 10 propriétés publiques. Les exigences exactes relatives à la propriété seront déterminées au cours de l’étape de conception détaillée du projet. Des terrains de la Commission de la capitale nationale (CCN), d'Agriculture et Agroalimentaire Canada (AAC) et de Services publics et Approvisionnement Canada (SPAC) sont également requis.

Coût du projet

Le réseau abordable du PDT établit la mise en œuvre de ce projet comme suit :

- de la station Baseline à la station Heron : installation du TCRA, 160 M$ et
- de la station Baseline à la station Bayshore : mesures assurant la priorité aux transports en commun, 7,3 M$.

Les coûts pour la conception fonctionnelle pour les deux sections sont estimés à environ 148 M$ (140 M$ et 8 M$ respectivement), ce qui respecte l'enveloppe de financement du PDT.

La mise en œuvre du TCRA pour la section à partir de la station Baseline jusqu'à la station Bayshore (140 M$) se fera après 2031, à l'extérieur du réseau abordable.

Il y aura également des effets liés aux opérations de déneigement puisqu'il y a peu d'espace pour le stockage de la neige le long des voies d'autobus du centre. Une empreinte minimale a été aménagée le long du couloir afin de réduire les répercussions de ce projet sur les propriétés individuelles. L'enveloppe budgétaire allouée au déneigement sera augmentée en conséquence dans les prochains budgets annuels une fois que cette installation du transport en commun sera inaugurée.

BACKGROUND

The population of City of Ottawa is projected to grow from approximately 922,000 (2011) to 1.14 million (23% increase) by the year 2031.

A growth management strategy has been set out in the City's Official Plan (OP) that emphasizes urban intensification and increased mixed-use development centred on rapid transit corridors as one of the means to address future travel demand and to minimize the use of single occupancy vehicles for peak period travel. The City's 2008 Transportation Master Plan (TMP), as well as the updated 2013 TMP identified the Richmond-Baseline-Heron Road corridor as an important link in the City's bus-based rapid transit network in support of the OP objectives.

On February 2, 2011, Transportation Committee approved the Statement of Work for Baseline Road Planning and Environmental Assessment Study (Bayshore Station to Prince of Wales Drive). Transportation Committee also approved an addendum to the study scope on July 2, 2014 to extend the study limits easterly to the Southeast Transitway (Heron Station).

This report describes the findings of the EA Study.

DISCUSSION

Study Area

The study area (Figure 2) for the Baseline Road BRT EA Study extends from Bayshore Station to Heron Station at Data Centre Road along the Richmond-Baseline-Heron

Road corridor. In the western and central portions, the study area was expanded to examine alignment options for connection to Bayshore Station, Queensway-Carleton Hospital (QCH), and Baseline Station/Algonquin College campus.

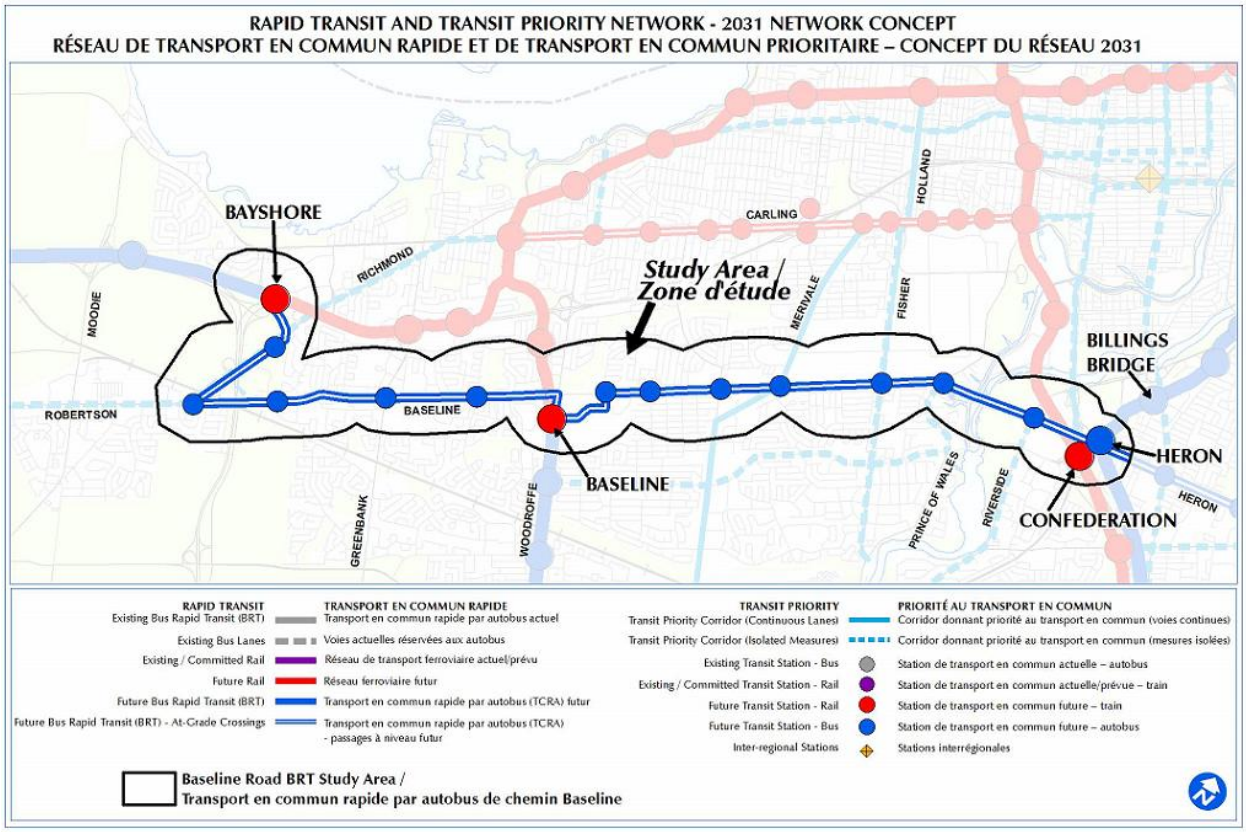

Figure 2: Study Area

Land uses in this area includes Bayshore Shopping Centre, Queensway-Carleton Hospital, Pinecrest Cemetery, Algonquin College, College Square, Centrepointe Town Centre, the Central Experimental Farm, Agriculture and Agri-Food Canada (AAFC), Confederation Heights, Billings Bridge Plaza, retail centres, single unit residential homes, town houses, multi-storeyed apartment buildings, schools, and parks.

The study area includes federal, provincial, municipal, and privately owned lands. Natural features located within the study area include the National Capital Greenbelt, the Central Experimental Farm, NCC National Interest Land Mass (NILM) lands, Pinecrest Creek corridor, watercourses, and Urban Natural Areas.

Existing Conditions

The Baseline Road BRT corridor primarily has four lanes (two in each direction) for general traffic. Between Cobden Road and Constellation Crescent it has six lanes which include a dedicated westbound curb-side lane for transit buses. Similarly, along Heron Road between Prince of Wales Drive and Data Centre Road, the corridor has six lanes with a dedicated curb-side transit lane in each direction. Auxiliary turn lanes also exist at many intersections along the corridor. Richmond Road within the study limits traverses the Greenbelt and generally has a rural section.

The corridor handles between 1500 and 3000 (vehicles/hr) two-way traffic volume during the morning and afternoon peak hours.

The existing transit service along the corridor is primarily provided by Route 118 (Terry Fox Station to Hurdman Station). It is an alternative east-west cross-town route which bypasses the downtown area. Route 111 is another east-west route that uses the corridor east of Prince of Wales Drive. Routes 87, 97, 111, 150, 151, 152, 252 and 290 use the corridor for short sections as they connect to other streets. Routes 86, 172, 173, 176 and 282 cross the corridor at intersecting streets. All routes on the Southwest Transitway cross the corridor at Baseline Station. The present bus service in the corridor operates primarily in mixed traffic, where it is subject to delay by auto traffic congestion, except for the bus-only lanes on the Heron Road bridge and short bus-only lanes at Confederation, Baseline, and Bayshore Stations.

The traffic analysis indicates that during the weekday AM and PM peak hours, several intersections in the study area currently operate at capacity – resulting in traffic delays and congestion. Transit service is also affected by these conditions. As traffic patterns degrade along the corridor, transit service will continue to be adversely affected. Reliability issues and the ability to meet the City's transit modal share targets will be compromised.

The pedestrian network within the study area consists of sidewalks associated with major roadways, multi-use pathway connections, and several mid-block pathways into adjacent communities. There are no sidewalks, for the most part, on Richmond Road within the study area, nor on the north side of Baseline Road adjacent to the Central Experimental Farm. The remainder of the corridor has pedestrian infrastructure in place.

Baseline Road is designated as a Spine Route for cycling. Currently, on-road dedicated bike/shoulder lanes exist along the corridor between Holly Acres Road and Greenbank Road, and east from Prince of Wales Drive to Data Centre Road (discontinuous). Multi-

use Pathways exist in several locations including Holly Acres Road, Queensway-Carleton Hospital, the Pinecrest Creek corridor, the Central Experimental Farm, Vincent Massey Park, and near Confederation O-Train Station along the Trillium Line.

Project Need and Justification

The TMP as well as the Needs and Justification component of the EA Study has confirmed that there is sufficient transit demand along the corridor to support implementation of a rapid transit facility.

The micro-simulation analysis demonstrates that dedicated median transit lanes along the corridor will reduce transit travel time by up to 11 minutes in the afternoon peak hour. This is a substantial saving of time for transit customers. In addition to the travel time saving, the BRT facility would also improve service reliability, and the travel time saving would allow the buses to cycle more frequently over their routes, allowing for increased capacity and shorter waiting times at the same operating cost. The improvements to waiting time, travel time, and reliability will encourage more travellers to choose transit, which will help to reduce automobile dependence.

The Capital Urban Lands Plan 2015 designates Confederation Heights as a major federal employment centre over the long-term. Implementation of rapid transit facility along the corridor will complement these sites and support compact development and mixed-use employment centres located near rapid transit infrastructure.

While the O-Train Confederation Line service will serve neighbourhoods to the north, the Baseline-Heron Road BRT facility is needed to serve communities farther south and to move transit riders east and west quickly, without travelling through downtown.

The project is supportive of the City building objectives with respect to connecting significant employment, commercial and higher density residential land uses to the City's rapid transit network. The project also offers an opportunity to implement the City's OP policies with respect to Complete Streets by providing improved walking and cycling facilities to encourage active transportation along the corridor.

Corridor/Alignment Options

Alternative routes to provide an east-west rapid transit facility south of the O-Train Confederation Line were investigated during the 2008 and 2013 TMP update exercise. Baseline-Heron Road corridor was selected as it is already a major east-west transit route which is complemented by its existing and future land use types. In the western and central parts of the study area, alignment options were developed and evaluated to

provide connections to important trip generators such as Bayshore Station, Queensway-Carleton Hospital, and the Algonquin College/Centrepointe Town Centre areas. These alignment options are described in Section 1 of Document 2. Key considerations that guided the development and evaluation of alternative alignments and the evaluation results are summarized in Section 2 of Document 2.

Design Considerations

Due to the challenging nature of constraints along the corridor, special consideration was given to creating a balance among the interrelated needs of all modes of transportation and the impacts on the adjacent lands. The following key factors were considered in the development of alternative designs for the corridor:

- Improved transit services;
- Dedicated cycling facilities;
- Pedestrian facilities;
- Station and stop locations;
- Level-of-Service for vehicular traffic;
- Property issues including access management; and,
- Reallocation of road space versus widening.

Five alternative designs were investigated:

- Curb-side Bus Lanes;
- Median Bus Lanes;
- One-side Bus Lanes;
- Reversible Lane; and,
- Lane Reduction.

Discussion on these alternative designs is provided in Section 3 of Document 2.

The Median Bus Lanes option is recommended due to a number of transit operational benefits. Being in the median, buses are not affected by right-turning vehicles. Buses travelling in the curb lane will need to mix with private vehicles that are making right-turns into and out of both private approaches/driveways and municipal side streets. The buses will experience delay and be subject to sudden braking situations as private vehicles make the right-turns in and out. Without monitoring and enforcement, there will be incidents of cars illegally using (or blocking) the transit lane. Transit in the curb lane would be slower and less reliable. Operating costs are higher for curb-side transit as lower operating speed and reduced service reliability requires that additional buses be operated continually. These costs can be very large over time. In the curb-side bus

lanes, cyclists would also have to yield to passengers at stations. The additional service reliability (of median transit lanes) is one of the features that attract riders – not only are the buses faster, but they are consistently faster. This reduces the amount of time passengers need to plan into their schedule to make a trip. The median bus lane configuration places buses further from the building faces. It also divides up the crossing distance to the station platforms for both directions. The median provides a place of refuge for pedestrians and is seen as an improvement to local mobility, particularly by seniors and others with limited mobility.

Furthermore, as the Median Bus Lanes provide better separation from general traffic, this design is least likely to be affected by future, increased traffic volumes. A visible infrastructure investment as well as the faster travel times is likely to increase transit-supportive development in the corridor. Faster travel times will allow the same number of buses to operate more frequently and carry more people, thus attracting more ridership along the corridor.

Recommended Plan

Although the Official Plan protects for a 44.5 m right-of-way, the Recommended Plan has a minimal footprint ranging from 32.7 m to 36.9 m and provides all desired elements of a Complete Street. In unconstrained areas such as the NCC's Greenbelt along Richmond Road and the Central Experimental Farm lands, a wider right-of-way width is recommended to accommodate the rural cross-section and a 3 m wide MUP. With the exception of the area around Algonquin College where curb-side bus lanes and a single lane in each direction for general traffic is recommended, the plan for the rest of the corridor provides for median bus lanes and two traffic lanes in each direction for general traffic. For most of the corridor, it also incorporates a 1.2 m wide boulevard, a 1.5 m one-way raised cycle track, and a 1.8 m wide concrete sidewalk immediately adjacent to the cycle track on both sides of the roadway. Auxiliary turn lanes are provided at signalized intersections. In between stations, a 1.5 m concrete median will be provided to separate opposing traffic streams. The design also includes the "protected intersection" feature to further enhance cycling safety. This is described further in the report (see section Protected Intersection Design).

The Recommended Plan for the project has the following four distinct sections:

- Section 1: Bayshore Station – Richmond/Baseline;
- Section 2: Richmond/Baseline – Baseline Station;
- Section 3: Baseline Station – Prince of Wales Drive; and,

- Section 4: Prince of Wales Drive – Heron Station (Data Centre Road).

The distinguishing elements of each section are described below:

Section 1: Bayshore Station – Richmond/Baseline

This section starts from Bayshore Station and connects to Holly Acres Road using the West Transitway. The existing at-grade connection at Holly Acres Road will be used to service buses to/from the Baseline BRT corridor.

Along Holly Acres Road and Richmond Road, dedicated median transit lanes are proposed, starting east of the Holly Acres/Highway 417 eastbound off-ramp intersection. West of this intersection, a transition is provided to allow buses to and from Bayshore Station to merge into the curb lanes. Transit stations will be provided at Holly Acres/West Transitway, Holly Acres/Richmond, and John Sutherland/Richmond intersections to serve the adjacent communities and the Queensway-Carleton Hospital.

Existing multi-use pathways on both sides of Holly Acres Road will be maintained between the West Transitway and Richmond Road. Along Richmond Road, in addition to paved shoulders, a multi-use pathway is also recommended on the east side to encourage pedestrian and bicycle movement along the corridor.

The cross-section developed will fit within the existing structure limits on the Richmond Road overpass of Highway 416.

On Holly Acres Road, the preferred design protects for the proposed relocation of the existing Highway 417 eastbound on-ramp from Richmond Road as per the approved Ontario Ministry of Transportation (MTO) Environmental Assessment.

Access to eight individual properties on Richmond Road between Baseline Road and Holly Acres Road will be limited to right-in/right-out only.

Figure 3 shows the typical cross-section that will be applied along Richmond Road where it traverses the Greenbelt. The Recommended Plan was developed with the participation of the NCC.

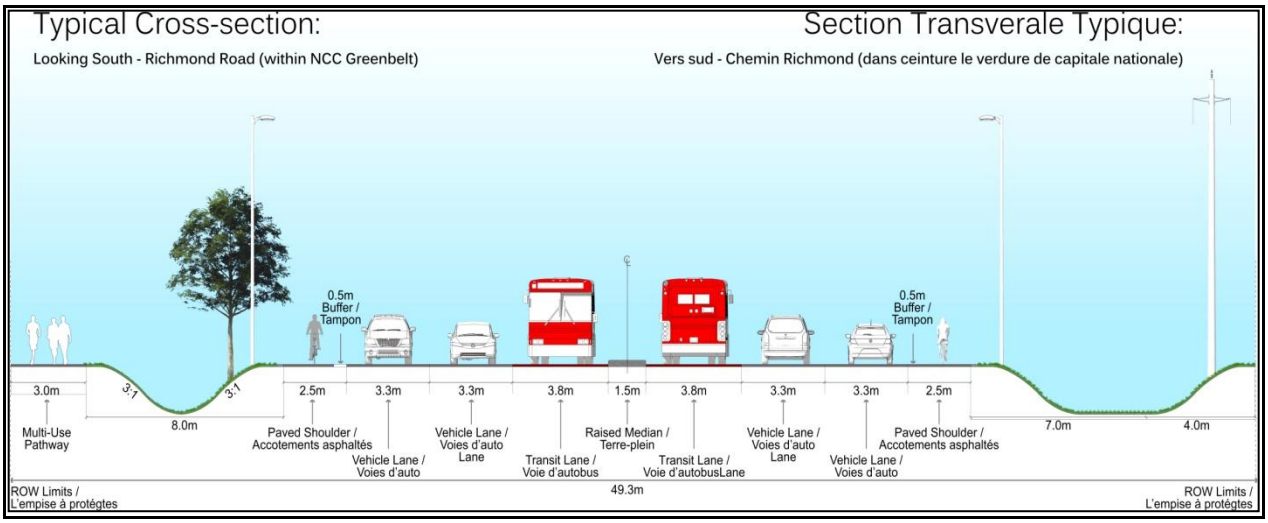

Figure 3: Typical cross-section - Richmond Road (Within NCC Greenbelt)

Section 2: Richmond/Baseline – Baseline Station

This section of the corridor includes Baseline Road from Richmond Road to Constellation Drive, Constellation Drive from Baseline Road to Navaho Drive, and Navaho Drive to Baseline Station. Moving along Baseline, west of Constellation Drive, the cross-section width varies from 32.7m to 36.3m. The larger width is used in unconstrained areas where a wider inner boulevard can be implemented allowing space for some snow storage.

Continuous median transit lanes are proposed along Baseline Road from Richmond Road to Constellation Drive, and along Constellation Drive between Baseline Road and Navaho Drive. Stations are proposed at Queensway-Carleton Hospital (QCH), Sandcastle Drive, Morrison Drive, Greenbank Road, Rockway Crescent, Centrepointe/Cobden Road, Centrepointe/Highgate Road, and Navaho Drive.

Buses currently operate through the QCH campus and the City expects to continue as such until the need for median BRT is established.

Figure 4 shows the typical cross-section (mid block) that will be applied on Baseline Road west of Constellation Drive. Figure 5 depicts a typical median station at an intersection.

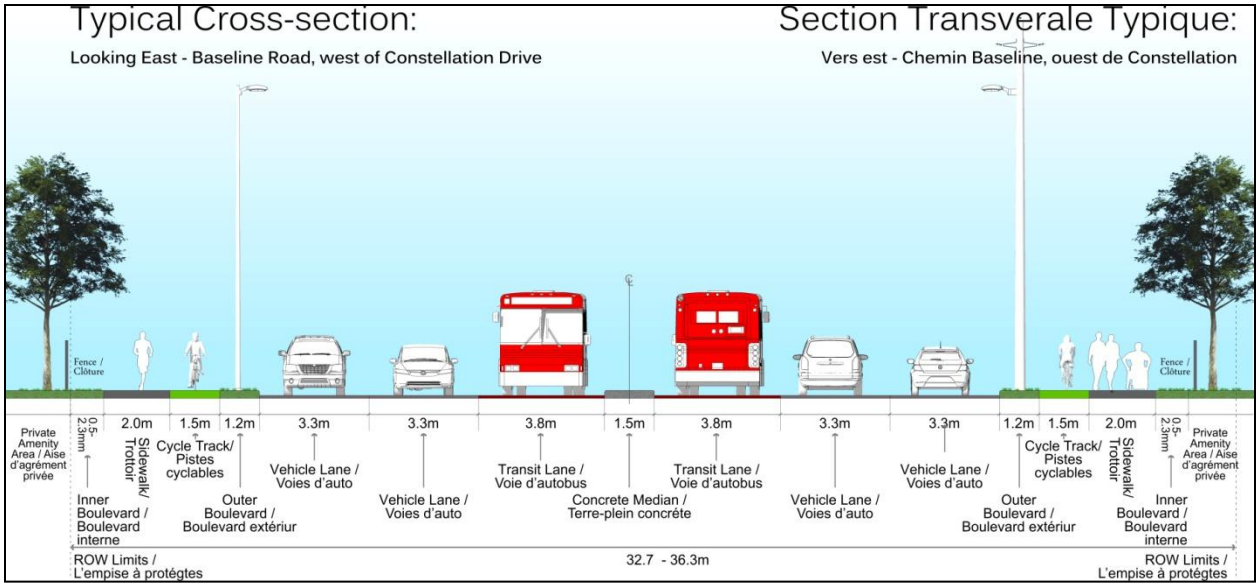

Figure 4: Typical cross-section - Baseline Road, West of Constellation Drive

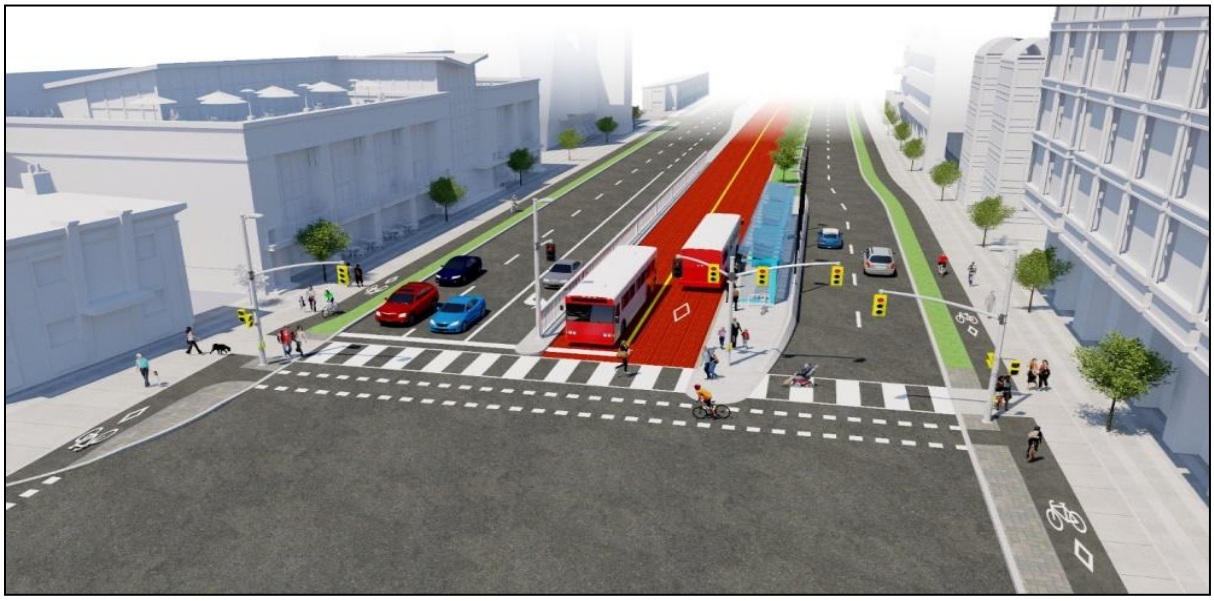

Figure 5: Median BRT lanes with station

The road widening in this section will affect some private residences and commercial establishments from which only a sliver of property is required. A strip of land from the Pinecrest Cemetery is also required but this does not affect any burial sites. In some sections, there will be relocation of fences. Out of the seven un-signalized full movement intersections, five will be limited to right-in/out movements. These intersections include Sioux Crescent, 2938 Baseline Road (retail development), Cornell Street; Pinecrest Road (affects eastbound left-turn only), and 2340 Baseline (St. John

the Apostle Church). Access to the Pinecrest Cemetery will be signalized due to the fact that it is the only access to the Cemetery from Baseline Road. The Rockway Crescent intersection will also be signalized as it serves a large high-density residential community. A BRT station is also proposed at this location which will require traffic signals to accommodate pedestrian access.

The Recommended Plan incorporates the design for the future Baseline Station as identified in the completed Confederation Line West LRT Extension EA Study.

Section 3: Baseline Station – Prince of Wales Drive

This section of the corridor includes Woodroffe Avenue from College Avenue to Navaho Drive, Navaho Drive from Woodroffe Avenue to Baseline Road, and Baseline Road from Navaho Drive to Prince of Wales Drive.

On Woodroffe Avenue, an existing southbound curb-side transit lane will be used to access Baseline Station, while in the northbound direction it is proposed to re-purpose the existing curb-side lane as a dedicated transit lane, leaving two lanes for general traffic. Along Navaho Drive, widening is proposed to provide two dedicated curb-side transit lanes, with buses transitioning from curb to median lanes at the Navaho Drive/Algonquin College intersection. Buses currently operate through the Algonquin campus and the City expects to continue as such before BRT lanes along Navaho Drive are introduced.

Stations are proposed at Baseline Station, Navaho Drive (Algonquin College), Navaho/Baseline, Ferguson Street, Erindale Drive, Clyde Avenue, Baseline/Walmart Plaza, Merivale Road, Farlane Boulevard, Zena Street, Fisher Avenue, and Prince of Wales Drive.

Moving from Navaho Drive to Clyde Avenue, Figure 6 shows a cross-section of 32.7 m, for this particularly constrained section.

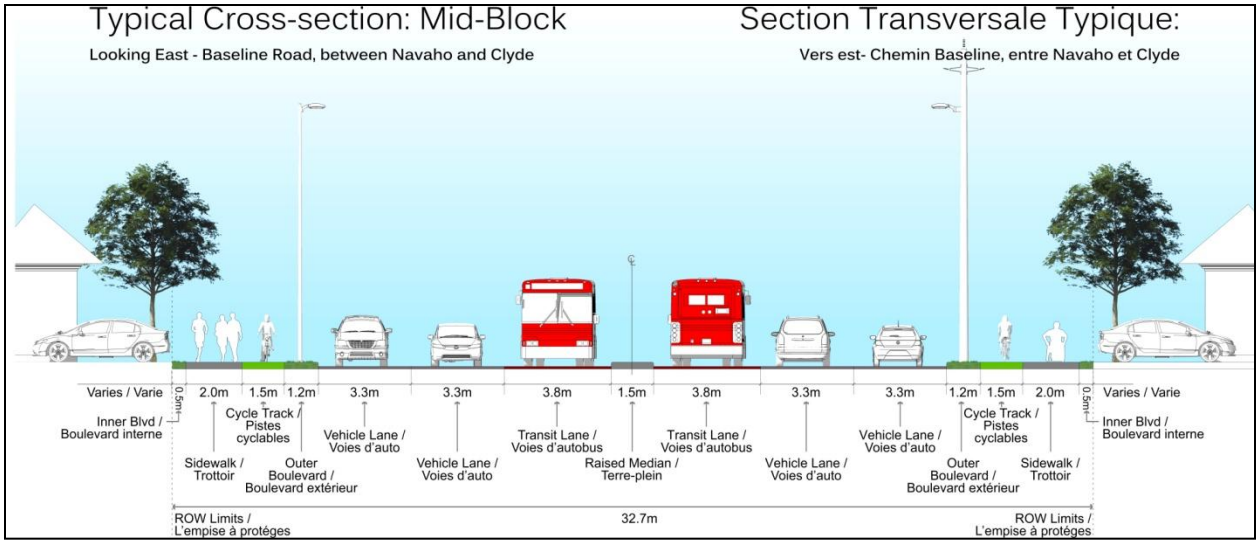

Figure 6: Typical cross-section - Baseline Road (Navaho to Clyde)

Figure 7 shows a cross-section along the Central Experimental Farm. It includes a new 3 m Multi-use Pathway (MUP) on the north side of the corridor.

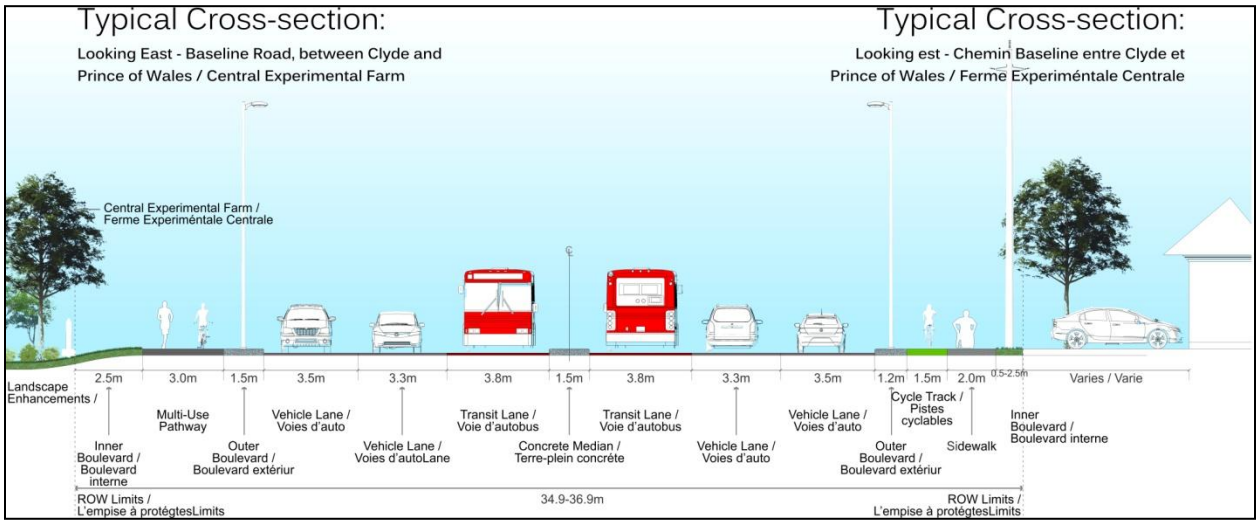

Figure 7: Typical cross-section - Baseline Road (Merivale to Prince of Wales)

The project requires a strip of land (the typical widening being in the range of 7 m) from the Central Experimental Farm to accommodate median BRT lanes. Agriculture and Agri-Food Canada staff requested a buffer “Shelterbelt” along the frontage of Experimental Farm. The Shelterbelt which provides a specific arrangement of trees, and shrubs to reduce the effects of snow-drift, salt spray, and erosion on the Farm’s fields – this is viewed as a positive design element for the corridor. The Shelterbelt will improve

the long-term health of the Central Experimental Farm, and provide a pleasant vista for users of the pedestrian and cycle facilities.

There are four existing un-signalized full movement intersections of which two will be limited to right-in/out movement. These intersections are located at Skyline Campus (office development) and 1032 Baseline (St. Augustine Church). The intersection at Erindale Drive will be signalized, as a BRT station is identified at this location which will require signals to accommodate pedestrian access. Also, as a result of public feedback, a new signalized intersection is proposed at St. Helen's Place to substitute the multi-directional access at 1465 Baseline (residential development).

Section 4: Prince of Wales – Heron Station (Data Centre Road)

This section of the corridor includes Heron Road from Prince of Wales Drive to Heron Station (Data Centre Road).

Existing curb-side transit lanes on Heron Road from Prince of Wales Drive to Data Centre Road are proposed to be converted to median transit lanes to provide consistency with the design of the remainder of the corridor. No structural modifications are required for the Heron Road Bridge. Stations are proposed at Riverside Drive, Confederation Station/Bronson Avenue (connection to O-Train Trillium Line), and Heron Station (connection to Southeast Transitway). Buses will continue along Data Centre Road to Billings Bridge Station on the Southeast Transitway.

A short section of the existing on-street cycle lanes is recommended to be maintained where Heron Road passes over the Rideau Canal and Colonel By Drive, to avoid the need to make alterations to this recently rehabilitated structure.

Protected Intersection Design

To further promote active transportation and to enhance the environment for people with mobility constraints, intersections have been designed as protected intersections to separate cyclists and pedestrians from vehicles and to increase their visibility and safety (Figure 8).

Figure 8: Protected Intersection Design

The Recommended Plan for the corridor is shown in Document 1 A.

The EA Study also recommends interim Transit Priority Measures (Document 1 B) between Baseline Station and Bayshore Station (Phase 2) as identified in the TMP's 2031 Affordable Network. The existing bus bays along the corridor will be removed and buses will receive signal priority at signalized intersections. The intersection at Baseline/Greenbank Road requires major modifications which have been designed to minimize throw away cost at the time of BRT implementation.

Additionally, a functional design plan has also been developed that would complete the "missing link" of cycling network between Constellation Drive and Navaho Drive along Baseline Road (Document 1 C).

Property Requirements

The Recommended Plan requires additional right-of-way from adjacent properties to implement the project. This will affect private and publicly owned properties. The land taking requirement ranges from less than a metre to full acquisition (up to 15 private properties). A total of 232 properties are identified to be affected, which includes 222 private properties. Strips of land are also required from 10 properties owned by the NCC, the Agriculture and Agri-Food Canada (the Central Experimental Farm), and Public Service and Procurement Canada (PSPC). Exact property requirements will be determined during the detailed design stage of the project.

Project Cost

The TMP's Affordable Network identifies the implementation of this project as follows:

- Baseline Station to Heron Station: BRT facility, $160M
- Baseline Station to Bayshore Station: Transit Priority measures, $7.3M.

The functional design cost estimate for both sections is about $148M ($140M and $8M respectively) which is well within the TMP funding envelope.

Implementation of BRT for the section from Baseline Station to Bayshore Station ($140M) is post 2031, outside of the Affordable Network.

The project estimates (in 2016 dollars) represent a Class C estimate, prepared in accordance with the City's Project Delivery Review and Cost Estimating Process. The estimates include detailed design, construction, project management, property acquisition costs, as well as contingency allocations. These costs will be refined and better quantified through the design phase of the project.

There will also be implications for snow removal operations as there is limited space along the median bus lanes for snow storage. A minimal footprint for the corridor was developed to mitigate the impact of this project on individual properties. The snow clearing budget will be increased accordingly in future annual budgets once this transit facility is in service.

RURAL IMPLICATIONS

Lands south and east of the Highway 416/417 interchange are comprised of NCC's Greenbelt Employment and Greenbelt Rural areas on which active farmland, public open space, and the Queensway-Carleton Hospital (QCH) are located. Policies identified within the Greenbelt Master Plan 2013 apply to these areas.

The Recommended Plan along Richmond Road will require land from the NCC Greenbelt; however, the Plan includes measures that preserve the rural character through use of ditching for storm-water management. The Recommended Plan also provides an improved environment for pedestrians and cyclists through a new east-side multi-use pathway and paved shoulders/on-road bicycle facility.

CONSULTATION

The project benefitted from the review and feedback of: the Agency Consultation Group (ACG) consisting of representatives from select government agencies (includes NCC and AAFC) and approval bodies as well as other City Service Areas; the Public Consultation Group (PCG) consisting of representatives from directly affected Community Associations; the Business Consultation Group (BCG) including Chamber of Commerce, Queensway-Carleton Hospital, Pinecrest Cemetery, business associations, institutions and large commercial establishments; the Accessibility Advisory Committee (AAC); and special interest groups (Citizens for Safe Cycling, Friends of the Central Experimental Farm). A website (www.ottawa.ca/baselinecorridor) was established to post project-related information.

Various consultation meetings took place, such as:

- Four Public Open Houses (April 26, 2012, November 20, 2012, June 2, 2014 and October 5, 2016) were scheduled to share study progress with residents and seek feedback. Notice of each Open House was advertised twice in local newspapers (English and French) and posted on project web site. Copy of the newspaper advertisement was circulated to the offices of study area councillors for onward distribution to their mailing list and to those individuals on the project mailing list;
- Five meetings were scheduled with each Consultation Group;
- Two Special Information Sessions were scheduled for owners of properties identified to be significantly affected;

- A letter was sent out to the affected property owners inviting to attend the fourth Open House to discuss property-related matters with the study team; and,
- Approximately 12,000 local residents were notified of the Open House via Canada Post mail drop.

Major comments received include: concerns about property impacts, access to/from properties and median transitway stations, timeline for property acquisition, support for BRT early implementation, space for snow storage, support for sidewalks, a strong desire for the bicycle lanes and their maintenance during winter months, impact on the Central Experimental Farm, location and design features of stations, noise, vibration, air quality, need for north-south transit service, and future traffic signal operation.

The Recommended Plan addresses many of the issues. City policies and procedures dictate response to issues such as the property acquisition process. Operational matters (such as snow clearing) will be addressed when the project is implemented.

COMMENTS BY THE WARD COUNCILLOR(S)

Councillor Taylor provided the following comments:

“I am pleased to support the Baseline BRT project as it will in my opinion create a robust secondary east west corridor through our western suburban area as an alternative supplementary to the LRT. By enhancing transit use possibilities in this heavily populated area we will be inventing more conversion to transit from vehicle for users not downtown bound. Those wishing to connect to LRT will be able to but those simply wishing to make smaller migrations or more interrupted trips will have the flexibility to do so that offers an interstitial solution between community bus and rail.”

Councillor Chiarelli provided the following comments:

“The Community has raised several valid concerns – only some of which have been resolved.

One of the remaining concerns being fewer bus stops means more distance between bus stops which is a concern for seniors as well as those with mobility issues. This is especially relevant for the many seniors at Baseline and Clyde.”

Councillor Egli provided the following comments:

“As Chair of the Transportation Committee and as a ward councillor I have been following this project for some time and appreciate its diversity in that it will enhance a

number of transportation options for residents including transit, cycling and walking. It is an example of creative design and engineering to make the most of an important roadway in our city."

Councillor Brockington provided the following comments:

"I have had an opportunity to review the staff report prior to its release and offer the following comments:

Public transit initiatives in our growing City continue to move large volumes of people across our City, effectively and efficiently. While the Transitway exists and helps shuttle people from west to east and east to west, there are no other major public transit west-east links that can rapidly move people in the City. The Baseline Road Bus Rapid Transit project attempts to do just that. I do believe that the new corridor will reduce travel times, improve connections and provide better passenger mobility across the system. I also believe that this may promote new business and future residential developments.

I do have a number of concerns with this project:

1. Limited public knowledge and awareness of this project
When I first started talking about this project over a year ago at community association meetings, I was greeted with silence. Very few people were aware that a major public transit project was being discussed and that public consultations had been underway for some time.

2. The pricetag - $138+ million
Has every conceivable attempt been made to control costs. Are there any other ways to reduce costs without sacrificing the quality of this project?

3. Prince of Wales – Heron Station (Data Centre Road)
The draft staff report indicates the following:

"Existing curb-side transit lanes on Heron Road from Prince of Wales Drive to Data Centre Road are proposed to be converted to median transit lanes to provide consistency with the design of the remainder of the corridor". Given that dedicated bus lanes already exist on Heron Road between Data Centre Road and Prince of Wales, why would expensive modifications be proposed. The only reason provided in the report is to "provide consistency with the design of the remainder of the corridor". If the current configuration in this particular section, reduces travel times

and is as effective, then further modifications to this particular section would be an example of taxpayer money not being used wisely.

4. Continued erosion of Experimental Farm lands.
I acknowledge and recognize that very little private property within River Ward is being used/expropriated for this project. As a trade-off, land from the Experimental Farm is being used. The staff report describes 'a strip of land from the Central Experimental Farm to accommodate median BRT lanes" is to be used. How much land is 'a strip' and what is the land currently used for by Agriculture Canada?

I would like to echo my on-going concerns, first raised in 2015 shortly after the announcement was made to relocate the Ottawa Civic Hospital, regarding the long term plans for agricultural education and research on Central Experimental Farm lands by Agriculture Canada. I believe the federal government needs to clarify what the long term plans are for the Farm. Additionally, if pieces of the Farm can be given up for other projects deemed to be in public interest, the federal government needs to publicly indicate what criteria they are using, to determine what is and what is not in the public interest.

"Overall, I am supportive of this project and favour public transit projects that will provide many benefits to commuters. I believe the Baseline Road Bus Rapid Transit project will become a rapid west-east bus corridor in the central part of the City."

Councillor Chernushenko provided the following comments:

"Councillor Chernushenko is aware of this report."

ADVISORY COMMITTEE(S) COMMENTS

The Accessibility Advisory Committee was consulted as part of the Consultation Group.

LEGAL IMPLICATIONS

There are no legal impediments to implementing the recommendations in this report.

RISK MANAGEMENT IMPLICATIONS

The implementation (construction) of this project is subject to federal and provincial funding. Recently, the City received funding ($6M) from the federal Public Transit Infrastructure Fund (PTIF) to initiate detailed design, with the City's share the total design costs are $12M. The timeline for PTIF spending ends March 31, 2019 for this

project and therefore prudent schedule management of the EA process (to be completed) and detailed design process is required.

Many properties are affected, which will require time and resources to complete the land acquisition program. Costs are included in the project budget estimate.

ASSET MANAGEMENT IMPLICATIONS

The information documented in this report is consistent with the City's Comprehensive Asset Management (CAM) Program (City of Ottawa Comprehensive Asset Management Program) objectives. Implementation of multi-modal transportation objectives as outlined assists to fulfill the City's obligation to deliver quality services to the community, in a way that balances service levels, risk, and affordability.

Ongoing long term operation, maintenance and capital renewal cost will increase in order to sustain the upgraded and new assets required to support the expected level of service. These costs will be defined and reported as the project enters into its preliminary and final design stages. Significant urban construction works such as described for this project may provide an opportunity to renew aging buried infrastructure and other underground assets such as utilities. Future reported estimates should clearly identify coordination opportunities with underground services and expected costs.

FINANCIAL IMPLICATIONS

The 2013 TMP affordable network identified the overall functional design costs.$12M funding is available within the existing capital budget and additional funding requirements will be included in future years capital budget submissions for Council consideration.

ACCESSIBILITY IMPACTS

The Recommended Plan will have an overall positive impact on individuals with mobility constraints. The design is reflective of feedback received from the Accessibility Advisory Committee (AAC).

Bus platforms, sidewalks, cycle tracks, and intersections are designed in accordance with the City's Accessibility Standards and the Accessibility for Ontarians with Disabilities Act (AODA). Cross-rides and cross-walks will be provided at each intersection allowing for dedicated space to all users. The cycle tracks will also have a

physical demarcation from the sidewalk to avoid potential conflicts, through the use of a delineator tile.

In addition, the BRT lanes will offer Para Transpo a dedicated facility to service the communities and connect major destinations and transit hubs along the corridor. This will provide a reliable and efficient service to the users of Para Transpo.

ENVIRONMENTAL IMPLICATIONS

The EA Study analyzed the project's effects on the natural, physical, and social environments and has developed appropriate mitigation measures which conform to City, Provincial, and Federal environmental policies, standards, regulations, and legislation.

In general, the environmental impacts have been minimized with the reduced footprint for the project. Based on the potential for archaeological features associated with the NCC Greenbelt, Central Experimental Farm, location of the Rideau Canal, and other sites within the corridor, the study recommendations include undertaking Stage 2 Archaeological Assessment during detailed design phase of the project. Further studies on cultural heritage features will also be undertaken during subsequent stages of the project to guide mitigation of any potential impacts on cultural heritage features within the study area.

Mitigation measures are also required to address impacts to the aquatic and terrestrial habitats and to species at risk (SAR). The presence of SAR habitat exists within the study area. The study also identifies future approvals from the regulating agencies and all levels of governments to implement the project including those from the National Capital Commission and Parks Canada (modifications to the Central Experimental Farm and works within the vicinity of the Rideau Canal).

Noise mitigation measures (noise barrier) will be required for a number of noise sensitive locations within the study area which qualify under the City's Environmental Noise Control Guidelines. Such locations have been identified in the Recommended Plan.

Future vibration levels are expected to fall below a perceptible level within the corridor in part due to the relocation of buses to median travel lanes and generally being further away from sensitive land use. Air quality impacts associated with the project are expected to be negligible.

As the project will provide commuters alternative modes of transportation, it will result in improved environmental quality for the corridor by reducing pollutants and greenhouse gases from vehicle emissions.

TERM OF COUNCIL PRIORITIES

The recommendations summarized in this report will help achieve following Strategic Objectives of 2015 - 2018 Term of Council Priorities:

TM2 Provide and promote infrastructure to support safe mobility choices.

TM3 Integrate the rapid transit and transit priority network into the community.

TM4 Improve safety for all road users.

TM5 Ensure reliable, safe, accessible, and affordable transit services.

SUPPORTING DOCUMENTATION

Document 1 A Functional Design drawings of the Recommended Plan

Document 1 B Functional Design drawings of Transit Priority Measures

Document 1 C Functional Design drawings for bicycle facility (Navaho – Constellation)

Document 2 Alternative Alignments, Design Options and Evaluation

DISPOSITION

Following Transportation Committee and Council approval of the functional design, the Transportation Services Department will undertake the following steps to complete the Environmental Assessment Study in accordance with the Ontario EA Regulation 231/08 for transit project:

- Initiate and complete the 6-month Transit Project Assessment Process (TPAP);
- File the Environmental Project Report (EPR) with the Ministry of the Environment and Climate Change (MOECC); and,
- Make the EPR available for the 30-day public review period.