

**Noise Assessment Report -
800 Ralph Hennessy Avenue
(Block 211 Riverside South
Phase 8)**

Project # 160401305



Prepared for:
Urbandale Construction

Prepared by:
Stantec Consulting Ltd.

August 28, 2017

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Introduction
August 28, 2017

Table of Contents

1.0	INTRODUCTION	1
1.1	PURPOSE OF REPORT	1
1.2	LOCATION.....	1
2.0	NOISE LEVEL CRITERIA.....	3
2.1	GUIDELINES	3
3.0	CALCULATIONS	6
3.1	NOISE LEVEL PREDICTIONS	6
3.2	ROAD TRAFFIC VOLUMES.....	6
3.3	PROJECTED NOISE LEVELS.....	8
4.0	CONCLUSIONS AND RECOMMENDATIONS.....	10
4.1	NOISE IMPACTS AND WARNING CLAUSES	10
4.2	INDOOR NOISE MITIGATION – AIF METHOD.....	11

LIST OF TABLES

Table 1 Noise Criteria for Residential and Office Land Use	3
Table 2 Combination of Road and Rail Noise Daytime Outdoor, Ventilation and Warning Clause Recommendations.....	4
Table 3 Combination of Road and Rail Noise, Night-Time Ventilation and Warning Clause Requirements	5
Table 4 Road and Rail Noise – Building Component Requirements	5
Table 5 Traffic Volumes – Earl Armstrong Road, 4-Lane Urban Arterial Divided	7
Table 6 Traffic Volumes – Ralph Hennessy Avenue, 2-Lane Urban Collector	7
Table 7 Summary of Projected Unattenuated Noise Levels	8
Table 9 AIF Summary	11

LIST OF FIGURES

Figure 1 – 800 Ralph Hennessy Avenue Development.....	2
Figure 2 Indoor Receivers	9

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Introduction
August 28, 2017

LIST OF APPENDICES

APPENDIX A	: NOISE LEVEL CALCULATIONS	A.1
A.1	Indoor Receiver Stamson Reports	A.2
APPENDIX B	: FLOOR PLANS AND AIF CALCULATIONS	B.1
APPENDIX C	: NOISE WARNING CLAUSES.....	C.1
APPENDIX D	: AIRCRAFT NOISE CONSTRAINTS MAP	D.1

NOISE ASSESSMENT REPORT - 800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)

Introduction
August 28, 2017

1.0 INTRODUCTION

1.1 PURPOSE OF REPORT

Stantec Consulting Ltd. has been retained by Urbandale Construction to prepare an environmental noise assessment for the proposed stacked townhome development at 800 Ralph Hennessy Avenue, located in the City of Ottawa. A site plan control application is being prepared and a Noise Assessment Study is required to address City policies regarding residential development adjacent to an arterial road and within proximity of the Macdonald Cartier International Airport.

The purpose of this report is to:

- outline the Ontario Ministry of the Environment and Climate Change (MOECC) and City of Ottawa guidelines and criteria for noise levels and residential land use;
- apply the noise level standards of the Ontario Ministry of the Environment and Climate Change NPC-300 to the site in conjunction with the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016;
- determine the extent to which noise levels will be of concern to future residents of the proposed development, using the computerized version (STAMSON 5.03) of the MOECC's noise model;
- outline recommendations for noise attenuation, as necessary, to achieve acceptable noise levels for future residents of the proposed development.

1.2 LOCATION

The site is located at the south-west corner of the intersection between Earl Armstrong Road and Ralph Hennessy Avenue. The proposed site is illustrated in **Figure 1**. The proposed development consists of 68 stacked townhome units. This report will focus on the rooms with exposure to Earl Armstrong Road and Ralph Hennessy Avenue.

Surrounding land uses are as follows:

- north – existing residential, existing Earl Armstrong Road;
- east – future residential, existing Ralph Hennessy Avenue;
- south – future residential;
- west – existing park, existing institutional building.

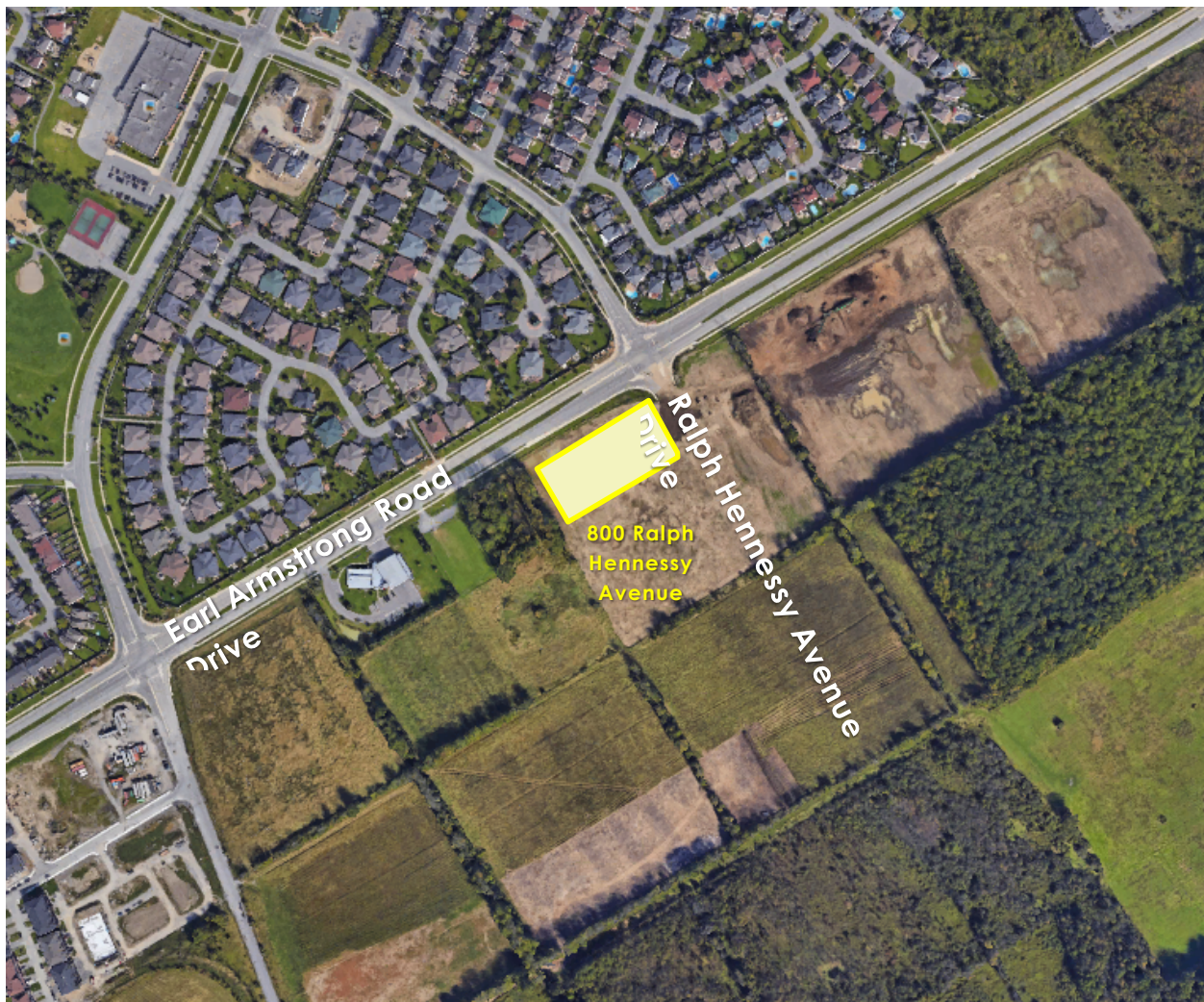
**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Introduction
August 28, 2017

The main potential noise source that may impact the subject site is vehicular traffic from Earl Armstrong Road and Ralph Hennessy Avenue. The traffic volumes for these roadways are based on the City of Ottawa document "Environmental Noise Control Guidelines".

The proposed site is also located within the Airport Vicinity Development Zone and outside of the 25 NEF/NEP composite line for the Macdonald Cartier International Airport (Annex 10 of the City of Ottawa Official Plan) (**Appendix D**)

Figure 1 – 800 Ralph Hennessy Avenue Development



**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Noise Level Criteria
August 28, 2017

2.0 NOISE LEVEL CRITERIA

2.1 GUIDELINES

The City of Ottawa has produced guidelines for noise levels for use in noise assessment and land use planning based on MOECC Publication NPC-300 guidelines. Noise level criteria for residential land use are summarized in **Table 1** below. Noise levels higher than the guidelines presented are acceptable under certain conditions and with certain provisions.

Table 1 Noise Criteria for Residential and Office Land Use

Location	Leq (16hr) (dBA) (7 a.m. – 11 p.m.)	Leq (8hr) (dBA)(11 p.m. – 7 a.m.)
Outdoor Living Areas	55 dBA	N/A
Indoor Living Areas	45 dBA	40 dBA
General offices, reception areas, retail stores, etc.	50 dBA	N/A

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Noise Level Criteria
August 28, 2017

Table 2 and **Table 3** set out the required controls and warning clauses that can be applied to allow residential activity in locations where noise levels are expected to exceed the criteria in Table 1.

**Table 2 Combination of Road and Rail Noise
Daytime Outdoor, Ventilation and Warning Clause Recommendations**

Location	Leq (16hr) (dBA)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
Outdoor Living Area	Leq _{16hr} less than or equal to 55 dBA	N/A	None required	Not required
	Leq (16hr) greater than 55 dBA to less than or equal to 60 dBA	N/A	Control measures (barriers) may not be required but should be considered	Required if resultant Leq exceeds 55 dBA Generic Clause or Extensive Mitigation Clause for outdoor amenity area
	Leq (16hr) greater than 60 dBA	N/A	Control measures (barriers) required to reduce the Leq to below 60 dBA and as close to 55 dBA as technically, economically and administratively feasible	Required if resultant Leq exceeds 55 dBA Extensive Mitigation Clause for outdoor amenity area (Supplied Central Air Conditioning)
Plane of Living Room Window	Leq (16hr) less than or equal to 55 dBA	None required	N/A	Not required
	Leq (16hr) greater than 55 dBA to less than or equal to 65 dBA	Provision for central air conditioning	N/A	Required Extensive Mitigation Clause for indoor area
	Leq (16hr) greater than 65 dBA	Central air conditioning	N/A	Required Extensive Mitigation Clause for indoor areas (Supplied Central Air Conditioning)

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016)

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Noise Level Criteria
August 28, 2017

**Table 3 Combination of Road and Rail Noise,
Night-Time Ventilation and Warning Clause Requirements**

Location	Leq (8hr) (dBA)	Ventilation Requirements	Outdoor Control Measures	Warning Clause
Plane of Bedroom Window	Leq _{8hr} greater than 50 dBA to less or equal to 60 dBA	Provision for central air conditioning	N/A	Required Extensive Mitigation Clause for indoor areas
	Leq _{8hr} greater than 60 dBA	Central air conditioning	N/A	Required Extensive mitigation of indoor and outdoor amenity area clause (Supplied Central Air Conditioning)

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016))

The MOECC also specifies building component requirements where indoor noise levels are expected to exceed the Table 1 criteria. These requirements are summarized in **Table 4**.

Table 4 Road and Rail Noise – Building Component Requirements

Location	Leq (16hr) (dBA)		Building Component Requirements
Plane of Living Room Window- Daytime	Road	Less than or equal to 65 dBA	Building compliant with the Ontario Building Code
		Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

Location	Leq (8hr) (dBA)		Building Component Requirements
Plane of Bedroom Window-Nighttime	Road	Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
		Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

(Source: Ministry of the Environment and Climate Change, Environmental Noise Guideline – Stationary and Transportation Sources- Approval and Planning – Publication NPC-300, August 2013 and City of Ottawa, Environmental Noise Control Guidelines, January 2016))

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Calculations
August 28, 2017

3.0 CALCULATIONS

3.1 NOISE LEVEL PREDICTIONS

Noise predictions in this report were conducted in accordance with the methods defined in Ontario Roads Noise Analysis Method for Environment and Transportation (ORNAMENT). The analysis was performed using the computerized version (STAMSON 5.03) of the methods contained in ORNAMENT. The program accepts variables related to noise sources and receivers, road traffic volumes, and the nature and extent of noise mitigation features, if required.

3.2 ROAD TRAFFIC VOLUMES

Traffic volume parameters are outlined in the City of Ottawa document "Environmental Noise Control Guidelines" dated January 2016. The document indicates that the average annual daily traffic volume for Earl Armstrong Road, a 4-lane urban divided arterial road, shall be estimated to be 35,000 vehicles per day and Ralph Hennessy Avenue, a 2-lane urban collector, shall have an estimated traffic volume of 8,000 vehicles per day. Additional assumptions and ratios for day/night traffic and car/ truck traffic are summarized as follows:

- heavy truck traffic for this segment is estimated to be 5% of total traffic volume;
- medium truck traffic for this segment is estimated to be 7% of total traffic volume; the rest is assumed to be car traffic;
- daytime (7 am – 11 pm) traffic is assumed to be 92%, with the remaining 8% at night (11 pm – 7 am); and
- the speed limit for Earl Armstrong Road is 80 km/hr and Ralph Hennessy Avenue is 50 km/hr.

Table 5 and Table 6 summarize the traffic volumes used for calculations in this report.

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Calculations
August 28, 2017

Table 5 Traffic Volumes – Earl Armstrong Road, 4-Lane Urban Arterial Divided

	Day	Night	Total
Car	28,336	2,464	30,800
Medium Truck	2,254	196	2,450
Heavy Truck	1,610	140	1,750
TOTAL	32,200	2,800	35,000
Speed Limit	80 km/hr		
Gradient	Approx. 1%		
Surface	Asphalt		

Table 6 Traffic Volumes – Ralph Hennessy Avenue, 2-Lane Urban Collector

	Day	Night	Total
Car	6,477	563	7,040
Medium Truck	515	45	560
Heavy Truck	368	32	400
TOTAL	7,360	640	8,000
Speed Limit	50 km/hr		
Gradient	Approx. 1%		
Surface	Asphalt		

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Calculations
August 28, 2017

3.3 PROJECTED NOISE LEVELS

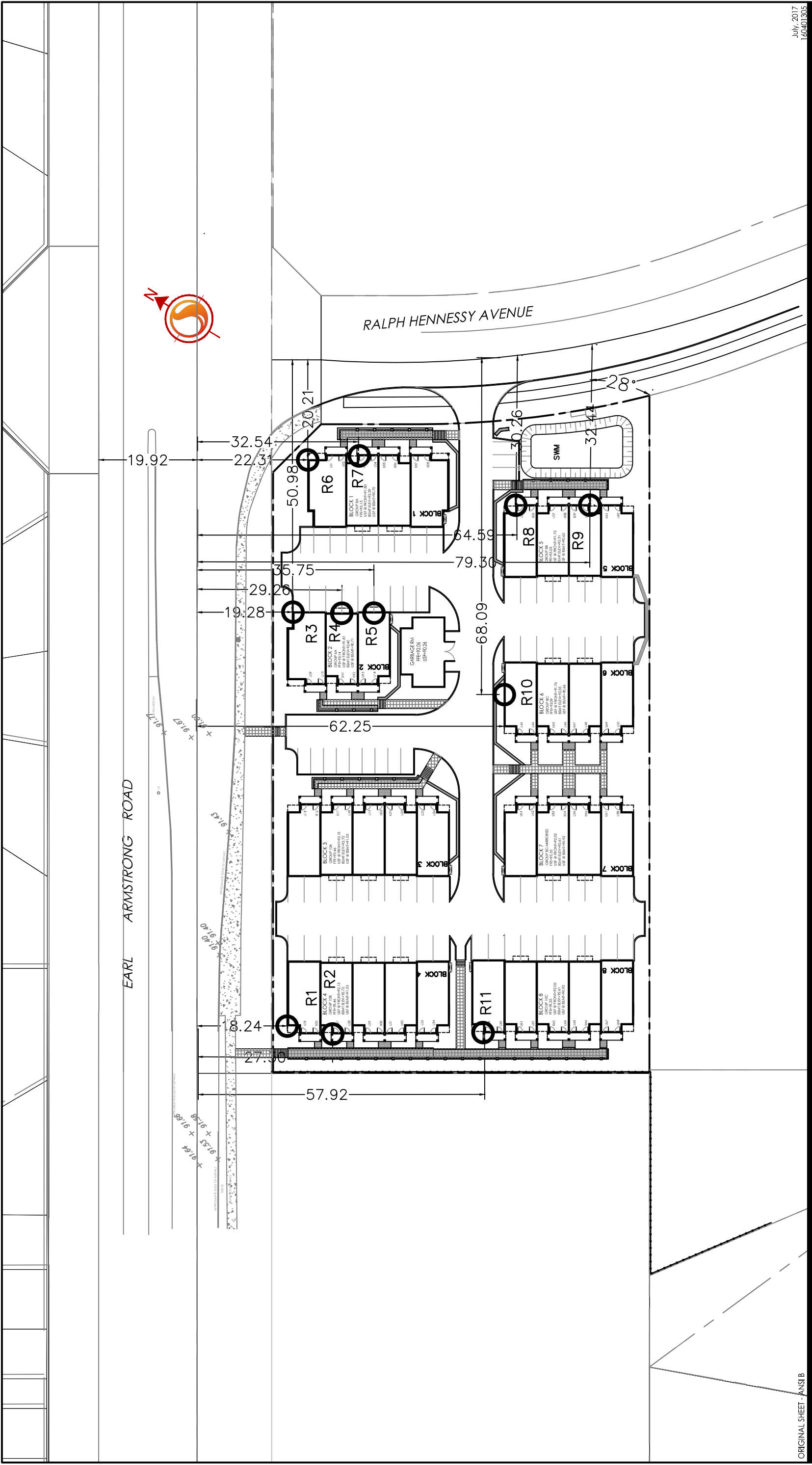
Using the MOECC noise model, ORNAMENT, noise levels were calculated for daytime and nighttime conditions at the points representing the anticipated building locations based on the site plan prepared by Urbandale Construction Limited. The resulting receiver sites are illustrated in **Figure 2**.

The receiver heights for indoor, daytime, and nighttime noise level calculations for the proposed buildings were completed at the mid-height of each floor starting with the main floor at 4.3m. The elevation drawings for the buildings are provided in **Appendix B**.

The unattenuated receiver noise levels have been summarized in **Table 7** and noise level calculations are provided in **Appendix A** for daytime and nighttime building face.

Table 7 Summary of Projected Unattenuated Noise Levels

Receiver Site	Location	Elevation (m)	Daytime-Building Face (dBA)	Nighttime-Building Face (dBA)
R1A	Block 4 - Exterior Main Floor	4.3	74.0	66.4
R1B	Block 4 - Exterior 2nd Floor	7.5	74.0	66.4
R2A	Block 4 - Interior Main Floor	4.3	69.5	61.9
R2B	Block 4 - Interior 2nd Floor	7.5	69.5	61.9
R2C	Block 4 - Interior 3rd Floor	10.5	69.5	61.9
R3	Block 2 - Exterior	4.3	73.8	66.2
R4	Block 2 - Interior	4.3	68.8	61.2
R5	Block 2 - Exterior	4.3	67.8	60.2
R6	Block 1 - Exterior	4.3	73.6	66.0
R7	Block 1 - Interior	4.3	70.0	62.4
R8	Block 5 - Exterior	4.3	62.8	55.2
R9	Block 5 - Interior	4.3	61.6	54.0
R10	Block 6 - Exterior	4.3	60.9	54.0
R11	Block 8 - Exterior	4.3	59.8	52.2



Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
www.stantec.com

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Conclusions and Recommendations
August 25, 2017

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 NOISE IMPACTS AND WARNING CLAUSES

Predicted noise levels are above City of Ottawa and MOECC criteria for the daytime building face and the nighttime building face for proposed units with exposure to Earl Armstrong Road and Ralph Hennessy Avenue.

In accordance with the City of Ottawa and MOECC guidelines, the following control measures and warning clauses are required for the proposed development.

- The provision for adding central air conditioning is to be included for Blocks 5 to 8 and Noise Warning Clause “generic indoor” is to be included in all offers of purchase and sale.
- A forced air heating and central air conditioning system is to be installed for Blocks 1 to 4. Noise Warning Clause “*extensive mitigation of indoor area*” is to be included in all offers of purchase and sale.
- Warning Clause “aircraft noise” is to be included in all offers of purchase and sale.

Noise warning clauses are provided in **Appendix C**.

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Conclusions and Recommendations
August 25, 2017

4.2 INDOOR NOISE MITIGATION – AIF METHOD

The following building components will apply based on calculations per the Acoustical Insulation Factor (AIF) method, as per “Environmental Noise Assessment in Land Use Planning Manual”, 1999.

Table 8 summarizes the AIF values and minimum building components that must be applied to the proposed development, and **Appendix B** provides the floor plans and complete AIF calculations.

Table 8 AIF Summary

Floor	Room	Wall	AIF Value	Type of Window Glazing	Type of Exterior Wall	Type of Exterior Door
Block 4- Exterior Unit (R1)	1-Den	1	36	-	EW1	-
		4	33	2(6)2	EW1	-
	1-Dining/ Living / Kitchen	1	39	2(22)2	EW3	D4-sd
		4	36	2(22)2	EW1	D4
	1-Master Bedroom	1	36	-	EW2	-
		2	33	2(22)2	EW1	-
	2-Dining/ Living / Kitchen	1	38	2(22)2	EW2	-
		4	35	2(42)2	EW1	D3
	2-Master Bedroom	1	36	-	EW2	-
		2	33	2(22)2	EW1	-
	2-Study	1	34	2(22)2	EW2	-
Block 4- Interior Unit (R2)	1-Den	1	27	2(6)2	EW1	-
	1-Dining/ Living / Kitchen	1	28	2(6)2	EW1	D2
	1-Master Bedroom	3	27	2(6)2	EW1	-
	2-Dining/ Living / Kitchen / Loft	1	28	2(6)2	EW1	D1
	2- Bedroom Two	3	27	2(6)2	EW1	-
	2-Master Bedroom	3	28	2(6)2	EW1	D1
Block 2 - Exterior Unit (R3)	1-Den	1	36	-	EW1	-
		4	33	2(6)2	EW1	-
	1-Dining/ Living / Kitchen	1	39	2(22)2	EW3	D4-sd
		4	36	2(22)2	EW1	D4
	1-Master Bedroom	1	36	-	EW2	-
		2	33	2(22)2	EW1	-
		1	38	2(22)2	EW2	-

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Conclusions and Recommendations
August 25, 2017

	2-Dining/ Living / Kitchen	1	38	2(22)2	EW2	-
		4	35	2(42)2	EW1	D3
	2-Master Bedroom	1	36	-	EW2	-
		2	33	2(22)2	EW1	-
	2-Study	1	34	2(22)2	EW2	-
Block 2 - Interior Unit (R4)	1-Den	1	26	2(6)2	EW1	-
	1-Dining/ Living / Kitchen	1	28	2(6)2	EW1	D2
	1-Master Bedroom	3	26	2(6)2	EW1	-
	2-Dining/ Living / Kitchen / Loft	1	28	2(6)2	EW1	D1
	2- Bedroom Two	3	26	2(6)2	EW1	-
	2-Master Bedroom	3	28	2(6)2	EW1	D1
Block 2 - Exterior Unit (R5)	1-Den	1	30	-	EW1	-
		4	27	2(6)2	EW1	-
	1-Dining/ Living / Kitchen	1	33	2(6)2	EW1	-
		4	30	2(6)2	EW1	D5 or D1-sd
	1-Master Bedroom	1	30	-	EW1	D1
		2	27	2(6)2	EW1	-
	2-Dining/ Living / Kitchen	1	32	2(6)2	EW1	-
		4	29	2(18)2	EW1	-
	2-Master Bedroom	1	30	-	EW1	D1
		2	27	2(6)2	EW1	-
	2-Study	1	28	2(6)2	EW1	-
Block 1 - Exterior Unit (R6)	1-Den	1	35	-	EW1	-
		4	35	2(15)2	EW1	-
	1-Dining/ Living / Kitchen	1	38	2(18)2	EW3	D3-sd
		4	38	2(35)2	EW1	D5 or D1-sd
	1-Master Bedroom	1	35	-	EW2	-
		2	32	2(18)2	EW1	-
	2-Dining/ Living / Kitchen	1	38	2(22)2	EW2	-
		4	38	2(80)2	EW1	D5 or D1-sd
	2-Master Bedroom	1	35	-	EW2	-
		2	32	2(18)2	EW1	-
	2-Study	1	34	2(22)2	EW2	-
	1-Den	1	30	2(6)2	EW1	-

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Conclusions and Recommendations
August 25, 2017

Block 1- Interior Unit (R7)	1-Dining/ Living / Kitchen	1	32	2(13)2	EW1	D4
	1-Master Bedroom	3	27	2(6)2	EW1	-
	2-Dining/ Living / Kitchen / Loft	1	32	2(18)2	EW1	D2
	2- Bedroom Two	3	27	2(6)2	EW1	-
	2-Master Bedroom	3	29	2(6)2	EW1	D2

As the noise levels exceed the MOECC Criteria, building components including walls and windows are to be designed so the indoor sound levels comply with MOECC noise criteria by using EW1, EW2 and EW3 as illustrated above. In this situation, double glazed windows with 2mm thickness and various spacing outlined above would be required. The building windows with an equivalent AIF may be substituted for the recommended thickness, glazing and spacing. E.g. a double glazed 3mm pane with 6mm spacing may be substituted for double glazed 2mm panes with 15mm spacing.

EW1 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as sheathing and wood siding or metal siding and fibre backer board.

EW2 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as rigid insulation(25-30mm) and wood siding or metal siding and fibre backer board.

EW3 construction consists of:

- 12.7 mm gypsum board, vapour barrier, and 38x89 studs with 50 mm mineral wool or glass fibre batts in inner stud cavities. As well as sheathing, 25 mm air space, and 100 mm brick veneer.

Should the actual floor plans differ from the plans shown in **Appendix B**, updated calculations must be performed prior to the issuance of building permits.

The application of these noise mitigation measures and warning clauses will allow the proposed residential development to meet MOECC and City of Ottawa criteria with respect to environmental noise.

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Conclusions and Recommendations
August 28, 2017

Respectfully submitted by:



Karin Smadella, P.Eng.,
Project Manager



Dustin Thiffault, P.Eng.,
Project Engineer

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix A : Noise Level Calculations
August 25, 2017

Appendix A : NOISE LEVEL CALCULATIONS

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix A : Noise Level Calculations
August 25, 2017

A.1 INDOOR RECEIVER STAMSON REPORTS

Filename: R1A.te Time Period: Day/Night 16/8 hours
Description: INDOOR R1A

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.24 / 18.24 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 38.16 / 38.16 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 72.31 + 0.00) = 72.31 dBA

Angle1 Angle2 Alpha ReflEq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 73.16 0.00 -0.85 0.00 0.00 0.00 0.00 0.00
72.31

Segment Leq : 72.31 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 69.10 + 0.00) = 69.10 dBA

Angle1 Angle2 Alpha ReflEq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 73.16 0.00 -4.06 0.00 0.00 0.00 0.00 0.00
69.10

Segment Leq : 69.10 dBA

Total Leq All Segments: 74.01 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 64.71 + 0.00) = 64.71 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -0.85 0.00 0.00 0.00 0.00 0.00
64.71

Segment Leq : 64.71 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 61.50 + 0.00) = 61.50 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -4.06 0.00 0.00 0.00 0.00 0.00
61.50

Segment Leq : 61.50 dBA

Total Leq All Segments: 66.41 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 74.01
(NIGHT): 66.41

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 14:30:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: R1B.te Time Period: Day/Night 16/8 hours
Description: INDOOR R1B

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 18.24 / 18.24 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

```
Data for Segment # 2: EARL A WEST (day/night)
-----
Angle1 Angle2      : -90.00 deg  90.00 deg
Wood depth          :      0      0 (No woods.)
No of house rows    :      0 / 0
Surface              :      2      (Reflective ground surface)
Receiver source distance : 38.16 / 38.16 m
Receiver height      : 7.50 / 7.50 m
Topography           :      1      (Flat/gentle slope; no barrier)
Reference angle      :      0.00

Results segment # 1: EARL A EAST (day)
-----
Source height = 1.50 m

ROAD (0.00 + 72.31 + 0.00) = 72.31 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq
---
-90   90   0.00  73.16   0.00 -0.85   0.00   0.00   0.00   0.00
72.31
---
Segment Leq : 72.31 dBA

Results segment # 2: EARL A WEST (day)
-----
Source height = 1.50 m

ROAD (0.00 + 69.10 + 0.00) = 69.10 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq
---
-90   90   0.00  73.16   0.00 -4.06   0.00   0.00   0.00   0.00
69.10
---
Segment Leq : 69.10 dBA

Total Leq All Segments: 74.01 dBA
```

```
Results segment # 1: EARL A EAST (night)
-----
Source height = 1.50 m

ROAD (0.00 + 64.71 + 0.00) = 64.71 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq
---
-90   90   0.00  65.56   0.00 -0.85   0.00   0.00   0.00   0.00
64.71
---
Segment Leq : 64.71 dBA

Results segment # 2: EARL A WEST (night)
-----
Source height = 1.50 m

ROAD (0.00 + 61.50 + 0.00) = 61.50 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq
---
-90   90   0.00  65.56   0.00 -4.06   0.00   0.00   0.00   0.00
61.50
---
Segment Leq : 61.50 dBA

Total Leq All Segments: 66.41 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 74.01
(NIGHT) : 66.41
```

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 14:41:30
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2a.te Time Period: Day/Night 16/8 hours
Description: INDOOR R2A

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 27.30 / 27.30 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.22 / 47.22 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 67.55 + 0.00) = 67.55 dBA

Angle1 Angle2 Alpha Refleq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 73.16 0.00 -2.60 -3.01 0.00 0.00 0.00
67.55

Segment Leq : 67.55 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m
ROAD (0.00 + 65.17 + 0.00) = 65.17 dBA
Angle1 Angle2 Alpha Refleq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 73.16 0.00 -4.98 -3.01 0.00 0.00 0.00
65.17

Segment Leq : 65.17 dBA

Total Leq All Segments: 69.53 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 59.95 + 0.00) = 59.95 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -2.60 -3.01 0.00 0.00 0.00 0.00
59.95

Segment Leq : 59.95 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 57.57 + 0.00) = 57.57 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -4.98 -3.01 0.00 0.00 0.00 0.00
57.57

Segment Leq : 57.57 dBA

Total Leq All Segments: 61.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.53
(NIGHT): 61.93

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 14:42:12
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2b.te Time Period: Day/Night 16/8 hours
Description: INDOOR R2B

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 27.30 / 27.30 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.22 / 47.22 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
Results segment # 1: EARL A EAST (day)

Source height = 1.50 m
ROAD (0.00 + 67.55 + 0.00) = 67.55 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 73.16 0.00 -2.60 -3.01 0.00 0.00 0.00
67.55

Segment Leq : 67.55 dBA
Results segment # 2: EARL A WEST (day)

Source height = 1.50 m
ROAD (0.00 + 65.17 + 0.00) = 65.17 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 73.16 0.00 -4.98 -3.01 0.00 0.00 0.00
65.17

Segment Leq : 65.17 dBA
Total Leq All Segments: 69.53 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m
ROAD (0.00 + 59.95 + 0.00) = 59.95 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -2.60 -3.01 0.00 0.00 0.00
59.95

Segment Leq : 59.95 dBA
Results segment # 2: EARL A WEST (night)

Source height = 1.50 m
ROAD (0.00 + 57.57 + 0.00) = 57.57 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -4.98 -3.01 0.00 0.00 0.00
57.57

Segment Leq : 57.57 dBA
Total Leq All Segments: 61.93 dBA
TOTAL Leq FROM ALL SOURCES (DAY) : 69.53
(NIGHT) : 61.93

STANSON 5.0 NORMAL REPORT Date: 10-07-2017 14:43:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r2c.te Time Period: Day/Night 16/8 hours
Description: INDOOR R2C

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT) : 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 27.30 / 27.30 m
Receiver height : 10.53 / 10.53 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT) : 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 47.22 / 47.22 m
Receiver height : 10.53 / 10.53 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 67.55 + 0.00) = 67.55 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -90 0 0.00 73.16 0.00 -2.60 -3.01 0.00 0.00 0.00
67.55

Segment Leq : 67.55 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 65.17 + 0.00) = 65.17 dBA

Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -90 0 0.00 73.16 0.00 -4.98 -3.01 0.00 0.00 0.00
65.17

Segment Leq : 65.17 dBA

Total Leq All Segments: 69.53 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 59.95 + 0.00) = 59.95 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -2.60 -3.01 0.00 0.00 0.00 0.00
59.95

Segment Leq : 59.95 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 57.57 + 0.00) = 57.57 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 0 0.00 65.56 0.00 -4.98 -3.01 0.00 0.00 0.00 0.00
57.57

Segment Leq : 57.57 dBA

Total Leq All Segments: 61.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.53
(NIGHT): 61.93

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:15:01
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r3.te Time Period: Day/Night 16/8 hours
Description: INDOOR R3

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 19.28 / 19.28 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 39.20 / 39.20 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -4.00 deg 59.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 80 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 50.98 / 50.98 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 72.07 + 0.00) = 72.07 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -90 90 0.00 73.16 0.00 -1.09 0.00 0.00 0.00 0.00 0.00
72.07

Segment Leq : 72.07 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 68.98 + 0.00) = 68.98 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -90 90 0.00 73.16 0.00 -4.17 0.00 0.00 0.00 0.00 0.00
68.98

Segment Leq : 68.98 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

ROAD (0.00 + 49.89 + 0.00) = 49.89 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -4 59 0.00 65.75 0.00 -5.31 -4.56 0.00 -5.99 0.00
49.89

Segment Leq : 49.89 dBA

Total Leq All Segments: 73.82 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 64.47 + 0.00) = 64.47 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -1.09 0.00 0.00 0.00 0.00 0.00
64.47

Segment Leq : 64.47 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 61.39 + 0.00) = 61.39 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -4.17 0.00 0.00 0.00 0.00 0.00
61.39

Segment Leq : 61.39 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 42.29 + 0.00) = 42.29 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-4 59 0.00 58.16 0.00 -5.31 -4.56 0.00 -5.99 0.00
42.29

Segment Leq : 42.29 dBA

Total Leq All Segments: 66.23 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.82
(NIGHT): 66.23

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:17:39
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r4.te Time Period: Day/Night 16/8 hours
Description: INDOOR R4

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : 0.00 deg 80.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 29.26 / 29.26 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : 0.00 deg 80.00 deg
Wood depth : 0 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 49.18 / 49.18 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -15.00 deg 55.00 deg
Wood depth : 0 0 (No woods.)
No of house rows : 1 / 1
House density : 85 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 50.98 / 50.98 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 66.73 + 0.00) = 66.73 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 80 0.00 73.16 0.00 -2.90 -3.52 0.00 0.00 0.00
66.73

Segment Leq : 66.73 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 64.48 + 0.00) = 64.48 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 80 0.00 73.16 0.00 -5.16 -3.52 0.00 0.00 0.00
64.48

Segment Leq : 64.48 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

ROAD (0.00 + 49.44 + 0.00) = 49.44 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-15 55 0.00 65.75 0.00 -5.31 -4.10 0.00 -6.89 0.00
49.44

Segment Leq : 49.44 dBA

Total Leq All Segments: 68.81 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 59.14 + 0.00) = 59.14 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 80 0.00 65.56 0.00 -2.90 -3.52 0.00 0.00 0.00 0.00
59.14

Segment Leq : 59.14 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 56.88 + 0.00) = 56.88 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 80 0.00 65.56 0.00 -5.16 -3.52 0.00 0.00 0.00 0.00
56.88

Segment Leq : 56.88 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 41.85 + 0.00) = 41.85 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-15 55 0.00 58.16 0.00 -5.31 -4.10 0.00 -6.89 0.00
41.85

Segment Leq : 41.85 dBA

Total Leq All Segments: 61.22 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.81
(NIGHT): 61.22

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:19:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r5.te Time Period: Day/Night 16/8 hours
Description: INDOOR R5

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : 0.00 deg 75.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 35.75 / 35.75 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/TimePeriod *
Medium truck volume : 1127/98 veh/TimePeriod *
Heavy truck volume : 805/70 veh/TimePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : 0.00 deg 75.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 55.67 / 55.67 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -22.00 deg 52.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 90 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 50.98 / 50.98 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 65.58 + 0.00) = 65.58 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- 0 75 0.00 73.16 0.00 -3.77 -3.80 0.00 0.00 0.00
65.58

Segment Leq : 65.58 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 63.66 + 0.00) = 63.66 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- 0 75 0.00 73.16 0.00 -5.70 -3.80 0.00 0.00 0.00
63.66

Segment Leq : 63.66 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

ROAD (0.00 + 48.53 + 0.00) = 48.53 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

--- -22 52 0.00 65.75 0.00 -5.31 -3.86 0.00 -8.05 0.00
48.53

Segment Leq : 48.53 dBA

Total Leq All Segments: 67.79 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 57.99 + 0.00) = 57.99 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 75 0.00 65.56 0.00 -3.77 -3.80 0.00 0.00 0.00 0.00
57.99

Segment Leq : 57.99 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 56.06 + 0.00) = 56.06 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 75 0.00 65.56 0.00 -5.70 -3.80 0.00 0.00 0.00 0.00
56.06

Segment Leq : 56.06 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 40.93 + 0.00) = 40.93 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-22 52 0.00 58.16 0.00 -5.31 -3.86 0.00 -8.05 0.00
40.93

Segment Leq : 40.93 dBA

Total Leq All Segments: 60.19 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.79
(NIGHT): 60.19

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:30:44
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r6.te Time Period: Day/Night 16/8 hours
Description: INDOOR R6

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 22.31 / 22.31 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 42.23 / 42.23 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
Medium truck volume : 515/45 veh/TimePeriod *
Heavy truck volume : 368/32 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -20.00 deg 79.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 20.21 / 20.21 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 71.43 + 0.00) = 71.43 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 73.16 0.00 -1.72 0.00 0.00 0.00 0.00
71.43

Segment Leq : 71.43 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 68.66 + 0.00) = 68.66 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 73.16 0.00 -4.50 0.00 0.00 0.00 0.00
68.66

Segment Leq : 68.66 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

ROAD (0.00 + 61.86 + 0.00) = 61.86 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-20 79 0.00 65.75 0.00 -1.29 -2.60 0.00 0.00 0.00
61.86

Segment Leq : 61.86 dBA

Total Leq All Segments: 73.58 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 63.84 + 0.00) = 63.84 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -1.72 0.00 0.00 0.00 0.00 0.00
63.84

Segment Leq : 63.84 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 61.06 + 0.00) = 61.06 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-90 90 0.00 65.56 0.00 -4.50 0.00 0.00 0.00 0.00 0.00
61.06

Segment Leq : 61.06 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 54.27 + 0.00) = 54.27 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-20 79 0.00 58.16 0.00 -1.29 -2.60 0.00 0.00 0.00 0.00
54.27

Segment Leq : 54.27 dBA

Total Leq All Segments: 65.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 73.58
(NIGHT): 65.98

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:31:32
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r7.te Time Period: Day/Night 16/8 hours
Description: INDOOR R7

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : 0.00 deg 68.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 20.21 / 20.21 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : 0.00 deg 68.00 deg
 Wood depth : 0 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 52.46 / 52.46 m
 Receiver height : 4.32 / 4.32 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/TimePeriod *
 Medium truck volume : 515/45 veh/TimePeriod *
 Heavy truck volume : 368/32 veh/TimePeriod *
 Posted speed limit : 50 km/h
 Road gradient : 1 %
 Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
 Percentage of Annual Growth : 0.00
 Number of Years of Growth : 0.00
 Medium Truck % of Total Volume : 7.00
 Heavy Truck % of Total Volume : 5.00
 Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -43.00 deg 78.00 deg
 Wood depth : 0 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 2 (Reflective ground surface)
 Receiver source distance : 20.21 / 20.21 m
 Receiver height : 4.32 / 4.32 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 67.63 + 0.00) = 67.63 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--- 0 68 0.00 73.16 0.00 -1.29 -4.23 0.00 0.00 0.00
 67.63

Segment Leq : 67.63 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 63.49 + 0.00) = 63.49 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--- 0 68 0.00 73.16 0.00 -5.44 -4.23 0.00 0.00 0.00
 63.49

Segment Leq : 63.49 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

ROAD (0.00 + 62.73 + 0.00) = 62.73 dBA
 Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
 SubLeq

--- -43 78 0.00 65.75 0.00 -1.29 -1.72 0.00 0.00 0.00
 62.73

Segment Leq : 62.73 dBA

Total Leq All Segments: 69.96 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 60.04 + 0.00) = 60.04 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 68 0.00 65.56 0.00 -1.29 -4.23 0.00 0.00 0.00 0.00
60.04

Segment Leq : 60.04 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 55.89 + 0.00) = 55.89 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 68 0.00 65.56 0.00 -5.44 -4.23 0.00 0.00 0.00 0.00
55.89

Segment Leq : 55.89 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 55.14 + 0.00) = 55.14 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-43 78 0.00 58.16 0.00 -1.29 -1.72 0.00 0.00 0.00 0.00
55.14

Segment Leq : 55.14 dBA

Total Leq All Segments: 62.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.96
(NIGHT): 62.37

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:29:36
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r8.te Time Period: Day/Night 16/8 hours
Description: INDOOR R8

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -32.00 deg 47.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 85 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 64.59 / 64.59 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -32.00 deg 47.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 85 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 84.51 / 84.51 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/timePeriod *
Medium truck volume : 515/45 veh/timePeriod *
Heavy truck volume : 368/32 veh/timePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -58.00 deg 50.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 30.26 / 30.26 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m
ROAD (0.00 + 56.47 + 0.00) = 56.47 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-32 47 0.00 73.16 0.00 -6.34 -3.58 0.00 -6.77 0.00
56.47

Segment Leq : 56.47 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m
ROAD (0.00 + 55.44 + 0.00) = 55.44 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-32 47 0.00 73.16 0.00 -7.51 -3.58 0.00 -6.64 0.00
55.44

Segment Leq : 55.44 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m
ROAD (0.00 + 60.48 + 0.00) = 60.48 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-58 50 0.00 65.75 0.00 -3.05 -2.22 0.00 0.00 0.00
60.48

Segment Leq : 60.48 dBA

Total Leq All Segments: 62.81 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 48.87 + 0.00) = 48.87 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-32 47 0.00 65.56 0.00 -6.34 -3.58 0.00 -6.77 0.00
48.87

Segment Leq : 48.87 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 47.84 + 0.00) = 47.84 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-32 47 0.00 65.56 0.00 -7.51 -3.58 0.00 -6.64 0.00
47.84

Segment Leq : 47.84 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 52.89 + 0.00) = 52.89 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-58 50 0.00 58.16 0.00 -3.05 -2.22 0.00 0.00 0.00
52.89

Segment Leq : 52.89 dBA

Total Leq All Segments: 55.22 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 62.81
(NIGHT): 55.22

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:33:59
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r9.te Time Period: Day/Night 16/8 hours
Description: INDOOR R9

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : 0.00 deg 39.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 70 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 79.30 / 79.30 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : 0.00 deg 39.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 70 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 99.22 / 99.22 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: RALPH HENNES (day/night)

Car traffic volume : 6477/563 veh/timePeriod *
Medium truck volume : 515/45 veh/timePeriod *
Heavy truck volume : 368/32 veh/timePeriod *
Posted speed limit : 50 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 8000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 3: RALPH HENNES (day/night)

Angle1 Angle2 : -66.00 deg 28.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 32.44 / 32.44 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m
ROAD (0.00 + 54.75 + 0.00) = 54.75 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 39 0.00 73.16 0.00 -7.23 -6.64 0.00 -4.54 0.00
54.75

Segment Leq : 54.75 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m
ROAD (0.00 + 53.84 + 0.00) = 53.84 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 39 0.00 73.16 0.00 -8.21 -6.64 0.00 -4.47 0.00
53.84

Segment Leq : 53.84 dBA

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m
ROAD (0.00 + 59.58 + 0.00) = 59.58 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-66 28 0.00 65.75 0.00 -3.35 -2.82 0.00 0.00 0.00
59.58

Segment Leq : 59.58 dBA

Total Leq All Segments: 61.61 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 47.15 + 0.00) = 47.15 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 39 0.00 65.56 0.00 -7.23 -6.64 0.00 -4.54 0.00
47.15

Segment Leq : 47.15 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 46.24 + 0.00) = 46.24 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

0 39 0.00 65.56 0.00 -8.21 -6.64 0.00 -4.47 0.00
46.24

Segment Leq : 46.24 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 51.99 + 0.00) = 51.99 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-66 28 0.00 58.16 0.00 -3.35 -2.82 0.00 0.00 0.00
51.99

Segment Leq : 51.99 dBA

Total Leq All Segments: 54.02 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.61
(NIGHT): 54.02

STAMSON 5.0 NORMAL REPORT Date: 10-07-2017 16:37:08
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r10.te Time Period: Day/Night 16/8 hours
Description: INDOOR R10

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -81.00 deg 64.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 90 %
Surface : 2 (Reflective ground surface)
Receiver source distance : 62.25 / 62.25 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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

Angle1	Angle2	-81.00 deg	64.00 deg
Wood depth		0	(No woods.)
No of house rows		1	1
House density		90 %	
Surface		2	(Reflective ground surface)
Receiver source distance		82.17 / 82.17 m	
Receiver height		4.32 / 4.32 m	
Topography		1	(Flat/gentle slope; no barrier)
Reference angle		0.00	

Car traffic volume	: 6477/563	veh/TimePeriod	*
Medium truck volume	: 515/45	veh/TimePeriod	*
Heavy truck volume	: 368/32	veh/TimePeriod	*
Posted speed limit	: 50 km/h		
Road gradient	: 1	%	
Road pavement	: 1	Typical asphalt or concrete	

24 hr Traffic Volume (AADT or SADT) :	8000
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

Angle1	Angle2	: -35.00 deg	26.00 deg
Wood depth		: 0	(No woods.)
No of house rows		: 1 / 0	
Surface		: 2	(Reflective ground surface)
Receiver source distance		: 68.09 / 68.09 m	
Receiver height		: 4.32 / 4.32 m	
Topography		: 1	(Flat/gentle slope; no barrier)
Reference angle		: 0.00	

Source height = 1.50 m

	64	0.00	73.16	0.00	-6.18	-0.94	0.00	-7.88	0.00
--	-81								
	58.16								

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

64	0.00	73.16	0.00	-7.39	-0.94	0.00	-7.72	0.00
-81								
57.12								

Results segment # 3: RALPH HENNES (day)

Source height = 1.50 m

-35	26	0.00	65.75	0.00	-6.57	-4.70	0.00	-7.83	0.00
46.65									

Total Leq All Segments: 60.85 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 50.56 + 0.00) = 50.56 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-81 64 0.00 65.56 0.00 -6.18 -0.94 0.00 -7.88 0.00
50.56

Segment Leq : 50.56 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 49.52 + 0.00) = 49.52 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-81 64 0.00 65.56 0.00 -7.39 -0.94 0.00 -7.72 0.00
49.52

Segment Leq : 49.52 dBA

Results segment # 3: RALPH HENNES (night)

Source height = 1.50 m

ROAD (0.00 + 46.89 + 0.00) = 46.89 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-35 26 0.00 58.16 0.00 -6.57 -4.70 0.00 0.00 0.00
46.89

Segment Leq : 46.89 dBA

Total Leq All Segments: 54.02 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 60.85
(NIGHT): 54.02

STAMSON 5.0 NORMAL REPORT Date: 17-07-2017 11:14:54
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: r11.te Time Period: Day/Night 16/8 hours
Description: INDOOR R11

Road data, segment # 1: EARL A EAST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
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: EARL A EAST (day/night)

Angle1 Angle2 : -77.00 deg 0.00 deg
Wood depth : 2 (Wood depth 60 metres or more)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 77.84 / 77.84 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: EARL A WEST (day/night)

Car traffic volume : 14168/1232 veh/timePeriod *
Medium truck volume : 1127/98 veh/timePeriod *
Heavy truck volume : 805/70 veh/timePeriod *
Posted speed limit : 80 km/h
Road gradient : 1 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 17500
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: EARL A WEST (day/night)

Angle1 Angle2 : -77.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 57.92 / 57.92 m
Receiver height : 4.32 / 4.32 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Results segment # 1: EARL A EAST (day)

Source height = 1.50 m

ROAD (0.00 + 49.90 + 0.00) = 49.90 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-77 0 0.28 73.16 0.00 -9.12 -4.13 -10.00 0.00 0.00
49.90

Segment Leq : 49.90 dBA

Results segment # 2: EARL A WEST (day)

Source height = 1.50 m

ROAD (0.00 + 59.35 + 0.00) = 59.35 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-77 0 0.58 73.16 0.00 -9.24 -4.56 0.00 0.00 0.00
59.35

Segment Leq : 59.35 dBA

Total Leq All Segments: 59.82 dBA

Results segment # 1: EARL A EAST (night)

Source height = 1.50 m

ROAD (0.00 + 42.31 + 0.00) = 42.31 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-77 0 0.28 65.56 0.00 -9.12 -4.13 -10.00 0.00 0.00
42.31

Segment Leq : 42.31 dBA

Results segment # 2: EARL A WEST (night)

Source height = 1.50 m

ROAD (0.00 + 51.76 + 0.00) = 51.76 dBA
Angle1 Angle2 Alpha RefLeq P.Adj D.Adj F.Adj W.Adj H.Adj B.Adj
SubLeq

-77 0 0.58 65.56 0.00 -9.24 -4.56 0.00 0.00 0.00
51.76

Segment Leq : 51.76 dBA

Total Leq All Segments: 52.23 dBA

TOTAL Leq FROM ALL SOURCES (DAY) : 59.82
(NIGHT) : 52.23

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix B : Floor Plans and AIF Calculations
August 25, 2017

Appendix B : FLOOR PLANS AND AIF CALCULATIONS

800 Ralph Hennessy Avenue - Block 4 Exterior Unit (R1)

Source: Road Traffic

Predicted free-field day time sound level: 74.01 dBA

Predicted free-field night time sound level: 66.41 dBA

Table 1.1 - Sound level at building façade

	Day (Living Area)				Night (Bedroom)			
	Wall 1	Wall 2	Wall 3	Wall 4	Wall 1	Wall 2	Wall 3	Wall 4
Source 1	74.01	74.01		74.01	66.41	66.41		66.41
Shielding Correction	0	-3		-3	0	-3		-3
Resultant Sound Level	74.01	71.01		71.01	66.41	63.41		63.41

Table 1.2 - Number of Components

Room	Wall 1			Wall 2			Wall 3			Wall 4			Total Number of Components
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		1								1	1		3
1-Dining/ Living / Kitchen	1	1	1							1	1	1	6
1-Master Bedroom		1		1	1								3
2-Dining/ Living / Kitchen	1	1								1	1	1	5
2-Master Bedroom		1		1	1								3
2-Study	1	1											2

Note: Ignore if sound level below 60 dBA

* Component AIF exceeds required value by 10 or more and has been ignored as a component

Table 1.3 - AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	36			33
1-Dining/ Living / Kitchen	39			36
1-Master Bedroom	36	33		
2-Dining/ Living / Kitchen	38			35
2-Master Bedroom	36	33		
2-Study	34			

Note: Max AIF selected between Day and Night

Table 1.4 - Adjustment for Geometry

	Wall 1	Wall 2	Wall 3	Wall 4
Exposure Angle	0-90	0-90		0-90
Adjustment	0	0		0

Table 1.5 - Required AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	36			33
1-Dining/ Living / Kitchen	39			36
1-Master Bedroom	36	33		
2-Dining/ Living / Kitchen	38			35
2-Master Bedroom	36	33		
2-Study	34			

Table 2.1 - Component Area (ft²)

Room	Wall 1			Wall 2			Wall 3			Wall 4			Room Floor Area
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		22								11	81		198
1-Dining/ Living / Kitchen	18	244	58							36	104	21	455
1-Master Bedroom		116		27	131								181
2-Dining/ Living / Kitchen	21	199								101	115	21	435
2-Master Bedroom		117		31	136								173
2-Study	14	88											102

Note: Susan D. Smith Architect Layout

Table 2.2 - Component Percentages per Room Floor Area (%)

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		11								6	41		
1-Dining/ Living / Kitchen	4	54	13							8	23	5	
1-Master Bedroom		64		15	72								
2-Dining/ Living / Kitchen	5	46								23	26	5	
2-Master Bedroom		68		18	79								
2-Study	14	86											

Table 2.3 - Component Selection

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		EW1								2 (6) 2	EW1		
1-Dining/ Living / Kitchen	2 (22) 2	EW3	D4-sd							2 (22) 2	EW1	D4	
1-Master Bedroom		EW2		2 (22) 2	EW1								
2-Dining/ Living / Kitchen	2 (22) 2	EW2								2 (42) 2	EW1	D3	
2-Master Bedroom		EW2		2 (22) 2	EW1								
2-Study	2 (22) 2	EW2											

Note 1: Use Tables 7.2 - 7.4, "Topic 7, Environmental Noise Assessment in Land Use Planning Manual"

Note 2: Windows are based on 2 mm and 3mm glass thickness (Double Glaze Windows)

800 Ralph Hennessy Avenue - Block 2 Exterior Unit (R3)

Source: Road Traffic

Predicted free-field day time sound level: 73.82 dBA

Predicted free-field night time sound level: 66.23 dBA

Table 1.1 - Sound level at building façade

	Day (Living Area)				Night (Bedroom)			
	Wall 1	Wall 2	Wall 3	Wall 4	Wall 1	Wall 2	Wall 3	Wall 4
Source 1	73.82	73.82		73.82	66.23	66.23		66.23
Shielding Correction	0	-3		-3	0	-3		-3
Resultant Sound Level	73.82	70.82		70.82	66.23	63.23		63.23

Table 1.2 - Number of Components

Room	Wall 1			Wall 2			Wall 3			Wall 4			Total Number of Components
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		1								1	1		3
1-Dining/ Living / Kitchen	1	1	1							1	1	1	6
1-Master Bedroom		1		1	1								3
2-Dining/ Living / Kitchen	1	1								1	1	1	5
2-Master Bedroom		1		1	1								3
2-Study	1	1											2

Note: Ignore if sound level below 60 dBA

* Component AIF exceeds required value by 10 or more and has been ignored as a component

Table 1.3 - AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	36			33
1-Dining/ Living / Kitchen	39			36
1-Master Bedroom	36	33		
2-Dining/ Living / Kitchen	38			35
2-Master Bedroom	36	33		
2-Study	34			

Note: Max AIF selected between Day and Night

Table 1.4 - Adjustment for Geometry

	Wall 1	Wall 2	Wall 3	Wall 4
Exposure Angle	0-90	0-90		0-90
Adjustment	0	0		0

Table 1.5 - Required AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	36			33
1-Dining/ Living / Kitchen	39			36
1-Master Bedroom	36	33		
2-Dining/ Living / Kitchen	38			35
2-Master Bedroom	36	33		
2-Study	34			

Table 2.1 - Component Area (ft²)

Room	Wall 1			Wall 2			Wall 3			Wall 4			Room Floor Area
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		22								11	81		198
1-Dining/ Living / Kitchen	18	244	58							36	104	21	455
1-Master Bedroom		116		27	131								181
2-Dining/ Living / Kitchen	21	199								101	115	21	435
2-Master Bedroom		117		31	136								173
2-Study	14	88											102

Note: Susan D. Smith Architect Layout

Table 2.2 - Component Percentages per Room Floor Area (%)

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		11								6	41		
1-Dining/ Living / Kitchen	4	54	13							8	23	5	
1-Master Bedroom		64		15	72								
2-Dining/ Living / Kitchen	5	46								23	26	5	
2-Master Bedroom		68		18	79								
2-Study	14	86											

Table 2.3 - Component Selection

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		EW1								2 (6) 2	EW1		
1-Dining/ Living / Kitchen	2 (22) 2	EW3	D4-sd							2 (22) 2	EW1	D4	
1-Master Bedroom		EW2		2 (22) 2	EW1								
2-Dining/ Living / Kitchen	2 (22) 2	EW2								2 (42) 2	EW1	D3	
2-Master Bedroom		EW2		2 (22) 2	EW1								
2-Study	2 (22) 2	EW2											

Note 1: Use Tables 7.2 - 7.4, "Topic 7, Environmental Noise Assessment in Land Use Planning Manual"

Note 2: Windows are based on 2 mm and 3mm glass thickness (Double Glaze Windows)

800 Ralph Hennessy Avenue - Block 1 Exterior Unit (R6)

Source: Road Traffic

Predicted free-field day time sound level: 73.58 dBA

Predicted free-field night time sound level: 65.98 dBA

Table 1.1 - Sound level at building façade

	Day (Living Area)				Night (Bedroom)			
	Wall 1	Wall 2	Wall 3	Wall 4	Wall 1	Wall 2	Wall 3	Wall 4
Source 1	73.58	73.58		73.58	65.98	65.98		65.98
Shielding Correction	0	-3		0	0	-3		0
Resultant Sound Level	73.58	70.58		73.58	65.98	62.98		65.98

Table 1.2 - Number of Components

Room	Wall 1			Wall 2			Wall 3			Wall 4			Total Number of Components
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		1								1	1		3
1-Dining/ Living / Kitchen	1	1	1							1	1	1	6
1-Master Bedroom		1		1	1								3
2-Dining/ Living / Kitchen	1	1								1	1	1	5
2-Master Bedroom		1		1	1								3
2-Study	1	1											2

Note: Ignore if sound level below 60 dBA

* Component AIF exceeds required value by 10 or more and has been ignored as a component

Table 1.3 - AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	35			35
1-Dining/ Living / Kitchen	38			38
1-Master Bedroom	35	32		
2-Dining/ Living / Kitchen	38			38
2-Master Bedroom	35	32		
2-Study	34			

Note: Max AIF selected between Day and Night

Table 1.4 - Adjustment for Geometry

	Wall 1	Wall 2	Wall 3	Wall 4
Exposure Angle	0-90	0-90		0-90
Adjustment	0	0		0

Table 1.5 - Required AIF

	Wall 1	Wall 2	Wall 3	Wall 4
1-Den	35			35
1-Dining/ Living / Kitchen	38			38
1-Master Bedroom	35	32		
2-Dining/ Living / Kitchen	38			38
2-Master Bedroom	35	32		
2-Study	34			

Table 2.1 - Component Area (ft²)

Room	Wall 1			Wall 2			Wall 3			Wall 4			Room Floor Area
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		22								11	81		198
1-Dining/ Living / Kitchen	18	244	58							36	104	21	455
1-Master Bedroom		116		27	131								181
2-Dining/ Living / Kitchen	21	199								101	115	21	435
2-Master Bedroom		117		31	136								173
2-Study	14	88											102

Note: Susan D. Smith Architect Layout

Table 2.2 - Component Percentages per Room Floor Area (%)

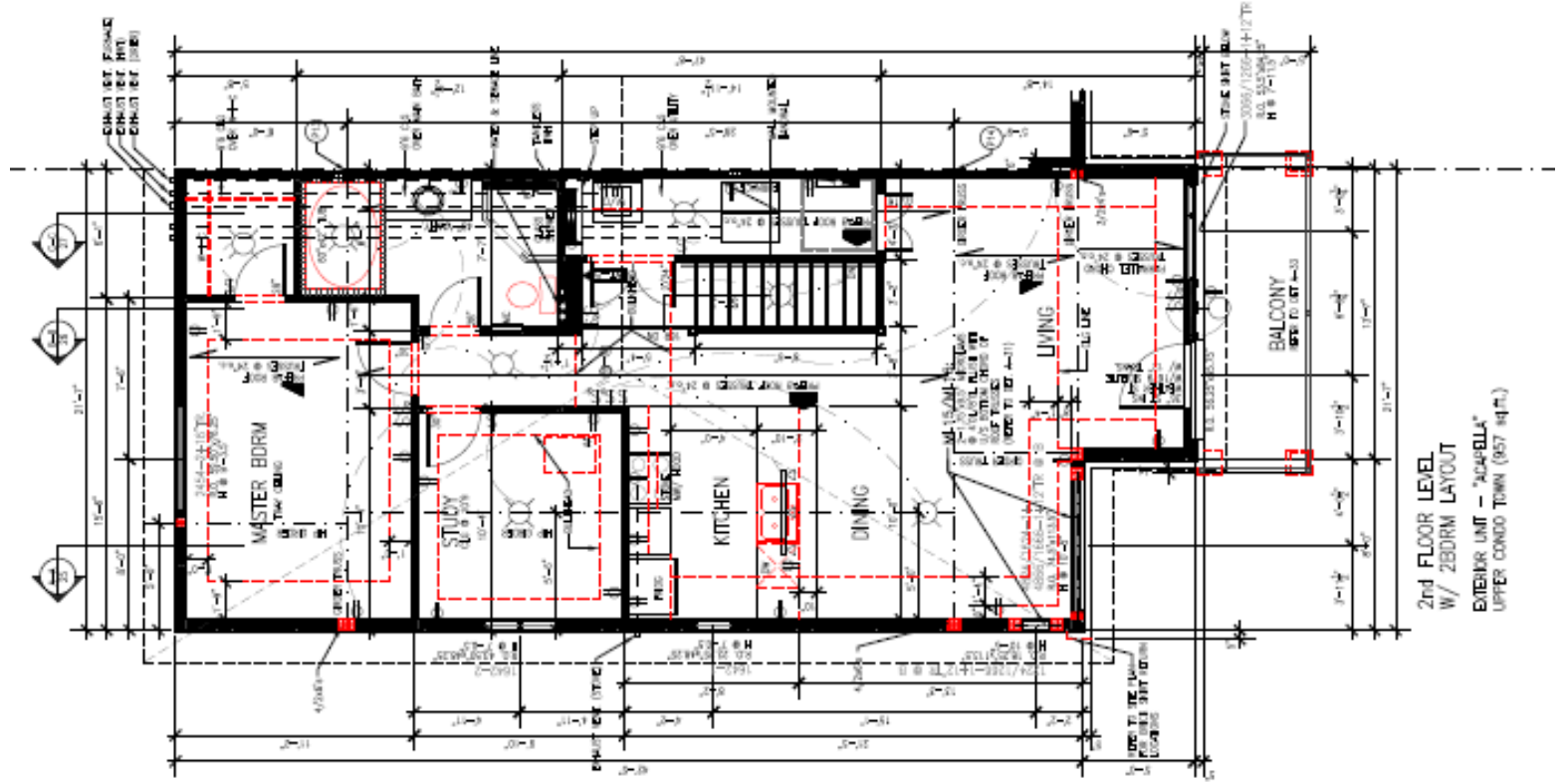
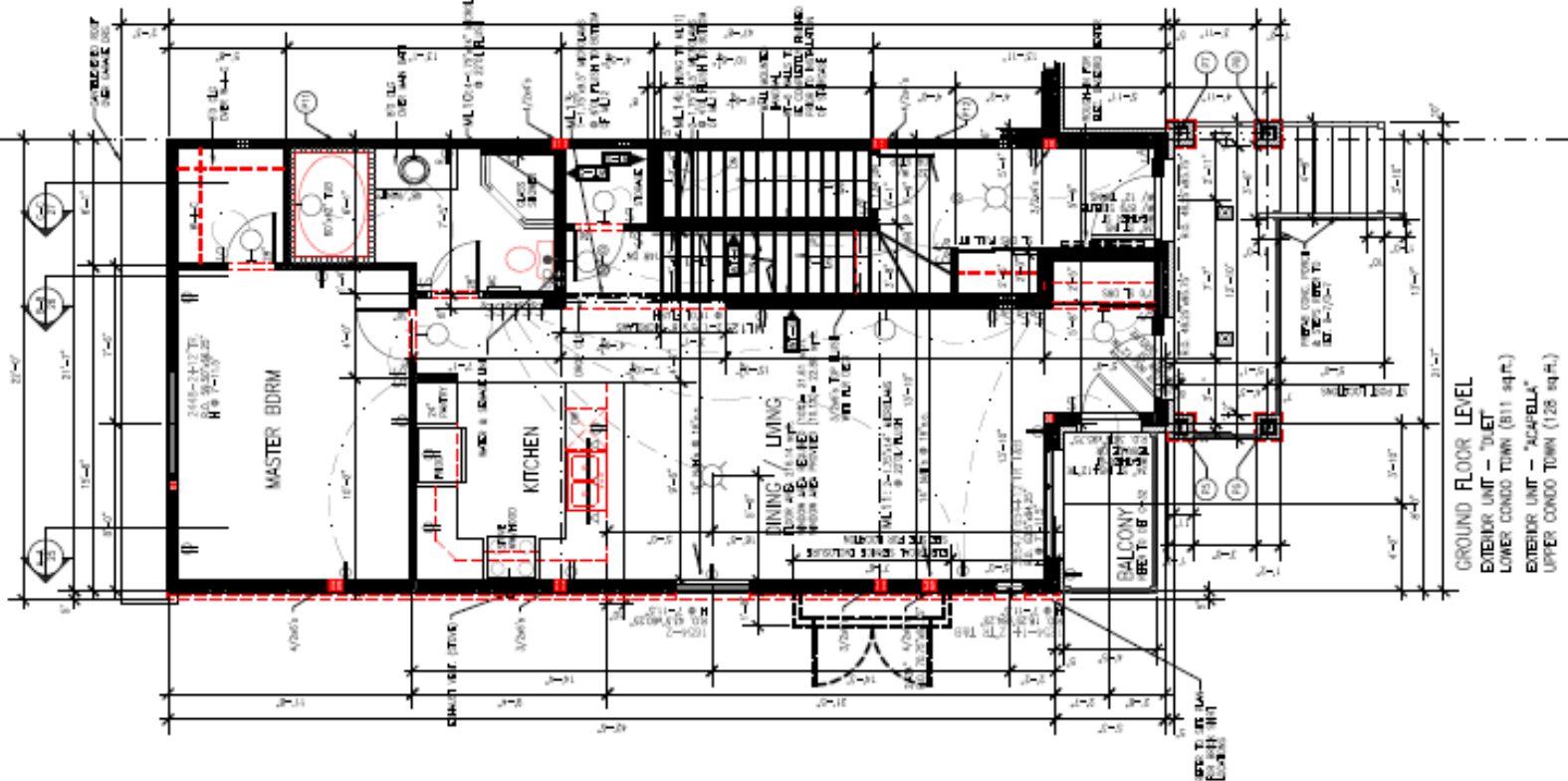
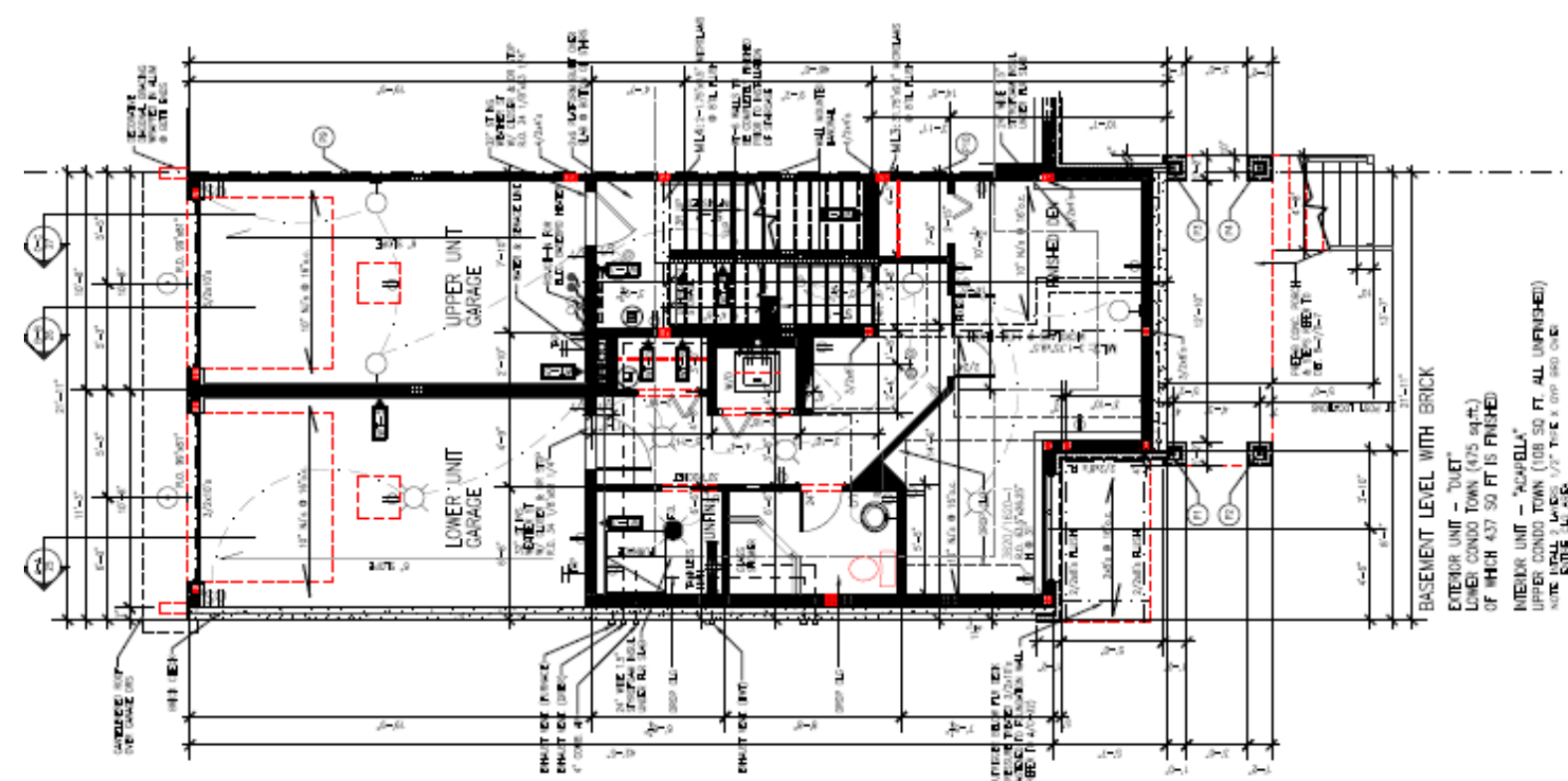
Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		11								6	41		
1-Dining/ Living / Kitchen	4	54	13							8	23	5	
1-Master Bedroom		64		15	72								
2-Dining/ Living / Kitchen	5	46								23	26	5	
2-Master Bedroom		68		18	79								
2-Study	14	86											

Table 2.3 - Component Selection

Room	Wall 1			Wall 2			Wall 3			Wall 4			
	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	Window	Wall	Door	
1-Den		EW1								2 (15) 2	EW1		
1-Dining/ Living / Kitchen	2 (18) 2	EW3	D3-sd							2 (35) 2	EW1	D5 or D1-sd	
1-Master Bedroom		EW2		2 (18) 2	EW1								
2-Dining/ Living / Kitchen	2 (22) 2	EW2								2 (80) 2	EW1	D5 or D1-sd	
2-Master Bedroom		EW2		2 (18) 2	EW1								
2-Study	2 (22) 2	EW2											

Note 1: Use Tables 7.2 - 7.4, "Topic 7, Environmental Noise Assessment in Land Use Planning Manual"

Note 2: Windows are based on 2 mm and 3mm glass thickness (Double Glaze Windows)





Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
www.stantec.com

800 RALPH HENNESSY AVENUE
(BLOCK 211 RIVERSIDE SOUTH PHASE 8)
NOISE ASSESSMENT REPORT

Figure No.
EXTERIOR UNITS
Title
FLOOR PLAN LAYOUTS

ORIGINAL SHEET - ANSI B



Stantec Consulting Ltd.
400 - 1331 Clyde Avenue
Ottawa ON
Tel. 613-724-4420
www.stantec.com

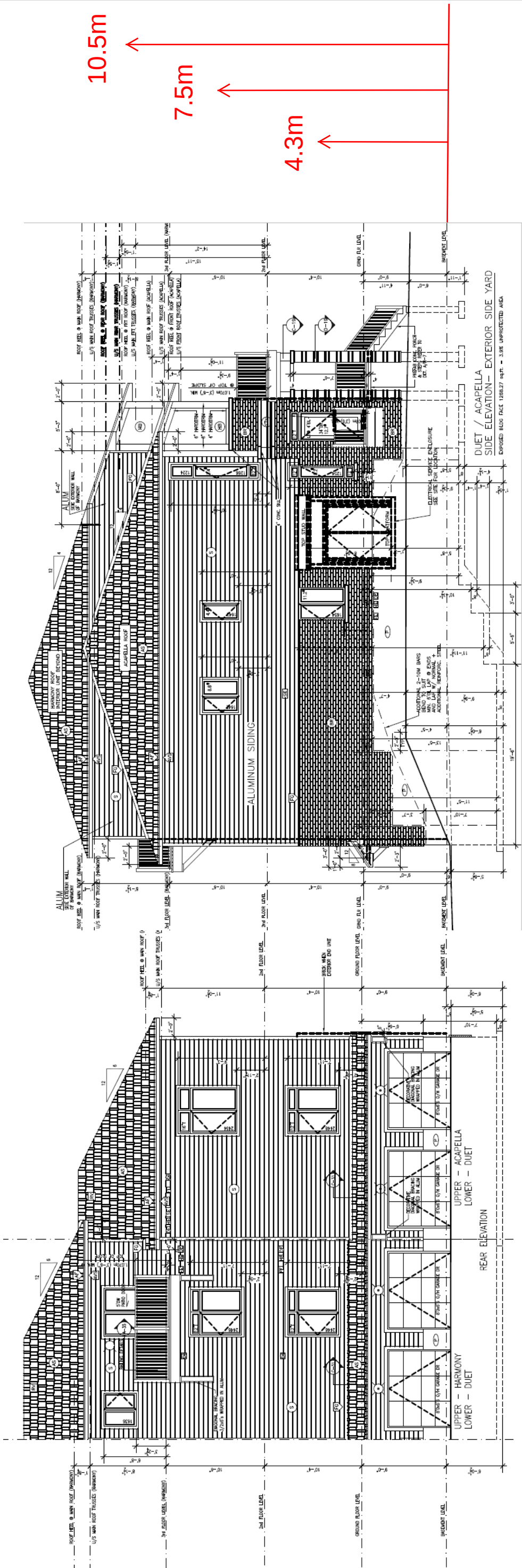
Client/Project

800 RALPH HENNESSY AVENUE
(BLOCK 211 RIVERSIDE SOUTH PHASE 8)
NOISE ASSESSMENT REPORT

Figure No.
ELEVATION PLAN

Title
FLOOR PLAN
LAYOUTS

July, 2017
160401305



**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix C : Noise Warning Clauses
August 25, 2017

Appendix C : NOISE WARNING CLAUSES

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix C : Noise Warning Clauses
August 25, 2017

WARNING CLAUSES

The following warning clauses may be used individually or in combination:

Generic Indoor :

Indoor environment - $L_{eq}(16)$ greater than 55 dBA and less than or equal to 65 dBA or ($L_{eq}(8)$ greater than 50dBA and less than or equal to 60 dBA

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- the provision for adding central air conditioning at the occupant's discretion.

Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of the Environment and Climate Change.

Extensive Mitigation of Indoor Area :

Indoor environment - $L_{eq}(16)$ greater than 65 dBA or ($L_{eq}(8)$ greater than 60dBA

To help address the need for sound attenuation this development has been designed so as to provide an indoor environment that is within provincial guidelines. Measures for sound attenuation include:

- multi-pane glass;
- exterior wall insulation;
- a forced central air conditioning system.

To ensure that provincial sound level limits are not exceeded, it is important to maintain these sound attenuation features.

This dwelling unit has been supplied with a forced central air conditioning system and other measures 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 City of Ottawa and the Ministry of the Environment and Climate Change.

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix C : Noise Warning Clauses
August 25, 2017

Aircraft Noise :

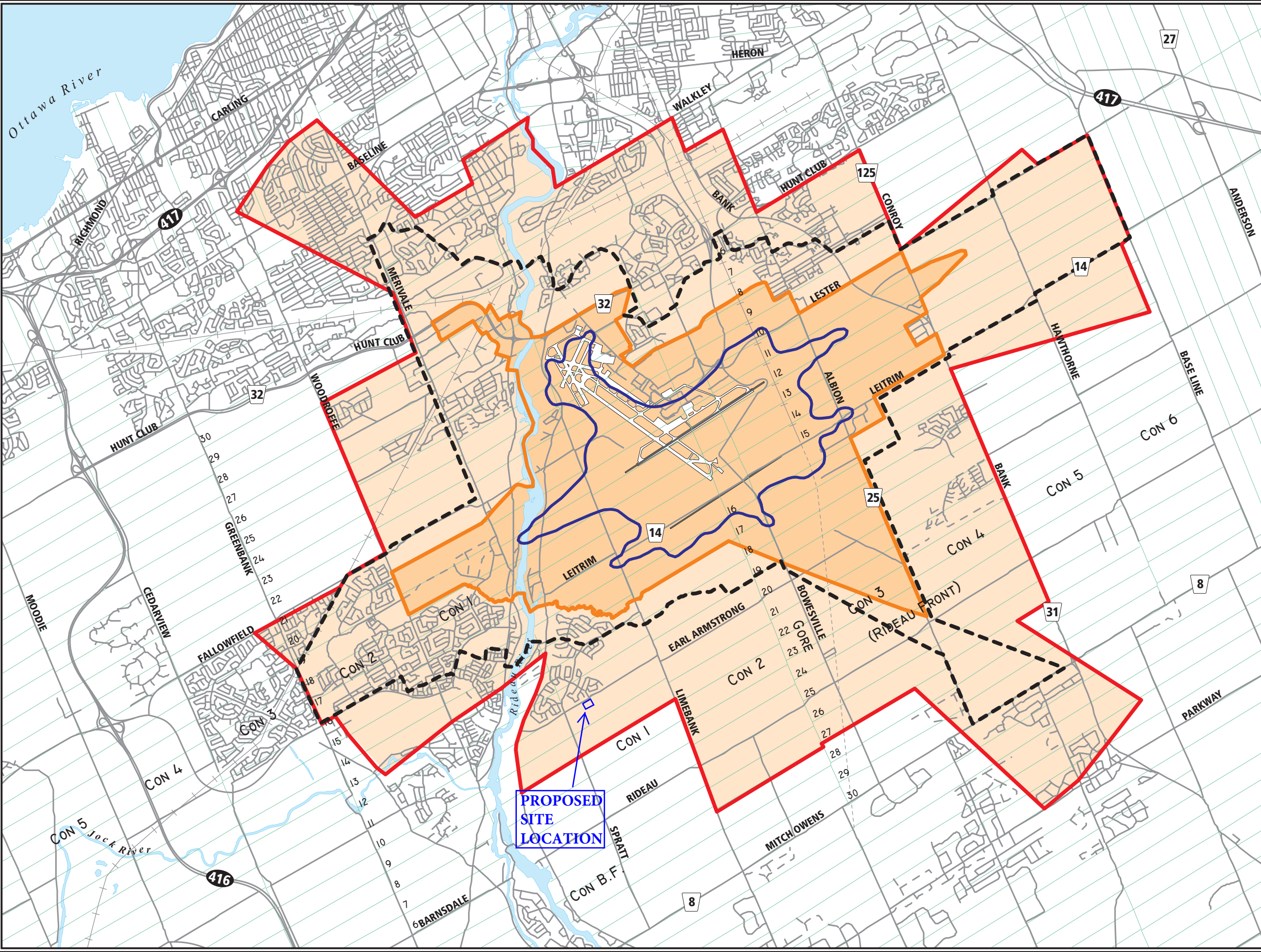
Purchasers/tenants are advised that due to the proximity of the airport, noise from the airport and individual aircraft may at times interfere with outdoor or indoor activities.

Source: City of Ottawa - Environmental Noise Control Guidelines, January 2016 and Ontario Ministry of the Environment, Environmental Noise Guideline Stationary and Transportation Sources – Approval and Planning Publication NPC-300, Queen's Printer for Ontario, 2013

**NOISE ASSESSMENT REPORT -
800 RALPH HENNESSEY AVENUE (BLOCK 211 RIVERSIDE SOUTH PHASE 8)**

Appendix D : Aircraft Noise Constraints Map
August 25, 2017

Appendix D : AIRCRAFT NOISE CONSTRAINTS MAP



OFFICIAL PLAN - ANNEX 10 Land Use Constraints Due to Aircraft Noise

Prepared by: City of Ottawa,
Department of Planning, Transit and the Environment,
September 2011

PLAN OFFICIEL - APPENDICE 10 Contraintes limitant l'utilisation en raison du bruit des avions

Préparé par : Ville d'Ottawa,
Le Service de l'urbanisme, du transport en commun et de l'environnement,
septembre 2011

- Airport Vicinity Development Zone
Zone d'aménagement dans le voisinage de l'aéroport
- 25 Line (Composite of 25 NEF/NEP)
Ligne 25 (ensemble des courbes NEF et NEP 25)
- 35 Line Noise Exposure Protection (NEP 2023)
Ligne 35 : prévisions à long terme de l'ambiance sonore (NEP 2023)
- Airport Zoning Regulations
Règlements de zonage applicables à de l'Aéroport
- Airport Operating Influence Zone
Zone d'influence d'exploitation de l'aéroport

Note:
The boundaries of the Ottawa Airport Operating Influence Zone and the Airport Vicinity Development Zone, are not subject to interpretation and their precise locations should be read from a map at a scale of 1:50,000 available from the City of Ottawa and the Ottawa International Airport Authority.

Scale / Échelle
1km 0 1 2 3 km

