

**Riverstone Retirement Community
HUNT CLUB DEVELOPMENT (PHASE 1)
NOISE IMPACT ASSESSMENT REPORT**

Prepared By:

NOVATECH

Suite 200, 240 Michael Cowpland Drive
Kanata, Ontario
K2M 1P6

May 19, 2017

Revised: November 2, 2017

Ref No.: R-2017-063
Novatech File No. 117036

November 2, 2017

City of Ottawa
Planning, Infrastructure and Economic Development Department
Planning Services Branch – Development Review South
City of Ottawa
110 Laurier Ave. West, 4th Floor
Ottawa, ON
K1P 1J1

Attention: Mr. Sean Moore, Planner

Dear Sir:

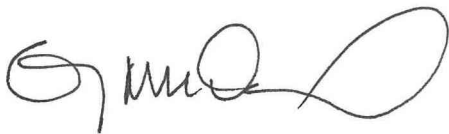
**Re: Noise Impact Assessment Report
Riverstone Retirement Community - Hunt Club Road Development (Phase 1)**

Please find enclosed three (3) copies of the updated Noise Impact Assessment Report for the proposed Retirement Building (Phase 1 Hunt Club development), located on Hunt Club Road at the Airport Parkway. This update revises the warning clauses to be included in the sales agreement. This report is in support of the rezoning and site plan applications and assesses the impact of traffic noise on the development.

Trusting the enclosed is satisfactory. Should you have any questions or require additional information please contact me.

Yours truly,

NOVATECH



Greg MacDonald, P. Eng.
Director
Land Development and Public Sector Infrastructure

Encl.

cc: Jim Burghout, Claridge

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1.0 INTRODUCTION

Novatech was retained by Claridge Homes to prepare this noise impact assessment report in support of a rezoning and site plan application for its development on Hunt Club Road at the Airport Parkway. The report assesses the impact of noise from traffic on Hunt Club Road and the Airport Parkway, and outlines the necessary noise attenuation measures to mitigate impacts.

The subject site is 0.93 hectares in area and is located at the southwest corner of Hunt Club Road and the Airport Parkway in the City of Ottawa, as shown on the **Figure 1** - Key Plan. Development of the site will be phased as shown on the Phasing Plan in **Figure 2**. Phase 1 will include an 8-storey retirement home with 145 units. Phase 2 will include an 8-storey hotel with 150 units. The overall development of the site (Phase 1 and 2) is shown in **Figure 3** – Concept Plan.

2.0 BACKGROUND

2.1 Noise Sources

The City of Ottawa Official Plan (OP) and the Environmental Noise Control Guidelines (ENCG) requires a noise impact assessment when a noise sensitive development is located within proximity to a surface transportation (road or rail), stationary, or aircraft noise source. The following distances to noise sources are applicable to the site:

- Within 100 meters from the right-of-way of an existing arterial
- Within 100 meters from the right of way of a bus rapid transit

Schedule E (Urban Road Networks) of the City of Ottawa's OP classifies Hunt Club Road and the Airport Parkway as arterial roadways. Due to its proximity to the site, this report includes the Airport Parkway's southbound on-ramp. All other on/off ramps are located too far from the site to consider. The ENCG does not define the characteristics of on/off ramps. This report assumes a traffic volume of 25% of the Airport Parkway average annual daytime traffic (AADT) at half the posted speed limit.

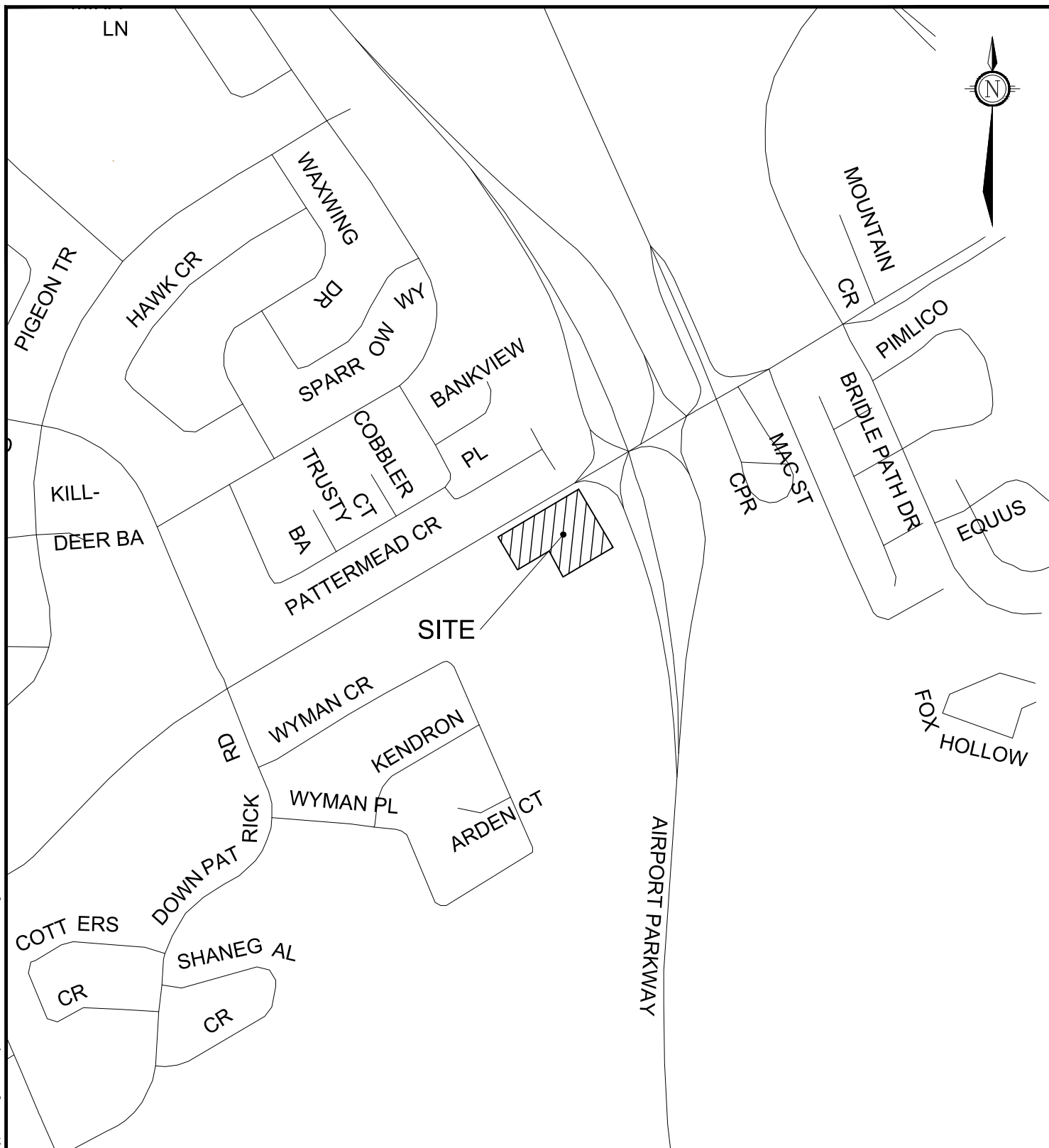
In addition, the Transportation Master Plan indicates that Hunt Club Road and the Airport Parkway will include future bus rapid transit. Bus volumes included in this report are assumed and should be reviewed when these routes are confirmed.

Roadway characteristics for Hunt Club Road and the Airport Parkway are provided in **Table 1**.

Table 1: Road Characteristics

Road		AADT	Speed Limit (km/hr)	Day/Night Split	Trucks (%)		Buses (day/night)
Name	Class				Medium	Heavy	
Hunt Club	4-UAD	35,000	60	92/8	7	5	128/16
Airport Parkway	4-UAU	30,000	80	92/8	7	5	128/16
A.P. Onramp	N/A	7,500*	40*	92/8	7	5	N/A

*Assumed



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KEY PLAN

1026-1054
WEST HUNT CLUB ROAD

HUNT CLUB DEVELOPMENT

DATE
MAY 2017

JOB
117036

FIGURE
FIGURE 1

HUNT CLUB ROAD

EX CONC SIDEWALK

EX CONC SIDEWALK

EX CONC SIDEWALK

PHASE 1

PROPOSED RETIREMENT HOME
FF=93.80
BSMT SLAB=90.70
USF=90.40

PHASE 2

PROPOSED HOTEL
FF=93.20
BSMT SLAB=90.10
USF=89.80

EXIT

AIRPORT PARKWAY ONRAMP

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HUNT CLUB DEVELOPMENT

PHASING PLAN

SCALE 1 : 500 0 5m 10m 20m

DATE MAY 2017 JOB 117036 FIGURE 2

HUNT CLUB ROAD

EX CONC SIDEWALK

EX CONC SIDEWALK

EX CONC SIDEWALK

PROPOSED RETIREMENT HOME
FF=93.80
BSMT SLAB=90.70
USF=90.40

LANDSCAPED AREA
REFER TO LANDSCAPING PLAN

AIRPORT PARKWAY ONRAMP

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HUNT CLUB DEVELOPMENT

CONCEPT PLAN PHASE 1

SCALE 1 : 500 0 5m 10m 20m

DATE MAY 2017 JOB 117036 FIGURE 3

The site is located within the Ottawa Airport Vicinity Development Zone (OAVDZ) but outside of the 25 Noise Exposure Forecast/Noise Exposure Projection (NEF/NEP) line. Therefore, noise from aircraft will not be assessed.

Refer to **Appendix A** for all excerpts from the City's Official Plan, ENCG, and Transportation Master Plan.

3.0 CITY OF OTTAWA NOISE CONTROL GUIDELINES

3.1 Sound Level Criteria

The City of Ottawa is concerned with noise from aircraft, roads, transitways, and railways, as expressed in:

- Table 2.2a: Sound Level Limit for Outdoor Living Areas – Road and Rail,
- 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

Table 2 summarizes the ENCG sound level criteria pertinent to the subject site. These sound level limits are the maximum threshold where no attenuation measures are required.

Table 2: Sound Level Criteria

Type of Space	Time Period	Allowable Leq (dBA)
		Road
Outdoor Living Area (OLA)	7:00 – 23:00	55
Plane of Window (POW): Residential Living/Dining Areas, Office/Dens	7:00 – 23:00	45
	23:00 – 7:00	45
Plane of Window (POW): Residential Sleeping quarters	7:00 – 23:00	45
	23:00 – 7:00	40

To analyze the noise levels, plane of window and outdoor living area sound receiver locations were considered along the building face and at the outdoor amenity area.

Plane of Window and Outdoor Living Area receivers are defined as:

- **Plane of Window (POW):** The indoor living space where the sound levels will affect the living room area during daytime hours and bedrooms during nighttime hours. The POW is considered 1.5m above the finished floor of the respective room.
- **Outdoor Living Area (OLA):** The outdoor amenity area provided for quiet enjoyment of the outdoor environment during the daytime period (i.e., backyards, terraces and decks). OLA noise levels are considered 3.0m from the building façade, 1.5m above grade.

3.2 Noise Attenuation Requirements

When the predicted sound levels are equal to or less than the criteria listed in **Table 1**, attenuation measures are not required. Conversely, when the noise criteria in **Table 1** is exceeded, attenuation measures are required. When required, the City of Ottawa suggests the following noise attenuation measures:

- Optimize setback distance with soft ground;
- Orientation of building to provide sheltered zones in rear yards;
- Enhanced construction techniques and construction quality;
- Construction of sound or acoustic barriers; and
- Installation of air conditioning and ventilation.

4.0 PREDICTION OF OUTDOOR NOISE LEVELS

4.1 Noise Level Analysis

The noise levels for the subject site were analyzed using version 5.03 of the STAMSON computer noise modelling program. Receiver locations and distances to noise sources are shown on the Noise Control Plan in **Figure 4**. STAMSON modeling results are included in **Appendix B** and summarized in **Table 3**.

Table 3: Predicted Unattenuated Noise Levels

Receiver	Location		Unattenuated Noise Level (dBA)	
	Building Face	Floor	Daytime (7:00-23:00)	Nighttime (23:00-7:00)
OLA 1	South	1	52.63	N/A
POW 1	West	1	62.29	54.74
		8	66.76	59.21
POW 2	North	1	70.00	62.43
		8	70.70	63.13
POW 3	East	1	67.45	59.87
		8	69.69	62.13
POW 4	South	1	54.19	46.69
		8	57.79	50.41

The predicted noise level for OLA1 is below the maximum allowable value listed in **Table 2**. Therefore, a ttenuation measures for the outdoor living area are not required.

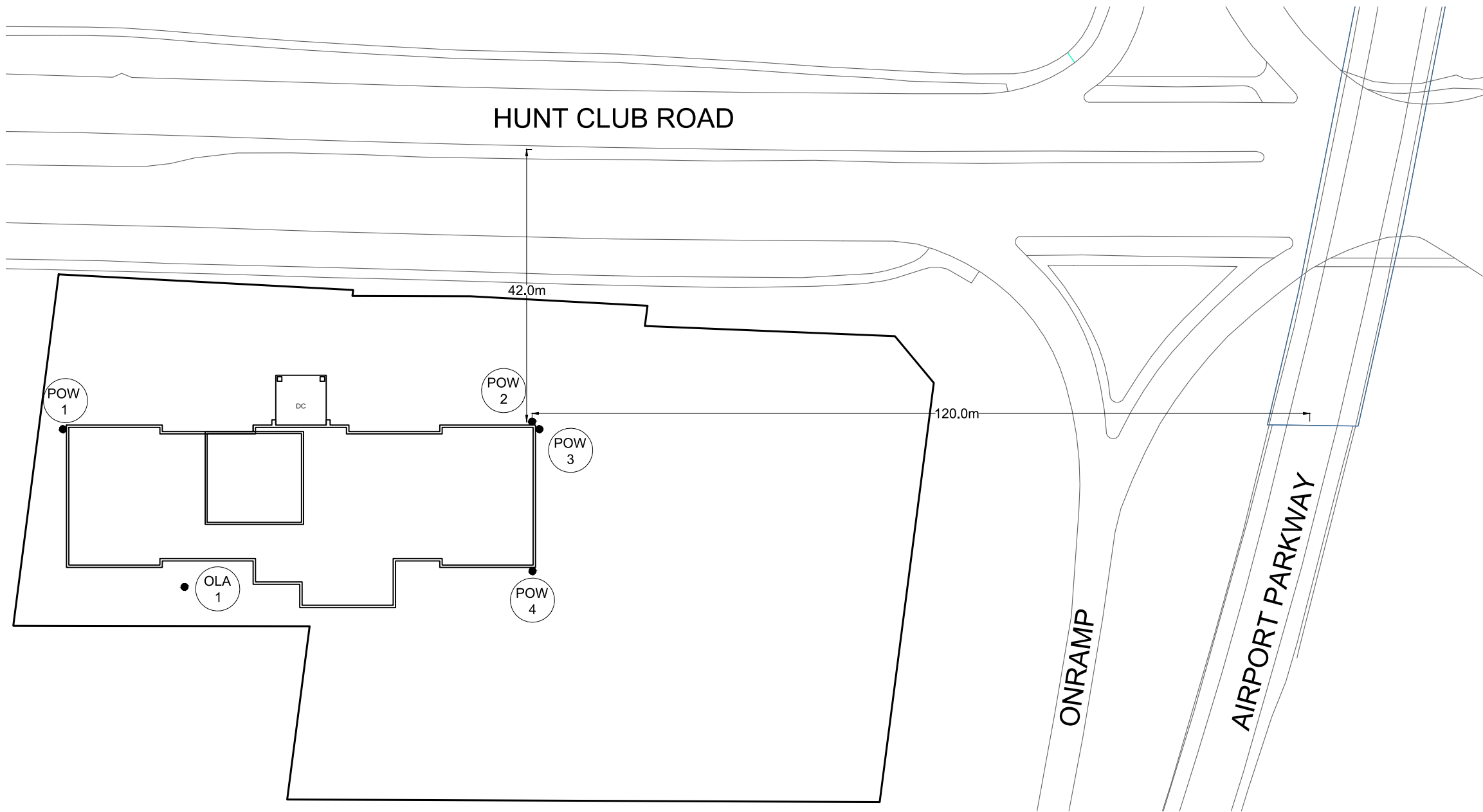
The predicted noise levels for POW 1 - 4 are above the maximum allowable values listed in **Table 2**. Therefore, window and wall façade improvements and waring clauses are required to mitigate the indoor sound levels on all building faces.

4.2 Noise Level Attenuation

To achieve the required sound attenuation, this report follows the guidelines of the “Acoustic Insulation Factor (AIF)” method outlined in the National Research Council’s “Acoustic Insulation Factor, A Rating for the Insulation of Buildings Against Noise, June 1980, by J.D. Quirt. “

The AIF method uses the following formula to determine the required AIF insulation levels:

M:\2017\117036\CAD\Design\Figures\Noise\Fig4-NoiseControl.dwg, 117036-NC, May 19, 2017 - 1:28pm, smdaughlin



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HUNT CLUB DEVELOPMENT

NOISE CONTROL PLAN

SCALE 1 : 750 0 10 20 30

DATE MAY 2017 JOB 117036 FIGURE 4

$$\text{AIF} = \text{Outside } L_{\text{eq}} (24 \text{ h}) - \text{Indoor } L_{\text{eq}} (24 \text{ h}) + 10 \log_{10}(N) + 2\text{dBA}$$

Where: Outside Leq (24hr) = The maximum unattenuated noise level (Table 4).
 Indoor Leq (24hr) = The maximum allowable noise level (Table 1).
 N = The number of components forming the exterior

Table 4 summarizes the AIF calculations for each of the receivers. A sample calculation is provided below.

Sample Calculation at Receiver POW 2 on the 8th floor assuming 2 exterior components:

$$\begin{aligned} \text{AIF}_{(\text{Daytime})} &= 70.7 \text{ dBA} - 45 \text{ dBA} + 10\log(2) + 2\text{dBA} \\ \text{AIF}_{(\text{Daytime})} &= 30.7 \text{ dBA} \\ \text{AIF}_{(\text{Daytime})} &= 31 \text{ dBA (rounded)} \\ \\ \text{AIF}_{(\text{Nighttime})} &= 63.1 \text{ dBA} - 40 \text{ dBA} + 10\log(2) + 2\text{dBA} \\ \text{AIF}_{(\text{Nighttime})} &= 28.1 \text{ dBA} \\ \text{AIF}_{(\text{Nighttime})} &= 28 \text{ dBA (rounded)} \end{aligned}$$

The higher of the two AIF values (daytime versus nighttime) is considered. The AIF for POW 2 on the 8th floor is therefore 31.

Table 4: Minimum Required Acoustic Insulation Factor (AIF)

Receiver	Location		Minimum Required AIF Values	
	Building Face	Floor	2 Components	3 Components
OLA 1	South	1	N/A	N/A
POW 1	West	1	22	24
		8	27	28
POW 2	North	1	30	32
		8	31	32
POW 3	East	1	27	29
		8	30	31
POW 4	South	1	14	16
		8	18	20

The AIF values listed in Table 4 – Minimum Required Acoustic Insulation Factor (AIF) are used to determine the type of window and wall assemblies required to attenuate the noise levels. This is done by using Tables 5 and 6 listed in **Appendix C. Table 5 – Acoustic Insulation Factor for Various Types of Windows** is used to select or verify the adequacy of the window assembly. **Table 6 – Acoustic Insulation Factor for Various Types of Exterior Wall** is used to select or verify the adequacy of the wall construction. Tables 11 and 12 in Appendix C can then be used to convert the AIF values to STC values which builders are more accustomed to.

Once detailed drawings are provided by the architect, these calculations will be performed and window/door and wall assemblies will be selected and verified.

In addition to the above-noted attenuation measure, the following warning clause is to be included in the Agreement of Purchase and Sale.

“Purchasers/tenants are advised that sound levels due to increasing road/rail/light-rail/transitway traffic will interfere with outdoor activities as the sound levels exceed the sound level limits of the City of Ottawa and the Ministry of the Environment. To help address the sound attenuation this development includes multi-pane glass and upgraded exterior walls.

To ensure provincial sound level limits are not exceeded this unit has been supplied with a central air conditioning system and other measures which all windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment.”

Due to the site being located within the OAVDZ, the following warning clause is to be included in the Agreement of Purchase and Sale.

“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.”

5.0 CONCLUSIONS

This report assessed the impact of noise levels from traffic on Hunt Club Road and the Airport Parkway on the proposed retirement building. Due to the noise levels exceeding ENCG guidelines, the following attenuation measure are proposed:

- Construction of window/door and wall assemblies to satisfy the calculated AIF levels in Table 4. These calculations will be performed once final architectural drawings are received, and this report will be up-dated accordingly.
- Provision of the following Warning Clauses in Purchase and Sale Agreements and Rental Agreements.

“Purchasers/tenants are advised that sound levels due to increasing road/rail/light-rail/transitway traffic will interfere with outdoor activities as the sound levels exceed the sound level limits of the City of Ottawa and the Ministry of the Environment. To help address the sound attenuation this development includes multi-pane glass and upgraded exterior walls.

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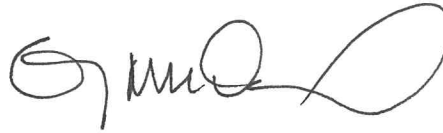
NOVATECH

Prepared by:



Mark Bowen, B. Eng.
Project Manager
Land Development Engineering

Reviewed by:

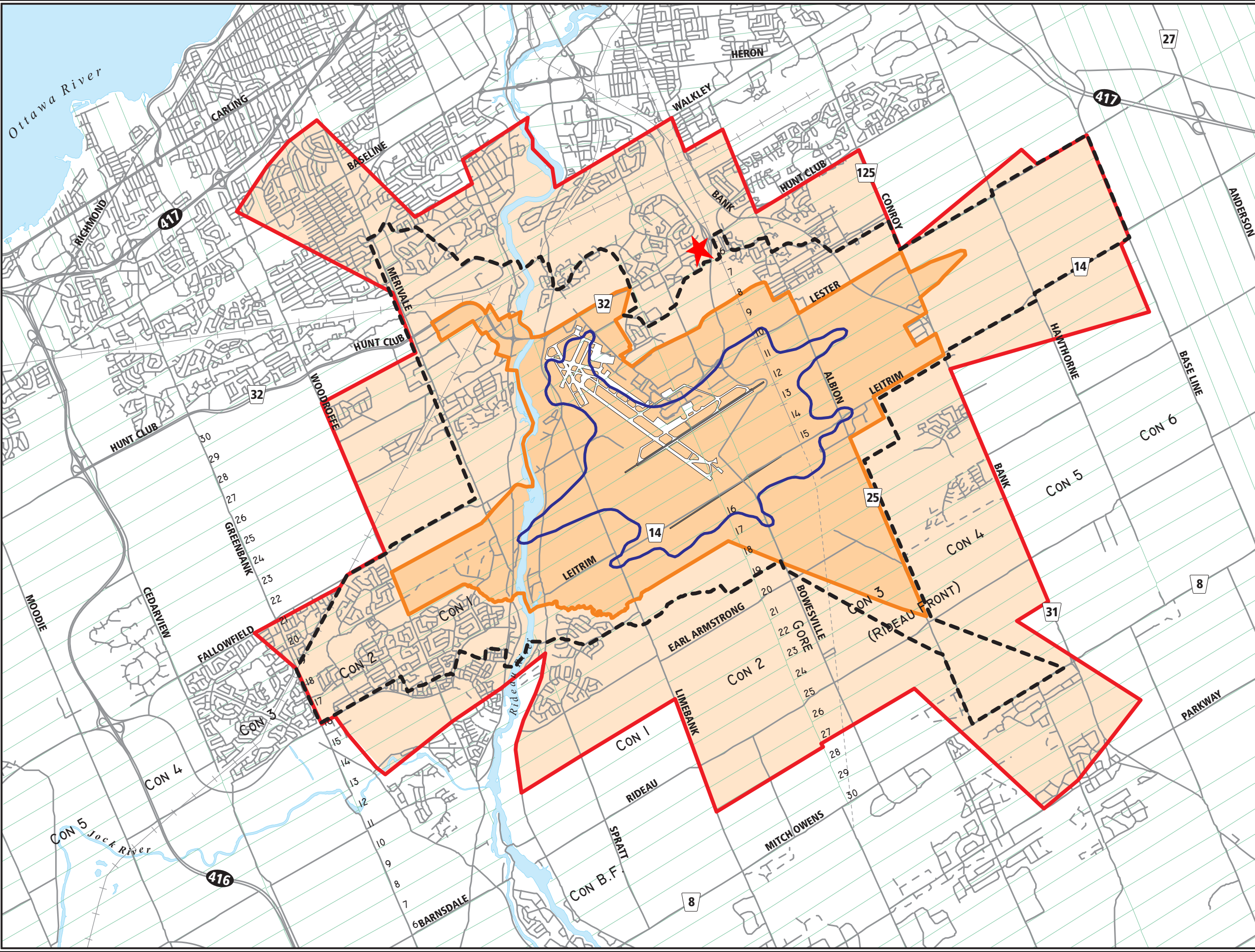


Greg MacDonald, P.Eng.
Director
Land Development and Public Sector Infrastructure



APPENDIX A

City of Ottawa Official Plan, ENCG, and Transportation Master Plan Excerpts



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.

Site Location

Scale / Échelle
1km 0 1 2 3 km



Table 2.2a: Sound Level Limit for Outdoor Living Areas - Road and Rail
 (from NPC-300, 2013 Table C-1)

Time Period	Required Leq (16) (dBA)
16-hour, 07:00 – 23:00	55

Table 2.2b: Sound Level Limit for Indoor Living Areas Road and Rail
 (from NPC-300, 2013 Table C-2)

Type of Space	Time Period	Required Leq (dBA)	
		Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	07:00 – 23:00	45	40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	23:00 – 07:00	45	40
Sleeping quarters	07:00 – 23:00	45	40
	23:00 – 07:00	40	35

The Province also provides for supplementary indoor sound level limits for land uses not generally considered noise sensitive (see Table 2.2c below). These good practice design objectives should be addressed in any noise study prepared for the City. These supplementary sound level limits are based on the windows and doors to an indoor space being closed.

Table 2.2c: Supplementary Sound Level Limits for Indoor Spaces - Road and Rail (adapted from NPC-300 Table C-9)

Type of Space	Time Period	Required Leq (dBA)	
		Road	Rail
General offices, reception areas, retail stores, etc.	16 hours between 07:00 – 23:00	50	45
Theatres, places of worship, libraries, individual or semi-private offices, conference rooms, reading rooms, etc.	16 hours between 07:00 – 23:00	45	40
Sleeping quarters of hotels/motels	8 hours between 23:00 – 07:00	45	40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc.	8 hours between 23:00 – 07:00	40	35

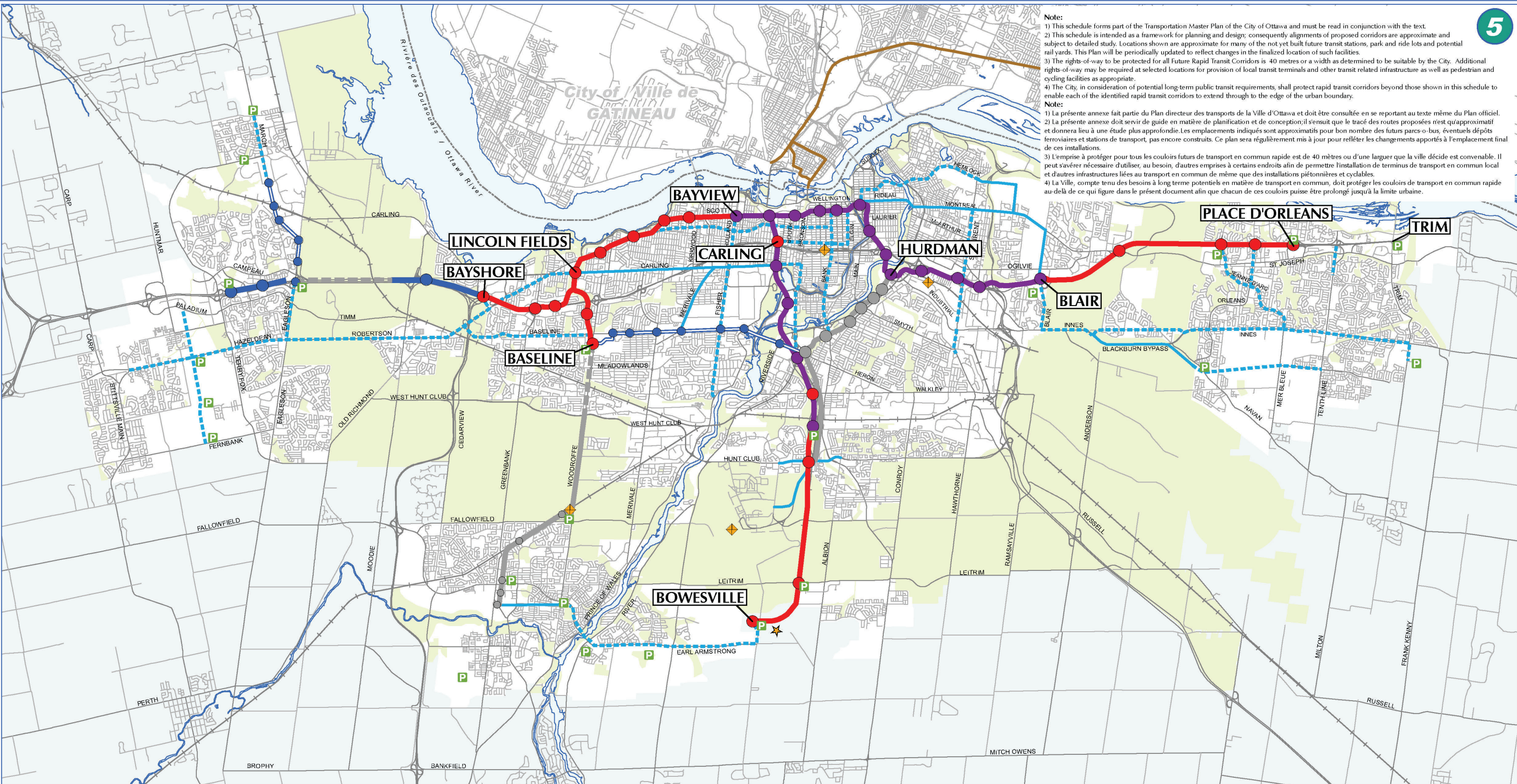
Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions

Table B1 Traffic And Road Parameters To Be Used For Sound Level Predictions

Row Width (m)	Implied Roadway Class	AADT Vehicles/Day	Posted Speed Km/Hr	Day/Night Split %	Medium Trucks %	Heavy Trucks % ¹
NA ²	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6 UAD)	50,000	50-80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35,000	50-80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30,000	50-80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24,000	40-60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15,000	50-80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12,000	40-60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10,000	50-80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8,000	40-50	92/8	7	5

¹ The MOE Vehicle Classification definitions should be used to estimate automobiles, medium trucks and heavy trucks.

² The number of lanes is determined by the future mature state of the roadway.



Note:

1) This schedule forms part of the Transportation Master Plan of the City of Ottawa and must be read in conjunction with the text.

2) This schedule is intended as a framework for planning and design; consequently alignments of proposed corridors are approximate and subject to detailed study. Locations shown are approximate for many of the not yet built future transit stations, park and ride lots and potential rail yards. This Plan will be periodically updated to reflect changes in the finalized location of such facilities.

3) The rights-of-way to be protected for all Future Rapid Transit Corridors is 40 metres or a width as determined to be suitable by the City. Additional rights-of-way may be required at selected locations for provision of local transit terminals and other transit related infrastructure as well as pedestrian and cycling facilities as appropriate.

4) The City, in consideration of potential long-term public transit requirements, shall protect rapid transit corridors beyond those shown in this schedule to enable each of the identified rapid transit corridors to extend through to the edge of the urban boundary.

Note:

1) La présente annexe fait partie du Plan directeur des transports de la Ville d'Ottawa et doit être consultée en se reportant au texte même du Plan officiel.

2) La présente annexe doit servir de guide en matière de planification et de conception; il s'ensuit que le tracé des routes proposées n'est qu'approximatif et donnera lieu à une étude plus approfondie. Les emplacements indiqués sont approximatifs pour bon nombre des futurs parcs-o-bus, éventuels dépôts ferroviaires et stations de transport, pas encore construits. Ce plan sera régulièrement mis à jour pour refléter les changements apportés à l'emplacement final de ces installations.

3) L'emprise à protéger pour tous les couloirs futurs de transport en commun rapide est de 40 mètres ou d'une largeur que la ville décide est convenable. Il peut s'avérer nécessaire d'utiliser, au besoin, d'autres emprises à certains endroits afin de permettre l'installation de terminus de transport en commun local et d'autres infrastructures liées au transport en commun de même que des installations piétonnières et cyclables.

4) La Ville, compte tenu des besoins à long terme potentiels en matière de transport en commun, doit protéger les couloirs de transport en commun rapide au-delà de ce qui figure dans le présent document afin que chacun de ces couloirs puisse être prolongé jusqu'à la limite urbaine.



1 0.5 0 1 2 3 km

Prepared by: Planning and Growth Management Department,
Mapping & Graphics Unit, 2015 Revision
Préparé par: Service de l'urbanisme et de la gestion de la
croissance, Unité de la cartographie et des graphiques, Révision 2015

RAPID TRANSIT	TRANSPORT EN COMMUN RAPIDE	Existing Transit Station - Bus	Station de transport en commun actuelle – autobus
Existing Bus Rapid Transit (BRT)	Transport en commun rapide par autobus actuel	Existing / Committed Transit Station - Rail	Station de transport en commun actuelle/prévue – train
Existing Bus Lanes	Voies actuelles réservées aux autobus	Future Transit Station - Rail	Station de transport en commun future – train
Existing / Committed Rail	Réseau de transport ferroviaire actuel/prévu	Future Transit Station - Bus	Station de transport en commun future – autobus
Future Rail	Réseau ferroviaire futur	Inter-regional Stations	Stations interrégionales
Future Bus Rapid Transit (BRT)	Transport en commun rapide par autobus (TCRA) futur	Potential Rail Yard	Cour de tirage possible pour trains
Future Bus Rapid Transit (BRT) - At-Grade Crossings	Transport en commun rapide par autobus (TCRA) - passages à niveau futur	Gatineau Rapibus	Rapibus de Gatineau
TRANSIT PRIORITY	PRIORITÉ AU TRANSPORT EN COMMUN	Park and Ride	Parc-O-Bus
Transit Priority Corridor (Continuous Lanes)	Corridor donnant priorité au transport en commun (voies continues)		
Transit Priority Corridor (Isolated Measures)	Corridor donnant priorité au transport en commun (mesures isolées)		

TRANSPORTATION MASTER PLAN - Map 5

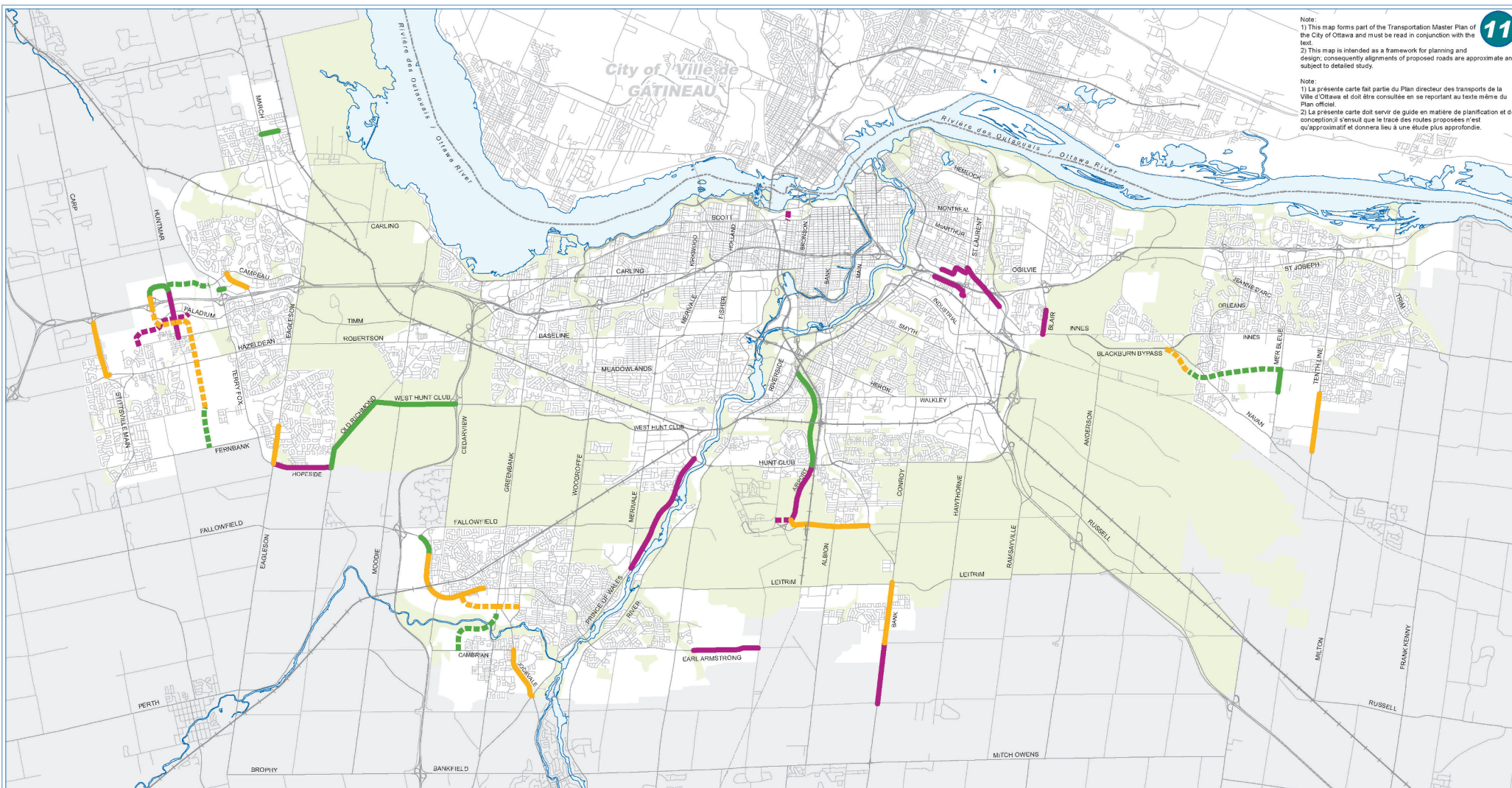
**RAPID TRANSIT AND
TRANSIT PRIORITY NETWORK
- 2031 AFFORDABLE NETWORK**

PLAN DIRECTEUR DES TRANSPORTS - Carte 5

**RÉSEAU DE TRANSPORT EN COMMUN RAPIDE
ET DE TRANSPORT EN COMMUN PRIORITAIRE
– RÉSEAU ABORDABLE 2031**

Note:
1) This map forms part of the Transportation Master Plan of the City of Ottawa and must be read in conjunction with the text.
2) This map is intended as a framework for planning and design; consequently alignments of proposed roads are approximate and subject to detailed study.

Note:
1) La présente carte fait partie du Plan directeur des transports de la Ville d'Ottawa et doit être consultée en se reportant au texte même du Plan officiel.
2) La présente carte doit servir de guide en matière de planification et de conception; il s'ensuit que le tracé des routes proposées n'est qu'approximatif et donnera lieu à une étude plus approfondie.



Phase 1 (2014 - 2019) Widening
Phase 1 (2014 - 2019) New Road
Phase 2 (2020 - 2025) Widening
Phase 2 (2020 - 2025) New Road
Phase 3 (2026 - 2031) Widening
Phase 3 (2026 - 2031) New Road

Phase 1 (2014 - 2019) élargissement
Phase 1 (2014 - 2019) Nouvelle route
Phase 2 (2020 - 2025) élargissement
Phase 2 (2020 - 2025) Nouvelle route
Phase 3 (2026 - 2031) élargissement
Phase 3 (2026 - 2031) Nouvelle route

TRANSPORTATION MASTER PLAN - Map 11
ROAD NETWORK – 2031 AFFORDABLE NETWORK

PLAN DIRECTEUR DES TRANSPORTS - Carte 11
RÉSEAU ROUTIER - RÉSEAU ABORDABLE 2031

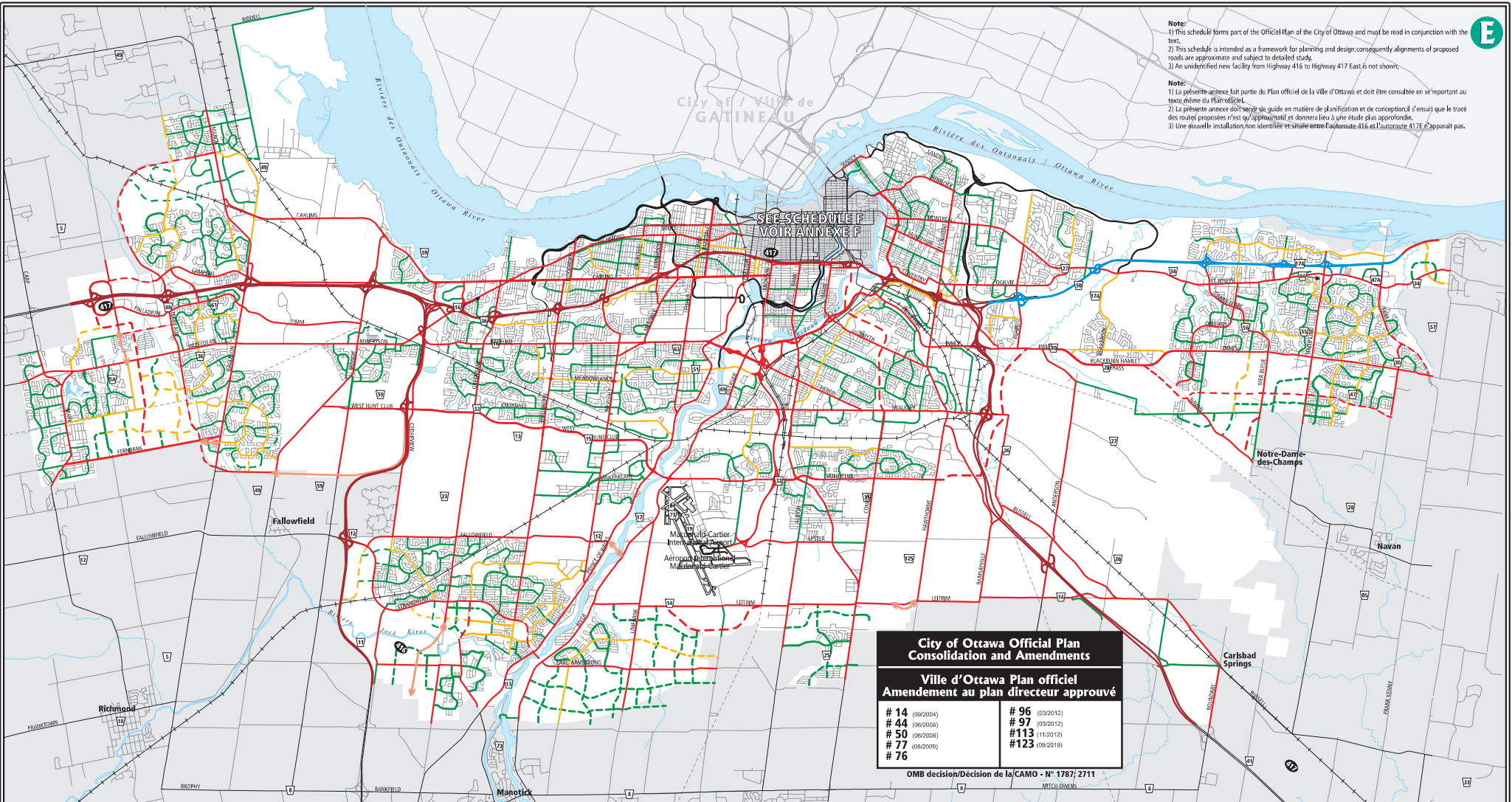


1 0.5 0 1 2 3 km

Prepared by: Planning and Growth Management Department,
Mapping & Graphics Unit, 2015 Revision
Préparé par: Service de l'urbanisme et de la gestion de la
croissance, Unité de la cartographie et des graphiques, Révision 2015

Notes:
1) This schedule forms part of the Official Plan of the City of Ottawa and must be read in conjunction with the text.
2) This schedule is intended as a framework for planning and design; consequently alignments of proposed roads are approximate and subject to detailed study.
3) An unidentified new facility from Highway 416 to Highway 417 East is not shown.

Note:
1) La présente annexe fait partie du Plan officiel de la Ville d'Ottawa et doit être consultée en se reportant au texte même du Plan officiel.
2) La présente annexe doit servir de guide en matière de planification et de conception; il s'ensuit que le tracé des routes proposées n'est qu'approximatif et donnera lieu à une étude plus approfondie.
3) Une nouvelle installation non identifiée et située entre l'autoroute 416 et l'autoroute 417E n'apparaît pas.



City of Ottawa Official Plan Consolidation and Amendments	
Ville d'Ottawa Plan officiel Amendement au plan directeur approuvé	
# 14	(09/2004)
# 44	(06/2006)
# 50	(06/2008)
# 77	(06/2009)
# 76	
# 96	(03/2012)
# 97	(03/2012)
# 113	(11/2012)
# 123	(09/2019)

OMB decision/Decision de la CAMO - N° 1787; 2711

Official Plan - Schedule E Urban Road Network

Plan officiel - Annexe E Routes Arterial - Urbain

Prepared by: Planning and Growth Management Department, Mapping & Graphics Unit

Préparé par : Service de l'urbanisme et de la gestion de la croissance, Unité de la cartographie et des graphiques

- | | | | | | |
|--|---|--|--|---|--|
| Provincial Highway
City Freeway | Route provinciale
Autoroute de ville | Arterials
Existing
Proposed
(Alignment Defined)
Conceptual
(Alignment Undefined) | Artère
Établie
Proposée
(Alignement déterminée)
Conceptuelle
(Alignement à déterminer) | Major Collectors
Existing
Proposed | Grande collectrice
Établie
Proposée |
| Federally Owned Road
Existing
Proposed
(Alignment defined) | Chemins de propriété fédéral
Établie
Proposée
(Alignement déterminée) | | | Collectors
Existing
Proposed | Collectrice
Établie
Proposée |



Scale / Echelle
0 1 2 3 4 km

APPENDIX B

STAMSON Noise Modelling Program Results

Filename: ola1.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\OLA1\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (day/night)

```

-----
Angle1 Angle2 : -90.00 deg -80.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with
barrier)
Barrier angle1 : -90.00 deg Angle2 : -80.00 deg
Barrier height : 6.50 m
Barrier receiver distance : 1.00 / 1.00 m
Source elevation : 93.20 m
Receiver elevation : 93.55 m
Barrier elevation : 93.55 m
Reference angle : 0.00

```

Road data, segment # 2: HUNT CLUB (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 : 3 %
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 # 2: HUNT CLUB (day/night)

```
-----
Angle1 Angle2 : -80.00 deg 85.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -80.00 deg Angle2 : 85.00 deg
Barrier height : 25.60 m
Barrier receiver distance : 3.00 / 3.00 m
Source elevation : 93.20 m
Receiver elevation : 93.55 m
Barrier elevation : 93.65 m
Reference angle : 0.00
```

Road data, segment # 3: HUNT CLUB (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 : 3 %
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 # 3: HUNT CLUB (day/night)

```

-----
Angle1 Angle2 : 85.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 67.00 / 67.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : 85.00 deg Angle2 : 90.00 deg
Barrier height : 4.10 m
Barrier receiver distance : 1.00 / 1.00 m
Source elevation : 93.20 m
Receiver elevation : 93.55 m
Barrier elevation : 93.65 m
Reference angle : 0.00

```

Road data, segment # 4: AIRPORT PKWY (day/night)

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 4: AIRPORT PKWY (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 : 168.00 / 168.00 m
Receiver height : 1.50 / 1.50 m
Topography : 2 (Flat/gentle slope; with barrier)
Barrier angle1 : -90.00 deg Angle2 : 0.00 deg
Barrier height : 25.60 m
Barrier receiver distance : 1.00 / 1.00 m
Source elevation : 91.50 m
Receiver elevation : 93.55 m
Barrier elevation : 93.65 m
Reference angle : 0.00
```

Road data, segment # 5: AIRPORT PKWY (day/night)

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 5: AIRPORT PKWY (day/night)

```
-----
Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 2 (Wood depth 60 metres or
more)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 168.00 / 168.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00
```

Road data, segment # 6: AIRPORT RAMP (day/night)

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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 # 6: AIRPORT RAMP (day/night)

```
-----
Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 140.00 / 140.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	38.80	!	38.80
2.HUNT CLUB	!	1.50	!	47.38	!	47.38
3.HUNT CLUB	!	1.50	!	35.74	!	35.74
4.AIRPORT PKWY	!	1.50	!	42.51	!	42.51
5.AIRPORT PKWY	!	1.50	!	47.32	!	47.32
6.AIRPORT RAMP	!	1.50	!	43.11	!	43.11
	+		+		+	
		Total				51.99 dBA

Barrier table for segment # 1: HUNT CLUB (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
8.00	101.55	39.44	39.44
8.50	102.05	39.70	39.70
9.00	102.55	39.98	39.98
9.50	103.05	40.29	40.29
10.00	103.55	40.60	40.60
10.50	104.05	40.94	40.94
11.00	104.55	41.29	41.29
11.50	105.05	41.09	41.09
12.00	105.55	40.91	40.91
12.50	106.05	40.74	40.74

Barrier table for segment # 2: HUNT CLUB (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
27.10	120.75	47.38	47.38
27.60	121.25	47.38	47.38
28.10	121.75	47.38	47.38
28.60	122.25	47.38	47.38
29.10	122.75	47.38	47.38
29.60	123.25	47.38	47.38
30.10	123.75	47.38	47.38
30.60	124.25	47.38	47.38
31.10	124.75	47.38	47.38
31.60	125.25	47.38	47.38

Barrier table for segment # 3: HUNT CLUB (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
5.60	99.25	36.31	36.31
6.10	99.75	36.58	36.58
6.60	100.25	36.88	36.88
7.10	100.75	37.20	37.20
7.60	101.25	37.55	37.55
8.10	101.75	37.92	37.92
8.60	102.25	38.31	38.31
9.10	102.75	38.71	38.71
9.60	103.25	39.13	39.13
10.10	103.75	39.57	39.57

Barrier table for segment # 4: AIRPORT PKWY (day)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
27.10	120.75	42.47	42.47
27.60	121.25	42.46	42.46
28.10	121.75	42.46	42.46
28.60	122.25	42.45	42.45
29.10	122.75	42.44	42.44
29.60	123.25	42.43	42.43
30.10	123.75	42.42	42.42
30.60	124.25	42.41	42.41
31.10	124.75	42.41	42.41
31.60	125.25	42.40	42.40

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	31.20	!	31.20
2.HUNT CLUB	!	1.50	!	39.78	!	39.78
3.HUNT CLUB	!	1.50	!	28.14	!	28.14
4.AIRPORT PKWY	!	1.50	!	34.91	!	34.91
5.AIRPORT PKWY	!	1.50	!	39.72	!	39.72
6.AIRPORT RAMP	!	1.50	!	35.51	!	35.51
Total						44.39 dBA

Barrier table for segment # 1: HUNT CLUB (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
8.00	101.55	31.84	31.84
8.50	102.05	32.10	32.10
9.00	102.55	32.39	32.39
9.50	103.05	32.69	32.69
10.00	103.55	33.01	33.01
10.50	104.05	33.34	33.34
11.00	104.55	33.69	33.69
11.50	105.05	33.50	33.50
12.00	105.55	33.32	33.32
12.50	106.05	33.14	33.14

Barrier table for segment # 2: HUNT CLUB (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
27.10	120.75	39.78	39.78
27.60	121.25	39.78	39.78
28.10	121.75	39.78	39.78
28.60	122.25	39.78	39.78
29.10	122.75	39.78	39.78
29.60	123.25	39.78	39.78
30.10	123.75	39.78	39.78
30.60	124.25	39.78	39.78
31.10	124.75	39.78	39.78
31.60	125.25	39.78	39.78

Barrier table for segment # 3: HUNT CLUB (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
5.60	99.25	28.71	28.71
6.10	99.75	28.98	28.98
6.60	100.25	29.28	29.28
7.10	100.75	29.61	29.61
7.60	101.25	29.95	29.95
8.10	101.75	30.32	30.32
8.60	102.25	30.71	30.71
9.10	102.75	31.12	31.12
9.60	103.25	31.54	31.54
10.10	103.75	31.97	31.97

Barrier table for segment # 4: AIRPORT PKWY (night)

Barrier Height	Elev of Barr Top	Road dBA	Tot Leq dBA
27.10	120.75	34.88	34.88
27.60	121.25	34.87	34.87
28.10	121.75	34.86	34.86
28.60	122.25	34.85	34.85
29.10	122.75	34.84	34.84
29.60	123.25	34.83	34.83
30.10	123.75	34.83	34.83
30.60	124.25	34.82	34.82
31.10	124.75	34.81	34.81
31.60	125.25	34.80	34.80

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 67.00 / 67.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

RT/Custom data, segment # 2: AIRPORT PKWY (day/night)

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 168.00 / 168.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	42.44	!	42.44
2.AIRPORT PKWY	!	0.50	!	38.80	!	38.80
Total						44.00 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	36.42	!	36.42
2.AIRPORT PKWY	!	0.50	!	32.78	!	32.78
	!		!		!	
		Total				37.98 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 52.63
(NIGHT): 45.29

STAMSON 5.0

SUMMARY REPORT

Date: 05-05-2017

POW1

12:03:02

UNATTENUATED

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

1ST FLOOR

Filename: pow1.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise
\Unattenuated\POW1\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	62.20	!	62.20
		Total				62.20 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	54.60	!	54.60
Total						54.60 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 43.00 / 43.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	45.64	!	45.64
		Total			45.64 dBA	

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	39.62	!	39.62
		Total			39.62 dBA	

TOTAL Leq FROM ALL SOURCES (DAY): 62.29
(NIGHT): 54.74

STAMSON 5.0

SUMMARY REPORT

Date: 05-05-2017

POW1
UNATTENUATED
8TH FLOOR

12:38:13

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow1f8.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW1\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	66.67	!	66.67
	!		!		!	
		Total				66.67 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	59.08	!	59.08
		Total				59.08 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 43.00 / 43.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	49.94	!	49.94
Total						49.94 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	43.92	!	43.92
Total						43.92 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.76
(NIGHT): 59.21

Filename: pow2.te Time Period: Day/Night 16/8 hours
Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW2\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (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 : 42.00 / 42.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg -20.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: AIRPORT PKWY (day/night)

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 3: AIRPORT PKWY (day/night)

```
-----
Angle1 Angle2 : -20.00 deg -5.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 4: AIRPORT RAMP (day/night)

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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 # 4: AIRPORT RAMP (day/night)

```
-----
Angle1 Angle2 : -20.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	69.78	!	69.78
2.AIRPORT PKWY	!	1.50	!	54.45	!	54.45
3.AIRPORT PKWY	!	1.50	!	49.64	!	49.64
4.AIRPORT RAMP	!	1.50	!	41.16	!	41.16
	+		+		+	
		Total				69.95 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	62.19	!	62.19
2.AIRPORT PKWY	!	1.50	!	46.85	!	46.85
3.AIRPORT PKWY	!	1.50	!	42.04	!	42.04
4.AIRPORT RAMP	!	1.50	!	33.56	!	33.56
	+		+		+	
		Total				62.36 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (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 : 42.00 / 42.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

RT/Custom data, segment # 2: AIRPORT PKWY (day/night)

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg -5.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 120.00 / 120.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	50.22	!	50.22
2.AIRPORT PKWY	!	0.50	!	37.87	!	37.87
	!		!		!	
		Total				50.47 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	44.20	!	44.20
2.AIRPORT PKWY	!	0.50	!	31.85	!	31.85
	!		!		!	
		Total				44.45 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.00
(NIGHT): 62.43

STAMSON 5.0

SUMMARY REPORT

Date: 15-05-2017 **POW2**

10:06:02

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

**UNATTENUATED
8TH FLOOR**

Filename: pow2f8.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW2\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (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 : 42.00 / 42.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg -20.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 3: AIRPORT PKWY (day/night)

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 3: AIRPORT PKWY (day/night)

```
-----
Angle1 Angle2 : -20.00 deg -5.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 4: AIRPORT RAMP (day/night)

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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 # 4: AIRPORT RAMP (day/night)

```
-----
Angle1 Angle2 : -20.00 deg 0.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	69.78	!	69.78
2.AIRPORT PKWY	!	1.50	!	62.36	!	62.36
3.AIRPORT PKWY	!	1.50	!	55.67	!	55.67
4.AIRPORT RAMP	!	1.50	!	41.16	!	41.16
	+		+		+	
		Total				70.65 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	62.19	!	62.19
2.AIRPORT PKWY	!	1.50	!	54.77	!	54.77
3.AIRPORT PKWY	!	1.50	!	48.08	!	48.08
4.AIRPORT RAMP	!	1.50	!	33.56	!	33.56
	+		+		+	
		Total				63.06 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (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 : 42.00 / 42.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

RT/Custom data, segment # 2: AIRPORT PKWY (day/night)

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg -5.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 120.00 / 120.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	50.22	!	50.22
2.AIRPORT PKWY	!	0.50	!	45.09	!	45.09
	+		+		+	
		Total				51.38 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	44.20	!	44.20
2.AIRPORT PKWY	!	0.50	!	39.07	!	39.07
Total						45.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 70.70
(NIGHT): 63.13

STAMSON 5.0

SUMMARY REPORT

Date: 15-05-2017 POW3

11:08:10

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

UNATTENUATED
1ST FLOOR

Filename: pow3.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise
\Unattenuated\POW3\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground
surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: AIRPORT PKWY (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 3: AIRPORT RAMP (day/night)

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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: AIRPORT RAMP (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	66.67	!	66.67
2.AIRPORT PKWY	!	1.50	!	59.05	!	59.05
3.AIRPORT RAMP	!	1.50	!	47.69	!	47.69
	+		+		+	
		Total				67.41 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	59.08	!	59.08
2.AIRPORT PKWY	!	1.50	!	51.45	!	51.45
3.AIRPORT RAMP	!	1.50	!	40.09	!	40.09
	+		+		+	
		Total				59.82 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 43.00 / 43.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

RT/Custom data, segment # 2: AIRPORT PKWY (day/night)

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 120.00 / 120.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	45.64	!	45.64
2.AIRPORT PKWY	!	0.50	!	41.23	!	41.23
Total						46.98 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	39.62	!	39.62
2.AIRPORT PKWY	!	0.50	!	35.21	!	35.21
	!		!		!	
		Total				40.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.45
(NIGHT): 59.87

STAMSON 5.0

SUMMARY REPORT

Date: 15-05-2017

POW3
UNATTENUATED
8TH FLOOR

11:11:37

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: pow3f8.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW3\WithBuses

Road data, segment # 1: HUNT CLUB (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 : 3 %
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: HUNT CLUB (day/night)

Angle1 Angle2 : 0.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground
surface)
Receiver source distance : 43.00 / 43.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

```
-----
Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00
```

Data for Segment # 2: AIRPORT PKWY (day/night)

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 120.00 / 120.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Road data, segment # 3: AIRPORT RAMP (day/night)

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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: AIRPORT RAMP (day/night)

```
-----
Angle1 Angle2 : -25.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 90.00 / 90.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00
```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	66.67	!	66.67
2.AIRPORT PKWY	!	1.50	!	66.47	!	66.47
3.AIRPORT RAMP	!	1.50	!	47.69	!	47.69
	+		+		+	
		Total				69.61 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	1.50	!	59.08	!	59.08
2.AIRPORT PKWY	!	1.50	!	58.87	!	58.87
3.AIRPORT RAMP	!	1.50	!	40.09	!	40.09
	+		+		+	
		Total				62.01 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 60 km/h

Data for Segment # 1: HUNT CLUB (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 43.00 / 43.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

RT/Custom data, segment # 2: AIRPORT PKWY (day/night)

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 2: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 120.00 / 120.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	49.94	!	49.94
2.AIRPORT PKWY	!	0.50	!	48.36	!	48.36
	!		!		!	
		Total				52.23 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.HUNT CLUB	!	0.50	!	43.92	!	43.92
2.AIRPORT PKWY	!	0.50	!	42.34	!	42.34
	!		!		!	
		Total				46.21 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 69.69
(NIGHT): 62.13

STAMSON 5.0

SUMMARY REPORT

Date: 15-05-2017 POW4

11:23:24

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

UNATTENUATED
1ST FLOOR

Filename: pow4.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW4\WithBuses

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 2 (Wood depth 60 metres or
more)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 115.00 / 115.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

```

-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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: AIRPORT RAMP (day/night)

```

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

```

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	1.50	!	52.57	!	52.57
2.AIRPORT RAMP	!	1.50	!	48.30	!	48.30
Total						53.95 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	1.50	!	44.97	!	44.97
2.AIRPORT RAMP	!	1.50	!	40.70	!	40.70
Total						46.35 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 1: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 115.00 / 115.00 m

Receiver height : 1.50 / 1.50 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	0.50	!	41.53	!	41.53
		Total				41.53 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	0.50	!	35.51	!	35.51
Total						35.51 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 54.19
(NIGHT): 46.69

STAMSON 5.0

SUMMARY REPORT

Date: 15-05-2017

POW4

11:26:50

UNATTENUATED

MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

8TH FLOOR

Filename: pow4f8.te

Time Period: Day/Night 16/8 hours

Description: M:\2017\117036\DATA\Calculations\Noise\Unattenuated
\POW4\WithBuses

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

Car traffic volume : 24288/2112 veh/TimePeriod *
Medium truck volume : 1932/168 veh/TimePeriod *
Heavy truck volume : 1380/120 veh/TimePeriod *
Posted speed limit : 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): 30000
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 7.00
Heavy Truck % of Total Volume : 5.00
Day (16 hrs) % of Total Volume : 92.00

Data for Segment # 1: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 2 (Wood depth 60 metres or
more)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 115.00 / 115.00 m
Receiver height : 23.70 / 23.70 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

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

```
-----
Car traffic volume : 6072/528 veh/TimePeriod *
Medium truck volume : 483/42 veh/TimePeriod *
Heavy truck volume : 345/30 veh/TimePeriod *
Posted speed limit : 40 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): 7500
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: AIRPORT RAMP (day/night)

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

Result summary (day)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	1.50	!	56.65	!	56.65
2.AIRPORT RAMP	!	1.50	!	48.30	!	48.30
Total						57.24 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	1.50	!	49.05	!	49.05
2.AIRPORT RAMP	!	1.50	!	40.70	!	40.70
Total						49.64 dBA

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

1 - Bus:

Traffic volume : 128/16 veh/TimePeriod

Speed : 80 km/h

Data for Segment # 1: AIRPORT PKWY (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg

Wood depth : 0 (No woods.)

No of house rows : 0 / 0

Surface : 1 (Absorptive ground surface)

Receiver source distance : 115.00 / 115.00 m

Receiver height : 23.70 / 23.70 m

Topography : 1 (Flat/gentle slope; no barrier)

Reference angle : 0.00

Result summary (day)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	0.50	!	48.55	!	48.55
Total						48.55 dBA

Result summary (night)

	!	source	!	Gen	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.AIRPORT PKWY	!	0.50	!	42.53	!	42.53
Total						42.53 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.79
(NIGHT): 50.41

APPENDIX C

Table 5	Acoustic Insulation Factor for Various Types of Windows
Table 6	Acoustic Insulation Factor for Various Types of Exterior Wall
Table 11	Approximate Conversion from STC to AIF for Windows and Doors
Table 12	Approximate Conversion from STC to AIF for Exterior Walls

TABLE 5: Acoustic Insulation Factor for Various Types of Windows

Window area as a percentage of total floor area of room (1)													Single glazing thickness	Double glazing of indicated glass thickness				Triple Glazing			
4	5	6	8	10	13	16	20	25	32	40	50	63	80	2mm glass 2mm glass	3mm and 3mm glass	4mm and 4mm glass	6mm and 6mm glass	3mm and 3mm glass 3mm glass	3mm, 3mm and 3mm glass	3mm and 3mm glass 6mm glass	6mm and 6mm glass 6mm glass
Acoustic Insulation Factor (AIF) (2)														Interpane spacing in mm (3)						Interpane spacings in mm (5)	
35	34	33	32	31	30	29	28	27	26	25	24	23	22	6							
36	35	34	33	32	31	30	29	28	27	26	25	24	23	13							
37	36	35	34	33	32	31	30	29	28	27	26	25	24	15	6						
38	37	36	35	34	33	32	31	30	29	28	27	26	25	10	13	6					
39	38	37	36	35	34	33	32	31	30	29	28	27	26	22	16	13	6			6,6	
40	39	38	37	36	35	34	33	32	31	30	29	28	27	28	20	16	13			6,10	6,6
41	40	39	38	37	36	35	34	33	32	31	30	29	28	35	25	20	16			6,15	6,10
42	41	40	39	38	37	36	35	34	33	32	31	30	29	42	32	25	20			6,20	6,15
43	42	41	40	39	38	37	36	35	34	33	32	31	30	50	40	32	25			6,30	6,20
44	43	42	41	40	39	38	37	36	35	34	33	32	31	63	50	40	32			6,40	6,30
45	44	43	42	41	40	39	38	37	36	35	34	33	32	80	63	50	40			6,50	6,40
46	45	44	43	42	41	40	39	38	37	36	35	34	33	100	80	63	55			6,65	6,50
47	46	45	44	43	42	41	40	39	38	37	36	35	34	125	100	80	75			6,80	6,65
48	47	46	45	44	43	42	41	40	39	38	37	36	35	150	125	100	95			6,100	6,80
49	48	47	46	45	44	43	42	41	40	39	38	37	36		150	125	110				6,100
50	49	48	47	46	45	44	43	42	41	40	39	38	37			150	135				125

Source: National Research Council, Division of Building Research, June 1980.

Explanatory Notes:

- 1) Where the calculated percentage window area is not presented as a column heading, the nearest percentage column in the table values should be used.
- 2) AIF data listed in the table are for well-fitted weatherstripped units that can be opened. The AIF values apply only when the windows are closed. For windows fixed and sealed to the frame, add three (3) to the AIF given in the table.
- 3) If the interpane spacing or glass thickness for a specific double-glazed window is not listed in the table, the nearest listed values should be used.
- 4) The AIF ratings for 9mm and 12mm glass are for laminated glass only; for solid glass subtract two (2) from the AIF values listed in the table.
- 5) If the interpane spacings for a specific triple-glazed window are not listed in the table, use the listed case whose combined spacings are nearest the actual combined spacing.
- 6) The AIF data listed in the table are for typical windows, but details of glass mounting, window seals, etc. may result in slightly different performance for some manufacturers' products. If laboratory sound transmission loss data (conforming to ASTM test method E-90) are available, these should be used to calculate the AIF.

Table 6.3 - Acoustic Insulation Factor for Various Types of Exterior Wall

	Percentage of exterior wall area to total floor area of room											Type of Exterior Wall
	16	20	25	32	40	50	63	80	100	125	160	
Acoustic	39	38	37	36	35	34	33	32	31	30	29	EW1
Insulation	41	40	39	38	37	36	35	34	33	32	31	EW2
Factor	44	43	42	41	40	39	38	37	36	35	34	EW3
	47	46	45	44	43	42	41	40	39	38	37	EW4
	48	47	46	45	44	43	42	41	40	39	38	EW1R
	49	48	47	46	45	44	43	42	41	40	39	EW2R
	50	49	48	47	46	45	44	43	42	41	40	EW3R
	55	54	53	52	51	50	49	48	47	46	45	EW5
	56	55	54	53	52	51	50	49	48	47	46	EW4R
	58	57	56	55	54	53	52	51	50	49	48	EW6
	59	58	57	56	55	54	53	52	51	50	49	EW7 or EW5R
	63	62	61	60	59	58	57	56	55	54	53	EW8

Source : National Research Council, Division of Building Research, December 1980.

Explanatory Notes :

- 1) Where the calculated percentage wall area is not presented as a column heading, the nearest percentage column in the table should be used.
- 2) The common structure of walls EW1 to EW5 is composed of 12.7 mm gypsum board, vapour barrier, and 38 x 89 mm studs with 50 mm (or thicker) mineral wool or glass fibre batts in inter-stud cavities.
- 3) EW1 denotes exterior wall as in Note 2), plus sheathing, plus wood siding or metal siding and fibre backer board.
EW2 denotes exterior wall as in Note 2), plus rigid insulation (25-30 mm), and wood siding or metal siding and fibre backer board.
EW3 denotes simulated mansard with structure as in Note 2), plus sheathing, 28 x 89 mm framing, sheathing, and asphalt roofing material.
EW4 denotes exterior wall as in Note 2), plus sheathing and 20 mm stucco.
EW5 denotes exterior wall as in Note 2), plus sheathing, 25 mm air space, 100 mm brick veneer.
EW6 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 100 mm back-up block, 100 mm face brick.
EW7 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 140 mm back-up block, 100 mm face brick.
EW8 denotes exterior wall composed of 12.7 mm gypsum board, rigid insulation (25-50 mm), 200 mm concrete.
- 4) R signifies the mounting of the interior gypsum board on resilient clips.
- 5) An exterior wall conforming to rainscreen design principles and composed of 12.7 mm gypsum board, 100 mm concrete block, rigid insulation (25-50 mm), 25 mm air space, and 100 mm brick veneer has the same AIF as EW6.
- 6) An exterior wall described in EW1 with the addition of rigid insulation (25-50 mm) between the sheathing and the external finish has the same AIF as EW2.

TABLE 11: Approximate conversion from STC to AIF for windows and doors:

Window (or door) area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
80	STC-5
63	STC-4
50	STC-3
40	STC-2
32	STC-1
25	STC
20	STC+1
16	STC+2
12.5	STC+3
10	STC+4
8	STC+5
6.3	STC+6
5	STC+7
4	STC+8

Note: For area percentages not listed in the table use the nearest listed value.

Examples: For a window whose area = 20% of the room floor area and STC = 32 the AIF is $32 + 1 = 33$.

For a window whose area = 60% of the room floor area and STC = 29 the AIF is $29 - 4 = 25$.

TABLE 12: Approximate conversion from STC to AIF for exterior walls:

Exterior wall area expressed as percentage of room floor area	Acoustic Insulation Factor (AIF)
200	STC-10
160	STC-9
125	STC-8
100	STC-7
80	STC-6
63	STC-5
50	STC-4
40	STC-3
32	STC-2
25	STC-1
20	STC
16	STC+1
12.5	STC+2
10	STC+3
8	

Note: For area percentages not listed in the table use the nearest listed value.

Example: For a wall whose area = 120% of room floor area and STC = 48 the AIF is $48 - 8 = 40$.