

REPORT



33 Heney Street

Ottawa, Ontario

Noise Impact Assessment Study

SACL #SW17077

Jun 12, 2017

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APPENDIX A: Sample Transportation Noise Results from STAMSON



1. Introduction

At the request of 33 Heney St Inc., Swallow Acoustic Consultants Ltd. (SACL) is pleased to present this Noise Impact Assessment Study (NIAS) for the proposed 3-storey residential building (the Project) to be located at 33 Heney Street in Ottawa, Ontario (the Site). This NIAS assesses noise impacts from nearby surface transportation sources. Based on observations made at the site and surrounding area, there are no significant stationary noise sources that may exceed the applicable sound level criteria for the Project.

The Project is a building consisting entirely of residential suites. All floors of the building, including the basement, will include 3 or 4 dwelling units per floor. The Outdoor Living Area (OLA) for this property is located in the backyard at grade, directly northwest of the building.

Adjacent properties consist of residential dwellings to the north, east and west. MacDonald Gardens Park is also located south of the property, across Heney Street.

The main surface transportation corridors impacting on the Project are Cobourg Street and Beausoleil Drive, based on their roadway classifications per the City of Ottawa, and their proximity to the development.

An aerial photo of the area is presented in Figure 1, and the site plan is presented in Figure 2. The floor-plan layouts for the Project are presented in Figures 3 to 6, which have also been marked-up to show the Points of Assessment (PoA) locations.

2. Noise Assessment Criteria

The City of Ottawa requirements for environmental noise impact assessments are outlined in the Environmental Noise Control Guidelines (ENCG) [1], which in turn reference the Environmental Noise Guideline, NPC-300 [2], prepared by the Ontario Ministry of the Environment and Climate Change (MOECC). The Project is located in a Class 1 area, which is defined as an area with an acoustical environment typical of a major population centre.

The sections below describe the applicable noise assessment criteria for surface transportation noise sources and stationary noise sources.

2.1. Surface Transportation Noise Assessment Criteria

Exclusion limit values outlined in ENCG for surface transportation noise impacting on a noise-sensitive development have been summarized in Table 1 for a residential development.



Table 1: ENCG Exclusion Limit Values for Residential Developments (Road and Rail)

Type of Point of Reception	Time Period	Time Period Description	Sound Level Limit L_{eq} [dBA]	
			Road	Rail
Outdoor Living Area (OLA)	07:00 to 23:00	Daytime	55	55
Indoor Space (Living Quarters)	07:00 to 23:00	Daytime	45	40
Indoor Space (Sleeping Quarters)	07:00 to 23:00	Daytime	45	40
Indoor Space (Sleeping Quarters)	23:00 to 07:00	Night-time	40	35

For outdoor living areas (OLA) where it is not technically or economically feasible to achieve the noise level criterion in Table 1, NPC-300 and the ENCG include a conditional tolerance of no more than 5 dB above the noise level criterion, and a warning clause requirement.

Furthermore, based on the plane of window calculations for indoor spaces, upgraded building components, ventilation systems and warning clauses may be required. The ENCG building component and ventilation requirements for road noise are shown in Tables 2 and 3, below.

Table 2: ENCG Building Component Requirements (Road Noise)

Assessment Location	Sound Level (time as noted)	Building Component Requirements
Plane of Living Room Window and/or Bedroom Window	Daytime $L_{EQ-16HR}$ Less than or equal to 65 dBA	Building compliant with the Ontario Building Code
	Daytime $L_{EQ-16HR}$ Greater than 65 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria
Plane of Living Room Window and/or Bedroom Window	Night-time L_{EQ-8HR} Less than or equal to 60 dBA	Building compliant with the Ontario Building Code
	Night-time L_{EQ-8HR} Greater than 60 dBA	Building components (walls, windows, etc.) must be designed to achieve indoor sound level criteria

(Reference: MOECC NPC-300, Section C7.1.3 – Indoor Living Areas: Building Components)



Table 3: ENCG Ventilation and Warning Clause Requirements (Road noise)

Assessment Location	Sound Level (time as noted)	Ventilation Requirement	Warning Clause Requirement
Plane of Living Room Window and/or Bedroom Window	Daytime $L_{EQ-16HR}$ Less than or equal to 55 dBA	None required	Not required
	Daytime $L_{EQ-16HR}$ Greater than 55 dBA to less than or equal to 65 dBA	Forced air heating with provision for central air conditioning	Required Type C
	Daytime $L_{EQ-16HR}$ Greater than 65 dBA	Central air conditioning	Required Type D
Plane of Living Room Window and/or Bedroom Window	Night-time L_{EQ-8HR} Greater than 50 dBA to less than or equal to 60 dBA	Forced air heating with provision for central air conditioning	Required Type C
	Night-time L_{EQ-8HR} Greater than 60 dBA	Central air conditioning	Required Type D

(Reference: MOECC NPC-300, Section C7.1.2 – Plane of a Window: Ventilation Requirements)

2.2. Neighbouring Stationary Source Noise Assessment Criteria

Stationary sources of noise include all sources of sound and vibration that exist or operate on nearby premises, excluding construction noise sources. The noise level criterion for noise from stationary sources in a given time period is the higher value between (1) the time period exclusion limit value prescribed by the MOECC, and (2) the corresponding minimum hourly background/ambient sound level ($L_{eq,1hr}$) due to traffic during the time period. Exclusion limit values outlined in the ENCG for new noise-sensitive land uses in proximity to existing stationary noise sources have been summarized in Table 4 for Class 1 areas.

Table 4: ENCG Exclusion Limit Values for Class 1 Areas (New Noise-Sensitive Land Uses in Proximity to Existing Stationary Sources)

Type of Point of Reception	Time Period	Time Period Description	Exclusion Limit $L_{eq,1hr}$ [dBA]
Outdoor Living Area (OLA)	07:00 to 23:00	Daytime	50
Plane of Window (Living Quarters)	07:00 to 23:00	Daytime	50
Plane of Window (Sleeping Quarters)	23:00 to 07:00	Night-time	45

3. Surface Transportation Noise

3.1. Surface Transportation Noise – Road Noise Levels

The surface transportation corridors impacting on the Project are Cobourg Street and Beausoleil Drive, which are classified as “Collector” roadways as per the City of Ottawa Transportation Master Plan (TMP) [3]. Both roadways are located within 100 m of the Project’s limits.



The “ultimate” road and traffic data information, including the Annual Average Daily Traffic (AADT), for both Cobourg Street and Beausoleil Drive, was obtained from the ENCG based on the roadway classifications and is summarized in Table 5. These parameters were used to predict the traffic noise levels following the prediction method outlined in the Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT) [4], developed by the MOECC. Software developed by the MOECC to perform ORNAMENT calculations, STAMSON Version 5.04, was used to predict the noise levels. Calculation results from STAMSON are available in Appendix A.

Table 5: ENCG Traffic and Road Parameters for STAMSON Modelling

Road	Implied Roadway Class	Speed Limit [km/h]	Ultimate AADT [Vehicles per day]	Day/Night Split [%]	Medium Trucks [%]	Heavy Trucks [%]
Cobourg Street	2-Lane Urban Collector (2-UCU)	50	8,000	92/8	7	5
Beausoleil Drive	2-Lane Urban Collector (2-UCU)	50	8,000	92/8	7	5

Separation distances were taken from the centreline of the road segments to the PoA.

3.2. Surface Transportation Noise - Points of Assessment

PoAs were chosen to represent worst-case scenarios at the Plane of Window (PoW) of bedrooms and living spaces. One OLA is located in the backyard of the building, PoA ‘A’, with the assessment location approximately 3 metres away from the centre of the building façade. Table 6 contains a description of the location of each PoA, and their locations are shown in Figures 2 to 6.

Table 6: Points of Assessment (PoA) Locations

Point of Assessment (PoA)	Height (ref. Grade) [m]	Storey	Building Facade	Notes/Comments
PoA ‘A’	1.5	Ground	North/West	OLA: Backyard area exposed to Cobourg St. only.
PoA ‘B’	1.5	1 st	South/West	PoW: Bedroom exposed to Cobourg St. and Beausoleil Dr.
PoA ‘C’	4.5	2 nd	South/West	PoW: Bedroom exposed to Cobourg St. and Beausoleil Dr.
PoA ‘D’	7.5	3 rd	South/West	PoW: Bedroom exposed to Cobourg St. and Beausoleil Dr.

Of note, noise from Cobourg Street is partially obstructed by the 2-storey residence at 29 Heney Street, which was modelled by SACL as a row of houses (50% density) in STAMSON for PoA ‘B’ and ‘C’. For the OLA (PoA ‘A’), the ground surface between Cobourg Street and the Project is



mostly comprised of backyards, and was therefore modelled as sound-absorptive in our analysis. All other PoAs were modelled with sound-reflective ground surfaces.

3.3. Surface Transportation Noise - Calculations

STAMSON transportation noise calculations can be found in Appendix A. Table 7 shows the daytime and night-time noise level prediction results at each PoA, along with a comparison to the daytime and night-time criteria for noise control measures outlined in Table 3.

Table 7: Daytime and Night-time Calculated Noise Levels Due to Surface Transportation Noise

Point of Assessment (PoA)	Transportation Noise Level Calculation [dBA]		Criteria for Noise Control Measures [dBA]		Compliant? (Day/Night)
	Daytime	Nighttime	Daytime	Nighttime	
PoA 'A'	50	N/A (OLA)	55	N/A (OLA)	(Yes / N/A)
PoA 'B'	55	47	55	50	(Yes / Yes)
PoA 'C'	56	48	55	50	(No / Yes)
PoA 'D'	58	50	55	50	(No / Yes)

The daytime criteria limit for noise control measures are exceeded at PoAs 'C' and 'D', primarily due to noise from Cobourg Street. Therefore, noise control measures are required, as detailed in Section 4, below.

4. Noise Control – Surface Transportation Noise

4.1. Indoor Noise Control Measures

4.1.1. Ventilation Requirements

The results shown in Table 7 indicate that the calculated surface transportation noise levels exceed the applicable daytime sound level limits at the plane of bedroom windows for the Project at PoA 'C' and 'D', which represents the southwest corner (worst-case location) of the building. Therefore, as per Table 3, forced air heating with provision for central air conditioning must be provided to all units. This will allow windows to remain closed, thus reducing noise transfer through openings for windows, which are essential for reducing interior noise levels.

4.1.2. Building Component Requirements

As indicated in Table 7, the sound levels at PoA 'B', 'C' and 'D' do not exceed 65 dBA during the daytime and 60 dBA during the nighttime due to road traffic. Therefore, as indicated in Table 2, the building envelope components (exterior walls and windows) for the Project must be designed to meet Ontario Building Code specifications.



4.2. Outdoor Noise Control Measures

The calculated outdoor noise levels in the backyard amenity space is 50 dBA, which does not exceed the City of Ottawa daytime limit of 55 dBA. Therefore, no noise control measures are required for the OLA.

4.3. Warning Clause Requirements

Per the ENCG, warning clauses must be included in agreements of offers of purchase and sale, lease/rental agreements and condominium declarations. Sample wording from the ENCG have been adapted below for the Project:

"Purchasers/tenants are advised that sound levels due to increasing road traffic may occasionally interfere with some outdoor activities as the sound levels may exceed the sound level limits of the City and the Ministry of the Environment and Climate Change. To help address the need for sound attenuation this development has been designed so as to provide an outdoor amenity area and indoor environment that is within provincial guidelines.

This dwelling unit has also been designed with 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 and the Ministry of the Environment and Climate Change."

5. Neighbouring Stationary Source Noise

As noted during a site visit undertaken on June 8th 2017, there are no significant stationary noise sources neighbouring the Project that were identified to cause noise levels in excess of MOECC and City of Ottawa requirements.

6. The Project as Stationary Noise Source

The Project may also be considered a Stationary Source for adjacent land uses. Mechanical equipment selections have not yet been made, and therefore, a detailed analysis is not possible at this time. The final design will be required to comply with ENCG sound level limits from a Stationary Source at all nearby noise-sensitive land uses.

7. Concluding Comments

With the incorporation of the noise control measures and warning clauses as presented in Section 4 of this report, the impact of transportation noise on the proposed residential development will meet ENCG requirements. The proposed residential development located at 33 Heney Street should therefore be approved from the noise aspect.

----- End -----



References

1. City of Ottawa Environmental Noise Control Guidelines (ENCG), approved by Ottawa City Council in January 2016.
2. Ministry of the Environment and Climate Change (MOECC) Publication NPC-300: Stationary and Transportation Sources - Approval and Planning, published in October 2013.
3. City of Ottawa Transportation Master Plan (TMP), published by the City of Ottawa on November 2013.
4. Ontario Road Noise Analysis Method for Environment and Transportation (ORNAMENT), Technical document published by the MOECC in October 1989.

Figures

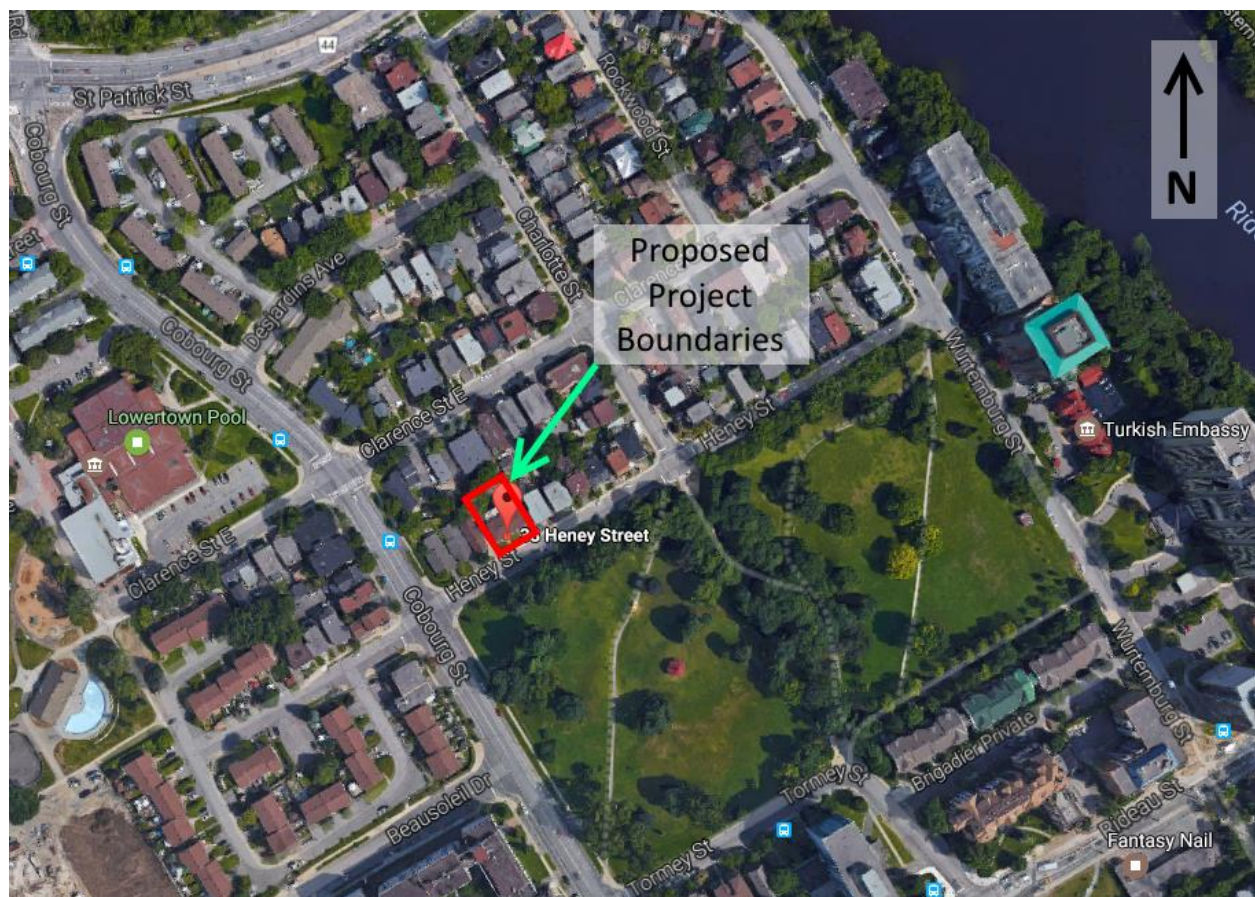


Figure 1. Site Aerial

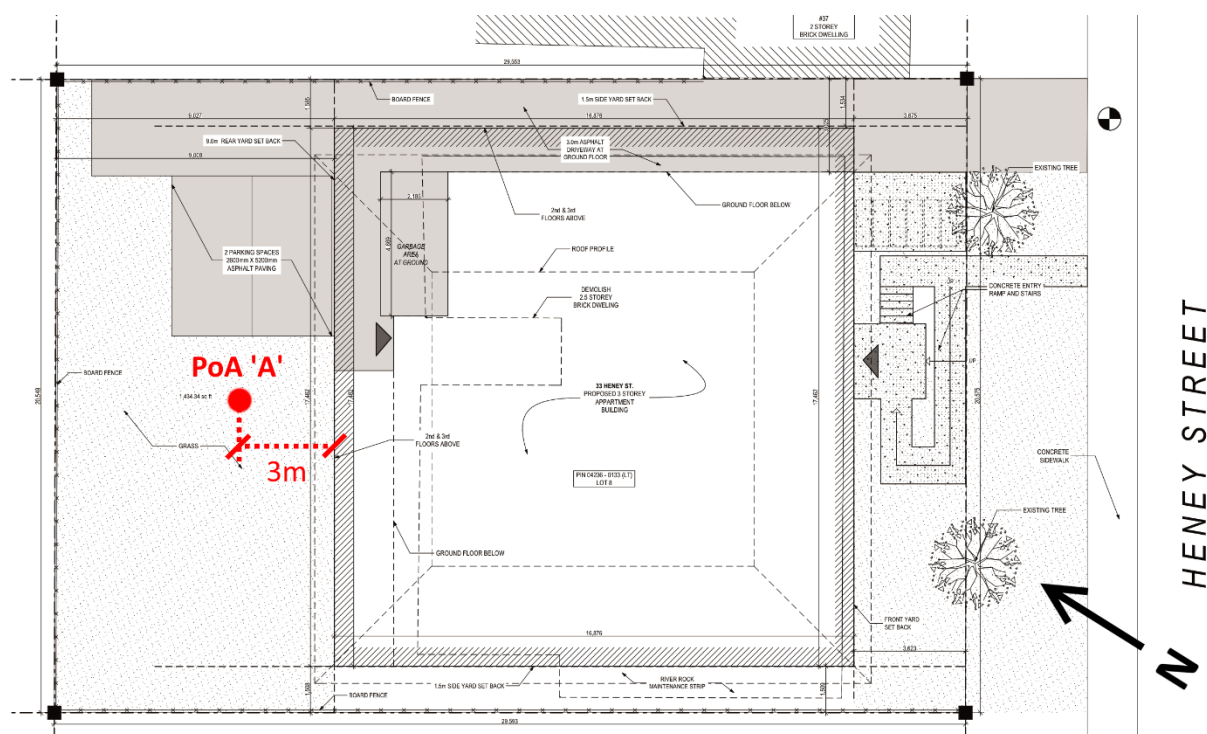


Figure 2. Site Plan at Grade, with Location of PoA 'A' (OLA)

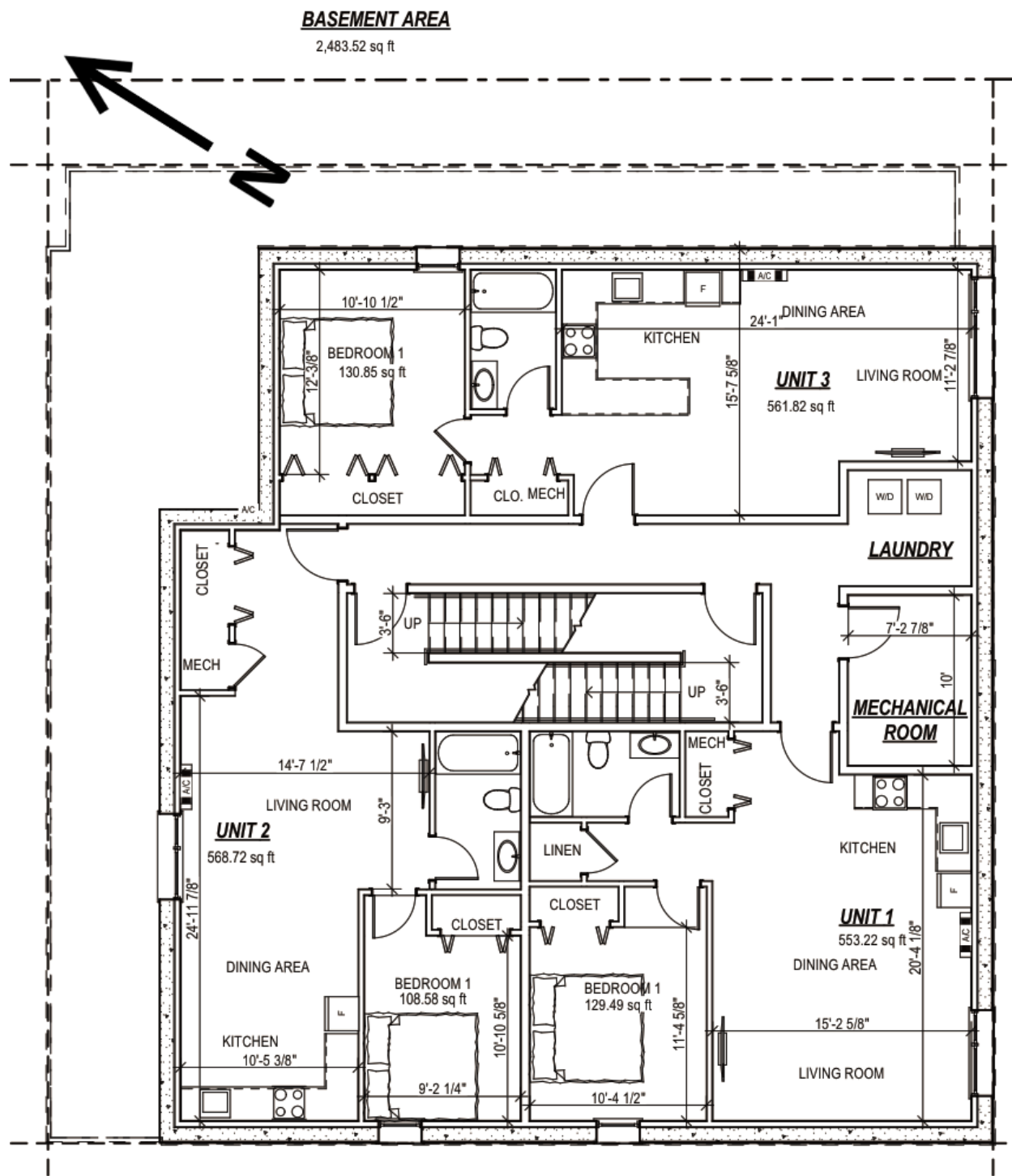


Figure 3. Basement Floor Plan

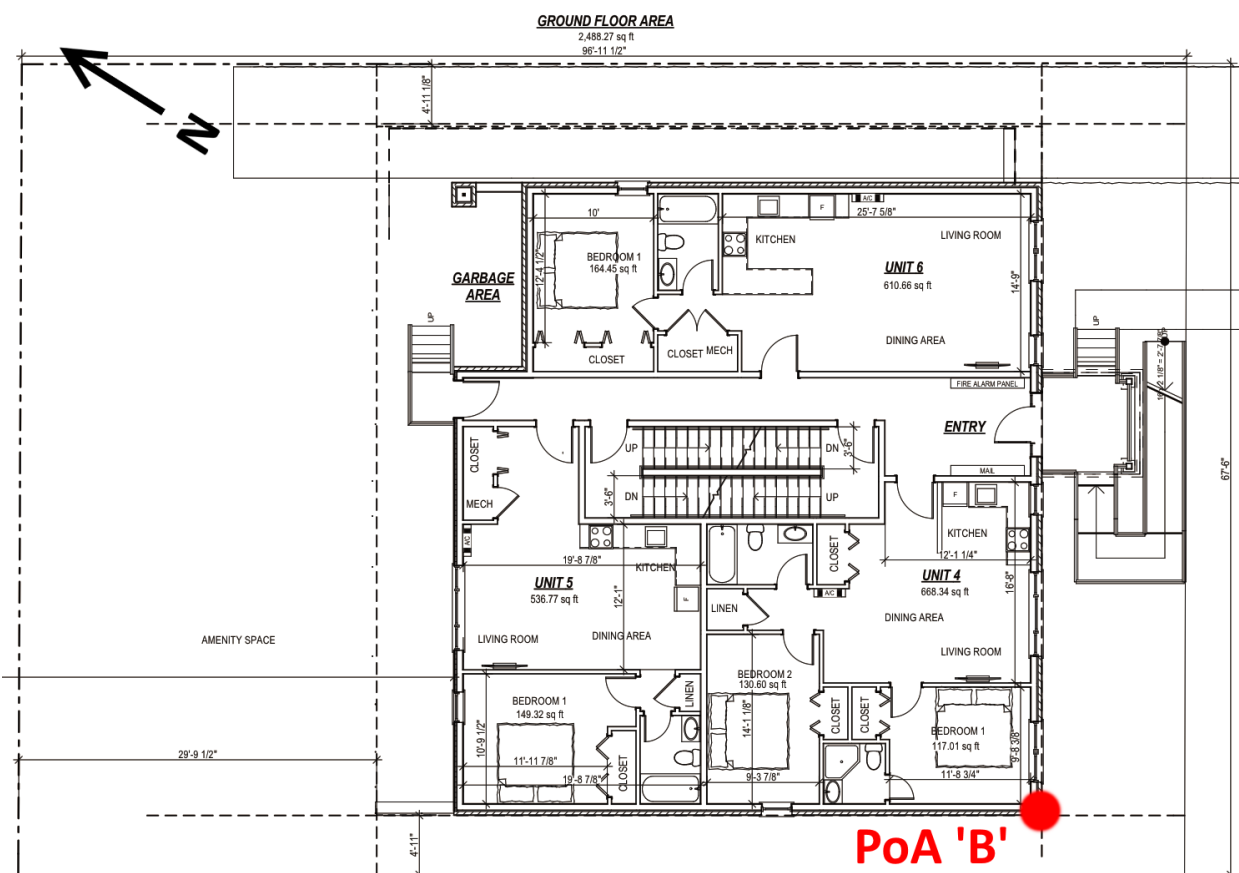


Figure 4. Ground Floor Plan, with Location of PoA 'B'

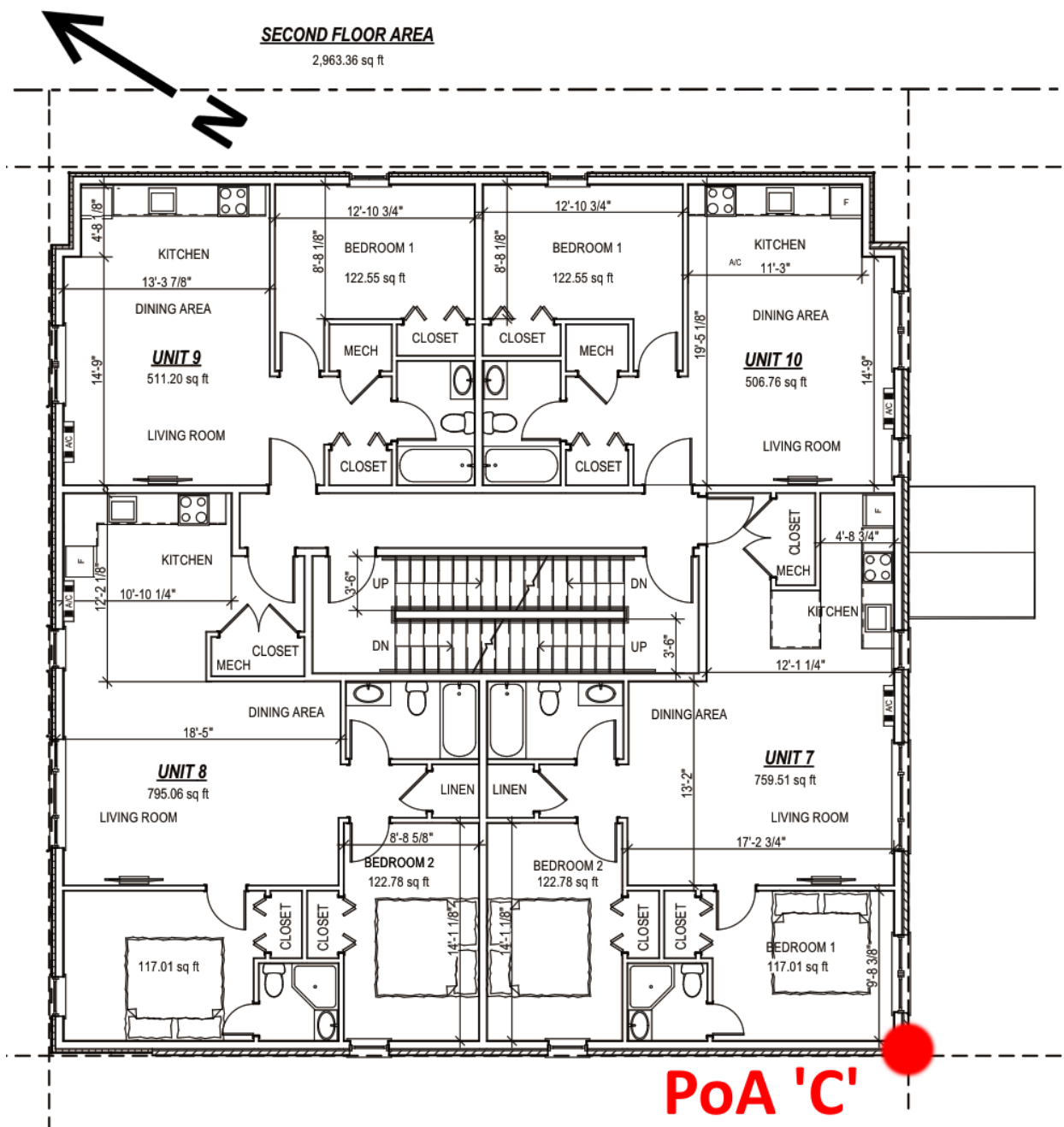


Figure 5. Second Floor Plan, with Location of PoA 'C'

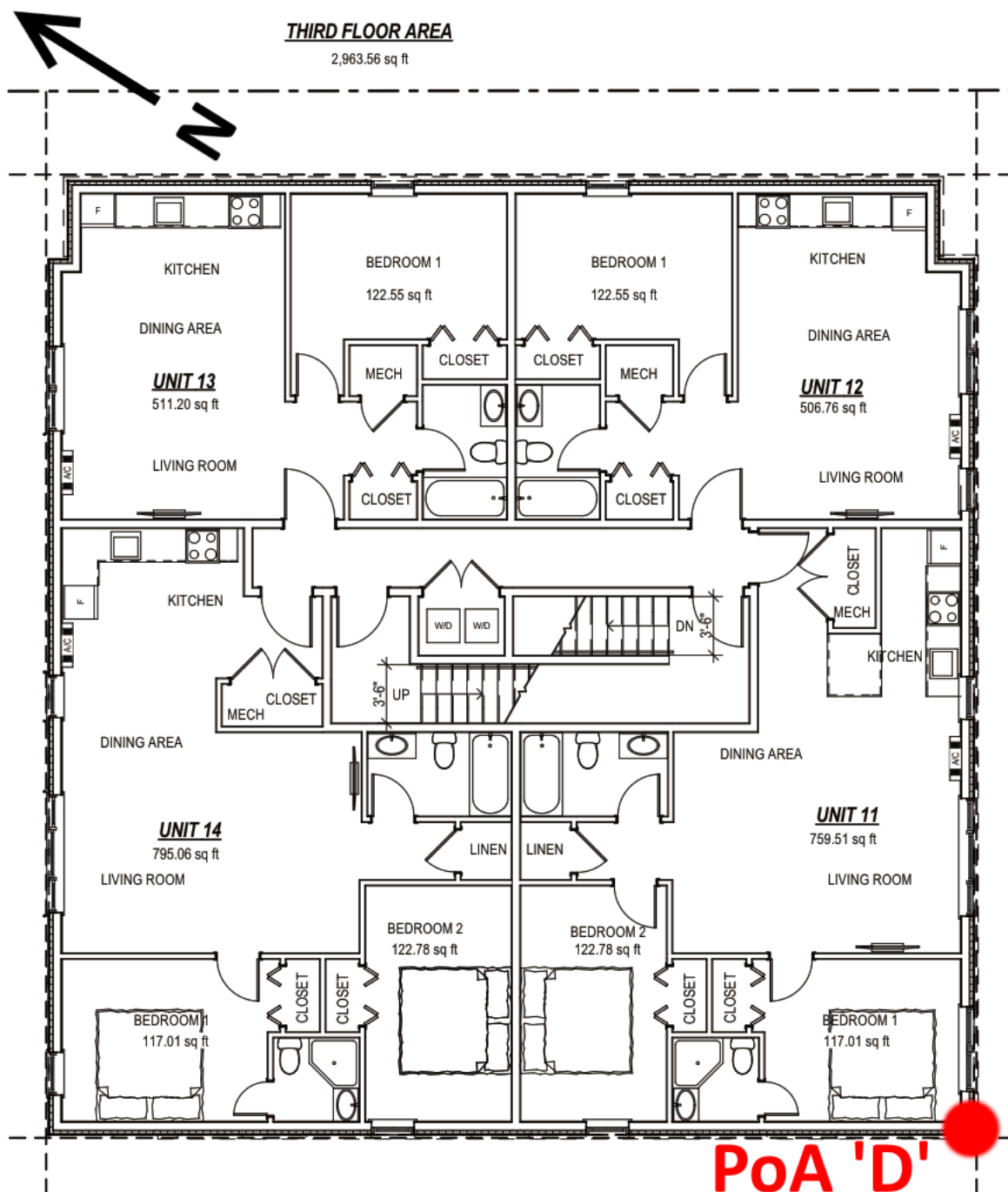


Figure 6. Third Floor Plan, With Location of PoA 'D'



Appendices



APPENDIX A: Sample Transportation Noise Results from STAMSON

STAMSON 5.0 SUMMARY REPORT Date: 12-06-2017 15:56:04
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: poaa2.te Time Period: Day/Night 16/8 hours
Description: Noise level prediction at PoA 'A'

Road data, segment # 1: CobourgStNor (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 1: CobourgStNor (day/night)

Angle1 Angle2 : 22.00 deg 72.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 56.00 / 56.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: CobourgStMid (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 2: CobourgStMid (day/night)

 Angle1 Angle2 : -2.00 deg 22.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 56.00 / 56.00 m
 Receiver height : 1.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: CobourgStSou (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 : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: CobourgStSou (day/night)

 Angle1 Angle2 : -20.00 deg -2.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 2 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 56.00 / 56.00 m
 Receiver height : 1.50 / 4.50 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.CobourgStNor	!	1.50	!	45.25	!	45.25
2.CobourgStMid	!	1.50	!	47.44	!	47.44



3.CobourgStSou	!	1.50	!	35.19	!	35.19
-----+-----+-----+-----						
Total						49.65 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
-----+-----+-----+-----						
1.CobourgStNor	!	1.50	!	41.87	!	41.87
2.CobourgStMid	!	1.50	!	40.37	!	40.37
3.CobourgStSou	!	1.50	!	39.12	!	39.12
-----+-----+-----+-----						
Total						45.37 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 49.65
 (NIGHT): 45.37



STAMSON 5.0 SUMMARY REPORT Date: 12-06-2017 16:01:43
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: poab2.te Time Period: Day/Night 16/8 hours
Description: Noise level prediction at PoA 'B'

Road data, segment # 1: CobourgStNor (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 1: CobourgStNor (day/night)

Angle1 Angle2 : 0.00 deg 74.00 deg
Wood depth : 0 (No woods.)
No of house rows : 2 / 2
House density : 50 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: CobourgStSou (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 2: CobourgStSou (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 : 47.00 / 47.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: BeausoleilDr (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 : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: BeausoleilDr (day/night)

 Angle1 Angle2 : 27.00 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.CobourgStNor	! 1.50 !	48.52 !	48.52
2.CobourgStSou	! 1.50 !	53.05 !	53.05
3.BeausoleilDr	! 1.50 !	46.08 !	46.08



```

-----+-----+-----+-----
                                Total                    54.96 dBA
  
```

Result summary (night)

```

-----+-----+-----+-----
                                ! source ! Road ! Total
                                ! height ! Leq  ! Leq
                                ! (m)    ! (dBA) ! (dBA)
-----+-----+-----+-----
1.CobourgStNor                !   1.50 !  40.92 !  40.92
2.CobourgStSou                !   1.50 !  45.46 !  45.46
3.BeausoleilDr                !   1.50 !  38.49 !  38.49
-----+-----+-----+-----
                                Total                    47.37 dBA
  
```

TOTAL Leq FROM ALL SOURCES (DAY): 54.96
 (NIGHT): 47.37



STAMSON 5.0 SUMMARY REPORT Date: 12-06-2017 16:05:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: poac2.te Time Period: Day/Night 16/8 hours
Description: Noise level prediction at PoA 'C'

Road data, segment # 1: CobourgStNor (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 1: CobourgStNor (day/night)

Angle1 Angle2 : 0.00 deg 74.00 deg
Wood depth : 0 (No woods.)
No of house rows : 1 / 1
House density : 50 %
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: CobourgStSou (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 2: CobourgStSou (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 : 47.00 / 47.00 m
 Receiver height : 4.50 / 4.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Road data, segment # 3: BeausoleilDr (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 : 0 %
 Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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: BeausoleilDr (day/night)

 Angle1 Angle2 : 27.00 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 : 4.50 / 4.50 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.CobourgStNor	! 1.50 !	50.57 !	50.57
2.CobourgStSou	! 1.50 !	53.65 !	53.65
3.BeausoleilDr	! 1.50 !	47.03 !	47.03



```

-----+-----+-----+-----
                                Total                    55.98 dBA
  
```

Result summary (night)

```

-----+-----+-----+-----
                                ! source ! Road ! Total
                                ! height ! Leq  ! Leq
                                ! (m)    ! (dBA) ! (dBA)
-----+-----+-----+-----
1.CobourgStNor      !      1.50 !  42.98 !  42.98
2.CobourgStSou      !      1.50 !  46.06 !  46.06
3.BeausoleilDr      !      1.50 !  39.43 !  39.43
-----+-----+-----+-----
                                Total                    48.39 dBA
  
```

TOTAL Leq FROM ALL SOURCES (DAY): 55.98
 (NIGHT): 48.39



STAMSON 5.0 SUMMARY REPORT Date: 12-06-2017 16:08:24
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: poad2.te Time Period: Day/Night 16/8 hours
Description: Noise level prediction at PoA 'D'

Road data, segment # 1: CobourgStNor (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 1: CobourgStNor (day/night)

Angle1 Angle2 : 0.00 deg 74.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 47.00 / 47.00 m
Receiver height : 7.50 / 7.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: CobourgStSou (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 : 0 %
Road pavement : 1 (Typical asphalt or concrete)

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

24 hr Traffic Volume (AADT or SADT): 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 # 2: CobourgStSou (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 : 47.00 / 47.00 m
Receiver height       :    7.50 / 7.50 m
Topography           :           1       (Flat/gentle slope; no barrier)
Reference angle       :           0.00
  
```

Road data, segment # 3: BeausoleilDr (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        :           0 %
Road pavement        :           1 (Typical asphalt or concrete)
  
```

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

```

24 hr Traffic Volume (AADT or SADT): 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: BeausoleilDr (day/night)

```

-----
Angle1   Angle2           : 27.00 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       :    7.50 / 7.50 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.CobourgStNor	!	1.50	!	53.88	!	53.88
2.CobourgStSou	!	1.50	!	54.26	!	54.26
3.BeausoleilDr	!	1.50	!	47.99	!	47.99



Total 57.59 dBA

Result summary (night)

	!	source	!	Road	!	Total
	!	height	!	Leq	!	Leq
	!	(m)	!	(dBA)	!	(dBA)
1.CobourgStNor	!	1.50	!	46.28	!	46.28
2.CobourgStSou	!	1.50	!	46.67	!	46.67
3.BeausoleilDr	!	1.50	!	40.39	!	40.39
	!		!		!	
		Total				49.99 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.59
 (NIGHT): 49.99