

Transportation Noise Assessment

Wateridge Village – Phase 1B

Block 19


Proposed Mixed Use Development Hemlock Road and Codd's Road City of Ottawa

May 29, 2018
Project: 117-0363-100

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VALCOUSTICS

Canada Ltd.

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1.0 INTRODUCTION

Valcoustics Canada Ltd. (VCL) previously prepared a Transportation Noise Assessment report for Blocks 15, 22, and 24 (dated December 14, 2017) in Phase 1B of Wateridge Village in support of the Site Plan Application (SPA) submission to the City of Ottawa. This report is provided in support of the SPA submission for Block 19 in the same phase of the development. The potential sound levels and noise mitigation measures needed to comply with the Ministry of the Environment and Climate Change (MOECC) and the City of Ottawa noise guidelines are outlined herein.

This report addresses the potential impact of transportation noise sources on the subject site described herein. The proposed development consists of four mixed use buildings (Buildings A, B, C, and D) which are 6 and 7 storeys in height.

The site is identified as:

Part of Lots 21, 22 and 23
Concession 1 (Ottawa Front)
Geographic Township of Gloucester
and Blocks 118-124, 126 and 127
Registered Plan 4M-1559
City of Ottawa

Wateridge Village is to be located on the site of the former Canadian Forces Rockcliffe Base. The overall site is bounded by:

- the National Research Council of Canada facility to the east;
- natural areas, with Sir George-Étienne Cartier Parkway (Rockcliffe Parkway) beyond, to the north;
- Aviation Parkway to the west; and

- existing residential, commercial and hospital uses to the south.

Phase 1B is at the middle southeast corner of the development, south of Hemlock Road and east of Codd's Road. Phase 1B will consist of residential, mixed-use, institutional and employment uses.

As noted above, Block 19 will consist of four mixed use buildings (including ground floor retail). The Block will be provided with a "Pocket Park" in the northwest corner and a central at grade amenity area in the middle of the four buildings. It is assumed that suites will be provided with balconies, but rooftop terraces will not be provided. Figure 1 shows a Key Plan.

This report is based on the Site Plan for Block 19, prepared by Q4A Architects and dated 2018-04-27 ("Issued for SPA No. 1"). The Site Plan is shown as Figure 2.

2.0 ENVIRONMENTAL NOISE ASSESSMENT

2.1 NOISE SENSITIVE RECEPTORS

The noise sensitive receptors as defined by the MOECC Publication NPC-300, "*Stationary and Transportation Sources - Approval and Planning*" (see Appendix B), and the City of Ottawa Environmental Noise Control Guidelines, are all residential units within the development.

2.2 NOISE SOURCES

The main noise sources with potential for impact on Block 19 will be road traffic on Hemlock Road, Codd's Road, and Mikinak Road. Aviation Parkway is located over 1000 m to the west of the proposed dwellings and Sir George-Étienne Parkway is located over 600 m to the north. Due to the distance separation, no significant noise impact from these roadways is anticipated at the subject site. Therefore, noise impact from these roadways has not been considered further in this assessment.

Standard ultimate traffic volumes and compositions were used. These volumes were obtained from the City of Ottawa ENCG Appendix B: Table of Traffic Parameters To Be Used for Sound Level Predictions. The road traffic data is summarized in Table 1.

A preliminary assessment of the noise impact due to the Rockcliffe Airport has been done. Based on the Environmental Noise Impact Assessment - Wateridge Village Phase 1B (prepared by IBI Group, and dated July 2016), the Rockcliffe Airport is operated by the Rockcliffe Flying Club and provides flying lessons in two and four seat Cessna planes. Although NEF/NEP contours are not available for the airport, a comparison was done between the NEF25 setback at Buttonville airport in Markham (relative to the runway centreline) and the proposed residential setback at the Rockcliffe Airport (relative to the runway centreline). It should be noted that Buttonville is a busy private airport with more than 100,000 movements per year. Based on the preliminary analysis discussed here, noise impacts due to Rockcliffe Airport will not be considered further in this report.

2.3 ENVIRONMENTAL NOISE GUIDELINES

City of Ottawa has implemented the "Environmental Noise Control Guideline" (ENCG) for use in the planning applications. With a few exceptions, the current version of the ENCG, dated January 2016, is based on the MOECC Publication NPC-300, "*Stationary and*

Transportation Sources - Approval and Planning". The environmental noise guidelines in NPC-300, as well as some items in the ENCG which are distinct from NPC-300, are described below.

2.3.1 MOECC Publication NPC-300

In accordance with NPC-300, if the daytime sound level, $L_{eq\ Day}^{(1)}$, at the exterior plane of living/dining room windows is greater than 65 dBA, or if the nighttime sound level, $L_{eq\ Night}^{(2)}$, at the exterior plane of bedroom windows is greater than 60 dBA, means must be provided so that windows can be kept closed for noise control purposes and central air conditioning is required. For daytime sound exposures greater than 55 dBA and less than or equal to 65 dBA, or for nighttime sound exposures greater than 50 dBA and less than or equal to 60 dBA, there need only be the provision for adding air conditioning at a later date. For mid-rise development (as is the case here), the provision for adding air conditioning at the discretion of the occupant is typically not an option, and as such buildings that would normally require the provision for adding air conditioning at a later date will need to be provided with air conditioning at the time of construction. A warning clause advising the occupants of the potential interference with some activities is also required.

For outdoor amenity areas ("Outdoor Living Areas"- OLA's), the design goal is 55 dBA $L_{eq\ Day}$, with an excess not exceeding 5 dBA considered acceptable if it is technically not practicable to achieve the 55 dBA objective, provided warning clauses are registered on title.

Note that for road traffic sources, a balcony is not considered an OLA, unless it is the only OLA for the occupant and it is:

- at least 4 m in depth; and
- unenclosed.

For indoor areas, the daytime guideline for living rooms, bedrooms, and dining rooms is $L_{eq\ Day} \leq 45$ dBA for road traffic sound sources. The nighttime guideline for bedrooms is $L_{eq\ Night} \leq 40$ dBA for road traffic sound sources.

2.3.2 City of Ottawa

The City of Ottawa requires that the noise analysis use standard ultimate road traffic volumes, subject to the road type and number of lanes. The ultimate daily traffic volumes listed in the ENCG Appendix B: Table of Traffic and Road Parameters To Be Used For Sound Level Predictions. The Table is included in Appendix A of this report.

Warning clauses are required whenever noise is expected to meet or exceed 55 dBA during the daytime ($L_{eq,16\ hour}$) in the outdoor living area or plane of window of any living space prior to mitigation.

(1) $L_{eq\ Day}$: 16-hour energy equivalent sound level (0700-2300 hours).

(2) $L_{eq\ Night}$: 8-hour energy equivalent sound level (2300-0700 hours).

The City of Ottawa also requires that the use of the 5 dB allowable excess in OLA sound levels be justified. For this purpose, the City requires an analysis of the sound levels for various alternative planning and engineering options (including setbacks, grades and calculated barrier height options) in increments of one dB from $L_{eq\ Day}$ 55 to 60 dBA.

The City of Ottawa has a minimum sound barrier fence height requirement of 2.2 m. The maximum sound barrier fence height is allowed to be determined by the City for a given development.

2.4 NOISE IMPACT ASSESSMENT

Using the road traffic data in Table 1, the sound energy exposures, in terms of $L_{eq\ Day}$ and $L_{eq\ Night}$, were determined using STAMSON V5.04 – ORNAMENT, the computerized road traffic noise prediction model of the MOECC.

The highest *unmitigated daytime* sound level of 68 dBA would occur at the north façade of Building A and the west facade of Building D (fronting onto Hemlock Road and Codd's Road). The highest *unmitigated nighttime* sound level of 61 dBA would occur at the same locations.

Inherent screening of each building face due to its orientation to the noise source was taken into account. To be conservative, screening from other development blocks within Wateridge Village was not included.

The existing residential development to the south will provide screening from road traffic on Montreal Road and a portion of Codd's Road. In particular, there are several rows of dwellings between the subject site and Montreal Road (between Codd's Road and Burma Road). In this instance, Montreal Road has not been included in the assessment due to screening and distance.

For facade calculations, worst-case receptor heights of 16.5 m and 19.5 m were used for the 6 and 7 storey buildings, respectively. This corresponds to the height of an upper storey window.

Table 2 summarizes the predicted sound levels outdoors at specific locations. Note that Table 2 shows the contributions from each of the roadways as well as the total sound level at each location. Sound level calculations for sample locations are presented in Appendix C.

3.0 NOISE ABATEMENT REQUIREMENTS

The noise control measures can generally be classified into two categories which are interrelated, but which the designer can treat separately for the most part:

- (a) Architectural elements to achieve acceptable indoor noise guidelines;
- (b) Design features to protect the OLA's.

Noise abatement requirements are summarized in Table 3 and the notes to Table 3.

3.1 INDOORS

The indoor noise exposure guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. The specific STC requirements of these building components will depend on the wall and window areas relative to the floor areas of the associated rooms.

Since building plans have not yet been established for this development, it is not possible to calculate the specific STC requirements at this time. However, based on the predicted sound levels, upgraded exterior window construction is anticipated at the outward facing windows for all buildings. Specific STC requirements for walls and windows should be determined once detailed architectural plans are available. This would likely be a condition of building permit.

To assess the feasibility of meeting the indoor noise criteria, a sample calculation was done at a worst-case location for each building using the analysis procedures outlined in Building Practice Note BPN 56, *“Controlling Sound Transmission Into Buildings”*. In the preliminary assessment, it is assumed that each of the wall and window areas will be 50% of the floor area. It is also assumed that the wall construction will meet a minimum STC of 45. Based on this information, the following preliminary worst-case results are:

- Building A – Window STC up to 31
- Building B – Window STC up to 29
- Building C - Window STC up to 31
- Building D – Window STC up to 31

It is noted that windows with higher STC ratings may be required if the wall and window dimensions are greater than those used in this sample calculation.

Calculation details, as well as example window configurations and their STC ratings are shown in Appendix D.

As outlined in NPC-300, where the sound level on the outside of a window is greater than 60 dBA during the night or 65 dBA during the day, ventilation provisions must be made to permit the windows to remain closed. A commonly used technique is to provide central air conditioning. Table 3 indicates which dwellings would require mandatory air conditioning.

3.2 OUTDOORS

The medium density buildings include two “outdoor amenity areas”. In the northwest corner of Block 19, there is a small “Pocket Park” on the corner of Codd’s Road and Hemlock Road. A second amenity area is provided in the middle of the four buildings. As the “Pocket Park” is not the only outdoor amenity area provided for residents, it is recommended that the pocket park not be considered in terms of noise attenuation.

The predicted sound level in the middle amenity area would be 49 dBA. Mitigation is not recommended for this amenity area.

3.3 WARNING CLAUSES

Where the sound level guidelines are exceeded, appropriate warning clauses should be registered on title and included on Offers of Purchase and Sale to make future occupants aware of the potential noise situation. Lots requiring warning clauses and the wording for the City of Ottawa warning clauses are given in Table 3 and the notes to Table 3. Note, warning clauses in the ENCG have ventilation and sound barrier requirements grouped together. The ventilation and

sound barrier requirements have been separated for use in Table 3 but the wording has been maintained.

As noted above, exact calculations of wall and window requirements cannot be completed at this point as architectural plans are not available, although a sample calculation based on typical room dimensions indicates that it will be feasible to meet the indoor noise criteria. Reviews of building components (wall and window constructions) will be done prior to the application for building permit with dwelling-specific building component requirements to be included in the building permit application package.

Where upgraded wall and/or window constructions are anticipated, warning clauses include language indicating that building components have been designed to provide sound isolation performance that will result in the indoor sound level limits being met when windows and exterior doors are closed.

4.0 CONCLUSIONS

With the incorporation of the recommendations above, the indoor noise guidelines will be met at all units. Future occupants will be made aware of the potential noise situation through warning clauses, as per MOECC guidelines.

5.0 REFERENCES

1. "PC STAMSON 5.04 Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment.
2. Building Practice Note No. 56: "Controlling Sound Transmission into Buildings", by J. D. Quirt, Division of Building Research, National Council of Canada, September 1985.
3. Environmental Noise Guideline NPC-300, "Stationary and Transportation Noise Sources - Approval and Planning", Ontario Ministry of the Environment and Climate Change, August 2013.
4. "Road and Rail Noise: Effects on Housing", Canada Mortgage and Housing Corporation, Publication NHA 5156, 81/10.
5. "City of Ottawa Environmental Noise Control Guidelines", January 2016.
6. "Transportation Noise Assessment, Wateridge Village - Phase 1B, Blocks 15, 22 and 24, Proposed Residential Development, Hemlock Road and Codd's Road, City of Ottawa", Valcoustics Canada Ltd., August 11, 2017, Project: 117-0363.

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TABLE 1 ROAD TRAFFIC DATA

Roadway	Classification	Ult. AADT	% Trucks		Speed Limit (kph)	Day/Night Split (%)
			Medium	Heavy		
Hemlock Road	2-UMCU	12 000	7	5	50	92/8
Codd's Road	2-UMCU	12 000	7	5	50	92/8
Mikinak Road	2-UCU	8 000	7	5	50	92/8

Note:

(1) As per Appendix B of the City of Ottawa "Environmental Noise Control Guidelines", dated January 2016.

TABLE 2 PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS

Location ⁽¹⁾	Source	L _{eq} Day ⁽³⁾ (dBA)	L _{eq} Night ⁽⁴⁾ (dBA)
Building A			
Northwest Corner North Facade	Hemlock Road	68	60
	Codd's Road	59	51
	TOTAL	68	61
Northwest Corner West Facade	Hemlock Road	65	57
	Codd's Road	61	53
	TOTAL	66	59
Northeast Corner East Facade	Hemlock Road	63	56
	Mikinak Road	52	44
	TOTAL	64	56
Building B			
Southwest Corner South Facade	Mikinak Road	65	58
	Codd's Road	55	47
	TOTAL	66	58
Southeast Corner East Facade	Hemlock Road	52	45
	Mikinak Road	61	53
	TOTAL	61	54
Northeast Corner East Facade	Hemlock Road	55	48
	Mikinak Road	53	46
	TOTAL	58	50

.../Cont'd

TABLE 2 (CONTINUED) PREDICTED UNMITIGATED SOUND LEVELS OUTDOORS

Location ⁽¹⁾	Source	L _{eq} Day ⁽³⁾ (dBA)	L _{eq} Night ⁽⁴⁾ (dBA)
Building C			
Southwest Corner South Facade	Mikinak Road	65	58
	Codd's Road	62	55
	TOTAL	67	59
Southwest Corner West Facade	Hemlock Road	52	45
	Mikinak Road	61	53
	Codd's Road	66	59
	TOTAL	68	60
Building D			
Southwest Corner West Facade	Hemlock Road	56	48
	Mikinak Road	55	48
	Codd's Road	67	59
	TOTAL	67	60
Northwest Corner West Facade	Hemlock Road	60	52
	Mikinak Road	52	45
	Codd's Road	67	59
	TOTAL	68	60
Northwest Corner North Facade	Hemlock Road	62	54
	Codd's Road	64	56
	TOTAL	66	58
Outdoor Areas			
Central Amenity Area	Hemlock Road	45	-
	Mikinak Road	39	-
	Codd's Road	45	-
	TOTAL	49	-

Notes:

- (1) See Figure 2.
(2) Receptors were assessed at a height of 16.5 m above grade for the 6 storey buildings (Buildings B and C) and 19.5 m above grade for the 7 storey buildings (Buildings A and D).

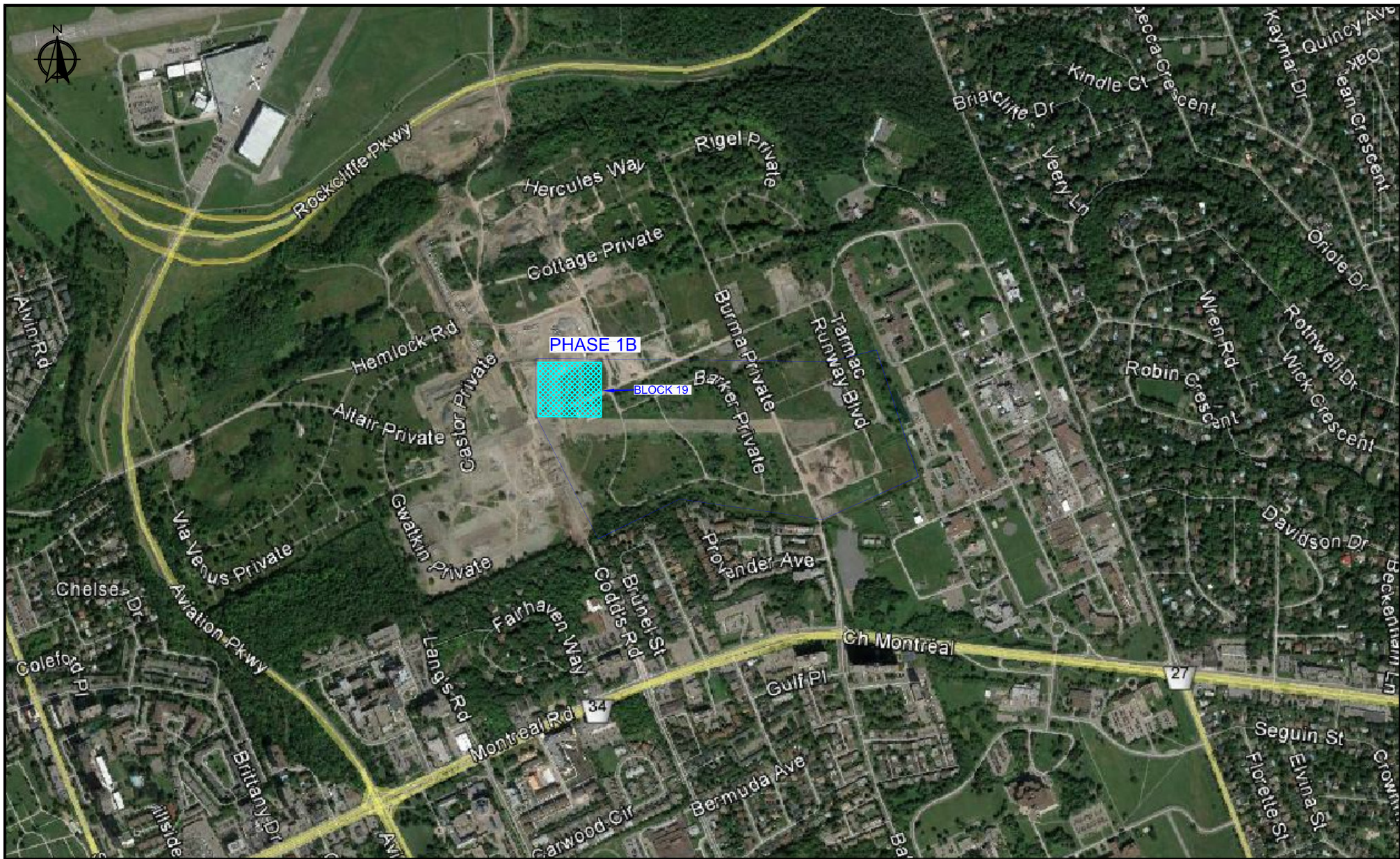
TABLE 3 NOISE ABATEMENT MEASURES


Location	Air Conditiong ⁽¹⁾	Exterior Wall and Window ⁽²⁾	Sound Barrier ⁽⁴⁾	Warning Clauses ⁽⁵⁾
Buildings A, B, C, D	Mandatory	Upgraded window construction is expected	None	A + B + C

For notes to this table, see following page.

NOTES TO TABLE 3

- (1) Where means must be provided to allow windows to remain closed for noise control purposes, a commonly used technique is that of central air conditioning. Where possible, air cooled condenser units, if any, should be located in a noise insensitive area.
Provision for air conditioning would correspond to a ducted, forced air heating system, which would allow the addition of central air conditioning at a later date by the occupant.
- (2) STC - Sound Transmission Class Rating (Reference ASTM-E413). Values, where shown, are based on assumed areas. Requirements should be checked once building plans become available.
OBC indicates that construction meeting the minimum non-acoustical requirements of the Ontario Building Code will provide adequate sound isolation.
- (3) STC - Sound Transmission Class Rating (Reference ASTM-E413). A sliding glass walkout door should be considered as a window and be included in the percentage of glazing. Values shown are based on assumed areas. Requirements should be checked once building plans become available.
OBC indicates that construction meeting the minimum non-acoustical requirements of the Ontario Building Code will provide adequate sound isolation.
- (4) Sound barriers must be of solid construction having a minimum face density of 20 kg/m² with no gaps or cracks. Earthen berms, solid fences or combinations of berms/fences are acceptable.
- (5) Warning clauses to be registered on title and be included in Offers of Purchase and Sale for designated lots:
 - A. "The Transferee, for himself, his heirs, executors, administrators, successors and assigns acknowledge being advised that despite the inclusion of noise control features in the development and/or within the building unit sound levels due to increasing road traffic may occasionally interfere with some indoor and/or outdoor activities of the dwelling occupants as the sound levels may at times exceed the sound level limits of the City of Ottawa and the Ministry of the Environment and Climate Change noise criteria."
 - B. "This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the City and the Ministry of the Environment."
"The building components of this dwelling unit (walls, windows and exterior doors) have been designed to provide acoustic insulation so that, when windows and exterior doors are closed, the indoor sound levels are within the sound level limits of the City of Ottawa and the Ministry of Environment and Climate Change. The details of this building component design are available by contacting the builder of this unit."
 - C. "The Transferee, for himself, his heirs, executors, administrators, successors and assigns acknowledge being additionally advised that due to the proximity of the Rockcliffe Airport, sound levels from the airport may at times be audible"
- (6) Conventional ventilated attic roof construction meeting OBC requirements is satisfactory.
- (7) All exterior doors shall be fully weatherstripped.



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				<div>Project Name</div> <div>Wateridge Village Phase 1B - Block 19</div>	<div>Scale</div> <div>N.T.S.</div>	<div>Figure</div> <div>1</div>
No.	Revision/Issue	Date				

APPENDIX A

ROAD TRAFFIC

Appendix A (Reference 6)

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
NA2	Freeway, Queensway, Highway	18,333 per lane	100	92/8	7	5
37.5-44.5	6-Lane Urban Arterial-Divided (6-UAD)	50000	50 - 80	92/8	7	5
34-37.5	4-Lane Urban Arterial-Divided (4-UAD)	35000	50 - 80	92/8	7	5
23-34	4-Lane Urban Arterial-Undivided (4-UAU)	30000	50 - 80	92/8	7	5
23-34	4-Lane Major Collector (4-UMCU)	24000	40 -60	92/8	7	5
30-35.5	2-Lane Rural Arterial (2-RAU)	15000	50 - 80	92/8	7	5
20-30	2-Lane Urban Arterial (2-UAU)	15000	50 - 80	92/8	7	5
20-30	2-Lane Major Collector (2-UMCU)	12000	40 - 60	92/8	7	5
30-35.5	2-Lane Outer Rural Arterial (near the extremities of the City) (2-RAU)	10000	50 -80	92/8	7	5
20-30	2-Lane Urban Collector (2-UCU)	8000	40 -50	92/8	7	5

¹ The MOECC 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.

APPENDIX B

ENVIRONMENTAL NOISE GUIDELINES

APPENDIX B

ENVIRONMENTAL NOISE GUIDELINES

MINISTRY OF THE ENVIRONMENT AND CLIMATE CHANGE (MOECC)

Reference: MOECC Publication NPC-300, October 2013: *“Environmental Noise Guideline, Stationary and Transportation Source – Approval and Planning”*.

SPACE	SOURCE	TIME PERIOD	CRITERION
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc.	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres)	Road	23:00 to 07:00	45 dBA
	Rail	23:00 to 07:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 5
Sleeping quarters	Road	07:00 to 23:00	45 dBA
	Rail	07:00 to 23:00	40 dBA
	Aircraft	24-hour period	NEF/NEP 0
Sleeping quarters	Road	23:00 to 07:00	40 dBA
	Rail	23:00 to 07:00	35 dBA
	Aircraft	24-hour period	NEF/NEP 0
Outdoor Living Areas	Road and Rail	07:00 to 23:00	55 dBA
Outdoor Point of Reception	Aircraft	24-hour period	NEF/NEP 30 [#]
Stationary Source			
Class 1 Area		07:00 to 19:00 ⁽¹⁾	50 ⁺ dBA
		19:00 to 23:00 ⁽¹⁾	50 ⁺ dBA
Class 2 Area		07:00 to 19:00 ⁽²⁾	50 ⁺ dBA
		19:00 to 23:00 ⁽²⁾	45 ⁺ dBA
Class 3 Area		07:00 to 19:00 ⁽³⁾	45 ⁺ dBA
		19:00 to 23:00 ⁽³⁾	40 ⁺ dBA
Class 4 Area		07:00 to 19:00 ⁽⁴⁾	55 ⁺ dBA
		19:00 to 23:00 ⁽⁴⁾	55 ⁺ dBA

..../cont'd

SPACE	SOURCE	TIME PERIOD	CRITERION
Plane of a Window of Noise Sensitive Spaces	Stationary Source Class 1 Area	07:00 to 19:00 ⁽¹⁾	50* dBA
		19:00 to 23:00 ⁽¹⁾	50* dBA
		23:00 to 07:00 ⁽¹⁾	45* dBA
	Class 2 Area	07:00 to 19:00 ⁽²⁾	50* dBA
		19:00 to 23:00 ⁽²⁾	50* dBA
		23:00 to 07:00 ⁽²⁾	45* dBA
	Class 3 Area	07:00 to 19:00 ⁽³⁾	45* dBA
		19:00 to 23:00 ⁽³⁾	45* dBA
		23:00 to 07:00 ⁽³⁾	40* dBA
	Class 4 Area	07:00 to 19:00 ⁽⁴⁾	60* dBA
		19:00 to 23:00 ⁽⁴⁾	60* dBA
		23:00 to 07:00 ⁽⁴⁾	55* dBA

- # may not apply to in-fill or re-development.
 * or the minimum hourly background sound exposure $L_{eq(1)}$, due to road traffic, if higher.
 (1) Class 1 Area: Urban.
 (2) Class 2 Area: Urban during day; rural-like evening and night.
 (3) Class 3 Area: Rural.
 (4) Class 4 Area: Subject to land use planning authority's approval.

Reference: MOECC Publication ISBN 0-7729-2804-5, 1987: "Environmental Noise Assessment in Land-Use Planning".

EXCESS ABOVE RECOMMENDED SOUND LEVEL LIMITS (dBA)	CHANGE IN SUBJECTIVE LOUDNESS ABOVE	MAGNITUDE OF THE NOISE PROBLEM	NOISE CONTROL MEASURES (OR ACTION TO BE TAKEN)
No excess (<55 dBA)	—	No expected noise problem	None
1 to 5 inclusive (56 to 60 dBA)	Noticeably louder	Slight noise impact	If no physical measures are taken, then prospective purchasers or tenants should be made aware by suitable warning clauses.
6 to 10 inclusive (61 - 65 dBA)	Almost twice as loud	Definite noise impact	Recommended.
11 to 15 inclusive (66 - 70 dBA)	Almost three times as loud	Serious noise impact	Strongly Recommended.
16 and over (>70 dBA)	Almost four times as loud	Very serious noise impact	Strongly Recommended (may be mandatory).

APPENDIX C

SOUND LEVEL CALCULATIONS

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:06:07
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_ne_ef.te Time Period: Day/Night 16/8 hours
Description: Building A - Northeast Corner - East Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 18.00 / 18.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Angle1 Angle2 : -90.00 deg 0.00 deg

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	0	0.12	58.16	0.00	-10.80	-3.35	0.00	0.00	0.00	44.01
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Segment Leq : 44.01 dBA

Total Leq All Segments: 55.97 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.57
(NIGHT): 55.97

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:06:27
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_nw_nf.te Time Period: Day/Night 16/8 hours
Description: Building A - Northwest Corner - North Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 13.00 / 13.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (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 : 45.00 / 45.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 67.87 + 0.00) = 67.87 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	67.51	0.00	0.70	-0.34	0.00	0.00	0.00	67.87

Segment Leq : 67.87 dBA

Results segment # 2: Codd's (day)

Source height = 1.50 m

ROAD (0.00 + 58.82 + 0.00) = 58.82 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.12	67.51	0.00	-5.34	-3.35	0.00	0.00	0.00	58.82

Segment Leq : 58.82 dBA

Total Leq All Segments: 68.38 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 60.27 + 0.00) = 60.27 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	59.91	0.00	0.70	-0.34	0.00	0.00	0.00	60.27

Segment Leq : 60.27 dBA

Results segment # 2: Codd's (night)

Source height = 1.50 m

ROAD (0.00 + 51.22 + 0.00) = 51.22 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	59.91	0.00	0.70	-0.34	0.00	0.00	0.00	60.27

0	90	0.12	59.91	0.00	-5.34	-3.35	0.00	0.00	0.00	51.22
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Segment Leq : 51.22 dBA

Total Leq All Segments: 60.78 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 68.38
(NIGHT): 60.78

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:06:42
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: a_nw_wf.te Time Period: Day/Night 16/8 hours
Description: Building A - Northwest Corner - West Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 13.00 / 13.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (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 : 45.00 / 45.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 64.86 + 0.00) = 64.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	67.51	0.00	0.70	-3.35	0.00	0.00	0.00	64.86

Segment Leq : 64.86 dBA

Results segment # 2: Codd's (day)

Source height = 1.50 m

ROAD (0.00 + 60.51 + 0.00) = 60.51 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-40	90	0.12	67.51	0.00	-5.34	-1.66	0.00	0.00	0.00	60.51

Segment Leq : 60.51 dBA

Total Leq All Segments: 66.22 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 57.26 + 0.00) = 57.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	59.91	0.00	0.70	-3.35	0.00	0.00	0.00	57.26

Segment Leq : 57.26 dBA

Results segment # 2: Codd's (night)

Source height = 1.50 m

ROAD (0.00 + 52.91 + 0.00) = 52.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	59.91	0.00	0.70	-3.35	0.00	0.00	0.00	57.26

-40	90	0.12	59.91	0.00	-5.34	-1.66	0.00	0.00	0.00	52.91
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Segment Leq : 52.91 dBA

Total Leq All Segments: 58.62 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.22
(NIGHT): 58.62

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:07:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_ne_ef.te Time Period: Day/Night 16/8 hours
Description: Building B - Northeast Corner - East Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 75.00 / 75.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Angle1 Angle2 : -90.00 deg 0.00 deg

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	0	0.21	58.16	0.00	-8.86	-3.57	0.00	0.00	0.00	45.72
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Segment Leq : 45.72 dBA

Total Leq All Segments: 49.94 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 57.54
(NIGHT): 49.94

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:07:21
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_se_ef.te Time Period: Day/Night 16/8 hours
Description: Building B - Southeast Corner - East Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 137.00 / 137.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Angle1 Angle2 : -90.00 deg 0.00 deg

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	0	0.21	58.16	0.00	-1.24	-3.57	0.00	0.00	0.00	53.34
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Segment Leq : 53.34 dBA

Total Leq All Segments: 53.90 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 61.49
(NIGHT): 53.90

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:07:45
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: b_sw_sf.te Time Period: Day/Night 16/8 hours
Description: Building B - Southwest Corner - South Facade

Road data, segment # 1: Mikinak (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: Mikinak (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 : 15.00 / 15.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (day/night)

Angle1 Angle2 : -90.00 deg 25.00 deg

Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 111.00 / 111.00 m
 Receiver height : 16.50 / 16.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Mikinak (day)

Source height = 1.50 m

ROAD (0.00 + 65.19 + 0.00) = 65.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	65.75	0.00	0.00	-0.56	0.00	0.00	0.00	65.19

Segment Leq : 65.19 dBA

Results segment # 2: Codd's (day)

Source height = 1.50 m

ROAD (0.00 + 54.61 + 0.00) = 54.61 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	25	0.21	67.51	0.00	-10.52	-2.39	0.00	0.00	0.00	54.61

Segment Leq : 54.61 dBA

Total Leq All Segments: 65.55 dBA

Results segment # 1: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 57.60 + 0.00) = 57.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	58.16	0.00	0.00	-0.56	0.00	0.00	0.00	57.60

Segment Leq : 57.60 dBA

Results segment # 2: Codd's (night)

Source height = 1.50 m

ROAD (0.00 + 47.01 + 0.00) = 47.01 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	58.16	0.00	0.00	-0.56	0.00	0.00	0.00	57.60

-90	25	0.21	59.91	0.00	-10.52	-2.39	0.00	0.00	0.00	47.01
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Segment Leq : 47.01 dBA

Total Leq All Segments: 57.96 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 65.55
(NIGHT): 57.96

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:08:06
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c_sw_sf.te Time Period: Day/Night 16/8 hours
Description: Building C - Southwest Corner - South Facade

Road data, segment # 1: Mikinak (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: Mikinak (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 : 15.00 / 15.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (day/night)

Angle1 Angle2 : -90.00 deg -45.00 deg

Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 46.00 / 46.00 m
 Receiver height : 16.50 / 16.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

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

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 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): 12000
 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: Codds (day/night)

 Angle1 Angle2 : -75.00 deg 0.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 22.00 / 22.00 m
 Receiver height : 16.50 / 16.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Mikinak (day)

 Source height = 1.50 m

ROAD (0.00 + 65.19 + 0.00) = 65.19 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	65.75	0.00	0.00	-0.56	0.00	0.00	0.00	65.19

 Segment Leq : 65.19 dBA

Results segment # 2: Codds (day)

 Source height = 1.50 m

ROAD (0.00 + 54.52 + 0.00) = 54.52 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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-90	-45	0.21	67.51	0.00	-5.89	-7.10	0.00	0.00	0.00	54.52
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Segment Leq : 54.52 dBA

Results segment # 3: Codds (day)

Source height = 1.50 m

ROAD (0.00 + 61.38 + 0.00) = 61.38 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	0	0.21	67.51	0.00	-2.01	-4.12	0.00	0.00	0.00	61.38

Segment Leq : 61.38 dBA

Total Leq All Segments: 66.96 dBA

Results segment # 1: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 57.60 + 0.00) = 57.60 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	58.16	0.00	0.00	-0.56	0.00	0.00	0.00	57.60

Segment Leq : 57.60 dBA

Results segment # 2: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 46.92 + 0.00) = 46.92 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	-45	0.21	59.91	0.00	-5.89	-7.10	0.00	0.00	0.00	46.92

Segment Leq : 46.92 dBA

Results segment # 3: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 53.78 + 0.00) = 53.78 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-75	0	0.21	59.91	0.00	-2.01	-4.12	0.00	0.00	0.00	53.78

Segment Leq : 53.78 dBA

Total Leq All Segments: 59.36 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.96
(NIGHT): 59.36

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:08:28
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: c_sw_wf.te Time Period: Day/Night 16/8 hours
Description: Building C - Southwest Corner - West Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 137.00 / 137.00 m
Receiver height : 16.50 / 16.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Mikinak (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: Mikinak (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 : 19.00 / 19.00 m
 Receiver height : 16.50 / 16.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

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

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 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): 12000
 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: Codds (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 : 17.00 / 17.00 m
 Receiver height : 16.50 / 16.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 52.31 + 0.00) = 52.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.21	67.51	0.00	-11.62	-3.57	0.00	0.00	0.00	52.31

Segment Leq : 52.31 dBA

Results segment # 2: Mikinak (day)

Source height = 1.50 m

ROAD (0.00 + 60.93 + 0.00) = 60.93 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.21	67.51	0.00	-11.62	-3.57	0.00	0.00	0.00	52.31

0	90	0.21	65.75	0.00	-1.24	-3.57	0.00	0.00	0.00	60.93
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Segment Leq : 60.93 dBA

Results segment # 3: Codds (day)

Source height = 1.50 m

ROAD (0.00 + 66.29 + 0.00) = 66.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	67.51	0.00	-0.66	-0.56	0.00	0.00	0.00	66.29

Segment Leq : 66.29 dBA

Total Leq All Segments: 67.53 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 44.71 + 0.00) = 44.71 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.21	59.91	0.00	-11.62	-3.57	0.00	0.00	0.00	44.71

Segment Leq : 44.71 dBA

Results segment # 2: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 53.34 + 0.00) = 53.34 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.21	58.16	0.00	-1.24	-3.57	0.00	0.00	0.00	53.34

Segment Leq : 53.34 dBA

Results segment # 3: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 58.69 + 0.00) = 58.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.21	59.91	0.00	-0.66	-0.56	0.00	0.00	0.00	58.69

Segment Leq : 58.69 dBA

Total Leq All Segments: 59.93 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.53
(NIGHT): 59.93

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:09:00
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d_nw_nf.te Time Period: Day/Night 16/8 hours
Description: Building D - Northwest Corner - North Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (day/night)

Angle1 Angle2 : -90.00 deg 55.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 36.00 / 36.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (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 : 16.00 / 16.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 62.07 + 0.00) = 62.07 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	55	0.12	67.51	0.00	-4.26	-1.18	0.00	0.00	0.00	62.07

Segment Leq : 62.07 dBA

Results segment # 2: Codd's (day)

Source height = 1.50 m

ROAD (0.00 + 63.85 + 0.00) = 63.85 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.12	67.51	0.00	-0.31	-3.35	0.00	0.00	0.00	63.85

Segment Leq : 63.85 dBA

Total Leq All Segments: 66.06 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 54.47 + 0.00) = 54.47 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	55	0.12	59.91	0.00	-4.26	-1.18	0.00	0.00	0.00	54.47

Segment Leq : 54.47 dBA

Results segment # 2: Codd's (night)

Source height = 1.50 m

ROAD (0.00 + 56.25 + 0.00) = 56.25 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	55	0.12	59.91	0.00	-4.26	-1.18	0.00	0.00	0.00	54.47

0	90	0.12	59.91	0.00	-0.31	-3.35	0.00	0.00	0.00	56.25
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Segment Leq : 56.25 dBA

Total Leq All Segments: 58.46 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 66.06
(NIGHT): 58.46

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:09:18
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d_nw_wf.te Time Period: Day/Night 16/8 hours
Description: Building D - Northwest Corner - West Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 36.00 / 36.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Mikinak (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: Mikinak (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 : 120.00 / 120.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

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

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 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): 12000
 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: Codds (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 : 16.00 / 16.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 59.91 + 0.00) = 59.91 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	67.51	0.00	-4.26	-3.35	0.00	0.00	0.00	59.91

Segment Leq : 59.91 dBA

Results segment # 2: Mikinak (day)

Source height = 1.50 m

ROAD (0.00 + 52.29 + 0.00) = 52.29 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	67.51	0.00	-4.26	-3.35	0.00	0.00	0.00	59.91

0	90	0.12	65.75	0.00	-10.12	-3.35	0.00	0.00	0.00	52.29
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Segment Leq : 52.29 dBA

Results segment # 3: Codd's (day)

Source height = 1.50 m

ROAD (0.00 + 66.86 + 0.00) = 66.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	67.51	0.00	-0.31	-0.34	0.00	0.00	0.00	66.86

Segment Leq : 66.86 dBA

Total Leq All Segments: 67.78 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 52.31 + 0.00) = 52.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	59.91	0.00	-4.26	-3.35	0.00	0.00	0.00	52.31

Segment Leq : 52.31 dBA

Results segment # 2: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 44.69 + 0.00) = 44.69 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.12	58.16	0.00	-10.12	-3.35	0.00	0.00	0.00	44.69

Segment Leq : 44.69 dBA

Results segment # 3: Codd's (night)

Source height = 1.50 m

ROAD (0.00 + 59.26 + 0.00) = 59.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	59.91	0.00	-0.31	-0.34	0.00	0.00	0.00	59.26

Segment Leq : 59.26 dBA

Total Leq All Segments: 60.18 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.78
(NIGHT): 60.18

STAMSON 5.04 NORMAL REPORT Date: 17-05-2018 15:09:46
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: d_sw_wf.te Time Period: Day/Night 16/8 hours
Description: Building D - Southwest Corner - West Facade

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (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 : 88.00 / 88.00 m
Receiver height : 19.50 / 19.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

Road data, segment # 2: Mikinak (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: Mikinak (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 : 67.00 / 67.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

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

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 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): 12000
 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: Codds (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 : 16.00 / 16.00 m
 Receiver height : 19.50 / 19.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

 Source height = 1.50 m

ROAD (0.00 + 55.56 + 0.00) = 55.56 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	67.51	0.00	-8.61	-3.35	0.00	0.00	0.00	55.56

Segment Leq : 55.56 dBA

Results segment # 2: Mikinak (day)

 Source height = 1.50 m

ROAD (0.00 + 55.12 + 0.00) = 55.12 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
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0	90	0.12	65.75	0.00	-7.28	-3.35	0.00	0.00	0.00	55.12
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Segment Leq : 55.12 dBA

Results segment # 3: Codds (day)

Source height = 1.50 m

ROAD (0.00 + 66.86 + 0.00) = 66.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	67.51	0.00	-0.31	-0.34	0.00	0.00	0.00	66.86

Segment Leq : 66.86 dBA

Total Leq All Segments: 67.43 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 47.96 + 0.00) = 47.96 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	0	0.12	59.91	0.00	-8.61	-3.35	0.00	0.00	0.00	47.96

Segment Leq : 47.96 dBA

Results segment # 2: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 47.53 + 0.00) = 47.53 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
0	90	0.12	58.16	0.00	-7.28	-3.35	0.00	0.00	0.00	47.53

Segment Leq : 47.53 dBA

Results segment # 3: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 59.26 + 0.00) = 59.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-90	90	0.12	59.91	0.00	-0.31	-0.34	0.00	0.00	0.00	59.26

Segment Leq : 59.26 dBA

Total Leq All Segments: 59.83 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 67.43
(NIGHT): 59.83

Filename: ola.te Time Period: Day/Night 16/8 hours
Description: OLA

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (day/night)

Angle1 Angle2 : -42.00 deg -32.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.00 / 80.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Hemlock (day/night)

Angle1 Angle2 : 64.00 deg 81.00 deg

Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 80.00 / 80.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Angle1 Angle2 : -15.00 deg -9.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 75.00 / 75.00 m
Receiver height : 1.50 / 1.50 m
Topography : 1 (Flat/gentle slope; no barrier)
Reference angle : 0.00

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

Car traffic volume : 9715/845 veh/TimePeriod *
Medium truck volume : 773/67 veh/TimePeriod *
Heavy truck volume : 552/48 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): 12000
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: Codds (day/night)

Angle1 Angle2 : -20.00 deg -12.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 76.00 / 76.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

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

 Car traffic volume : 9715/845 veh/TimePeriod *
 Medium truck volume : 773/67 veh/TimePeriod *
 Heavy truck volume : 552/48 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): 12000
 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: Codds (day/night)

 Angle1 Angle2 : 47.00 deg 57.00 deg
 Wood depth : 0 (No woods.)
 No of house rows : 0 / 0
 Surface : 1 (Absorptive ground surface)
 Receiver source distance : 76.00 / 76.00 m
 Receiver height : 1.50 / 1.50 m
 Topography : 1 (Flat/gentle slope; no barrier)
 Reference angle : 0.00

Results segment # 1: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 42.24 + 0.00) = 42.24 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-42	-32	0.66	67.51	0.00	-12.07	-13.20	0.00	0.00	0.00	42.24

Segment Leq : 42.24 dBA

Results segment # 2: Hemlock (day)

Source height = 1.50 m

ROAD (0.00 + 41.70 + 0.00) = 41.70 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
64	81	0.66	67.51	0.00	-12.07	-13.74	0.00	0.00	0.00	41.70

Segment Leq : 41.70 dBA

Results segment # 3: Mikinak (day)

Source height = 1.50 m

ROAD (0.00 + 39.31 + 0.00) = 39.31 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	-9	0.66	65.75	0.00	-11.60	-14.84	0.00	0.00	0.00	39.31

Segment Leq : 39.31 dBA

Results segment # 4: Codds (day)

Source height = 1.50 m

ROAD (0.00 + 42.18 + 0.00) = 42.18 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	-12	0.66	67.51	0.00	-11.70	-13.64	0.00	0.00	0.00	42.18

Segment Leq : 42.18 dBA

Results segment # 5: Codds (day)

Source height = 1.50 m

ROAD (0.00 + 41.86 + 0.00) = 41.86 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
47	57	0.66	67.51	0.00	-11.70	-13.95	0.00	0.00	0.00	41.86

Segment Leq : 41.86 dBA

Total Leq All Segments: 48.57 dBA

Results segment # 1: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 34.64 + 0.00) = 34.64 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-42	-32	0.66	59.91	0.00	-12.07	-13.20	0.00	0.00	0.00	34.64

Segment Leq : 34.64 dBA

Results segment # 2: Hemlock (night)

Source height = 1.50 m

ROAD (0.00 + 34.10 + 0.00) = 34.10 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
64	81	0.66	59.91	0.00	-12.07	-13.74	0.00	0.00	0.00	34.10

Segment Leq : 34.10 dBA

Results segment # 3: Mikinak (night)

Source height = 1.50 m

ROAD (0.00 + 31.72 + 0.00) = 31.72 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-15	-9	0.66	58.16	0.00	-11.60	-14.84	0.00	0.00	0.00	31.72

Segment Leq : 31.72 dBA

Results segment # 4: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 34.58 + 0.00) = 34.58 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
-20	-12	0.66	59.91	0.00	-11.70	-13.64	0.00	0.00	0.00	34.58

Segment Leq : 34.58 dBA

Results segment # 5: Codds (night)

Source height = 1.50 m

ROAD (0.00 + 34.26 + 0.00) = 34.26 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj	B.Adj	SubLeq
47	57	0.66	59.91	0.00	-11.70	-13.95	0.00	0.00	0.00	34.26

Segment Leq : 34.26 dBA

Total Leq All Segments: 40.97 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 48.57
(NIGHT): 40.97

APPENDIX D

SAMPLE STC CALCULATION DETAILS

APPENDIX D

TYPICAL STC RATINGS OF SOME WINDOW CONFIGURATIONS

STC Rating	Single Glazing	Double Glazing					Triple Glazing	
		Glass Thickness					Glass Thickness	
	Thickness (mm)	2 mm & 2 mm	3 mm & 3 mm	4 mm & 4 mm	3 mm & 6 mm	6 mm & 6 mm	3 mm, 3 mm & 3 mm	3 mm, 3 mm & 6 mm
		Interpane Spacing (mm)					Interpane Spacing (mm)	
27	2	6						
28		13						
29	3	15	6					
30	4 to 6	18	13	6				
31		22	16	13	6	6	6, 6	
32	9	28	20	16	13	13	6, 10	6, 6
33		35	25	20	16	16	6, 15	6, 10
34	12	42	32	25	20	20	6, 20	6, 15
35		50	40	32	25	24	6, 30	6, 20
36		63	50	40	32	30	6, 40	6, 30
37		80	63	50	40	37	6, 50	6, 40
38		100	80	63	55	50	6, 65	6, 50
39		125	100	80	75	70	6, 80	6, 65
40		150	125	100	95	90	6, 100	6, 80
41			150	125	110	100		6, 100
42				150	125			

For Explanatory Notes to this table, see following page.

Example:

STC 34 can be met by using:

- a) a 12 mm thick, laminated single glazed openable window
- or b) a 2 mm glass, 42 mm air space, 2 mm glass openable window
- or c) a 3 mm glass, 6 mm air space, 3 mm glass, 20 mm air space, 3 mm glass openable window
- or d) a 4 mm glass, 13 mm air space, 4 mm glass window fixed and sealed to the frame.

SOURCE: National Research Council, Division of Building Research.

EXPLANATORY NOTES:

1. STC data listed in the table are for well-fitted weatherstripped units that can be opened. The STC values apply only when the windows are closed. For windows fixed and sealed to the frame, add three to the STC given in the table.
2. 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.
3. The STC ratings for 9 mm and 12 mm glass are for laminated glass only; for solid glass, subtract two from the STC values listed in the table.
4. 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.
5. The STC 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.

STC - Sound Transmission Calculator

Valcoustics Canada Limited

Find/Change Required STC for Components

29-May-18

File # 117-363

Indoor Sound Level 45 dB(A)
Room Absorption Category Intermediate
Outdoor Sound Level 68 dB(A) +3dB = 71 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 1 (North)
66 dB(A) +3dB = 69 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 2 (West)
Spectrum D (Mixed Road Traffic, or Distant Aircraft)
Calc Location Block 19 - Bldg A - NW corner

Components:			Surf.	After Step 2	From Table 3 (% Energy)	From Table 4 (% floor area)	From Table 5 (spectrum)	STC	Calc
1	North	(8 , Exterior Wall)	1	28	12.0 (6 %)	-2.0 (50 %)	7.0	45	By STC
2	West	(8 , Exterior Wall)	2	26	14.0 (4 %)	-2.0 (50 %)	7.0	45	By STC
3	North	(4 , window, openable thin, dou)	1	28	3.0 (50 %)	-2.0 (50 %)	2.0	31	By Energy
4	West	(4 , window, openable thin, dou)	2	26	4.0 (39 %)	-2.0 (50 %)	2.0	30	By STC

STC - Sound Transmission Calculator

Valcoustics Canada Limited

Find/Change Required STC for Components

29-May-18

File # 117-363

Indoor Sound Level 45 dB(A)
 Room Absorption Category Intermediate
 Outdoor Sound Level 66 dB(A) +3dB = 69 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 1 (South)
 66 dB(A) +3dB = 69 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 2 (West)
 Spectrum D (Mixed Road Traffic, or Distant Aircraft)
 Calc Location Block 19 - Bldg B - SW corner

Components:			Surf.	After Step 2	From Table 3 (% Energy)	From Table 4 (% floor area)	From Table 5 (spectrum)	STC	Calc
1	South	(8 , Exterior wall)	1	26	14.0 (4 %)	-2.0 (50 %)	7.0	45	By STC
2	West	(8 , Exterior wall)	2	26	14.0 (4 %)	-2.0 (50 %)	7.0	45	By STC
3	South	(4 , window, openable thin, dou)	1	26	3.4 (46 %)	-2.0 (50 %)	2.0	29	By Energy
4	West	(4 , window, openable thin, dou)	2	26	3.4 (46 %)	-2.0 (50 %)	2.0	29	By Energy

STC - Sound Transmission Calculator

Valcoustics Canada Limited

Find/Change Required STC for Components

29-May-18

File # 117-363

Indoor Sound Level 45 dB(A)
 Room Absorption Category Intermediate
 Outdoor Sound Level 67 dB(A) +3dB = 70 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 1 (South)
 68 dB(A) +3dB = 71 dB(A) (plus 2 dB from Table 2 to for 40 to 90 Degrees) for surface 2 (West)
 Spectrum D (Mixed Road Traffic, or Distant Aircraft)
 Calc Location Block 19 - Bldg C - SW corner

Components:			Surf.	After Step 2	From Table 3 (% Energy)	From Table 4 (% floor area)	From Table 5 (spectrum)	STC	Calc
1	South	(8 , Exterior wall)	1	27	13.0 (5 %)	-2.0 (50 %)	7.0	45	By STC
2	West	(8 , Exterior wall)	2	28	12.0 (6 %)	-2.0 (50 %)	7.0	45	By STC
3	South	(4 , window, openable thin, dou)	1	27	3.5 (44 %)	-2.0 (50 %)	2.0	30	By Energy
4	West	(4 , window, openable thin, dou)	2	28	3.5 (44 %)	-2.0 (50 %)	2.0	31	By Energy