
SS WILSON ASSOCIATES

Consulting Engineers

REPORT NO. WA20-037

**NOISE CONTROL FEASIBILITY STUDY
PROPOSED RESIDENTIAL SUBDIVISION
GLEN WILLIAMS-PHASE 2
WEST LOT 23, CONC. 10
HALTON HILLS**

**SUBMITTED TO:
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1.0 INTRODUCTION

- 1.1** The services of SS Wilson Associates (SSWA) were retained by Matson Planning and Development Inc. on behalf of 1404649 Ontario Limited (Charleston Developments) to prepare a Noise Control Feasibility Study for the proposed residential development referred to as Glen Williams-Phase 2, located at West Lot 23, Concession 10 in the Town of Halton Hills.

The objective of this report is to support an application for Draft Plan Approval of the proposed development.

- 1.2** The site is bounded by the following land uses:
- to the north by agricultural lands
 - to the south by residential dwellings
 - to the east by vacant lands
 - to the west by Ninth Line/Confederation Street

The location of the site is shown in Figure 1. Project north is as illustrated in Figures 2 and 3.

- 1.3** Major features of the development are defined by the Draft Plan of Subdivision drawing revised June 16, 2020.

Figure 2 illustrates the general layout of the proposed development.

- 1.4** The major surface transportation noise source (current and future) of concern to the development is Ninth Line/Confederation Street.

- 1.5** There are no nearby stationary noise sources of concern for the proposed development.

- 1.6** The proposed development is located outside the 25 NEF/NEP contour lines prepared by Transport Canada; therefore aircraft noise is not considered a problem.

- 1.7** The scope of this report is to define the minimum noise attenuation requirements for the control of outdoor and indoor environmental sound levels.

2.0 SUMMARY AND RECOMMENDATIONS

2.1 SUMMARY

Based on the analysis conducted in this investigation it is concluded that:

1. The unattenuated daytime sound levels in the Outdoor Living Areas (OLAs)¹ of all of the residential dwellings will not exceed the recommended objective sound level. Therefore, no outdoor noise control measures need be considered.
2. The unattenuated sound levels at the outside walls of some of the dwellings will exceed the recommended objective sound levels. Indoor noise controls are required for these dwellings along with relevant warning clauses. All other dwellings on the development will have acceptable indoor sound levels. Therefore, noise control measures are not required.
3. Although the projected sound levels are predicted to be above the sound level criteria outlined in Section 3, it is feasible to control sound levels within the indoor areas of the proposed development to meet the stated criteria.

2.2 RECOMMENDATIONS

A summary of the minimum noise attenuation requirements is presented in Table 1. Detailed description is as follows:

1. Air Conditioning

Lots: 1 and 28

The above noted properties should be equipped with central air conditioning systems with their condensing units to be located in noise insensitive locations. The sound levels of the outdoor condensing units should meet the MECP's the maximum sound level, L_{AS} of 50 dBA² at the neighbour's closest point(s) of reception, i.e. at their ground-based outdoor areas as well as the closest window on any floor level as outlined in MECP publication NPC-216 and other

¹ At times, it may also be referred to as Outdoor Amenity Areas. The size of an OLA is subject to municipal standards and other project requirements (except when classified as a balcony along with other applicable MECP rules).

² Or the lowest hourly ambient L_{eq} due to road traffic projected at the receptor location(s). It should be noted that L_{AS} of 55 dBA is acceptable only for cases where the A/C unit is placed in a high ambient location (i.e. with a direct line of sight to a major roadway).

levels specified by the municipality. The following warning clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of these properties:

“This dwelling unit has been supplied with a central air conditioning system which will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks”.

Where the air conditioning units are bracket-mounted on walls or come in direct contact with the building structure, they should be mounted on neoprene/rubber isolation supports or pads that are rated to provide minimum 0.2” static deflection.

It is also our strong recommendation that the necessary detailed technical analysis be performed prior to submitting an application for Building Permit to optimize the required air conditioning unit noise rating /specification and their acceptable placements in order to meet the Provincial sound level standards at the closest receptors (i.e., a maximum sound level L_{AS} of 50 dBA³ at the neighbour’s closest point(s) of reception within their ground-based outdoor areas as well as at the closest window on any floor level) after taking into consideration the specific property design and proposed A/C unit location. Other A/C noise/vibration control measures, where required to meet the sound level criteria at the point(s) of reception, should also be identified and shown on the applicable permit drawings /specifications. Where the condensing units are bracket-mounted on walls, they should be mounted on neoprene/rubber isolation supports or pads that are rated to provide minimum 0.2” static deflection.

The Analysis Section in this study provides additional important details on the application of air conditioners.

2. Provision for Air Conditioning

Lots: 26 and 27

The above noted properties should be equipped with a ducted forced air heating system: furnace/fan, supply air plenum, and duct work. The components are to be appropriately situated and sized to accommodate future installation of central air conditioning systems. The provision for future air conditioning should also include the installation of the necessary rough-in work such as a floor drain for the condensate, appropriate electrical power supply,

³ Or the lowest hourly ambient Leq due to road traffic projected at the receptor location(s). It should be noted that L_{AS} of 55 dBA is acceptable only for cases where the A/C unit is placed in a high ambient location (i.e. with a direct line of sight to a major roadway).

thermostat control wiring and a capped sleeve in the exterior wall for future refrigeration tubing in an approved location (Installation cost of the air conditioning system is an option to the developer/builder as they see fit).

Where the air conditioning units are bracket-mounted on walls or come in direct contact with the building structure, they should be mounted on neoprene/rubber isolation supports or pads that are rated to provide minimum 0.2" static deflection.

If the purchaser/occupant does not take the central air conditioning option, the following clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of these properties:

"This dwelling unit has been fitted with provisions, which include a fan forced heating system, suitably sized ducts, plenum, electrical power wiring, thermostatic control wiring, a nearby floor drain, etc. sized to accommodate the future addition of central air conditioning by the occupant at their expense and discretion. Installation of central air conditioning by the occupant will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment, Conservation and Parks. Future installation of the air conditioning system should meet the Ministry of the Environment, Conservation and Parks criteria in Publication NPC-216 (a maximum sound level L_{AS} of 50 dBA at the neighbour's closest point(s) of reception, i.e. at their ground-based outdoor areas as well as at the closest window on any floor level) and other applicable levels specified by the municipality."

3. Warning Clause *4

Lots: 1, and 26 to 28

The following warning clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of these properties:

"Purchasers/tenants are advised that despite the inclusion of noise control features within this development area and within the dwellings, sound levels from increasing road traffic may continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the sound level exceeds the Municipality's and the Ministry of the Environment, Conservation and Parks noise criteria."

*4 Reference should be made to Bulletin No. 91003, Environmental Warnings/Restrictions, Ontario Ministry of Consumer and Commercial Relations.

4. Building Acoustic Insulation

Lots: 1 and 28

All exterior building components (walls, windows and doors) should meet the minimum Acoustic Insulation Factors (AIF) shown in Tables 3 and 4. All windows should be well fitted and weather-stripped.

It is also the responsibility of the developer/builder responsible for final design and construction of the subject dwellings to ensure that the correct windows, walls and doors acoustic specifications are secured from the Acoustical Engineer prior to planning and construction of the noted dwellings.

Typical Acoustic Insulation Factors (AIF) are shown in Tables 3 and 4. The Detailed Noise Control Study should provide complete and specific tabulations of AIF's for all properties affected.

It is also the responsibility of the developer/builder responsible for final design and construction of the subject dwellings to ensure that the correct windows, walls and doors acoustic specifications are secured from the Acoustical Engineer prior to planning and construction of the noted dwellings.

5. Implementation Procedures

The following is a summary of the generally recommended procedures for implementation as per the MECP requirements:

- a) Prior to final approval of this development, a Detailed Noise Control Study, or an upgraded noise study should be required to take into consideration the following:
 - Final lot layout, lot numbers, etc.
 - Possible proposed dwelling locations
 - The exact distances to all sources of concern
 - Other relevant conditions to noise in the Development Agreement
- b) The Development Agreement(s) should include the details of all the necessary noise control measures and procedures as outlined herein this noise study to the satisfaction of all concerned parties.
- c) Prior submission of the project plans for Building Permit, the Builder's plans, with respect to the units requiring noise control measures as referred to earlier, should be certified by an Acoustical Engineer as being in conformance with the recommendations of the Detailed Noise Control Study as approved and/or amended by the authorities having jurisdiction.

- d) Prior to their final inspection and release for occupancy, these dwellings should be certified by an Acoustical Engineer as being in compliance with the recommendations of the Detailed Noise Control Study.

In view of the fact that municipal implementation procedures of the noise control measures recommended herein may differ, it is the responsibility of the developer/builder responsible for final design and construction of the subject structures/dwellings to ensure that the correct details related to the noise control measures referred in this report, such as, building shell component specifications (windows, walls, doors, and others), air conditioning noise control technical requirements, etc. are secured from the Acoustical Engineer prior to planning and construction of the noted dwellings.

3.0 SOUND AND VIBRATION LEVEL CRITERIA

3.1 SURFACE TRANSPORTATION CRITERIA⁵

The surface transportation noise is based on the objective sound levels recommended by the Ministry of the Environment, Conservation and Parks (Ref: MECP Publication NPC-300 “Environmental Noise Guideline, Noise Assessment Criteria for Stationary Sources and for Land Use Planning, 2013”) and applicable Regional/Municipal sound level standards and procedures for different land uses and spaces.

The following is a summary of the applicable sound level criteria for surface transportation sources for the shown time periods (day=d & night=n):

Sound Level Limits for Outdoor Living Areas (OLAs)

AREA & TIME PERIOD	L _{Aeq(day)} ROAD AND RAIL (dBA)
Designated (Individual or common) Outdoor Living Areas (16 hr day, 07:00 - 23:00)	L _{Aeq(day)} 55

Indoor Sound Level Limits

Type of Space	L _{Aeq} (Time Period) (dBA)	
	Road	Rail
Living/dining, den areas of residences, hospitals, nursing homes, schools, daycare centres, etc. (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Living/dining, den areas of residences, hospitals, nursing homes, etc. (except schools or daycare centres) (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 45	L _{Aeq(night)} 40
Sleeping quarters (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Sleeping quarters (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 40	L _{Aeq(night)} 35

⁵ Road, rail and rolling stock traffic.
SS Wilson Associates Consulting Engineers

**Additional Supplementary (Best Management Practices) Sound Level
Criteria Recommended for Other Uses**

Type of Space	L _{Aeq} (Time Period) (dBA)	
	Road	Rail
General offices, reception areas, retail stores, etc. (Time period-day: 16 hr, 07:00 - 23:00)	L _{Aeq(day)} 50	L _{Aeq(day)} 45
Living/dining areas of residences, hospitals, schools, nursing/retirement homes, daycare centres, theatres, places of worship, libraries, individual or semiprivate offices, conference rooms, reading rooms, etc. (Time period-day: 16 hr, 23:00 - 07:00)	L _{Aeq(day)} 45	L _{Aeq(day)} 40
Sleeping quarters of hotels/motels (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 45	L _{Aeq(night)} 40
Sleeping quarters of residences, hospitals, nursing/retirement homes, etc. (Time period-night: 8 hr, 23:00 - 07:00)	L _{Aeq(night)} 40	L _{Aeq(night)} 35

The criteria for acceptable outdoor and indoor sound levels are based on “free-field” predicted and/or measured sound levels at the applicable receiver locations, thus the effects of sound reflections and reverberant sound fields are not considered.

If the sound level is less than or equal to the sound level criteria, no control measures will be required.

The outdoor sound levels **may** exceed the outdoor sound level criterion by up to 5 decibels, provided that it can be demonstrated that it is not technically, economically or administratively feasible to achieve the criterion and that the occupants are informed of a potential disturbance due to the excess noise by means of a warning clause or cautionary note to be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease.

Central air conditioning is required when the daytime sound level at the outside wall of any habitable room containing windows exceeds an L_{Aeq(day)} 16 hrs of 65 dBA or when the nighttime sound level at the outside wall of any habitable room containing windows exceeds an L_{Aeq(night)} 8hrs of 60 dBA.

Forced air ventilation (with provision for future installation of a central air conditioning system) is required when the daytime sound level at the outside wall of any habitable room containing windows an exceeds L_{Aeq(day)} 16 hrs of 55 dBA

but is less than or equal to 65 dBA or when the nighttime sound level at the outside wall of any habitable room containing windows exceeds an $L_{Aeq(night)}$ 8hrs of 50 dBA but is less than or equal to 60 dBA.

Application of Criteria

The following table summarizes the requirements for noise control measures for the various sound level ranges:

SOURCE OF NOISE	DAYTIME SOUND LEVEL $L_{Aeq(day)}$	NIGHTTIME SOUND LEVEL $L_{Aeq(night)}$	AIR CONDITIONING	FORCED AIR VENTILATION WITH PROVISION FOR FUTURE AIR COND.	WARNING CLAUSE	ACOUSTIC INSULATION
ROAD	<=55	<=50	-	-	-	-
	>55 & <=65	>50 & <=60	-	Yes	Yes "Type C"	-
	>65	>60	Yes	-	Yes "Type D"	Yes
RAIL	<=55	<=50	-	-	-	-
	>55 & <=60	>50 & <=55	-	Yes	Yes "Type C"	-
	>60 & <=65	>55 & <=60	-	Yes	Yes "Type C"	Yes
	>65	>60	Yes	-	Yes "Type D"	Yes

4.0 ANALYSIS

4.1 TRANSPORTATION SOURCES OF NOISE

The relevant road and traffic data were obtained from the Region of Halton:

- Ninth Line/Confederation Road

Current No. of Lanes	2
Future No. of Lanes (assumed)	2
Posted Speed Limit	50 km/hr.
Future Speed Limit (assumed)	50 km/hr.
AADT (Year 2021)	8,947 vpd
Future AADT (Year 2035)	12,313 vpd
- Annual Growth Rate (assumed)	2.5%
- Number of Years of Growth (assumed)	14
Total Truck Percentage	2.6%
- Medium Truck Split	2.5%
- Heavy Truck Split	0.1%
Day(16 hrs.)/Night(8 hrs.) Split	34%/ 66%
Directional Traffic Split (assumed)	50%/50%
Road Gradient	2 to 2.4%
Current R.O.W.	20 m

Appendix A contains the relevant road traffic data used in this study.

4.2 OUTDOOR NOISE ENVIRONMENT

Sound level predictions were carried out based on MECP's ORNAMENT sound level prediction modeling procedures⁶ (Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document, 1989).

Overall sound levels at the OLAs of the selected representative receptor locations are shown in Tables 3 and 4. Sample sound level calculations at representative receptor locations are presented in Appendix B.

In consideration of the calculations, it is concluded that for all of the Lots within the development, the unattenuated daytime sound levels in the designated OLAs will not exceed the objective level of L_{Aeq} 55dBA, therefore outdoor noise control measures are not required for these properties.

⁶ The MECP's noise prediction models ORNAMENT and STEAM have a limitation as to the minimum AADT value for 24 hour traffic volume (calculated for the daytime and nighttime hourly volume). When the AADT value is less than 40 vph, there is a neutral mathematical manipulation that can be used as long as the hourly traffic volume is not very low. The manipulation is implemented by multiplying the traffic volume by any reasonable factor (for example a factor of 10) and then by deducting $10 \times \log$ "factor" from the results (in this case, $10 \times \log 10=10$).

4.3 TYPICAL WINDOW / WALL CONSTRUCTION

As the detailed architectural plans for Building Permit submission are not available at this time, it is not possible to specify the window and wall details to meet the AIF requirements presented in Tables 3 and 4. Further detailed analysis should be undertaken based on the data presented in this Report to take into consideration the final room location, floor area, window type (operable or fixed), window size and orientation, etc. Such analysis is required by the MECP and the municipality prior to submission for building permits as part of their Certification process.

It must be pointed out that there are several factors affecting the final glass selection including:

1. Size of window.
2. Room dimensions.
3. Floor level and direction room faces.
4. Fixed or operable glass.
5. The number of building components.
6. Type of wall to be used.
7. Projected sound levels outside the window
8. The choice of “laminated” window glazing in one or two of the window panes.

For the calculation of type of windows required for each dwelling, a detailed description of each unit is required.

As an example, for a typical unit with daytime outdoor sound level of 56 dBA, the AIF value for the Living Room will be 18 assuming 3 components. If the window to floor ratio is 32%, then the window requirements in terms of glass thickness, mm (air space thickness, mm) glass thickness, mm are any of the following:

Double Glazed: 3mm (13mm) 3mm; 4mm (6mm) 4mm

As an example, for a typical unit with nighttime outdoor sound level of 61 dBA, the AIF value for the bedrooms will be 28 assuming 3 components. If the window to floor ratio is 20%, then the window requirements in terms of glass thickness, mm (air space thickness, mm) glass thickness, mm are any of the following:

Double Glazed: 3mm (13mm) 3mm; 4mm (6mm) 4mm

The above window glazing construction is typical examples only. It is recommended that prior to the submission of the building plans for Building Permit that the detailed architectural drawings of the units requiring noise control measures, as referred to earlier, be examined by an Acoustical Engineer in order to advise the design consultant on the *specific* building components for noise control to suite the actual window construction details.

IMPORTANT NOTES TO THE WINDOW SUPPLIER/CONTRACTOR:

The Contractor should use the window glazing dimensions specified in this report. If the Contractor chooses to use, instead the minimum specified STC values herein in this report, then the Contractor MUST observe the following rules:

- (1) The **specific** windows MUST be tested by an “accredited” acoustic laboratory that is “NVLAP” accredited, and
- (2) The full STC test results shall be submitted to SS Wilson Associates for prior approval before installation.

Indoor Sound Levels

While the control of the indoor noise created by the air conditioning equipment is not the direct subject of this study, it is important that the selected and designed air conditioning systems achieve indoor sound levels that meet the OBC/ASHRAE criteria and be at least 5dB lower than the Ministry of the Environment, Conservation and Parks recommended indoor sound level criteria included in Section 3.0 of this study.

4.4 Important Notes for the Residential Builder Regarding Windows

The results in this report provide information on the calculated Acoustic Insulation Factors (AIF) for windows based on typical assumed window and room dimensions.

To assist the Builder in appreciating the fact of whether the results presented herein require typical commercially available residential type windows, or special type windows, the following table⁷ provides reasonably accurate information on whether such window(s) are standard industry window or not:

Acoustic Insulation Factor (AIF) in this report	35	34	33	32	31	30	29	28	27	26
Window to room floor area percentage NOT to be exceeded	10%	13%	16%	20%	25%	32%	40%	50%	63%	80%

If the above ratios are exceeded, several options are available to the builder including one or more of: reducing the size of the window, increasing the inter-pane air spacing, the use of thicker glazing, the use of “laminated” glazing (1 or 2 panes), etc.

⁷ Based on a typical commercially available glazing: 3mm inside pane, 16mm inter-pane air space & 3mm exterior pane.

WORKED EXAMPLE 1:

- AIF shown in this study: 31
- Actual room floor area: 250 sq.ft.
- You selected a window area of: 45 sq.ft
- Your window/floor ratio: (45 divided by 250, then times 100) =18%
- Your result is less than above table value 25%; i.e. standard glazing unit

WORKED EXAMPLE 2:

- AIF shown in this study: 34
- Actual room floor area: 200 sq.ft.
- You selected a window area of: 50 sq.ft
- Your window/floor ratio: (50 divided by 200, then times 100) =25%
- Your result is more than above table value 13%; i.e. Non-standard (special) glazing unit

TABLES

TABLE 1

SUMMARY OF MINIMUM REQUIRED NOISE CONTROL MEASURES

LOT(S)	SOUND BARRIER	CENTRAL AIR CONDITIONING	PROVISION FOR CENTRAL AIR CONDITIONING	WARNING CLAUSE
1	No	Yes	--	Yes
2 to 25	No	No	No	No
26 and 27	No	No	Yes	Yes
28	No	Yes	--	Yes

2021-02-02 0:00

SUMMARY- OUTDOOR SOUND LEVEL CALCULATIONS

File Number : WA20-037
 Project Name : West of Lot 23, Conc. 10
 Description : Town of Halton

OUTDOORS	
Table 2	

(Using NRC/MOE Procedures)

Any Heavy Rail Line ? No

Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	N	N	N	N	N	N	N	N	N	N
LOT NO.	1	28										
FACE/DIRECTION	SOUTH	SOUTH										
LOCATION	OLA	OLA										

Source 1: CONFEDERATION	Road Traffic		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS					
Leq Outdoors	53.00	53.00										
Partial angle of exposure, degrees	180	180										
Partial exposure adjust., dB												
Barrier Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	53.00	53.00										

Source 2:	Road Traffic		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS					
Leq Daytime												
Partial angle of exposure, degrees	180	180										
Partial exposure adjust., dB												
Barrier Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												

Source 3:	Road Traffic		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS					
Leq Daytime												
Partial angle of exposure, degrees	180	180										
Partial exposure adjust., dB												
Barrier Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												

Source 4:	Road Traffic		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS					
Leq Daytime												
Partial angle of exposure, degrees	180	180										
Partial exposure adjust., dB												
Barrier Adjustment, dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												

Sub-Tot. 4 Sources Leq, dBA	53.00	53.00										
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Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												

<i>Approx. Overall Combined Leq</i>	53	53										
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Overall Road and/or Rail and/or Stationary Sources, Leq (dBA)	53	53										
--	-----------	-----------	--	--	--	--	--	--	--	--	--	--

Aircraft Noise Only, NEF												
Additional Requirements	NO BARRIER REQUIRED	NO BARRIER REQUIRED										

	N6 Leq-AIF Master- 2019-05-16		SS WILSON ASSOCIATES			(Using NRC/MOE Procedures)						
2021-02-02 15:15	Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS											
File Number :	WA20-037		DAYTIME			NOTES						
Project Name :	West of Lot 23, Conc. 10		Table 2									
Description :	Town of Halton Hills											
Description :												
Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	Y	Y	Y	N	N	N	N	N	N	N
LOT NO.	1	25	26	27	28							
FACE/DIRECTION	West	North	North	North	West							
LOCATION	Building Façade	Building Façade	Building Façade	Building Façade	Building Façade							
ROOM CLASSIFICATION	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining							
Manual Adjust. to Criterion, MOE Transportation Sources												
Daytime Leq Indoor Criteria, dBA	45	45	45	45	45							
Aircraft Indoor Criteria, NEF	5	5	5	5	5							
Source 1: CONFEDERATION	Road Traffic		DAYTIME LEVELS			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime	56.00	43.00	45.00	48.00	56.00							
Partial angle of exposure, 1-180°	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	56.00	43.00	45.00	48.00	56.00							
Angular range of incidence Case(0,12,3)												
Adjusted AIF	18	5	7	10	18	-38	-38	-38	-38	-38	-38	-38
Source 2:	Road Traffic		DAYTIME LEVELS			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, 1-180°	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence Case(0,12,3)												
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Source 3:	Road Traffic		DAYTIME LEVELS			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, 1-180°	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence Case(0,12,3)												
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Source 4:	Road Traffic		DAYTIME LEVELS			DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, 1-180°	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence Case(0,12,3)												
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Sub-Tot. 4 Sources Leq, dBA	56.00	43.00	45.00	48.00	56.00							
Aircraft noise NEF/NEP												
Adjust. 1												
Adjust. 2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	56	43	45	48	56							
Assume 32% W/F ratio for Living/Dining rooms in the absence of specific data	32.0	32.0	32.0	32.0	32.0							
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3							
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3							
AIF of 4 Sources	18	5	7	10	18							
Aircraft AIF												
Combined AIF	18	6	8	10	18							
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable							
Adjustment, dB/AIF												
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Regular							
Other Adjustment (dB,AIF), Specify												
Final Adjusted AIF	18	6	8	10	18							
Minimum STC (Approx)	19	7	9	11	19							
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3							
Air Conditioning Required	No Indoor Air Quality Concerns	Provision for A/C	Provision for A/C	Provision for A/C	Air Conditioning Required							

		N6 Leq-AIF Master- 2019-05-16					SS WILSON ASSOCIATES		(Using NRC/MOE Procedures)			
2021-02-02 15:15		Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS										
File Number :		WA20-037					NIGHT TIME					
Project Name :		West of Lot 23, Conc. 10					Table 3		NOTES			
Description :		Town of Halton Hills										
Description :												
Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	Y	Y	Y	N	N	N	N	N	N	N
LOT NO.	1	25	26	27	28							
FACE/DIRECTION	West	North	North	North	West							
	Building Façade	Building Façade	Building Façade	Building Façade	Building Façade							
ROOM CLASSIFICATION	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom							
Manual Adjust. to Criterion, MOE												
Leq Indoor Criteria, dBA	40	40	40	40	40							
Aircraft Indoor Criteria, NEF												
Source 1: CONFEDERATION	Road Traffic		NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS			
Leq Night Time	61.00	49.00	51.00	50.00	61.00							
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	61.00	49.00	51.00	50.00	61.00							
Angular range of incidence (0,12,3)												
Adjusted AIF	28	16	18	17	28	37	37	37	37	37	37	37
Source 2:	Road Traffic		NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS			
Leq Night Time												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,12,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Source 3:	Road Traffic		NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS			
Leq Night Time												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,12,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Source 4:	Road Traffic		NIGHT TIME LEVELS			NIGHT TIME LEVELS			NIGHT TIME LEVELS			
Leq Night Time												
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,12,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Sub-Tot. 4 Sources Leq, dBA	61.00	49.00	51.00	50.00	61.00							
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	61	49	51	50	61							
Assume 20% W/F ratio for Living/Dining rooms in the absence of specific data	20.0	20.0	20.0	20.0	20.0							
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3							
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3							
AIF of 4 Sources	28	16	18	17	28							
Aircraft AIF												
Combined AIF	28	16	18	17	28							
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable							
Adjustment, dB/AIF												
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Regular							
Other Adjustment												
Final Adjusted AIF	28	16	18	17	28							
Minimum STC (Approx)	27	15	17	16	27							
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3							
NOTES	Air Conditioning Required	No Indoor Requirements	Provision for A/C	Provision for A/C	Air Conditioning Required							

FIGURES



**FIGURE 1
KEY PLAN**

PROJECT NORTH



**FIGURE 2
DRAFT PLAN OF SUBDIVISION**

PROJECT NORTH

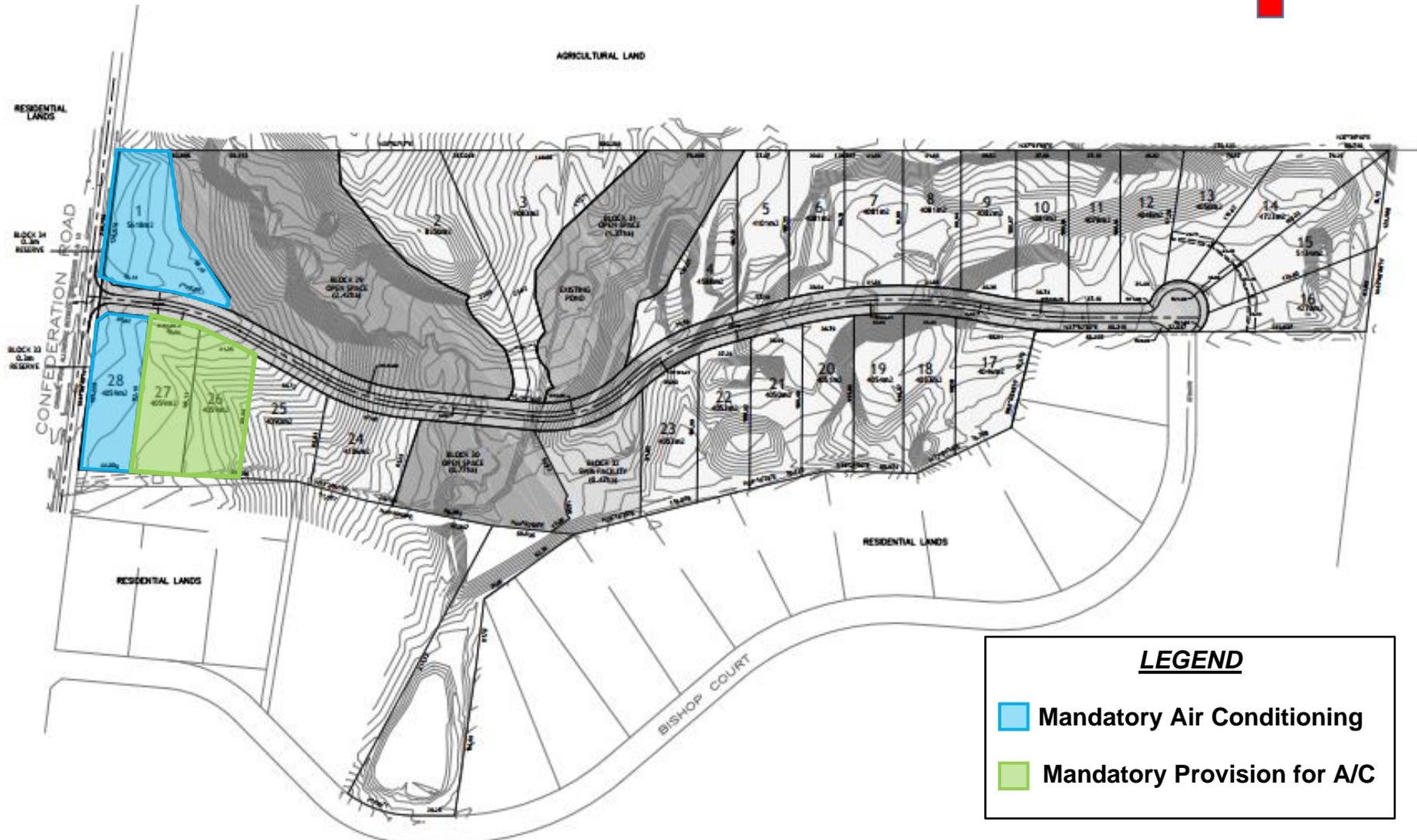


FIGURE 3
SUMMARY OF MINIMUM NOISE REQUIREMENTS

APPENDIX A
ROAD TRAFFIC DATA

Hi Amira,

Identified below is an updated table. We have reviewed the traffic information and factored in the existing counts. Please use this information as current (2021).

ROW Width	Confederation Street	20m
	Wildwood Road	26m
# of Lanes	Both	2
Roadway Gradient	Confederation Street	N/A
	Wildwood Road	N/A
AADT	Confederation St - SB	2076
	Confederation St - NB	6747 (Estimate)
	Main Street - WB	2200 (Estimate)
	Wildwood Road - EB	4322
Medium Truck %	Total	2.5%
Heavy Truck %	Total	0.1%
Posted Speed Limit	Confederation Street	50km/h
Posted Speed Limit	Wildwood Road	40km/h
% Day Traffic Split	Total	742(34%)
% Night Traffic Split	Total	1419(66%)
Directional Split	NBL	486 (34%)
Directional Split	SBL	49 (3%)
Directional Split	EBL	817 (57%)
Directional Split	WBL	83 (6%)

Please let me know if you have any questions.

Matt Roj
Traffic Coordinator
Town of Halton Hills
Ph:905-873-2601 ext. 2215
Toll Free: 1-877-712-2205
Fax: 905-873-3036
matthewr@haltonhills.ca

APPENDIX B

SAMPLE SOUND LEVEL CALCULATIONS

Filename: lotlola.te Time Period: Day/Night 16/8 hours
Description: Lot 1-Sound Level at Outdoor Living Area

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

```
-----
Car traffic volume   : 4186/8127   veh/TimePeriod  *
Medium truck volume : 107/209    veh/TimePeriod  *
Heavy truck volume  : 4/8         veh/TimePeriod  *
Posted speed limit  : 50 km/h
Road gradient       : 2 %
Road pavement      : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8947
Percentage of Annual Growth         : 2.50
Number of Years of Growth           : 14.00
Medium Truck % of Total Volume      : 2.50
Heavy Truck % of Total Volume       : 0.10
Day (16 hrs) % of Total Volume      : 34.00
```

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

```
-----
Angle1  Angle2      : -30.00 deg  90.00 deg
Wood depth      : 0 (No woods.)
No of house rows : 0 / 0
Surface         : 2 (Reflective ground surface)
Receiver source distance : 30.00 / 30.00 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.Confederatio ! 0.55 ! 53.12 ! 53.12
-----+-----+-----+-----
Total 53.12 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Confederatio ! 0.56 ! 59.03 ! 59.03
-----+-----+-----+-----
```

Total 59.03 dBA
TOTAL Leq FROM ALL SOURCES (DAY): 53.12
(NIGHT): 59.03

DRAFT

Filename: lot1dn.te Time Period: Day/Night 16/8 hours
Description: Lot 1-Sound Levels at Building Facade

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

```
-----
Car traffic volume : 4186/8127 veh/TimePeriod *
Medium truck volume : 107/209 veh/TimePeriod *
Heavy truck volume : 4/8 veh/TimePeriod *
Posted speed limit : 50 km/h
Road gradient : 2 %
Road pavement : 1 (Typical asphalt or concrete)
```

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

```
24 hr Traffic Volume (AADT or SADT): 8947
Percentage of Annual Growth : 2.50
Number of Years of Growth : 14.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 0.10
Day (16 hrs) % of Total Volume : 34.00
```

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

```
-----
Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 2 (Reflective ground surface)
Receiver source distance : 25.00 / 30.00 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.Confederatio	! 0.55	! 55.67	! 55.67
Total			55.67 dBA

Result summary (night)

	! source	! Road	! Total
	! height	! Leq	! Leq
	! (m)	! (dBA)	! (dBA)
1.Confederatio	! 0.56	! 60.79	! 60.79
Total			60.79 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 55.67
 (NIGHT): 60.79