

REPORT NO. WA15-033

**NOISE CONTROL FEASIBILITY STUDY
PROPOSED RESIDENTIAL SUBDIVISION
MAYFIELD WEST PHASE 2 (STAGE 2)
12259 CHINGUACOUSY ROAD
TOWN OF CALEDON**

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1.0 INTRODUCTION

- 1.1** The services of SS Wilson Associates (SSWA) were retained by Mattamy (Mayfield West) Limited to prepare a Noise Control Feasibility Study for the proposed residential development referred to as 'Mayfield West Phase 2, Stage 2', located at 12259 Chinguacousy Road in the Town of Caledon.

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 a Greenbelt Plan area
 - to the south by a future residential development, including an elementary school and neighbourhood park.
 - to the east by a future residential development
 - to the west by Chinguacousy Road

The above directions are in reference to project north, as shown in Figure 1.

- 1.3** Major features of the development are defined by the Concept Plan drawing (illustrated in Figure 2) prepared by Korsiak Urban Planning, drawing dated December 3, 2020.

- 1.4** Major surface transportation noise sources (current and future) of concern to the development are:

1. Chinguacousy Road
2. Tim Manley Avenue (Future Internal Road)

It should be noted that due to the extensive distance setbacks to Highway 410 (approx. 1500 meters to the closest dwelling), the future GTA Highway Corridor and the associated future interchange (approx. 1200 meters to the closest dwelling), traffic noise from these sources is not of concern. As such, as per the MECF Guidelines, these sources have not been included in the assessment.

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

- 1.5** The proposed development is located outside the 25 NEF/NEP contour lines prepared by Transport Canada; therefore, aircraft noise from Lester B Pearson Airport is not considered a problem.

It should be noted that the proposed development is in proximity to the Brampton Flight Centre, however due to the significant distance setback of over 4 km, from an acoustic perspective, this source is not of concern and will not be considered in this report.

- 1.6** The proposed development was the subject of an overall Noise Control Feasibility Study Report (for both Stages 1 and 2) previously prepared by SSWA, Report No. WA15-033 dated April 22nd, 2016. In addition, a stand-alone Noise Control Feasibility Study for Stage 1 was completed on December 14th, 2018.
- 1.7** The analysis in this report adheres to the MECP's Noise Guideline, NPC-300, The Region of Peel's Noise Guidelines, and the Town of Caledon's Noise Guidelines.
- 1.8** 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 some of the residential dwellings will exceed the recommended objective sound level. For these dwellings, outdoor noise control measures are required along with relevant warning clauses. All other dwellings on the development will have acceptable outdoor sound levels in their OLAs and, therefore, no outdoor noise control measures need be considered.
2. The unattenuated daytime sound level at the Common Outdoor Living Area (Common OLA) for the development, referred to as 'Neighbourhood Park' on the drawings, will have acceptable outdoor sound levels, therefore, no outdoor noise control measures need be considered for this area.
3. As advised by the Proponent, the following assumptions were made:
 - Blocks 348 to 353 will be back-to-back towns which have the amenity spaces above the garages which will be <4m in depth.
 - Blocks 354 to 369 will be rear-lane towns which have the amenity spaces above the garages at the rear which will be <4m in depth.

Based on the MECP guidelines, the terraces at the above-noted locations are not considered as OLAs due to fact that the depth of the balconies/terraces are less than 4m. Therefore, no physical mitigation measures are required and a warning clause registered in the Development Agreement(s) will suffice.

4. 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.
5. 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 outdoor and indoor areas of the proposed development to meet the stated criteria.

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).

2.2 **RECOMMENDATIONS**

For the purposes of this study, unit numbers have been assigned to the Blocks as illustrated in Figure 2.

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

1. **Outdoor Noise Control Measures**

- **Lots: 198 and 214**
 - a. Acoustical barriers should be constructed to shield the Outdoor Living Areas (OLAs) for the above areas with the following details:
 - (i) Barriers should be constructed along the alignments shown schematically in Figure 3.
 - (ii) The required barrier heights as shown in Figure 3 could be as high as 2.4m.
 - (iii) Barriers may consist of an earth berm, a fence or a combination thereof. The fence component to be constructed of a durable material having approximately 20 kg/m² (≅ 4 lb/ft²) of surface density and be in a continuous line without openings or gaps.
 - b. Since final grading plans are not available at this stage, the barrier heights are based on the assumption that the ground elevations at the road, the base of the barriers and the receiver are all equal. The ground elevations are all assumed to be 0m in this case until such time as the grading plans become available.

Accordingly, a Detailed Noise Control Study should be undertaken prior to final approval of the specified locations requiring a barrier to define specific barrier alignments and heights based on the final grading plans.

It is also the responsibility of the developer/builder responsible for final design and construction of the sound barriers to ensure that the correct barrier elevation details are secured from the Acoustical Engineer prior to planning and construction of the specified barriers.

2. **Air Conditioning**

- **Lots: 198 and 214**
- **Blocks: 354 (Unit 7), 361 (Unit 1), 362 (Unit 7), and 369 (Unit 1)**

The above noted properties should be equipped with central air conditioning systems with their condensing units to be located in noise insensitive locations.

The location and installation of the outdoor air conditioning device should comply with sound level limits of provincial policies and with any other criteria 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:

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria”.

“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 provincial policies”.

3. Provision for Air Conditioning

- **Lots: 199 to 213, 215 to 228, 346 and 347**
- **Blocks: 348 to 353 (All Units Inclusive), 354 (Units 1 to 6), 355 to 360 (All Units Inclusive), 361 (Units 2 to 6), 362 (Units 1 to 6), 363 to 368 (All Units Inclusive), and 369 (Units 2 to 7)**

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, 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).

If the purchaser/occupant does not take the central air conditioning option in favour of forced air, 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 applicable guidelines.

A summary of the indoor noise control requirements is illustrated in Figure 4.

4. Warning Clause²

- **Lots: 198 and 214**
- **Blocks: 354 (Unit 7), 361 (Unit 1), 362 (Unit 7), and 369 (Unit 1)**

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria”.

“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 provincial policies”.

- **Lots: 199 to 213, 215 to 228, 346 and 347**
- **Blocks: 348 to 353 (All Units Inclusive), 354 (Units 1 to 6), 361 (Units 2 to 6), 362 (Units 1 to 6), and 369 (Units 2 to 7)**

The following warning clause should be registered in all Development Agreement(s) and Offers of Sale and Purchase or Lease of the above 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.”

5. Building Acoustic Insulation

- **Lots: 198 and 214**
- **Blocks: 354 (Unit 7), 361 (Unit 1), 362 (Unit 7), and 369 (Unit 1)**

²Reference should be made to Bulletin No. 91003, Environmental Warnings/Restrictions, Ontario Ministry of Consumer and Commercial Relations.

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.

3.0 SOUND LEVEL CRITERIA

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

**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.

Notwithstanding the above, the Region of Peel requires that for those dwellings with a nighttime building façade sound level of 60dBA, air conditioning be installed, as opposed to the MECP's requirement for provision for air conditioning for these dwellings.

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 & <=55	-	Yes	Yes "Type C" 'may'	
		>55 & <=59			Yes "Type C" 'will'	
	>65	>59	Yes	-	Yes "Type D"	Yes
RAIL	<=55	<=50	-	-	-	-
	>55 & <=60	>50 & <=55	-	Yes	Yes "Type C" 'may'	-
	>60 & <=65	>55 & <=59	-	Yes	Yes "Type C" 'will'	Yes
	>65	>59	Yes	-	Yes "Type D"	Yes

4.0 ANALYSIS

4.1 TRANSPORTATION SOURCES OF NOISE

The relevant road and traffic data were obtained from the Traffic Consultants, LEA Consulting Ltd., and are summarized below:

- Chinguacousy Road

Current No. of Lanes	2
Future No. of Lanes	2
Posted Speed Limit	80km/hr.
Future Posted Speed Limit ³	80 km/hr.
Adjusted Speed Limit as per Caledon's Guidelines	90 km/hr
Ultimate AADT (Year 2031)	11,250 vpd
Total Truck Percentage	5%
- Medium Truck Split	2.5%
- Heavy Truck Split	2.5%
Day (16 hrs.)/Night (8 hrs.) Split (assumed)	90%/10%
Directional Traffic Split (assumed)	50%/50%
Road Gradient	2%
Current R.O.W.	15m
Future R.O.W.	35m

- Tim Manley Avenue

Future No. of Lanes	3
Future Posted Speed Limit ⁶	50 km/hr.
Adjusted Speed Limit as per Caledon's Guidelines	60 km/hr.
Ultimate AADT (Year 2031)	7,180 vpd
Total Truck Percentage	5%
- Medium Truck Split	2.5%
- Heavy Truck Split	2.5%
Day (16 hrs.)/Night (8 hrs.) Split (assumed)	50%/50%
Directional Traffic Split (assumed)	50%/50%
Road Gradient	0%
Future R.O.W.	29m

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

³As per the Town of Caledon Noise Guidelines, the transportation source speeds used in the engineering noise prediction calculations have been increased by 10 km/h from the posted speed limit.

As updated traffic data for the future Tim Manley Avenue (formerly referred to as 'Street A') is unavailable, the traffic data assumed for this road as detailed above is based on traffic data received from LEA Consulting Ltd. received in 2016.

4.2 OUTDOOR NOISE ENVIRONMENT

Sound level predictions were carried out based on MECP's ORNAMENT sound level prediction modeling procedures⁴ (Ontario Road Noise Analysis Method for Environment and Transportation, Technical Document).

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

Based on the calculations, it is concluded that for the Common OLA (i.e. Neighbourhood Park), the unattenuated daytime sound levels will not exceed the objective level of L_{Aeq} 55dBA, therefore outdoor noise control measures will not be required for this area

In consideration of the calculations, it is concluded that for Lots 198 and 214, the unattenuated daytime sound levels in the designated OLAs will exceed 60 dBA, the maximum criteria levels allowed. Therefore, outdoor noise control measures are required for these properties.

As advised by the Proponent, for Blocks 348 to 369, the outdoor amenity areas will be located above the garages, all with depths less than 4m. Therefore, based on the MECP guidelines, no physical mitigation measures are required and a warning clause registered in the Development Agreement(s) will suffice.

As advised by the Proponent, Blocks 370 and 371 will be provided to Peel Housing and Habitat for Humanity which will be a part of a separate Site Plan Application. As such, assessment for these blocks was not included in this study. Furthermore, the assessment for the proposed dwellings within Stage 2 did not assume any shielding from the future buildings on Blocks 370 and 371.

In consideration of the calculations, it is concluded that for all other receptor locations, 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 and a warning clause registered in the Development Agreement(s) will suffice.

The conventional approach by which excess noise in the rear yard OLAs may be

⁴ 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, $10 \times \log 10=10$).

mitigated is through construction of acoustical barriers. Barrier height calculations for the receptors of concern are included in Appendix B. Barrier alignments are as shown in Figure 3.

As per the Town of Caledon, when berms and/or barriers are being installed on the site, the following warning clauses included in all offers of purchase Agreement(s) of sale and purchase or lease and in the title deed or lease of each of the above dwellings:

“Purchasers are advised that despite the inclusion of noise control features in this development area and within the building units, noise levels from increasing road traffic will continue to be of concern, occasionally interfering with some activities of the dwelling occupants as the noise level exceeds the Municipality’s and the Ministry of the Environment’s noise criteria. That the acoustical berm and/or barrier as installed, shall be maintained, repaired or replaced by the owner. Any maintenance, repair or replacement shall be with the same material, or to the same standards, and having the same colour and appearance of the original”.

4.3 INDOOR NOISE ENVIRONMENT

The criteria for indoor L_{Aeq} sound levels are based on projected L_{Aeq} levels at the outside face of the dwellings with appropriate assumptions for the differences between the outdoor and indoor sound levels. If the outside L_{Aeq} levels do not exceed the recommended objective sound levels, then the indoor L_{Aeq} levels will not be exceeded, assuming standard building construction and operable windows.

Overall daytime sound levels at the building facades are shown in Table 3 and the overall nighttime sound levels at the building facades are shown in Table 4.

In consideration of the estimated sound levels and by comparison to the acceptable indoor sound level criteria (Section 3) the following is concluded:

- The sound levels at the outside walls of the following receptors (within any habitable room on any floor) is predicted to exceed $L_{Aeq(day)}$ 65 and/or $L_{Aeq(night)}$ 59 dBA respectively:
 - **Lots: 198 and 214**
 - **Blocks: 354 (Unit 7), 361 (Unit 1), 362 (Unit 7), and 369 (Unit 1)**

Therefore, central air conditioning is required.

- The daytime/nighttime noise environment at the outside walls of the following receptors (within any habitable room on any floor) is predicted to be in the range of $L_{Aeq day}$ 56-65 dBA and/or $L_{Aeq night}$ 51-59 dBA:

- **Lots: 199 to 213, 215 to 228, 346 and 347**
- **Blocks: 348 to 353 (All Units Inclusive), 354 (Units 1 to 6), 355 to 360 (All Units Inclusive), 361 (Units 2 to 6), 362 (Units 1 to 6), 363 to 368 (All Units Inclusive), and 369 (Units 2 to 7)**

Therefore, forced-air heating system with provision for central air conditioning is therefore required for the above properties.

- All other blocks/units will have a sound level equal to or less than $L_{Aeq(day)}$ 55 dBA and/or $L_{Aeq(night)}$ 50 dBA and therefore no noise control measures need be considered.

Typical Acoustic Insulation Factors (A.I.F.) are summarized in Tables 3 and 4.

A summary of the minimum indoor noise control requirements is illustrated in Figure 4.

4.4 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 67 dBA, the AIF value for the Living Room will be 29 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 60 dBA, the AIF value for the bedrooms will be 27 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.

4.5 CONTROL OF AIR CONDITIONING UNITS NOISE

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 (MECP) recommended indoor sound level criteria included in Section 3.0 of this study.

4.6 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 table⁵ 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

⁵ Based on a typical commercially available glazing: 3mm inside pane, 16mm inter-pane air space & 3mm exterior pane.

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.

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: $(45 \text{ divided by } 250, \text{ then times } 100) = 18\%$
- 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: $(50 \text{ divided by } 200, \text{ then times } 100) = 25\%$
- 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

RECEPTOR LOCATION	SOUND BARRIER	CENTRAL AIR CONDITIONING	PROVISION FOR CENTRAL AIR CONDITIONING	WARNING CLAUSE
LOT(S)				
198	Yes	Yes	--	Yes
199 to 213	No	No	Yes	Yes
214	Yes	Yes	--	Yes
215 to 228	No	No	Yes	Yes
346 and 347	No	No	Yes	Yes
All Other Lots	No	No	No	No
BLOCK(S)				
348 to 353	No	No	Yes	Yes
354 (Units 1 to 6)	No	No	Yes	Yes
354 (Unit 7)	No	Yes	--	Yes
361 (Unit 1)	No	Yes	--	Yes
361 (Units 2 to 6)	No	No	Yes	Yes
362 (Units 1 to 6)	No	No	Yes	Yes
362 (Unit 7)	No	Yes	--	Yes
369 (Unit 1)	No	Yes	--	Yes
369 (Units 2 to 7)	No	No	Yes	Yes
All Other Blocks	No	No	No	No

File Number : WA15-033
Project Name : 12259 Chinguacousy Rd
Description : Town Caledon

OUTDOORS
Table 2

Any Heavy Rail Line ?	Yes
Appropriate adjustment will be applied to the Acoustic Insulation Factor to account for their	

Description : Stage 2

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
RECEPTOR	PARK	Lot 1	Lot 198	Lot 199	Lot 347							
FACE/ DIRECTION	Centre	North	South	South	South							
LOCATION	Common Outdoor Living Area	Outdoor Living Area	Outdoor Living Area	Outdoor Living Area	Outdoor Living Area							

Source 1: Chinguacousy	Road Traffic	OUTDOOR DAYTIME LEVELS				OUTDOOR DAYTIME LEVELS		OUTDOOR DAYTIME LEVELS				
Leq Outdoors	51.00	53.00	64.00	53.00	55.00							
Partial angle of exposure, degrees	180	180	180	180	180							
Partial exposure adjust., dB												
Barrier Adjustment, dB			-9.00									
Additional Adjustment, dB												
Sub-Total Leq, dBA	51.00	53.00	55.00	53.00	55.00							

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

Sub-Tot. 4 Sources Leq, dBA	51.00	53.00	55.00	53.00	55.00							
------------------------------------	--------------	--------------	--------------	--------------	--------------	--	--	--	--	--	--	--

Aircraft noise NEF/NEP												
Adjust. 1												
Adjust. 2												
Adjusted NEF/NEP												

Approx. Overall Combined Leq	51	53	55	53	55							
------------------------------	----	----	----	----	----	--	--	--	--	--	--	--

Overall Road and/or Rail and/or Stationary Sources, Leq (dBA)	51	53	55	53	55							
--	-----------	-----------	-----------	-----------	-----------	--	--	--	--	--	--	--

Aircraft Noise Only, NEF												
NOTES	No Barrier Required	No Barrier Required	2.4m High Sound Barrier	No Barrier Req'd (Attenuation from 100m)	No Barrier Required							

N6 Leq-AIF Master-January 2007
 2020-12-07 13:15
 File Number :
 Project Name :
 Description :

Proceed

SS WILSON ASSOCIATES

Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

DAYTIME
Table 3

(Using NRC/MOE Procedures)

Description : Stage 2

Caution: , the AIF Reported for heavy Rail Noise is the Higher of day and night

Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
RECEPTOR	Lot 1	Lot 193	Lot 198	Lot 199	Lot 200	Lot 201	Lot 345	Lot 346	Lot 347	B353 (North Unit)	B362 (Unit 7)	B368 (Unit 1)
FACE/DIRECTION	West	West	West	North	North	North	North	North	West	West	West	North
LOCATION	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE
ROOM CLASSIFICATION	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining	Living /Dining
Adjustm. to Criterion, dBA												
MOE Transportation Sources												
Daytime Leq Indoor Criteria, dBA	45	45	45	45	45	45	45	45	45	45	45	45
Aircraft Indoor Criteria, NEF	5	5	5	5	5	5	5	5	5	5	5	5
Source 1: Chinguacousy	Road Traffic	DAYTIME LEVELS				DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime	55.00	54.00	67.00	60.00	56.00	55.00	55.00	56.00	56.00	63.00	66.00	55.00
Partial angle of exposure, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	55.00	54.00	67.00	60.00	56.00	55.00	55.00	56.00	56.00	63.00	66.00	55.00
Angular range of incidence (0,1,2,3)												
Adjusted AIF	17	16	29	22	18	17	17	18	18	25	28	17
Source 2:	Rail Traffic	DAYTIME LEVELS				DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
Source 3:	Road Traffic	DAYTIME LEVELS				DAYTIME LEVELS			DAYTIME LEVELS			
Leq Daytime												
Partial angle of exposure, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
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, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38	-38
Sub-Tot. 4 Sources Leq, dBA	55.00	54.00	67.00	60.00	56.00	55.00	55.00	56.00	56.00	63.00	66.00	55.00
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	55	54	67	60	56	55	55	56	56	63	66	55
Assumed Window/ Floor Area %	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3	3	3	3	3	3	3	3
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3	3	3	3	3	3	3	3
AIF of 4 Sources	17	16	29	22	18	17	17	18	18	25	28	17
Aircraft AIF												
Combined AIF	17	16	29	22	18	17	17	18	18	25	28	17
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Other Adjustment												
Final Adjusted AIF	17	16	29	22	18	17	17	18	18	25	28	17
Minimum STC (Approx)	18	17	30	23	19	18	18	19	19	26	29	18
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(13)3 4(6)4	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3
NOTES	No Indoor Requirement	No Indoor Requirement	Air Conditioning Required	Provision for A/C	Provision for A/C	No Indoor Requirement	No Indoor Requirement	Provision for A/C	Provision for A/C	Provision for A/C	Air Conditioning Required	No Indoor Requirement

SS WILSON ASSOCIATES

SUMMARY TABLE OF Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

WA15-033

12259 Chinguacousy Rd

Town of Caledon

Stage 2

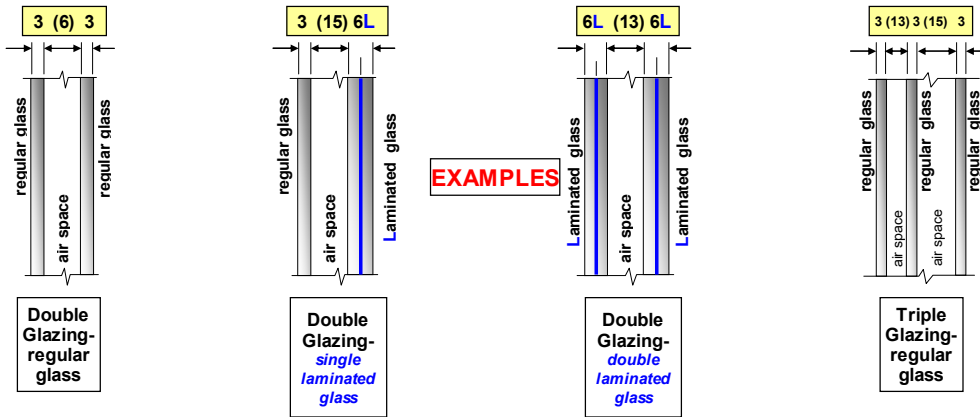
DAYTIME

Table 3

- Windows must be well-fitted weatherstripped units. - The interpane spacing shown in the tables are the minimum acceptable.
 - Larger spacing for a given glazing thickness normally improves the performance.

RECEPTOR	FACE/ DIRECTION	ROOM CLASSIFICATION	LOCATION	Openable or Fixed Window	Regular Strength or Laminated Glass	Combined AIF	Approx. Overall Combined Leq	Double Glazing Alternatives , mm	Triple Glazing Alternatives , mm	Minimum STC (Approx)
Lot 1	West	Living /Dining	BUILDING FA	Openable	Regular	17	55	3(6)3		18
Lot 193	West	Living /Dining	BUILDING FA	Openable	Regular	16	54	3(6)3		17
Lot 198	West	Living /Dining	BUILDING FA	Openable	Regular	29	67	3(13)3 4(6)4		30
Lot 199	North	Living /Dining	BUILDING FA	Openable	Regular	22	60	3(6)3		23
Lot 200	North	Living /Dining	BUILDING FA	Openable	Regular	18	56	3(6)3		19
Lot 201	North	Living /Dining	BUILDING FA	Openable	Regular	17	55	3(6)3		18
Lot 345	North	Living /Dining	BUILDING FA	Openable	Regular	17	55	3(6)3		18
Lot 346	North	Living /Dining	BUILDING FA	Openable	Regular	18	56	3(6)3		19
Lot 347	West	Living /Dining	BUILDING FA	Openable	Regular	18	56	3(6)3		19
B353 (North Unit)	West	Living /Dining	BUILDING FA	Openable	Regular	25	63	3(6)3		26
B362 (Unit 7)	West	Living /Dining	BUILDING FA	Openable	Regular	28	66	3(6)3		29
B368 (Unit J)	North	Living /Dining	BUILDING FA	Openable	Regular	17	55	3(6)3		18

ABBREVIATIONS SPECIFIC TO THIS PROJECT : FF(Front Face), RF(Rear Face), RS(Right Side face), LS(Left Side face)



SS WILSON ASSOCIATES

File Number : WA15-033
Project Name : 12259 Chinguacousy Rd
Description : Town of Caledon

NIGHT TIME
Table 4

Description : Stage 2												
Record Number	1	2	3	4	5	6	7	8	9	10	11	12
Consider Record	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
TOWNHOUSE/ UNIT NO.	Lot 1	Lot 193	Lot 198	Lot 199	Lot 200	Lot 201	Lot 345	Lot 346	Lot 347	B353 (North Unit)	B362 (Unit 7)	B368 (Unit 1)
FACE/ DIRECTION	West	West	West	North	North	North	North	North	West	West	West	North
LOCATION	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE	BUILDING FACADE
ROOM CLASSIFICATION	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom	Bedroom
Adjstm. to Criterion, dBA												
MOE Transportation Sources Night Leq Indoor Criteria, dBA	40	40	40	40	40	40	40	40	40	40	40	40
Aircraft Indoor Criteria, NEF												
Source 1: Chinguacousy	Road Traffic		NIGHT TIME LEVELS				NIGHT TIME LEVELS			NIGHT TIME LEVELS		
Leq Night Time	49.00	48.00	60.00	54.00	50.00	49.00	48.00	49.00	50.00	57.00	60.00	49.00
Partial angle of exposure, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA	49.00	48.00	60.00	54.00	50.00	49.00	48.00	49.00	50.00	57.00	60.00	49.00
Angular range of incidence (0,1,2,3)												
Adjusted AIF	16	15	27	21	17	16	15	16	17	24	27	16
Source 2:	Rail Traffic		NIGHT TIME LEVELS				NIGHT TIME LEVELS			NIGHT TIME LEVELS		
Leq Night Time												
Partial angle of exposure, degrees	180	180	180	180	180	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
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	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
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	180	180	180	180	180	180	180
Partial exposure adjust., dB												
Additional Adjustment, dB												
Sub-Total Leq, dBA												
Angular range of incidence (0,1,2,3)												
Adjusted AIF	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
Sub-Tot. 4 Sources Leq, dBA	49.00	48.00	60.00	54.00	50.00	49.00	48.00	49.00	50.00	57.00	60.00	49.00
Aircraft noise NEF/NEP												
Adjust.1												
Adjust.2												
Adjusted NEF/NEP												
Approx. Overall Combined Leq	49	48	60	54	50	49	48	49	50	57	60	49
Assumed Window/ Floor Area %	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Assumed Total # of Components (Road, Rail, and Other Sources)	3	3	3	3	3	3	3	3	3	3	3	3
Assumed Total # of Components Aircraft ONLY	3	3	3	3	3	3	3	3	3	3	3	3
AIF of 4 Sources	16	15	27	21	17	16	15	16	17	24	27	16
Aircraft AIF												
Combined AIF	16	15	27	21	17	16	15	16	17	24	27	16
Openable or Fixed windows ?	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable	Openable
Regular or Laminated Glass	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular	Regular
Other Adjustment												
Final Adjusted AIF	16	15	27	21	17	16	15	16	17	24	27	16
Minimum STC (Approx)	15	14	26	20	16	15	14	15	16	23	26	15
Typical Minimum Double Glazing Alternatives	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3	3(6)3
NOTES	No Indoor Requirement	No Indoor Requirement	Air Conditioning Required	Provision for A/C	Provision for A/C	No Indoor Requirement	No Indoor Requirement	Provision for A/C	Provision for A/C	Provision for A/C	Air Conditioning Required	No Indoor Requirement

Caution: , the AIF Reported for heavy Rail Noise is the Higher of day and night

SUMMARY TABLE OF Leq- AIF CALCULATIONS AND TYPICAL WINDOW GLAZING REQUIREMENTS

WA15-033

12259 Chinguacousy Rd

Town of Caledon

Stage 2

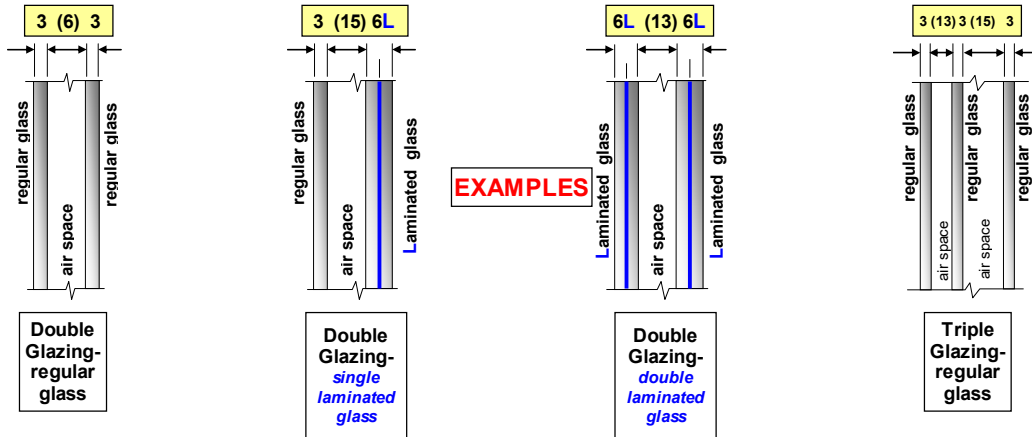
NIGHT TIME

Table 4

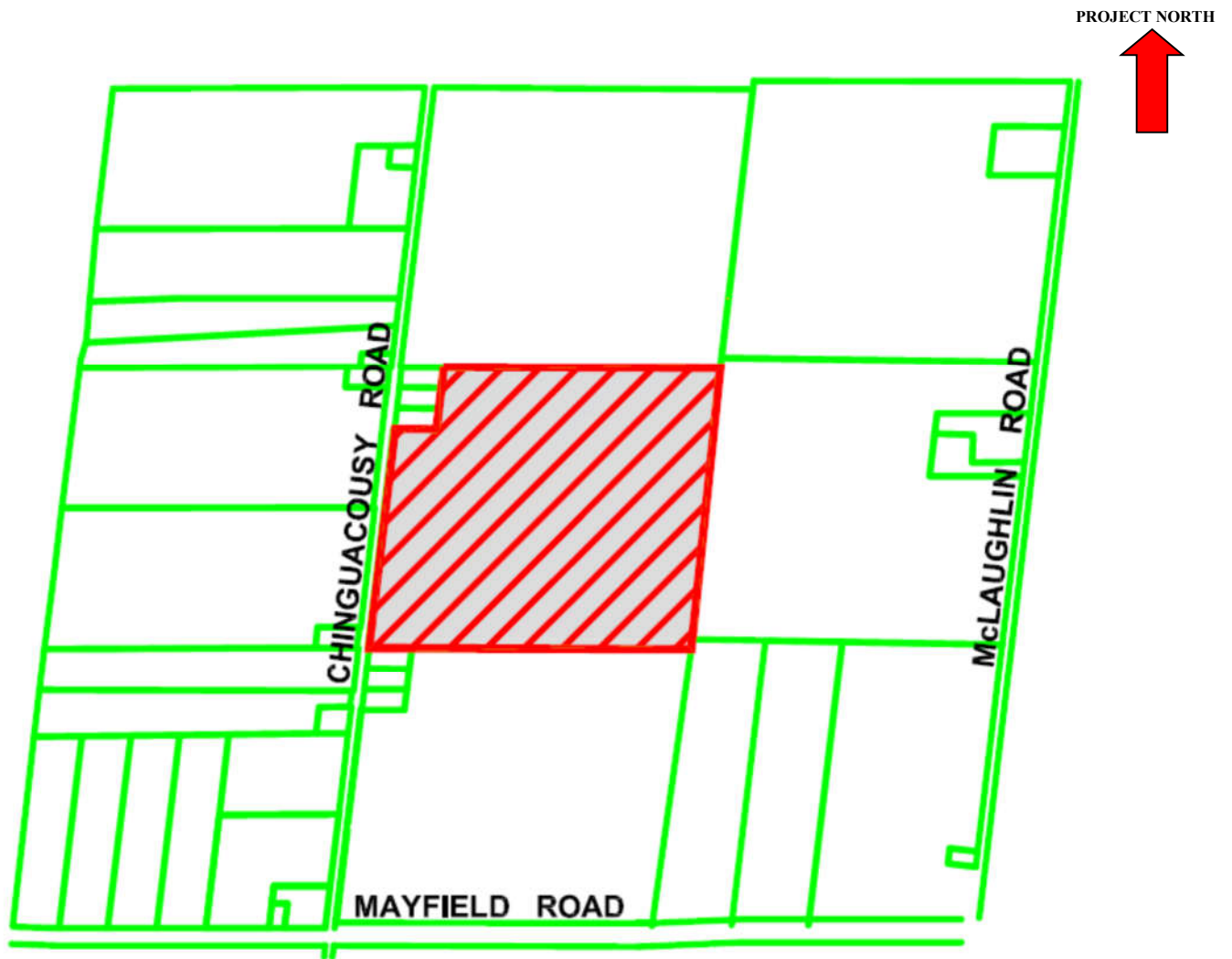
- Windows must be well-fitted weatherstripped units. - The interpane spacing shown in the tables are the minimum acceptable.
 - Larger spacing for a given glazing thickness normally improves the performance.

TOWNHOUSE/UNIT NO.	FACE/ DIRECTION	ROOM CLASSIFICATION	LOCATION	Openable or Fixed Window	Regular Strength or Laminated Glass	Combined AIF	Approx. Overall Combined Leq	Double Glazing Alternatives , mm	Triple Glazing Alternatives , mm	Minimum STC (Approx)
Lot 1	West	Bedroom	BUILDING FA	Openable	Regular	16	49	3(6)3		15
Lot 193	West	Bedroom	BUILDING FA	Openable	Regular	15	48	3(6)3		14
Lot 198	West	Bedroom	BUILDING FA	Openable	Regular	27	60	3(6)3		26
Lot 199	North	Bedroom	BUILDING FA	Openable	Regular	21	54	3(6)3		20
Lot 200	North	Bedroom	BUILDING FA	Openable	Regular	17	50	3(6)3		16
Lot 201	North	Bedroom	BUILDING FA	Openable	Regular	16	49	3(6)3		15
Lot 345	North	Bedroom	BUILDING FA	Openable	Regular	15	48	3(6)3		14
Lot 346	North	Bedroom	BUILDING FA	Openable	Regular	16	49	3(6)3		15
Lot 347	West	Bedroom	BUILDING FA	Openable	Regular	17	50	3(6)3		16
B353 (North Unit)	West	Bedroom	BUILDING FA	Openable	Regular	24	57	3(6)3		23
B362 (Unit 7)	West	Bedroom	BUILDING FA	Openable	Regular	27	60	3(6)3		26
B368 (Unit 1)	North	Bedroom	BUILDING FA	Openable	Regular	16	49	3(6)3		15

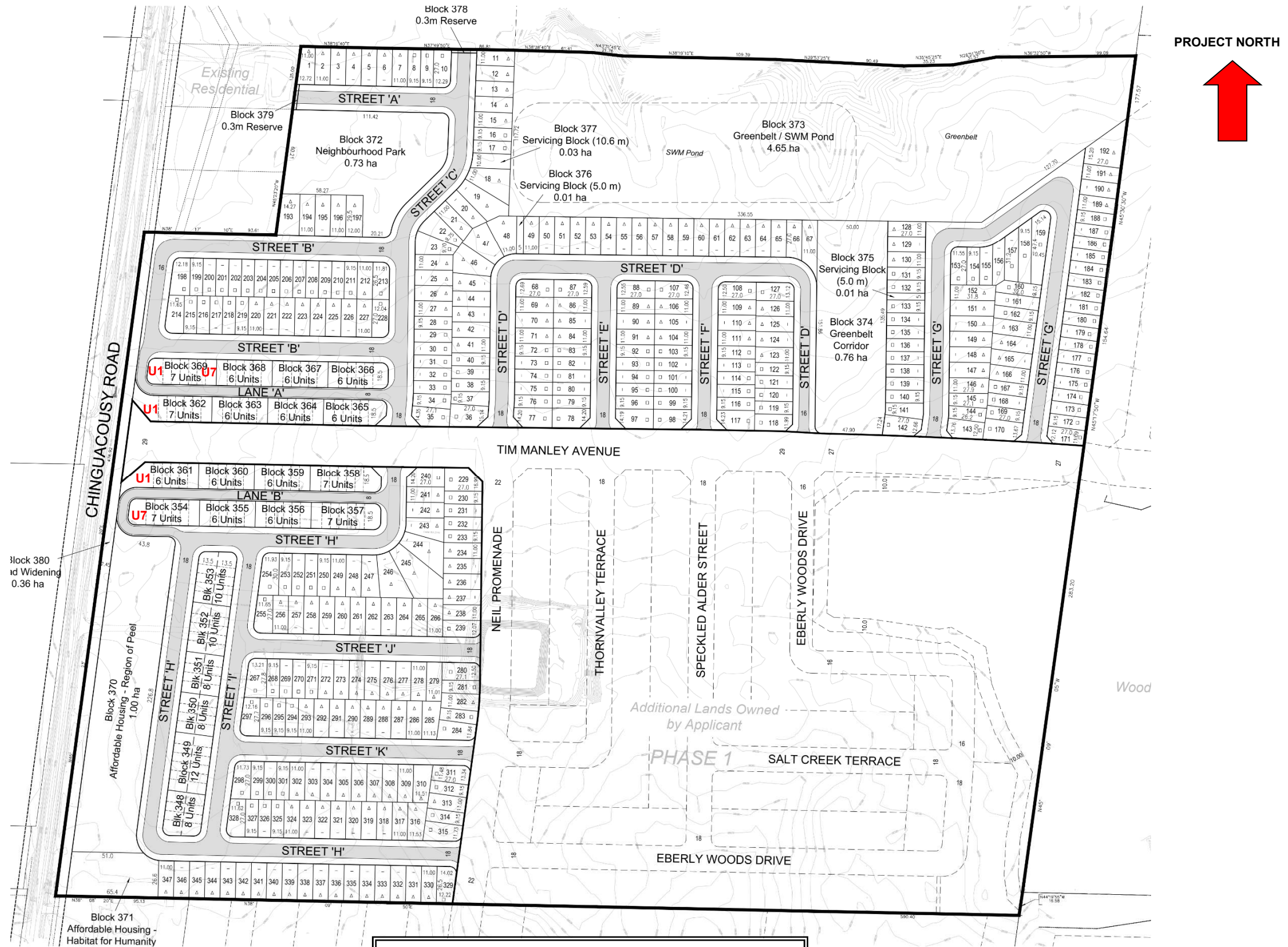
ABBREVIATIONS SPECIFIC TO THIS PROJECT : FF(Front Face), RF(Rear Face), RS(Right Side face), LS(Left Side face)

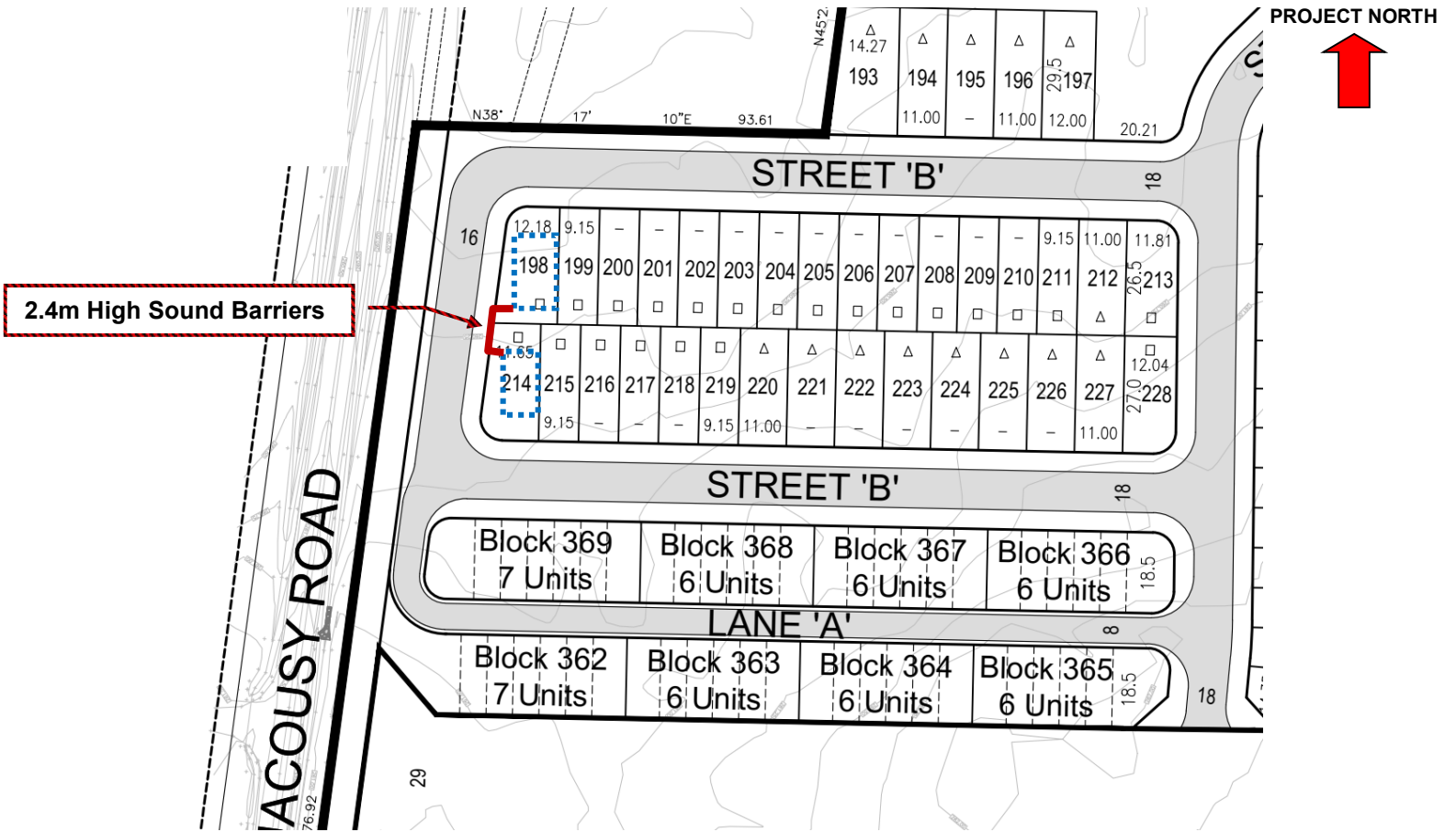


FIGURES

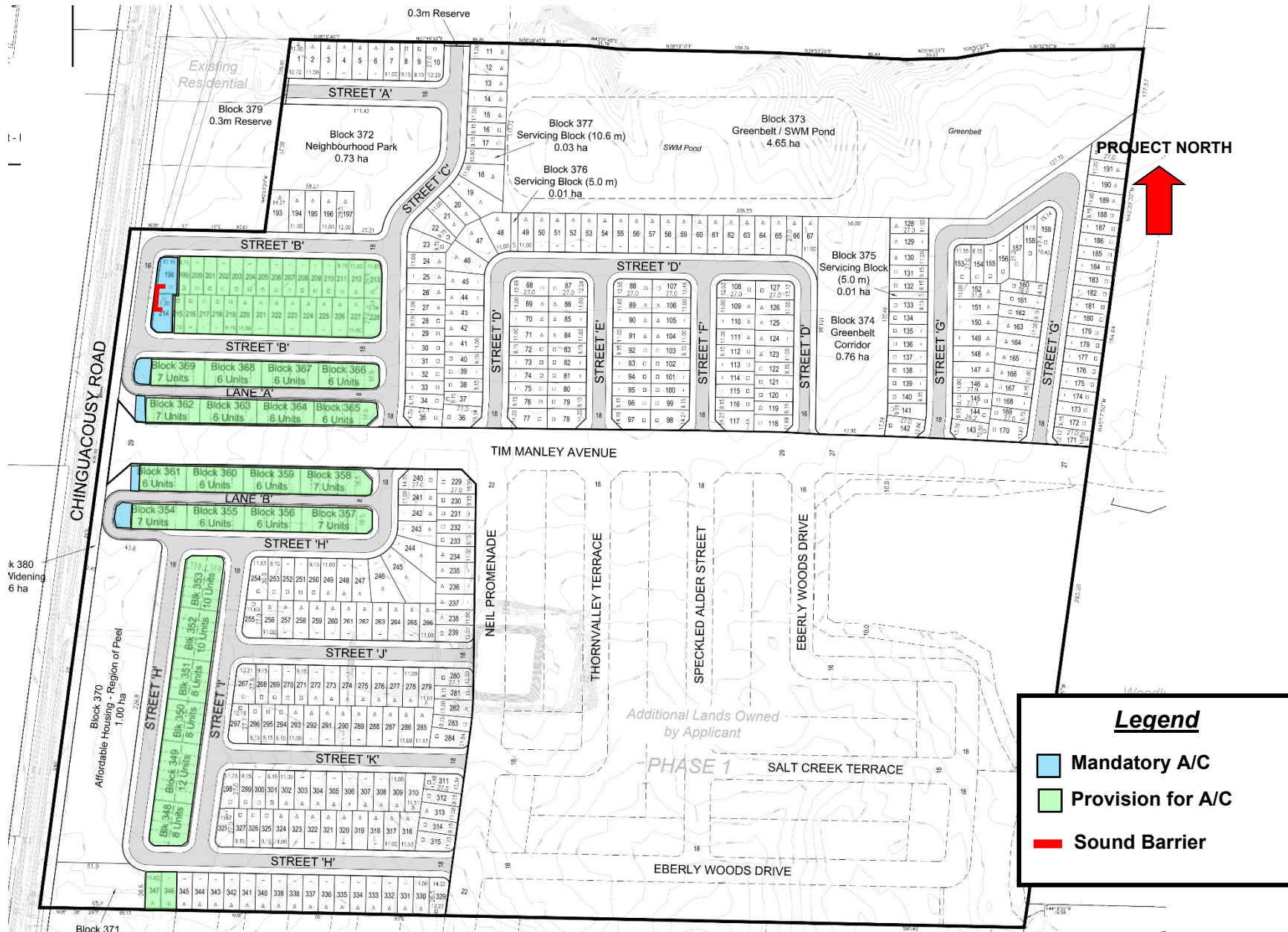


**FIGURE 1
KEY PLAN**





**FIGURE 3
SCHEMATIC BARRIER ALIGNMENTS**



**FIGURE 4
SUMMARY OF MINIMUM INDOOR AND
OUTDOOR NOISE REQUIREMENTS**

APPENDIX A
ROAD TRAFFIC DATA

Roads:

- Chinguacousy Road (North of Mayfield Road)
- Mayfield Road (East of Creditview Road)
- Spine Road (East of Chinguacousy Road)

	Mayfield Road (West of Chinguacousy Road)		Chinguacousy Road (North of Mayfield Road)		Spine Road (East of Chinguacousy Road)	
	Current (2015)	Ultimate (2031 Full Buildout of MW2 Stages 1 & 2)	Current (2015)	Ultimate (2031 Full Buildout of MW2 Stages 1 & 2)	Current (2015)	Ultimate (2031 Full Buildout of MW2 Stages 1 & 2)
ROW Width	30m	50m	15m	35m		29m
No. of Lanes	2	4	2	2		3
Roadway Gradient	1%	1%	2%	2%		0%
AADT	11,720	19,120	2,350	11,250		7,180
Medium Truck %	2.5%	2.5%	2.5%	2.5%		2.5%
Heavy Truck %	2.5%	2.5%	2.5%	2.5%		2.5%
Posted Speed Limit (kph)	80	80	80	80		50
%Day/%Night Traffic Split						
Directional Split % NBL/%SBL or EBL% WBL	42% WB 58% EB	41% WB 59% EB	76% SB 24% NB	46% SB 54% NB		31% WB 69% EB

Notes:

AADT calculations based on AM Peak Hour volumes assumed to correspond to 10% of AADT



APPENDIX B

SAMPLE SOUND LEVEL CALCULATIONS

Filename: nl198ola.te Time Period: Day/Night 16/8 hours
Description: Lot 198-Sound Level at Outdoor Living Area

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

```
-----
Car traffic volume   : 9619/1069  veh/TimePeriod  *
Medium truck volume : 253/28    veh/TimePeriod  *
Heavy truck volume  : 253/28    veh/TimePeriod  *
Posted speed limit  : 90 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): 11250
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 2.50
Heavy Truck % of Total Volume      : 2.50
Day (16 hrs) % of Total Volume    : 90.00
```

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

```
-----
Angle1 Angle2      : -70.00 deg  30.00 deg
Wood depth          : 0          (No woods.)
No of house rows   : 0 / 0
Surface            : 2          (Reflective ground surface)
Receiver source distance : 42.00 / 42.00 m
Receiver height     : 1.50 / 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.Chinguacousy ! 1.26 ! 63.53 ! 63.53
-----+-----+-----+-----
Total 63.53 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Chinguacousy ! 1.26 ! 56.99 ! 56.99
-----+-----+-----+-----
Total 56.99 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 63.53
 (NIGHT): 56.99

Filename: nl198b55.te Time Period: Day/Night 16/8 hours
Description: Lot 198-Sound Level at OLA with Sound Barrier

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

```
-----
Car traffic volume   : 9619/1069   veh/TimePeriod  *
Medium truck volume : 253/28     veh/TimePeriod  *
Heavy truck volume  : 253/28     veh/TimePeriod  *
Posted speed limit  : 90 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): 11250
Percentage of Annual Growth       : 0.00
Number of Years of Growth         : 0.00
Medium Truck % of Total Volume    : 2.50
Heavy Truck % of Total Volume     : 2.50
Day (16 hrs) % of Total Volume    : 90.00
```

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

```
-----
Angle1  Angle2           : -70.00 deg  30.00 deg
Wood depth           : 0 (No woods.)
No of house rows     : 0 / 0
Surface              : 2 (Reflective ground surface)
Receiver source distance : 42.00 / 42.00 m
Receiver height      : 1.50 / 4.50 m
Topography           : 2 (Flat/gentle slope; with barrier)
Barrier angle1       : -70.00 deg  Angle2 : 30.00 deg
Barrier height       : 2.40 m
Barrier receiver distance : 4.00 / 4.00 m
Source elevation     : 0.00 m
Receiver elevation   : 0.00 m
Barrier elevation    : 0.00 m
Reference angle      : 0.00
```

Result summary (day)

```
-----
! source ! Road ! Total
! height ! Leq  ! Leq
! (m)    ! (dBA) ! (dBA)
-----+-----+-----
1.Chinguacousy ! 1.26 ! 54.94 ! 54.94
-----+-----+-----
Total 54.94 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq  ! Leq
```

	! (m)	! (dBA)	! (dBA)
1.Chinguacousy	1.26	56.99	56.99 *
Total			56.99 dBA

* Bright Zone !

TOTAL Leq FROM ALL SOURCES (DAY): 54.94
(NIGHT): 56.99

Filename: nl198dn.te Time Period: Day/Night 16/8 hours
Description: Lot 198-Sound Levels at Building Facade

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

```
-----
Car traffic volume : 9619/1069 veh/TimePeriod *
Medium truck volume : 253/28 veh/TimePeriod *
Heavy truck volume : 253/28 veh/TimePeriod *
Posted speed limit : 90 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): 11250
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 2.50
Day (16 hrs) % of Total Volume : 90.00
```

Data for Segment # 1: Chinguacousy (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 : 37.00 / 37.00 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.Chinguacousy ! 1.26 ! 66.63 ! 66.63
-----+-----+-----+-----
Total 66.63 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Chinguacousy ! 1.26 ! 60.09 ! 60.09
-----+-----+-----+-----
Total 60.09 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 66.63
 (NIGHT): 60.09

Filename: npark.te Time Period: Day/Night 16/8 hours
Description: Sound Level at Common Outdoor Living Area-Park

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

```
-----
Car traffic volume : 9619/1069 veh/TimePeriod *
Medium truck volume : 253/28 veh/TimePeriod *
Heavy truck volume : 253/28 veh/TimePeriod *
Posted speed limit : 90 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): 11250
Percentage of Annual Growth : 0.00
Number of Years of Growth : 0.00
Medium Truck % of Total Volume : 2.50
Heavy Truck % of Total Volume : 2.50
Day (16 hrs) % of Total Volume : 90.00
```

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

```
-----
Angle1 Angle2 : -40.00 deg 40.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground surface)
Receiver source distance : 130.00 / 130.00 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.Chinguacousy ! 1.26 ! 51.22 ! 51.22
-----+-----+-----+-----
Total 51.22 dBA
```

Result summary (night)

```
-----
! source ! Road ! Total
! height ! Leq ! Leq
! (m) ! (dBA) ! (dBA)
-----+-----+-----+-----
1.Chinguacousy ! 1.26 ! 45.49 ! 45.49
-----+-----+-----+-----
Total 45.49 dBA
```

TOTAL Leq FROM ALL SOURCES (DAY): 51.22
 (NIGHT): 45.49