

Environmental Noise Feasibility Study

3016 Kirwin Avenue

Proposed Residential Development

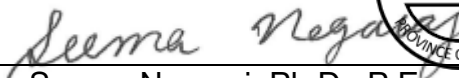
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VALCOUSTICS

Canada Ltd.

Version History

Version #	Date	Comments
1.0	December 19, 2017	Final Report for Submission
2.0	March 25, 2019	Final Update Report for Submission
3.0	April 23, 2021	Revised with latest architectural drawing set
4.0	March 21, 2024	Updated with new measurements at commercial plaza

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EXECUTIVE SUMMARY

Valcoustics Canada Ltd. (VCL) previously prepared an Environmental Noise Feasibility Study, dated December 19, 2017, for the proposed residential development. VCL subsequently prepared updates to the Environmental Noise Feasibility Study, dated March 25, 2019 and April 23, 2021, to address changes to the Site Plan and comments from the City of Mississauga. This assessment and report were updated to account for the recently completed sound measurements of the rooftop mechanical equipment at the adjacent commercial plaza to the south.

The transportation noise sources in the vicinity of the proposed development include road traffic on Kirwin Avenue and Dundas Street East. There are also stationary sources in the vicinity of the site: the commercial plaza located immediately south of the proposed development at the northwest corner of Dundas Street and Kirwin Avenue (99-131 Dundas Street East), and the commercial plaza located at the northeast corner of Kirwin Avenue and Dundas Street East (157 Dundas Street East).

The sound levels at the site have been determined and compared with the applicable Ministry of the Environment, Conservation and Parks (MECP) guideline limits to determine the requirements for noise mitigation.

To meet the applicable transportation source guideline limits:

- All suites in the development require mandatory air conditioning;
- Exterior wall construction meeting Sound Transmission Class (STC) 45 and exterior windows meeting STC 32 will mitigate the indoor sound levels to the indoor criteria. If walls with higher STC ratings are used, the window requirements may decrease.

Mitigation is required to meet the stationary source guideline limits. The mitigation is:

- Commercial Building to South (99-131 Dundas Street East) - Mitigation measures are required for three rooftop exhaust fans (C1_EF01, C1_EF02 and C1_EF03). The exhaust fans could be replaced with “quieter” units or rooftop sound barriers/acoustic screens could be used.

- The developer intends to pursue the Class 4 status for the site, as they have indicated the mitigation measures required to meet the Class 1 limits are not practicable to implement. With the Class 4 status applied, the sound level limits would be met without the need for physical mitigation.

1.0 INTRODUCTION

1.1 PROJECT SCOPE

Valcoustics Canada Ltd. (VCL) previously prepared an Environmental Noise Feasibility Study, dated December 19, 2017, for the proposed residential development. VCL subsequently prepared updates to the Environmental Noise Feasibility Study, dated March 25, 2019 and April 23, 2021, to address changes to the Site Plan and comments from the City of Mississauga. This assessment and report were updated to account for the recently completed sound measurements of the rooftop mechanical equipment at the adjacent commercial plaza to the south.

The potential sound levels and noise mitigation measures required for the proposed development to comply with applicable MECP noise guideline limits are outlined herein.

1.2 SITE DESCRIPTION AND SURROUNDING AREA

The proposed residential development is located just north of the northwest corner of Kirwin Avenue and Dundas Street East. The site is bounded by the following:

- A commercial/retail building and small vehicle service centre building to the south, with Dundas Street East beyond;
- Future Parkland, with Little John Lane and existing commercial and mid-rise residential buildings beyond to the west;
- Public Park immediately to the north, with existing residential development beyond; and
- Kirwin Avenue to the east, with commercial/retail development beyond.

A Key Plan showing the site location is provided as Figure 1.

The study is based on the architectural drawing set prepared by KFA Architects + Planners Inc., last revised November 6, 2023. The Site Plan from the drawing set is included as Figure 2.

1.3 PROPOSED DEVELOPMENT

The development concept is an 8-storey residential building. Common indoor amenity space will be located on the ground floor. Grade-level common outdoor amenity space will be located at the northwest and southeast corners of the building and there is a common amenity space on the roof. The suites will also be provided with private patios, balconies or terraces. The development will have two levels of underground parking.

2.0 TRANSPORTATION NOISE SOURCE IMPACT ASSESSMENT

2.1 NOISE SOURCES

The transportation noise sources with potential to impact the proposed residential development include road traffic on Kirwin Avenue and Dundas Street East.

Hurontario Street is not expected to create a significant noise impact on the proposed development. It is located approximately 350 m to the west of the subject site, with several intervening high-rise buildings between. Thus, it was not considered further in the assessment.

Ultimate road traffic data for the Dundas Street East and Kirwin Avenue were obtained from the City of Mississauga. Table 1 summarizes the traffic data used in the assessment. Appendix B contains correspondence regarding the road traffic data.

TABLE 1: ULTIMATE ROAD TRAFFIC DATA⁽¹⁾

Roadway	AADT ⁽²⁾	No. Lanes	% Trucks		Speed Limit (km/hr)	Day/ Night Split	%Grade
			Medium	Heavy			
Kirwin Avenue	20,000	4	1.65%	1.35%	50	90% / 10%	2
Dundas Street East	50,000	6	3.85%	3.15%	50	90% / 10%	2

Notes:

(1) Obtained from City of Mississauga (refer to Appendix B).

(2) AADT – Annual Average Daily Traffic (Ultimate, as provided by City of Mississauga).

2.2 ENVIRONMENTAL NOISE GUIDELINES

2.2.1 Ministry of the Environment, Conservation and Parks

The applicable noise guidelines for new residential developments are those in MECP Publication NPC-300, “*Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning*.” The Region of Peel also has applicable noise guidelines for the assessment of transportation noise.

The environmental noise guidelines of the MECP as provided in the NPC-300 document, and those of the Region of Peel, are discussed briefly in the following sections. Additional information is provided in Appendix C for the NPC-300 guidelines.

2.2.1.1 Architectural Elements

During daytime and evening hours (0700 to 2300), the indoor criterion for road noise is a 16-hour $L_{eq,Day}$ of 45 dBA for sensitive spaces such as living/dining rooms, dens, and bedrooms. At night (2300 to 0700 hours), the indoor criterion for road noise is $L_{eq,Night}$ of 45 dBA for sensitive spaces such as living/dining rooms and dens, and 40 dBA for bedrooms and sleeping quarters.

The architectural design of the building envelopes (walls, windows, etc.) must provide adequate sound isolation to achieve these indoor sound level limits, based on the applicable outdoor sound levels predicted on the building facades.

2.2.1.2 Ventilation Requirements

In accordance with the MECP noise guidelines for transportation noise sources, if the daytime sound level ($L_{eq,Day}$) at the exterior face of a noise-sensitive window is greater than 65 dBA, means must be provided such that windows can be kept closed for noise control purposes, and central air conditioning is required. For daytime sound levels between 56 dBA and 65 dBA inclusive, there need only be the provision for adding central air conditioning at a later date. A warning clause advising the occupants of the potential noise interference with some activities is also required. At nighttime, air conditioning would be required when the sound level exceeds 60 dBA ($L_{eq,Night}$) at a noise sensitive window. The provision for adding air conditioning is required when the nighttime sound level is greater than 50 dBA.

2.2.1.3 Outdoor Living Areas

For outdoor amenity areas (OLAs), the guideline sound level limit is a daytime sound level ($L_{eq,Day}$) of 55 dBA, with an excess not more than 5 dBA (i.e., an upper allowable design limit of 60 dBA) considered acceptable if it is not feasible to achieve the 55 dBA objective for technical, economic or administrative reasons. In these cases, warning clauses must be provided and registered on title. Nighttime sound level limits are not applicable for OLA's.

It should be noted that for road traffic sources, a balcony/terrace is considered an OLA if it is elevated, is the only OLA for the occupant, and it is 4 m in depth or greater.

2.2.2 Region of Peel

The Region of Peel guidelines are similar to the MECP guidelines, except that the nighttime level for triggering the central air conditioning requirement is 1 dB more stringent than the level specified by the MECP. Specifically, mandatory air conditioning for nighttime sound levels of 60 dBA or greater trigger the requirement for central air conditioning, and the provision for adding air conditioning at a late date when nighttime sound levels are between 51 dBA and 59 dBA inclusive.

2.3 ANALYSIS METHOD

The equivalent sound energy levels in terms of $L_{eq,Day}$ and $L_{eq,Night}$ were determined using ORNAMENT – STAMSON V5.04, the computerized road traffic noise prediction software of the MECP.

At the building facades, the daytime and nighttime sound levels were assessed at an 8th floor height of 25 m above grade and a 3rd floor height of 10 m above grade. The daytime OLA sound levels at the common outdoor amenity areas were assessed at a height of 1.5 m above grade or above the floor of the terrace, at the centre of the space.

It is noted that the ground floor units will be provided with private patios. The patios are approximately 2 m in depth, with entrance doors and street connections. It is expected that these patios will be more similar to front porches than backyard spaces. Front porches are not typically designed and intended for the quiet enjoyment of the outdoors and would therefore not be considered OLA's. In addition, the patios are small spaces, similar in depth to the balconies above, which are not considered OLA's. Thus, these patios have not been considered as OLA's.

There are large (i.e., greater than 4 m in depth) west-facing private terraces on the 5th and 6th floors. Since these are not the only OLA's provided for the occupants, these terraces do not strictly qualify as OLA's under the MECP guidelines. All other terraces and balconies are less than 4 m in depth and therefore do not qualify as OLA's under the MECP guidelines.

Inherent screening of each proposed building facade due to its orientation to the noise source was included in the assessment. Screening from the existing development in the vicinity was not included in the facade sound level calculations. Screening from the existing dwellings to the east (along the west side of Kirwin Avenue) and the commercial buildings to the south were included in the grade-level common OLA sound level calculations.

2.4 RESULTS

At the building facades, the highest daytime/nighttime sound levels of 67 dBA/61 dBA are predicted to occur at the southeast corner of the building at the third floor, closest to the intersection of Kirwin Avenue and Dundas Street East.

The unmitigated daytime OLA sound levels at the northwest and southeast grade-level common amenity areas are predicted to be 48 dBA and 62 dBA, respectively. The unmitigated daytime OLA sound level at the rooftop terrace is predicted to be 55 dBA.

Sample calculations are provided in Appendix D.

TABLE 2: PREDICTED UNMITIGATED OUTDOOR SOUND LEVELS

Location	Source	Distance (m) ⁽¹⁾	L _{eq} Day (dBA) ⁽²⁾	L _{eq} Night (dBA) ⁽³⁾
8 th Floor Southwest Corner South Facade	Kirwin Avenue	75	56	49
	Dundas Street - Westbound	64	63	57
	Dundas Street - Eastbound	74	63	56
	TOTAL	---	66	60
8 th Floor Southwest Corner West Facade	Dundas Street - Westbound	64	60	54
	Dundas Street - Eastbound	74	60	53
	TOTAL	---	63	56
8 th Floor Northwest Corner West Facade	Dundas Street - Westbound	93	58	52
	Dundas Street - Eastbound	103	58	51
	TOTAL	---	61	54
8 th Floor Northwest Corner North Facade	Kirwin Avenue	75	57	50
8 th Floor Northeast Corner North Facade	Kirwin Avenue	22	61	55
8 th Floor Northeast Corner East Facade	Kirwin Avenue	22	65	58
	Dundas Street - Westbound	85	60	53
	Dundas Street - Eastbound			

TABLE 2: PREDICTED UNMITIGATED OUTDOOR SOUND LEVELS (continued)

Location	Source	Distance (m) ⁽¹⁾	Leq Day (dBA) ⁽²⁾	Leq Night (dBA) ⁽³⁾
8 th Floor Southeast Corner East Facade	Kirwin Avenue	23	64	58
	Dundas Street - Westbound	59	61	54
	Dundas Street - Eastbound	69	60	53
	TOTAL	---	67	60
8 th Floor Southeast Corner South Facade	Kirwin Avenue	23	60	53
	Dundas Street - Westbound	59	63	56
	Dundas Street - Eastbound	69	62	56
	TOTAL	---	67	60
3 rd Floor Southeast Corner East Facade	Kirwin Avenue	19	65	59
	Dundas Street - Westbound	53	61	55
	Dundas Street - Eastbound	64	60	54
	TOTAL	---	67	61
3 rd Floor Southeast Corner South Facade	Kirwin Avenue	19	61	54
	Dundas Street - Westbound	53	63	57
	Dundas Street – Eastbound	64	63	56
	TOTAL	---	67	61
Northwest Grade-Level Common Outdoor Amenity Area (OLA)	Kirwin Avenue	76	48	-
Southeast Grade-Level Common Outdoor Amenity Area (OLA)	Kirwin Avenue	40	55	-
	Dundas Street - Westbound	56	58	-
	Dundas Street – Eastbound	66	57	-
	TOTAL	---	62	-
Common Rooftop Amenity Terrace (OLA)	Kirwin Avenue	64	48	-
	Dundas Street - Westbound	76	51	-
	Dundas Street – Eastbound	86	52	-
	TOTAL	---	55	-

Notes:

- (1) Distance to the OLA/building facade, respectively, from the centreline of the noise source.
- (2) Daytime sound levels for the for terrace OL

2.5 NOISE CONTROL REQUIREMENTS

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

- Architectural elements to achieve acceptable indoor noise guideline limits; and,
- Design features to protect the OLAs.

The applicable noise control requirements are summarized in Table 3, and the notes to Table 3.

2.5.1 Architectural Elements

The indoor noise guidelines can be achieved by using appropriate construction for exterior walls, windows and doors. In determining the worst-case architectural requirements for the residential suites, wall and window areas were assumed to 20% and 80%, respectively, on each facade of a corner room with both facade exposed to the noise sources.

Based on the predicted sound levels, exterior wall construction meeting a minimum STC 45 and exterior windows meeting STC 32 will be sufficient to achieve the indoor noise guidelines of the MECP. If exterior walls with higher STC ratings are used, the window STC requirements may decrease.

For walls, a typical spandrel panel exterior wall construction with a backup assembly (gypsum board on independent row of studs) would be expected to achieve the requirement of STC 45.

For windows, the window frames themselves must also be designed to ensure that the overall sound isolation performance of the entire window unit meets the sound isolation requirements. This needs to be confirmed by the window manufacturer through the submission of acoustical test data.

The final sound isolation requirements with respect to architectural elements should be reviewed when final architectural plans are developed. Wall and window constructions should also be reviewed at this point to ensure that they will meet the sound isolation performances to achieve the indoor noise guideline requirements of the MECP. This is typically done during the building permit application stage.

2.5.2 Ventilation Requirements

Based on the predicted sound levels at the building facades, all suites in the development require mandatory air conditioning to allow windows to remain closed for noise control purposes.

2.5.3 Outdoor Living Area Requirements

The unmitigated daytime OLA sound level at the southeast grade-level common outdoor amenity area is predicted to exceed 60 dBA. A 1.8 m high acoustic fence along the south side of the amenity area will mitigate the daytime OLA sound level to 59 dBA. This is within the 60 dBA maximum permitted under the MECP guidelines, provided warning clauses are registered on title, and is recommended. The location of the acoustic fence is shown on Figure 2.

The acoustic fence must be of solid construction with no gaps, cracks or holes (except for small openings required for water drainage) and must have a minimum surface weight of 20 kg/m². A variety of materials are available, including concrete, masonry, glass, wood, specialty composite materials, or a combination of the above.

The unmitigated daytime OLA sound levels at the northwest grace-level common outdoor amenity area and the rooftop common outdoor amenity terrace are predicted to be 55 dBA or lower. This meets the MECP design objective. Thus, sound barriers are not required at these locations for noise control purposes.

2.6 WARNING CLAUSES

Warning clauses are a tool to inform prospective owners/occupants of potential annoyance due to existing/future noise sources. Where the sound level guidelines are exceeded, warning clauses should be registered on title, or included in the development agreement that is registered on title. The warning clauses should also be included in the agreements of Offers of Purchase and Sale and/or lease/rental agreements.

Applicable warning clauses for the proposed development are included in Table 3 and the Notes to Table 3.

TABLE 3: MINIMUM NOISE CONTROL MEASURES

Location	Air Conditioning ⁽¹⁾	Exterior Walls ⁽²⁾	Exterior Windows ⁽³⁾	Sound Barrier ⁽⁴⁾	Warning Clauses ⁽⁵⁾
All suites	Mandatory	STC 45	Up to STC 32	1.8 m high at south side of southeast common outdoor amenity area	A + B + C

Notes:

- (1) Where means must be provided to allow windows to remain closed for road noise control purposes, a commonly used technique is that of air central conditioning.
- (2) STC - Sound Transmission Class Rating (Reference ASTM-E413).
The requirements are based on assumed wall and window areas and should be confirmed once detailed floor plans and elevations are available.
- (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.
The requirements are based on assumed wall and window areas and should be confirmed once detailed floor plans and elevations are available.
- (4) Acoustic fences/sound barriers must be of solid construction having a minimum face density of 20 kg/m² with no gaps, cracks or holes. A variety of materials are available, including concrete, masonry, glass, wood, specialty composite materials, or a combination of the above.
- (5) Warning clauses to be included in Occupancy Agreements:
 - A. "Purchasers are advised that despite the inclusion of noise control features in the development and within the building units, sound levels due to increasing road traffic may occasionally interfere with some activities of the dwelling occupants as the sound level may exceed the noise guidelines of the Municipality and the Ministry of the Environment."
 - B. "This dwelling 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 noise criteria of the municipality and the Ministry of the Environment."
 - C. "Purchasers are advised that due to the proximity of the commercial/retail uses, noise from these facilities may at times be audible."
- (6) All exterior doors shall be fully weather-stripped.

3.0 STATIONARY NOISE SOURCE IMPACT ASSESSMENT

3.1 NOISE SOURCES

The stationary noise sources with potential for impact the proposed development are the commercial plazas located immediately to the south (99-131 Dundas Street East) and east (157 Dundas Street East) of the site. The main noise sources associated with these establishments are the mechanical rooftop units.

The noise sources are shown in Figures 4 and 5.

3.1.1 Commercial/Retail Plaza at 99-131 Dundas Street East

The commercial/retail plaza at 99-131 Dundas Street East is a two-storey building with several businesses on the first and second floors. The businesses within the plaza include a dry cleaner, restaurants, and other general services (i.e., jeweller, beauty and hair salons, convenience store, etc.).

The operating hours of the businesses vary, with some operating only during daytime hours (such as the J&D Organic Dry Cleaners). Restaurants operate during daytime and evening hours. The Jung Thai restaurant is open until 11:30 pm (nighttime) on the weekend. Noise sources include rooftop exhaust fans, HVAC units, condensers, and building-side air conditioning units and exhaust fans.

VCL visited the site to do sound measurements on June 1, 2017 and November 24, 2022. Acoustical data for the various noise sources were obtained by measurement. For the mechanical units that were not operating during the site visit, typical sound data of a similar unit and capacity were taken from the VCL database. Appendix E includes tables summarizing the sources modeled for this commercial development (Source IDs: C1_##), and the associated sound level data used in the assessment.

3.1.2 Commercial/Retail Plaza at 157 Dundas Street East

The commercial building at 157 Dundas Street East is a single-storey plaza with various types of retail uses including a bakery, convenience store, beauty salon, etc. Using aerial imagery, the rooftop mechanical equipment (such as exhaust fans and HVAC units, Source IDs: C2_##) were located. Generic acoustic emission data for the equipment was used to model these sources (summarized in Appendix E tables). The operating scenarios were based on similar facilities obtained from previous projects completed by VCL.

The sizes of the rooftop HVAC units were determined based on the assumed total cooling requirement of the building divided by the number of rooftop mechanical equipment. The total cooling capacity in tons for the retail/commercial uses was determined based on the approximate relationship of one-ton of cooling per 350 ft² of floor area. Based on this, the HVAC requirements would be nine 4-ton units.

The associated sound emission level for each unit was assumed based on the size of the unit. All HVAC units were assumed to be Lennox brand units. Manufacturer's sound data was used to model these sources. Refer to Appendix E Sample Calculations.

TABLE 4: MINIMUM EXCLUSION SOUND LIMITS FOR CLASS 1 AREAS

Time of Day	Outdoor Plane of Window One-Hour L_{eq} (dBA) Sound Limit	Outdoor Point of Reception One-Hour L_{eq} (dBA) Sound Limit
Daytime (0700 to 1900 hours)	50	50
Evening (1900 to 2300 hours)	50	50
Nighttime (2300 to 0700 hours)	45	-

Note, the limits contained in Publication NPC-300 do not apply to occasional movement of vehicles on the property such as infrequent delivery of goods to convenience stores.

3.2.2 Applicable Guideline Limits

At several of the receptor locations, the existing ambient due to road traffic on Kirwin Avenue and Dundas Street East is higher than the minimum exclusion limits. The existing background sound levels, therefore, define the applicable sound level limits for receptors most exposed to Dundas Street East or Kirwin Avenue.

Section 3.4 below describes the calculation procedure to predict the ambient sound levels.

3.3 ANALYSIS METHOD

A 3-D acoustic model of the proposed development and surrounding area was developed using CadnaA V2023 MR1 environmental noise modeling software, which follows the protocol of ISO Standard 9613-2, “Acoustics – Attenuation of Sound During Propagation Outdoors”, to predict sound levels at each of the receptor locations.

Hard ground ($G = 0$) was used for the site, adjacent commercial plazas and roadways. Soft ground ($G = 1$) was used elsewhere. Two orders of sound reflection were included in the acoustical model.

Screening from the 1.8 m high acoustic fence required for transportation noise sources was included in the model.

The sound level predictions at the proposed buildings were done using the building evaluation feature in the CadnaA acoustic model. This method calculates the sound levels on a grid of receivers over each building facade at each storey of the building. The point receptors shown in Figures 4 to 7 were added at the worst-case locations for ease of reporting.

3.4 AMBIENT SOUND LEVEL ASSESSMENT

Minimum ambient sound levels (daytime, evening and nighttime hours) due to road traffic at receptors most exposed to Kirwin Avenue and Dundas Street East were calculated using traffic count data provided by Lea Consulting Ltd. The provided peak AM/PM traffic count data applicable to the year 2017 were converted to 24-hour volumes by multiplying the peak counts by a factor of 10. The hourly traffic volumes were derived from the 24-hour data by applying the typical traffic distribution for well travelled roadways. The minimum hourly volumes for the three scenarios considered were:

- 1000 to 1100 hours in the daytime scenario, where 3.5% of the 24-hour traffic volume occurs;

- 2200 to 2300 hours in the evening scenario, where 2.5% of the 24-hour traffic volume occurs; and
- 0400 to 0500 hours in the nighttime scenario, where 0.2% of the 24-hour traffic volume occurs.

Minimum ambient sound levels were calculated at the assessment receptors in terms of one-hour L_{eq} , for the indicated hours, using RLS-90, the road traffic noise model included in the CadnaA software package.

The ambient sound levels due to road traffic on Kirwin Avenue and Dundas Street East are shown on Figure 3. The numbers shown in the octagons represent the highest ambient sound level at that location on the building facade.

3.5 OPERATING SCENARIOS

Two operating scenarios with different levels of activity were considered for each commercial development, according to the three criterion periods, daytime (0700 to 1900 hours), evening (1900 to 2300 hours) and nighttime (2300 to 0700 hours).

These scenarios reflect predictable worst-case operating conditions, as required by the MECP guidelines, that would not be expected to occur on a regular basis, and perhaps only occasionally. In practice, it is expected that actual operating activities will be less than considered in this report.

The operating scenarios assessed are:

- Daytime and Evening Hours (any one-hour period between 0700 and 2300 hours)
 - all rooftop units/equipment operating at 100% duty cycle (each unit operates for the full hour).
- Nighttime Hours (any one-hour period between 2300 and 0700 hours)
 - all rooftop HVAC units operating at 50% duty cycle (each unit operates for 30 minutes per hour);
 - all condenser units operating at 100% duty cycle (C1_CU01 and C1_CU02);
 - kitchen exhaust fans at the restaurant open during the nighttime (Source ID: C1_EF02) operating for the full hour; and
 - all other exhaust fans off.

3.6 ASSESSMENT RESULTS

3.6.1 Commercial/Retail Plaza at 99-131 Dundas Street East

Figure 4 show the predicted unmitigated sound levels at the proposed site due to the operation of the commercial plaza at 99-131 Dundas Street East. The panes on the left show the sound levels and the panes on the right show the excesses over the noise guideline limits during the daytime, evening and nighttime.

Sound level excesses are predicted to occur during the daytime, evening and nighttime scenarios. The highest sound level excess of 6 dBA occurs on the south facade of the proposed building during the evening scenario.

These excesses are mainly due to the rooftop kitchen exhaust fans (Source IDs: C1_EF01 to C1_EF03).

3.6.2 Commercial/Retail Plaza at 157 Dundas Street East

Figure 5 shows the predicted unmitigated sound levels from the noise sources associated with the commercial plaza at 157 Dundas Street East. The panes on the left show the sound levels and the panes on the right shows the sound level excesses over the applicable noise guideline limits.

As shown on Figure 5, the unmitigated sound levels are predicted to meet the noise guideline limits. Thus, mitigation measures are not required for this plaza.

3.7 MITIGATION MEASURES

3.7.1 Commercial/Retail Plaza at 99-131 Dundas Street East

To mitigate the sound levels from 99-131 Dundas Street East to the applicable guideline limits, noise control measures are required at rooftop exhaust fans C1_EF01, C1_EF02 and C1_EF03. Mitigation options include:

- Replacing the fans with quieter units. The maximum sound power levels should be: 83 dBA at C1_EF01, 81 dBA at C1_EF02 and 74 dBA at C1_EF03; or
- Adding rooftop acoustic screens. The screen heights should be: 2.3 m high at C1_EF01, 2.3 m high at C1_EF02 and 2.7 m high at C1_EF03.

The predicted sound levels with the two mitigation options are shown as Figures 6 and 7.

3.8 DISCUSSION

For this project, the developer intends to pursue a change in site classification from Class 1 to Class 4.

The sound level limits for a Class 4 area are higher than those for a Class 1 area. Similar to a Class 1 area, the sound level limits are defined as the higher of the ambient due to road traffic or the minimum exclusion limits. The Class 4 minimum exclusion limits are: 60 dBA during the daytime and evening at an exterior POW; 55 dBA during the daytime and evening at an OPOR; and 55 dBA during the nighttime at an exterior POW. As in a Class 1 area, there are no nighttime guideline limits for OPORs at night.

The reason for the higher sound level limits in a Class 4 area is that even though the exterior windows are permitted to be operable, they are assumed to be closed to protect the indoor living spaces. In a Class 1 or 2 area, exterior windows are assumed to be open. In either case, the objective is to create a suitable indoor sound environment for the future occupants. In a Class 4 area, buildings need to have central air conditioning to allow the exterior windows to remain closed. A specific warning clause will also need to be registered on title.

To meet the Class 1 guideline limits, physical mitigation measures would be required at the commercial plaza at 99-131 Dundas Street East. The developer intends to have the site deemed Class 4 by the Municipality, as they indicate the mitigation measures are not practicable for this site. The unmitigated sound levels due to the commercial plazas meet the Class 4 minimum exclusion limits without the need for physical mitigation measures.

Future occupants will be made aware of the potential noise impacts through warning clauses, as per MECP guidelines.

5.0 REFERENCES

1. PC STAMSON 5.04, "Computer Program for Road Traffic Noise Assessment", Ontario Ministry of the Environment and Climate Change.
2. Building Practice Note No. 56: "Controlling Sound Transmission into Building", by J.D. Quirt, Division of Building Research, National Council of Canada, September 1985.
3. "Environmental Noise Guideline, Stationary and Transportation Sources – Approval and Planning", MECP Publication NPC-300, October 2013.
4. "Environmental Noise Feasibility Study – 3016 Kirwin Avenue – Proposed Residential Development", Valcoustics Canada Ltd., December 19, 2017.

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APPENDIX A

SITE PLAN AND DRAWINGS

