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File: RWDI# 2001879

Starlight Developments
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Attention: Andrew Browne

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RE: 1045 YATES STREET – HARRIS GREEN VILLAGE – EXTERIOR MECHANICAL NOISE REVIEW

As requested by the city of Victoria, RWDI has completed the Exterior Mechanical Noise Review for the new multi-tower development project, Harris Green Village, located at 1045 Yates St. in Victoria, BC. The criteria for this project is determined by the City of Victoria Noise Bylaw No. 03-012. For the purpose of analysis, the mechanical assessment has been divided into the following distinct areas: Rooftop mechanical equipment, Parkade fans, and Level 1 mechanical equipment.

The review is based on the following information provided to RWDI:

- Mechanical Drawing Set (dated September 23, 2021); and
- Sound information provided by Reinbold Engineer Group (received January 11, 2022).

Note that the focus of this review is on rooftop equipment and fans. The emergency generator is not considered as part of this review.

COMMUNITY NOISE BYLAW TARGETS

According to the Victoria Noise Bylaw, permitted noise levels are dependent on the “Noise Districts” in which the noise source(s) and receiver(s) are located. There are four types of Noise Districts in the bylaw, namely Quiet, Intermediate, Harbour-Intermediate, and Activity. According to the City of Victoria Noise District Map, Harris Green Village and the immediate surrounding buildings are in an Intermediate District. The noise level limit for noises created and received in an Intermediate District at the property line are:

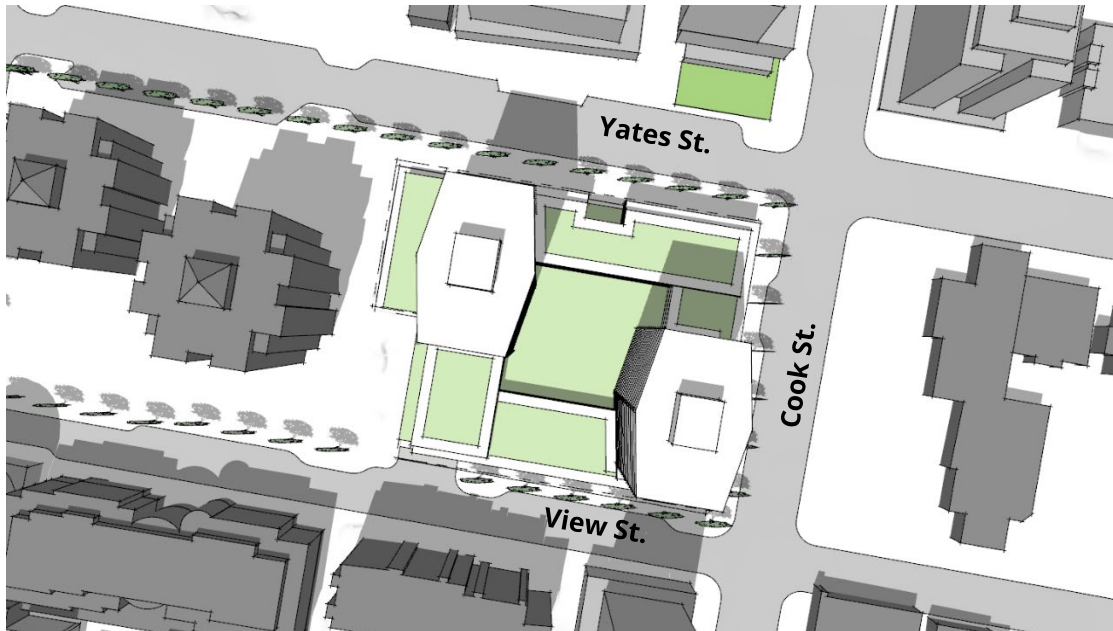
- 60 dBA during daytime
- 55 dBA during nighttime

As the mechanical equipment is assumed to operate 24/7, the effective noise level limit is then the 55 dBA nighttime limit.

Applicable Noise Limit at the Property Line

To our understanding, the buildings adjacent to this project include commercial and/or residential. Figure 1 shows the location of Harris Green Village and its surrounding buildings.

Figure 1: Location of Harris Green Village



Given the location of the ground level mechanical equipment, exhaust shafts, and louvres, the limiting factor for Harris Green Village is going to be the property line. We have based our analysis on meeting the 55 dBA nighttime limit for Victoria's Noise Bylaw at both the property line and the adjacent building facades.

ROOFTOP MECHANICAL EQUIPMENT

Each tower at Harris Green has a mechanical room which houses much of the mechanical equipment. The mechanical rooms include primarily domestic hot water heaters, and pumps.

Additionally, there are two small 3-Ton condensing units (CU-A and CU-B) on each building located outside of the structure. Upon review of the equipment specifications, the accumulative levels of mechanical room and small condensing units are predicted to be below the 55 dBA limit at adjacent buildings.



PARKING GARAGE AND LEVEL 1 MECHANICAL EQUIPMENT

Parking Garage

Harris Green Village contains three levels of underground parking which is served by ventilation shafts at the west and south sides of the lower structure. We have reviewed supply and exhaust fans and determined that they will not exceed the noise limits at ground level. Source fan data is provided in Appendix A.

Several exhaust and supply fans within the parkade are used for internal ventilation. We have reviewed the sound levels of interior parkade mechanical equipment and do not expect the interior noise will have a significant effect on the noise environment.

In addition, there is a condensing unit (CU-P1-1) located on level P1. Sound data was not provided for this unit but based on the expected sound level and configuration, this unit is not predicted to exceed the noise limits at ground level. Without sound data, RWDI cannot comment on the potential interior noise levels within the parking garage.

Level 1 Mechanical Equipment

Chiller

The mechanical drawing set, 'Issued For: Building Permit' (dated November 15, 2021), used to review equipment for the noise assessment contains a chiller (CH-1) in the southwest corner of Level 1. It is our understanding that the chiller is no longer part of the project.

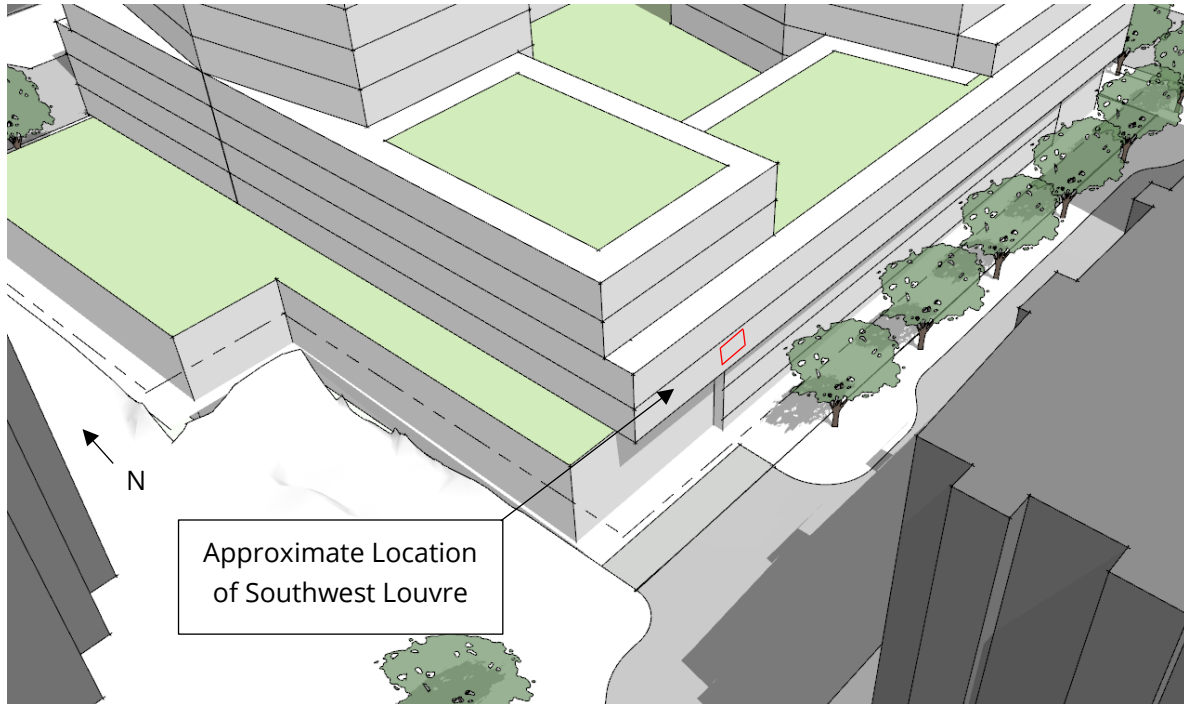
MUAs and Fans

Much of the mechanical equipment for Harris Green village is located in a mechanical mezzanine above Level 1. Several supply and exhaust fans are ducted to the perimeter of Level 1. We have reviewed the sound level of these fans and determined that levels at the property line are below the nighttime target of 55 dBA.

One area of interest, however, is the southwest corner of ground level structure where two make-up air units (MUA-1 and MUA-2) and two supply fans (SF-MEZZ-05 and SF-MEZZ-06) ventilate through a louver. We have determined that mitigation is required to meet the nighttime limit at the property line. Figure 2 shows the approximate location of the southwest louver.



Figure 2: Location of Southwest Louvre



Duct borne noise calculations were performed using a specialized Excel spreadsheet and further analysis was conducted using noise modeling software CadnaA. Based on our review of the mechanical equipment layout which serves the southwest louvre and the equipment sound power level provided in Appendix A.

Based on the results of our analysis, mitigation is recommended to reduce the noise impact at the southwest Louvre. We suggest the following mitigation:

1. Install 3 m lining in each of the 4 duct runs between the mechanical unit and the Southwest Louvre with minimum 25 mm thick fiberglass acoustic duct liner.

This concludes our Mechanical Community Noise Assessment for Harris Green village. Please do not hesitate to let us know if you have any further questions.

Yours truly,

RWDI Air Inc.

Matthew Johnston, P.Eng.
Acoustical Engineer

Curtis Langley, B. Sc.
Acoustician



January 31, 2022

RWDI#: 2001879

**Harris Green Village
Victoria, BC**

APPENDIX A: Sound Power Level Data

Shown in Table A1 below are the sound power levels used in our calculations based on cut sheet data provided to RWDI.

Table A1: Mechanical Unit Sound Power Level Data

Unit	Location	OCTAVE BAND SOUND POWER LEVELS (dB)								Overall
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	(dBA)
Make-up Air Unit MUA-1	Level 1 Mechanical Equipment	88	86	83	81	81	80	77	75	87
Make-up Air Unit MUA-2	Level 1 Mechanical Equipment	87	85	82	79	80	78	76	74	85
Fan SF-MEZZ-05	Level 1 Mechanical Equipment	77	76	76	73	71	67	60	53	76
Fan SF-MEZZ-06	Level 1 Mechanical Equipment	68	68	69	71	69	65	59	52	76
Fan PSF-P1-01	Parking Garage	92	91	88	85	82	77	70	62	87
Fan PSF-P1-02	Parking Garage	92	91	88	85	82	77	70	62	87
Fan PSF-P2-01	Parking Garage	88	92	87	80	77	73	70	68	84
Fan PSF-P2-02	Parking Garage	88	92	87	80	77	73	70	68	84
Fan PSF-P3-01	Parking Garage	89	94	90	82	78	75	71	69	86