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Subject: South March Initial Noise Control Options
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Aercoustics was retained by Evolugen to assess the noise impact of the proposed South March BESS site in Dunrobin, Ontario. The site was evaluated per MECP guidelines. Several noise control options were provided for the site to satisfy the applicable sound level limits.

Facility

The proposed South March BESS site is a 250 MW (1000 MWh) battery site. The facility will be located at 2625 & 2555 Marchurst Road, Dunrobin, Ontario.

The main noise generating equipment on site will include battery cabinets (BESS) – including battery and inverter units, Medium-Voltage Transformer Skids (MVS) – including a medium-voltage transformer and control cabinet, and a High-Voltage Transformer (TX).

A fully built out site, including future augmentation was considered. The sources were modeled as follows:

Battery Cabinets:

- 307 BESS units – Sungrow PowerTitan2.0 (4H, HX) – were included.
- Worst-case hour operating conditions were assumed to be 35°C ambient temperature while running at 80% power during the daytime, and ≤25°C ambient temperature while running at 80% power during the nighttime, for a full hour.
- The sound power level of the unit was 79 dBA based on manufacturer data, corresponding to a maximum sound pressure level of 66 dBA measured at 1 m.
- The unit was determined to be tonal based on 1/3rd octave data from the manufacturer and the method outlined in ANSI S12.9-2005. As such, a 5 dB tonal

penalty was applied. The tone is present at the 1 kHz band when measured 1 m to the front of the unit. If it is possible to obtain 1/3rd octave data at a further setback, a better understanding of the tone's presence at a receptor may be possible.

Medium-Voltage Transformer Skids:

- 77 MVS units – Sungrow MVS5140-LS-US with Noise-Relief Cover – were included.
- Worst-case hour operating conditions were assumed to be running at full power for the entire hour.
- The sound power level of the unit was 79 dBA based on manufacturer data, corresponding to a maximum sound pressure level of 66 dBA measured at 1 m.
- As this unit includes a transformer, it was assumed to be tonal and a 5 dB tonal penalty was applied.

High-Voltage Transformer:

- 2 TX units – 175 MVA transformers – were included.
- Worst-case hour operating conditions were assumed to be running at full power with ONAF cooling for the entire hour.
- The sound power level of the unit was 89 dBA based on a guaranteed reference sound level of 65 dBA at 1.8 m following the method outlined in IEEE C57.12.90.
- The transformers are expected to be tonal and a 5 dB tonal penalty was applied.

Receptors

There are several 1- and 2-storey detached dwellings, identified as Receptors R01 to R13, surrounding the facility. Receptor locations are show in Figure 1.

The critical receptors driving the need for mitigation are all located north of the site: R01, R02, R04, R05, and VL14.

It should be noted that R01 is on the same lot as the proposed facility. Due to the proximity of the receptor to the site (<200 m), this receptor will be extremely difficult to achieve compliance with the sound levels. Aercoustics understands that this property is owned or controlled to some degree by the developer of the proposed facility and, therefore, it is recommended that this dwelling be vacated during the entire lifetime of the facility.

The receptor height and setback distance from the nearest noise source for each of the receptors are shown in Table 1. Receptor heights were determined using open-source imaging. Any receptors that could not be verified were conservatively assumed to be 2-storeys. The affected points of noise reception were determined in accordance with MECP guidelines.

Figure 1: Receptor Locations

Table 1: Summary of Points of Reception

Receptor	Description	Height	Distance
R01	Existing 2-storey dwelling	4.5 m	190 m N
R01g	Outdoor point of reception associated with R01	1.5 m	160 m N
R02	Existing 2-storey dwelling	4.5 m	440 m NE
R02g	Outdoor point of reception associated with R02	1.5 m	410 m NE
R03	Existing 2-storey dwelling	4.5 m	650 m NE
R03g	Outdoor point of reception associated with R03	1.5 m	620 m NE
R04	Existing 3-storey dwelling	7.5 m	410 m N
R04g	Outdoor point of reception associated with R04	1.5 m	380 m N
R05	Existing 2-storey dwelling	4.5 m	410 m N
R05g	Outdoor point of reception associated with R05	1.5 m	380 m N
R06	Existing 2-storey dwelling	4.5 m	770 m NW
R06g	Outdoor point of reception associated with R06	1.5 m	740 m NW

Receptor	Description	Height	Distance
R07	Existing 1-storey dwelling	1.5 m	720 m NW
R07g	Outdoor point of reception associated with R07	1.5 m	690 m NW
R08	Existing 1-storey dwelling	1.5 m	780 m W
R08g	Outdoor point of reception associated with R08	1.5 m	750 m W
R09	Existing 1-storey dwelling	1.5 m	1230 m W
R09g	Outdoor point of reception associated with R09	1.5 m	1200 m W
R10	Existing 2-storey dwelling	4.5 m	680 m SE
R10g	Outdoor point of reception associated with R10	1.5 m	650 m SE
R11	Existing 2-storey dwelling	4.5 m	790 m E
R11g	Outdoor point of reception associated with R11	1.5 m	770 m E
R12	Existing 1-storey dwelling	1.5 m	720 m E
R12g	Outdoor point of reception associated with R12	1.5 m	690 m E
R13	Existing 2-storey dwelling	4.5 m	880 m NE
R13g	Outdoor point of reception associated with R13	1.5 m	850 m NE
VL14	Noise sensitive zoned vacant lot	4.5 m	440 m N
VL15	Noise sensitive zoned vacant lot	4.5 m	1000 m W
VL16	Noise sensitive zoned vacant lot	4.5 m	1300 m W

Vacant Lots

Several vacant lots with zoning permitting noise sensitive uses were identified near the proposed site. These lots are zoned rural (RU) and Environmental Protection (EP3), which permit the construction of a dwelling.

Noise Criteria

Affected points of noise reception R01 to R13 and VL14 to VL16 have an ambient acoustical environment consistent with the Class 3 designation as defined by Chapter 3 of the EASR Publication. In a Class 3 area, the acoustical environment is dominated by natural sounds with little or no road traffic and infrequent human activity. The corresponding MECP exclusion limits are summarized in Table 2.

Table 2: Noise Exclusion Limits - Class 3

Time of Day	Sound Level Exclusion Limit* Plane of Window	Sound Level Exclusion Limit* Outdoors
Daytime (07:00 to 19:00)	45 dBA	45 dBA
Evening (19:00 to 23:00)	45 dBA	40 dBA
Nighttime (23:00 to 07:00)	40 dBA	- -

*or the minimum existing hourly background sound level Leq, whichever is higher

The MECP sound level limit is determined by the exclusion limit listed above or the minimum hourly equivalent background sound level, whichever is higher. The background sound level is not expected increase the sound level limit for the receptors in this study.

Noise Control Options

With the assumptions and criteria detailed above, a model of the proposed site was constructed to predict the noise impacts on the surrounding noise-sensitive areas. To establish a baseline, an unmitigated scenario is included below in Figure 2.

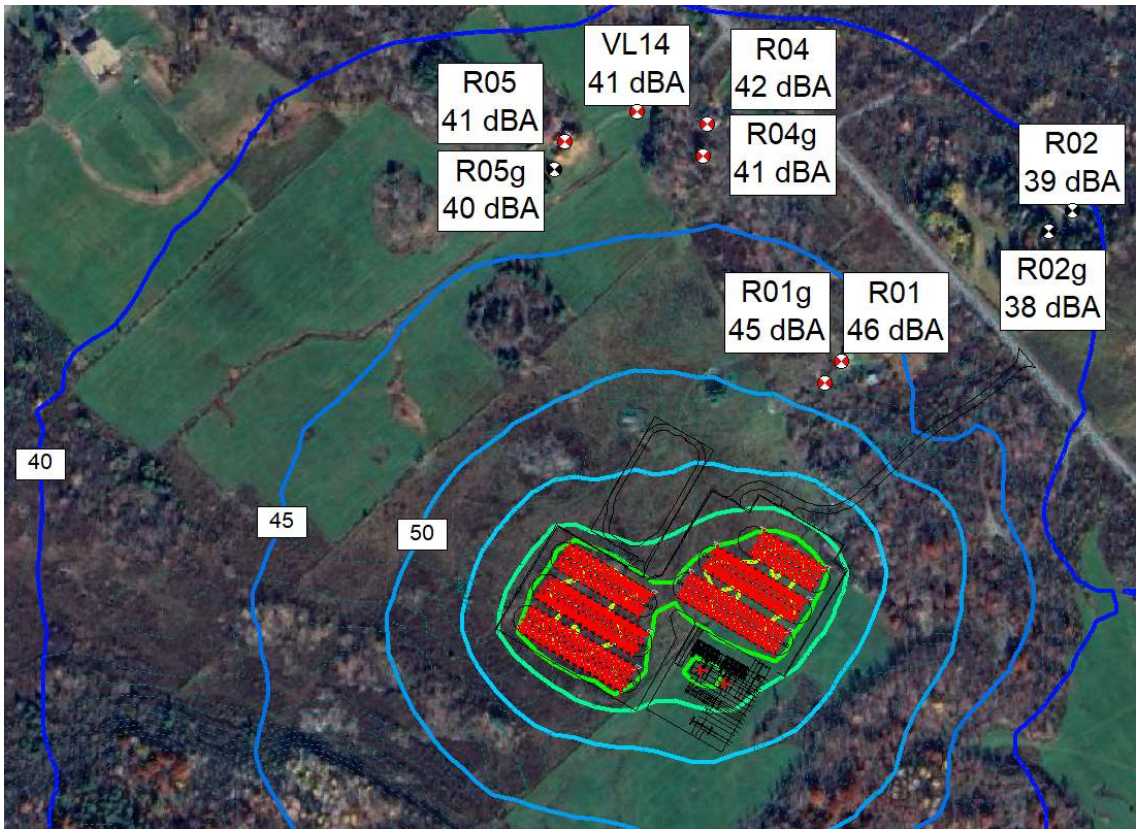

Figure 2: Unmitigated Impact – Noise Contours at 4.5m Height

Other noise controls such as barriers, berms, and a combination of both were explored. It is understood that at the current stage of design, options minimizing barrier height are preferred. As such, the barrier-only option is likely preferred.

Option 1: Barrier Only

The barrier-only mitigation option provides a noise control layout that minimizes the height of the barriers. These will not be sufficient to mitigated noise at R01 and as such, it is recommended that R01 be vacated.

Due to the receptor heights, being 2- and 3-storeys, the barrier heights will need to be 4.5 m to effectively mitigate noise. The barriers will extend along the length of the rows and, for the equipment on the east portion of the site, the barriers will also extend along the west edge.

The barrier layout and site impact are show in Figure 3.

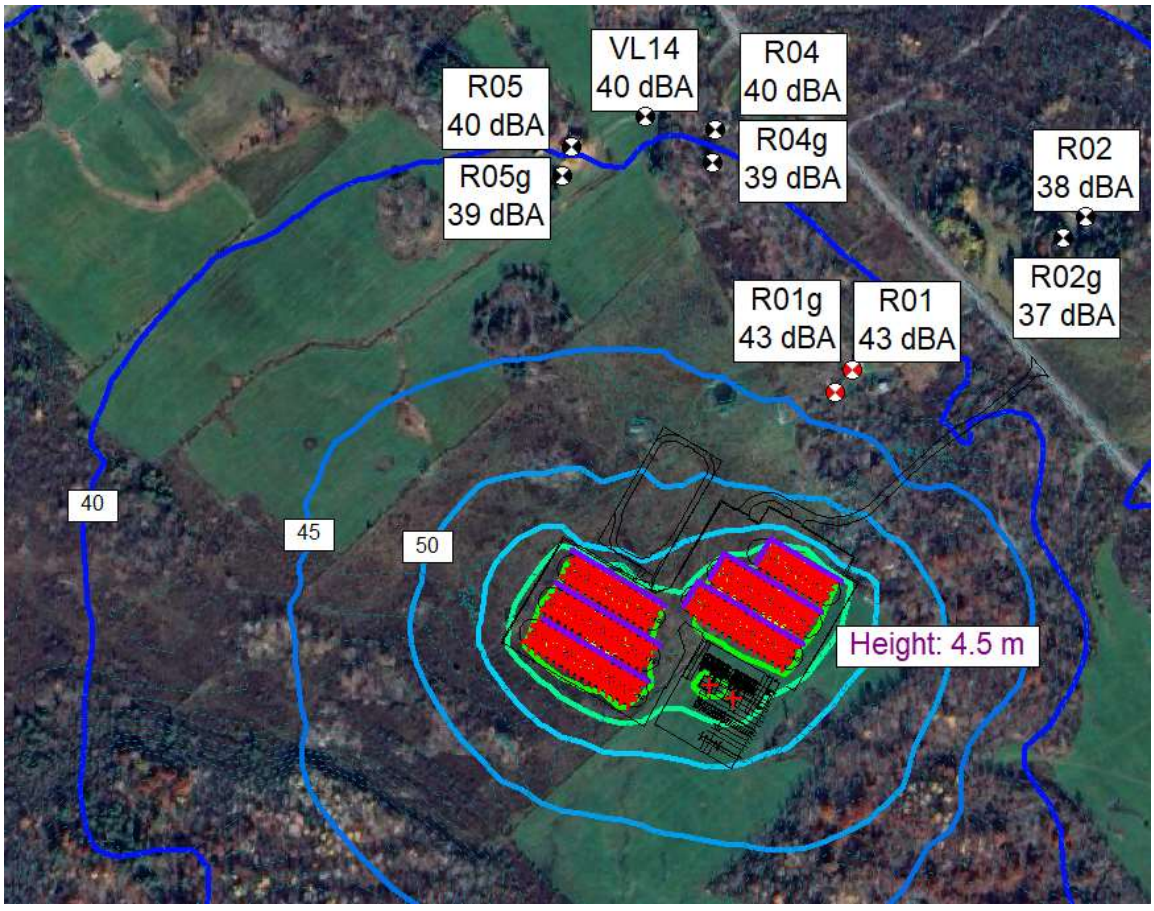

Figure 3: Option 1 – Barrier Only Impact – Noise Contours at 4.5m Height

Option 2: Berm Only

A berm-only option was explored. The berms were placed at locations such that they did not overlap with the waterways indicated on the site plans provided by Evolugen. This option is not expected to be sufficient to meet the applicable noise levels at all receptors, specifically R04 remains non-compliant in this scenario due to its height being 3-storeys.

The berm layout and site impact are shown in Figure 4.

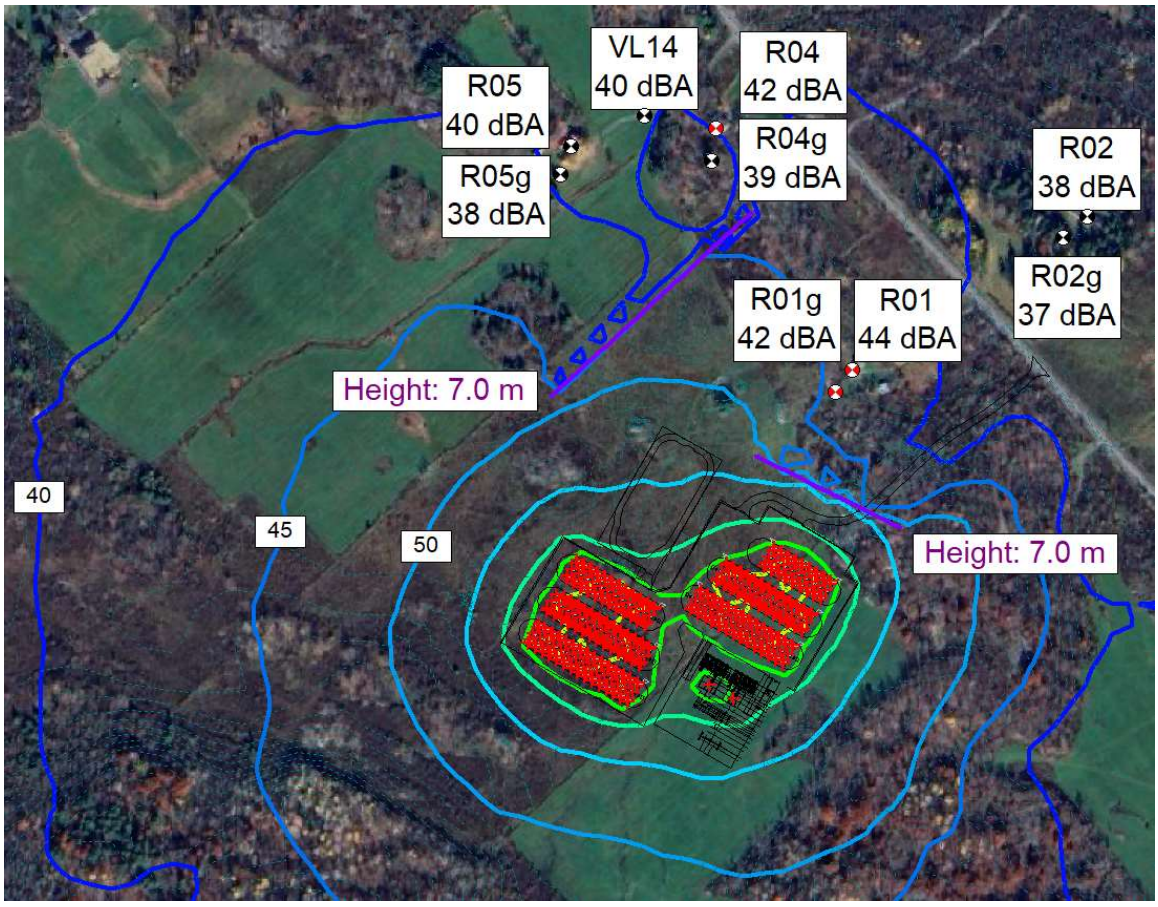

Figure 4: Option 2 – Berm Only Impact – Noise Contours at 4.5m Height

Option 3: Combination of Barriers and Berms for R01 Compliance

A combination of barrier and berms were investigated. It was found that combining the effects of a berm and barrier will permit the site to meet at R01. However, this is an extreme amount of mitigation and it is expected that it may be more practical to remove R01. This barrier and berm layout and site impact is shown in Figure 5.

This option was also investigated without R01 to decrease the barrier height further by introducing a berm to the north / northwest of the site. However due to the height of R04, a 3-storey dwelling, the berm was not able to provide enough attenuation to reduce the heights of the barriers from 4.5 m.

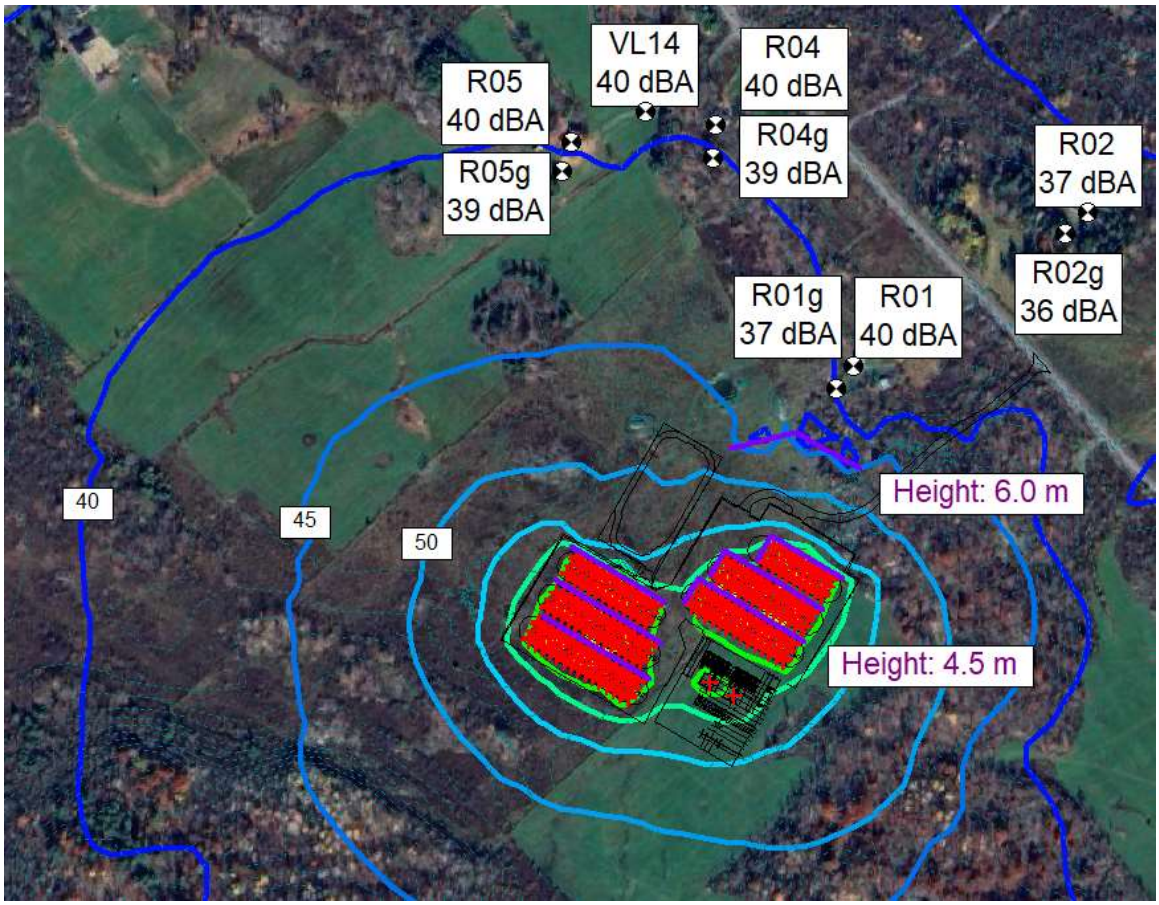

Figure 5: Option 3 – Combination of Barriers and Berms Impact – Noise Contours at 4.5m Height

Option 4: Equipment Sound Level or Tonality Reduction

As discussed under the previous section (Facility) the BESS units may not be audibly tonal at the receptors. Since the information to investigate this was not available at the time of the assessment, the units were assessed as tonal. If it can be confirmed the units are not tonal at further setbacks, the 5 dB tonal penalty can be removed. Without the tonal penalty, the site will be compliant at all receptors, excluding R01, without the used of any noise barriers. This is shown in Figure 6.

Alternatively, if the manufacturer is able to provide quieter units, a reduction of 5 dB would provide similar results.

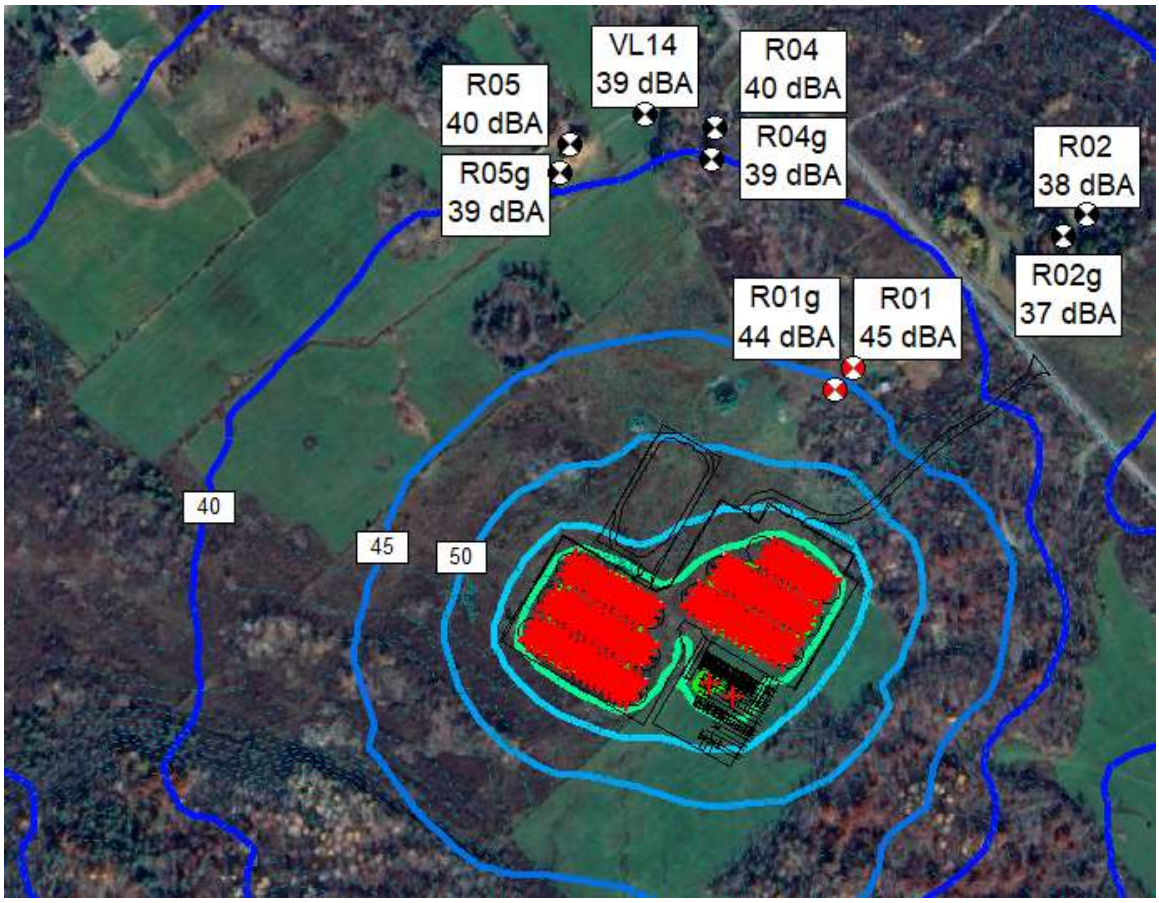

Figure 6: Option 4 – Equipment Sound Level or Tonality Reduction – Noise Contours at 4.5m Height

Unit Orientation

During the assessment of the site, the directivity of the BESS units was investigated. It was noted that the front of the unit was the “loud side” – where ventilation openings are

included – and the back of the unit was the “quiet side”. The proposed layout has the BESS units positioned back-to-back such that the loud and quiet sides average out. It may be possible to reduce the site impact at the critical receptors by positioning all the units with the quiet side facing north. This is expected to provide up to 2-3 dB of reduction. However, it is understood that this may not be a practical option to implement.

Disclaimer

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