



Reference: Aldi, Havant

Date: 26th November 2019

Technical note

Re: Assessment of fixed plant noise

Following submission of the plant noise assessment report dated 18th October 2019, the Pollution Team Leader, Charlotte Adcock, has raised a number of questions, and our comments are detailed below:

As noted, we have based the typical daytime background noise climate on the latter part of the day, to ensure a robust approach, and protect the amenity of the residents (gardens) during the evening.

In terms of the BS 4142 assessment, based on our experience, this type of plant is not considered as impulsive, and providing the plant is correctly commissioned and regularly maintained, is not considered to be tonal in nature, particularly when compared against the existing noise climate. The refrigeration plant will operate in-line with the cooling demand of the store, therefore is considered to be intermittent, therefore a +3 dB correction has been applied to the source data within the model. See para 3.7 of the report. I appreciate this is not very clear, but to take into account the +3 dB correction for the intermittency of the refrigeration plant, the source data has been input as 200% ie +3. See Appendix B, Noise Model Input Data , extract below:

Figure 1: Extract from Noise Model Input Data

Source Description	Coordinates			Outlet details			Run Q	Lp/ DNA	dBA Lw	Dist. Y/N	(m)	Mid frequency octave bands							
	X (m)	Y (m)	Z (m)	A (mm)	B (mm)	Ang. °						63	125	250	500	1k	2k	4k	8k
Gas cooler	202.5	185.0	4.5	0	0	0	200	3	A	P	Y	10.0	43	0	0	0	0	0	0
Compressor pack	202.5	185.0	2.5	0	0	0	200	3	A	P	Y	10.0	43	0	0	0	0	0	0
Gas Cooler	202.5	178.5	4.5	0	0	0	200	3	A	P	Y	10.0	43	0	0	0	0	0	0
Compressor pack	202.5	178.5	2.5	0	0	0	200	3	A	P	Y	10.0	43	0	0	0	0	0	0

It should also be noted that based on the proposed location of the plant, we have included a directivity Q factor of 3, which equates to a correction of +9 dB for reflections.

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Typically the noise data provided to ourselves for the refrigeration plant (gas coolers and compressor packs) is a single figure dBA value at a distance of 10m. Therefore as discussed, for the purposes of the acoustic modelling, the program converts the single figure sound pressure level to a sound power level in octave bands, as follows:

43 dBA at 10m

Correction from Lp at 10m to Lw = $20 \log (10\text{m}) + 8 = +28 \text{ dB}$

Split the single figure to 8 octave bands = $10 \log (8) = 9$

Re-apply A-weighting

Table 1: Noysplot conversion from LpA at 10m, to approximate Lw

Based on 43 dBA at 10m	Noise level (dB)							
	63	125	250	500	1k	2k	4k	8k
Lp at 10m	43	43	43	43	43	43	43	43
Lp to Lw	+28	+28	+28	+28	+28	+28	+28	+28
Split into 8 equal octaves	-9	-9	-9	-9	-9	-9	-9	-9
Apply A weighting	+26	+16	+9	+3	0	-1	-1	+1
Approx Lw	88	78	71	65	62	61	61	63

The above spectrum is purely an approximation, to provide octave band data for the software package, and it is noted that the re-application of the A weighting does provide artificially high low frequency content. In reality, based on our experience with this type of plant, the spectrum shape will have a flatter more even profile.

I have requested the octave band data for the specific proposed gas cooler for this development, but based on our library data for an equivalent gas cooler at a similar development, we have the following octave band sound power level:

Table 2: Gas cooler octave band noise data

	Sound power level (dB)						
	125	250	500	1k	2k	4k	8k
Gas Cooler	74	73	73	71	64	58	51

As can be seen from the manufacturer's octave band sound power level, the spectrum shape is very flat, indicative of a bland noise character, and no indication of tonality.

Whilst octave band noise data is not available from the manufacturers for the compressor housing as a packaged unit, confirmation of the noise data for the actual compressors within the housing has been confirmed. There are 4 individual compressors within the housing, and the octave band sound power levels for the internal compressors is as follows:

Table 3: Compressor octave band noise data

Compressor	Sound power level (dB)							
	63	125	250	500	1k	2k	4k	8k
4JTC-10K	69	76	83	79	76	73	74	66
4JTC-20K	70	77	84	80	77	74	75	67
4JTC-20K	70	77	84	80	77	74	75	67
2MM-07K	47	53	51	63	61	62	51	41
Overall combined	75	82	88	85	82	78	79	71

As with the gas cooler, the octave band spectrum shape of the compressors within the housing is quite flat, indicative of a bland noise character.

In summary, based on the manufacturer's octave band noise data, there is no indication that either the gas cooler or compressor pack would be tonal in nature. On this basis, and allowing a +3 dB penalty for the refrigeration plant being intermittent in use, the following rating noise levels are predicted:

Table 4: Predicted rating noise levels for all with +3dB correction to the refrigeration plant for intermittency

Receptor	Daytime (0700-2300)				Night (2300-0700)			
	Predicted LAeq	Typical Background LA90	Difference	Impact	Predicted LAeq	Typical Background LA90	Difference	Impact
Wendover Road	33 dBA	47 dBA	-14	Low	33 dBA	34 dBA	-1	Low
Wendover Road - garden	40 dBA	47 dBA	-7	Low	N/A			
Mavis Crescent	30 dBA	47 dBA	-17	Low	30 dBA	34 dBA	-4	Low
Mavis Crescent - garden	30 dBA	47 dBA	-17	Low	N/A			

I understand the concerns raised regarding the compressors, and have looked at these as a separate item.

Table 5: Predicted rating noise levels for just the compressor +3dB correction for intermittency

Receptor	Daytime (0700-2300)				Night (2300-0700)			
	Predicted LAeq	Typical Background LA90	Difference	Impact	Predicted LAeq	Typical Background LA90	Difference	Impact
Wendover Road	28 dBA	47 dBA	-19	Low	28 dBA	34 dBA	-6	Low
Wendover Road - garden	37 dBA	47 dBA	-10	Low	N/A			
Mavis Crescent	23 dBA	47 dBA	-24	Low	23 dBA	34 dBA	-11	Low
Mavis Crescent - garden	23 dBA	47 dBA	-24	Low	N/A			

Whilst the octave band sound power level data for the compressors, excluding the benefit from the housing does not indicate any tonality, we appreciate that in some cases, compressors can be tonal in nature. Based on the predicted noise levels detailed in Table 5 for just the compressor packs, if there is any tonality, at these noise levels it is likely to be considered as just perceptible. Therefore we have-run the noise model with an additional +2 dB penalty applied to the noise data for the compressor packs, in accordance with BS 4142:2014, and the predicted rating levels are as follows:

Table 6: Predicted rating noise levels for all with +3 dB correction to the refrigeration plant for intermittency, and +2 dB for potential tonality of the compressors

Receptor	Daytime (0700-2300)				Night (2300-0700)			
	Predicted LAeq	Typical Background LA90	Difference	Impact	Predicted LAeq	Typical Background LA90	Difference	Impact
Wendover Road	34 dBA	47 dBA	-13	Low	34 dBA	34 dBA	0	Low
Wendover Road - garden	41 dBA	47 dBA	-6	Low	N/A			
Mavis Crescent	31 dBA	47 dBA	-16	Low	31 dBA	34 dBA	-3	Low
Mavis Crescent - garden	31 dBA	47 dBA	-16	Low	N/A			

Based on the comparison presented in Table 6, allowing for a +3 dB penalty for the intermittency of the gas cooler and compressor pack, and +2 dB penalty for potential tonality of the compressor pack, the predicted rating noise level does not exceed the typical background noise climate, which in accordance with BS 4142:2014, is considered to be indicative of a low impact.

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