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TECHNICAL NOTE: **All Bar One, 1 Kew Road, Richmond**
Planning Reference 24/1568/FUL
Commissioning Acoustic Test of Kitchen Ventilation Plant

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This Technical Note has been prepared with respect to the requirements of the following noise-related planning condition, attached to the planning consent including for installation of replacement kitchen ventilation plant, as per planning reference 24/1568/FUL.

The condition is as follows:

> *U0190370 Mechanical plant*
>
> *1. The plant hereby permitted shall be installed, operated and maintained in strict accordance with the details provided in the acoustic report submitted by Hepworth Acoustics reference P22-347-R01v1, dated September 2024, unless otherwise agreed in writing with the Local Planning Authority.*
>
> *2. A commissioning acoustic test report shall be undertaken within two weeks of the mechanical services installation in order to demonstrate the limiting noise levels detailed in the above report have been achieved. The results of the tests shall be submitted to and approved in writing by the Local Planning Authority.*

The above referenced Hepworth Acoustics report set out appropriate noise limits for the new kitchen ventilation plant based on the provisions of British Standard 4142: 2014 + A1: 2019 '*Methods for rating and assessing industrial and commercial sound' provides methods for rating and assessing sound of an industrial and/or commercial nature'*.

As described in the report, BS 4142 sets out a qualitative means of evaluating the potential impact of plant noise emissions, based on a comparison of the 'rating' sound level of the plant to the 'background' sound level in the absence of the plant noise, stating that: "*Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact…*"

The above referenced Hepworth Acoustics report detailed the findings of a background sound level survey undertaken at the site in September 2024, prior to installation, and hence in the absence of the new kitchen ventilation plant.

Subsequently, a commissioning test was undertaken during the morning of Monday 11 November 2024.

On arrival, the kitchen ventilation plant was inspected and found to be fully and properly installed with acoustic attenuators and acoustic duct lagging applied as required.

Noise measurements were undertaken with the new kitchen ventilation plant switched on and running at full capacity. Further noise measurements were undertaken with the kitchen ventilation plant switched off, to enable suitable corrections to be made for residual noise.

Residual noise at the site was minimised by ensuring that all other plant in the existing plant area was switched off for the whole survey, insofar as was possible. However, it was not possible for the existing refrigeration plant to be switched off. Some of that equipment operates cyclically, and hence all noise measurements were undertaken during off-cycles, hence when no noise was emitted, however other units emit a continuous steady noise, albeit at a relatively low level.

It was also necessary to carry out the noise measurements during lulls in other noise, including some occasional noise on the site associated with the wider refurbishment of the premises, and also aircraft noise from planes approaching Heathrow for landing.

Other local noise included road traffic on Parkshot to the rear of the premises and other roads in the vicinity. However, care was taken to ensure that residual noise levels during noise measurements were minimal and were broadly consistent across all measurements.

To assist further to minimising interference of other extraneous noise, all noise levels have been evaluated on the basis of the L_{90} measurement index, as this metric is approach for the measurement of a steady noise. The noise measurements were fairly brief (typically ~20seconds), which is also appropriate due to the steady nature of the noise emissions of the kitchen ventilation plant.

Due to the orientation of the site, the new kitchen ventilation plant and the nearest residences at Merivale House to the south, it was not practicably possible to measure noise levels at actual habitable room window locations. This presents a degree of complexity to determining overall plant noise levels incident at the habitable room window, as is the objective of this exercise, however this is a common scenario and an appropriate approach has been adopted.

As set out in our previous report, referenced in the above condition, there is some need to consider the effects of noise at both 2nd and 1st floor levels at Merivale House. These floor levels are respectively with and without a line-of-sight to the plant deck, where the majority of the plant is located, although both floor levels have a line-of-sight to the vertical exhaust flue of the kitchen extract fan, which terminates at a somewhat higher level.

Therefore, following an approach based on our previous survey of prevailing background levels (September 2024), noise measurements were undertaken for each scenario with the measurement microphone mounted about 1 metre beyond the line of the absorptive acoustic barrier that bounds the plant deck and also with the measurement microphone lowered below the line of the acoustic barrier, hence with no line-of-sight to the plant deck.

The measured noise levels at these locations are set out in octave bands in Table 1, along with the actual kitchen ventilation plant noise levels at those locations, corrected for residual background noise.

Table 1 – Measured Noise Levels

Microphone Height	Kitchen Plant	Noise Level (dB L_{90})							
		Octave Band Centre Frequency (Hz)							
		63	125	250	500	1k	2k	4k	8k
Raised	On	62	65	52	47	44	39	37	30
	Off	54	56	50	46	44	39	31	25
	Corrected	61	64	48	41	41	36	36	29
Lowered	On	63	65	56	50	50	44	44	39
	Off	56	58	51	49	49	43	35	28
	Corrected	62	64	54	45	45	37	44	39

Noting the site constraints, the noise measurements were undertaken closer to the plant than the actual habitable room windows, and therefore further attenuation of sound over distance is applicable.

Again, due to the constraints, noise level measurements were taken at varying distances from different elements of the kitchen ventilation plant. However, based on our observations, it is estimated that the effective acoustic centre of the plant from the plant to the measurement location is about half the corresponding distance to the windows. Based on point source attenuation, a -6dB corrected is therefore applicable, and hence the calculated kitchen ventilation plant noise levels at the habitable room windows of Merivale House are set out in Table 2.

Table 2 – Calculated Kitchen Ventilation Plant Noise Levels at Merivale House Habitable Room Windows

Merivale House	Kitchen Ventilation Plant Levels (dB L_{90})								
	Octave Band Centre Frequency (Hz)								A wtd
	63	125	250	500	1k	2k	4k	8k	
1st Floor	55	58	42	35	35	30	30	23	44
2nd Floor	56	58	48	39	39	31	38	33	47

As established in our earlier report (as reference by the relevant planning condition), the kitchen ventilation plant noise does not feature tonal or impulsive characteristics readily distinctive against the residual acoustic environment, and the noise is steady rather than intermittent. Therefore, no acoustic feature corrections are warranted in accordance with the guidance in BS 4142, and the rating sound levels are equal those set out in Table 2.

The assessment of the noise emissions from the installed kitchen ventilation plant are therefore as set out in Table 3, based on the rating levels set out in Table 2 and the background levels determined in September 2024, as per our previous report.

Table 3 – Assessment of Kitchen Ventilation Plant Noise

	Merivale House	
	1st Floor	2nd Floor
Rating Sound Level, L_{Ar}	44	47
Background Sound Level, L_{A90}	45	47
Rating minus Background	**-1**	**0**

Based on the foregoing it is demonstrated that the installed kitchen ventilation plant noise levels are within pre-existing background noise levels at the nearest residential windows and are hence within the limiting noise levels detailed in the September 2024 Hepworth Acoustics report.

It is therefore recommended that planning condition U0190370 should be discharged.