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PROPOSED REPLACEMENT OF ROOF-MOUNTED CELLAR CONDENSER AT SINCLAIRS OYSTER BAR, MANCHESTER

NOISE ASSESSMENT REPORT

On behalf of:
Samuel Smith Old Brewery

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CONTENTS

		Page
1.0	INTRODUCTION	1
2.0	SITE DESCRIPTION AND PROPOSALS	2
3.0	AMBIENT NOISE SURVEY	3
4.0	ASSESSMENT OF NOISE IMPACT AND RECOMMENDATIONS	4
5.0	SUMMARY AND CONCLUSIONS	6

Appendix I – Noise Units and Indices 7

Appendix II – Results of Ambient Noise Survey 9

1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Samuel Smith Old Brewery to assess the noise impact of a proposed replacement air-cooled condenser at Sinclairs Oyster Bar in Manchester City Centre.

1.2 There are a number of air cooled condensers installed on the roof of the public house, one of which is for cooling of the cellar. However, the condensers are located in an enclosed area such that there is insufficient circulation of air. This is impairing the cooling performance of the cellar condenser. Also the discharge air from the cellar condenser is impairing the cooling performance of the condensers for the kitchen.

1.3 Therefore the proposal is to retain the compressor element of the cellar condenser in the existing location but remove the existing air cooling (i.e. fan/condensing) unit, and install a new remote air cooled condenser on a flat roof that is at a slightly higher elevation and which has a free airflow.

1.4 The noise assessment for the proposed new replacement fan unit has involved:-

- inspecting the premises (including the roof-top) and environs;
- measurement of ambient noise levels of the area late at night;
- calculating noise levels from the proposed remote condenser;
- evaluating the noise impact.

1.5 Noise levels referred to in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible. A description of noise units and noise characteristics is provided in Appendix I.

2.0 SITE DESCRIPTION AND PROPOSALS

Site Description

2.1 Sinclairs Oyster Bar is an historic building located in the Exchange Square area of the city centre of Manchester. Adjoining Sinclairs is another public house – The Old Wellington. To the east of Sinclairs is The Triangle retail building and the Cathedral is to the north.

2.2 The nearest building in residential use is the Mitre Hotel which is located to the west, on the other side of the Cathedral Gates passageway.

Proposals

2.3 A replacement air cooled condenser unit will be installed on the lift shaft roof, which is adjacent to the existing condenser area at The Triangle side of the building. The lift shaft roof is a flat roof with a low parapet wall around it.

2.4 The new chiller will be installed by Acme Refrigeration. The proposed unit is a Searle MDA23-4 twin-fan unit. The unit will be housed within an enclosure which will have a lead-clad plywood panel roof and louvred sides.

2.5 The proposed condenser is a modern unit of modest size which would not be expected to give rise to any adverse noise impact on neighbouring retail and licenced premises, or the Cathedral, which are used in the daytime and evening. However, since the condenser could operate at any time of day or night, it is necessary to consider any potential noise impact on residential-type buildings at night i.e. at the time when background noise levels are likely to be at their lowest. Therefore the potential noise impact has been assessed for the nearby Mitre Hotel assuming a 'worst case' operating time of the condenser in the middle of the night.

3.0 AMBIENT NOISE SURVEY

3.1 A noise survey was carried out late at night to quantify the existing ambient noise climate outside The Mitre Hotel. The survey was undertaken during the early hours of Tuesday 9th June 2009 with noise levels measured between approximately 02:40 hours and 03:10 hours. The noise measurements consisted of a number of five minute samples taken outside the Cathedral Gates elevation of the hotel.

3.2 The weather conditions for the noise survey were dry, mild and calm. The equipment used for the survey was a B&K 2260 Type 1 Sound Level Meter (Serial no. 02467015). The calibration level of the instrument was checked both before and after the survey; no variation in the calibration level was noted.

3.3 The results of the noise measurements are detailed in Appendix II and the values measured are summarised in Table 1.

Table 1: Summary of Ambient Noise Levels Measured at Night

Measured Noise Levels, dB	
L_{Aeq}	L_{A90}
53 – 54	51 – 52

3.4 The ambient noise climate at the site was due to building services equipment, occasional pedestrians and distant road traffic.

4.0 ASSESSMENT OF NOISE IMPACT AND RECOMMENDATIONS

4.1 When assessing the potential environmental noise impact of new fixed plant and machinery it is appropriate to refer to British Standard 4142 'Method for rating industrial noise affecting mixed residential and industrial areas', 1997. This standard requires the 'Specific Noise Level' from the industrial plant (in L_{Aeq}) to be assessed outside the nearest noise-sensitive building and compared with the measured background noise level (L_{A90}). A 5 dB 'acoustic feature' penalty is added for any plant which gives rise to sudden peaks of noise or discrete tones to obtain the 'Rating Level'.

4.2 British Standard 4142 states that if the rated noise level exceeds the L_{A90} background noise level by 10 dB or more then complaints would be likely. An excess of 5 dB over the background noise level is viewed as being 'of marginal significance'. A noise rating level of 10 dB below the background noise is a positive indication that complaints will be unlikely.

4.3 BS 4142 was devised for industrial noise (i.e. factory noise) in mixed industrial/residential areas. However, although we are not dealing here with a mixed industrial/residential area and the proposal is for a small condenser, it is common practice to apply the same standard to such small scale proposals. Therefore the condenser noise has been assessed to BS 4142.

4.4 The proposed condenser will be located at a distance of approximately 25 metres from The Mitre Hotel. The quoted noise output level of the unit is 49 dB(A) @ 10 metres. This equates to a noise level of 41 dB(A) at 25 metres, as shown in Table 2.

Table 2: Calculation of Specific Noise Level

Location	Condenser Noise Output in dB(A)	Distance	Distance attenuation 20 log 25/10	Specific Noise Level
Mitre Hotel	49 dB(A) @ 10 metres	25m	-8 dB(A)	41 dB(A)

4.5 The calculated noise level of 41 dBL_{Aeq} is low. This level is at least 10 dB(A) below the background noise levels measured late at night. The calculated noise level does not take into account any noise reduction that will be provided by the proposed enclosure. Thus the assessment is a 'worst case' evaluation.

4.6 We have also calculated octave band noise levels (between 63 Hz and 4KHz) which were found to be at least 5 dB below the L_{90} octave band noise levels measured late at night.

4.7 The BS 4142 assessment is shown in Table 3. As the condenser could switch on/off at any time, the 5dB acoustic feature penalty has been applied.

Table 3: Night-time BS 4142 Assessment

Location	Specific Noise Level	Rating Level (incl. +5 dB acoustic feature correction)	Lowest Background Noise Level (L_{A90})	Excess over background noise
Mitre Hotel	41 dB	46 dB	51 dB	-5

4.1 Table 3 shows that the Noise Rating Level will be 5 dB below the lowest background noise measured at night outside the Mitre Hotel. Therefore, in terms of British Standard 4142, this means that the noise impact will be less than 'of marginal significance'.

5.0 SUMMARY AND CONCLUSIONS

5.1 An assessment of the potential noise impact of locating an air cooled condenser unit on the roof of Sinclairs Oyster Bar has been undertaken.

5.2 The proposed air cooled condenser will replace an existing older fan unit that is installed on the roof. The unit will be located within a louvred enclosure. The proposed condenser is a modern unit which would not be expected to give rise to any adverse noise impact on the Cathedral or neighbouring retail and licenced premises, which are used in the daytime and evening.

5.3 The nearest residential-type building in the area is The Mitre Hotel. The condenser will be located on the east side of the roof, well away (25 metres approx.) from the hotel.

5.4 The noise level from the proposed new condenser unit has been calculated outside the hotel and was found to be 41 dB L_{Aeq}. The existing noise level measured outside the hotel in the middle of the night was found to be 51 dB L_{A90}. Therefore the noise from the proposed new condenser unit will be well below the prevailing night-time noise climate of the area.

5.5 The assessment concludes that the proposed new air-cooled condenser unit will not result in any adverse noise impact on the occupiers of nearby buildings.

Appendix I – Noise Units and Indices

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) Glossary of Terms

When a noise level is constant and does not fluctuate over time, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously

varying, a number of other indices, including statistical parameters, are used. The indices used in this report are described below.

L_{Aeq} This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, LAeq is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. L_{A90} is used as a measure of background noise.

Appendix II – Results of Ambient Noise Survey

Date: Tuesday 9th June 2009
Equipment: B&K 2260 sound level meter (Serial no.02467015), tripod, calibrator.
Weather: Dry, mild and calm

Time (hours)		Noise levels (dB)			Comments
		L_{Amax}	L_{Aeq}	L_{A90}	
02:37	02:42	63.3	52.6	51.4	Building services, distant road traffic, distant pedestrian noise
02:42	02:47	62.2	52.8	51.2	Building services, distant road traffic, distant pedestrian noise
02:47	02:52	62.5	54.1	52.2	Building services, distant road traffic, occasional pedestrians
02:52	02:57	60.4	53.8	52.0	Building services, distant road traffic, occasional pedestrians, people by steps
02:57	03:02	60.3	54.1	52.0	Building services, distant road traffic, occasional pedestrians
03:02	03:07	63.1	52.5	51.2	Building services, distant road traffic, occasional pedestrians