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Project **Red Lion Street Premier Inn**
29-37 Red Lion Street, London, WC1R 4PS

Title **Mechanical Plant Noise Acoustic Assessment**

Sub Title

Client McAleer & Rushe Group
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Revision	Reason	Checked	Signature

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1. INTRODUCTION

1.1 Adnitt Acoustics have been commissioned by McAleer and Rushe Group to undertake a plant noise assessment of the proposed mechanical plant at the new Premier Inn development in Red Lion Street, London.

1.2 This assessment makes use of noise level information provided by Caldwell Consulting Engineers, noise survey data collected by Adnitt Acoustics and Camden Council Planning Policy DP28.

1.3 As this is a technical report it will be necessary to make use of some technical terms. To assist the reader a glossary has been included in Appendix A.

2. MECHANICAL PLANT NOISE DESIGN CRITERIA

2.1 The Local Authority, Camden Council, have provided the following planning policy with regard to noise from mechanical plant at the nearest noise sensitive receptors. This policy (Policy DP28) is reproduced as Table 1455/T1, below:

Noise description and location of measurement	Period	Time	Noise Level
Noise at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	5dB(A)<LA90
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A)<LA90
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at 1 metre external to a sensitive façade	Day, evening and night	0000-2400	10dB(A)<LA90
Noise at 1 metre external to a sensitive façade where LA90>60dB	Day, evening and night	0000-2400	55dB L_{Aeq}

Table 1455/T1 – Local Authority Plant Noise Criteria

3. ENVIRONMENTAL NOISE SURVEY

3.1 Measurements of the internal and external ambient noise levels were undertaken between Tuesday 22nd October and Saturday 26th October 2013. The measurements consisted of a series of discreet but continuous 15 minute measurements on the roof of the existing building at 5th floor level.

3.2 The external position was located overlooking the Red Lion Street façade of the building on the flat roof at the 5th floor level of the existing building

3.3 A schedule of equipment used during the noise survey may be found in Table 6, below. The weather during the survey was mainly dry but windy. Full weather data was recorded on site shows that for a majority of the time the wind speeds were less than the 5m/s, which is the recommended maximum wind speed for ambient noise measurements given in BS 4142:1997.

Description	Manufacturer and Model Number	Serial Number
Sound Level Meter with Real Time Analyser	Cirrus Optimus Green	G061849
Calibrator	Cirrus CR:515	60704

Table 1455/T2 – Equipment used during the noise survey.

3.4 A summary of the results of the noise survey is presented in Table 7, below. To assist the reader these have been presented in terms of the daytime (07:00hrs – 23:00hrs) and night-time (23:00hrs – 07:00hrs) periods.

Measurement Position	Time Period	$L_{Aeq,T}$ (dB)	L_{AFMax} (dB)	L_{A90} (dB)	Octave Band Levels (dB)				
					125Hz	250Hz	500Hz	1kHz	2kHz
External	Daytime	59.9	98.8	50	63.6	59.2	56.3	56.1	52.4
	Night-time	54.9	83.1	45	58.1	53.5	50.2	51.6	47.9

Table 1455/T3 – Summary of Noise Survey Results

3.5 The time history results of the overall A-weighted noise levels may be found in Figures 1455/TH1 which is appended to this report.

4. MECHANICAL PLANT NOISE ASSESSMENT

4.1 Predictions of mechanical plant noise have been undertaken using information provided by Caldwell Consulting Engineers. Predictions have been made at a nominal sensitive façade at 10m from the mechanical plant items. The noise level criteria have been derived from the Local Authority criteria and background noise survey as 39dB $L_{Aeq,T}$ at the nearest noise sensitive façade.

4.2 It is understood that there are two major plant areas:

- Rear of the building containing a number of air handling units;
- Southern elevation of the building over the kitchen;

Air Handling Units Noise Predictions

	Description	Parameter	Octave Band Noise Levels (dB)							
			63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
A	PURY-EP200	SPL at 1m for one unit	56.5	48.4	46	39	38.5	32.5	33	25.5
B		SPL at 1m for 11 units	66.9	58.8	56.4	49.4	48.9	42.9	43.4	35.9
C	PUHY-EP250	SPL at 1m for 1 unit	51	52	47	43	42.5	44	42	38.5
D		SPL at 1m for all units	67	60	57	50	50	46	46	40
E	Distance Correction	10m	20	20	20	20	20	20	20	20
F	Noise level at receptor	SPL (D-E)	47	40	37	30	30	26	26	20
G	A-Weighting		-26.2	-13.8	-8.6	-3.2	0	1	1	-1
H	Noise Level at Receptor	SPL(A) (F+G)	21	26	28	27	30	27	27	19

Table 1455/T4 – Noise Level Predictions for Air Handling Units

4.3 The predicted noise levels at the nominal nearest façade for these units is 36dB $L_{Aeq,T}$ which is compliant with the criteria of the Local Planning Authority.

Kitchen Extract Fan

	Description	Parameter	Octave Band Noise Levels (dB)							
			63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
A	Fan Noise Level	SWL	93	62	60	84	80	78	72	62
B	Attenuator Performance		3	6	11	20	25	25	15	8
C	Distance Correction	10m	28	28	28	28	28	28	28	28
D	Noise level at receptor	SPL (A-B-C)	62	28	21	36	27	25	29	26
E	A-Weighting		-26.2	-13.8	-8.6	-3.2	0	1	1	-1
F	Noise Level at Receptor	SPL(A) (E+F)	36	14	12	33	27	26	30	25

Table 1455/T5 – Noise Level Predictions for Kitchen Extract Fan

4.4 The predicted noise levels at the nominal nearest façade for these units is 39dB $L_{Aeq,T}$ which is compliant with the criteria of the Local Planning Authority.

5. CONCLUSION

5.1 Adnitt Acoustics were commissioned by McAleer and Rushe Group to undertake a plant noise assessment of the proposed mechanical plant at the new Premier Inn development in Red Lion Street, London.

5.2 This assessment made use of noise level information provided by Caldwell Consulting Engineers, noise survey data collected by Adnitt Acoustics and Camden Council Planning Policy DP28.

5.3 The assessment showed that at a nominal receiver, approximately 10m away from the plant areas, the predicted noise levels comply with the criteria set out by Camden Council.

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APPENDIX A: GLOSSARY OF ACOUSTIC TERMS

dB	Sound levels are usually measured in decibels (dB) and relate absolute values to a reference value. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which reflects the response of the human ear to sound.
L_p	The sound pressure level, Lp, is a measure of the total instantaneous sound pressure at a point in space. The threshold of hearing occurs at approximately 0 dB and the threshold of pain is around 140 dB.
dB(A)	The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A). For clarity and convenience, the 'A' is often included in the acoustic descriptor, eg LAeq, rather than in brackets after the units. For example, A-weighted levels can be quoted as 55 dB LAeq.
$L_{Aeq,T}$	The most widely used unit is the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$). It is an energy average and is defined as the level of a notional sound which (over a defined period of time, T) would deliver the same A-weighted sound energy as the actual fluctuating sound.
$D_{nT,w}$ **(dB)**	DnT is widely used to set sound insulation criteria for dwellings, where To is taken as 0.5 seconds. The suffix $_w$ indicates that the third octave band values have been weighted with an emphasis on low frequency to obtain a single number rating.
R_w **(dB)**	The sound reduction index, R, of an element such as a wall, floor, door or window describes the sound transmitted through that element. It is measured in a laboratory with suppressed flanking transmission. R varies with frequency and is expressed as a value for each one-third octave band or octave band. The suffix $_w$ indicates that the third octave band values have been weighted with an emphasis on low frequency to obtain a single number rating.
$L'_{nT,w}$ **(dB)**	L'_{nT} is widely used for dwellings, where T_o is taken as 0.5 seconds. The suffix $_w$ indicates that the third octave band values have been weighted with an emphasis on low frequency to obtain a single number rating.

Figure 1455/ TH 1 : Time History of External Noise Measurements