Royal London House
196 Deansgate, Manchester

Noise Level Commissioning Report

23780/NLC1

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For:
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Document Control

Rev	Date	Comment	Prepared by	Authorised by
0	12/10/18	-		-
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1.0 Introduction

A change of use from A1 (retail) to A3/A4 (e.g. restaurant/bar) has reached pre-completion stage for a unit at the ground and basement level of Royal London House, 196 Deansgate, Manchester. The unit is to be occupied by Manahatta bar.

As part of the planning approval, a condition was set requiring a post-completion noise report to demonstrate that pre-planning "acoustic improvements" have taken place and also to ensure that the proposed limit noise levels do not exceed agreed noise criteria.

Hann Tucker Associates carried out this post-completion site survey on 26 September 2018. This report presents our findings.

2.0 Objectives

To visit site to visually inspect the fit-out works to ensure acoustic improvements have been carried out in accordance with the requirements of Planning Condition 11.

To carry out noise level measurements to inform an assessment of noise emissions from the operation of the unit in terms of:-

- Music noise levels to office accommodation above.
- Music noise levels to external receptors (through facades).
- Noise emissions from external plant and louvres.

To commission the tenant's music PA system to ensure music noise levels do not exceed pre-agreed operational noise limits. Once set, to carry out a subjective evaluation of noise transfer to office accommodation above and to the street and comment as appropriate.

3.0 Site Description

3.1 Location

The site is located at Royal London House, 196 Deansgate and falls within Manchester City Council's jurisdiction. See Location Map below.



Location Map (Map Data © 2016 Google)

3.2 Description

The site comprises a ground plus five (5No.) storey building on Deansgate, with Manahatta bar at ground and basement floors and office accommodation from floors 1 – 5. The surrounding buildings comprise predominantly commercial and retail uses and are generally comparable in height to 196 Deansgate. However, an existing commercial unit called Invicta House to the north over Atkinson Street has been granted planning approval for a conversion into a hotel. See Site Plan below.



Site Plan (Imagery © 2016 Google)

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Planning Condition 11

Planning Condition 11 states:-

"Prior to first occupation of the premises, a post completion noise report, to include sound testing and inspection of the premises to ensure that the required acoustic improvements have taken place and also to ensure that the proposed limiting levels do not exceed noise criteria, shall be submitted to, and approved in writing by, the City Council, as local planning authority."

6.0 Pre-Planning Assessment

A pre-planning noise impact assessment was carried out by Hann Tucker Associates, as presented in Report 23780/NIA1 (Revision 9) dated 4 April 2018. This report confirmed our understanding that, once works were complete, the facades of the unit would comprise the following "acoustic improvements".

- Single glazed windows to be retained and renovated;
- 500mm thick (min) masonry walls, made good;
- Lobbied entrance door (please see example specification attached);
- Timber emergency exit door on Deansgate refurbished with acoustic seals;
- New emergency exit door to rear elevation on Little Quay Street, assumed conventional sealed external door.

With the above carried out, the Report advised that noise criteria (stipulated in line with Manchester City Council guidance) should be achieved provided the following internal music noise limits were achieved.

Time Period	Limiting Reverberant Sound Pressure Level, $L_{eq,5min}$ (dB) at OBCF (Hz)								Broadband (dBA)
	63	125	250	500	1k	2k	4k	8k	
Daytime (08:00-20:00)	84	80	78	80	80	80	80	80	89
Evening (20:00-03:30)*	94	88	89	90	90	90	90	90	97

* Providing office accommodation above is not sensitive to noise beyond 20:00hr.

7.0 Agreed Noise Criteria

7.1 Operational (Music) Noise

Operational (music) noise limits presented above were assigned based on the noise transfer assessments to first floor office accommodation and external noise sensitive receptors. The agreed noise criteria for these areas are presented below.

Internal Noise Transfer from Commercial Unit

Receive Location (Sensitive Period)	Operational Noise Limit, $L_{eq,5min}$ (dB) at OCBF (Hz)								Broadband
	63	125	250	500	1k	2k	4k	8k	
First Floor Office	55	44	35	29	25	22	20	18	NR25

External Noise Breakout from Commercial Unit

External Receptor Type	Operational Noise Limit, $L_{eq,5min}$ (dB) at OCBF (Hz)								Broadband (dBA)
	63	125	250	500	1k	2k	4k	8k	
Office	61	50	49	48	46	45	40	32	50
Residential	60	49	48	46	45	42	37	30	48

7.2 Plant Noise

For plant noise, the following criteria were assigned which are to be achieved at the nearest noise sensitive external receptors.

Period	BS 4142 Plant Noise Rating Limit (dBA)
Daytime (07:00-23:00hr)	48
Night-time (23:00-07:00hr)	38

8.0 Visual Inspection

Comments on our visual inspection of the fit-out works and façade acoustic improvements are presented below.

Element	Expected Improvements	Inspection Notes
Windows	Single glazed windows to be retained and renovated	Existing timber frames renovated to a good standard. Frame and wall interfaces sealed to a good airtight standard. No noticeable weak sound paths when noise was generated in bar. See Figure 1.
Masonry walls	500mm thick (min) masonry walls, made good	All walls appear to have been made good and finished with paint, wallpaper or tiled finishes. Interfaces between walls and windows/doors well sealed.
Entrance door	Lobbied entrance door	Entrance door lobbied with 2 sets of heavy glazed doors. No noticeable weak sound paths when noise was generated in bar. See Figure 2.

Element	Expected Improvements	Inspection Notes
Deansgate emergency door	Exit door to be refurbished with acoustic seals	The door appears to have been refurbished to a good standard with acoustic seals installed. Frame abutments to external walls fully sealed to a good airtight standard.
Little Quay St emergency door	New door to be installed with acoustic seals	A new door has been installed to separate the bar area from the rear escape corridor. The door is timber with acoustic seals to jambs.

All “acoustic improvements” presented in our pre-planning Report appear to have been carried out.



Figure 1 Window Refurbishment



Figure 2 Lobbied Entrance Door

9.0 Operational (Music) Noise Assessment

In order to assess whether operational music noise output complies with the criteria presented in Section 7.1, sound level differences across the separating elements (floor to office and façade to street) were determined. Pink noise was generated by the house PA system and sound level measurements in octave bands 63 Hz to 8 kHz were taken within the bar, within the offices on the floor above and at 1 metre from the façade. Background noise levels were taken in each of the receiver spaces to correct for extraneous noises (e.g. road traffic).

A Precision 1 sound level meter was used. The measurement results and corresponding sound level differences (based on are presented below.

Space	Sound Level (dB) at OBCF (Hz)							
	63	125	250	500	1k	2k	4k	8k
Manahatta Bar (pink noise)	101	98	94	95	94	93	92	89
Office (highest recorded noise level in 2No meetings rooms and across vacant office floor) *	68	59	50	44	34	26	22	15
Deansgate Frontage @ 1m (inc. lobbied door and emergency door) *	80	73	67	64	64	61	56	49
Little Quay St Frontage @ 1m (inc emergency door) *	78	74	64	60	56	60	58	50

* Corrected for background noise (e.g. road traffic, office air conditioning).

Space	Sound Level Difference (dB) at OBCF (Hz)							
	63	125	250	500	1k	2k	4k	8k
Floor to Office	33	39	44	51	60	67	70	74
Deansgate Frontage	21	26	27	31	29	32	37	39
Little Quay St Frontage	23	24	31	35	37	33	35	38

Using the above sound level differences and the agreed operational music noise limits presented in Section 6.0, the following tables present our assessment of operational noise output.

Assessment to Office

Space	Sound Level (dB) at OBCF (Hz)							
	63	125	250	500	1k	2k	4k	8k
Bar Daytime Noise Limit	84	80	78	80	80	80	80	80
Floor Level Diff.	33	39	44	51	60	67	70	74
Music Noise Level in Office	51	41	34	29	20	13	10	6
Acoustic Criteria	55	44	35	29	25	22	20	18
Compliance?	✓	✓	✓	✓	✓	✓	✓	✓

Assessment to Upper Floor Office Windows on Deansgate & Atkinson St (Daytime)

Space	Sound Level (dB) at OBCF (Hz)							
	63	125	250	500	1k	2k	4k	8k
Bar Daytime Noise Limit	84	80	78	80	80	80	80	80
Deansgate Façade Level Diff.	21	26	27	31	29	32	37	39
$10*\log_{10}(S/r^2)$	-2	-2	-2	-2	-2	-2	-2	-2
-14	-14	-14	-14	-14	-14	-14	-14	-14
Music Noise Level at Window	47	38	35	33	35	32	27	25
Acoustic Criteria	61	50	49	48	46	45	40	32
Compliance?	✓	✓	✓	✓	✓	✓	✓	✓

Assessment to Windows of Proposed Hotel on Atkinson St (Evening/Night)

Space	Sound Level (dB) at OBCF (Hz)							
	63	125	250	500	1k	2k	4k	8k
Bar Daytime Noise Limit	94	88	89	90	90	90	90	90
Little Quay St Façade Level Diff.	23	24	31	35	37	33	35	38
$10*\log_{10}(S/r^2)$	-5	-5	-5	-5	-5	-5	-5	-5
-14	-14	-14	-14	-14	-14	-14	-14	-14
Music Noise Level at Window	52	45	39	36	34	38	36	33
Acoustic Criteria	60	49	48	46	45	42	37	30
Compliance?	✓	✓	✓	✓	✓	✓	✓	+3

The results demonstrate that, provided internal operational (music) noise limits are met, the agreed noise criteria should be achieved. Note the 3 dB exceedance in noise at 8 kHz to the proposed hotel is subjectively insignificant.

10.0 Plant Noise Survey

Noise level measurements were taken at 1 metre from newly installed external plant items (and façade ventilation louvre outlets) serving the Manahatta bar. The results of these measurements are presented below. Measurements were taken with a Precision 1 sound level meter. Background noise level readings were also taken.

Unit	Location	Measured Sound Level @ 1m (dBA)	Notes
Kitchen Extract (Casing)	Roof	72	Only audible over existing roof plant when in close proximity to the unit
Kitchen Extract Fan (Grille)	Roof	75	Only audible over existing roof plant when in close proximity to the unit
Background	*Roof*	*73*	*Other existing plant dominant*
Condensers	Lightwell	66	Barely audible over noise from existing plant within lightwell
Background	*Lightwell*	*66*	*Other existing plant dominant*
Condensers in Rear Fire Escape Corridor	Little Quay St	64	Non-tonal
General Supply/Extract Louvre	Little Quay St	63	Non-tonal
Background	*Little Quay St*	*62*	*Road traffic noise*

For rooftop units, noise levels only reached/exceeded prevailing noise levels from existing rooftop plant at close proximity to the units (within 1 metre). At a distance of, say, 2 to 3 metres the kitchen extract was barely discernible over existing plant noise and is not, therefore, contributing significantly to total roof plant noise output. This would suggest the risk of complaints from the newly installed roof plant is **low**.

The situation is similar for new condensers installed within the lightwell. The new plant was barely discernible over existing plant noise and is not, therefore, contributing significantly to total lightwell plant noise output. This would suggest the risk of complaints from the newly installed lightwell plant is **low**.

For plant at street level on Little Quay Street, the following table presents an assessment of noise to the proposed hotel development over Atkinson Street to the north (circa 20 metres distance from plant outlets).

Desc.	Sound Level (dBA)	
	Condensers	Supply/Extract Louvre
Source Noise Level at 1m (corrected for background)	61	59
Divergence (20m)	-26	-26
Directionality (receptor ca. 45 degrees off axis)	-2	-2
Noise Level at receptor	33	31
Cumulative noise level	35	
Acoustic feature (BS 4142)	0	
BS 4142 Noise Rating Level	35	
Night plant noise limit	38	
Rating Level	✓	

The above demonstrates that the risk of complaints due to plant noise emission from the Manahatta bar is likely to be **low**.

11.0 PA System Commissioning

In conjunction with the resident sound engineer, music noise levels were adjusted in octave bands (using a software based noise limiter with octave band filters) until agreed daytime and evening/night noise limits were being achieved. The levels were tested by measuring noise across the entire bar area and by playing various dance/club music tracks.

We have been informed that the resident sound engineer has programmed these limits via an electronic signal limiter within the software based PA audio controls available to the house sound engineers only.

A subjective evaluation of resultant music noise levels was carried out in the office accommodation above and on the street (Deansgate and Little Quay Street) with music noise playing at a loudness commensurate with the agreed evening/night noise limits. On the street, close to façade, music noise was audible but not dominant over road traffic noise. In the office, bass-beat music noise was faintly audible over the air conditioning systems. However, during office hours low frequency noise limits will be 8-10 dB lower and thus the risk of adverse impact to office occupants is considered low provided noise limits are adhered to.

Appendix A – Acoustic Terminology

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

L_p — Sound Pressure Level (SPL) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

L_w — Sound Power Level (SWL) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).