

# SANDY BROWN

*Consultants in Acoustics, Noise & Vibration*

**16303-R01-B**

**8 August 2016**

## Northumberland House, High Holborn

*Environmental noise survey report*

55 Charterhouse Street, London EC1M 6HA  
68 Sackville Street, Manchester M1 3NJ  
2 Walker Street, Edinburgh EH3 7LA  
35 St Paul's Square, Birmingham B3 1QX

T: +44 (0)20 7549 3500  
T: +44 (0)161 771 2020  
T: +44 (0)131 235 2020  
T: +44 (0)121 227 5020

[post@sandybrown.com](mailto:post@sandybrown.com)  
[www.sandybrown.com](http://www.sandybrown.com)

Sandy Brown Associates LLP  
Registered in England & Wales No. OC 307504

Registered Office: 55 Charterhouse Street, London EC1M 6HA

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<b>Version</b>	<b>Date</b>	<b>Comments</b>	<b>Author</b>	<b>Reviewer</b>
A	5 Aug 16		Zac Fox	Jason Swan
B	8 Aug 16	Receivers updated	Zac Fox	Jason Swan

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## Summary

Sandy Brown Associates LLP (SBA) has been commissioned by Workman LLP to provide acoustic advice in relation to the proposed development at Northumberland House, 303-306 High Holborn, London, WC1V 7JZ.

An environmental noise survey has been carried out to determine the existing background sound levels in the area and setting appropriate plant noise limits in line with the requirements of the Camden Council.

The noise survey was performed between 15:50 on the 22 July 2016 and 15:50 on 27 July 2016.

The representative background sound levels measured during the survey were  $L_{A90,15min}$  48 dB during the daytime and  $L_{A90,15min}$  44 dB at night.

Based on the requirements of Camden Council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed  $L_{Aeq,15min}$  43 dB during the daytime, and  $L_{Aeq,15min}$  39 dB during the night. These limits are cumulative, and apply with all plant in operation under normal conditions. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

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## 1 Introduction

Sandy Brown Associates LLP (SBA) has been commissioned Workman LLP to provide acoustic advice in relation to the proposed development at Northumberland House, 303-306 High Holborn, London WC1V 7JZ.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

This report presents the survey method, results of the environmental noise survey, and a discussion of acceptable limits for noise emission from building services plant

## 2 Site description

### 2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1, highlighted in red. The site is located in the London Borough of Camden on the south side of High Holborn. Chancery Lane is to the east of the site.



Figure 1 Site map (courtesy of Google Earth Pro)

## 2.2 Adjacent premises

The nearest noise sensitive premises to the site are shown in Figure 1. Lincoln House to the west and 2-4 Stone Buildings to the south are commercial buildings and have been highlighted in blue. The top floor of 76 Chancery Lane and Flat 1 of 1 Stone Buildings are residential accommodation and are highlighted in green.

## 3 Method

### 3.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 5 days to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 15 minute periods between 15:50 on the 22 July 2016 and 15:50 on 27 July 2016. The equipment was installed and collected by Zac Fox and Jonathan Riley.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. The microphone was located approximately 1.5 m above the ground and 1 m away from other reflective surfaces, so the resulting levels are to be considered facade levels. A photograph showing the measurement position is provided in Figure 2. This location was chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises.



Figure 2 Photo showing the location of the logging equipment at Northumberland House

## 4 Measurement results

### 4.1 Observations

The dominant noise sources observed at the site at the start and end of the survey consisted of the plant within the courtyard of Northumberland House, which is understood does not run full time.

Less significant noise sources included nearby construction noise and a small birds' nest.

During the Friday and Saturday nights well into the following mornings there were high noise levels from what seems to be plant for an all-night weekend venue or something similar. This noise was not observed when setting out the logger, and has been excluded from the assessments to be conservative.



## 4.2 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A graph showing the results of the unattended measurements is provided in Appendix B.

The day and night time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{Aeq,16h}$ (dB)	$L_{Aeq,8h}$ (dB)
Friday 22 July 2016	-	63
Saturday 23 July 2016	59	62
Sunday 24 July 2016	56	47
Monday 25 July 2016	54	50
Tuesday 26 July 2016	54	48
Average	56	54

The minimum background sound levels measured during the unattended survey are given in Table 2.

Table 2 Minimum background sound levels measured during the survey

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{A90,15min}$ (dB)	$L_{A90,15min}$ (dB)
Friday 22 July 2016	62 *	46
Saturday 23 July 2016	47	55
Sunday 24 July 2016	46	44
Monday 25 July 2016	47	44
Tuesday 26 July 2016	46	45

\* Measurement not made over full period due to monitoring start and end time

The lowest background sound levels measured during the survey were  $L_{A90,15min}$  46 dB during the daytime and  $L_{A90,15min}$  44 dB at night.

In line with BS 4142:2014, for the purpose of analysis and establishing representative background sound levels, day and night time typical levels have been quantified using statistical analysis from the continuous logging measurements.



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Daytime and night time statistical analysis of representative values for the site are given in Figure 3 and Figure 4. These exclude the data from Friday and Saturday nights to be conservative.

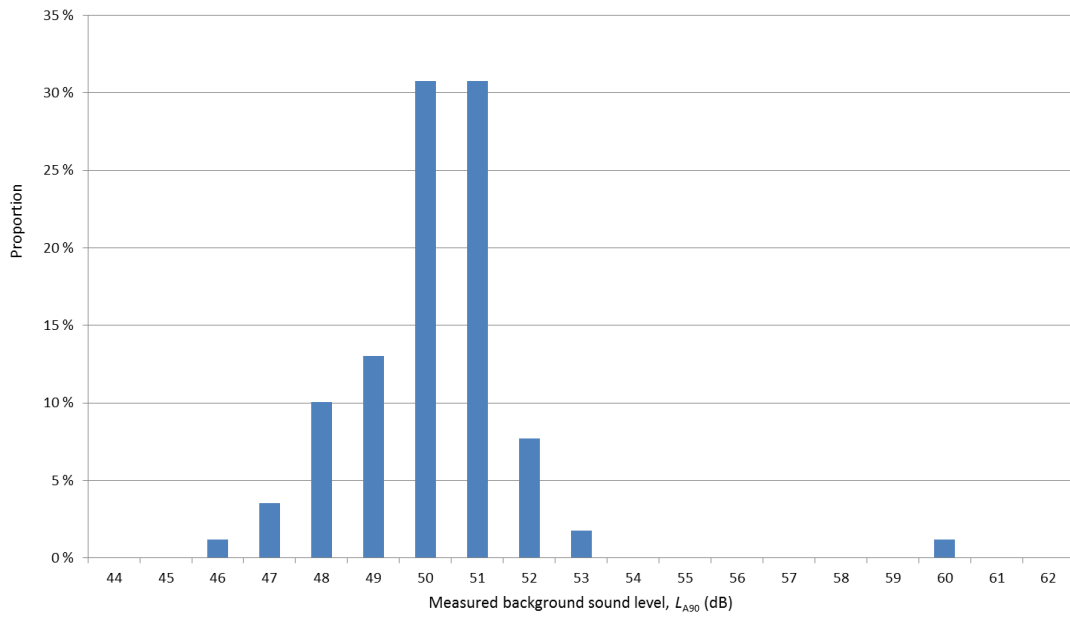


Figure 3 Histogram distribution of daytime noise levels (24 to 27 July only)

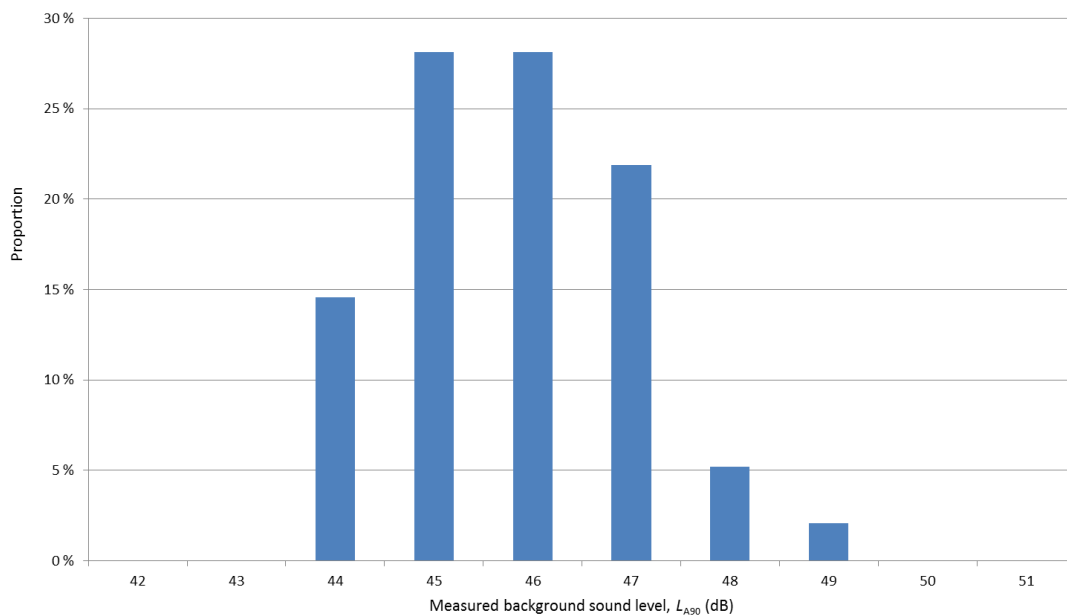


Figure 4 Histogram distribution of night-time noise levels (24 to 27 July only)

The histogram distributions of sound levels measured in Figure 3 and Figure 4 are used to determine the representative background noise levels for the day and night. To better reduce the likelihood of complaint, we have looked at the cumulative distribution of noise and selected the background noise level that is not exceeded up to 10% of the time period in question as the representative background level. Based on this, the representative background sound levels measured during the survey were deemed to be  $L_{A90,15min}$  48 dB during the daytime and  $L_{A90,15min}$  44 dB at night.

## 5 Building services noise egress limits

### 5.1 Local Authority criteria

Environmental noise limits for building services plant are set in order to protect the amenity of nearby noise sensitive premises.

These are typically set at a distance of 1 m from the most affected window of the nearest noise sensitive premises to the proposed plant location.

DP28, detailed in Camden Council's *Camden Development Project 2010-2025, Local Development Framework*, provides requirements for controlling noise emissions from building services plant. This document indicates that the noise level measured at 1 m external to a sensitive facade should not exceed 5 dB below the lowest  $L_{A90}$ . If the noise contains distinguishable discrete continuous whine, or discrete impulses should not exceed 10 dB below the lowest  $L_{A90}$ .

Noise sensitive is defined in DP28 as applying to housing, schools, hospitals, offices, workshops and open spaces. The nearest noise sensitive premises to the site are Lincoln House to the west, 300 High Holborn to the north, and 3-4 Stone Buildings to the south. These are highlighted in blue in Figure 1.

Based on the above criteria and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from the worst affected windows of the nearest noise sensitive premises should not exceed the limits set out in Table 3.

Table 3 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises ( $L_{Aeq,15min}$ dB)
Daytime (07:00-23:00)	43
Night-time (23:00-07:00)	39

The limits set out in Table 3 do not include any attention catching features. The penalties for attention catching features are established by Camden to be 5 dB lower than these levels.

## 5.2 Assessment

It is proposed to install a VRF condenser unit in the rear courtyard of Northumberland House. The location of the unit is indicated in Figure 5.

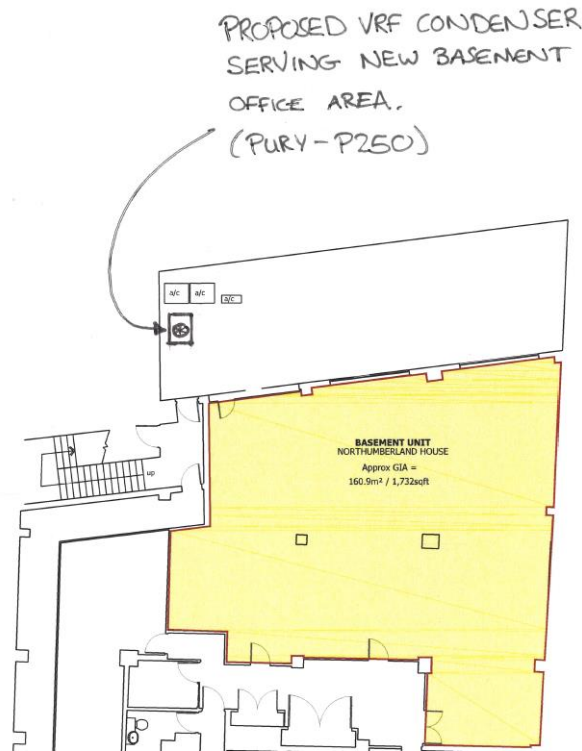


Figure 5 Location of proposed new building services plant in Northumberland House rear courtyard

The calculated sound power level of the unit is given in Table 4.

Table 4 Octave band sound pressure level of VRF unit

	Octave band sound power level (Hz)							
	Sound power level(dB re 1pW)							
	63	125	250	500	1000	2000	4000	8000
VRF condenser unit	76	66	63	59	52	46	42	34

An assessment of this unit indicates a level at the worst affected window of the nearest noise sensitive premises (3-4 Stone Buildings) of  $L_{Aeq}$  38 dB. This complies with the minimum night-time noise level of  $L_{Aeq,8hr}$  39 dB set by Camden Council, so no further noise mitigation measures are required.

## 6 Conclusion

A noise survey has been carried out to determine the existing background sound levels in the vicinity of the site and surrounding noise sensitive premises. The representative background sound levels were  $L_{A90,15min}$  48 dB during the day, and  $L_{A90,15min}$  44 dB during the night.

On the basis of the requirements of the Camden Council, the relevant plant noise limits at the worst affected existing noise sensitive premises would be  $L_{Aeq}$  43 dB during the day, and  $L_{Aeq}$  39 dB during the night.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be 5 dB lower as per Camden requirements.

An initial assessment of the proposed plant items associated with the development has been carried out. No further noise mitigation measures are required.

## Appendix A

### Survey details

#### Equipment

A Rion NL-32 sound level meter was used to undertake the unattended measurements. The calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-32/00623762	Rion	13 Oct 17	1510549
Microphone	UC-53A/319234	Rion	13 Oct 17	1510549
Pre-amp	NH-21/76670	Rion	13 Oct 17	1510549
Calibrator	NC-74/34536130	Rion	02 Oct 17	1510534

Calibration of the sound level meters used for the tests is traceable to national standards. The calibration certificates for the sound level meter used in this survey are available upon request.

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant deviation in calibration occurred.

## Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

- $L_{Aeq,T}$  The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$  The A-weighted maximum sound pressure level that occurred during a given period with a fast time weighting.
- $L_{A90,T}$  The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The  $L_{A90}$  is considered most representative of the background sound level for the purposes of complying with any local authority requirements.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg  $L_{A90}$ ) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

## Weather conditions

During the unattended noise measurements between 15:50 on the 22 July 2016 and 15:50 on 27 July 2016, weather reports for the area indicated that temperatures varied between 13°C at night and 28°C during the day, and the wind speed was less than 6 m/s.

These weather conditions are considered suitable for obtaining representative measurements

## Appendix B

Results of unattended measurements at Northumberland House  
rear courtyard



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Northumberland House  
Results of noise logging survey in rear courtyard  
22 July 2016 to 27 July 2016

