SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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101 Camley Street

Residential planning noise report

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Summary

Sandy Brown Associates LLP (SBA) has been commissioned to provide acoustic advice in relation to the proposed development at 101 Camley Street, London, N1C 4PF.

An environmental noise survey was performed between 11 June 2014 and 16 June 2014. The lowest minimum noise levels measured during the survey were L_{AFmin} 38 dB during the daytime and L_{AFmin} 37 dB at night.

Based on the requirements of the London Borough of Camden 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 nearby noise sensitive premises does not exceed L_{Aeq} 33 dB during the daytime and L_{Aeq} 32 dB during the night.

The highest day and night time noise levels recorded during the survey were $L_{Aeq,16h}$ 61 dB and $L_{Aeq,8h}$ 58 dB respectively. Maximum external noise levels exceeding L_{AFmax} 80 dB were sometimes recorded at night.

An initial facade sound insulation assessment has been carried out, setting a sound insulation performance requirement of $R_w + C_{tr}$ 36 dB for all building facades, such that the appropriate internal noise criteria set in accordance with BS8233 and WHO will be achieved.

Contents

1 Introduction

Sandy Brown Associates LLP (SBA) has been commissioned on behalf of Regent Renewal Ltd to provide acoustic advice in relation to the proposed development at 101 Camley Street, London, N1C 4PF.

An environmental noise survey has been carried out, the purpose of which was to establish the existing ambient and minimum noise levels in the vicinity of the site and nearby noise sensitive premises.

The minimum noise levels measured during the survey are used as the basis for setting limits for noise emission from proposed building services plant. These limits are set in accordance with the requirements of the London Borough of Camden.

The facade sound insulation has be assessed in order to determine the necessary performance required to achieve appropriate internal noise levels for residences set in accordance with BS8233:2014 *Sound insulation and noise reduction for buildings*, World Health Organisation and London Borough of Camden guidelines.

This report presents the noise survey methods, the results of the survey, a discussion of acceptable limits for noise emission from building services plant and minimum sound insulation requirements for the building envelope.

2 Site description

2.1 The site and its surroundings

The site in relation to its surroundings is shown in Figure 1. It is located at the junction of Camley Street and Granary Street approximately 0.5 km north of Kings Cross St. Pancras station and is bounded to the east by the railway lines from the station. Camley Street and the Grand Union Canal form the west and south boundaries of the site. To the north is another warehouse site.

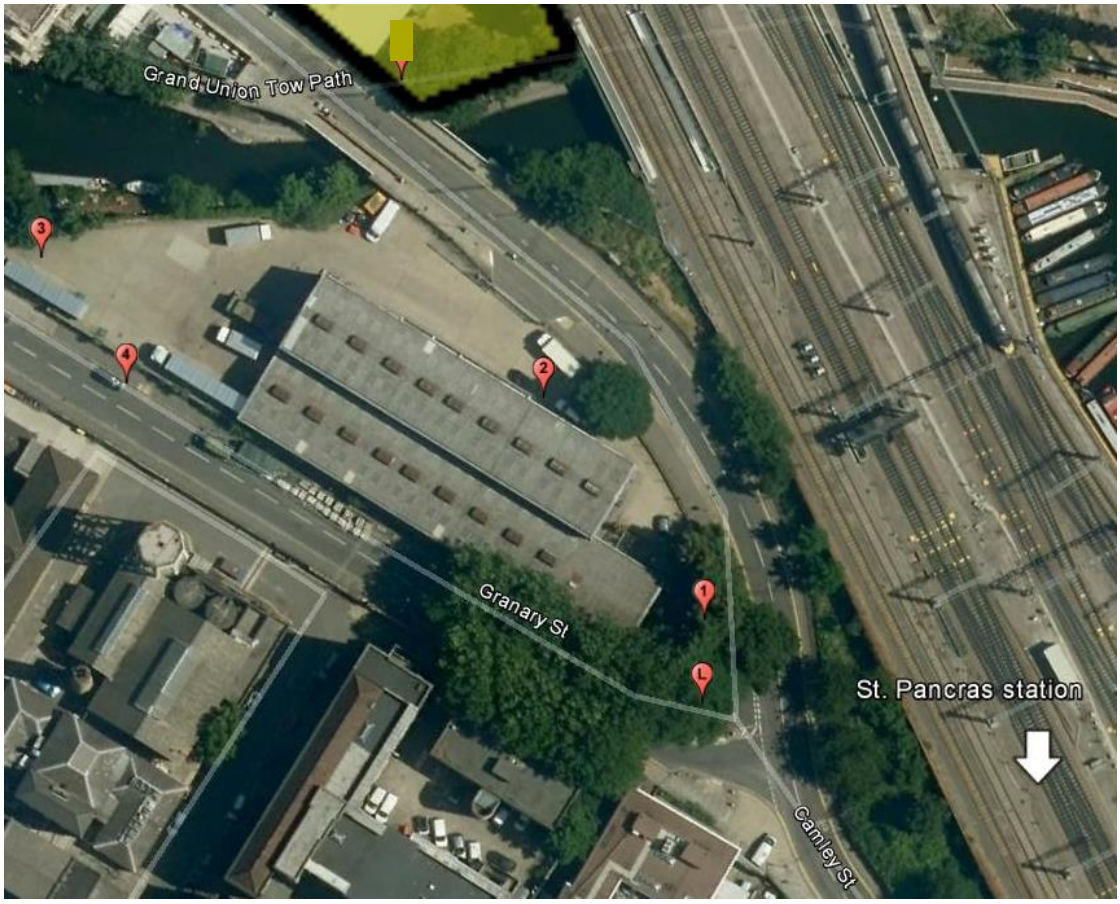


Figure 1 Site layout and measurement positions

2.2 Adjacent premises

The site is located between St Pancras Hospital to the west and the mainline railways into St Pancras station to the east. Across the canal immediately to the north, 102 Camley Street is currently a light industrial unit, as are the majority of other units along this road to the north, but is flagged for a residential development.

3 Method

3.1 Unattended measurements

A six-day continuous unattended noise survey was undertaken at the site to determine the existing noise levels in the vicinity of the site and nearby noise sensitive premises.

The unattended measurements were performed over 5-minute periods between 16:40 on 11 June 2014 and 15:30 on 16 June 2014.

The microphone was positioned at Location 'L', indicated in Figure 1. This location was chosen as noise levels here are deemed to be reasonably representative of the background noise levels experienced by the nearest noise sensitive premises and of maximum noise levels experienced at the worst affected façade of the proposed development.

Figure 2 shows the microphone at position 'L' on the site, mounted 2 m above the ground.

Figure 2 Photo of the unattended noise measurement position

3.2 Attended measurements

Attended sample measurements were performed at a number of locations around the site. These are indicated in Figure 1 as positions 1 to 4. In each case the microphone was mounted on a tripod approximately 1.5 m above ground level and at least 1 m from any other reflective surface. The attended measurements were carried out on 16 June 2014 over 5-minute periods for the purpose of determining nose variance across the site.

3.3 Equipment

The unattended noise measurements were carried out using a Svantek 957 sound level meter. The attended noise measurements were performed using a Bruel & Kjaer 2260 sound level meter.

Calibration details of the equipment used during the noise surveys are provided in Appendix A.

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

3.4 Noise indices

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. Measured using the fast time weighting.
- $L_{ASmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period measured with the slow time weighting.
- $L_{AFmin,T}$ The A-weighted minimum sound pressure level that occurred during a given period. Measured using the fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background noise level.

The L_{A90} is considered most representative of the background noise 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.*

3.5 Weather Conditions

During the attended measurements carried out on 16 June 2014, the weather was generally clear and dry although some light rain occurred.

During the unattended noise measurements at position L between 11 June and 16 June 2014, weather reports for the area indicated that temperatures varied between 11°C at night and 26°C during the day, and the wind speed was less than 9 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

4 Measurement results

4.1 Observations

The dominant noise sources observed at the site during the survey consisted of intermittent traffic on Camley and Granary Streets, construction on the nearby King's Cross T1 plot and trains pulling into and out of King's Cross St Pancras station.

Less significant noise sources included pedestrians and construction activity on other sites in the vicinity.

4.2 Unattended measurement results

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

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

Due to issues with instrumentation during the survey, it was not possible to measure the background noise level in terms of L_{A90} typically used as a basis for setting plant noise limits. As such, the minimum noise levels (L_{ASmin}) have been shown which present worst case as these are always lower than background noise levels (L_{A90}). The minimum noise levels measured during the unattended survey are given in Table 2.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Wednesday 11 June 2014	n/a	56
Thursday 12 June 2014	61	57
Friday 13 June 2014	61	56
Saturday 14 June 2014	59	52
Sunday 15 June 2014	59	58
Average	60	56

Table 2 Minimum noise levels measured during the survey

Date	Daytime (07:00 – 23:00)	Night (23:00 – 07:00)
	$L_{ASmin,5min}$ (dB)	$L_{ASmin,5min}$ (dB)
Wednesday 11 June 2014	39*	37
Thursday 12 June 2014	40	37
Friday 13 June 2014	43	37
Saturday 14 June 2014	41	37
Sunday 15 June 2014	38	37
Monday 16 June 2014	46*	n/a

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

The lowest minimum noise levels measured during the survey were $L_{ASmin,5min}$ 39 dB during the daytime and $L_{ASmin,5min}$ 37 dB at night.

4.3 Attended measurement results

Attended measurements were performed at a number of locations around the site on 16 June 2014. The sound pressure levels recorded during these measurements are summarised in Table 3. The dominant noise sources noted during the measurements are also described.

Table 3 Sound pressure levels from attended measurements

Position	Start time	Sound pressure levels (dB)				Noise sources
		$L_{Aeq,5min}$	$L_{AFmax,5min}$	$L_{ASmax,5min}$	$L_{A90,5min}$	
1	15:47	60	76	74	50	Traffic, construction
2	15:53	61	73	68	55	Construction, automatic gate
3	16:00	59	73	68	53	Trains, construction
4	16:18	63	78	76	51	Trains, passing cars

5 Assessment criteria

5.1 NPPF and NPSE

The National Planning Policy Framework (NPPF) sets out the government planning requirements, and supersedes previous guidance notes such as PPG24. No specific noise criteria are set out in the NPPF, or in the Noise Policy Statement for England (NPSE) to which it refers.

The NPPF states:

'Planning policies and decisions should aim to:

- *Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*
- *Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and*
- *Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

The NPSE states that its aims are as follows:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.'*

As such, although neither of these documents sets out specific acoustic criteria for new residential development, the requirement to control both the effect of existing noise on the new development and the effect of noise from the development on the surroundings needs to be considered.

5.2 External noise levels – noise egress

5.2.1 Standard guidance

Standard guidance for noise emission from proposed new items of building services plant is given in BS4142: 1997 '*Method for rating industrial noise affecting mixed residential and industrial areas*'.

BS4142 provides a method for assessing noise from items such as building services plant against the existing background noise levels at the nearest noise sensitive receptors to assess the risk of complaints occurring.

BS4142 suggests that if the noise level is 10 dB or more higher than the existing background noise level, complaints are likely. If the level is 5 dB above the existing background noise level, it is considered of marginal significance. If the level is 10 dB or more below the existing background noise level, this is considered a positive indication that complaints are unlikely.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty is applied which effectively reduces these limits by a further 5 dB.

5.2.2 Local Authority requirements

The requirements of Camden Borough Council are set out 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

On this basis, all external plant installed at the site must be designed such that the cumulative noise level at the nearest noise sensitive receiver is at least 5 dB below the lowest measured background noise level ($L_{A90,15min}$), unless it contains tones or impulsive sound.

5.3 Internal noise levels – noise ingress

5.3.1 Standard guidance

Guidance on acceptable internal noise levels in residential dwellings is given in BS8233 *Sound insulation and noise reduction for buildings*, and is also provided by the World Health Organisation. The guidance given by BS8233 and WHO is shown in Table 4.

Table 4 Internal noise criteria for sleeping/resting

Internal space	Indoor ambient noise level L_{Aeq} (dB)		
	BS8233 (07:00 to 23:00)	BS8233 (23:00 to 07:00)	WHO
Living rooms	35	-	30/35[1]
Dining room	40	-	-
Bedrooms	35	30[2]	30[2]

[1] WHO does not differentiate between different types of living spaces, but recommends L_{Aeq} 30 dB in relation to sleep disturbance and L_{Aeq} 35 dB in relation to speech intelligibility. WHO provides a 16 hour time base when referring to speech intelligibility and an 8 hour time base when referring to sleep disturbance.

[2] BS8233 notes that individual noise events can cause sleep disturbance, and that a guideline value may be set depending on the character and number of events per night, although no specific limit is provided. Section 3.4 of the WHO guidelines suggests that good sleep will not generally be affected if internal levels of L_{Amax} 45 dB are not exceeded more than 10-15 times per night.

5.3.2 Local Authority requirements

The London Borough of Camden requirements regarding facade levels for developments adjoining rail and road are given below:

Table A: Noise levels on residential sites adjoining railways and roads at which planning permission will not be granted

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	74 dB L_{Aeq} 12h	72 dB L_{Aeq} 12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	74 dB L_{Aeq} 4h	72 dB L_{Aeq} 4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	66 dB L_{Aeq} 8h	66 dB L_{Aeq} 8h

Table B: Noise levels on residential streets adjoining railways and roads at and above which attenuation measures will be required

Noise description and location of measurement	Period	Time	Sites adjoining railways	Sites adjoining roads
Noise at 1 metre external to a sensitive façade	Day	0700-1900	65 dB L_{Aeq} 12h	62 dB L_{Aeq} 12h
Noise at 1 metre external to a sensitive façade	Evening	1900-2300	60 dB L_{Aeq} 4h	57 dB L_{Aeq} 4h
Noise at 1 metre external to a sensitive façade	Night	2300-0700	55 dB L_{Aeq} 1h	52 dB L_{Aeq} 1h
Individual noise events several times an hour	Night	2300-0700	>82dB L_{Amax} (S time weighting)	>82dB L_{Amax} (S time weighting)

6 Plant noise limits – noise egress

Based on the criteria set out in section 5.2 and the measurement results, the cumulative noise level resulting from the operation of all new plant at 1 m from any noise sensitive premises should not exceed 5 dB below the minimum background noise level. As discussed in Section 4.3, it was not possible to measure the background noise level in terms of L_{A90} and the noise limits are based on the lowest minimum noise levels (L_{ASmin}) which present worst case. These limits are given in Table 5

Table 5 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 (dB)
Daytime (07:00 - 23:00)	33
Night-time (23:00 - 07:00)	32

As previously stated, if the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), the plant should be designed to achieve a limit 5 dB below those set out above.

At this stage, no detailed information is available in relation to the proposed installation of building services plant, and this will need to be assessed in detail as the design progresses. However, all plant items will be designed to achieve the plant noise limits set out above.

The required attenuation measures will depend on the type and location of the plant items, but typical measures include in-duct attenuation, acoustic enclosures or screens, and acoustic louvres.

7 Facade sound insulation – noise ingress

This section discusses internal noise level criteria and assesses the facade sound insulation performance requirement. In principle, the required facade specification depends on two factors – the external noise levels at the site, and the internal noise criteria.

The following assessment is based on achieving the internal noise levels recommended in BS8233 and by the WHO, set out in Section 5.3.1.

7.1 External noise levels

Based on results from the environment noise survey, worst case day and night time facade noise levels of $L_{Aeq,16h}$ 61 dB and $L_{Aeq,8h}$ 58 dB are expected respectively. However, maximum facade noise levels exceeding L_{AFmax} 80 dB can sometimes be expected at night.

7.2 Facade sound insulation

The facade sound insulation requirement is driven by the requirement to control maximum noise levels in bedrooms at night. The overall sound insulation performance requirement for all facades of the proposed development is set out below:

- Overall sound insulation performance = $R_w + C_{tr}$ 36 dB

The above performance is designed so that internal noise levels will not exceed L_{AFmax} 45 dB more than 10-15 times at night in accordance with WHO guidelines. It will also ensure that day and night time indoor ambient noise levels in bedrooms and living rooms are in line with BS8233 and WHO guidelines (see Section 5.3.1).

7.3 Guidance on external glazing and ventilation strategy

An example glazing configuration capable of achieving $R_w + C_{tr}$ 36 dB is set out below:

- Example glazing configuration - 12.8 mm/12 mm/10 mm

It may be possible to maintain the required facade sound insulation using high performance acoustically attenuated passive ventilation. However, this would be at the limit of achievable ventilator performances. For buildings that require such high levels of sound insulation, it is typical to adopt a mechanical ventilation strategy (eg, whole house ventilation).

The use of open windows for purposes of providing background ventilation is not considered feasible.

8 Conclusion

On the basis of the requirements of the London Borough of Camden, plant noise limits at ajacent noise sensitive premises would be L_{Aeq} 33 dB during the day and L_{Aeq} 32 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 more stringent than those set out above.

An initial facade sound insulation assessment has been carried out, setting a sound insulation performance requirement of $R_w + C_{tr}$ 36 dB for all building facades, such that the appropriate internal noise criteria set in accordance with BS8233 and WHO will be achieved.

Appendix A - Equipment calibration information

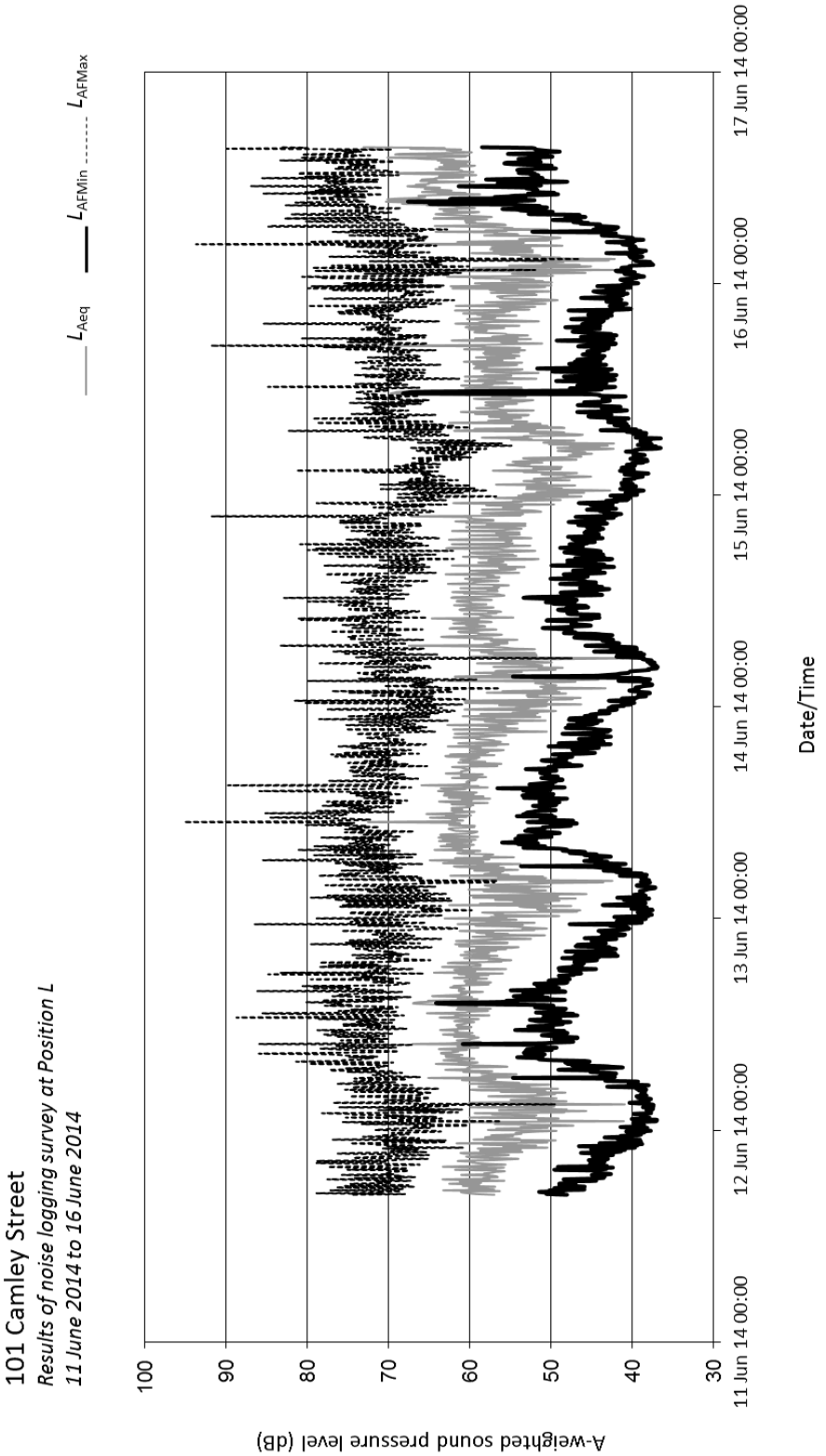
Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	SVAN957/12327	Svantek	23 Oct 15	1310490
Microphone	ACO7052H/43273	Svantek	23 Oct 15	1310490
Calibrator	SV30A/7451	Svantek	23 Oct 15	1310484
Sound level meter	2260/2553982	Brüel & Kjær	16 Nov 2014	06848
Microphone	4189/2556112	Brüel & Kjær	16 Nov 2014	06848
Pre-amplifier	ZC0026/4584	Brüel & Kjær	16 Nov 2014	06848
Calibrator	4231/2558390	Brüel & Kjær	16 Nov 2014	06845

The calibration certificates for the sound level meters stated above are available upon request.

Calibration of the sound level meters used for the measurements is traceable to national standards. The sound level meters and the respective measurement chains were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant calibration deviation occurred.

Appendix B - Results of unattended measurements


101 Camley Street
Results of noise logging survey at Position L
11 June 2014 to 16 June 2014
L_{Aeq}
L_{AFMin}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
11 Jun 14 00:00
12 Jun 14 00:00
13 Jun 14 00:00
14 Jun 14 00:00
15 Jun 14 00:00
16 Jun 14 00:00
17 Jun 14 00:00
Date/Time