Report VA1635.161116.NIA

Beef & Brew, London

Noise Impact Assessment

17 November 2016

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Contents

Attachments

1. Introduction

Following replacement of a pre-existing fan with a new unit in the extract system of the kitchen at Beef & Brew, London, the operators have been advised that retrspecctive planning permission should be obtained for the new fan.

Venta Acoustics has been commissioned by Beef & Bew to undertake an assessment of the noise impact of the new fan in support of an application for planning permission.

In an effort to improve the amenity of the surrounding premises, Beef & Brew are proposing to modify the existing extract flue to discharge above the mid-point of the roof of the building.

An environmental noise survey has been undertaken to determine the background noise levels at the most affected noise sensitive receptors. These levels are used to undertake an assessment of the likely impact with reference to the planning requirements of Camden Council.

2. Design Criterion and Assessment Methodology

2.1 Consultation with the Local Authority

Following liaison with Mr Charles of Camden Council Environmental Health, it has been advised that the scheme should aim to achieve a noise level of 10dB below background at the most affected premises.

2.2 BS8233:2014

BS8233 *Guidance on sound insulation and noise reduction for buildings* provides guidance as to suitable internal noise levels for different areas within residential buildings.

The relevant section of the standard is shown below in Table 2.1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq,\ 16\ hour}$	-
Dining	Dining Room	40 dB $L_{Aeq,\ 16\ hour}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,\ 16\ hour}$	30 dB $L_{Aeq,\ 8\ hour}$

Table 2.1 - Excerpt from BS8233: 2014 [dB ref. 20µPa]

3. Site Description

As illustrated on attached site plan VA1635/SP1, the site building is located off Kentish Town Road amongst other restaurants and commercial premises at ground floor and residential dwellings at first floor level.

The residential dwelling above the Beef & Brew has a rear balcony above the restaurant's kitchen. Beyond this balcony is another residential dwelling fronting onto York Mews. The property immediately to the north of the premises is currently being redeveloped to what is understood to be new dwellings.

The extract system flue runs from the fan, located within the kitchen, through the balcony floor and up the side of the wall before turning 45 degrees to discharge above roof level in the direction of the residential dwelling to the rear. It is proposed to reroute the flue to return along the roof and discharge vertically and at a greater distance from the surrounding residential dwelling (existing and proposed).

The most affected noise sensitive receivers are expected to be the existing residential dwelling approximately 8m from the flue to the rear of the premises and potentially the new dwellings adjacent to the flue. Other dwellings are well screened from the flue discharge by the roof.

Existing building services plant in the form of condenser units were noted on the balcony of the dwelling to the rear of the premises.

The Beef & Brew restaurant operates between

- Mondays: 6pm – 10pm
- Tuesdays – Thursdays: 12pm – 10pm,
- Fridays: 12am – 11pm
- Saturdays: 10am – 11pm
- Sundays: 10am – 10pm

4. Environmental Noise Survey

4.1 Survey Procedure & Equipment

In order to establish the existing background noise levels at the site, a noise survey was carried out between Friday 11th and Monday 14th November 2016 at the location shown in site plan VA1635/SP1. This location was chosen to be representative of the background noise level at the most affected noise sensitive receivers.

Continuous 5-minute samples of the L_{Aeq}, L_{Amax}, L_{A10} and L_{A90} sound pressure levels were undertaken at the measurement location.

The weather during the survey period was generally dry with light winds with some periods of rain. The background noise data is not considered to have been compromised by these conditions.

Measurements were made generally in accordance with ISO 1996 2:2007 *Acoustics - Description, measurement and assessment of environmental noise – Part 2: Determination of environmental noise levels*.

The following equipment was used in the course of the survey:

Manufacturer	Model Type	Serial No	Calibration	
			Certificate No.	Date
NTi Class 1 Integrating SLM	XL2	A2A-11586-E0	42530-A2A-11586-E0	9/6/16
Larson Davis calibrator	CAL200	13069	42530-13069	9/6/16

Table 4.1 – Equipment used for the survey

The calibration of the sound level meter was verified before and after use with no significant calibration drift observed.

4.2 Results

The measured sound levels are shown as time-history plots on the attached charts VA1635/TH1-3.

The background noise level is determined by building services plant on surrounding properties, the Beef & Brew kitchen extract fan, traffic noise and noise from the railway line some 70m to the north east.

The minimum background noise levels measured were:

Monitoring Period	Minimum $L_{A90,5min}$
07:00 – 23:00 hours	48dB 14/11/2016 07:20
23:00 – 07:00 hours	38dB 14/11/2016 03:30

Table 4.2 – Minimum background noise levels

The background noise level at the closing time of the restaurant, when the fan turns off, is L_{A90} 43dB.

4.3 Plant Noise Emission Limits

On the basis of the measured noise levels and the planning requirements of the Local Authority, and considering that it is not expected that tonal noise will be generated by the proposed plant units, the following plant specific sound levels should not be exceed at the most affected noise sensitive receivers:

Monitoring Period	Design Criterion (L_{Aeq})
07:00 – 23:00 hours	38dB
23:00 – 07:00 hours	28dB
During Operational Hours (summarised in section 3)	33dB

Table 4.3 – Specific sound pressure levels not to be exceeded at most affected noise sensitive receivers

5. Predicted Noise Impact

5.1 Installed plant

The following plant is installed within the Beef & Brew kitchen.

Plant Item	Quantity	Proposed Model	Notes
Kitchen Extract Fan	1	Helios GBW 500/4	No attenuation currently fitted

Table 5.1 – Indicative plant selections assumed for this assessment.

Consulting the manufacturer's datasheets, the following noise emissions levels are attributed to the proposed plant items:

Plant Item	Octave Band Centre Frequency (Hz) Power Level, L_w (dB)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Helios GBW 500/4	89	77	82	77	74	72	68	61	80

Table 5.2 – Advised plant noise data used for the assessment.

5.2 Recommended Mitigation Measures

The system is understood to not currently have an attenuator fitted. It is recommended that an attenuator providing the following minimum insertion loss is attached to the system:

Attenuation Component	Octave Band Centre Frequency (Hz) Attenuator Insertion Loss (dB)							
	63	125	250	500	1k	2k	4k	8k
In-duct attenuators	7	8	11	22	24	17	16	12

Table 5.3 – Recommended minimum attenuation to be fitted to kitchen extract system.

This attenuation is provided by a 1200mm long, 500mm diameter Helios attenuator. However other suppliers are available who may be able to achieve these performances with alternative configurations.

It is recommended that the attenuator be installed as close to the fan as possible to minimise duct breakout noise. Where this cannot be achieved the duct should be externally lagged in a mass barrier to control the breakout of noise.

Please note that the above recommendations relate to acoustic issues only. It is recommended that professional advice confirming the suitability of these measures be sought from others with regards to issues such as airflow, structural stability and visual impact.

5.3 Predicted noise levels

The cumulative noise level at the most affected noise sensitive receiver, some 8 meters away, has been calculated on the basis of the above information and assuming the recommended mitigation measures, with reference to the guidelines set out in BS4142:1997 / BS4142:2014 / ISO 9613-2:1996 *Attenuation of sound during propagation outdoors - Part 2: General method of calculation.*

All other receivers, including the newly constructed dwellings, are expected to benefit from roof edge screening and so have a lower noise exposure.

A summary of the calculations are shown in Appendix B.

Predicted Cumulative Noise Level	Design Criterion (Fan operational hours)
L_{Aeq} 32dB	L_{Aeq} 33dB

Table 5.4 – Predicted cumulative noise level at most affected noise sensitive receiver and design criterion.

5.4 Comparison to BS8233:2014 Criteria

BS8233 assumes a loss of approximately 15dB for a partially open window. The external noise level shown in Table 5.4Table 5.4 would result in internal noise levels that would comfortably achieve the guidelines shown in Table 2.1.

6. Conclusion

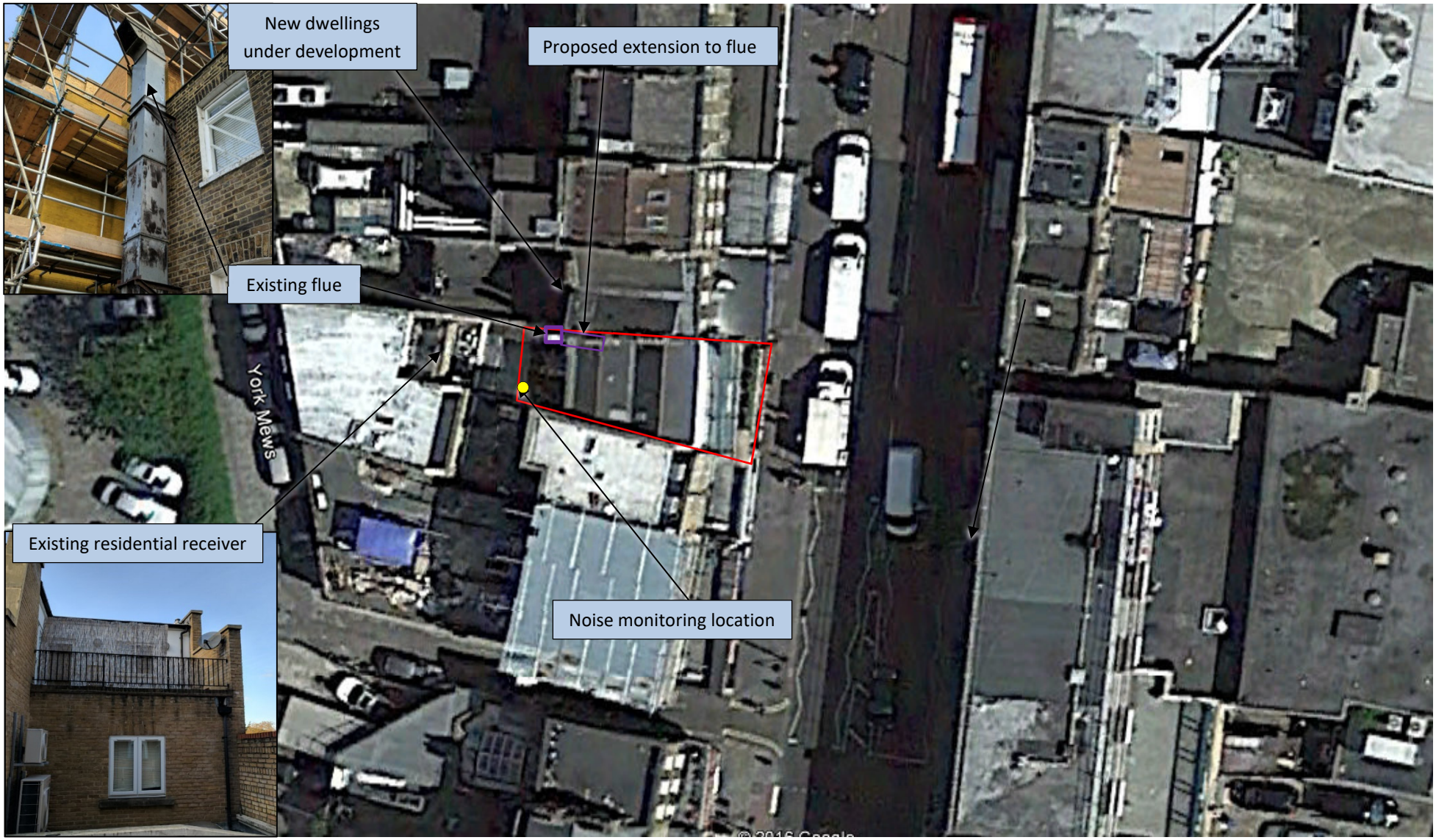
A baseline noise survey has been undertaken by Venta Acoustics to establish the background noise climate in the locality of Beef & Brew, London in support of a planning application for the proposed extension and rerouting of the existing flue and the retrospective permission for a replacement kitchen extract fan.

This has enabled noise emission limits to be set at the most affected noise sensitive receiver such that the proposed installation meets the requirements of Camden Council.

The cumulative noise emission levels from the proposed plant have been assessed to be compliant with the plant noise emission limits, with necessary mitigation measures specified.

The proposed scheme is not expected to have a significant adverse noise impact and the relevant Planning Conditions have been shown to be met.

Steven Liddell MIOA


New dwellings under development
Proposed extension to flue
Existing flue
York Mews
Existing residential receiver
Noise monitoring location
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Beef & Brew, London

Environmental Noise Time History: 1

Balcony

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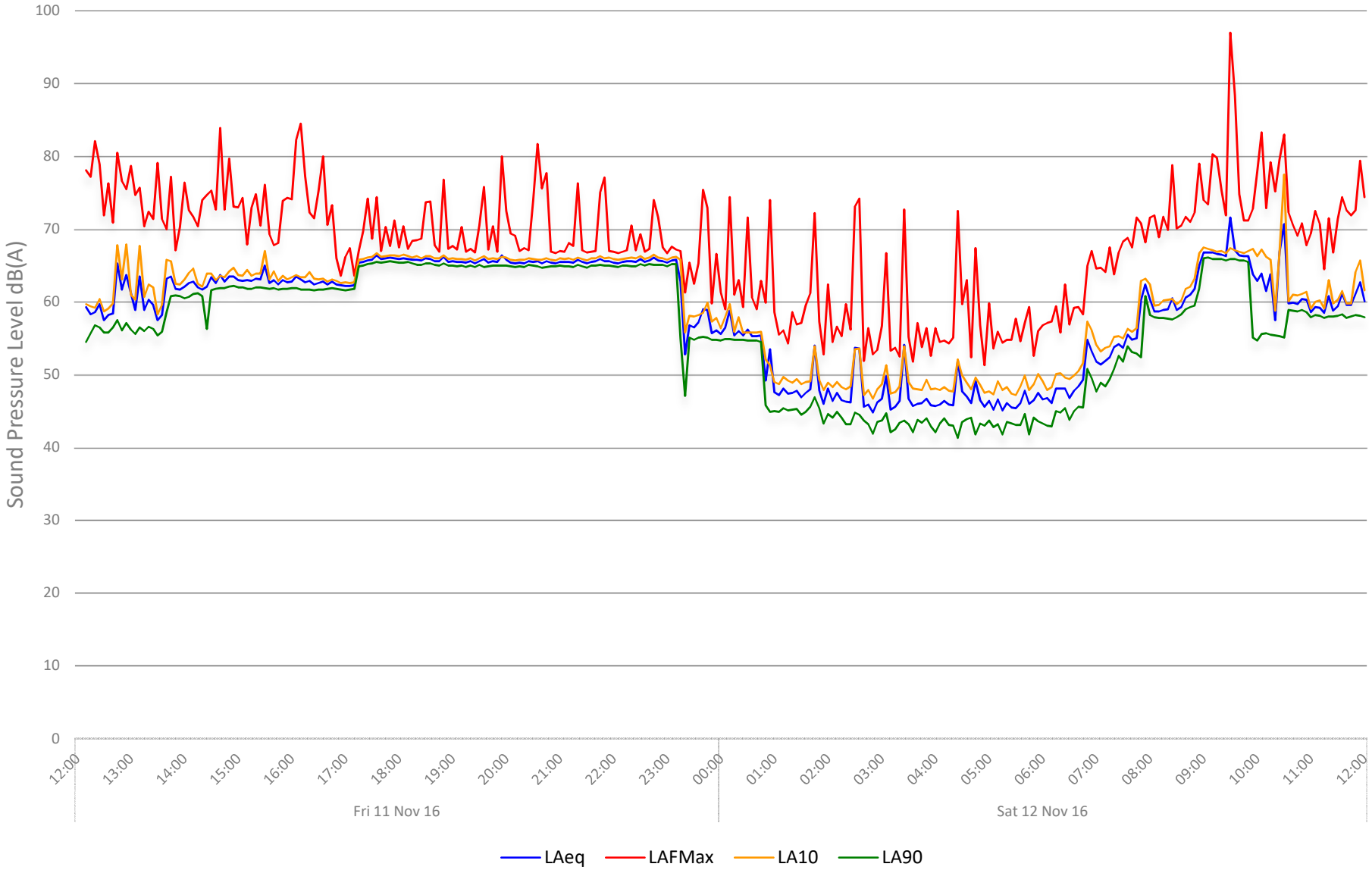
Figure VA1635/TH1



Beef & Brew, London

Environmental Noise Time History: 2

Balcony

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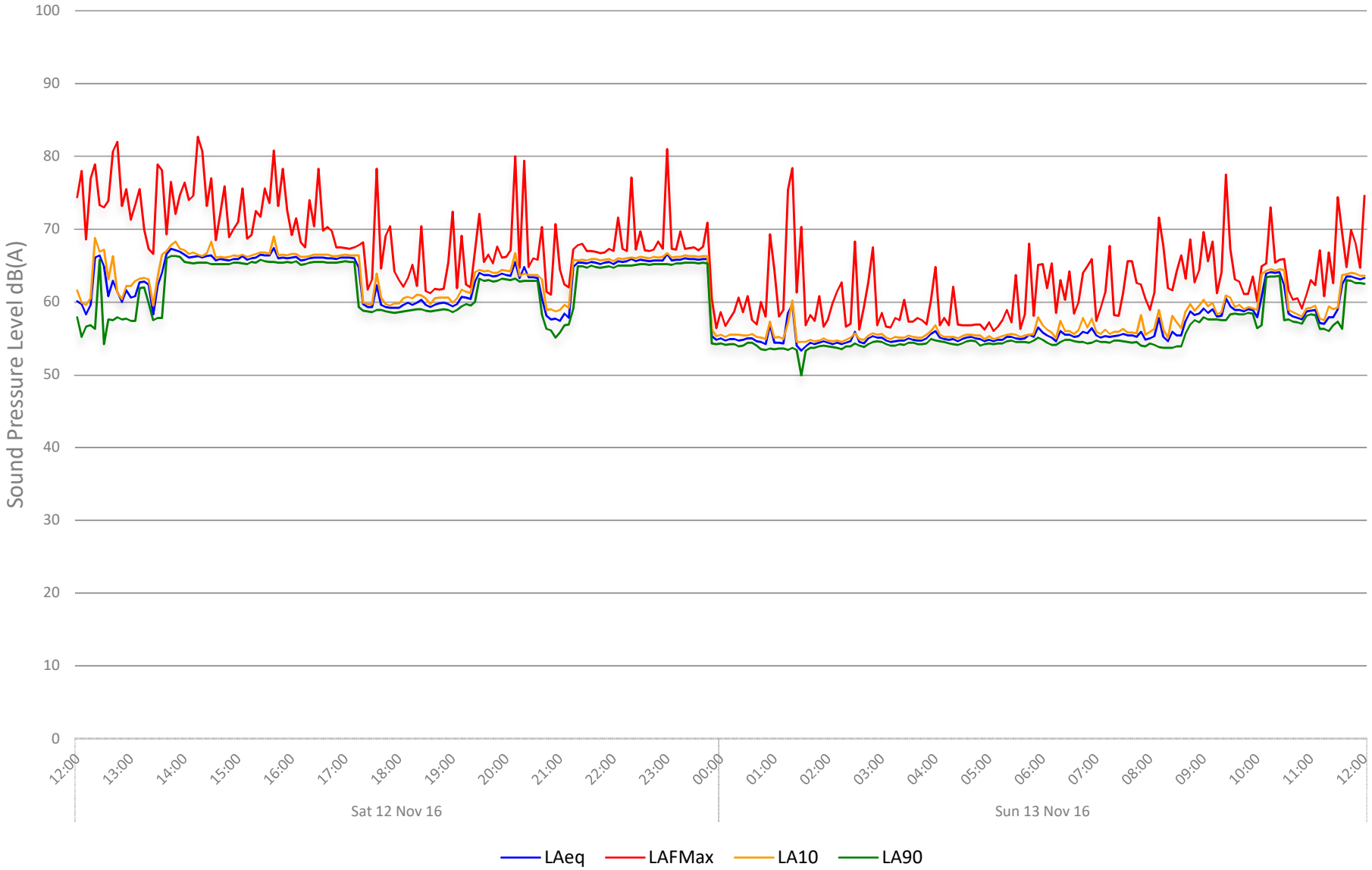
Figure VA1635/TH2



Beef & Brew, London

Environmental Noise Time History: 3

Balcony

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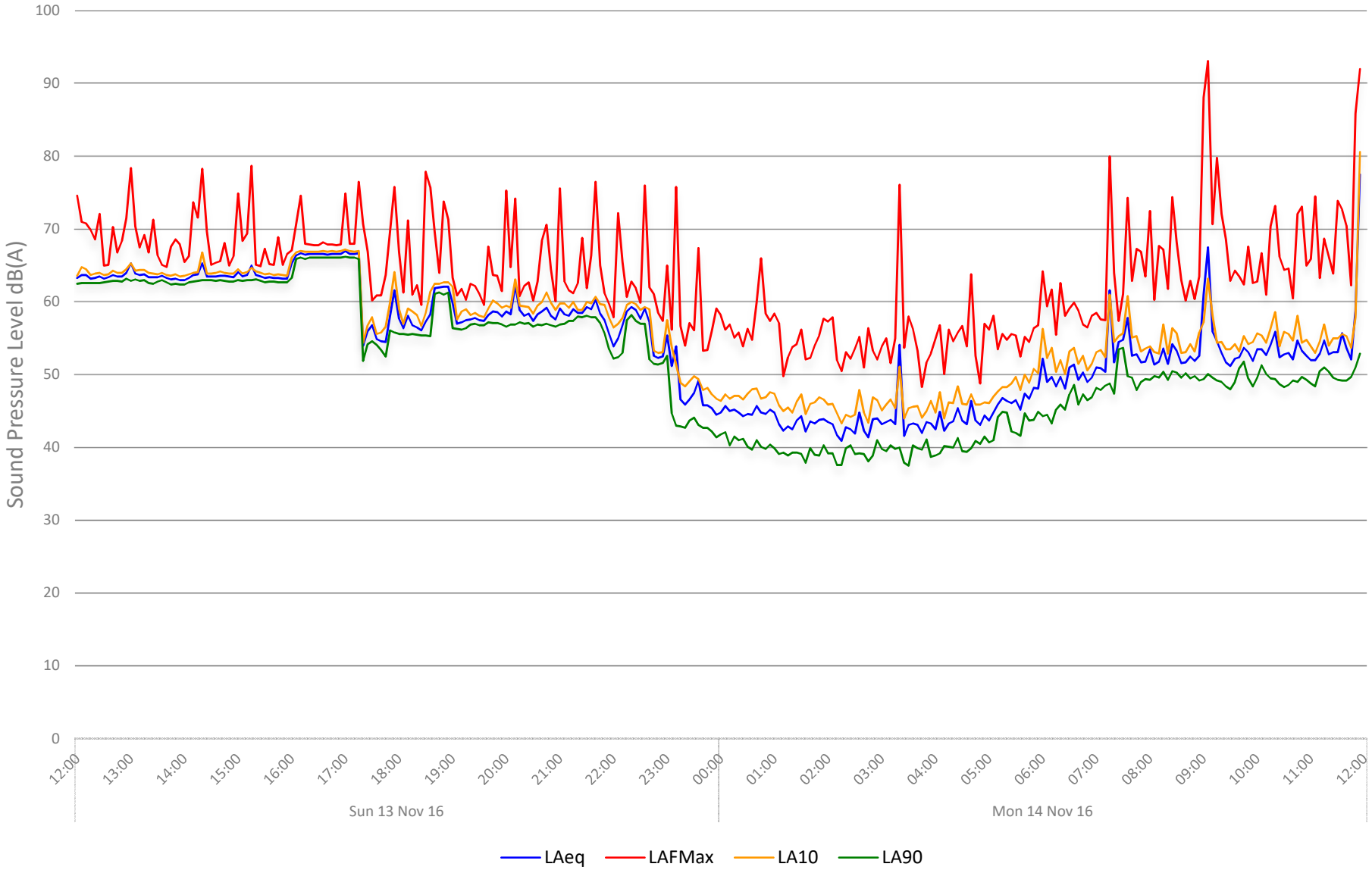
Figure VA1635/TH3



APPENDIX A

1.1 Acoustic Terminology

The human impact of sounds is dependent upon many complex interrelated factors such as 'loudness', its frequency (or pitch) and variation in level. In order to have some objective measure of the annoyance, scales have been derived to allow for these subjective factors.

Sound	Vibrations propagating through a medium (air, water, etc.) that are detectable by the auditory system.
Noise	Sound that is unwanted by or disturbing to the perceiver.
Frequency	The rate per second of vibration constituting a wave, measured in Hertz (Hz), where 1Hz = 1 vibration cycle per second. The human hearing can generally detect sound having frequencies in the range 20Hz to 20kHz. Frequency corresponds to the perception of 'pitch', with low frequencies producing low 'notes' and higher frequencies producing high 'notes'.
dB(A):	Human hearing is more susceptible to mid-frequency sounds than those at high and low frequencies. To take account of this in measurements and predictions, the 'A' weighting scale is used so that the level of sound corresponds roughly to the level as it is typically discerned by humans. The measured or calculated 'A' weighted sound level is designated as dB(A) or L_A.
L_{eq} :	A notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the actual, fluctuating sound measured over that period (e.g. 8 hour, 1 hour, etc). The concept of L_{eq} (equivalent continuous sound level) has primarily been used in assessing noise from industry, although its use is becoming more widespread in defining many other types of sounds, such as from amplified music and environmental sources such as aircraft and construction. Because L_{eq} is effectively a summation of a number of events, it does not in itself limit the magnitude of any individual event, and this is frequently used in conjunction with an absolute sound limit.
L_{10} & L_{90} :	Statistical L_n indices are used to describe the level and the degree of fluctuation of non-steady sound. The term refers to the level exceeded for n% of the time. Hence, L_{10} is the level exceeded for 10% of the time and as such can be regarded as a typical maximum level. Similarly, L_{90} is the typical minimum level and is often used to describe background noise. It is common practice to use the L_{10} index to describe noise from traffic as, being a high average, it takes into account the increased annoyance that results from the non-steady nature of traffic flow.
L_{max} :	The maximum sound pressure level recorded over a given period. L_{max} is sometimes used in assessing environmental noise, where occasional loud events occur which might not be adequately represented by a time-averaged L_{eq} value.

1.2 Octave Band Frequencies

In order to determine the way in which the energy of sound is distributed across the frequency range, the International Standards Organisation has agreed on "preferred" bands of frequency for sound measurement and analysis. The widest and most commonly used band for frequency measurement and analysis is the Octave Band. In these bands, the upper frequency limit is twice the lower frequency limit, with the band being described by its "centre frequency" which is the average (geometric mean) of the upper and lower limits, e.g. 250 Hz octave band extends from 176 Hz to 353 Hz. The most commonly used octave bands are:

Octave Band Centre Frequency Hz	63	125	250	500	1000	2000	4000	8000

1.3 Human Perception of Broadband Noise

APPENDIX A

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Acoustic Terminology & Human Response to Broadband Sound

Because of the logarithmic nature of the decibel scale, it should be borne in mind that sound levels in dB(A) do not have a simple linear relationship. For example, 100dB(A) sound level is not twice as loud as 50dB(A). It has been found experimentally that changes in the average level of fluctuating sound, such as from traffic, need to be of the order of 3dB before becoming definitely perceptible to the human ear. Data from other experiments have indicated that a change in sound level of 10dB is perceived by the average listener as a doubling or halving of loudness. Using this information, a guide to the subjective interpretation of changes in environmental sound level can be given.

Change in Sound Level dB	Subjective Impression	Human Response
0 to 2	Imperceptible change in loudness	Marginal
3 to 5	Perceptible change in loudness	Noticeable
6 to 10	Up to a doubling or halving of loudness	Significant
11 to 15	More than a doubling or halving of loudness	Substantial
16 to 20	Up to a quadrupling or quartering of loudness	Substantial
21 or more	More than a quadrupling or quartering of loudness	Very Substantial

APPENDIX B

VA1635 - Beef & Brew, London

Noise Impact Assessment

With Mitigation (Attenuator + relocation of Flue)

Discharge point		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Helios GBW 500/4	Lw	89	77	82	77	74	72	68	61	**80**
Indicative Attenuator (1200mm)		-7	-8	-11	-22	-24	-17	-16	-12	
End Reflection		-8	-4	-1	0	0	0	0	0	
Directivity (Hor:,Vert:)		-1	-1	-2	-3	-10	-11	-11	-11	
Geometic propagation	Q=2	-8	-8	-8	-8	-8	-8	-8	-8	
Distance Loss	To 10m	-20	-20	-20	-20	-20	-20	-20	-20	
Level at receiver		**45**	**36**	**39**	**24**	**12**	**16**	**13**	**10**	**32**

Duct Breakout		63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	dB(A)
Helios GBW 500/4	Lw	89	77	82	77	74	72	68	61	**80**
Indicative Attenuator (1200mm)		-7	-8	-11	-22	-24	-17	-16	-12	
SRI of duct (24 guage)		21	24	27	30	33	36	41	45	
SPL @ 1m		62	46	45	26	18	20	12	5	
Distance Loss	To 8m	-18	-18	-18	-18	-18	-18	-18	-18	
Level at receiver		**44**	**28**	**27**	**8**	**0**	**2**	**-6**	**-13**	**21**

Cumilative level		**48**	**36**	**40**	**24**	**12**	**16**	**13**	**10**	**32**