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CLUB MONACO,
MONMOUTH STREET, LONDON

NOISE IMPACT ASSESSMENT

Report **13727-NIA-01**

Prepared on 14 June 2018

Issued For:

Ink Associates Ltd

10 Chancel Street

London

SE1 0UX

Contents

List of Attachments

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Ink Associates Ltd to measure existing background noise levels at Club Monaco, Monmouth Street, London WC2H 9DD. The measured noise levels have been used to determine noise emission criteria for a proposed plant installation in agreement with the planning requirements of the London Borough of Camden.

This report presents the results of the environmental survey followed by noise impact calculations and outlines any necessary mitigation measures.

2.0 SITE DESCRIPTION

Current proposals are to install an external air conditioning unit in an existing plant area to the rear of commercial units facing onto Monmouth Street.

The plant unit will be in use during store opening hours, which are a worst case of 10:30 to 19:00.

The plant area is overlooked by windows to Seven Dials Court, a residential block which has been identified as the nearest affected receivers. This nearest noise sensitive receiver was identified through observations on-site. If there are any receivers closer to that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receptor should be confirmed by the Client before the plant is installed or any noise mitigation measures are implemented.

Locations are shown in attached site plan 13727-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Procedure

Measurements were undertaken at one position as shown on indicative site drawing 13727-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the site.

The microphone was mounted on a tree in the upper residential terrace at the rear of the building. The position was considered to be free-field according to guidance found in BS4142:2014, and a correction for reflections has therefore not been applied. Dominant noise levels at the monitoring position were dominated by ambient traffic noise during the installation and collection of equipment.

Continuous automated monitoring was undertaken for the duration of the survey between 16:00 on 6 June 2018 and 16:00 on 7 June 2018.

Weather conditions were generally dry with light winds, therefore suitable for the measurement of environmental noise.

The measurement procedure generally complied with BS 7445:1991: '*Description and measurement of environmental noise, Part 2- Acquisition of data pertinent to land use*'.

3.2 Equipment

The equipment calibration was verified before and after use and no abnormalities were observed.

The equipment used was as follows.

- 1 No. Svantek Type 977 Class 1 Sound Level Meter
- Norsonic Type 1251 Class 1 Calibrator

4.0 RESULTS

The $L_{Aeq: 5min}$, $L_{Amax: 5min}$, $L_{A10: 5min}$ and $L_{A90: 5min}$ acoustic parameters were measured at the location shown in site drawing 13727-SP1.

The measured noise levels are shown as a time history in Figure 13727-TH1, with ambient and background noise levels summarised in Table 4.1.

	Average ambient noise level $L_{eq: T}$	Minimum background noise level $L_{90: 5min}$
Daytime (07:00 - 23:00)	52 dB(A)	46 dB(A)
Night-time (23:00 - 07:00)	49 dB(A)	43 dB(A)
Proposed Operating Hours (10:30 - 19:00)	52 dB(A)	48 dB(A)

Table 4.1: Minimum background noise levels

5.0 NOISE CRITERIA

The London Borough of Camden general criteria for noise emissions are as follows:

> *"The 'A' weighted sound pressure level from the plant, when operating at its noisiest, shall not at any time exceed a value of 10 dB below the minimum external background noise, at a point 1 metre outside any window of any residential property."*

It is understood that the proposed plant unit will be for commercial use during store opening hours of 10:30 to 19:00. We therefore propose to set the noise criteria at 38 dB(A), the value 10 dB below the minimum measured background noise level during the proposed operating hours.

6.0 PLANT NOISE IMPACT ASSESSMENT

6.1 Proposed Installation

The proposed plant installation comprises the following:

- 1 No. Hitachi Condenser Unit type RAS 6HVNP1E

Noise emissions for the proposed plant units, as provided by the manufacturer, are shown in Table 6.1. Loudest modes of operation have been used in order to present a robust worst case assessment.

	Sound Pressure Levels (at 1 meter, dB) in each Frequency Band								
Unit	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Plant unit	59	52	48	50	47	38	36	27	51

Table 6.1: Manufacturer Noise Emissions Levels

The proposed plant location is within the existing plant area to the rear of the store, which is shown on indicative site plan 13727-SP1. The unit will be fixed to an existing masonry wall, beneath a horizontal coping stone.

The closest receiver has been identified as the window of a residential property opposite which overlooks the plant area at a minimum of 3 m from the proposed plant location.

The existing coping stone will block line of sight to overlooking windows, providing a reasonable amount of reduction to noise emissions.

6.2 Proposed Mitigation Measures

Proposals are to house the unit in a timber surround, with ventilation provided through slatted panels. In order to meet the proposed criteria stated in Section 5.0, it is recommended that instead an enclosure with an acoustic rating is installed around the plant. The enclosure should provide sufficient attenuation to achieve a maximum sound pressure level of 55 dB(A) when measured at 1 m in all directions.

Based on the information provided, an enclosure meeting the sound reduction indices as stated in Table 6.2 should be suitable to achieve this.

	Required Attenuation (dB) in each Frequency Band							
Mitigation	**63Hz**	**125Hz**	**250Hz**	**500Hz**	**1kHz**	**2kHz**	**4kHz**	**8kHz**
Louvred Enclosure	1	2	5	6	6	4	3	2

Table 6.2: Required Attenuation from Mitigation

6.3 Noise Impact Assessment

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 6.3. Detailed calculations are shown in Appendix B.

Receiver	Operating Hours Criterion	Noise Level at Receiver (due to proposed plant)
Nearest Residential Property	38 dB(A)	38 dB(A)

Table 6.3: Noise levels and criteria at noise sensitive receivers

As presented in Table 6.3 and Appendix B, the proposed plant installation with acoustic enclosure would be expected to meet the requirements of the proposed criteria.

6.4 British Standard Requirements

Further calculations have been undertaken to assess whether the noise emissions from the proposed plant unit would be expected to meet recognised British Standard recommendations, in order to further ensure the amenity of nearby noise sensitive receivers.

British Standard 8233:2014 '*Guidance on sound insulation and noise reduction for buildings*' gives recommendations for acceptable internal noise levels in residential properties. Assuming worst case conditions, of the closest window being for a bedroom, BS 8233:2014 recommends 30dB(A) as being acceptable internal resting/sleeping conditions during night-time.

With loudest external levels of 38 dB(A), acceptable internal conditions would be met when taking the attenuation of the window itself into consideration. According to BS 8233:2014, a typical building facade with a partially open window offers 15 dB attenuation.

It can therefore be predicted that, in addition to meeting the requirements of the set criteria, the emissions from the proposed plant would be expected to meet the most stringent recommendations of the relevant British Standard, with neighbouring windows partially open. Predicted levels are shown in Table 6.4.

Receiver	Recomended Target – *For resting/sleeping conditions in a bedroom, in BS8233:2014*	Noise Level at Receiver (due to plant installation)
Inside Residential Window	30 dB(A)	23 dB(A)

Table 6.4: Noise levels and criteria inside nearest residential space

7.0 CONCLUSION

An environmental noise survey has been undertaken at Club Monaco, Monmouth Street, London WC2H 9DD. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant units in accordance with the requirements of the London Borough of Camden.

A noise impact assessment has then been undertaken using manufacturer noise data to predict the noise levels, due to the proposed plant, at the nearby noise sensitive receivers.

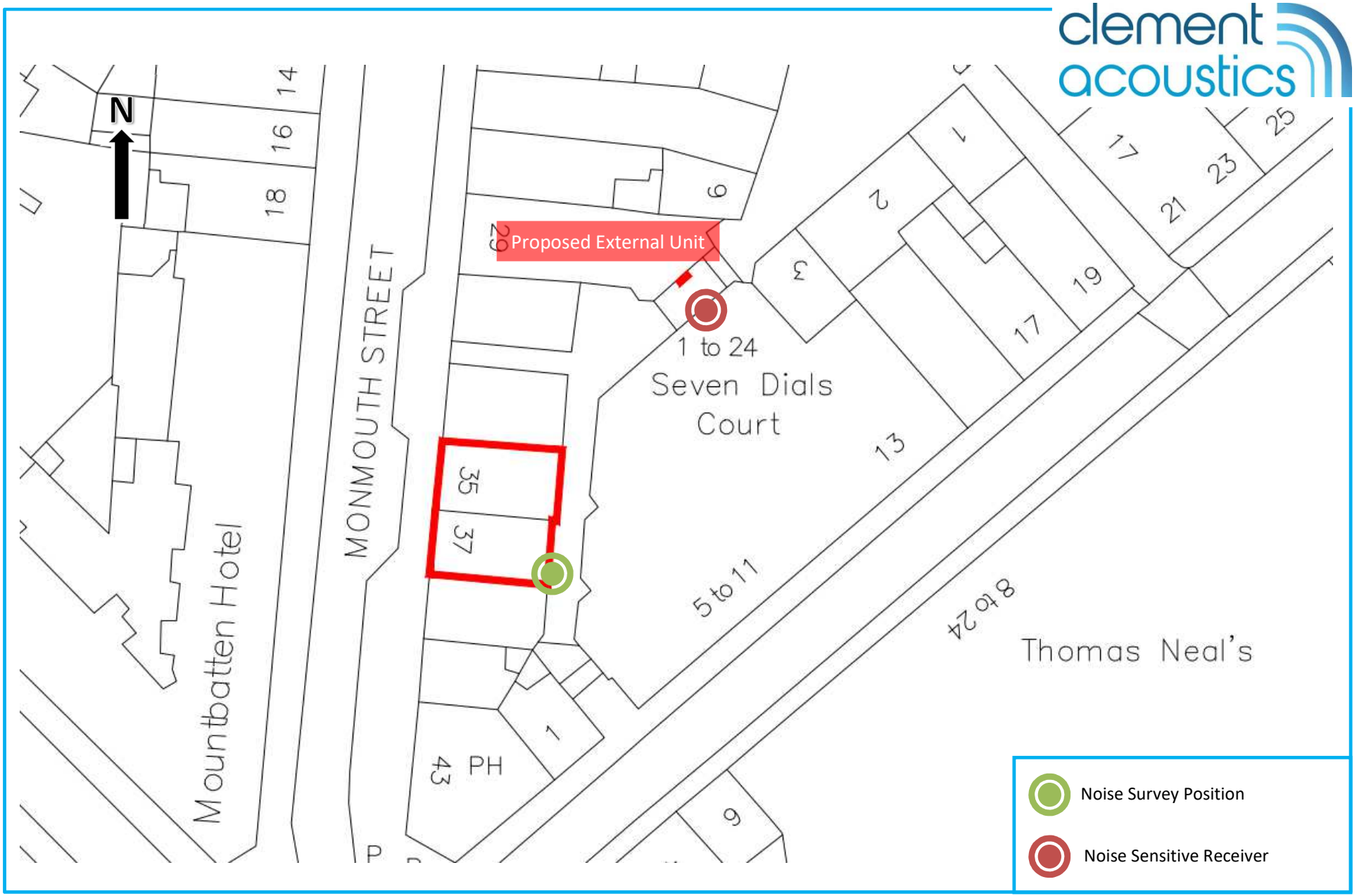
Calculations show that noise emissions from the proposed plant units should meet the requirements of the London Borough of Camden with the recommended mitigation installed as stated herein.

Report by

Duncan Martin MIOA

Checked by

Matt Markwick AMIOA

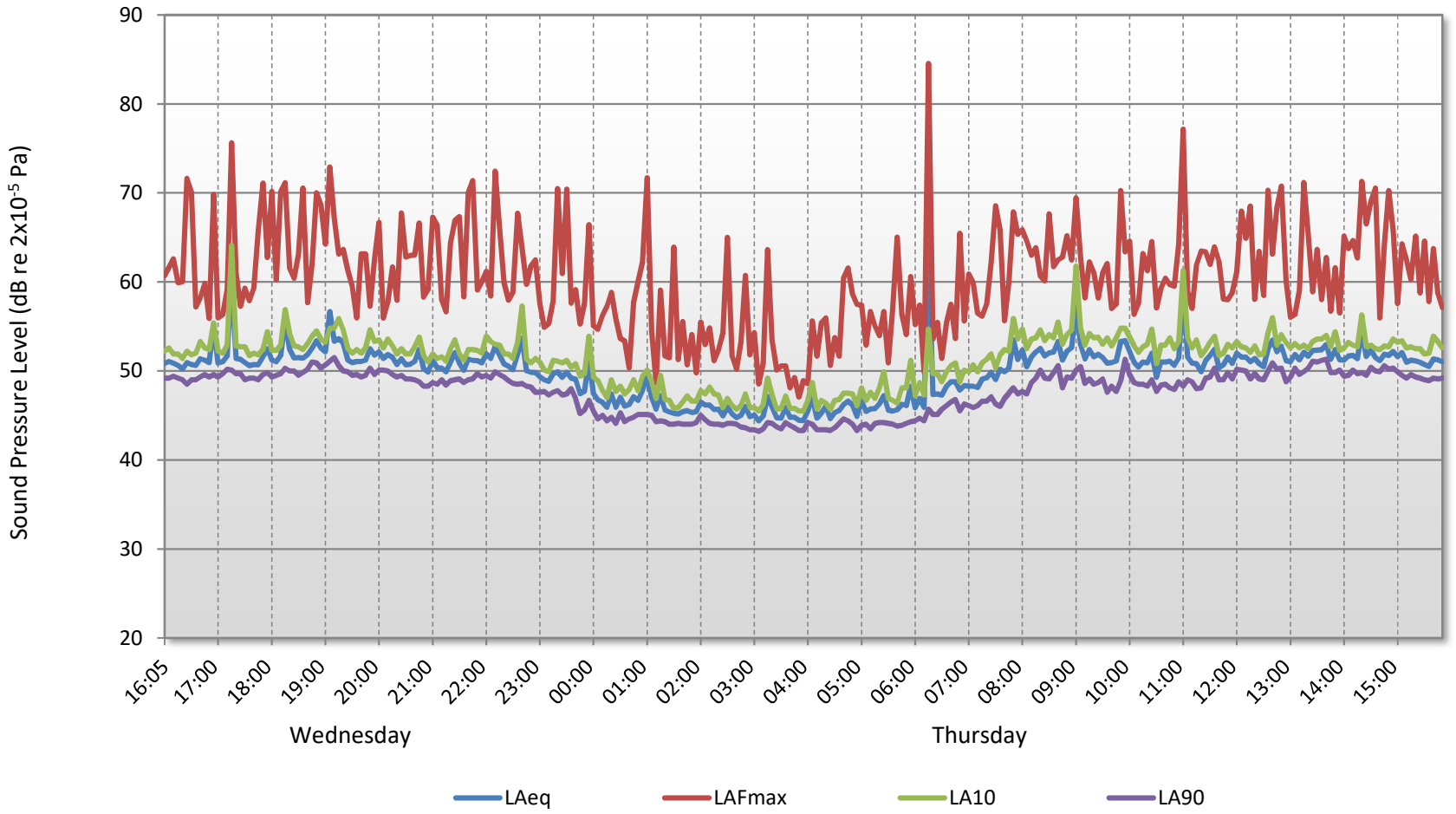


13727-SP1 Indicative site plan indicating noise monitoring position and nearest noise sensitive receiver **Date:** 14 June 2018

Club Monaco, Monmouth Street, London

Environmental Noise Time History

6 June 2018 to 7 June 2018



13727-TH1

APPENDIX A

GLOSSARY OF ACOUSTIC TERMINOLOGY

dB(A)

The human ear is less sensitive to low (below 125Hz) and high (above 16kHz) frequency sounds. A sound level meter duplicates the ear's variable sensitivity to sound of different frequencies. This is achieved by building a filter into the instrument with a similar frequency response to that of the ear. This is called an A-weighting filter. Measurements of sound made with this filter are called A-weighted sound level measurements and the unit is dB(A).

L_{eq}

The sound from noise sources often fluctuates widely during a given period of time. An average value can be measured, the equivalent sound pressure level L_{eq}. The L_{eq} is the equivalent sound level which would deliver the same sound energy as the actual fluctuating sound measured in the same time period.

L_{10}

This is the level exceeded for not more than 10% of the time. This parameter is often used as a "not to exceed" criterion for noise

L_{90}

This is the level exceeded for not more than 90% of the time. This parameter is often used as a descriptor of "background noise" for environmental impact studies.

L_{max}

This is the maximum sound pressure level that has been measured over a period.

Octave Bands

In order to completely determine the composition of a sound it is necessary to determine the sound level at each frequency individually. Usually, values are stated in octave bands. The audible frequency region is divided into 10 such octave bands whose centre frequencies are defined in accordance with international standards.

Addition of noise from several sources

Noise from different sound sources combines to produce a sound level higher than that from any individual source. Two equally intense sound sources operating together produce a sound level which is 3dB higher than one alone and 10 sources produce a 10dB higher sound level.

Attenuation by distance

Sound which propagates from a point source in free air attenuates by 6dB for each doubling of distance from the noise source. Sound energy from line sources (e.g. stream of cars) drops off by 3dB for each doubling of distance.

Subjective impression of noise

Sound intensity is not perceived directly at the ear; rather it is transferred by the complex hearing mechanism to the brain where acoustic sensations can be interpreted as loudness. This makes hearing perception highly individualised. Sensitivity to noise also depends on frequency content, time of occurrence, duration of sound and psychological factors such as emotion and expectations. The following table is a reasonable guide to help explain increases or decreases in sound levels for many acoustic scenarios.

Change in sound level (dB)	Change in perceived loudness
1	Imperceptible
3	Just barely perceptible
6	Clearly noticeable
10	About twice as loud
20	About 4 times as loud

Barriers

Outdoor barriers can be used to reduce environmental noises, such as traffic noise. The effectiveness of barriers is dependent on factors such as its distance from the noise source and the receiver, its height and its construction.

Reverberation control

When sound falls on the surfaces of a room, part of its energy is absorbed and part is reflected back into the room. The amount of reflected sound defines the reverberation of a room, a characteristic that is critical for spaces of different uses as it can affect the quality of audio signals such as speech or music. Excess reverberation in a room can be controlled by the effective use of sound-absorbing treatment on the surfaces, such as fibrous ceiling boards, curtains and carpets.

APPENDIX B

13727

Club Monaco, Monmouth Street, London

EXTERNAL PLANT NOISE EMISSIONS CALCULATION

Receiver: Nearest Residential Receiver
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Manufacturer provided sound pressure level at 1 metre									
Hitachi Condenser Unit type RAS 6HVNP1E	59	52	48	50	47	38	36	27	51
Correction for reflections, dB	9	9	9	9	9	9	9	9	
Attenuation from proposed louvred panels	-1	-2	-5	-6	-6	-4	-3	-2	
Screening from covering coping stone	-1	-2	-4	-7	-11	-15	-18	-18	
Distance correction to receiver, dB (3 m)	-10	-10	-10	-10	-10	-10	-10	-10	
Sound pressure level at receiver	**56**	**47**	**38**	**36**	**29**	**18**	**14**	**6**	**38**

Design Criterion	**38**

BS 8233 ASSESSMENT CALCULATION

Receiver: Inside Nearest Residential Window
Source: Proposed plant installation

	Frequency, Hz								
	63	*125*	*250*	*500*	*1k*	*2k*	*4k*	*8k*	*dB(A)*
Sound pressure level outside window	56	47	38	36	29	18	14	6	38
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**41**	**32**	**23**	**21**	**14**	**3**	**-1**	**-9**	**23**

Design Criterion	**30**