MACH TESTING

17 CHARTERHOUSE STREET, LONDON

Assessment – BS 4142: 2014

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MACH Testing Ltd
Trelawney House
Surrey Street
Bristol
BS2 8PS

t: 0117 944 1388
e: info@machacoustics.com
w: www.machacoustics.com

Consultants	Andrew Rickard	andrew@machacoustics.com
	Claire Bye	claire@machacoustics.com
	Chris Jones	chris@machacoustics.com
	Hsuan-Yang Wang	yang@machacoustics.com
	Josh Childs	josh@machacoustics.com
	Max Reynolds	max@machacoustics.com
	Lewis Wheatley	lewis@machacoustics.com
	Patrick Shuttleworth	patrick@machacoustics.com
	Phil Jordan	phil@machacoustics.com
	Stefan Hannan	stefan@machacoustics.com
	Ze Nunes	ze@machacoustics.com
	Zoe Vernon	zoe@machacoustics.com
Finance	Tracy Toal	tracy@machacoustics.com

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1.0 INTRODUCTION

MACH Testing has been appointed on behalf of Anglo American and De Beers to undertake an environmental noise assessment for the proposed plant at 17 Charterhouse Street, London. Proposals are to install plant on the roof of the development.

The purpose of the assessment is to determine the existing ambient background noise level representative of the worst affected dwellings to the proposed development. Based on this level, a maximum noise rating target has been specified for proposed plant, such that there will be no adverse impact to nearby sensitive receptors. This target will be used at a later stage to assess the plant once a specification is available.

In order to assess noise emissions from the proposed condenser units, an assessment has been carried out to BS 4142: 2014 "*Methods for rating and assessing industrial and commercial sound*". This assessment has been benchmarked against a noise survey carried out between the 18th and 19th July 2017.

2.0 SITE DESCRIPTION

The proposed plant is to be located on the roof of the development. Measurement location (F) is indicated in Figure 2.1.

Figure 2.1: Site and Measurement Location

2.1 Environmental Noise Sources

Existing plant noise from various sources in the local area is seen to constitute a primary contributor to background noise levels on site. Secondary noise sources are from nearby roads; Charterhouse St, Farringdon Road and Ely Pl.

2.2 Noise Sensitive Receptors

The nearest residential noise sensitive receptors are in the rear courtyard. Offices are located within the existing buildings at the development.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Methodology

In order to establish the existing environmental noise levels on site, a noise survey was conducted between 15:30 on 18/07/17 and 15:30 on 19/07/17.

A fixed microphone position was used to determine the background noise levels during typical operating hours, with the fixed long term meter set to measure consecutive 'A' weighted 5 minute time samples. Measurements have been taken in free-field conditions.

The fixed measurement location (F) is shown in Figure 2.1. The location is comparable to the receptor location in terms of background noise, which has been verified on site. The results of the environmental noise survey are provided within Section 4.0 of this report.

3.2 Measurement Equipment

The measurement equipment illustrated in Table 3.1 was used during the survey, all equipment complies with BS EN 60942:2003 i.e. a class 1 device.

Name	Serial Number	Last Calibrated	Calibration Due
Norsonic Precision Sound Analyser Type 131	1313109	Mar-16	Mar-18
Norsonic Type 1207 Pre-amplifier	12303	Mar-16	Mar-18
Norsonic Type 1228 Microphone	170603	Mar-16	Mar-18
Norsonic Precision Sound Analyser Type 118	30562	Jun-16	Jun-18
Norsonic Type 1206 Pre-amplifier	30249	Jun-16	Jun-18
GRAS 40AF Microphone	114670	Jun-16	Jun-18
Svantek Acoustic Calibrator Type SV31	32527	Jul-17	Jul-18

Table 3.1: Measurement Equipment Calibration

3.3 Weather Conditions

The following climate conditions were recorded for the site:

Wind: Less than 5 m/s.
Humidity: The weather was sunny and clear during the day. There was some rainfall that evening.
Temperature: 18-24^{o}C.

The above weather conditions are suitable for the measurement of environmental noise in accordance with BS7445 *Description and Measurement of Environmental Noise.*

4.0 RESULTS

4.1 Fixed Measurement Results

The following graph presents the background noise levels recorded over the measurement period at the fixed location (F). The complete set of measurement data is available on request.

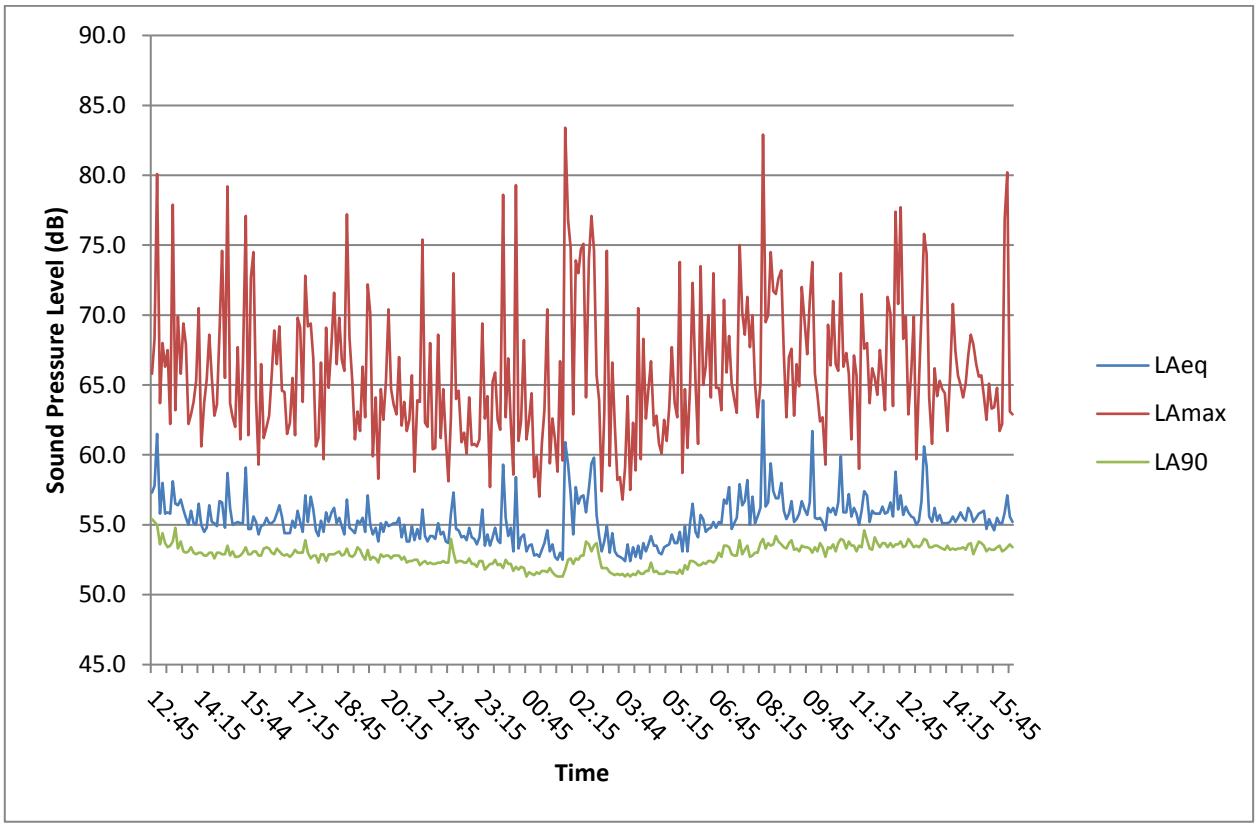

Figure 4.1: Fixed measurement (F) survey results; LAeq, LA90, LAmax (Norsonic 118).

4.1.1 Summary of Fixed Location Measurements – Background Noise

BS4142: 2014 states that '*in using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.*' BS4142 further states that '*a representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either minimum or modal value*'. Hence BS4142 does not provide a black and white method of obtaining the assessment level for background noise.

For the purposes of assessment, MACH Acoustics have derived the minimum LA90 occurring during the operational hours of the noise source. Table 4.1 provides the background noise levels which will form the basis of assessment.

Position	Time Period	L_{A90}, dB
F	DAY (07:00-23:00)	53
	NIGHT (23:00-07:00)	52

Table 4.1: Assessment Background Noise Levels

5.0 NOISE BREAK-OUT ASSESSMENT

5.1 Nearest Noise Sensitive Receiver

At this stage, there are no noise emission targets set by the Local Planning Authority. MACH Testing propose a suitable rating level target of –5 to the existing background noise level. Section 2.0 outlines the noise sensitive receptor locations.

5.2 Noise Rating Level Limit

Table 5.1 provides the maximum rating level limit at the nearest residential receptors. At this time it is understood that no acoustic correction should be added. The manufacturer should confirm that no tonal or impulsive characteristics are associated with the chosen plant. The nearest noise sensitive receptors are indicated in Figure 2.1.

Measurement Period	Background Noise Level (LA90, dB)	Noise Rating Level Design Criteria	Noise Rating Level Limit dB (A) LAeq,T
DAY (07:00-23:00)	53	- 5	48
NIGHT (23:00-07:00)	52	- 5	47

Table 5.1: BS4142: Assessment Outcome

6.0 CONCLUSION

MACH Testing has been appointed on behalf of Anglo American and De Beers to undertake an environmental noise assessment for the proposed extension at 17 Charterhouse Street. Proposals are to install plant on the roof of the development.a

The assessment has specified the maximum rating level limits for the proposed plant, such that it is in line with the provisions of BS 4142: 2014. As such, the proposed plant will not cause an adverse noise impact at the worst affected noise sensitive receptors.

APPENDIX A – BS4142 Criteria

BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" describes a method of determining the level of noise of an industrial nature, together with the procedures for assessing whether the noise in question is likely to give rise to complaints from persons living in the vicinity. As such, an assessment to BS 4142 is typically called for within planning conditions. The likelihood of complaints in response to a noise depends on various factors. BS 4142 assesses the likelihood of complaints by considering the margin by which the noise in question exceeds the background noise level.

BS 4142 states that one should *'obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level and consider the following:*

a) *Typically, the greater this difference, the greater the magnitude of the impact.*
b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
c) *A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.*
d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*

The aforementioned rating level is based upon the specific noise level of the noise source in question. A correction should be applied to the specific noise level to obtain an increased rating level if *'a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.* To summarise, BS4142 section 9.2 advises the following in regards to corrections for acoustic characteristics:

- Tonality – *for sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*
- Impulsivity – *A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level., Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.*
- Other sound characteristics – *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied*
- Intermittency – *When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.*