Cole Jarman

4 Princess Mews, London

Plant Noise Assessment

Report 18/0392/R1

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Report 18/0392/R1

Lady Bellamy

4 Princess Mews,
London,
NW3 5AP

Revision	Description	Date	Prepared	Approved
0	1st Issue	1 August 2018	Josh Large Adam Sharpe	Ben Harper

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Table of Contents

Attachments

End of Section

Plant Noise Assessment

1 Introduction

1.1 New mechanical services plant has been installed at the existing 4 Princess Mews property in NW3, London. As part of this, a retrospective planning application is being sought.

1.2 Cole Jarman have undertaken an unattended noise survey on site in order to quantify the existing noise climate and the subsequent plant assessment.

1.3 The report details an evaluation of noise emissions from the proposed plant strategy to the nearest noise sensitive areas. Where necessary, mitigation measures have been set out with performance requirements for the various elements specified.

2 Site Description

2.1 The site is located at 4 Princess Mews, London, NW3 5AP, and is a 3 storey residence which sits within a larger terrace of residential properties along the eastern side of Princess Mews. Access to Princess Mews is obtained from Belsize Crescent to the south.

2.2 The area to the west of the site beyond the residential properties opposite is occupied by the gardens of the nearby properties that front onto the nearby Belsize Crescent in a southerly direction. The site shares its eastern boundary with a large mixed use terrace of ground floor commercial units, with three storeys of residential dwellings above.

2.3 To the north of the site are further residences along Princess Mews, which eventually meets with Belsize Place.

2.4 Traffic was not audible on site due to the screening caused by the nearby buildings.

2.5 The noise climate perceived onsite was most notably caused by plant noise, with construction noise also audible in the distance at the time of equipment setup.

2.6 The site falls under the jurisdiction of the London Borough of Camden.

3 Background Noise Survey

3.1 **Methodology**

3.1.1 An unattended noise survey was undertaken at the site commencing at 1100 hours on 19 July 2018, concluding at 1100 hours on 20 July 2018.

3.1.2 Measurements of background noise levels were made at one position. This has been illustrated in attached site plan 18/0392/SP1 and is described below:

- MP1 – Approximately 2m above finished floor level on the site's roof terrace, at the location of installed plant.

3.1.3 This position was selected to quantify background noise levels representative of those at the nearest noise sensitive receivers.

3.1.4 Measurements of the L_{Aeq}, L_{Amax} and L_{A90} indices were recorded over consecutive 15 minute periods for the duration of the survey using the equipment listed within table T1 (see attached Glossary of Acoustic Terms for an explanation of the noise units used).

Item	Manufacturer	Type
Sound Level Analyser	Norsonic	118
Acoustic Calibrator	Norsonic	1251
Weatherproof windshield	Norsonic	1212

T1 Equipment used during noise survey.

3.1.5 The microphone was fitted within a weatherproof enclosure, and the sound level meter calibrated before and after the survey in order to confirm an acceptable level of accuracy. No significant drift was noted to have occurred.

3.1.6 The weather conditions when setting up and collecting the noise monitoring equipment were warm with clear skies. Publically available weather information suggests no rain fell during the measurement period. These conditions are deemed acceptable and are not considered to have affected measurement results.

3.2 Results

3.2.1 The results of the noise measurements are presented in attached figure 18/0392/TH01.

3.2.2 When setting up the noise monitoring equipment, plant noise associated with neighbouring properties could be heard, with construction noise in the distance. When collecting the equipment, the plant noise could still be heard.

3.2.3 The minimum background noise levels recorded during the day and night time measurement hours during the survey duration are set out in table T2 below:

Location	Minimum Background Noise Level, dB(A)	
	Daytime (0700-2300)	Night time (2300-0700)
MP1: Site's roof terrace	38	34

T2 Lowest measured background noise levels, L_{A90}.

4 Plant Noise Limits

4.1 The site falls under the jurisdiction of the London Borough of Camden.

4.2 Policy A4 of The London Borough of Camden's *Local Plan 2017* relates specifically to noise:

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity.

Planning conditions will be imposed to require that plant and equipment which may be a source of noise is kept working efficiently and within the required noise limits and time restrictions.

Conditions may also be imposed to ensure that attenuation measures are kept in place and are effective throughout the life of the development.

4.3 With regard to noise from new mechanical services plant, Appendix 3 of the Local Plan sets out the following:

A relevant standard or guidance document should be referenced when determining values for LOAEL and SOAEL for non-anonymous noise. Where appropriate and within the scope of the document it is expected that British Standard 4142:2014 'Methods for rating and assessing industrial and commercial sound' (BS 4142) will be used. For such cases a 'Rating Level' of 10 dB below background (15dB if tonal components are present) should be considered as the design criterion).

4.4 However, for low background noise levels such as those measured on-site, Section 11(1) of BS4142 states:

Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.

4.5 Considering this point, as the daytime background noise levels in table T2 are 8 dB(A) above 30dB(A) and the night time levels 4 dB(A) above, we would recommend a plant noise emission

limit of 30dB(A), so as to set a pragmatic and achievable limit. This limit should apply 1m from the facade of any affected residential building not part of the hotel itself.

4.6 To put the recommended limit of 30dB(A) in context, allowing for a typical loss of 12dB(A) from a partially open window would result in noise levels below 20dB(A) inside any residences exposed to this level of external plant noise.

4.7 Internal noise levels below 20dB(A) are more than 10dB(A) below the guideline level of $L_{Aeq,8h}$ 30dB suggested in BS8233:2014[1], as being appropriate or bedrooms to provide suitable conditions for sleeping.

4.8 Based on the results of our background noise survey set out within table T3, in addition to the guidance set out above, we recommend that the following plant emission limits are to apply at the nearest noise sensitive premises:

Location	**Noise Emission Limit, dB**	
	Daytime (0700-2300 only)	**Night time (2300-0700)**
AP1	30	30

T3 Plant noise emission limits at the nearest residential properties.

5 Plant Noise Assessment

5.1 Proposed Installation

5.1.1 The specification for the proposed external condenser unit is as follows:

- Mitsubishi Heavy Industries SCM60ZM-S;

5.1.2 The unit has been installed on the northern boundary of the property's roof terrace.

5.1.3 Due to the purpose of the unit as part of a residential scheme, there will be no strict operating hours for the plant, with the units used on an ad hoc basis. As a result of this, the 24-hour night time plant noise limits will apply.

[1] British Standard 8233:2014 - Guidance and sound insulation and noise reduction for buildings

5.2 Methodology

5.2.1 Due to a lack of published noise data for the unit installed on site, our assessment has used manufacturer's noise data for a similar unit. This has been set out on the attached schedule 18/0392/PNS1. The noise data suggests that no tonality correction need be applied.

5.2.2 The noise levels generated by the condensing unit have been calculated by correcting the plant noise levels for distance and radiation losses and façade reflections where appropriate.

5.2.3 Details of our calculations are set out on attached sheets 18/0392/CS1-CS2.

5.3 Results

5.3.1 The results of our assessment indicate that mitigation of noise emissions from the unit will be required in order to meet the local authority's noise emission limits. This can be achieved through the provision of an acoustic enclosure.

5.3.2 The required enclosure can either be custom made using high performance acoustic louvres or manufactured enclosures. Examples of companies which produce high performance enclosure include Environ Technologies Ltd[2] and Sound Planning Ltd[3]. The minimum insertion loss requirements for the enclosure can be found in table T4 below. The enclosure must be sized to allow sufficient airflow to the condenser unit and installed on suitable vibration isolation mounts.

Mitigation measure	Insertion Loss at Octave Band Centred Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
ENC-1: Acoustic Enclosure	12	13	20	29	36	37	39	39

T4 Required insertion losses

5.3.3 The rating noise levels calculated with the mitigation measures specified above are shown in table T5.

[2] http://www.Environ.co.uk
[3] http://www.soundplanning.co.uk/

Assessment Position	Rating Noise Level, dB(A) *(Limit)*
AP1 – Façade of residence to north-east of site, approximately 7.5m from air conditioning unit	26 *(30)*
AP2 – Façade of residence to south-west of site, approximately 11.5m from air conditioning unit	23 *(30)*

T5 Plant noise emission levels at assessment positions.

6 Conclusions

6.1 New mechanical services plant has been installed at the existing 4 Princess Mews property in NW3, London. As part of this, a retrospective planning application is being sought.

6.2 Cole Jarman have undertaken an unattended noise survey on site in order to quantify the existing noise climate and the subsequent plant assessment.

6.3 Noise mitigation measures have been recommended on the basis of a subsequent assessment of the proposed units and it has been shown that the limits would be met at all times.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_{n}.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section

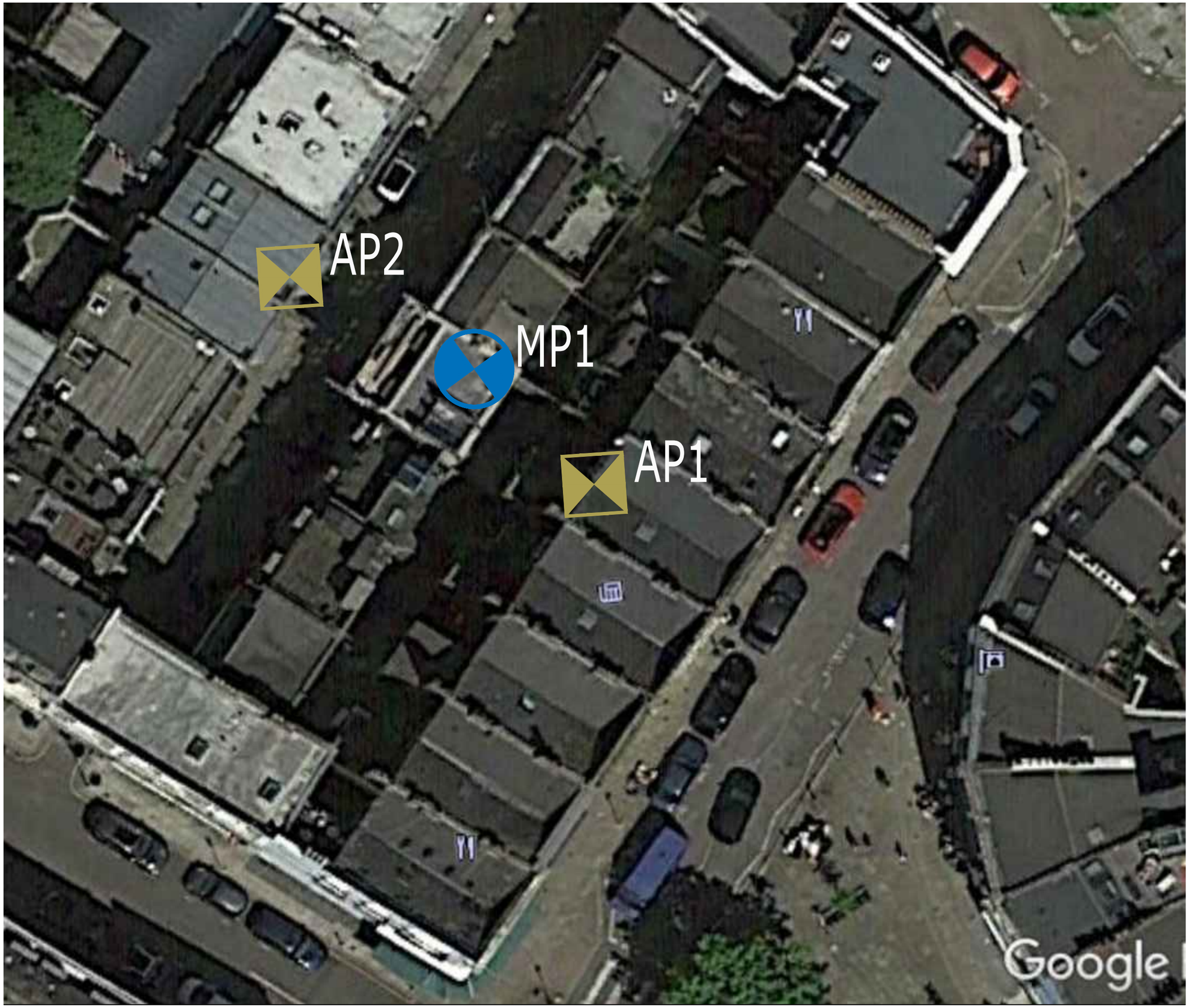

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Figure 18/0392/SP1

Title:

Site plan illustrating unattended measurement and assessment positions

Project:

4 Princess Mews, London

Date:

July 2018

Revision:

-

Scale:

Not to scale

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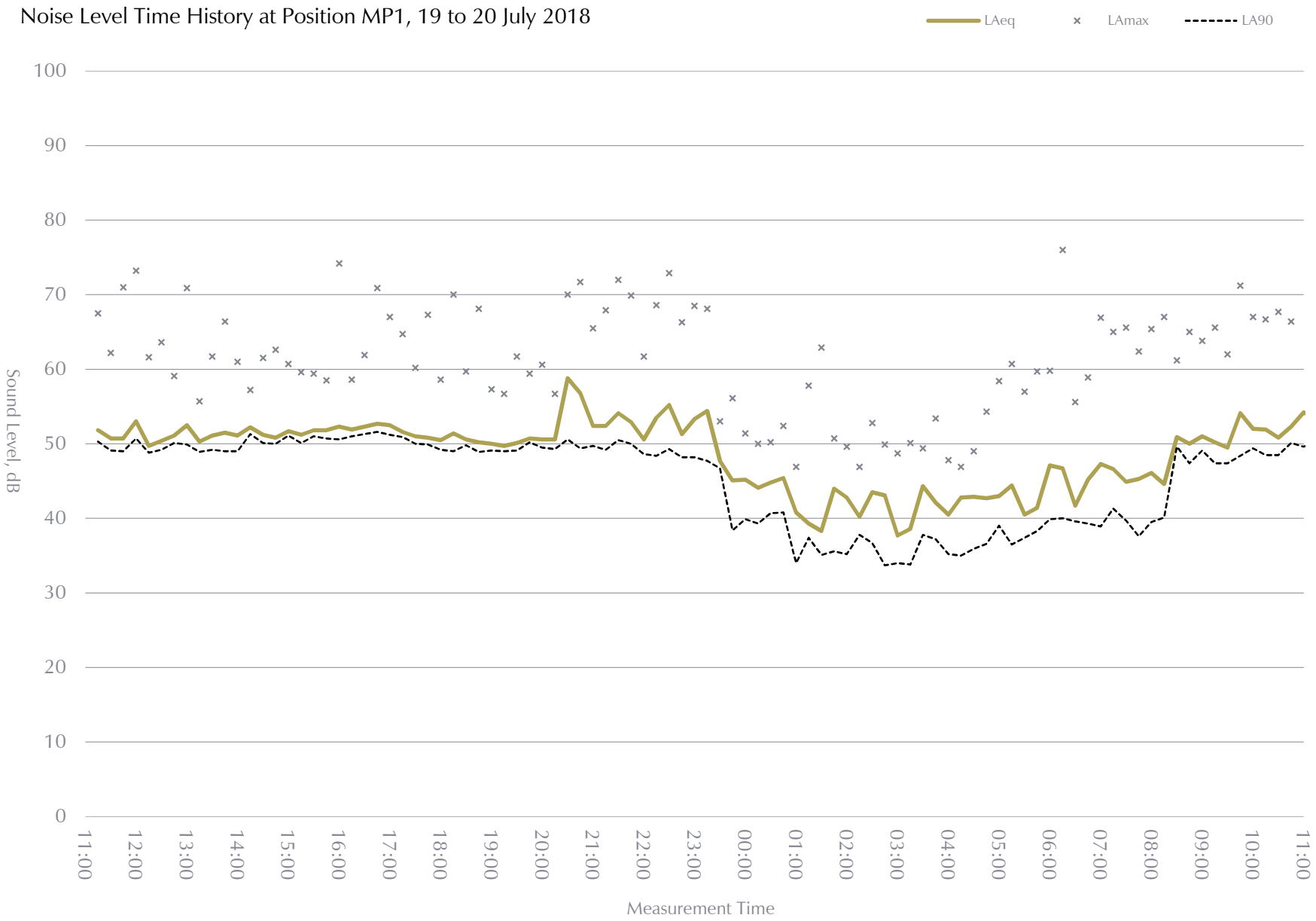

Figure 18/0392/TH01

Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Data Source[1]	Noise Level Type	Noise Levels (dB)							
				63	125	250	500	1k	2k	4k	8k
Condenser	Condenser located on roof terrace	Emp	Sound Power, Lw	70.5	73.5	66.5	64.5	59.5	53.5	53.5	48.5

Notes

1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

Calculation Sheet 18/0392/CS1

Condenser to AP1

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Condenser									
Sound Power Levels		**70**	**74**	**66**	**64**	**60**	**54**	**54**	**48**
Silencer									
Silencer - ENC-1									
		-12	*-13*	*-20*	*-29*	*-36*	*-37*	*-39*	*-39*
Point Source Radiation Loss									
Radiation - Quarterspherical									
Single Figure Read	5								
		-5	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*
Point Source Distance Loss									
Start Distance (m)	1								
End Distance (m)	7.5								
		-18	*-18*	*-18*	*-18*	*-18*	*-18*	*-18*	*-18*
Facade Reflection									
Reflection (dB)	3								
		3	*3*	*3*	*3*	*3*	*3*	*3*	*3*
External Receiver									
External Receiver - AP1									
Sound Pressure, Lp		**39**	**41**	**27**	**16**	**4**	**-3**	**-5**	**-10**

Calculation Sheet 18/0392/CS2

Condenser to AP2

		Octave Band Centre Frequency (Hz)							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Noise Source									
Noise Source - Condenser									
Sound Power Levels		**70**	**74**	**66**	**64**	**60**	**54**	**54**	**48**
Silencer									
Silencer - ENC-1									
		-12	*-13*	*-20*	*-29*	*-36*	*-37*	*-39*	*-39*
Point Source Radiation Loss									
Radiation - Quarterspherical									
Single Figure Read	5								
		-5	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*	*-5*
Point Source Distance Loss									
Start Distance (m)	1								
End Distance (m)	11.5								
		-21	*-21*	*-21*	*-21*	*-21*	*-21*	*-21*	*-21*
Facade Reflection									
Reflection (dB)	3								
		3	*3*	*3*	*3*	*3*	*3*	*3*	*3*
External Receiver									
External Receiver - AP2									
Sound Pressure, Lp		**35**	**37**	**23**	**12**	**0**	**-7**	**-9**	**-14**

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