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12 Pilgrims Lane
London

25 September 2024

17451-NIA-01 RevB

Noise Impact Assessment

Project Number
17451

Issued For
Alex Shamash

Institute of Acoustics sponsoring organisation
CQMS Safety Scheme
ISO 17025 Quality Assurance
CHAS Contractors Health & Safety Assessment Scheme Accredited Contractor
Constructionline
UKAS TESTING 7688

Company registered in England & Wales no. 07958744
UKAS accreditation is only applicable to pre-completion sound insulation testing services for building regulations and is not linked to the endorsements and certifications shown above

EXECUTIVE SUMMARY

This noise impact assessment has been undertaken in order to assess a proposed plant installation for residential use at 12 Pilgrims Lane, London.

The proposed plant installation comprises a single Daikin condenser unit.

A background noise survey has been undertaken as detailed in the report, in order to determine an appropriate noise emission criterion, in accordance with the requirements of the London Borough of Camden.

Calculations were undertaken for the nearest receivers, identified as 14 Pilgrims Lane and 10 Downshire Hill. It should be noted that if there are closer receivers that Clement Acoustics is not aware of, a reassessment will be necessary, and this should therefore be confirmed by the Client.

It has been demonstrated that compliance with the established criterion is feasible, dependent on the following material considerations:

- The plant could be in use at any time over a 24 hour period
- The noise emissions data for the proposed units, as obtained from available manufacturer information
- Plant and receiver locations are as established in this report and marked on the attached site plan
- Mitigation is applied as recommended in this report, in the form of a louvre.

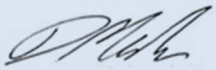
If there is any deviation from the above, Clement Acoustics must be informed, in order to establish whether a reassessment is necessary.

Clement Acoustics has used all reasonable skill and professional judgement when preparing this report. The report relies on the information as provided to us at the time of writing and the assumptions as made in our assessment.

This report is designed to be suitable to discharge typical plant noise planning conditions, as per our original scope of work. The report should not be relied upon for further reasons, such as the detailed design of mitigation measures.

CONTENTS

LIST OF ATTACHMENTS

Issue	Date of Issue	Author	Reviewed	Authorised
RevB	25/09/24			
		Daniel Ladega Technical Assistant MPhys (Hons)	**John Smethurst** Director BSc (Hons) MIOA	**Duncan Martin** Director BSc (Hons) MIOA

Issue	Comment
0	First Issue
RevA	Amended Client name
RevB	New plant scheme

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Alex Shamash to measure existing background noise levels at 12 Pilgrims Lane, London. Measured noise levels have been used to determine noise emissions 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.

An acoustic terminology glossary is provided in Appendix A.

2.0 SITE DESCRIPTION

The site is located on Pilgrims Lane, with the surrounding area being predominantly residential in nature.

Current proposals are to install a single condenser unit on the eastern façade at the rear of the property.

14 pilgrims Lane and 4 Downshire hill have been identified as the nearest affected receivers. This nearest noise sensitive receivers were identified through observations on-site. If there are any receivers closer than that identified within this report then a further assessment will need to be carried out. Therefore, the closest noise sensitive receiver 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 17451-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 17451-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receivers.

The microphone was mounted on a tripod at the southern corner of the garden and was positioned 1.5 m above ground level not near any reflective surfaces This position is considered to be free-field according to the guidance found in BS 4142: 2014.

Continuous automated monitoring was undertaken for the duration of the survey between 11:30 on 30 May 2022 and 12:15 on 31 May 2022.

The measurement procedure generally complied with ISO 1996-2: 2017: '*Description, measurement and assessment of environmental noise'*.

3.2 Weather Conditions

At the time of set-up and collection of the monitoring equipment the weather conditions were generally dry with light winds. It is understood that the weather conditions during the unattended survey were of the same nature.

It is considered that the weather conditions did not significantly adversely affect the measurements and are therefore considered suitable for the measurement of environmental noise.

3.3 Equipment

The equipment calibration was verified, by means of a field verification check, 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
- Rion Type NC-74 Class 1 Calibrator

4.0 RESULTS

4.1 Unattended Noise Survey 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 17451-SP1.

Measured noise levels are shown as a time history in Attachment 17451-TH1, with average ambient and typical background noise levels summarised in Table 4.1.

Time Period	Average ambient noise level $L_{Aeq:\,T}$, dB	Typical background noise level $L_{A90:\,5min}$, dB
Daytime (07:00 - 23:00)	48	39
Night-time (23:00 - 07:00)	47	32

Table 4.1 Average ambient and typical background noise levels

5.0 NOISE CRITERIA

5.1 Relevant Local Policy

The assessment and recommendations in this report have been undertaken in accordance with Policy D14 of the London Plan 2021, which contains the following relevant sections:

"D14. In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:

5) mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses".

5.2 Local Authority Criteria

The London Borough of Camden general criteria for noise emissions, as stated in the *'Camden Local Plan (2017)'* are as follows:

"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)."

It is understood that the proposed plant unit will be for residential use and can be operational at all times.

Based on the results of the environmental noise survey and requirements of the London Borough of Camden, Table 5.1 presents the proposed plant noise emission criteria to be achieved at 1 m from the nearest noise sensitive receiver.

Period	Plant Noise Emission Limit $L_{Aeq:T}$, dB
Daytime (07:00 - 23:00)	29
Night-time (23:00 - 07:00)	22

Table 5.1 Plant noise emission limits

6.0 PLANT NOISE IMPACT ASSESSMENT

6.1 Proposed Installation

The proposed plant installation comprises the following:

- 1 No. Daikin RXYSQ12TY1

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.

Unit	Sound Pressure Level (at 1 m, dB) in each Frequency Band, Hz								
	63	125	250	500	1k	2k	4k	8k	dB(A)
Daikin RXYSQ12TY1	67	61	56	54	52	48	43	36	57

Table 6.1 Manufacturer provided noise emissions levels

The proposed plant location is at the southern façade of the dwelling which is shown on indicative site plan 17451-SP1.

6.2 Proposed Mitigation Measures

In order to meet the proposed criteria stated in Section 5.0, it is recommended that an enclosure is installed around the plant. The enclosure should provide sufficient attenuation to achieve a maximum sound pressure level of 49 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.

Mitigation	Required Attenuation (dB) in each Frequency Band, Hz							
	63	125	250	500	1k	2k	4k	8k
Louvred Enclosure	5	5	6	11	19	21	17	15

Table 6.2 Required attenuation from mitigation

6.3 Noise Impact Assessment

The closest receivers have been identified as the rear windows on the south-eastern façade of 14 Pilgrims Lane and the rear window of 4 Downshire Hill on the north-western façade opposite which are a minimum of 16 m and 31 m respectively from the proposed plant location.

Screening for 14 Pilgrims Lane mitigation is provided by the rear wall at 12 Pilgrims Lane. 4 Downshire Hill has direct line of sight of the plant. These are shown in site plane 17451-SP1.

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	Design Criterion	Noise Level at Receiver (due to proposed plant)
14 Pilgrims Lane	22 dB(A)	16 dB(A)
4 Downshire Hill		19 dB(A)

Table 6.3 Noise levels and project criterion 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 30 dB(A) as being acceptable internal sleeping conditions during night-time.

With loudest external levels of 19 dB(A), acceptable internal conditions would be met without 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	Recommended Target – For sleeping conditions in a bedroom, in BS 8233: 2014	Noise Level at Receiver (due to plant installation)
Inside Residential Window	30 dB(A)	4 dB(A)

Table 6.4 Noise levels and BS 8233: 2014 criteria inside nearest residential space

7.0 CONCLUSION

An environmental noise survey has been undertaken at 12 Pilgrims Lane, London. The results of the survey have enabled criteria to be set for noise emissions from the proposed plant in accordance with the requirements of the London Borough 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 units should meet the requirements of the London Borough of Camden with the recommended mitigation installed as stated herein.

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N

Not to scale

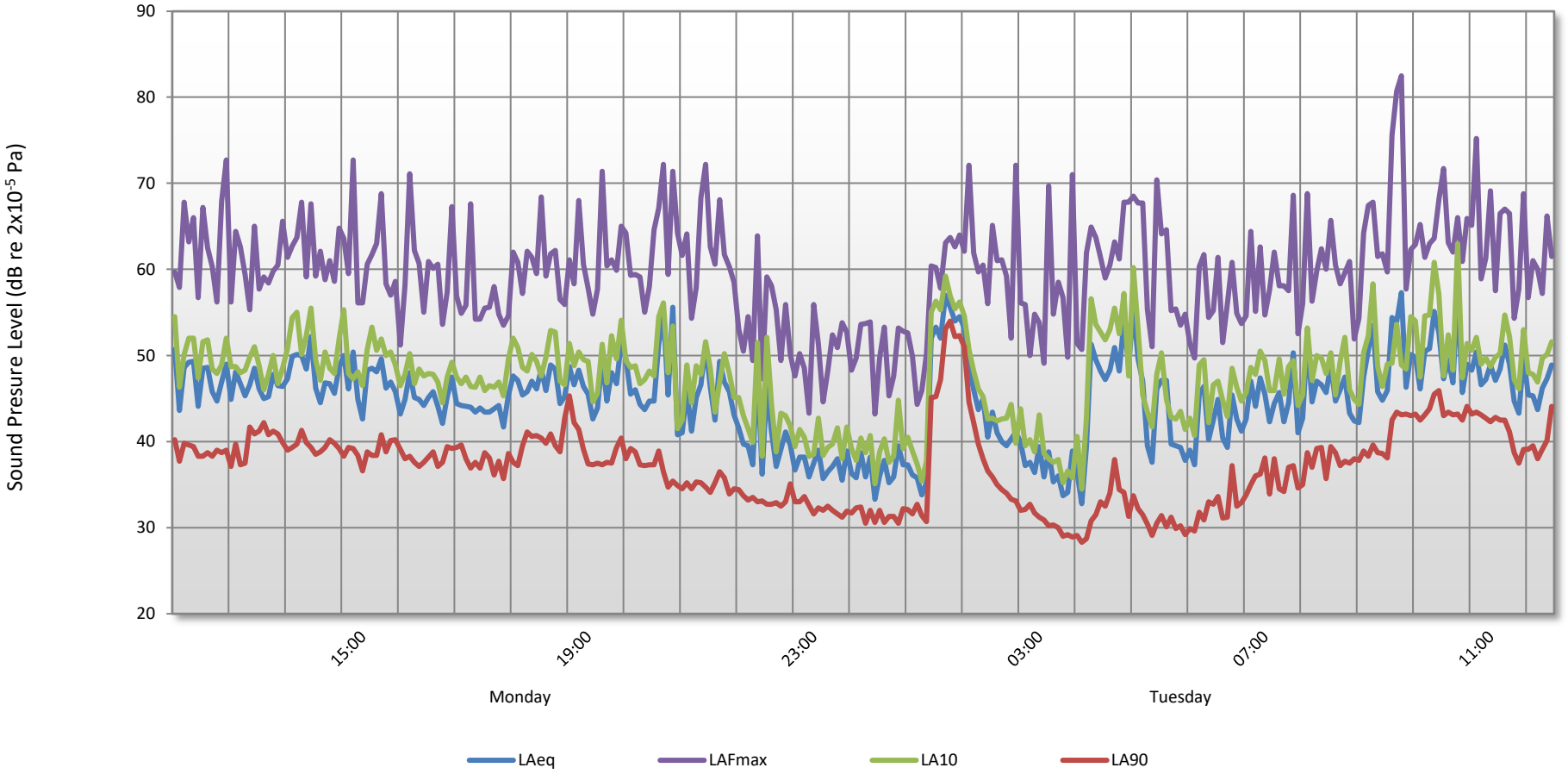
Description:
Indicative site plan showing noise monitoring position and nearest sensitive receiver

Date	25 September 2024
Reference	17451-SP1
Project Name	12 Pilgrims Lane, London
Image ©	Google Earth

Key:	
	Unattended Noise Survey Position
	Noise Sensitive Receiver
	Proposed Plant Location

Position 1

Environmental Noise Time History
30 May 2022 to 31 May 2022



-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 10 dB 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 3 dB for each doubling of distance.

APPENDIX A

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

Acoustic Calculations

17451

12 Pilgrims Lane, London

Receiver 1: 14 Pilgrims Lane

External Plant Noise Emissions Calculation

Description	Frequency, Hz 63	125	250	500	1k	2k	4k	8k	dB(A)
Manufacturer provided sound pressure level at 1 metre									
Daikin RXYSQ12TY1	67	61	56	54	52	49	43	36	57
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Mitigation due to building envelope, dB	-6	-7	-10	-12	-15	-18	-21	-25	
Distance correction to receiver, dB (16 m) *	-24	-24	-24	-24	-24	-24	-24	-24	
Mitigation required, dB	-5	-5	-6	-11	-19	-21	-17	-15	
Sound pressure level at receiver	**35**	**28**	**19**	**10**	**-3**	**-11**	**-16**	**-25**	**16**

*** Distance loss calculated assuming Point Source attenuation (*typically used where distance is more than 3x the largest source dimension*)**

Design Criterion	22

BS 8233 Assessment Calculation

Description	Frequency, Hz 63	125	250	500	1k	2k	4k	8k	dB(A)
Sound pressure level outside window	35	28	19	10	-3	-11	-16	-25	16
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**20**	**13**	**4**	**-5**	**-18**	**-26**	**-31**	**-40**	**1**

Design Criterion	30

Appendix B

Acoustic Calculations

17451

12 Pilgrims Lane, London

Receiver 1: 14 Pilgrims Lane

External Plant Noise Emissions Calculation

Description	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Manufacturer provided sound pressure level at 1 metre									
Daikin RXYSQ12TY1	67	61	56	54	52	49	43	36	57
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (31 m) *	-30	-30	-30	-30	-30	-30	-30	-30	
Mitigation required, dB	-5	-5	-6	-11	-19	-21	-17	-15	
Sound pressure level at receiver	**35**	**29**	**23**	**16**	**6**	**1**	**-1**	**-6**	**19**

*** Distance loss calculated assuming Point Source attenuation (*typically used where distance is more than 3x the largest source dimension*)**

Design Criterion	22

BS 8233 Assessment Calculation

Description	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Sound pressure level outside window	35	29	23	16	6	1	-1	-6	19
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**20**	**14**	**8**	**1**	**-9**	**-14**	**-16**	**-21**	**4**

Design Criterion	30