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Apartment 14, 3 Welbeck Street
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2 February 2024

18696-NIA-01

Noise Impact Assessment

Project Number
18696

Issued For
Larry Smith

EXECUTIVE SUMMARY

This noise impact assessment has been undertaken in order to assess a proposed plant installation for residential use at Apartment 14, 3 Welbeck Street, London.

The proposed plant installation comprises 1 No. Panasonic CU-3Z68TBE and 1 No. Panasonic CU-4Z80TBE Condenser Units.

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 City of Westminster.

Calculations were undertaken for the nearest receiver, identified as a window belonging to a flat within the same building and a window belonging to a building opposite at 72 Welbeck Street. 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

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.

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LIST OF ATTACHMENTS

18696-SP1	Indicative Site Plan
18696-TH1	Environmental Noise Time History
Appendix A	Glossary of Acoustic Terminology
Appendix B	Acoustic Calculations

Issue	Date of Issue	Author	Reviewed	Authorised
0	30/01/24			
		MD Atif Uddin Assistant Consultant BSc (Hons)	**Duncan Martin** Director BSc (Hons) MIOA	**John Smethurst** Director BSc (Hons) MIOA

Issue	Comment
0	First Issue

1.0 INTRODUCTION

Clement Acoustics has been commissioned by Larry Smith to measure existing background noise levels at Apartment 14, 3 Welbeck Street, 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 City of Westminster.

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 bound by Welbeck Street to the west, Wigmore Street to the north and commercial and residential dwellings to the rest of its surroundings.

Current proposals are to install 1 No. Panasonic CU-3Z68TBE and 1 No. Panasonic CU-4Z80TBE condenser units to be installed on the roof of the building. It is understood that the plant will be used for residential purposes and could therefore be operational at any time within a 24 hour period.

Two windows, one belonging to a flat on the same building and one belonging to a building opposite at 72 Welbeck street, have been identified as the nearest affected receivers. These nearest noise sensitive receivers were identified through observations on-site. If there are any receivers closer than those 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 18696-SP1.

3.0 ENVIRONMENTAL NOISE SURVEY

3.1 Unattended Noise Survey Procedure

Measurements were undertaken at one position as shown on indicative site drawing 18696-SP1. The choice of this position was based both on accessibility and on collecting representative noise data in relation to the nearest affected receiver.

The microphone was mounted on a tripod placed on the roof of the building.

The position was considered to be free-field according to guidance found in BS 4142: 2014, and a correction for reflections has therefore not been applied.

Continuous automated monitoring was undertaken for the duration of the survey between 14:21 on 16 January 2024 and 14:56 on 18 January 2024.

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 Weather Conditions

At the time of set-up and collection of the monitoring equipment, the weather conditions were sunny with medium winds. It is understood that the weather conditions during the unattended survey were generally dry with medium winds mostly throughout.

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 957 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 18696-SP1.

Measured noise levels are shown as a time history in Attachment 18696-TH1, with average ambient and minimum background noise levels summarised in Table 4.1.

Time Period	Average ambient noise level $L_{Aeq:\,T}$, dB	Minimum background noise level $L_{A90:\,5min}$, dB
Daytime (07:00 - 23:00)	59	50
Night-time (23:00 - 07:00)	53	48

Table 4.1 Average ambient and minimum 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".

The adopted Westminster City Plan 2019-2040 contains the following policy, which has been considered throughout this assessment:

"33. C Development should prevent adverse effects of noise and vibration and improve the noise environment in compliance with the council's Noise Thresholds, with particular attention to:

minimising noise from plant machinery and internal activities".

The above policies from the adopted plan and adopted city plan have been considered when determining suitable criteria for noise emissions from plant.

5.2 Local Authority Criteria

The City of Westminster criteria for noise emissions are as follows:

Required Standards

Minimising noise from plant machinery and internal/external activities
Development including plant or machinery, or proposed uses that cause noise from amplified/unamplified music or human voices both internally and externally, even when windows and doorways are open, should achieve the following standards:

Table 3: Noise and vibration criteria for plant machinery and internal/external activities.

Existing External Ambient Noise Level	Tonal or Intermittent Noise/Noise Source	Noise level that should not be exceeded at the nearest Noise sensitive Receptor*[1]
Exceeds WHO Guideline levels L_{Aeq} 55 dB over periods of day-time (7am–11pm) and L_{Aeq} 45 dB at night-time (11pm–7am)	Does not contain tones or intermittent noise sufficient to attract attention	10 dB below the minimum external background noise level
	Contains tones or intermittent noise sufficient to attract attention	15 dB below the minimum external background noise level
	Noise emitted from emergency plant or an emergency life supporting generator	10 dB above the lowest background noise level within a 24-hour period.
Does not exceed WHO Guideline levels. L_{Aeq} 55 dB over periods of daytime (7am–11pm) and L_{Aeq} 45 dB night-time (11pm–7am).	Does not contain tones or intermittent noise sufficient to attract attention	5 dB below the minimum external background noise level.
	Contains tones or intermittent noise sufficient to attract attention	10 dB below the minimum external background noise level
	Noise emitted from emergency plant or an emergency life supporting generator	10 dB above the lowest background noise level within a 24 hour period
Below 30 dB $L_{A90,15min}$ at the nearest noise sensitive receptors Both day-time (7am–11pm) and night-time (11pm–7am)	Noise contains and/or does not contain tones or intermittent noise	Site specific standards that avoid noise disturbance to nearest noise sensitive receptors may be considered

*[1] Measured at the nearest noise sensitive receptor 1m from the most affected façade, relative to the existing external background noise level in this location and including assessment at the quietest time during which the plant operates or when there is internal activity at the development site. The background noise level should be expressed in terms of the lowest $L_{A90,15min}$ during day time or night time (depending on the hours of use being applied for).
29

Figure 5.1 City of Westminster criteria for noise emissions

The data provided by the manufacturer indicates that the units do not possess tonal or intermittent noise components, therefore the criteria taken to be 10 dB below the lowest background noise level.

It is understood that the proposed plant units will be used for residential purposes and could therefore be operational at any time within a 24 hour period.

Based on the results of the environmental noise survey and requirements of the City of Westminster, 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
Night-time (23:00 - 07:00)	38

Table 5.1 Plant noise emission limits

6.0 PLANT NOISE IMPACT ASSESSMENT

6.1 Proposed Installation

The proposed plant installation comprises 1 No. Panasonic CU-3Z68TBE and 1 No. Panasonic CU-4Z80TBE condenser units.

In the absence of specific noise emission data from the manufacturer, data has been taken from a similar unit, Panasonic U-8MF3E8.

Noise emissions for the proposed plant units, 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)
Panasonic CU-3Z68TBE	47	54	53	50	47	42	37	30	52
Panasonic CU-4Z80TBE	47	54	53	50	47	42	37	30	52

Table 6.1 Manufacturer provided noise emissions levels

The proposed plant location is on the roof of the building which is shown on indicative site plan 18696-SP1.

6.2 Noise Impact Assessment

The receivers have been identified as follows:

- Receiver 1: Window on the western façade of a flat within the same building
  - Minimum of 15 m from the proposed plant location
- Receiver 2: Window on the eastern façade of the building opposite at 72 Welbeck Street,
  - Minimum of 24 m from the proposed plant location.

Taking into account all necessary acoustic corrections, the resulting noise level at the identified residential windows would be as shown in Table 6.2. Detailed calculations are shown in Appendix B.

Receiver	Design Criterion	Noise Level at Receiver (due to proposed plant)
Receiver 1: Window at 3 Welbeck Street	38 dB(A)	35 dB(A)
Receiver 2: Window at 72 Welbeck Street	38 dB(A)	30 dB(A)

Table 6.2 Noise levels and project criterion at noise sensitive receivers

As presented in Table 6.2 and Appendix B, the proposed plant installation would be expected to meet the requirements of the proposed criteria without the need for any particular mitigation.

6.3 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 35 dB(A), acceptable internal conditions would be met by 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 6.3.

Receiver	Recommended Target – For sleeping conditions in a bedroom, in BS 8233: 2014	Noise Level at Receiver (due to plant installation)
3 Welbeck Street	30 dB(A)	20 dB(A)
72 Welbeck Street	30 dB(A)	15 dB(A)

Table 6.3 Noise levels and BS 8233: 2014 criteria inside nearest residential space

7.0 CONCLUSION

An environmental noise survey has been undertaken at Apartment 14, 3 Welbeck Street, 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 City of Westminster.

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 City of Westminster.

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Not to scale

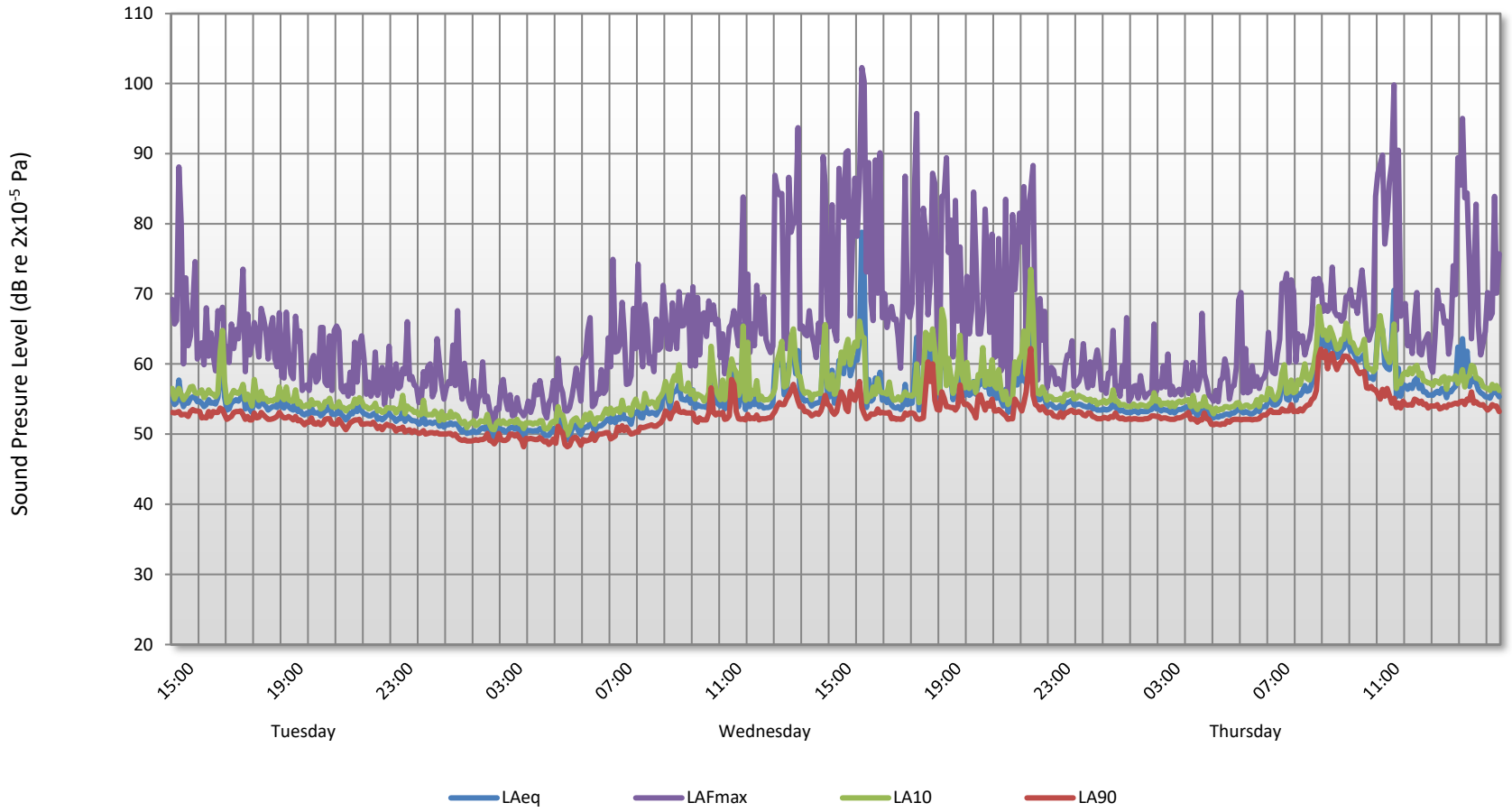
Description:
Indicative site plan showing noise monitoring position, nearest sensitive receivers and proposed plant location

Date	02 February 2024
Reference	18696-SP1
Project Name	Apartment 14, 3 Welbeck Street, London
Image ©	Google Earth

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

Apartment 14, 3 Welbeck Street, London

Environmental Noise Time History
16 January 2024 to 18 January 2024



18696-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

18696

Apartment 14, 3 Welbeck Street, London

Receiver 1: 3 Wellbeck Street

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									
Panasonic CU-3Z68TBE	47	54	53	50	47	42	37	30	52
Panasonic CU-4Z80TBE	47	54	53	50	47	42	37	30	52
Combined Sound Pressure Level	**50**	**57**	**56**	**53**	**50**	**45**	**40**	**33**	**55**
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (15 m) [1]	-24	-24	-24	-24	-24	-24	-24	-24	
Sound pressure level at receiver	**29**	**36**	**35**	**32**	**29**	**24**	**19**	**12**	**35**

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

Design Criterion	38

BS 8233 Assessment Calculation

Description	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Sound pressure level outside window	29	36	35	32	29	24	19	12	35
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**14**	**21**	**20**	**17**	**14**	**9**	**4**	**-3**	**20**

Design Criterion	30

Receiver 2: 72 Wellbeck Street

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									
Panasonic CU-3Z68TBE	47	54	53	50	47	42	37	30	52
Panasonic CU-4Z80TBE	47	54	53	50	47	42	37	30	52
Combined Sound Pressure Level	**50**	**57**	**56**	**53**	**50**	**45**	**40**	**33**	**55**
Correction for reflections, dB	3	3	3	3	3	3	3	3	
Distance correction to receiver, dB (24 m) [1]	-28	-28	-28	-28	-28	-28	-28	-28	
Sound pressure level at receiver	**25**	**32**	**31**	**28**	**25**	**20**	**15**	**8**	**30**

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

Design Criterion	38

BS 8233 Assessment Calculation

Description	Frequency, Hz								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Sound pressure level outside window	25	32	31	28	25	20	15	8	30
Minimum attenuation from partially open window, dB	-15	-15	-15	-15	-15	-15	-15	-15	
Sound pressure level inside nearest noise sensitive premises	**10**	**17**	**16**	**13**	**10**	**5**	**0**	**-7**	**15**

Design Criterion	30