ZONA ACOUSTICS

10 Prowse Place

London

Plant Noise Assessment

29 August 2024

For

Mrs Misha Moore

10 Prowse Place

London

WC1N 3QA

CONTENTS

Summary

Zona Acoustics has been appointed to carry out a noise assessment in relation to the proposed external plant installation at 10 Prowse Place in London. Proposals are for the installation of one air source heat pump in rear garden of the property.

The local authority, Camden Council, has requirements in relation to building services noise affecting noise sensitive receptors.

Noise limits have been set for the plant, based on the existing background noise levels and the Camden Council requirements.

The predicted rating level of the plant was found to be in line with the Camden Council requirements, subject to the unit being housed within a suitable acoustic enclosure. This is seen to relate to the No Observed Effect Level (NOEL), under national planning guidelines.

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1.0 Introduction

Zona Acoustics has been appointed to carry out a noise assessment in relation to the proposed external plant installation at 10 Prowse Place in London. Proposals are for the installation of one air source heat pump in rear garden of the property.

This report presents the methodology and results of a noise survey to determine background noise levels that are representative of the nearest noise sensitive receptors, as well as an assessment of noise from the proposed plant in relation to the Camden Council requirements.

The report is technical in nature, and such, a summary of noise units and acoustic terminology are included in Appendix A for reference.

2.0 Description of Site

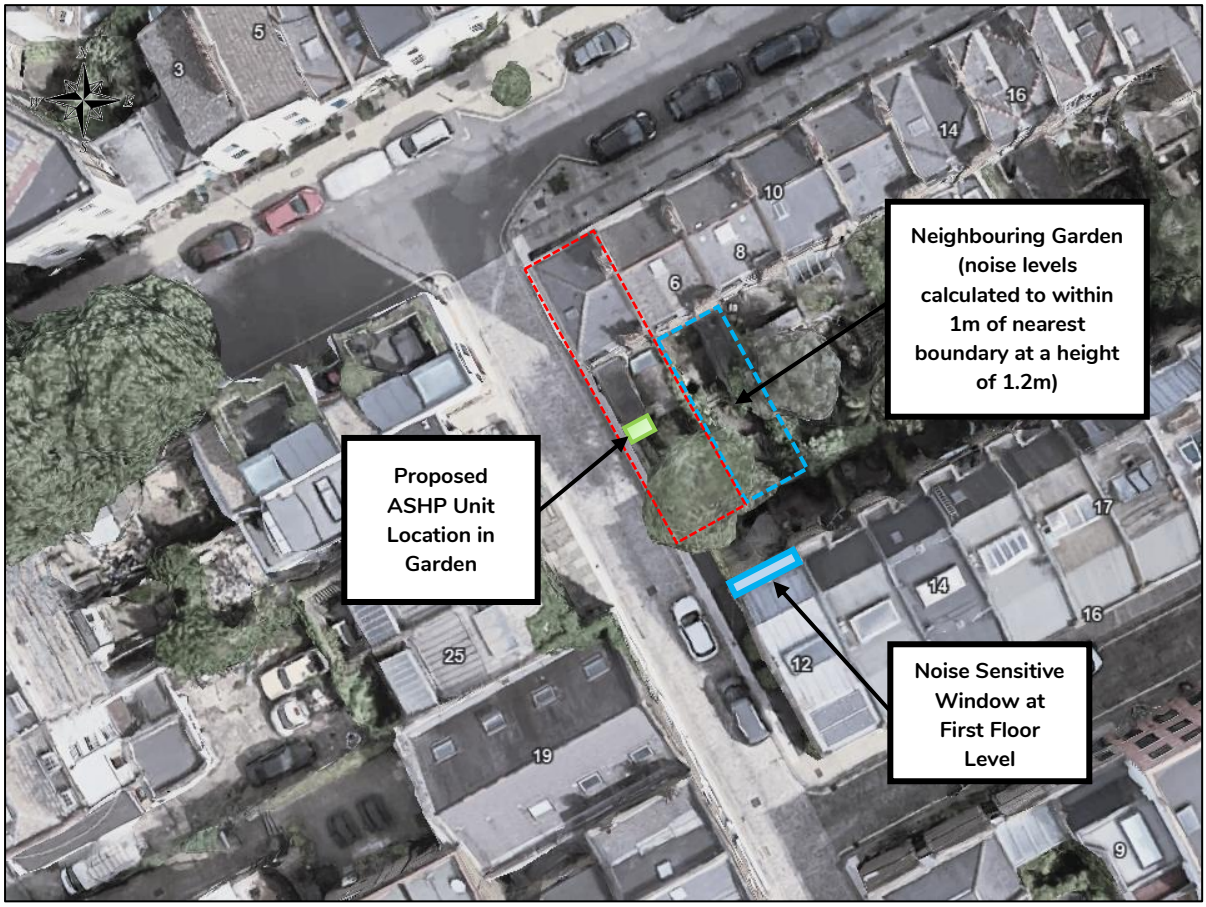
The site is located at 10 Prowse Place, London, WC1N 3QA.

The proposed air sour heat pump (ASHP) will be located at lower ground floor level in the rear garden of the property. Proposed site plans are included in Appendix D.

The nearest / most exposed noise sensitive receptor locations are taken to be the windows of a residential property at 12 Prowse Place, which are approximately 13m southeast of the proposed ASHP location with direct line of sight. The windows of neighbouring properties on Jeffreys Street will be significantly screened from the unit by the walls and roof of the building, and will therefore be less exposed to noise from the unit. The assessment also considers noise levels in the neighbouring garden of 4 Jeffreys Street during the daytime. The ASHP will be screened from the neighbouring garden by an approximately 2.5m high brick wall / close board timber trellis fence at the boundary.

Figure 2.1 shows the site extent in **red**, the approximate proposed location of the ASHP unit in **green**, and the nearest noise sensitive window and garden shown in **blue**.

Figure 2.1 Site and Surroundings



3.0 Noise Policy and Guidance

3.1 Camden Council Requirements

The Camden Council typical requirements for noise from fixed external plant are included in the Camden Local Plan 2017.

The requirement is for the rating level of the plant to be at least 10 dB below the existing background noise level (15dB if tonal components are present) at the assessment location, when assessed in accordance with British Standard 4142:2014 '*Methods for rating and assessing industrial and commercial sound*'.

3.2 British Standard 4142: 2014

British Standard (BS) 4142: 2014 (superseded by BS 4142: 2014+A1: 2019) provides a procedure for the measurement and rating of noise levels form industrial and commercial noise sources. A methodology for predicting the likelihood of adverse impact is provided in the document.

The rating level ($L_{Ar,Tr}$) is defined in BS 4142 and is used to rate the industrial source (known as the specific noise source) at the assessment location. This level is obtained by adding a correction of between 0 and 6 dB, for tonal noise sources, and a correction of between 0 and

9 dB for impulsive sources. Additionally, corrections of 3 dB can be made for other sound characteristics and intermittency of the noise source.

The rating level is assessed in terms of $L_{Ar,Tr}$, where 'T' is a reference period of one hour during the daytime period (07:00 - 23:00) and fifteen minutes during the night-time period (23:00 – 07:00).

The method for predicting the likelihood of complaints is based on differences between the rating level and the background $L_{A90,T}$ noise level. The standard states that:

a) *"Typically, the greater this difference, the greater the magnitude of the impact.*

b) *A difference of around +10dB 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 context.*

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 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."

In this case, the rating level requirement is 10 dB below the existing background noise level, as required by Camden Council.

4.0 Noise Survey

4.1 Methodology

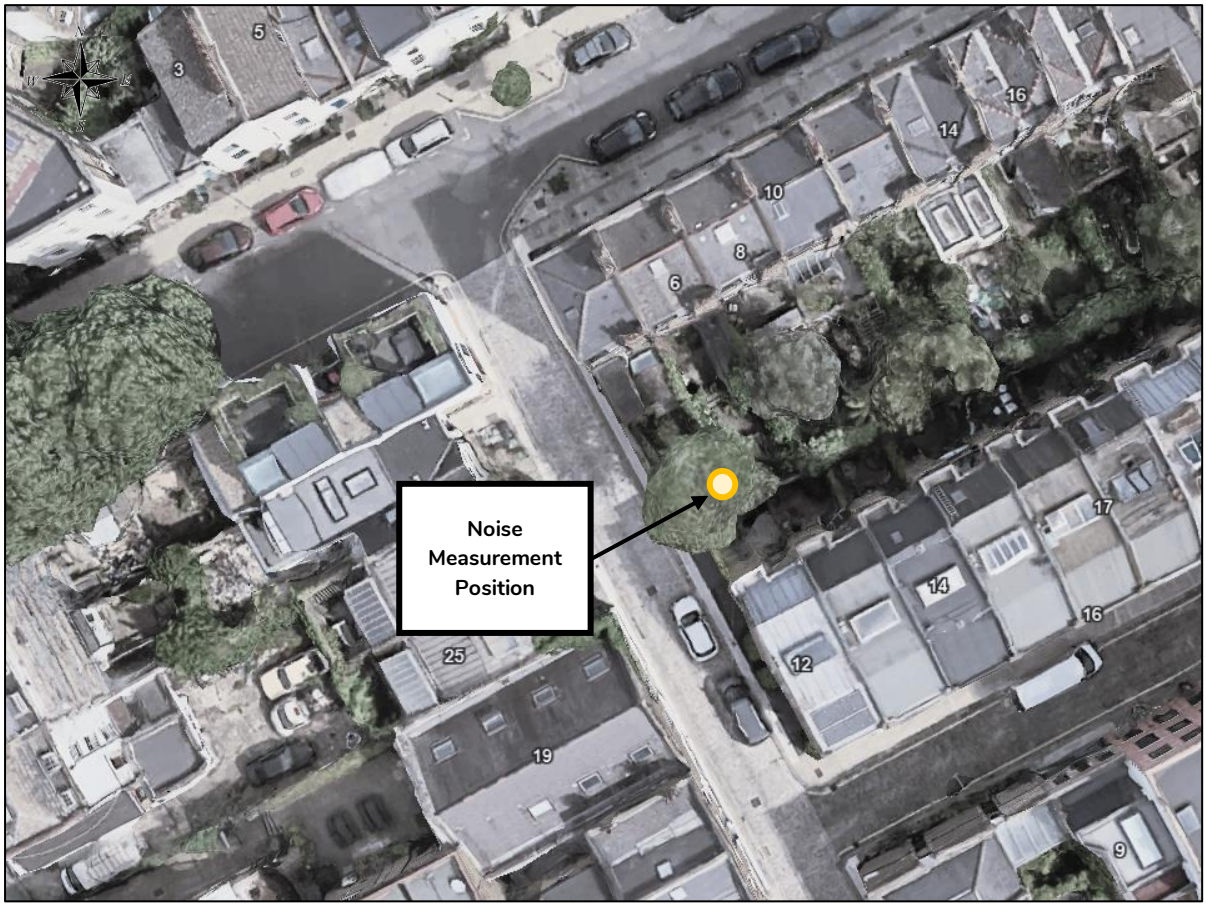
An unattended noise survey was carried out over an approximate 4-day period between 12:00 on Thursday 1 August and 13:00 on Monday 5 August 2024 to determine existing background noise levels at a position representative of the nearest noise sensitive receptors.

The measurement microphone was in the rear garden at a height of 1.5m above ground in the acoustic free field.

The measurement position is considered representative of the nearest noise sensitive receptors.

The approximate location of the measurement position is shown in **orange** in Figure 4.1 below.

Figure 4.1 Noise Measurement Position



The equipment used for the noise survey is summarised in Table 4.1

Table 4.1 Noise Survey Equipment

Item	Make & Model	Serial Number
Type 1 automated logging sound level meter	Casella CEL-633BC	2145374
Type 1 ½" microphone	B&K 4189	2529821
Calibrator	Casella CEL 120-1	3864607

L_{Aeq} and L_{A90} sound pressure levels were measured throughout the noise survey over continuous 15-minute intervals.

The noise monitoring equipment was calibrated before and after the noise survey period. No significant change was found. Laboratory equipment calibration certificates can be provided upon request.

Due to the nature of the noise survey, i.e. unattended, we are unable to comment on the weather conditions throughout the entire noise survey period, however at the beginning and end of the survey, there was noted to be no rainfall, dry ground, and only light wind (measured less than 5 m/s on site). Online weather history shows similar conditions throughout the survey period. Weather conditions are not considered to have had any significant effect on the measured noise levels.

4.2 Results

Appendix B presents a time history graph showing the sound pressure levels measured throughout the noise survey.

Due to the nature of the noise survey, i.e. unattended, we are unable to comment on the exact noise climate throughout the entire survey period. However, at the beginning and end of the survey period, the noise climate was noted to be dominated by distant road traffic noise and occasional aircraft.

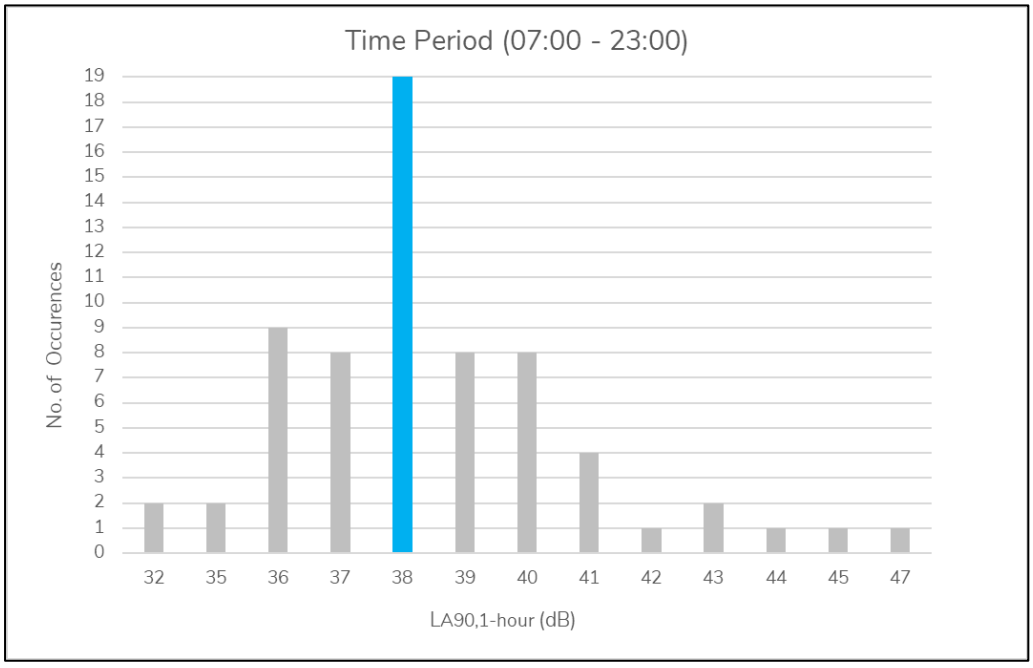
In accordance with BS 4142, the rating level should be assessed against a 'representative' background level.

BS 4142 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*".

The proposed plant has the potential to operate at any time. Our assessment will therefore consider both the day and night-time periods.

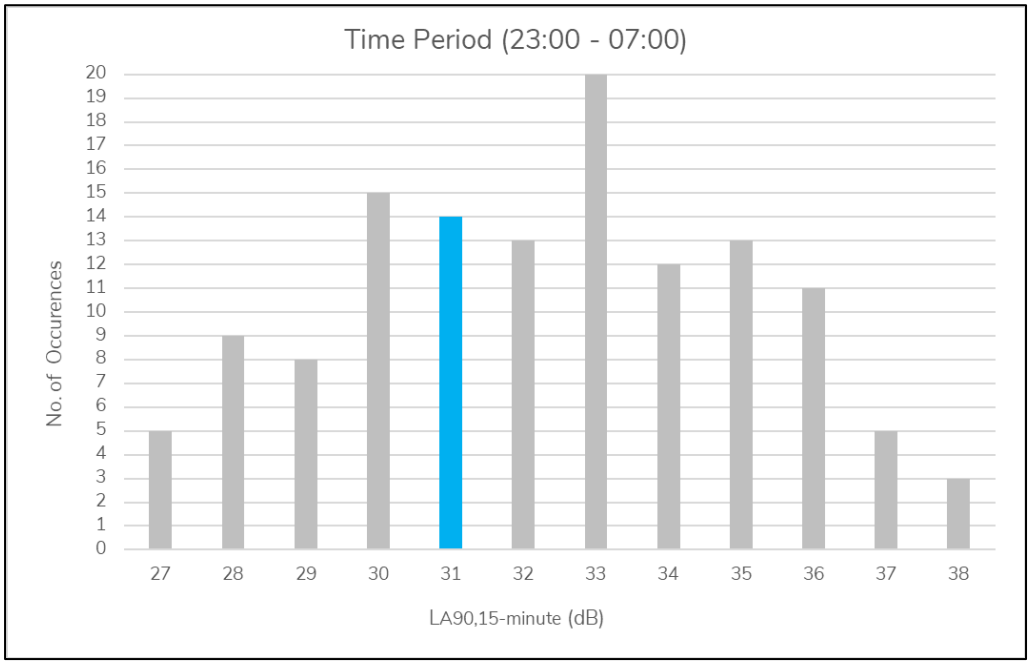
Figures 4.2 and 4.3 below present an analysis of the measured background noise levels during the day and night-time periods of the noise survey.

Figure 4.2 Background Noise Level Analysis – Daytime



Based on the analysis above, we have considered **38 dB $L_{A90\ (1\text{-}hour)}$** as the representative background noise level for the daytime. The measured background noise levels were at or above this level 68% of the time during the daytime periods of the survey.

Figure 4.3 Background Noise Level Analysis – Night-time



Based on the analysis above, we have considered **31 dB $L_{A90\ (15\text{-}minute)}$** as the representative background noise level for the night-time. The measured background noise levels were at or above this level 71% of the time during the night-time periods of the survey.

5.0 Plant Noise Assessment

5.1 Plant Noise Limit

Table 5.1 presents the plant noise limits for this assessment, based on the representative background noise levels determined above and the Camden Council requirements (as detailed in Section 3.1).

Table 5.1 Plant Noise Limits

Period	Rating Level Noise Limit $L_{Ar,Tr}$ (dB)
Daytime (07:00 - 23:00)	28
Night-time (23:00 – 07:00)	21

5.2 Proposed Plant

The proposed ASHP unit is understood to be the Vaillant aroTHERM plus 5kw (VWL 55/6 A 230V S2). The manufacture's data lists a worst-case operating Sound Power Level of 54 dB L_{WA}. The unit can also operate in a "noise reduction mode" with a listed Sound Power Level of 48 dB L_{WA} (40% noise reduction mode).

It is understood that the unit will be set to operate in its normal mode during the daytime period and be set to operate in its noise reduction mode during the night-time period.

No manufacture's octave band noise levels are provided for the unit. Our calculations are therefore based noise data for a similar ASHP unit, which we would consider to provide a robust assessment.

The octave band noise levels are included in the detailed plant noise calculations in Appendix C. Noise from these types of ASHP units are generally non-tonal in character. The units may operate intermittently, however, given that the specific noise level from the plant is be controlled to a level at least 10dB below the background levels, it is considered that noise from the plant will not be generally audible at the nearest noise sensitive receptor locations.

On this basis, acoustic character corrections are not considered appropriate and the rating level requirement remains 10dB below the background levels, providing a strong indication of a low impact.

5.3 Mitigation

In order to achieve the required noise limits it is recommended that the unit be housed in an acoustic enclosure.

For this we recommend the Environ Sound Cover which is quoted as providing a noise reduction of 6-8 dBA.

The manufacture's insertion loss values for the Environ Sound Cover are included in the detailed plant noise calculations in Appendix C.

An alternative acoustic enclosure may also be suitable. The successful supplier should confirm that the supplied acoustic enclosure would allow for the required noise limits to be achieved based on this assessment.

5.4 Assessment

We have carried out calculations to predict the plant noise emissions at the nearest noise sensitive receptors.

We have included an assessment of the predicted plant noise levels at the nearest noise sensitive window during the day and night-time periods, and in the nearest neighbouring garden during the daytime period (i.e. when the garden would generally be in use).

A summary of the results are presented in Tables 5.2 to 5.4 below. Detailed plant noise calculations are included in Appendix C.

Table 5.2 Plant Noise Calculation Results – Window – Daytime

Element	Noise Level (dBA)
Predicted ASHP Noise Level ($L_{Ar,Tr}$)	24
Noise Limit	28
Difference	-4

Table 5.3 Plant Noise Calculation Results – Garden – Daytime

Element	Noise Level (dBA)
Predicted ASHP Noise Level ($L_{Ar,Tr}$)	16
Noise Limit	28
Difference	-12

Table 5.4 Plant Noise Calculation Results – Window – Night-time

Element	Noise Level (dB)
Predicted ASHP Noise Level ($L_{Ar,Tr}$)	18
Noise Limit	21
Difference	-3

As can be seen, the predicted rating level of the proposed plant installation is in line with the Camden Council requirements, subject to the units being housed in a suitable acoustic enclosure. This is seen to relate to the No Observed Effect Level (NOEL), under national planning guidelines.

5.5 Vibration

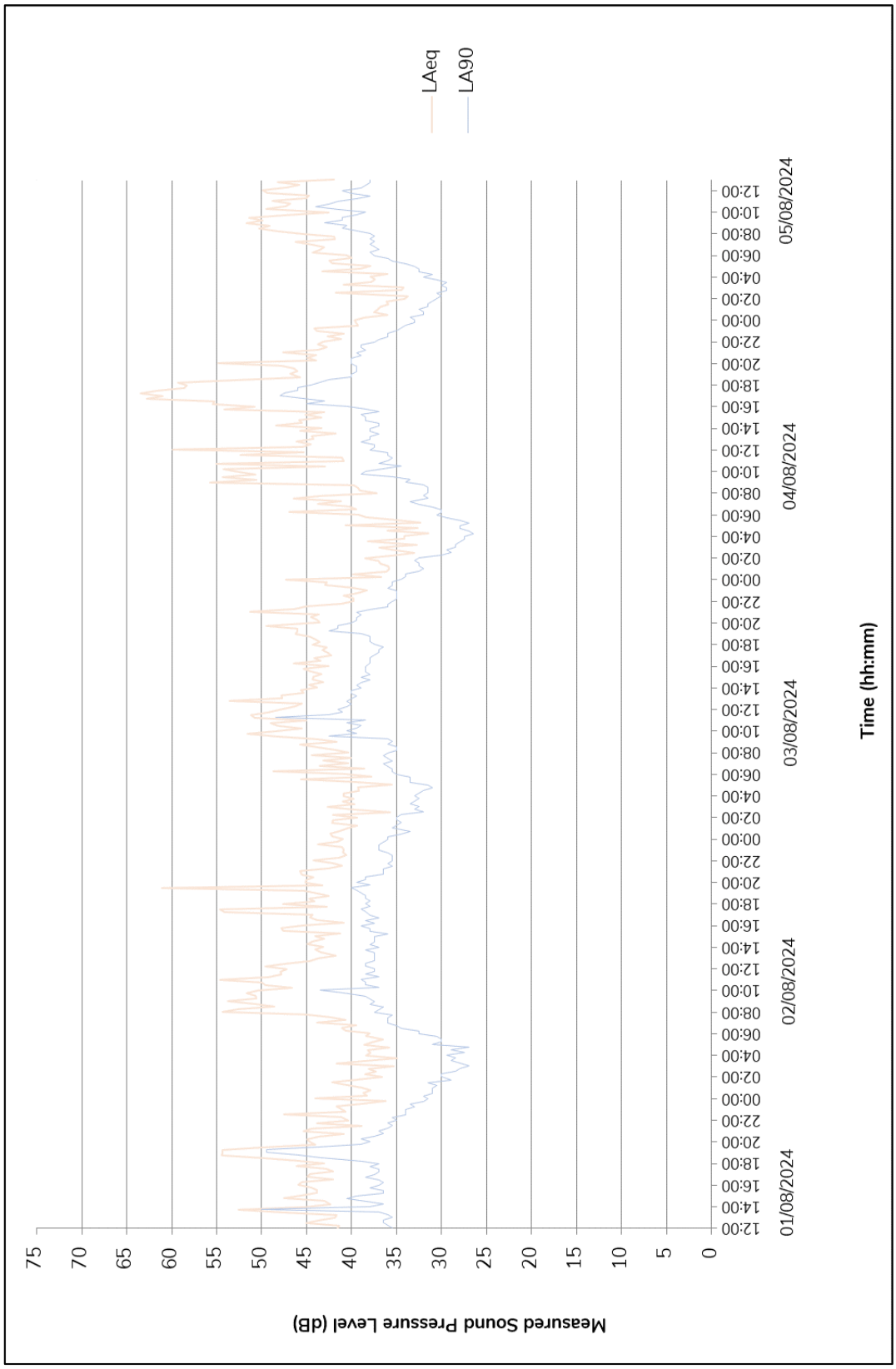
The external ASHP units should be installed using anti-vibration fixings and rubber washings on screws/bolts, to dampen vibration transmitting through the fixings and radiating through any structures.

Such mounts would usually be made of a resilient material such as rubber and should be supplied by the manufacturer (as standard) and then applied to any connection with the structure, including floors, walls, and soffits.

Appendix A – Acoustic Terminology

Parameter	Description
Decibel (dB)	A logarithmic scale representing the sound pressure or power level relative to the threshold of hearing ($20x10^{-6}$ Pascals).
Sound Pressure Level (L_p)	The sound pressure level is the sound pressure fluctuation caused by vibrating objects relative to the threshold of hearing.
Sound Power Level (L_w)	A measure of the acoustic energy emitted from a source of noise, expressed in decibels.
A-weighting (dBA)	The sound level in dB with a filter applied to increase certain frequencies and decrease others to correspond with the average human response to sound.
$L_{Aeq,T}$	The A-weighted equivalent continuous noise level over the time period T (typically T= 16 hours for daytime periods, T = 8 hours for night-time periods). This is the sound level that is equivalent to the average energy of noise recorded over a given period.
$L_{A90\ (15\ min)}$	The noise level exceeded for 90% of the time (also referred to as the background noise level), measured over a 15-minute period

Appendix B – Time History Graph



Appendix C – Detailed Plant Noise Calculations

10 Prowse Place	ZONA ACOUSTICS								
Plant Noise Calculations - Window - Daytime									
Vaillant aroTHERM plus 5kw (VWL 55/6 A 230V S2)	dBA	63	125	250	500	1k	2k	4k	8k
Typical ASHP Sound Power Levels Lw	54	57	56	54	52	49	45	38	32
Acoustic Enclosure (Environ Sound Cover)		-3	-3	-4	-6	-7	-9	-10	-10
Acoustic Reflections		+6	+6	+6	+6	+6	+6	+6	+6
Distance Attenuation (13m)		-30	-30	-30	-30	-30	-30	-30	-30
Sound Pressure Level at Nearest Noise Sensitive Window	24	30	28	26	22	18	12	4	0
Noise Limit	28								
Difference	-4								

10 Prowse Place	ZONA ACOUSTICS								
Plant Noise Calculations - Garden - Daytime									
Vaillant aroTHERM plus 5kw (VWL 55/6 A 230V S2)	dBA	63	125	250	500	1k	2k	4k	8k
Typical ASHP Sound Power Levels Lw	54	57	56	54	52	49	45	38	32
Acoustic Enclosure (Environ Sound Cover)		-3	-3	-4	-6	-7	-9	-10	-10
Acoustic Reflections		+6	+6	+6	+6	+6	+6	+6	+6
Screening (Boundary Wall)		-10	-12	-14	-17	-20	-20	-20	-20
Distance Attenuation (5m)		-22	-22	-22	-22	-22	-22	-22	-22
Sound Pressure Level 1m within Nearest Garden	16	29	25	20	13	7	0	0	0
Noise Limit	28								
Difference	-12								

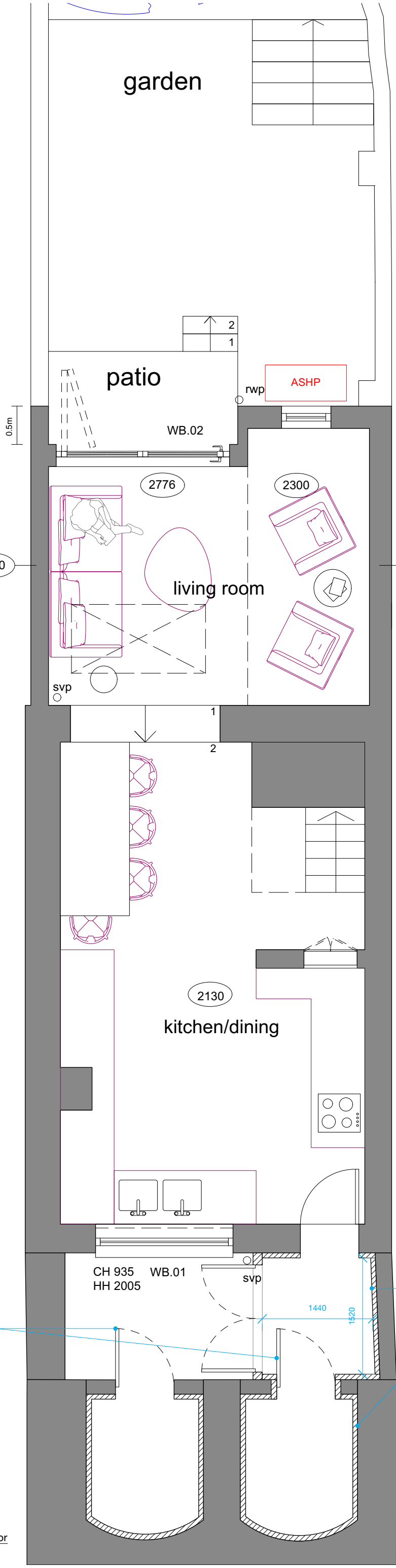
10 Prowse Place	ZONA ACOUSTICS								
Plant Noise Calculations - Window - Night-time									
Vaillant aroTHERM plus 5kw (VWL 55/6 A 230V S2) (Noise Reduction Mode 40%)	dBA	63	125	250	500	1k	2k	4k	8k
Typical ASHP Sound Power Levels Lw	48	51	50	48	46	43	39	32	26
Acoustic Enclosure (Environ Sound Cover)		-3	-3	-4	-6	-7	-9	-10	-10
Acoustic Reflections		+6	+6	+6	+6	+6	+6	+6	+6
Distance Attenuation (13m)		-30	-30	-30	-30	-30	-30	-30	-30
Sound Pressure Level at Nearest Noise Sensitive Window	18	24	22	20	16	12	6	0	0
Noise Limit	21								
Difference	-3								

Appendix D – Site Plans

For construction purposes:
- Do not scale this drawing.
- All dimensions and levels to be checked on site.
- Discrepancies to be reported to Miltiadou Cook Mitzman architects before proceeding.
- If in any doubt about information on this drawing contact Miltiadou Cook Mitzman architects.

REVISION

NUMBER	DATE	BY	NOTES



1 Proposed Lower Ground Floor
1:50

EXISTING BUILD UP

PROPOSED BUILD UP

0 0.5 1.5 2.5 M

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PROJECT
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SHEET TITLE
Proposed Lower Ground Floor Plan

SCALE
AS NOTED@A3

DATE CREATED **FILE REFERENCE**

DRAWING NUMBER **REVISION**

420-DWG-101

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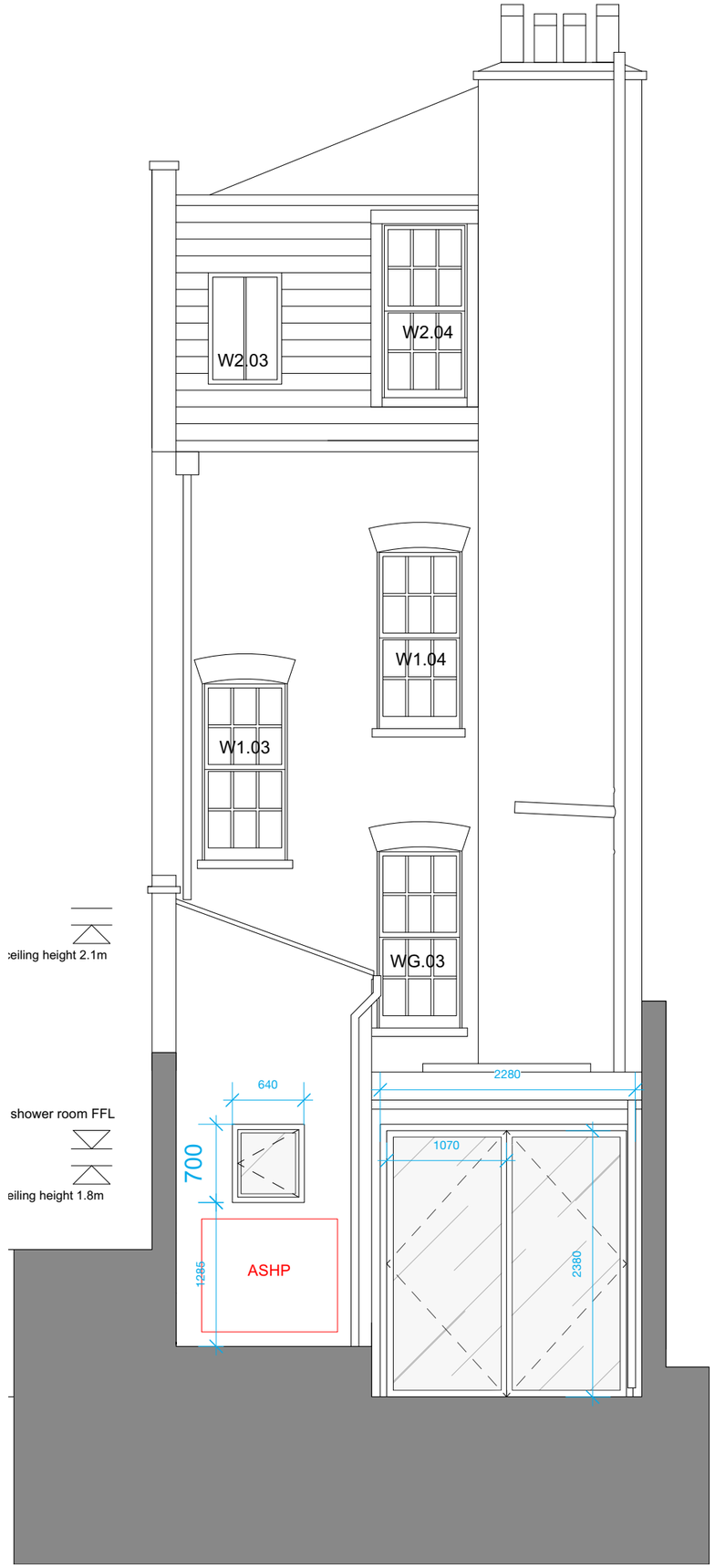

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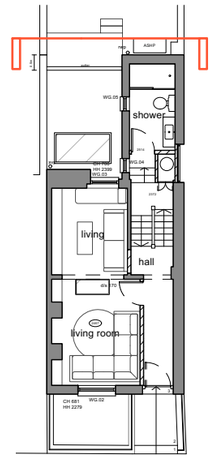
1:50

EXISTING BUILD UP

PROPOSED BUILD UP



0 0.5 1.5 2.5 M

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SHEET TITLE
Proposed Rear Elevation

SCALE
AS NOTED@A3

DATE CREATED **FILE REFERENCE**

DRAWING NUMBER **REVISION**

420-DWG-107