



ACOUSTIC REPORT

**Assessment of the potential noise impact caused to local noise sensitive properties,
including residents by the addition of mechanical ventilation unit servicing offices at:
42, Hatton garden
London**

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Confidential

Summary

- 1.1** A study has been completed to assess the noise output & potential impact caused by the installation of a mechanical ventilation unit at the bottom of the light well to the rear of 42, Hatton Garden (lower ground floor level).
- 1.2** The proposed unit:
1 x Daikin Model VAM2000J heat recovery, mechanics ventilation unit
- 1.3** A previous noise report was completed in October 2019 to assess the potential impact of replacement heat inverter (AC) units on the roof, and at the bottom of the light well to the rear of 42 Hatton Garden.
Baseline data from the noise survey, and target emissions levels derived in this report are used for reference in this report *
- 1.4** The closest residential properties which could potentially be affected by noise emissions from the VAM unit appear to be located to the north (Saint Cross Street), where there appear to be some residential properties on the upper floors of buildings, ~18m from the proposed unit location, and out of direct line of sight.
- 1.5** It is shown that the maximum level of noise emissions at the facade of the assessment location from the new VAM unit located at the bottom of the light well, will be likely to be at least 20dB below the prevailing background noise levels, at all times of the day & week
- 1.6** The cumulative emission levels from this VAM unit and the AC units considered in the previous report in October 2019 would still be 3 dB below the requirements Complying with the Camden City Council planning requirements.

* Joint Guidance on the impact of COVID-19 on the Practicality & Reliability of Baseline Sound Level Surveying & the Provision of Sound & Noise Impact Assessments. 6th April 2020
- The Association of Noise Consultants & The Institute of Acoustics

2. Introduction:

- 2.1** 42, Hatton Garden is a 5 storey office block. A new mechanical ventilation unit, model Daikin VAM2000J, is to be installed at the bottom of the light well to the rear of the building. Details of the location & acoustic data are presented in the Appendices.
- 2.2** Assessment location/ closest potentially noise sensitive properties: To the North (Saint Cross Street), there appear to be some residential properties on the upper floors of buildings, again at ~18m from the proposed unit location out of direct line of sight.
- 2.3** This mechanical ventilation unit, servicing the offices in 42, Hatton Garden is to be operational during night time & weekend periods (24/7).
- 2.5** The criteria required by the local authority is that that the level of noise emitted from any new plant shall be lower than the existing background level by at least 10 LpA.

Noise levels shall be determined at one metre from the window of the nearest noise sensitive premises (A “facade” measurement location) . The measurements and assessments were made in accordance with British Standard 4142:2014.

From Camden Council Local Plan:

Industrial and Commercial Noise Sources

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).*

Table B: Noise levels applicable to noise sensitive residential development proposed in areas of existing noise

Dominant Noise Source	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAEL (Red)
Anonymous noise such as general environmental noise, road traffic and rail traffic ~	Noise at 1 metre from noise sensitive façade/free field	Day	<50dBL _{Aeq,16hr} *	50dB to 72dBL _{Aeq,8hr} *	>72dBL _{Aeq,16hr} *
		Night	<45dBL _{Aeq,8hr} <40 dBL _{Aeq,8hr} **	45dB to 62dBL _{Aeq,8hr} * >40dBL _{night} **	>62dBL _{Aeq,8hrs} *

3. Discussion of the potential noise impact of noise emissions from unit

- 3.1** From the previous noise report completed in October 2019 (to assess the potential impact of replacement heat inverter (AC) units on the roof, and at the bottom of the light well to the rear of 42 Hatton Garden), the background noise survey indicated the following baseline noise levels in the vicinity:

Representative day time L_{A90} background noise levels are judged to be 50dBA 0700-2300 hours (free-field)

Representative night time L_{A90} background noise levels are judged to be 43dBA 2300-0700 hours (free-field).

- 3.2** The local authority requirement is that the (cumulative) sound emissions from the proposed units should be no greater than 10dBA lower than the lowest representative background noise levels (L_{A90}) at the facade of noise sensitive properties, at any time.

Therefore, from the lowest representative background noise levels recorded during the survey, the maximum target levels at the facade of any noise sensitive property should be:

Day time	=	40dBA
Nighttime	=	33dBA

- 3.3** The calculated noise emissions from the proposed VAM unit at the facade of the closest noise sensitive property = **22dBA**. Which is 11dBA lower than the local authority requirement.
(full calculation in appendix)

- 3.4** The previous report (October 2019) determined the noise emissions from the AC units on the roof & bottom of light well locations to be lower than 30dBA at this location, which is 3dBA lower than the local authority requirement.
The addition of the proposed VAM unit will be unlikely to result in the cumulative noise emissions from all plant machinery related to 42 Hatton Garden to be significantly greater than 30dBA at any time.

3.5 Other factors taken into consideration regarding the nature/ characteristics of the noise sources:

Potential “tonal content” in the noise emissions: Typically the VAM units produce a broadband noise emission with little significant tonal content, as indicated by the sound spectrum data.

Impulsive/ intermittent quality: The VAM unit proposed do not have noise emissions with any significant impulsive content.

- Providing that the units are well maintained, there is no reason to apply any penalty to the rating based on tonal/intermittent/impulsive characteristics of the noise emissions.

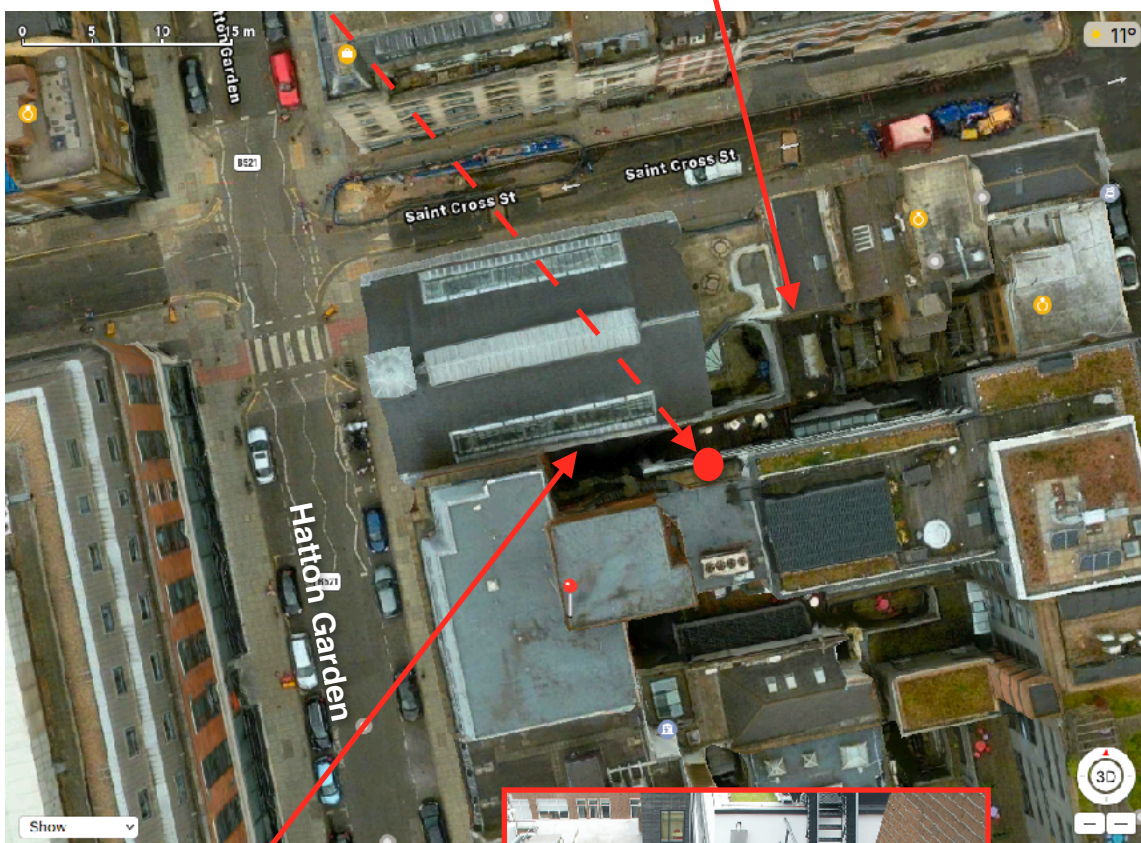
Potential impact of uncertainties in this assessment:

- There are inevitable degrees of uncertainty in this assessment. These are identified, & in each case the most cautious estimates have been used in the assessment calculations.

Appendix 1: Location:

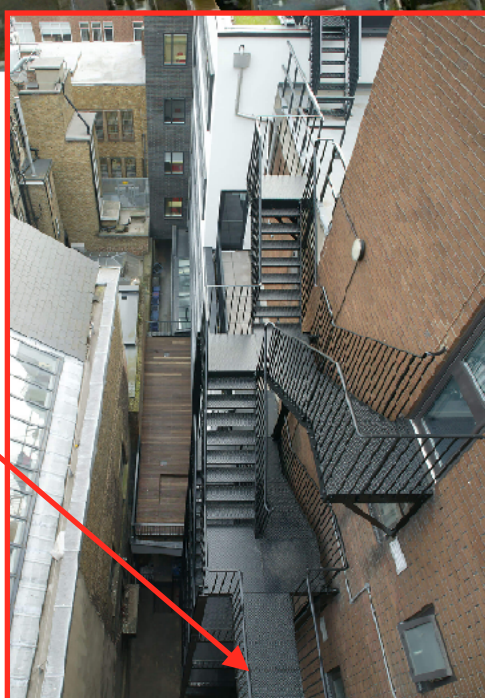
Survey location roof level -
“free-field”

Assessment location 2 - residential
on upper floors St Cross St

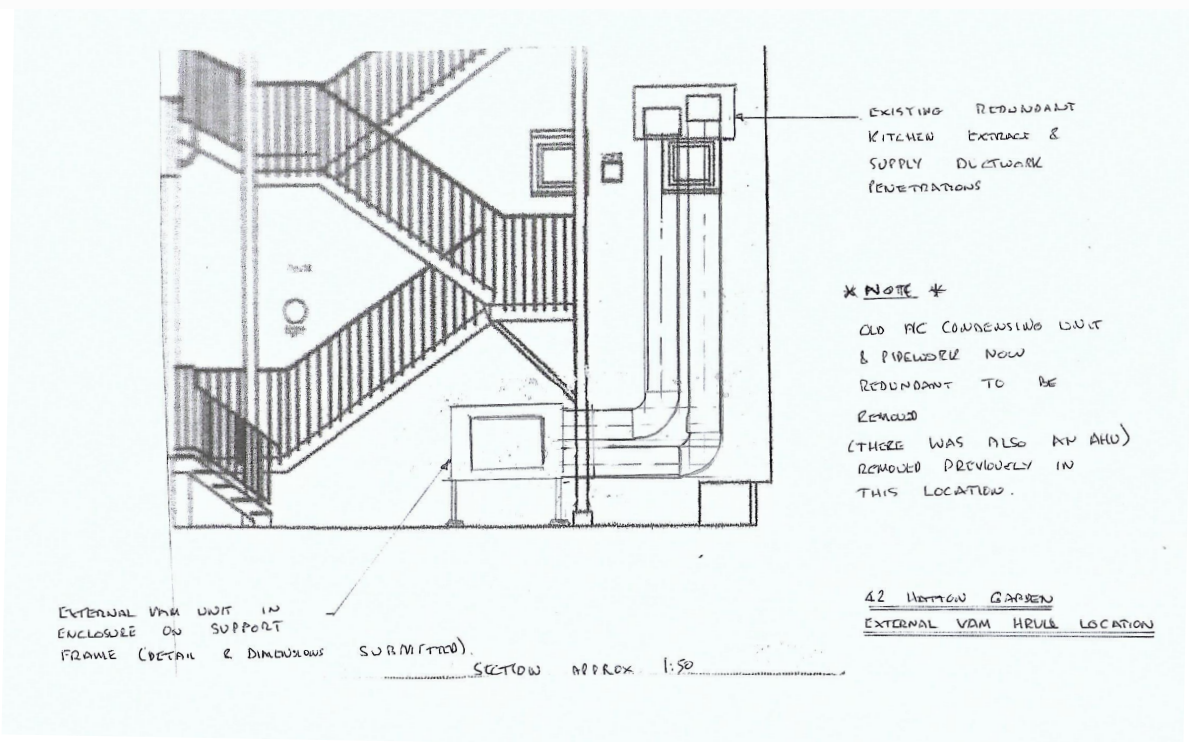
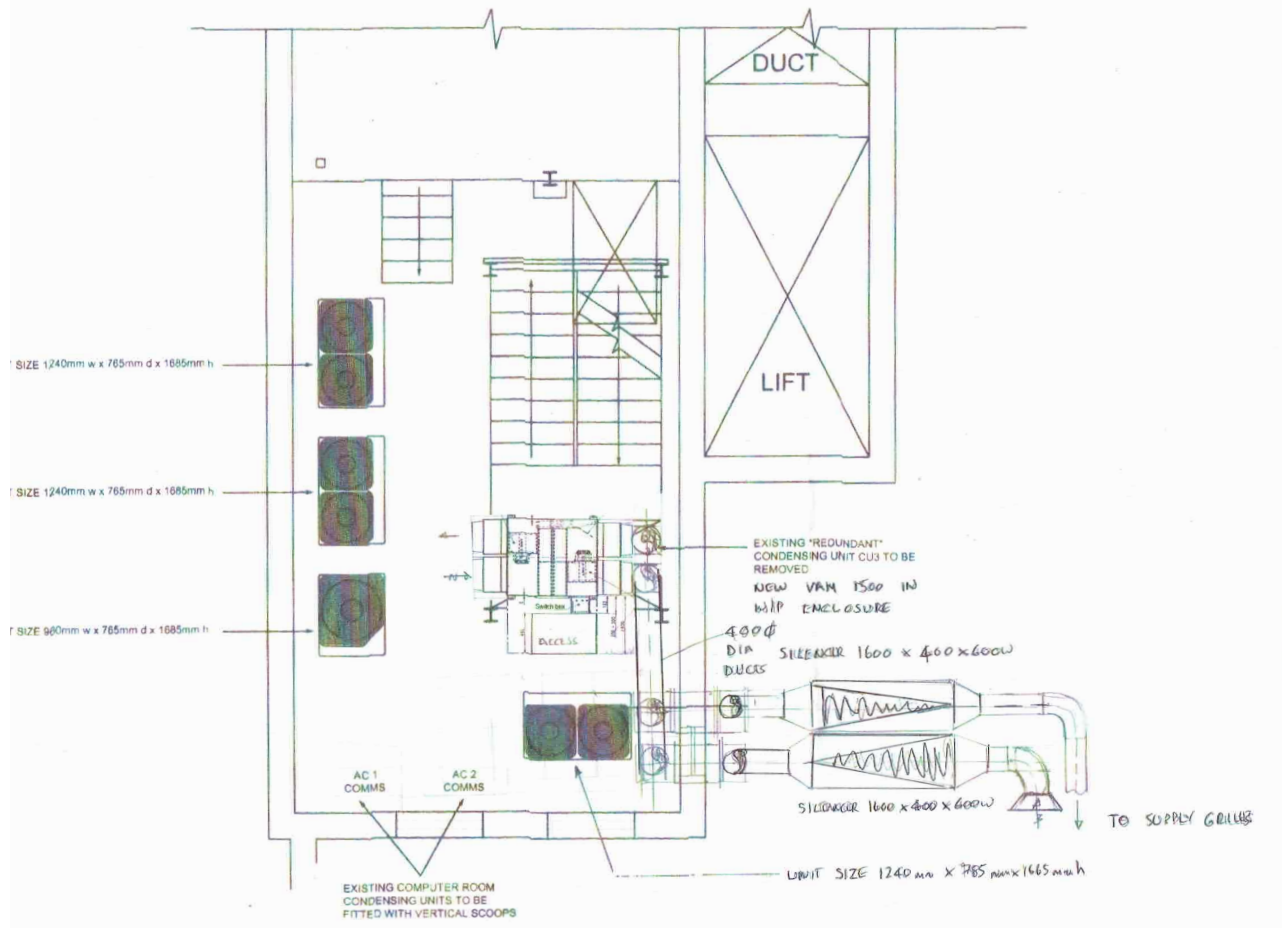


Location of new VAM unit at bottom of light well (lower ground floor)

NORTH

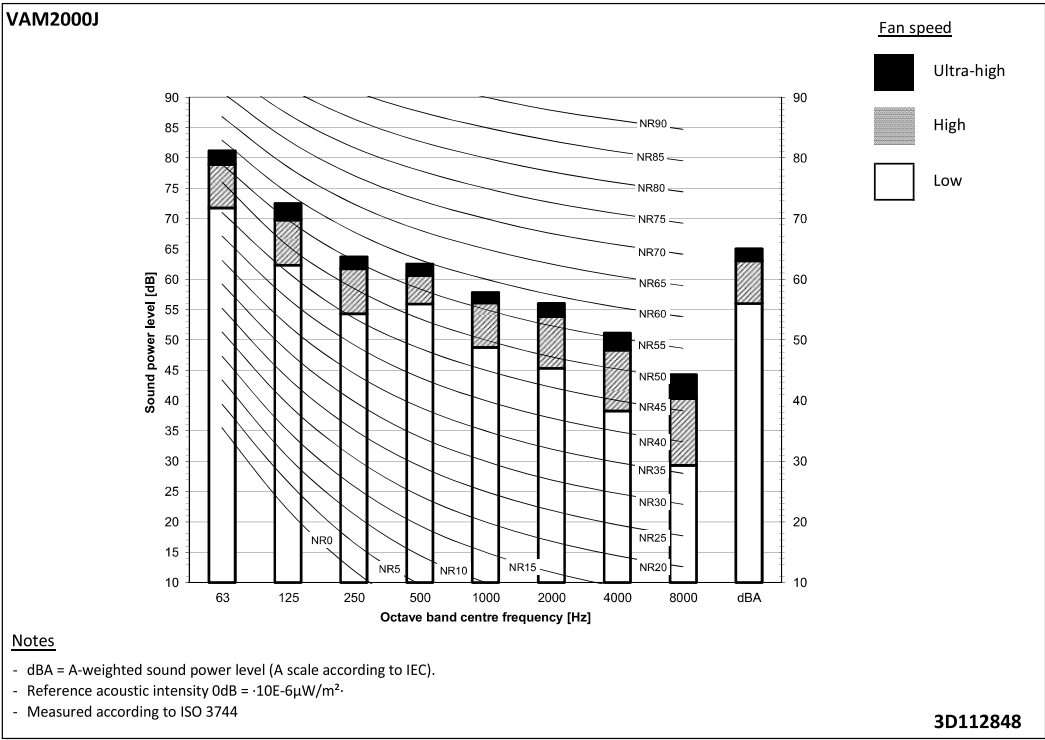


Plan & vertical section at bottom of light well indicating VAM unit location:



Appendix 2: new unit manufactures' noise specifications:

8 Sound data
8 - 1 Sound Power Spectrum



Appendix 3: Calculation of noise emission levels of VAM unit at closest noise sensitive property:

VAM2000J unit bottom of light well -HIGH MODE-1

	No.	63	125	250	500	1k	2k	4k	8k	Overall
										dBA
Daikin VAM2000J sound power level data (SWL dB)	1	78.0	69.0	62.0	61.0	56.0	53.0	47.0	40.0	
sound pressure level at 16m distance		45.9	36.9	29.9	28.9	23.9	20.9	14.9	7.9	
boundary/ reflection correction (+9dB, enclosed space)		54.9	45.9	38.9	37.9	32.9	29.9	23.9	16.9	
reduction due to building barrier, torturous route from machines to noise sensitive properties - minimum attenuation estimate		11	14	17	20	23	27	30	33	
“A”weight correction		-26.2	-16.1	-8.6	-3.2	0	1.2	1	1.1	
“A”weighted levels @ 16m		17.7	15.8	13.3	14.7	9.9	4.1	-5.1	-15.0	
Daikin VAM2000J NORMAL MODE in stairwell										22

Cumulative noise emissions at assessment location with no mitigation measures= 22dBA

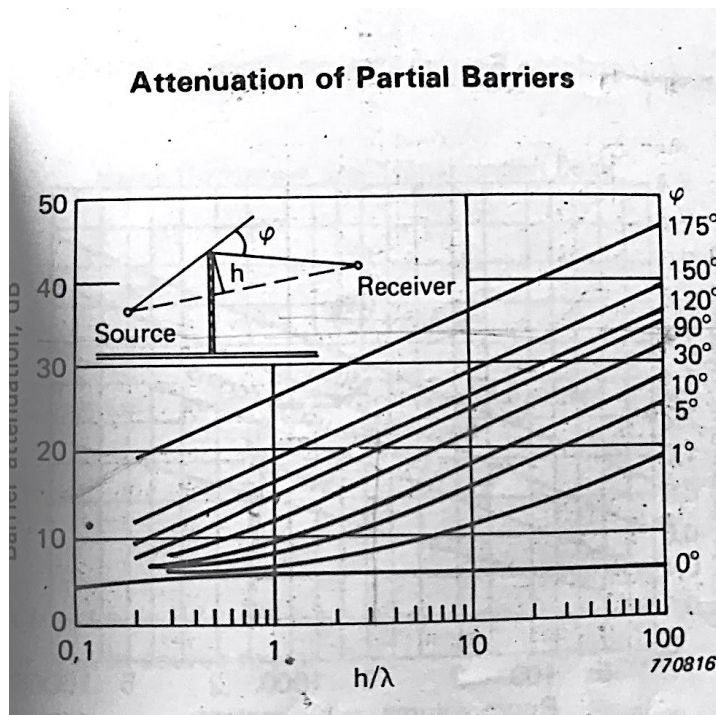
Calculation of noise attenuation - barrier effect

The attenuation provided by the three dimensional, reasonably tortuous path between the 4 units in the light well & potential noise sensitive premises is obviously difficult to predict with any degree of accuracy.

The minimum potential values of attenuation are estimated by barrier attenuation calculations

$$= -1 \times [10 \times \text{Log} (3 + \{(40 \times \text{Path Difference} \times \text{Frequency})/344\})]$$

or graphically: (courtesy Bruel & Kjaer)



Reflections/ boundary effects on calculated values:

The attenuation provided by the barrier effects will be reduced by the reflections of sound energy from the high walls of the surrounding buildings.

While this will not significantly effect the emission levels from the roof top units, a +3dB “penalty” is applied for reflections from the two walls adjacent to the unit’s location, which is possibly overestimating the effect to a degree, whereas the light well units are given a maximum +9dB “penalty” because of the enclosed nature of the units’ location.

Appendix 4 - Noise survey/ concurrent weather survey October 2019

Methodology of assessment:

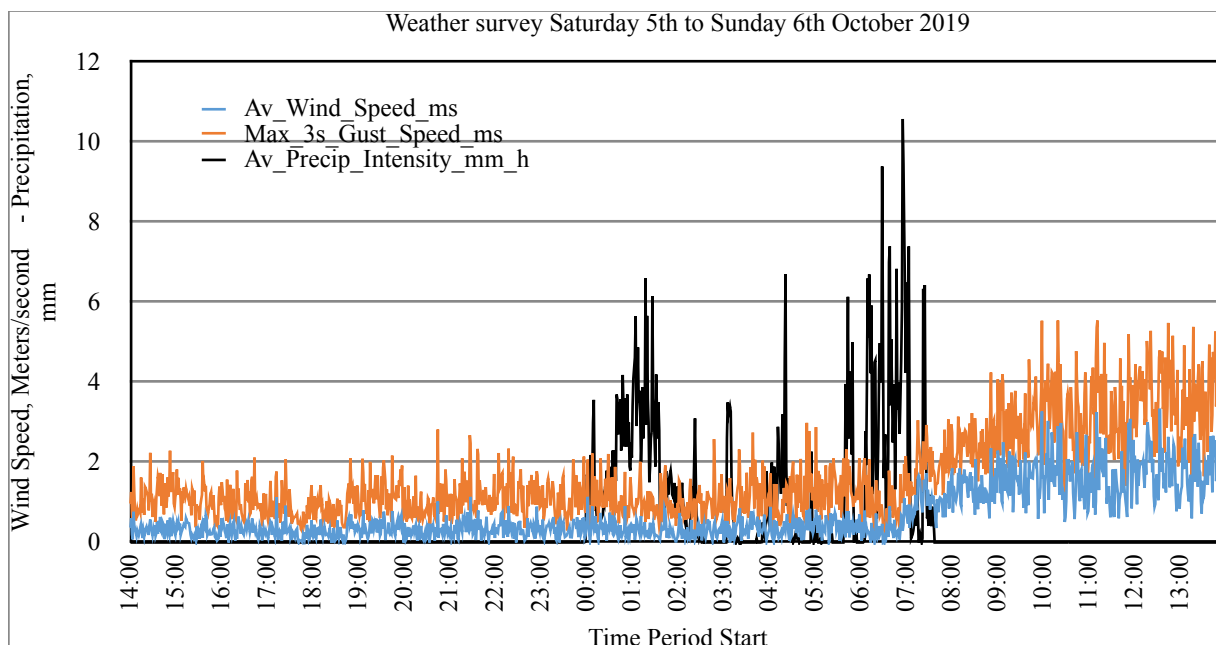
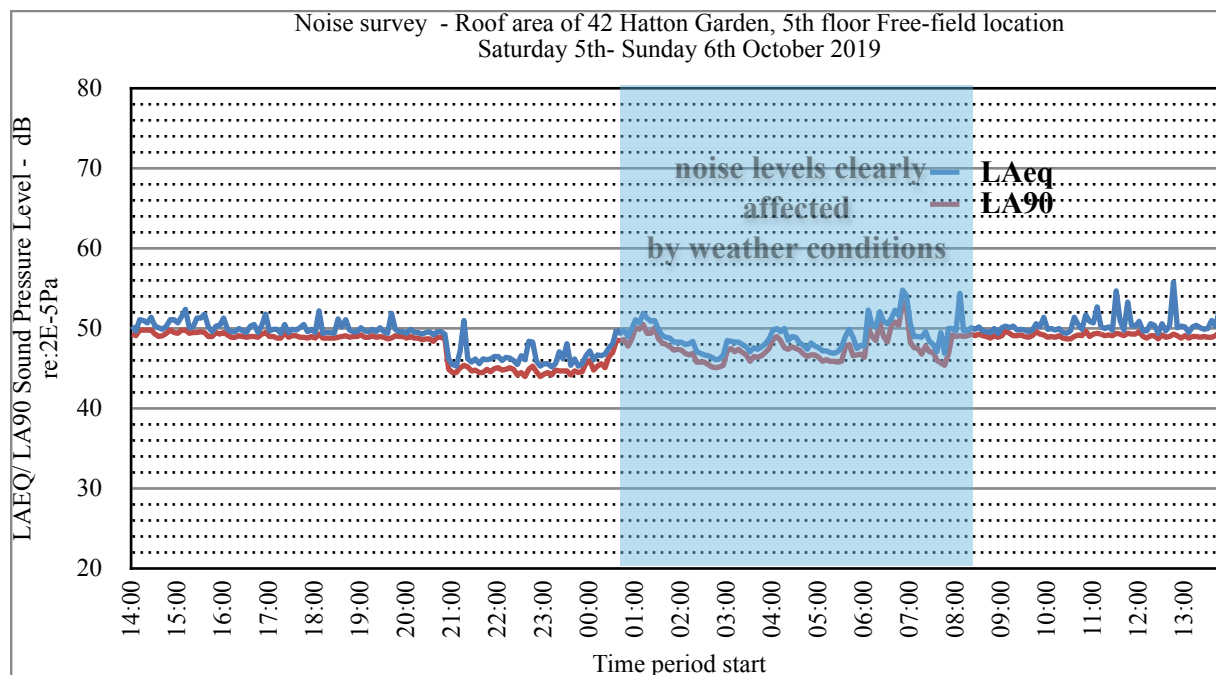
- 1** Measurements of sound levels in the vicinity were made and logged in 5 minute intervals over a 72 hour period, 1400 Saturday 5th October until 1400 Tuesday 8th October 2019. The measurements included L_{Aeq} & L_{A90} (background noise indicator percentile). Octave band frequency analysis of each period was also measured and logged.
- 2** Measurement equipment employed:
A RION NA-28 type 1 integrating sound level analyser (S/N 00991178), calibration was checked before & after the measurement period with RION NC-74 (S/N 34235944), both calibrated to traceable national standards – no significant drift in the calibration was noted at the end of the measurement period.
Appropriate weather protection was provided for the microphone.
A Lufft WS600 weather station (S/N 18101150701040), with CR6 data logger (S/N CR6 1079) was set up adjacent to the noise survey microphone .
- 3** The position of the measurement microphone to the edge of the flat roof on the 5th floor, overlooking the adjacent properties, ~1.5m above the roof level. A “Free-field” measurement location.

The data would need to be adjusted by +3dB to adjust to equivalent facade measurement location as described in the local authority noise criteria & BS4142:2014.

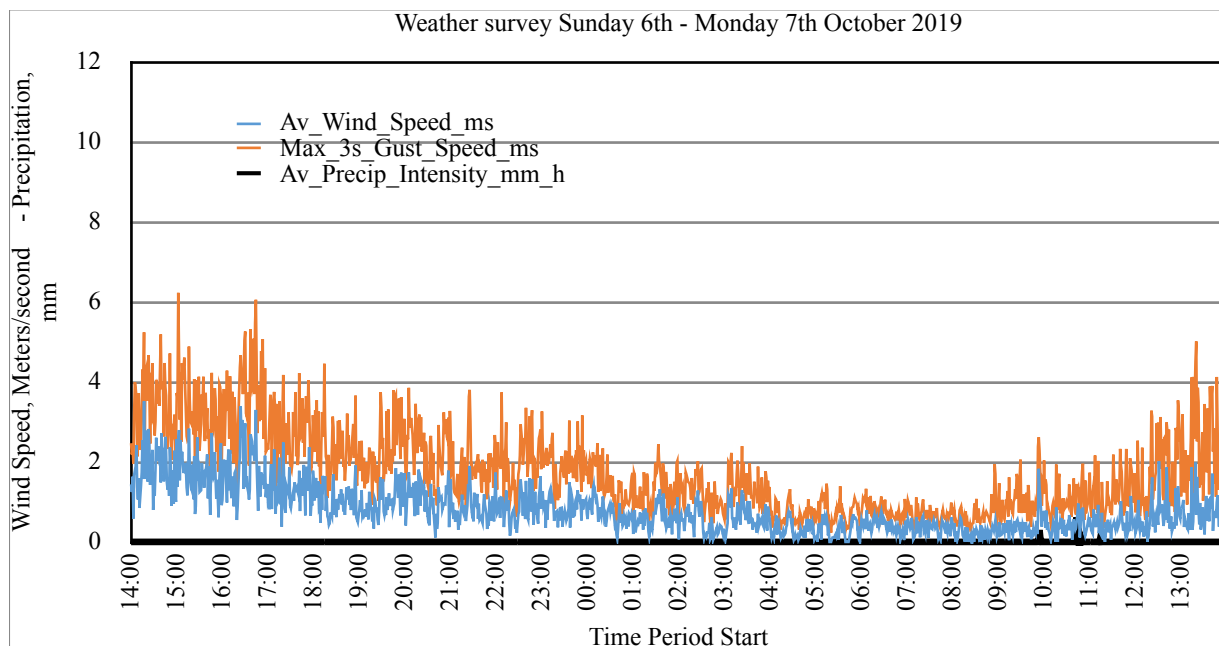
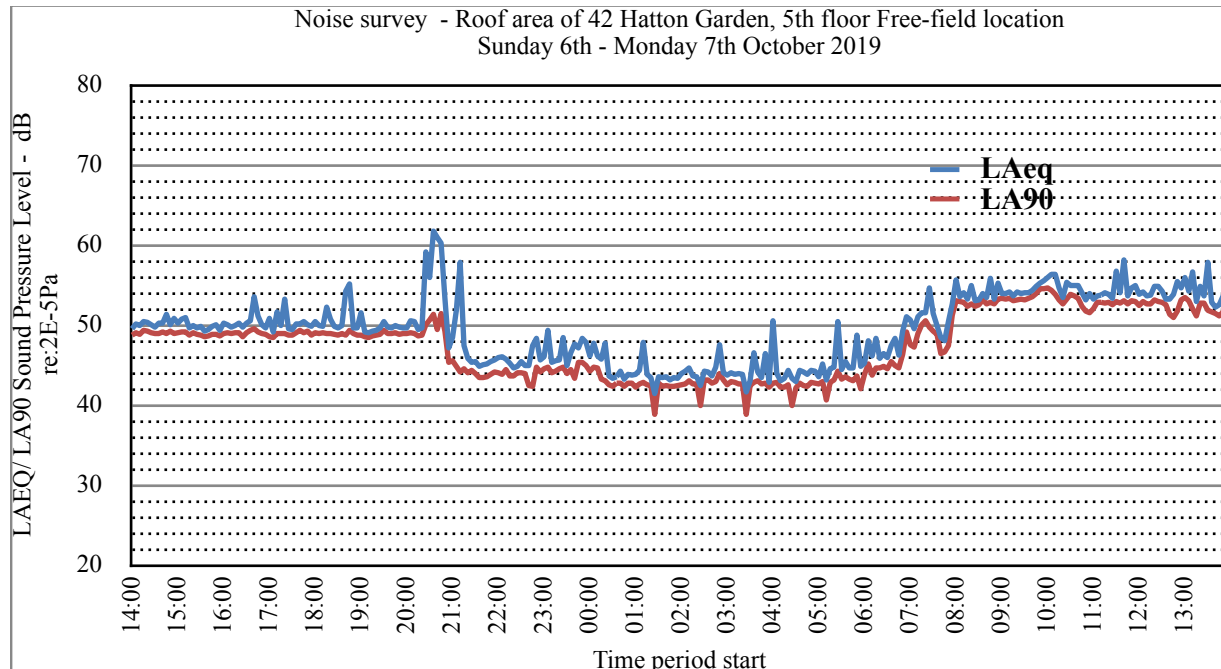
However, although the closest potentially noise sensitive premises (adjacent penthouse) is exposed to very similar levels of noise as measured during the survey, the second closest potentially noise sensitive premises (upper floors to the rear of Saint Cross Road) is lower level & possibly a little more occluded/shielded to noise in the vicinity than the survey location). Consequently the correction is not made in this assessment to account for this potential effect. I suspect this is an over compensation, as the most dominant noise sources in the vicinity appeared to be in the direction which would overlook assessment location 2.

4 Survey measurement data Noise survey/ concurrent weather survey

Day 1:



Day 2:

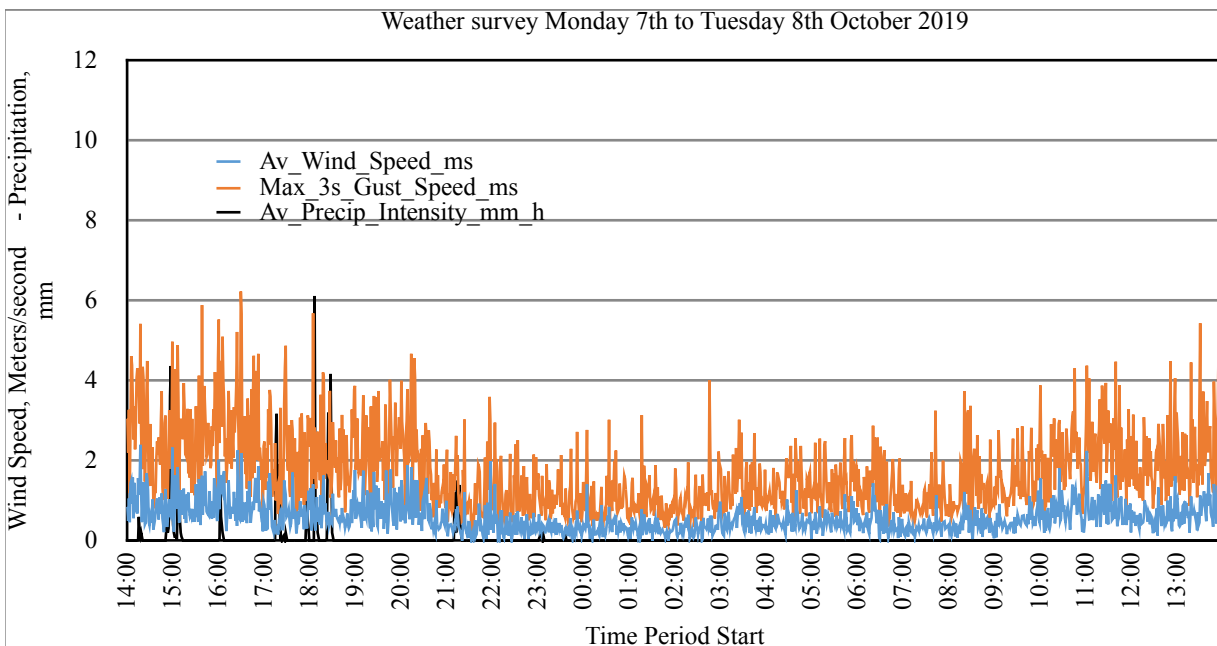
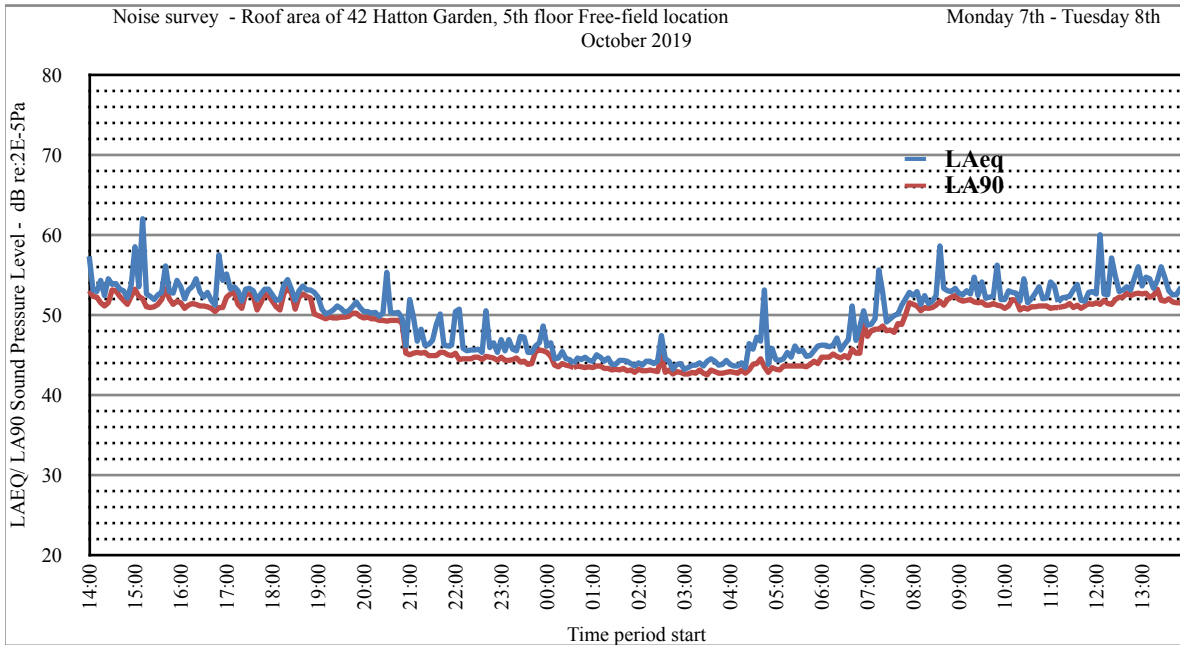


- during the early hours on Monday morning, the noise levels (L_{Aeq} , L_{A90}) intermittently fall from 42dBA to 39 dBA in several, 5 minute data samples.

This is possibly because of local dominate noise source(s) plant unit, or group of units) being temporary hut does - a fault, a power outage.

Measurement equipment connections and evidence of water ingress were checked, and found to be intact at the completion of the survey. The noise data collected over the following 24hrs is very consistent.

Day 3:



Description of results & statistical analysis used to describe time-varying noise sources:

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period (in these measurements, 5 minutes).

Statistical descriptors:

L_{A90} describes the sound level which is exceeded for 90% of the time period & is normally taken as a description of the ambient background noise levels – this is the underlying noise level, largely ignoring transient events during the time period. This descriptor is most useful to evaluate the underlying prevailing background noise levels & also noise emissions which are of a reasonable consistent level over the measurement period - for example, operating ac equipment.

L_{A10} describes the sound level which is exceeded for 10% of the time period & is normally taken as a description of the local varying traffic noise levels/ general activity in the vicinity – still largely ignoring very short transient events during the time period.