JOSTEC

BUILDING REGULATIONS COMPLIANCE SERVICES

REPORT TITLE: BS4142 Assessment for the Introduction of Condenser Units to George West House, 2-3 Clapham Common North Side, Clapham Town

REPORT REFERENCE: 230618-R001

ISSUED TO:
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1.0 Introduction

1.0.1 This report has been commissioned to determine the noise impact of the introduction of condenser units to the rear of George West House, 2-3 Clapham Common North Side, Clapham Town, London SW4 0QL.

1.0.2 The assessment has been conducted in line with the BS4142:2014+A1:2019.

2.0 Site Details

2.0.1 The site is located just off the north corner of Clapham Common on the B303. The building has 'The School of Journey Association – Educational Tour Operator Charity' building to the rear in what is otherwise a predominantly residential area.

2.0.2 The air conditioning condensers are located at either end of the rear elevation.

2.0.3 The closest Noise Sensitive Receptors (NSRs) are dwellings located within the George House building.

2.0.4 Although the air conditioning units had been placed on site at the time of the assessment, they were not operational nor available to be. The noise impact has therefor been calculated based on the manufacturers output data for the highest settings and compared to the measured background noise levels.

2.1 Location of Monitors

2.1.1 The noise location was chosen based on the proximity to the closest NSR. Photographs showing the measurement positions are Included in Figure 1 and 2 below.

Figure 1- Front

Figure 2 - Rear

2.1.2 Measurements were made in 15-minute periods, on 1 second averaging, to allow for the removal of anomalies and increased accuracy. The data was averaged into L_{Aeq1hr} daytime and $L_{Aeq15min}$ night-time with data also recorded in terms of the L_{AfMax} and other statistical indices in both day and night periods for the BS4142:2014 assessment.

2.1.3 The monitoring was conducted using 1 x Type 1 Svantek 307 sound level meter with batteries and outdoor microphone protection.

2.1.4 All measurements were taken after a field calibration was undertaken to ensure accuracy and repeatability of measurements.

2.1.5 Further data such as wind speed, wind direction, rainfall intensity, temperature and cloud cover were all recorded at the beginning and end of the assessment at the monitoring location.

2.1.6 Any anomalies (such as noise by the engineer during setup and collection of the kit) were removed from the survey for a true reflection of the ambient levels in the vicinity. This was done by recording audio throughout the survey at each location and listening back through the files during the analysis process to confirm what was recorded manually during the survey.

2.2 Plan Views of Site with Designated Work Areas

2.2.1 An aerial photograph of the site (available at www.google.com/maps) is Included in Figure 3 below. Locations of the air conditioning condensers is marked on the plan.

Figure 3

Key

= Monitoring Position for Noise Assessment

3.0 Legislation

3.0.1 The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental, and social planning policies for England and "these policies articulate the Government's vision of sustainable development." In respect of noise, Paragraph 174 of the NPPF states the following:

"Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution…."

Paragraph 185 goes on to mention:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;"

3.0.2 The NPPF reinforces the March 2010 DEFRA publication, "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life;
- and where possible, contribute to the improvement of health and quality of life."

3.0.3 Together, the first two aims require that no significant adverse impact should occur and that, where a noise level which falls between a level which represents the lowest observable adverse

effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

> "... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."

3.1 Local Authority Criteria

3.1.1 The Lambeth Local Plan 2020-2035 states in section policy Q2;

"Development will be supported if:

i. visual amenity from adjoining sites and from the public realm is not unacceptably compromised;
ii. acceptable standards of privacy are provided without a diminution of the design quality;
iii. adequate outlooks are provided avoiding wherever possible any undue sense of enclosure or unacceptable levels of overlooking (or perceived overlooking);
iv. it would not have an unacceptable impact on levels of daylight and sunlight on the host building or adjoining property including their gardens or outdoor spaces;
v. the adverse impact of noise is reduced to an acceptable level through the use of attenuation, distance, screening, or layout/orientation in accordance with London Plan policy D14;
vi. adequate outdoor amenity space is provided, practical in layout, free from excessive noise or disturbance, pollution or odour, oppressive enclosure, unacceptable loss of privacy, wind/downdraught and overshadowing; and
vii. service equipment (including lift plant, air handling/extract, boiler flues, meter boxes, gas pipes and fire escapes) is fully integrated into the building envelope or located in visually inconspicuous locations within effective and robust screening/enclosures, and does not cause disturbance through its operation.

viii. it addresses London Plan policy D13 on the agent of change."

3.1.2 The London Plan D14 states;

"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:

1) avoiding significant adverse noise impacts on health and quality of life

2) reflecting the Agent of Change principle as set out in Policy D13 Agent of Change

3) 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

4) improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity)

5) separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation

6) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles

7) promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver."

3.2 BS4142:2014 +A1:2019

3.2.1 The City plan also makes reference to the measurement procedure used for BS41421:2014 as the best method to assess plant noise.

3.2.2 Noise effects on residential properties due to the proposed plant have been assessed according to the guidance in BS 4142:2014+A1:2019. This standard primarily provides a numerical method by which to determine the significance of sound of an industrial nature (i.e. the 'specific sound' from the proposed development) at residential sensitive receptors.

3.2.3 The specific sound level may then be corrected for the character of the sound (e.g. perceptibility of tones and/or impulses), if appropriate, and it is then termed the 'rating level', whether or not a rating penalty is applied. The 'residual sound' is defined as the ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

3.2.4 According to BS 4142:2014, the background sound levels adopted for the assessment should be representative of the periods being assessed. The standard recommends that the background sound level should be collected from continuous measurements of normally not less than 15-minute intervals. However, the Standard states that there is no 'single' background sound level that can be derived from such measurements. It is particularly difficult to determine what is 'representative' of the night-time period because it can be subject to a wide variation in background sound levels between the shoulder night periods.

3.2.5 The method chosen for this section of the report is to use a statistical analysis of the data collected, as descried in the standard. The modal LA90 value will then be used for each time period over the course of the measurement as the most appropriate way of creating a representative value.

3.2.6 Daytime is typically between 07:00 and 23:00 hours and night-time is typically between 23:00 and 07:00 hours, so these periods have been adopted for this assessment.

3.2.7 At each of the most likely sensitive receptor locations, the rating level has been determined from the predicted specific sound level. Where it has considered it to be appropriate, a rating penalty has been applied for tonality, impulsivity and/or intermittent specific sounds as described in the commentary to paragraph 9.2 of BS4142:2014.

3.2.8 As per the requirements of the standard, an initial estimate of the impact of the specific sound has been obtained by subtracting the measured background sound level from the rating level of the specific sound. Table 1 provides the initial evaluation of impact following this method.

Table 1

Magnitude	Difference Between rating Level and Background Level	Comments
High	**+10dB**	**Significant Adverse impact Likely**
Medium	**+5**	**Adverse impact Likely**
Negligible	**Less than 0dB**	**Adverse impact unlikely**

3.2.9 Following the initial evaluation of impact, the context of the sound has also been considered, which is a key requirement of the Standard. In evaluation of the context, the following factors have been considered:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound and
- the sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions.

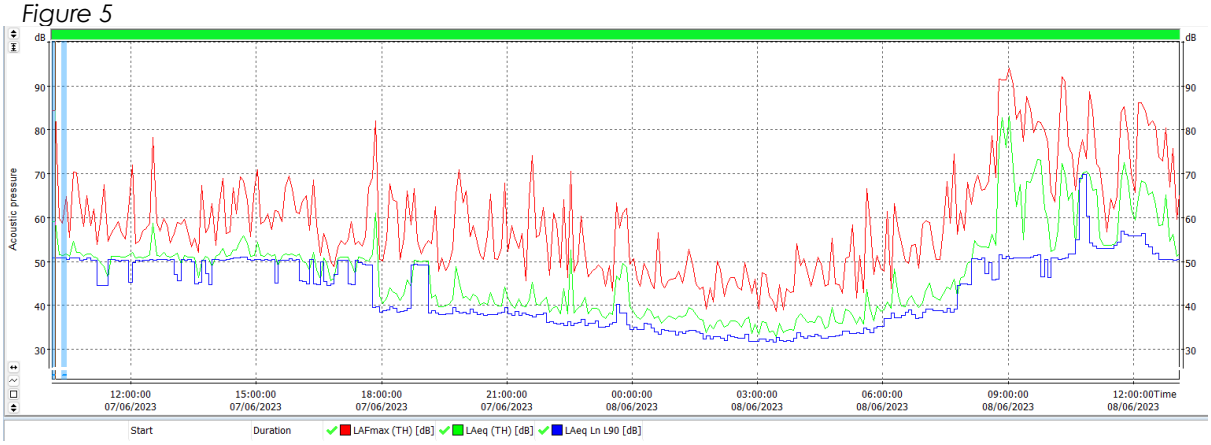
4.0 Results

4.0.1 Results of the sound level survey to the rear façade are included below.

Table 2

Period	Start Date/Time	L_{Aeq1hr} (Mode)	$L_{Aeq15min}$ (Mode)	L_{A90}
Day (0700-2300)	07-08 June 2023	53dBA		50dBA
Night (2300-0700)			38dBA	33dBA

Figure 5



Comments

Low background noise. Occasional birds causing spikes in L_{Amax}. Adjacent plant turning on/off through day period.

**based on Appendix C*

Cloud Cover	Temperature (Celsius)	Prescence of fog/snow/ice	Wind Speed (m/s)	Wind Direction
2	22 (1hr mode)	No	0.6	ENE

5.0 Analysis of Results

5.1 Calculated Results

5.1.1 The specific noise level for the two air-conditioning units has been calculated to the closest dwelling window. The calculation is based

on data taken from the manufacturer's specification sheet (Appendix D). Table 3 below illustrates the input data used.

Table 3

1/1 Octave Sound Pressure Levels @ 1m from the unit							
Frequency							
125 Hz	**250 Hz**	**500 Hz**	**1 kHz**	**2 kHz**	**4 kHz**	**8kHz**	**A(dBA)**
68	64	62	58	55	57	48	65

5.1.2 Calculated sound levels to the most affected receptor from the condensers are LAeq 31dB. The calculation sheet Is Included in Appendix E. The calculation Includes benefit of an acoustic enclosure Installed to the condensers.

5.1.3 Both condenser locations have the same model condensers Installed and are similar distance to their respective receptors. Therefore, the calculation Is applicable for both condenser locations. Note that the acoustic enclosure Is currently Installed to one of the condensers; It Is anticipated that an Identical enclosure will be Installed to the second condenser.

5.1.4 An assessment of the specific sound level from the condensers in accordance with BS4142 is included in Table 4.

Table 4

Measurement Type	*Parameter*	*Result*	*Comment*
Day			
Residual sound level	**L_{Aeq1hr}**	**53dBA**	
Background sound level	**L_{A901hr}**	**50dBA**	
Specific Sound Level	**L_{Aeq1hr}**	**31dBA**	**Modelled**
Acoustic Feature Correction	**dBA**	**0**	**Equipment significantly below residual and background sound levels**
Rating Level	**dBA**	**31dBA**	
Difference of Background vs Rating level	**dBA**	**-19dB**	
Likelihood of complaints			**No Adverse impact**

Night			
Residual sound level	$L_{Aeq15mins}$	**38dBA**	
Background sound level	$L_{A9015mins}$	**33dBA**	
Specific Sound Level	$L_{Aeq15mins}$	**31dBA**	**Modelled**
Acoustic Feature Correction	**dBA**	**0**	**Specific sound level is low and does not indicate any tonal characteristic**
Rating Level	**dBA**	**31dBA**	
Difference of Background vs Rating level	**dBA**	**-2dB**	
Likelihood of complaints			**No Adverse impact**

6.0 Conclusion and Further Comments

6.1 Discussion of Levels

6.1.1 The specific noise level of the condensers are below the existing background sound levels, in accordance with BS4142:2014, for there to be the likelihood of adverse impact on the nearest NSR.

6.1.2 Allowing a reduction through open windows, noise from the new condensers will be around LAeq 20dB inside the closest dwellings. This is significantly below guideline levels for a good standard of amenity in BS8233:2014. Noise from the condensers should not be disturbing or detrimental to the amenity of any nearby occupants.

6.1.3 The report includes the benefit of the acoustic enclosure currently installed to one condenser and recommends this will be installed to the second condenser accordingly. On this basis no further noise mitigation measures would be necessary to protect the amenity of nearby residents.

7.0 Credentials

Name	Title	Credentials
James Flitton BSc AMIOA	**Acoustic Consultant**	**CSCS Professionally Qualified person**
		Associate Member Institute of Acoustics
		Affiliate Member of IDE
		Affiliate Member of IOR
Signed		

Appendix A – Acoustic Terminology

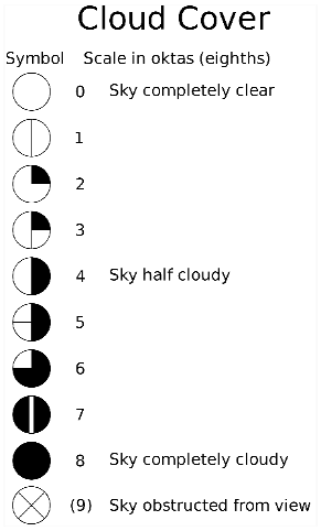
Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s1 and s2 is given by 20 log10 (s1/s2). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20μPa. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. Generally used to describe background noise level.

Appendix B – Survey Instrumentation

- Svantek Class 1 noise monitoring station model 307 serial number 75982 with integrated preamplifier plus ST30 microphone serial number 78375 in weatherproof outdoor environmental kit and tripod arrangement

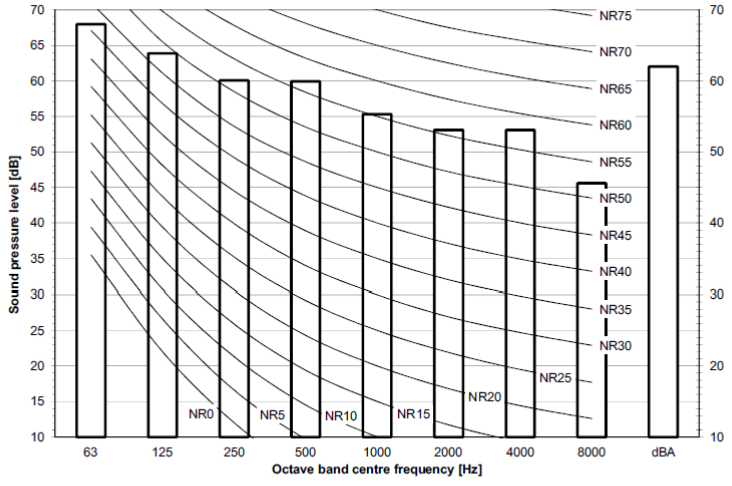
- Brüel & Kjær calibrator type 4231 serial number 3001014 (UKAS-certified)

Appendix C – Weather Conditions Chart Used

Weather Conditions				
Measurement Location	**Date/Time**	**Description**	**Beginning of Survey**	**End of Survey**
As indicated on **Error! Reference source not found.**		Temperature:		
		Precipitation:		
		Cloud cover (oktas - see guide)		
		Presence of fog/snow/ice		
		Presence of damp roads/wet ground		
		Wind Speed (m/s)		
		Wind Direction		
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)		

Appendix D – Air Handling Unit Technical Data Sheet

REYQ18U
RXYQQ18U
RXYQ18U
RYYQ18U
RYMQ12U



Notes
Data is valid at free field condition.
Data is valid at nominal operation condition.
dBA = A-weighted sound pressure level (A scale according to IEC).
Reference acoustic pressure 0 dB = 20 µPa

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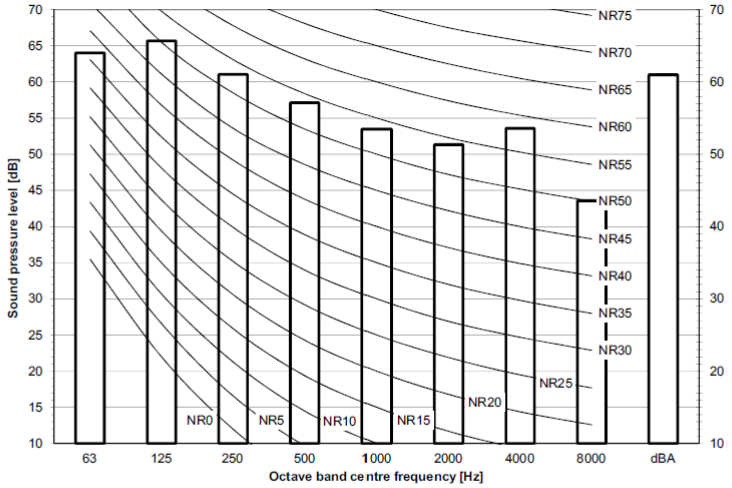
REYQ12U
RXYQQ12U
RXYQ12U
RYYQ12U
RYMQ12U



Notes
Data is valid at free field condition.
Data is valid at nominal operation condition.
dBA = A-weighted sound pressure level (A scale according to IEC).
Reference acoustic pressure 0 dB = 20 µPa

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Appendix E – Calculation Sheet

Acoustic Calculations

Project: George West House Enclosure — Our Ref: 2203067-4

Sound Source: — Date: 17/3/22

Sheet No: — Consultant: AJN

Octave Band Centre Frequen		32	63	125	250	500	1k	2k	4k	8k	Lin	A	NR
Court Yard Location													
REYQ18U	SPL		68	64	60	60	56	53	53	46	71	62	58
REYQ12U	SPL		64	66	61	57	54	51	54	44	69	61	59
Combined SPL			**69**	**68**	**64**	**62**	**58**	**55**	**57**	**48**	73	65	61
Inlet													
Unattenuated Noise			69	68	64	62	58	55	57	48	73	65	61
Distance Loss 5m			14	14	14	14	14	14	14	14			
Reflective surfaces x1			3	3	3	3	3	3	3	3			
Coil allowance			2	2	2	2	3	3	3	3			
ATT 40/1275			6	10	16	29	44	40	29	22			
Resultant Level			**50**	**44**	**34**	**19**	**0**	**1**	**14**	**12**	51	31	26
Criteria at NSR												31	
Combined SPL			**69**	**68**	**64**	**62**	**58**	**55**	**57**	**48**	73	65	61
Outlet													
Unattenuated Noise			69	68	64	62	58	55	57	48	73	65	61
Distance Loss 5m			14	14	14	14	14	14	14	14			
Reflective surfaces			3	3	3	3	3	3	3	3			
ATT 35/1350			8	13	22	38	47	40	34	20			
Resultant Level			**50**	**44**	**31**	**13**	**0**	**4**	**12**	**17**	51	31	25
Criteria at NSR												31	

Sound Power Level dB re:10^{-12} W — Sound Pressure Level dB re: 2 x 10^{-5} Pa

Notes: