PLANT NOISE ASSESSMENT

CARR SAUNDERS HALL, CAMDEN BOROUGH

RUND PARTNERSHIP LIMITED

FEBRUARY 2017

PLANT NOISE ASSESSMENT
CARR SAUNDERS HALL, CAMDEN

Our Ref: 3191_001r_0-1_kb

Client: **Rund Partnership Limited**
16 East Links,
Chandlers Ford,
Eastleigh, Hampshire,
SO53 3TG

Report by: **Anderson Acoustics Ltd**
9 Baden Place
Crosby Row
London
SE1 1YW

www.andersonacoustics.co.uk
T: 01273 696887

Date: **7 February 2017**

Project No: **3191**
Status: **ISSUED**

Author	**Kasia Bosiak** Assistant Consultant Bsc (Hons) Msc AMIOA	K. Bosiak	**7 February 2017**
Reviewed	**Joe Baggaley** Principal Consultant BSc (Hons) MSc MIOA	J. Bagg	**7 February 2017**
Approved	**Joe Baggaley** Principal Consultant BSc (Hons) MSc MIOA	J. Bagg	**7 February 2017**

REVISION HISTORY

Version	Comments	Changes made by	Approved by
1.0	First issued version	KB	JB

PAGE LEFT INTENTIONALLY BLANK

CONTENTS

1 INTRODUCTION

In order to complete a planning application for the installation of a replacement air handling unit at Carr Saunders Hall Building, 18-24 Fitzrovia Street, London W1T 4BN, The London Borough of Camden require consideration be given to atmospheric noise emissions from the proposed plant at the nearest neighbouring noise sensitive property.

Anderson Acoustics Ltd has been commissioned by Rund Partnership Limited to assess the current prevailing noise conditions at the site and ensure that noise from the installation is controlled in accordance with the local authority's noise policy.

Noise units, acoustic terminology and environmental noise criteria relevant to the assessment have been presented and briefly discussed in Section 2 of this report.

A brief description of the site and proposed plant installation is given in Section 3.

The methodology and results of an environmental noise survey undertaken at the site are given in Section 4.

Section 5 provides an assessment of the proposed plant noise levels against the environmental noise survey results.

The report is summarised in Section 6.

2 NOISE UNITS, POLICY AND CRITERIA

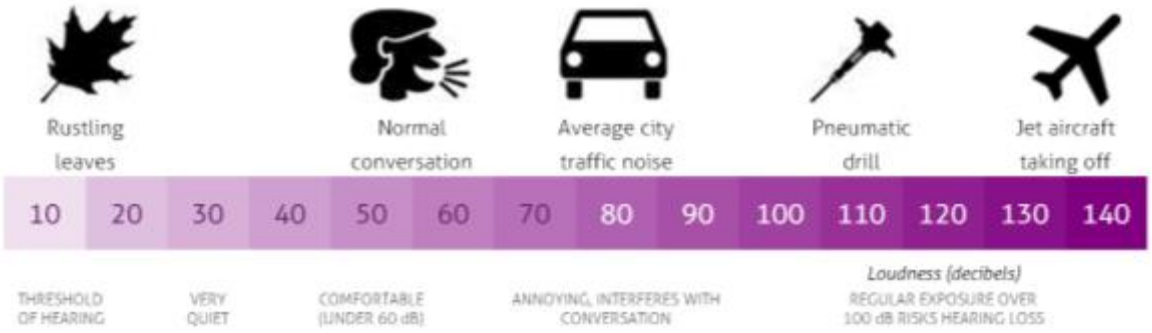
2.1 Noise Units

There is a million to one ratio between the threshold of hearing and the highest tolerable sound pressure. Noise is therefore measured using a logarithmic scale, to account for this wide range, called the decibel (dB). Noise is defined as unwanted sound and the range of audible sound varies from around 0 dB to 140 dB.

The human ear is capable of detecting sound over a range of frequencies from around 20 Hz to 20 kHz, however its response varies depending on the frequency and is most sensitive to sounds in the mid frequency range of 1 kHz to 5 kHz. Instrumentation used to measure noise is therefore weighted across the frequency bands to represent the sensitivity of the ear. This is called 'A weighting' and is represented as dB(A).

It is generally accepted that under normal conditions humans are capable of detecting changes in steady noise levels of 3 dB, whilst a change of 10 dB is perceived as a doubling or halving of the noise level. An indication of the range of noise levels commonly found in the environment is given below.

Figure 2.1: Typical noise levels



A number of different indices are used to describe the fluctuations in noise level over certain time periods. The main indices include:

$L_{A90,T}$ This is the noise level exceeded for 90% of the measurement period and provides a measurement of the quieter 'lull' periods in between noise events. It is often referred to as the background noise level.

$L_{Aeq,T}$ This is the "equivalent continuous A weighted sound pressure level" and is the level of a notional steady sound which has the same acoustic energy as the fluctuating sound over a specified time period. It is often used for measuring all sources of noise in the environment, which can be referred to as the ambient noise.

$L_{Amax,F}$ This is the maximum sound pressure level measured in a given time period with the sound level meter set to 'fast' response.

Reference is often made to acoustic measurements being undertaken in 'free-field' or 'façade' locations. Free-field measurements represent a location away from vertical reflecting surfaces, normally by at least 3.5 metres. A façade measurement is undertaken, or calculated to a position 1 metre from an external façade and a correction of up to 3 dB can be applied to account for the sound reflected from the façade. This latter position is often used when assessing the impact of external noise affecting residents inside properties.

2.2 Noise Policy

2.2.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) [1] was published on 15 March 2010. It sets out the long term vision of the Government's noise policy, which is to promote good health and a good quality of life through the management of noise within the context of sustainable development.

The NPSE sets out the following aims:

"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."*

The NPSE describes a number of effect levels that may be used to define effects in the context of noise policy, as follows:

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.2.2 National Planning Policy Framework

The National Planning Policy Framework (NPPF) [2] was published on 27 March 2012. Along with the introduction of this document, a number of detailed planning policy guidance notes were withdrawn, including PPG24, on planning and noise.

The NPPF sets out how the Government's planning policies should be applied. In terms of the detail of policies on environmental issues such as noise, the intention is for Local Planning Authorities to set their own guidance. This will form part of or be referred to in the relevant local plan.

2.3 Local Authority Requirements

The Draft Camden Local Plan 2015, Appendix 2 "Noise Thresholds" [4] states the following regarding permissible noise levels from newly installed building services plant:

"Noise should be measured 1m external to a noise sensitive façade in the case of buildings and noise at the nearest edge of the noise sensitive space in the case of gardens, balconies or open spaces:

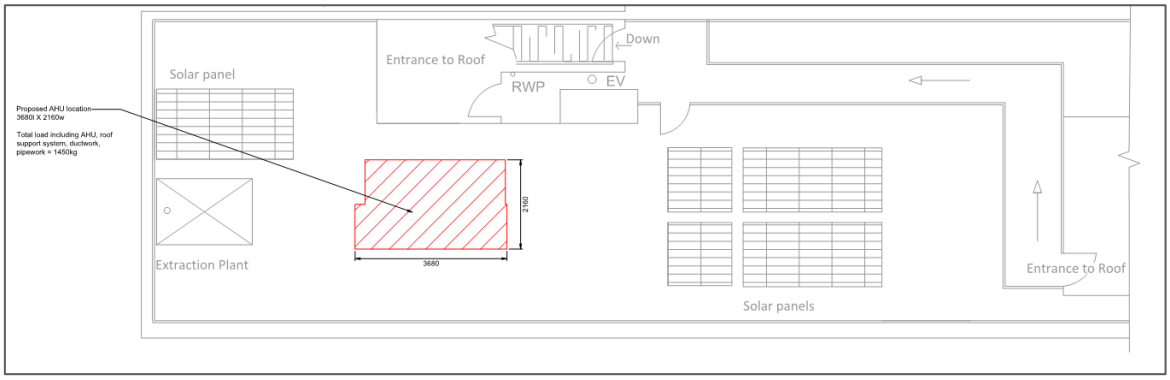
Figure 2.1: Local Authority development policy

Noise description and location of measurement	Period	Time	Noise level
Noise at the nearest noise sensitive receptor	Day, evening and night	0000-2400	10dB(A) <LA90 (15 minutes)
Noise that has a distinguishable discrete continuous note (whine, hiss, screech, hum) at the nearest noise sensitive receptor	Day, evening and night	0000-2400	15dB(A) <LA90 (15 minutes)
Noise that has distinct impulses (bangs, clicks, clatters, thumps) at the nearest noise sensitive receptor	Day, evening and night	0000-2400	15dB(A) <LA90 (15 minutes)
Noise at the nearest noise sensitive receptor LA90>60dB	Day, evening and night	0000-2400	55dBLAeq (15 minutes)

3 SITE DESCRIPTION

It is understood that the new AHU is to be to be installed on the roof of the building, see Figure 3.1 below.

Figure 3.1: Proposed plant location



Manufacturer's sound power level data for the proposed Denco Happel SX 096.064AVBV unit is provided in Table 3.1 below.

Table 3.1: Manufacturers Noise Data

Description	dB, Octave Band Centre Frequency Hz								
	63	125	250	500	1000	2000	4000	8000	dB(A)
Denco Happel SX 096.064AVBV (exahaust)	63	67	73	71	73	69	65	61	76
Denco Happel SX 096.064AVBV (supply)	63	65	70	68	62	63	60	56	70

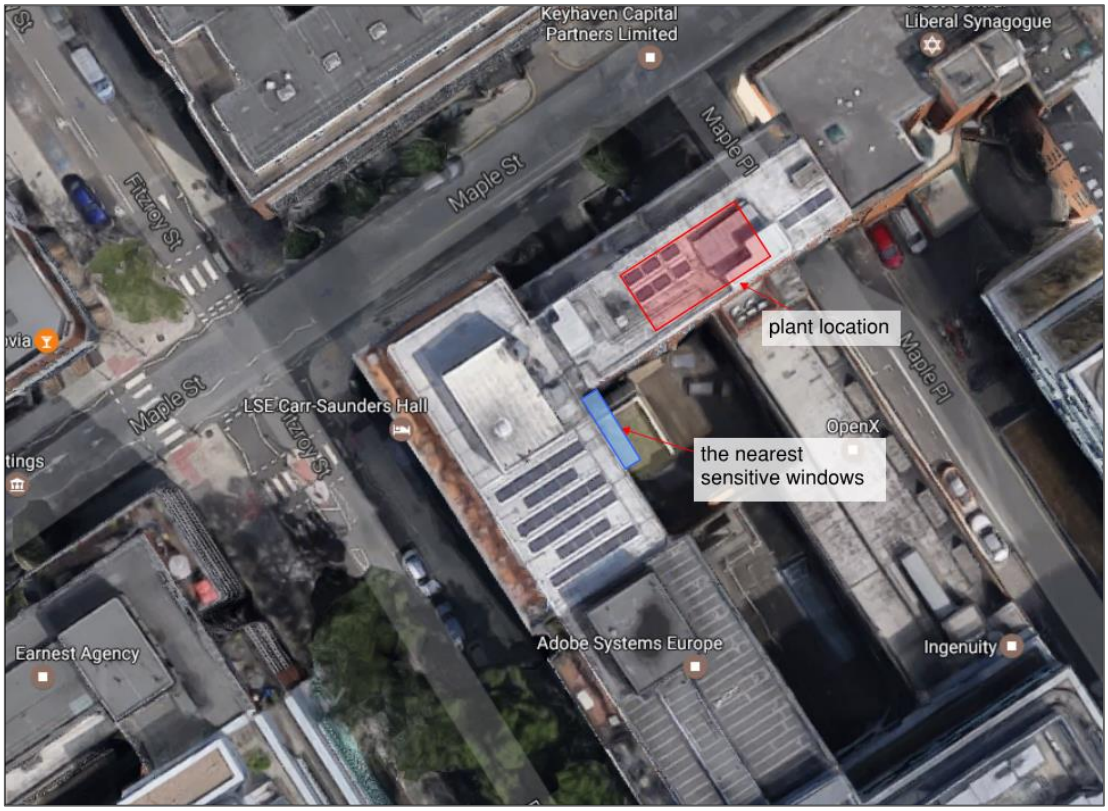
Based on the above spectrum the proposed units do not present tonal characteristics.

The plant will be serving a residential property and will have the potential to operate any time of the day or night seven days a week.

During the site visit background noise levels were noted to be moderate, dominated by distant road traffic noise, emissions from the existing AHU to be replaced and occasional distant aircraft noise.

The nearest noise sensitive windows belong to a residential property approximately 20m from the proposed plant location as shown in Figure 3.2 below.

Figure 3.2: Proposed plant location and nearest sensitive window



4 NOISE MEASUREMENTS

4.1 Continuous Noise Monitoring

Continuous unattended noise measurements were obtained over an approximate three day period to obtain data on the variation in noise levels at the site.

The continuous monitoring of ambient noise levels was undertaken on the roof of the building at approximately 18 m above ground level under 'free-field conditions.

Noise levels were measured using a Rion NL-32 precision integrating sound level meter. The microphone was fitted with a weatherproof windshield. The sound level meter was powered by dry cell batteries and stored inside a weatherproof security box.

Measurements were obtained using the 'F' time weighting and A-weighting frequency network. Fifteen-minute consecutive measurements of $L_{Aeq,T}$ and $L_{A90,T}$ noise levels were obtained between approximately 13:00 hrs Friday 20th and 14:20 hrs on Monday 23rd January 2017

The equipment was calibrated before and after the survey using a Rion NC-74 sound calibrator to generate a calibration level of 94.0 dB at 1 kHz. No significant calibration drifts were observed.

Equipment details are fully summarised in Table 4.1.

Table 4.1: Survey equipment details

Equipment	Serial no.	Date calibrated	Calibration certification number[1]	Measurement start date/time	Measurement end date/time
Rion NL-32 sound level meter	00732147	07/06/2016	UCRT1/61182	20/01/2017 13:00	23/01/2017 14:20
Rion NC-74 calibrator	34625646	10/11/2016	UCRT16/1329	-	

[1]Certificates available on request

4.2 Weather Conditions

Weather conditions during the survey period have been obtained from internet sources www.wunderground.com (Weather station at London, St James which indicates dry periods of light to moderate winds during the survey period). At the time of setting up and collecting the noise monitor, weather conditions were noted to be dry with clear skies.

It is considered that the weather conditions did not significantly affect the noise measurements.

4.3 Noise Survey Results

The results of the continuous noise monitoring survey are presented graphically in the Appendix.

Table 4.1 summarises the relevant average L_{Aeq} and L_{A90} noise levels measured during the proposed hours of plant operation (24/7).

Table 4.2: Noise survey results

Monitoring Period	Time period	$L_{Aeq,T}$	Minimum $L_{A90,15min}$
Friday 20th January	13:00 to 23:00	60	54
	23:00 to 07:00	52	49
Saturday 21th January	07:00 to 23:00	55	51
	23:00 to 07:00	49	47
Sunday 22nd January	07:00 to 23:00	53	50
	23:00 to 07:00	49	47
Monday 23nd January	07:00 to 14:00	55	52

The unattended noise survey results indicate ambient noise levels of between 53 to 60 dB $L_{Aeq,T}$ during daytime hours and 49 to 52 dB $L_{Aeq,T}$ during night-time hours. A minimum background noise level of 47 dB $L_{A90,15min}$ was measured during the proposed hours of plant operation.

5 PLANT NOISE ASSESSMENT

5.1 Noise Limit

In line with the requirements of Camden Council, noise emissions from the AHU will need to be controlled to 10 dB below the minimum measured background level during the proposed hours of operation.

The target noise limit is therefore 37dB(A) at the nearest noise sensitive property.

5.2 Assessment

Calculations have been carried out based on manufacturer's noise data for the proposed Denco Happel SX 096064AVBV air handling unit.

The calculations presented in Appendix A show the combined noise levels incident at the nearest noise sensitive window. Combined noise levels are within limits of Camden Council Requirements.

6 SUMMARY

Anderson Acoustics Ltd has undertaken an environmental noise assessment to assist in the planning application for the installation of a replacement AHU at Carr Saunders Hall Building, 18-24 Fitzrovia Street, London W1T 4BN.

Site observations indicated that the noise climate close to the nearest noise sensitive property was moderate and dominated by distant road traffic, the existing AHU and aircraft noise.

A background noise survey has been undertaken and an assessment of plant noise emissions carried out to establish the likely noise level at the nearest noise sensitive property.

Calculations show that plant noise levels at the nearest noise sensitive window are within limits of Camden Council Requirements therefore no attenuation is needed.

7 REFERENCES

1 Noise Policy Statement for England (NPSE). 15 March 2010

2 National Planning Policy Framework (NPPF). 27 March 2012

3 British Standard BS 4142:2014. Methods for rating and assessing industrial and commercial sound

4 Draft Camden Local Plan 2015, Policy A4 Noise and Vibration, Appendix 2, Section D.

PAGE LEFT INTENTIONALLY BLANK

APPENDIX A

PLANT CALCULATIONS

Job No.	Made By	Date Created	Sheet No.								
3191	KB	07/02/17	1								
Job Name		Date last revised	Rev								
Carr Saunders		07/02/17									
Calculation Description											
Carr Saunders				63	125	250	500	1k	2k	4k	8k
Denco Happel SX 096.064AVBV (EXHAUST)			dBA								
Sound Power			76	63	67	73	71	73	69	65	61
Roof Screening (Store vault) (path difference 1m)				-5	-5	-5	-5	-5	-5	-5	-5
Directivity (150 degrees)				-3	-5	-8	-12	-15	-18	-18	-18
end reflections 900x600mm				-5	-2	0	0	0	0	0	0
Distance Correction (20m) - 20LOG(20/1)-11		20.0 m		-37	-37	-37	-37	-37	-37	-37	-37
Noise level 1m from window			20	13	18	23	17	16	9	0	0
Denco Happel SX 096.064AVBV (SUPPLY)			dBA								
Sound Power			70	63	65	70	68	62	63	60	56
square band 900mm width				0	-3	-8	-5	-3	-3	-3	-3
end reflections 900x600mm				-5	-2	0	0	0	0	0	0
Directivity (60 degrees)				0	1	2	2	3	3	3	3
Distance Correction (20m) - 20LOG(20/1)-11		20.0 m		-37	-37	-37	-37	-37	-37	-37	-37
Noise level 1m from window			32	21	24	27	28	25	26	23	19
Denco Happel SX 096.064AVBV (BREAKOUT)			dBA								
Sound Power			55	48	51	53	47	51	50	37	31
Roof Screening (Store vault) (path difference 1m)				-5	-5	-5	-5	-5	-5	-5	-5
Distance Correction (20m) - 20LOG(20/1)-8		20.0 m		-34	-34	-34	-34	-34	-34	-34	-34
Noise level 1m from window			16	9	12	14	8	12	11	-2	-8
Combined noise level 1m from window			32	22	25	29	28	26	26	23	19
Minimum measured background LA90,15min			37								
Difference			5								

APPENDIX B

NOISE SURVEY RESULTS

Figure B1: Unattended Survey Results