24Acoustics

Armstrong House
Bassett Avenue
Southampton
SO16 7DP

T: 02381 555 000

HOLMES ROAD, KENTISH TOWN
PLANT NOISE ASSESSMENT

Technical Report: R6718-4 Rev 0

Date: 27th March 2019

For: Contemporary Design Solution LLP
46 Great Marlborough Street
London
W1F 7JW

24 Acoustics Document Control Sheet

Project Title: Holmes Road, Kentish Town – Plant Noise Survey

Report Ref: R6718-4 Rev 0

Date: 27th March 2019

	Name	Position	Signature	Date
Prepared by	Kiel Edwards BSc AMIOA	Technician		27/03/2019
Reviewed by	Neil McLeod BA (Hons) MIOA	Senior Consultant		27/03/2019
Approved by	Stephen Gosling BEng MIOA	Principal Consultant		27/03/2019
For and on behalf of 24 Acoustics Ltd				

Document Status and Approval Schedule

Revision	Description	Prepared By	Reviewed By	Approved By
0	Approved for issue	Kiel Edwards	Neil McLeod	Stephen Gosling

DISCLAIMER

This report was completed by 24 Acoustics Ltd on the basis of a defined programme of work and terms and conditions agreed with the Client. The report has been prepared with all reasonable skill, care and diligence within the terms of the Contract with the Client and taking into account the project objectives, the agreed scope of works, prevailing site conditions and the degree of manpower and resources allocated to the project.

24 Acoustics Ltd accepts no responsibility whatsoever, following the issue of the report, for any matters arising outside the agreed scope of the works.

This report is issued in confidence to the Client and 24 Acoustics Ltd has no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known. Any such party relies upon the report at their own risk.

Unless specifically assigned or transferred within the terms of the agreement, 24 Acoustics Ltd retains all copyright and other intellectual property rights, on and over the report and its contents.

CONTENTS **PAGE**

1.0 INTRODUCTION

1.1 24 Acoustics Ltd has been instructed by Contemporary Design Solution LLP to undertake an assessment of noise from proposed building services plant for a new building at Holmes Road, Kentish Town. The assessment is required to discharge a planning condition relating to noise from fixed plant.

1.2 The building comprises student accommodation to the upper floors, teaching spaces and a commercial warehouse at basement levels and retail areas to the ground floor.

1.3 This report presents the results of the assessment following site visits and background noise surveys undertaken between the 6th and 13th January 2017.

1.4 All noise levels in this report are presented in dB relative to 20μPa.

2.0 SITE DESCRIPTION

2.1 The site is located on the junction of Holmes Road and Cathcart Street in London. Residential properties lie to the north, on the opposite side of Holmes Road, and on the eastern and southern site boundary.

2.2 The majority of the proposed building services plant will be placed at the first-floor flat roof area to the centre of the building; additional plant will be located to the middle basement and upper basement lightwells. The plant selections comprise air handling units, condenser units, extract fans and an MVHR unit. The plant will be programmed to operate during daytime periods only (07:00 to 19:00 hours). The site plan in Figure 1 describes the nearest noise sensitive receivers in context of the new building.

3.0 CRITERIA

3.1 Planning condition 18 (reference: 2013/7130/P) states:

> *"Before the relevant uses commence, plans and acoustic information of any extract ventilating system/air-conditioning plant shall be submitted to the council for approval, this shall include details of any acoustic isolation and sound attenuation. Noise levels at a point 1 metre external to sensitive facades shall be at least 5 dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10 dB(A) below the LA90, expressed in dB(A). The Equipment and any noise control measures shall be thereafter retained."*

3.2 The following assessment has been carried out in accordance with the above planning condition.

4.0 ENVIRONMENTAL NOISE MEASUREMENTS

4.1 The following instrumentation was set up between 6th and 13th January 2017 to assess the prevailing background noise levels:

Rion precision sound level meter	Type NL52
Brüel & Kjær acoustic calibrator	Type 4231

4.2 Background noise measurements were undertaken in free-field conditions at a height of approximately 2.5 metres above local ground level in the location shown in Figure 1. The prevailing source of noise at this location is road traffic. The measurement location is representative of the noise climate outside the nearest and most affected sensitive properties.

4.3 The instrumentation was configured to record 5-minute measurements of the A-weighted statistical parameters including L_{Aeq}, L_{A90} and L_{Amax} (all measured on fast response). The survey was undertaken in general accordance with BS 7445: 1991 "Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use" [Reference 1].

4.4 The calibration of all instrumentation was verified before and after the survey and no significant signal variation occurred. Calibration of 24 Acoustics' equipment is traceable to National Standards. The weather conditions during the noise measurements were changeable but not considered to have affected the typical measured background noise levels.

4.5 Construction works were ongoing during the survey and measurements affected by construction noise have been removed from the assessment.

Background Noise Measurements

4.6 The measured values are summarised in graphical format in Appendix B and typical values presented in Table 1.

Date (Jan 2017)	**Typical Background Noise Level, dB**
	Daytime (07:00-19:00) [$L_{A90,1\ hour}$]
Friday 6th	46
Saturday 7th	41
Sunday 8th	38
Monday 9th	47
Tuesday 10th	46
Wednesday 11th	46
Thursday 12th	46
Friday 13th	49
Average	**45**

Table 1 - Summary of Background Noise Measurements

4.7 24 Acoustics considers the typical background noise level to be the average noise level minus one standard deviation for the given period.

4.8 The representative background noise level measured for the proposed operational hours (07:00 to 19:00 hours) is 45 dB $L_{A90,\ 1\ hour}$.

Plant Noise Limits

4.9 Table 2 sets out the proposed maximum external plant noise levels for the daytime operational period, to be achieved by the new plant at the nearest noise sensitive properties.

Receiver	Period and Maximum Plant Noise Level, dB
	Daytime (07:00-19:00) [$L_{Aeq,1\ hour}$]
Nearest Residential Properties	40

Table 2 - Maximum Cumulative External Plant Noise Levels

4.10 If the proposed plant exhibits tonal characteristics, then a 5 dB correction is applicable, as specified in Planning Condition 18.

5.0 PLANT NOISE ASSESSMENT

5.1 The following assessment assumes the proposed fixed items of building services plant will be programmed to operate during daytime periods only (07:00 to 19:00 hours). Plant locations are indicated in Figure 2.

5.2 Manufacturers' octave band sound pressure and sound power levels have been provided for the proposed plant selections, described in Table 3.

Unit Reference	Location	Manufacturer/Model
Air Handling Units		
AHU1	First Floor Roof Terrace	Swegon
AHU2	First Floor Roof Terrace	Swegon
AHU3A	Middle Basement Light Well	Swegon
AHU3B	Middle Basement Light Well	Swegon
Condenser Units		
VRFC01	First Floor Roof Terrace	Mitsubishi PURY-P200YNW-A
VRFC02	First Floor Roof Terrace	Mitsubishi PURY-P200YNW-A
VRFC03	First Floor Roof Terrace	Mitsubishi PURY-P350YNW-A
VRFC04	First Floor Roof Terrace	Mitsubishi PURY-P350YNW-A
DXC05	First Floor Roof Terrace	Mitsubishi PUHZ-P250
DXC08	First Floor Roof Terrace	Mitsubishi MVZAP50
Extract Fans		
EF01	First Floor Roof Terrace	Nuaire AX63D*42A3+06
EF02	First Floor Roof Terrace	Nuaire AVT3
EF04	First Floor Roof Terrace	Nuaire AVT6
EF05	Middle Basement	Nuaire AX35A-21A1-03/T
EF08	Middle Basement	Nuaire AX35A-21A1-03/T
Mechanical ventilation Heat Recovery Units		
MVHR01	Middle Basement	Lossnay LGH-50RVX-E

Table 3 - Proposed Plant Selections

5.3 Calculations have been undertaken using the manufacturers' octave band noise data to determine the cumulative plant noise level at the nearest noise sensitive properties. The equipment is not expected to exhibit tonal characteristics and calculations have included corrections for distance, screening and reflections as appropriate. Detailed calculations and manufacturers' data are available on request.

5.4 The proposed air handling units and extract fans will need to be fitted with in-line atmospheric attenuators to mitigate external noise levels. Table 4 describes the minimum insertion loss to be achieved by each attenuator.

Unit	Minimum Insertion Loss (dB) Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
AHU01 Supply	5	10	14	23	38	37	33	22
AHU01 Exhaust	9	16	25	38	48	50	50	50
AHU02 Supply	5	10	14	23	38	37	33	22
AHU02 Exhaust	5	10	14	23	38	37	33	22
AHU03a Supply	6	13	25	37	44	43	30	20
AHU03a Exhaust	6	13	25	37	44	43	30	20
AHU03b Supply	6	13	25	37	44	43	30	20
AHU03b Exhaust	6	13	25	37	44	43	30	20
AHU04 Supply	4	7	11	18	28	26	21	16
EF01	10	21	27	31	33	33	33	33
EF02	7	15	28	45	50	45	35	22
EF04	6	13	25	37	44	43	30	20
EF05	5	10	20	32	40	37	24	16
EF08	5	10	20	32	40	37	24	16

Table 4 - Atmospheric Attenuator Acoustic Requirements

5.5 It is recommended that all external ductwork be lagged with a mass barrier material that has a minimum mass per unit area of 5kg/m^2 (e.g. Muftilag, or similar).

5.6 Additionally, all condenser units will need to be installed in an acoustic enclosure to achieve the required noise levels. Table 5 describes the minimum insertion loss required for each condenser enclosure.

Unit	Minimum Insertion Loss (dB) Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
VRFC01	4	4	6	9	12	17	11	10
VRFC02	4	4	6	9	12	17	11	10
VRFC03	4	4	6	9	12	17	11	10
VRFC04	4	4	6	9	12	17	11	10
DXC05	4	4	6	9	12	17	11	10
DXC08	6	6	8	11	14	19	13	12

Table 5 - Condenser Enclosure Acoustic Requirements

5.7 Table 6 describes the predicted maximum plant noise levels outside the most affected Receptor Locations (shown in Figure 2) with the above mitigation measures in place.

Receptor	Location	Calculated Cumulative Noise Level, dB $L_{Aeq,T}$
Receiver 01	North facing façade of 16-30 Azania Mews	39
Receiver 02	South west façade of 55-57 Holmes Road	39
Receiver 03	East facing façade of 16-30 Azania Mews	39
Receiver 04	South west façade of 55-57 Holmes Road	38
Receiver 05	South façade of 74a Holmes Road	38
Receiver 06	West façade of 1-15 Azania Mews	38

Table 6 - Calculated Cumulative External Plant Noise Levels

5.8 With the recommended mitigation measures in place, external noise levels from the proposed building services plant selections would be acceptable at the nearest residential properties during daytime operation (07:00 to 19:00 hours).

5.9 The attenuation requirements and above mitigation measures should be revisited should any changes be made to the plant selections.

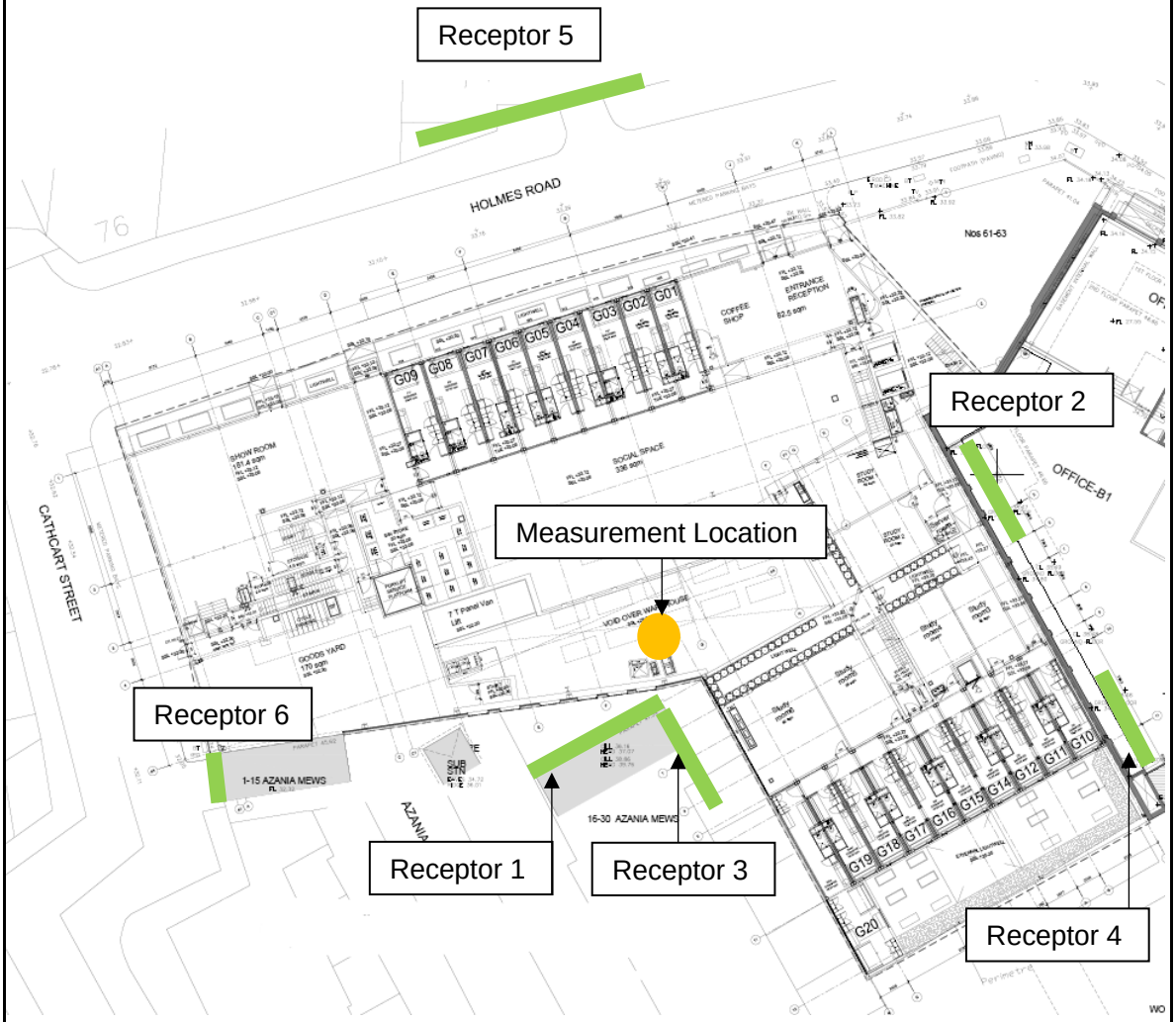
6.0 CONCLUSIONS

6.1 Contemporary Design Solution LLP has instructed 24 Acoustics Ltd to undertake an assessment of noise from the proposed building services plant at Holmes Road, London in order to discharge a planning condition relating to noise.

6.2 A background noise survey has been undertaken to determine the prevailing background noise levels during daytime and night-time periods.

6.3 Based upon the survey results and guidance of planning condition 18, maximum noise levels have been established for new plant, to be achieved outside the nearest noise sensitive properties. The plant will be programmed to operate during daytime periods only (07:00 to 19:00 hours).

6.4 Calculations have demonstrated that, with the recommended mitigation measures in place, external noise levels from plant would be acceptable at the nearest residential and commercial properties.



Project: Holmes Road, London	**Title:** Site Plan, survey location and receptor locations	
DWG No: Figure 1	**Scale:** N.T.S.	**Rev:** -
Date: March 2019	**Drawn By:** KE	**Job No:** 6718

First Floor Roof Terrace

Middle Basement

AHU01	=1
AHU02	=2
AHU03a	=3
AHU03b	=4
AHU04	=5
VRFC01	=6
VRFC02	=7
VRFC03	=8
VRFC04	=9
DXC05	=10
DXC08	=11
EF01	=12
EF02	=13
EF04	=14
EF05	=15
EF08	=16
MVHR01	=17

Project: Holmes Road, London	**Title**: Plant Locations	
DWG No: Figure 2	**Scale**: N.T.S.	**Rev**: -
Date: March 2019	**Drawn By**: KE	**Job No**: 6718

REFERENCES

1. British Standards Institution. British Standard 7445: 1991 Description and measurement of environmental noise Part 2 - Acquisition of data pertinent to land use

APPENDIX A: ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. The range of audible sound is from 0 to 140 dB. The frequency response of the ear is usually taken to be around 18 Hz (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in important by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting which is most widely used and which correlates best with subjective response to noise is the dBA weighting. This is an internationally accepted standard for noise measurements.

For variable sources, such as traffic, a difference of 3 dBA is just distinguishable. In addition, a doubling of traffic flow will increase the overall noise by 3 dBA. The 'loudness' of a noise is a purely subjective parameter, but it is generally accepted that an increase/ decrease of 10 dBA corresponds to a doubling/ halving in perceived loudness.

External noise levels are rarely steady but rise and fall according to activities within an area. In attempt to produce a figure that relates this variable noise level to subjective response, a number of noise indices have been developed. These include:

i) The L_{Amax} noise level

This is the maximum noise level recorded over the measurement period.

ii) The L_{Aeq} noise level

This is "equivalent continuous A-weighted sound pressure level, in decibels" and is defined in British Standard BS 7445 as the "value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time internal, T, has the same mean square sound pressure as a sound under consideration whose level varies with time".

It is a unit commonly used to describe construction noise and noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise. In more straightforward terms, it is a measure of energy within the varying noise.

iii) The L_{A10} noise level

This is the noise level that is exceeded for 10% of the measurement period and gives an indication of the noisier levels. It is a unit that has been used over many years for the measurement and assessment of road traffic noise.

iv) The L_{A90} noise level

This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during the quieter periods. It is often referred to as the background noise level and is used in the assessment of disturbance from industrial noise.

APPENDIX B: ENVIRONMENTAL NOISE LEVELS