

SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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66-68 South Street, Romford

Building services plant noise assessment

London, Manchester, Edinburgh, Birmingham, Leeds, Bristol

Sandy Brown Ltd

Registered in England & Wales

No. 13227735

post@sandybrown.com

www.sandybrown.com

Registered Office: 55 Charterhouse Street, London EC1M 6HA

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Version	Date	Comments	Author	Reviewer
A	3 Feb 25		Callum Bracher	Craig Simpson

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Summary

Sandy Brown has been commissioned by Maya Luxurious Ltd to provide an assessment of noise from proposed building services plant in relation to the proposed development of commercial space and new apartments at 66-68 South Street, Romford.

An environmental noise survey has been carried out at the site. The noise survey was carried out between 9 October 2020 and 16 October 2020.

Representative background sound levels measured during the survey were $L_{A90,15min}$ 55 dB during the daytime and $L_{A90,15min}$ 44 dB at night.

Based on the Local Authority planning condition and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed $L_{Aeq,1hour}$ 45 dB during the daytime and $L_{Aeq,1hour}$ 34 dB during the night.

The proposed external plant includes an air source heat pump (ASHP), 3 tenant condenser units, and a tenant kitchen extract duct located in a dedicated plant area on level 3 to the north west corner of the development.

The predicted noise level outside the nearest neighbouring premises from the proposed ASHP is L_{Aeq} 26 dB. This meets both the day and night time plant noise limits.

Tenant plant will need to be selected so that it operates at no more than L_{Aeq} 60 dB at 1 m from each unit.

Contents

1 Introduction 5

2 Site description 5

3 Development proposals 6

4 Assessment criteria 7

5 Survey method 7

6 Measurement results 9

7 Plant noise egress 11

Appendix A 15

 Survey details 15

Appendix B 18

 Results of unattended measurements at Location L 18

1 Introduction

Sandy Brown has been commissioned by Maya Luxurious Ltd to provide an assessment of noise from proposed building services plant in relation to the proposed development of commercial space and new apartments at 66-68 South Street, Romford.

An environmental noise survey has been carried out to establish background sound levels around the site and by nearby noise sensitive premises. The background sound levels measured during the survey are used as the basis for setting limits for noise emission from proposed building services plant. These limits are set in accordance with the requirements of the Havering Council.

This report provides details of the noise survey, including measurement results, and provides an assessment of noise from the proposed building services plant including recommendations for suitable noise mitigation measures.

2 Site description

2.1 The site and its surroundings

The site location in relation to its surroundings is shown in Figure 1. The existing two storey commercial building is located on a pedestrianised section of South Street at the junction with Arcade Place which is also pedestrianised. The nearest road traffic routes are Exchange Street to the west of the site, and the junction of Western Road and South Street to the south east of the site.

The noise measurement locations used during the noise survey are shown on Figure 1, with the attended measurement locations numbered 1 – 4, and the long term monitoring position marked as position 'L'.



Figure 1 Aerial view of site (courtesy of Google Earth Pro)

2.2 Adjacent premises

The site is surrounded by commercial premises including shops, offices, restaurants and a bar.

There are new build residential properties at 64 South Street, immediately to the north of the site. Residential upper floor windows of this will be the nearest noise sensitive premises to the proposed development.

3 Development proposals

The proposal is to demolish the existing buildings at 66 and 68 South Street and replace them with a new four storey building with commercial units at ground floor level and 19 flats across the three upper floors.

New external building services plant serving the development will be located in a rooftop plant area at the western corner of level 3.

4 Assessment criteria

The development currently has planning permission with conditions attached to it. Condition 15 relates to noise from building services plant and states:

Before any works commence a scheme for any new plant or machinery shall be submitted to the local planning authority to achieve the following standard. Noise levels expressed as the equivalent continuous sound level L_{Aeq} (1 hour) when calculated at the boundary with the nearest noise sensitive premises shall not exceed $L_{A90} - 10$ dB and shall be maintained thereafter to the satisfaction of the Local Planning Authority.

5 Survey method

5.1 Noise survey method

The survey included unattended and attended noise measurements.

5.1.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over seven days.

Details of the equipment used and the noise indices measured are provided in Appendix A.

The unattended measurements were taken over 15 minute periods between 13:30 on 9 October 2020 and 12:00 on 16 October 2020.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. A photograph showing the measurement location is provided in Figure 2. The microphone was positioned on the roof of the existing building at the western edge, next to the facade of the adjacent premises at 64 South Street, below the nearest noise sensitive premises. This location was chosen to be reasonably representative of noise levels at the site and outside the nearest noise sensitive premises.



Figure 2 Unattended measurement position

5.1.2 *Attended measurements*

Attended sample measurements were taken at four locations around the site. These are indicated in Figure 1 as positions 1 to 4. The attended measurements were carried out on 6 October 2020, over 15 minute periods.

At each position the microphone was mounted on a tripod approximately 1.5 m above ground level. Positions 2 and 3 were taken 1 m away from the building facade, whilst positions 1 and 4 were in free-field conditions. Details of the equipment used and the noise indices measured are provided in Appendix A. Dominant noise sources occurring during the measurements were noted.

5.2 Weather conditions

Weather conditions during the survey are described in Appendix A.

6 Measurement results

6.1 Observations

The dominant noise sources observed at the site during the survey were from road traffic on Exchange Street, Western Road, and the non-pedestrianised section of South Street. Pedestrians passing by and building services plant from nearby premises were also present in some measurements.

6.2 Noise measurement results

6.2.1 Unattended measurement results

A graph showing the results of the unattended measurements is provided in Appendix B.

Day and night-time ambient noise levels measured during the unattended survey are presented in Table 1. These are facade noise levels measured at 1 m from the adjacent building.

Table 1 Ambient noise levels measured during the unattended survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Friday 9 October 2020	-	49
Saturday 10 October 2020	58	48
Sunday 11 October 2020	56	49
Monday 12 October 2020	58	50
Tuesday 13 October 2020	56	49
Wednesday 14 October 2020	56	49
Thursday 15 October 2020	57	48
Average	57	49

In line with BS 4142:2014+A1:2019, representative background sound levels have been determined using statistical analysis of the continuous measurements.

Daytime and night time statistical analysis of representative values for the site are given in Figure 3 and Figure 4.

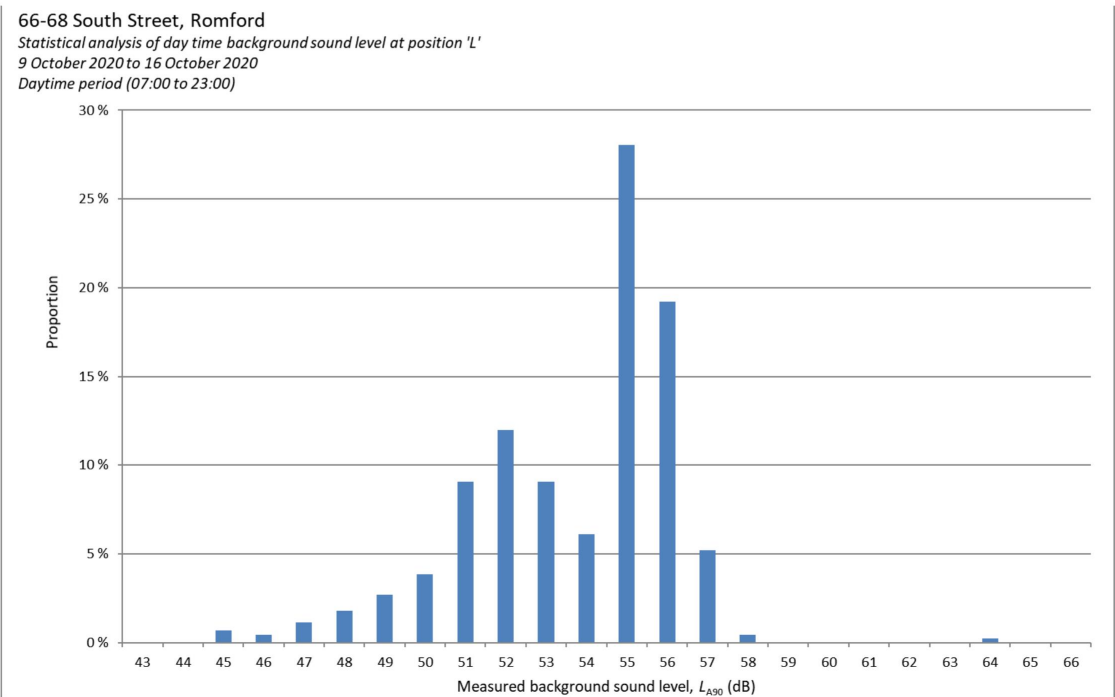


Figure 3 Statistical analysis of daytime background noise levels

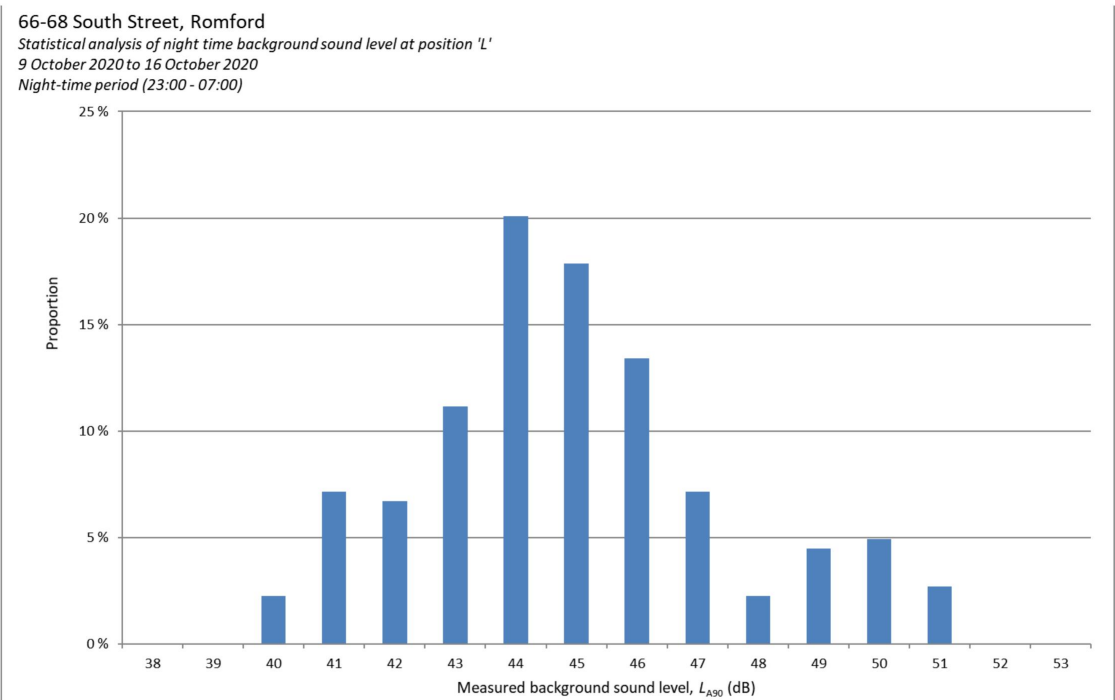


Figure 4 Statistical analysis of night time background noise levels

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 55 dB during the daytime and $L_{A90,15min}$ 44 dB at night.

6.2.2 Attended measurement results

Noise levels and key sources recorded during the attended measurements are summarised in Table 2. Positions 2 and 3 were taken 1 m away from the building facade, whilst positions 1 and 4 were in free-field conditions.

Table 2 Noise levels and key noise sources from attended measurements

Pos	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	13:23	63	82	57	Road traffic on Western Rd/South St, pedestrians
1	13:54	62	85	56	
1	14:09	61	80	56	
2	14:26	58	78	54	Road traffic on Exchange St and Western Rd/South St, pedestrians
2	14:42	57	78	53	
2	14:58	60	81	54	
3	15:17	63	81	60	Plant noise from louvre outside Spice Hut, traffic on Exchange St
4	15:34	62	77	59	Plant noise from Braza kitchen extract, traffic on Exchange St, pedestrians
4	15:49	62	77	60	

The sample noise measurements indicate that the daytime background noise level at all locations around the site is generally similar to that measured on the unattended noise monitor, ie in the region of $L_{A90,15min}$ 55 dB.

7 Plant noise egress

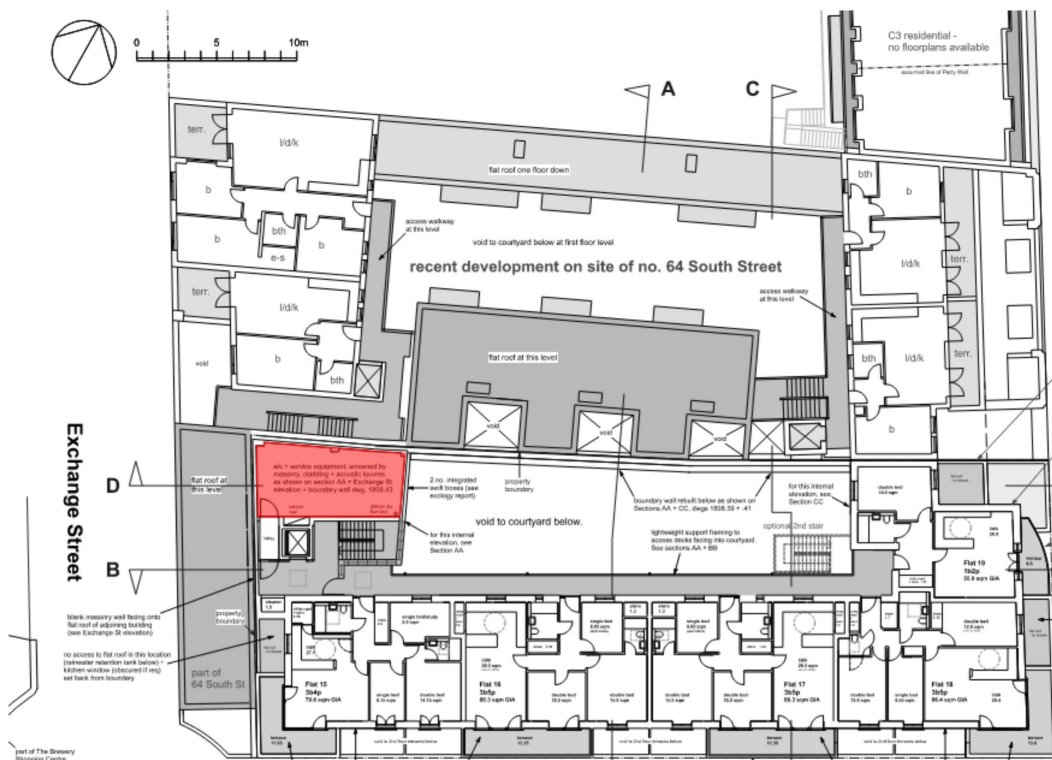
7.1 Noise limits

Based on the planning condition criteria and the measurement results, the cumulative noise level from the operation of all new plant should not exceed the limits set out in Table 3.

The limits apply at 1 m from the worst affected windows of the nearest noise sensitive premises and are presented as facade levels. In this case these limits would apply at the residential windows of flats at 64 South Street, directly to the north of the site.

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises, $L_{Aeq,1hour}$ (dB)
Daytime (07:00-23:00)	45
Night-time (23:00-07:00)	34

The proposed external plant includes an air source heat pump (ASHP), 3 potential tenant condenser units, and a potential tenant kitchen extract duct for the ground floor commercial units. These items are located in a dedicated plant area on level 3 to the north west corner of the development. The plant area is shown shaded in red in Figure 5 and the detail drawing showing the ASHP is shown in Figure 6. The plant area is to be enclosed with solid walls at least 2 m high on all sides and open above.



Page 12 of 19

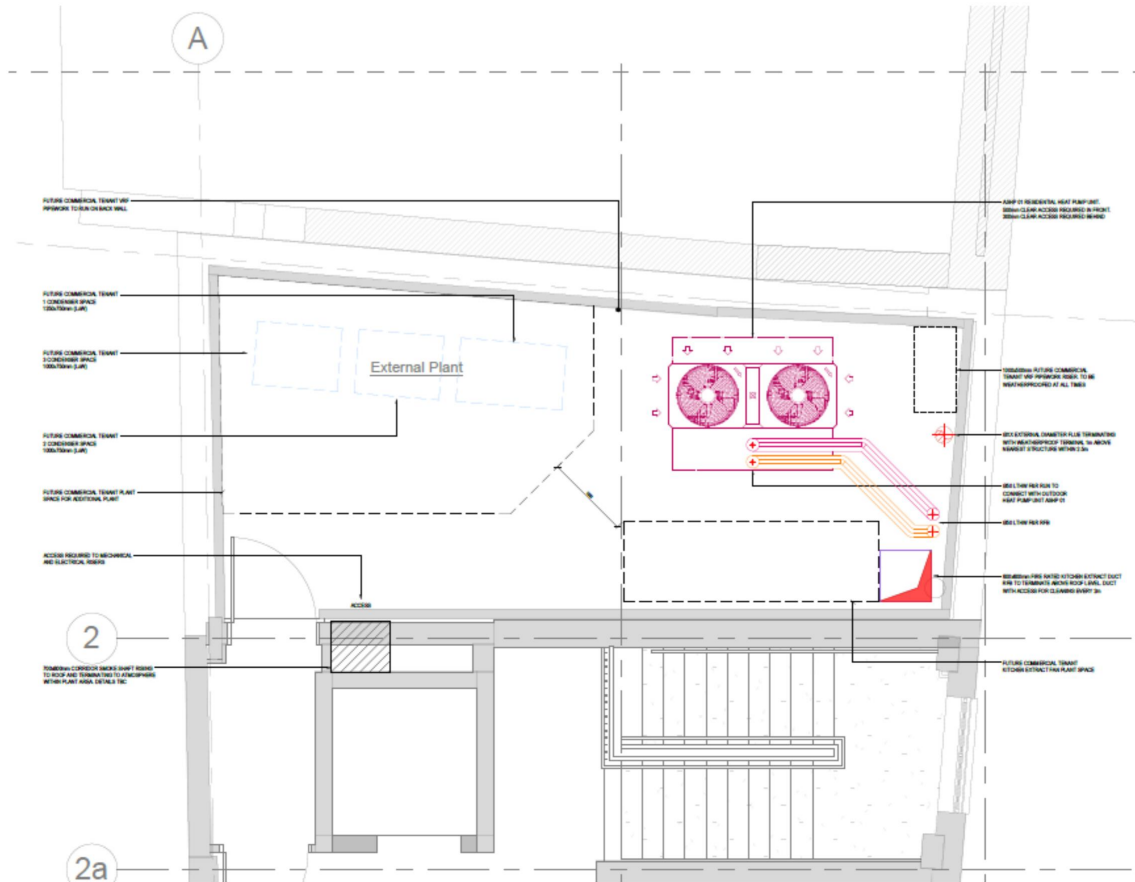


Figure 6 Proposed level 3 external plant layout

The ASHP is to be a Mitsubishi CAHV-P500YB-HPB which the manufacturer's data indicates has a sound pressure level of 59 dB at 1 m.

The tenant plant items are not yet selected.

There are two internally located extract fans from the boiler room and cleaner's cupboard on the ground floor which terminate on the internal courtyard facade. These are to be Nuaire models ILMEC 125 and ILMEC 100 which are understood to have sound pressure levels at 3 m of 51 dB and 54 dB, respectively.

The new flats are to have mechanical ventilation with heat recovery (MVHR) units with intake and exhaust ducts terminating on the south and east facades.

7.3 Plant noise assessment

The nearest neighbouring residential windows are on level 3 and level 4 of the adjacent flats at 64 South Street, approximately 9 m away to the north of the level 3 plant area. These are completely screened by the walls around the plant area and the edge of the adjacent building.

Based on the noise levels stated above, the distance to the nearest neighbouring premises, and the screening provided by the intervening structure, the noise level outside the nearest neighbouring premises from the proposed ASHP is predicted to be L_{Aeq} 26 dB. This meets both the day and night time plant noise limits set out in Section 7.1.

Tenant plant will need to be selected so that it operates at no more than L_{Aeq} 60 dB at 1 m from each unit to meet the night time plant noise limits at the adjacent properties given in Table 3.

The two small extract fans will be sufficiently far away and screened from the neighbouring properties.

Noise from the MVHR units in each flat will need to be attenuated. Attenuators onto the atmospheric connections will need to be minimum 600 mm long.

Appendix A

Survey details

Equipment

The unattended and attended noise measurements were taken using a 01dB Cube sound level meter and a Brüel & Kjær 2250 sound level meter, respectively.

Calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	2250/3011195	Brüel & Kjær	21 Mar 21	UCRT19/1358, UCRT19/1356
Microphone	4189/3086746	Brüel & Kjær	21 Mar 21	UCRT19/1358, UCRT19/1356
Pre-amp	ZC0032/25565	Brüel & Kjær	21 Mar 21	UCRT19/1358, UCRT19/1356
Calibrator	4231/3017676	Brüel & Kjær	21 Mar 21	UCRT19/1355
Sound level meter	CUBE/11021	01dB	30 Nov 20	TCRT17/1952
Microphone	CUBE/1605109	01dB	30 Nov 20	TCRT17/1952
Pre-amp	40CD/255759	GRAS	30 Nov 20	TCRT18/1952
Calibrator	CAL31/89190	01dB	12 Dec 21	135482

Calibration of the meters used for the measurements is traceable to national standards. Calibration certificates for the sound level meters used in this survey are available upon request.

Calibration checks were carried out on the meters and their measurement chains at the beginning and end of the survey. No significant calibration deviation occurred.

Noise indices

Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a fast time weighting.
- $L_{ASmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period, T, with a slow time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures*.

Weather conditions

During the attended noise measurements, the weather was sunny with intermittent rain showers.

During the unattended noise measurements, weather reports for the area indicated that temperatures varied between 8°C at night and 14°C during the day, and the wind speed was less than 6 m/s. Rain showers did occur during the survey period but there were sufficient dry periods to obtain representative background sound readings.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location L

66-68 South Street, Romford
Results of noise logging survey at position 'L'
9 October 2020 to 16 October 2020

