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The County Hotel, Bloomsbury
Splendid Hotel Group

Noise Impact Assessment

Revision 00

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Project Particulars

Client Name: Splendid Hotel Group

Project Name: The County Hotel, Bloomsbury

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1 Introduction

- 1.1 Refurbishment and extension works at The County Hotel, Bloomsbury ('The Site') are proposed. These works will involve the installation of new building services equipment. As this equipment has the potential to disturb nearby noise-sensitive neighbours, a noise impact assessment has been undertaken. This report presents the noise impact assessment and is based on the findings of a noise survey undertaken at the site.

2 Noise Survey

2.1 Site Description

2.1.1 The County Hotel is located on the A4200 (Upper Woburn Place) in Bloomsbury, within the London Borough of Camden. Immediately to the north of the property is Woburn Walk, a pedestrianised street with the Ambassadors Bloomsbury hotel beyond.

2.1.2 The nearest residential neighbours are terraced dwellings at 4-18 Woburn Walk to the north-east; the Ambassadors Bloomsbury hotel on the opposite side of Woburn Walk to the north-west; and Endsleigh Court hotel on the opposite side of Upper Woburn Place (A4200) to the south-west.

2.1.3 The property is subject to the noise from road traffic on the A4200 and commercial/pedestrian activity on Woburn Walk. An aerial photograph showing the property and surrounding area is presented in Figure 2.1.

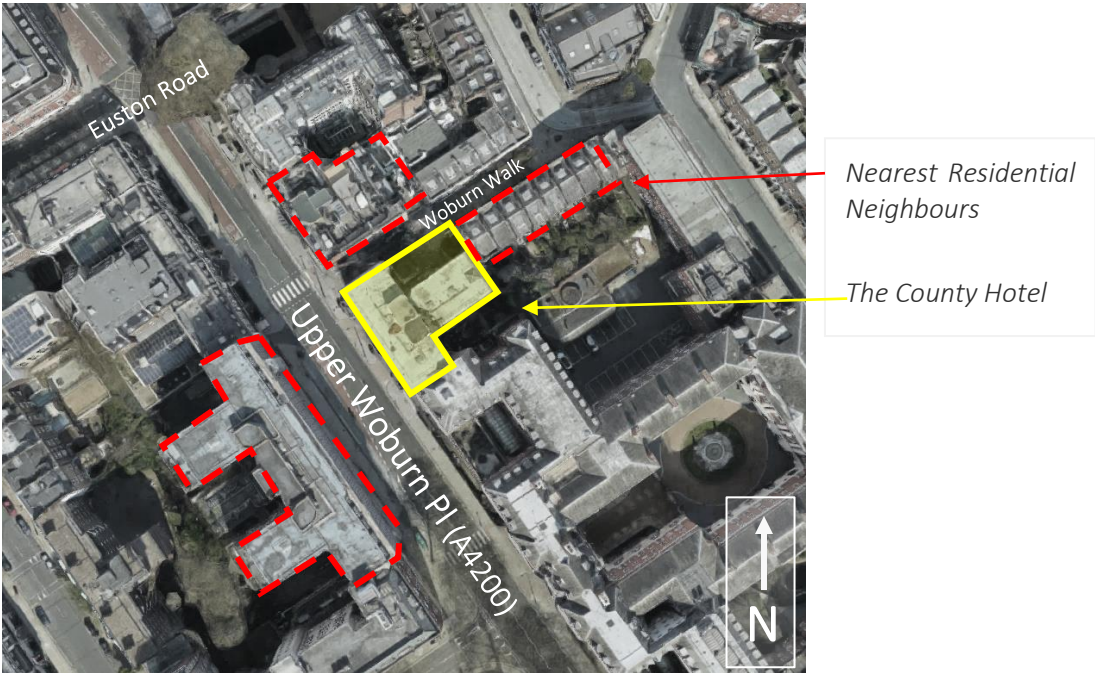


Figure 2.1 The County Hotel site, nearby roads, and nearest residential neighbours (image courtesy of Google)

2.2 Measurement methodology

- 2.2.1 Continuous, unattended noise level measurements were conducted at two locations on the property’s roof; at the front (west) of the property overlooking the A4200 and at the rear (east) of the property overlooking the neighbouring properties.
- 2.2.2 At the front location, the measurement microphone was positioned about 3m above the roof and 1m in from the roof edge. At the rear location, the measurement microphone was positioned about 1m above the roof and about 0.3m from the roof edge. Both measurement positions are shown in Figure 2.2.

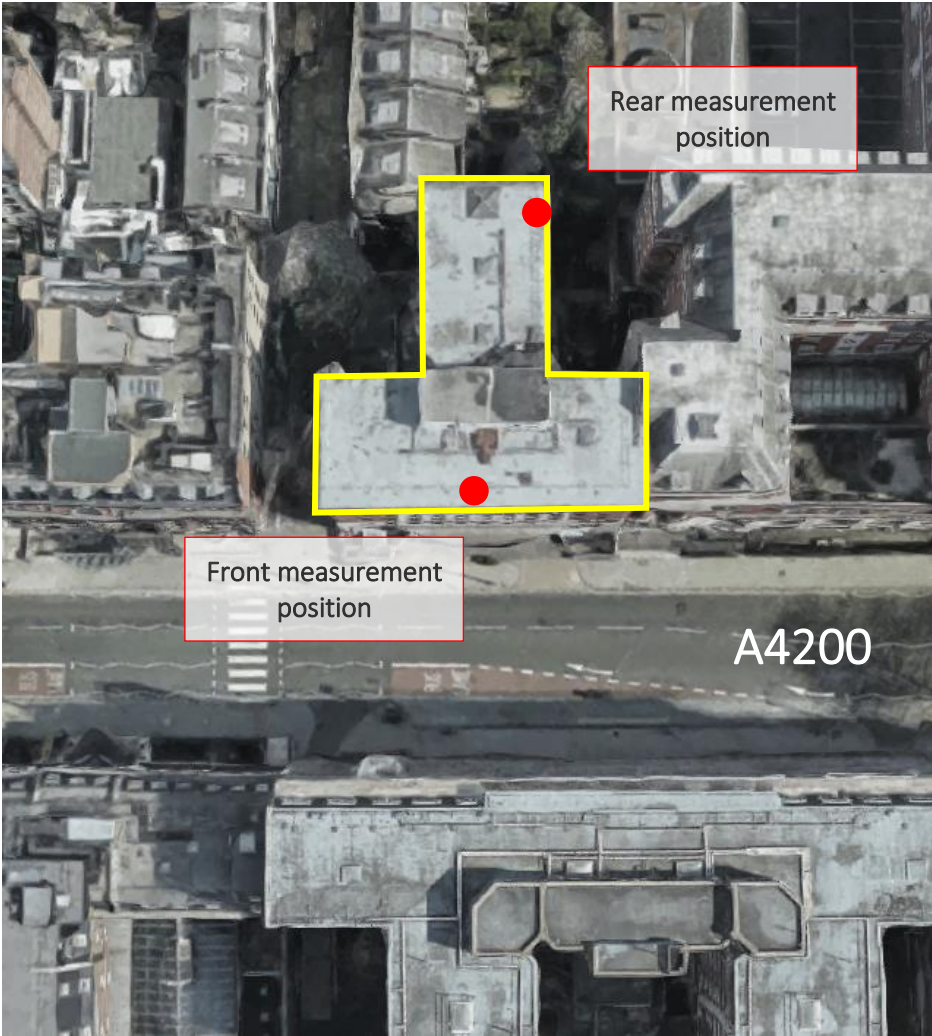


Figure 2.2 Measurement positions at rooftop level (image courtesy of Google)

- 2.2.3 Both measurement microphones were considered to be in free-field conditions and to provide data representative of the prevailing noise levels at the nearest neighbour’s windows.

2.2.4 Measurements were undertaken at the front position from 11th to 12th January, and at the rear position from 12th to 13th January, 2022. Statistical and spectral data were recorded continuously throughout the measurement period in 15-minute samples.

2.2.5 The following equipment was used for the survey:

Equipment	Type	Serial No.
Norsonic 139	Environmental noise meter	1392774
Norsonic 1218	Microphone protection system	12182561
Brüel and Kjær 4231	Calibrator	2291098

Table 2.1 Equipment used for the noise survey

2.2.6 The calibration of the sound level meter and associated microphone was checked prior to and on completion of the survey in accordance with recommended practice. No significant drift in calibration occurred during the survey. The accuracy of the calibrator can be traced to National Physical Laboratory standards.

2.2.7 The weather conditions during the survey were dry. Weather data for the survey period, recorded at Charing Cross, around 1.6km to the south, suggest that average wind speeds were below 4.5m/s and rainfall was negligible. This data can be found at: <https://www.wunderground.com/dashboard/pws/ILONDO440/graph/2022-01-16/2022-01-16/weekly>. The weather is not considered to have had an adverse impact on the results of the survey.

2.3 Measurement results

2.3.1 Graphs showing the noise level history for the measurements are given in Figures 2.3 and 2.4.

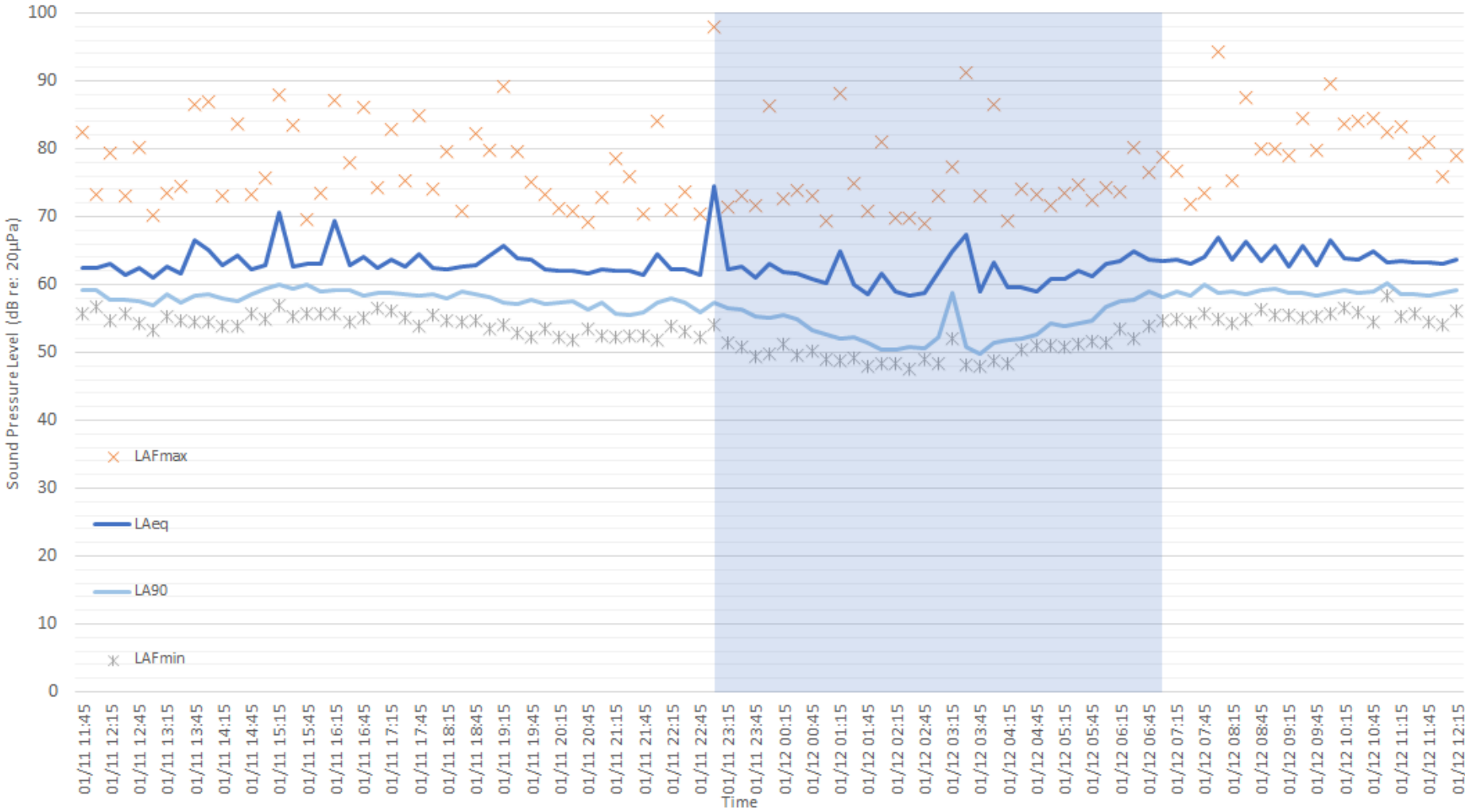


Figure 2.3 Sound level history measured at the front of The County Hotel

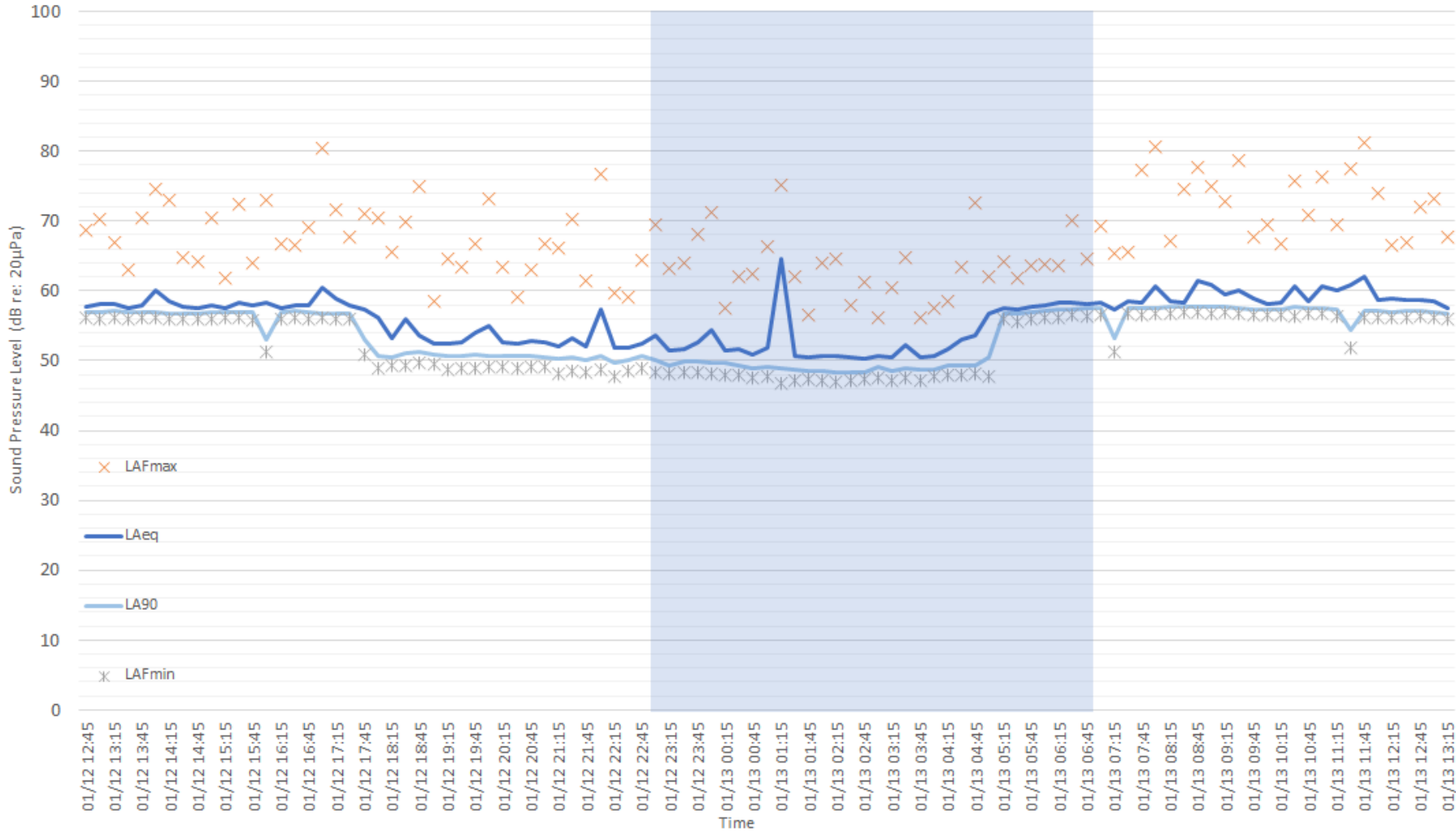


Figure 2.4 Sound level history measured at the rear of The County Hotel

2.3.2 The lowest background noise levels measured during the daytime, evening, and night-time are set down in Table 2.2.

Time Period	Background noise level, front position	Background noise level, rear position
Daytime (07:00-19:00)	57 dB	51 dB
Evening (19:00-23:00)	56 dB	50 dB
Night-time (23:00-07:00)	50 dB	48 dB

All background noise level values are $L_{A90,15min}$ sound pressure levels, re: 20µPa

Table 2.2 Noise level summary by time and location

2.4 Commentary

- 2.4.1 Ambient noise levels at the site are predominantly influenced by neighbouring building services equipment and traffic noise.
- 2.4.2 At the rear of the building, there is a steady noise from nearby mechanical equipment between the hours of 0500 and 1730. When this is switched off, there is a clear (~6 dBA) drop in background sound level. The lower level is steady, indicating other plant noise remaining.
- 2.4.3 At the front position, the dominant noise source is road traffic. This does not decrease significantly overnight.

3 Assessment Methodology

3.1 Local Authority criteria

- 3.1.1 The Local Authority's planning policies are set out in the *Camden Local Plan 2017*. Policy A4 of the Local Plan addresses noise and vibration and reads:

"The Council will seek to ensure that noise and vibration is controlled and managed.

Development should have regard to Camden's Noise and Vibration Thresholds (Appendix 3). We will not grant planning permission for: a. development likely to generate unacceptable noise and vibration impacts; or b. development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses.

We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development."

- 3.1.2 Appendix 3 of the Local Plan, mentioned in Policy A4, specifies relevant noise emission limits. The following passage sets out the expected methodology for noise impact assessments.

"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."

- 3.1.3 Tables within Appendix 3 specify noise emission limits applicable to different development types. Of these, *Table C* applies to rooftop plant introduced at The County Hotel and is shown below:

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings**	Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings**	Outside bedroom window (façade)	Night	'Rating level' 10dB* below background and no events exceeding 57dBL _{Amax}	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L _{Amax}	'Rating level' greater than 5dB above background and/or events exceeding 88dBL _{Amax}

Figure 3.1 Camden Local Plan, Appendix 3: Table C

3.1.4 The Green, Amber, and Red categories used in Table C draw from guidance given in the National Planning Policy Framework, evaluating noise in terms of “effect levels”, as shown below in Table 3.1:

Category	Definition
Green	Lowest Observed Adverse Effect Level (LOAEL) where noise is considered to be at an acceptable level.
Amber	Lowest to Significant Observed Adverse Effect Level (LOAEL – SOAEL) where noise is observed to have an adverse effect but which may be considered acceptable.
Red	Significant Observed Adverse Effect Level (SOAEL) where noise is observed to have a significant adverse effect.

Table 3.1 'Effect levels' described in the National Planning Policy Framework and Noise Policy Statement for England

3.2 Proposed assessment methodology: BS 4142:2014

3.2.1 BS 4142:2014 *Methods for rating and assessing industrial and commercial sound*, referred to within the planning guidance, presents a methodology for comparing the noise level of the new source (the specific sound level) with that of the existing background noise level, in the absence of the new source (the background sound level) and establishing the likely impact of the noise.

- 3.2.2 The methodology requires consideration be given to all aspects of the assessment process and accounts for unusual acoustic features such as tonal, impulsive, or intermittency characteristics of the noise by the addition of various decibel corrections to the specific sound level. The corrected specific sound level is the rating level.
- 3.2.3 Guidance is given within The Standard regarding the magnitude of impact that can be predicted. This is based on the difference between the rating level and the background level, as follows:
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending upon the context.
 - A difference of around +5dB or more is likely to be an indication of an adverse impact, depending upon the context.
 - Where the rating level does not exceed the background sound level, this is an indication of a low impact, depending upon the context.

3.3 Proposed assessment criterion

- 3.3.1 In line with the requirements of the planning authority for commercial noise-generating developments, the methodology within BS 4142 will be adopted, and the limit for the rating level will be set at 10 dB below the background sound level.
- 3.3.2 Noise emission from building services equipment associated with the intended works will be controlled so that the rating level of any plant noise does not exceed this limit.

4 Noise Impact Assessment

4.1 Introduction

4.1.1 To assess the potential noise impact from building services plant associated with the proposed works, consideration has been given to the objective requirements of Camden Council, alongside the type and location of the plant and location of noise-sensitive neighbours.

4.2 Noise-sensitive neighbours

4.2.1 The nearest affected residential neighbours are taken to be the uppermost windows of the Ambassadors Bloomsbury hotel and Endsleigh Court. These are highlighted in Figure 4.1.

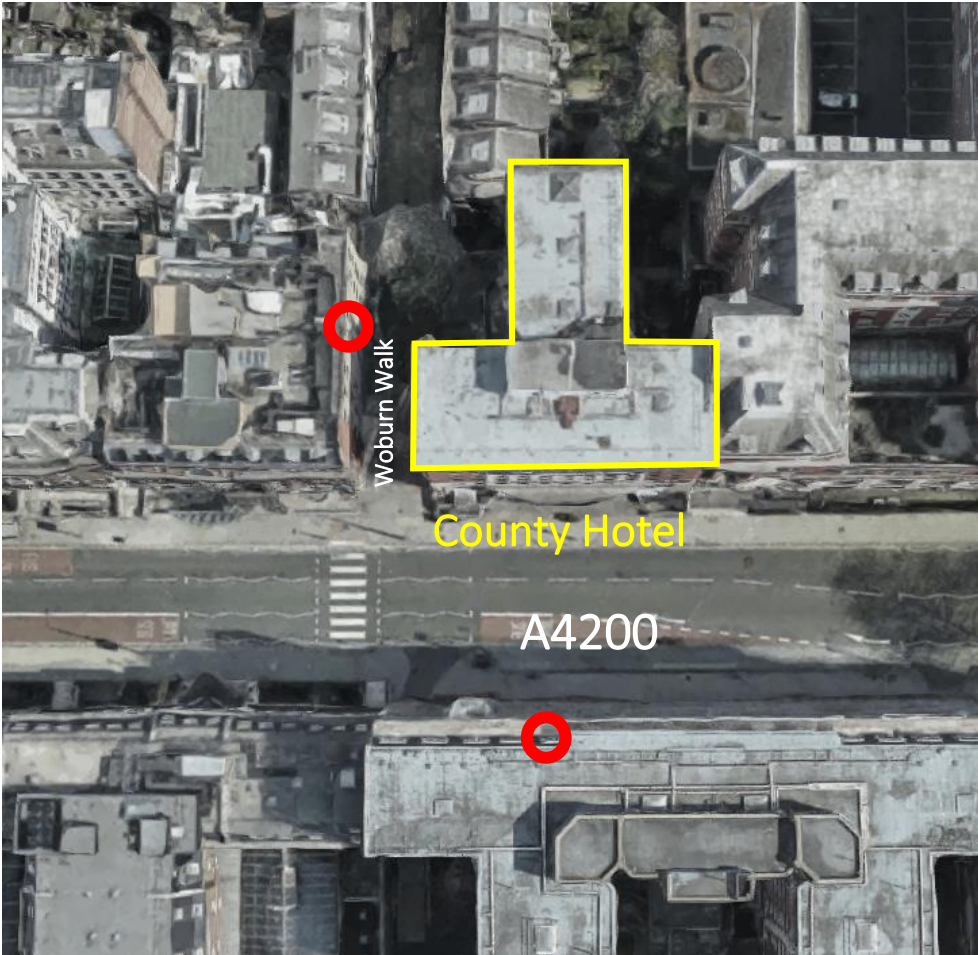


Figure 4.1 Aerial view showing The County's roof (yellow) and nearest receivers (red). Courtesy: Google Maps

4.2.2 Other residential neighbours on Woburn Walk are screened from potential plant noise by the building itself and so have less potential to be disturbed by plant noise.

4.3 Equipment proposals

4.3.1 The plant associated with the new works consists of 13 double-fan VRF units (Mitsubishi PURY-P400YNW-A(-BS)), providing cooling, and 3 air source heat pump (ASHP) units (Mitsubishi QAHV-N560YA-HPB), providing hot water.

4.3.2 Manufacturer’s data for the specified products are presented in Figures 4.2 and 4.3.

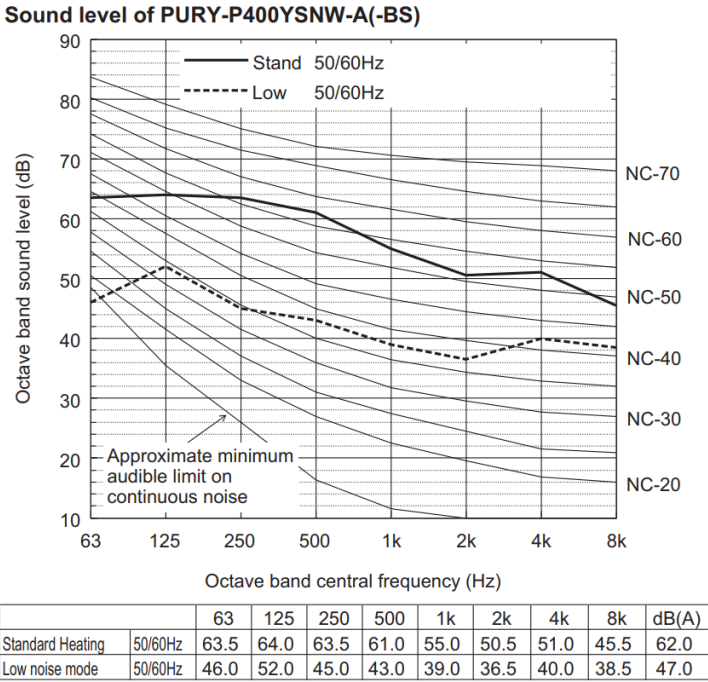


Figure 4.2 Manufacturer-provided sound pressure level spectrum, measured at 1m, for the VRF units

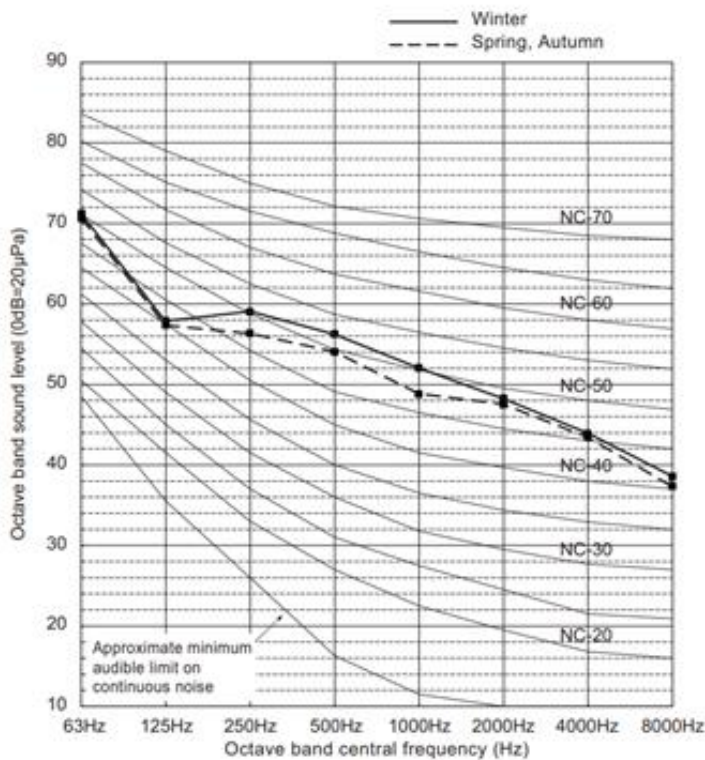


Figure 4.3 Manufacturer-provided sound pressure level spectrum, measured at 1m, for the ASHP units

4.3.3 The equipment is to be located on the roof of the property. A solid impermeate screen of height 2m around the equipment will provide acoustic screening to neighbouring properties. The proposed roof layout is shown in Figure 4.4.



Figure 4.4 Roof plan, showing proposed VRF and ASHP units and screen (orange)

4.4 Operating condition

- 4.4.1 The equipment has been selected to meet expected peak daytime cooling demand, during summer. It is therefore expected that it will operate with reduced capacity at all other times.
- 4.4.2 The expected ‘normal’ operating condition will involve all VRF units operating at 75% duty, one hot water pump unused and the other two at 100%. Manufacturer’s data for the selected VRF units, provided in Appendix A, shows a 10dBA reduction in noise emissions when operating at 75% capacity.

4.5 Predicted specific noise levels

- 4.5.1 Specific noise levels are predicted to be as follows:

Assessment Location	Peak demand specific noise level, $L_{Aeq,Tr}$	Reduced demand specific noise level, dB $L_{Aeq,Tr}$
Ambassadors hotel	45 dB	36 dB
Endsleigh court	38 dB	29 dB

Table 4.1 Calculated specific noise levels at nearest sensitive receivers

4.6 Predicted rating levels

- 4.6.1 In accordance with the methodology in BS 4142, the rating level for the plant must be compared with the prevailing background sound level. The Standard provides guidance on how the rating level is established to account for any acoustic features that may be present in the equipment noise. If such features are considered to be present, various corrections are applied to the specific sound level to give a rating level.
- 4.6.2 A correction of up to 6dB could be added for tonality. The noise associated with the equipment is not typically considered to be tonal. However, there is a small possibility that a tonal feature may be perceived by neighbours, so a correction of +2dB has been applied to each unit.
- 4.6.3 A correction can be applied for intermittency and/or impulsivity. However, the equipment is expected to operate for long periods and does not have significant stop/start noise, so no correction for these have been applied.

4.6.4 Subjective observations conclude that the character of the equipment noise is not expected to be distinctive against the prevailing background noise and so a correction for other sound characteristics has not been applied.

4.6.5 The rating level will therefore be 2dB higher than the specific sound level.

4.7 Background sound levels

4.7.1 The background sound levels have been taken to be the same as the lowest background sound levels ($L_{A90,15min}$) measured during the survey, as outlined in Section 2.3.

4.8 Predicted noise impact

4.8.1 It should be appreciated that summer demand is naturally higher during the day, so it is highly unlikely that the plant will operate at 100% capacity overnight. For this reason, the peak demand level will be assessed during the daytime and evening only.

4.8.2 The peak capacity rating level at the window of Endsleigh Court is 40 dB L_{Ar} . This is 10 dB below the night-time background sound level. The impact at Endsleigh Court is therefore expected to be low, and within the Green (LOAEL) category, at all times.

4.8.3 At the nearest window of Ambassadors Hotel, the rating level of the plant is 47dB L_{Ar} when all of the equipment is operating at full duty. At all other times, the rating level will be controlled below 38 dB L_{Ar} . The predicted impact of these rating levels are summarised below.

Time Period	Background Level <small>$L_{A90,15min}$</small>	Difference <small>(rating level subtract background level)</small>	Effect Level Category
Daytime (peak)	51 dB	-4 dB	Amber
Evening (peak)	50 dB	-3 dB	Amber
Daytime	51 dB	-13 dB	Green
Evening	50 dB	-12 dB	Green
Night-time	48 dB	-10 dB	Green

Table 4.2 Summary of noise impact at the window of the Ambassadors Bloomsbury Hotel

4.8.4 Due to the reduced noise impact, it is proposed that the specified operating condition should be set as the upper limit outside of peak demand times.

4.9 Context

4.9.1 The acoustic environment at the site is dominated by traffic noise and noise from building services plant belonging to the neighbours. The proposed rooftop plant is expected to generate noise of a very similar character to the equipment already present.

4.9.2 As detailed in Section 2.4, there is a ~6dB increase in background sound level arising from an individual piece of existing nearby equipment. During the survey, this was operational for ten out of twelve daytime hours.

4.9.3 It is reasonable to expect that for a significant portion of the day, the background sound level at neighbouring windows may be up to 6dB higher than the level used for this assessment. During this time, the rating level of The County Hotel's plant at peak capacity will be 10 dB below the background level, meeting the Green (LOAEL) criterion.

4.10 Uncertainty

4.10.1 While measures have been taken to maximise accuracy, there is a degree of uncertainty in measurements and calculations. Where uncertainty is unavoidable, a cautious approach has been taken.

4.10.2 To account for variance in noise levels from traffic, the background level ($L_{A90,15min}$) has been taken as the lowest measured L_{A90} value during the relevant time period, rather than a level obtained by statistical analysis as outlined in BS 4142:2014.

4.10.3 Where physical distances have been measured using software, such as between sources and receivers, values have been rounded to err on the side of caution.

5 Conclusions

- 5.1.1 An assessment has been undertaken of the expected noise impact from rooftop equipment which will be introduced at The County Hotel, Bloomsbury, London.
- 5.1.2 The rating level of plant noise is predicted to remain at least 10 dB below the background sound level during normal operation and at least 1 dB below the background sound level when all of the plant is operating simultaneously at maximum duty. This maximum duty scenario is very unlikely to occur in practice.
- 5.1.3 It is concluded that, when operating at or below the proposed duty limit, the plant at The County Hotel is predicted to have the *Lowest Observable Adverse Effect Level* at all applicable noise-sensitive receivers and therefore comply with the Local Authority's anticipated conditions.

6 Appendices

6.1 Appendix A

OUTDOOR UNITS		PURY-P200YNW-A1	PURY-P250YNW-A1	PURY-P300YNW-A1	PURY-P350YNW-A1	PURY-P400YNW-A1	PURY-P400YSNW-A1
CAPACITY (kW)	Heating (nominal)	25.0	31.5	37.5	45.0	50.0	50.0
	Cooling (nominal)	22.4	28.0	33.5	40.0	45.0	45.0
	High Performance Heating (UK)	25.0	31.5	35.6	42.8	45.0	50.0
	COP Priority Heating (UK)	22.8	28.7	34.1	41.0	43.0	45.5
	Cooling (UK)	20.1	25.1	30.0	35.8	40.3	40.3
POWER INPUT (kW)	Heating (nominal)	5.33	7.42	9.54	11.13	13.77	10.98
	Cooling (nominal)	5.27	7.25	8.98	10.98	14.61	10.92
	High Performance Heating (UK)	6.72	9.35	12.69	14.80	15.56	14.05
	COP Priority Heating (UK)	5.33	7.42	9.54	11.13	13.36	10.98
	Cooling (UK)	3.06	4.21	5.21	6.37	9.35	6.33
COP / EER (nominal)	4.69 / 4.25	4.24 / 3.86	3.93 / 3.73	4.04 / 3.64	3.63 / 3.08	4.55 / 4.12	
MAX No. OF CONNECTABLE INDOOR UNITS		20	25	30	35	40	40
MAX CONNECTABLE CAPACITY		50~150% OU Capacity	50~150% OU Capacity	50~150% OU Capacity	50~150% OU Capacity	50~150% OU Capacity	50~150% OU Capacity
AIRFLOW (m³/min)	High	170	185	240	250	315	170 / 170
PIPE SIZE mm (in)	Gas	19.05 (3/4")	22.2 (7/8")	22.2 (7/8")	28.58 (1-1/8")	28.58 (1-1/8")	28.58 (1-1/8")
	Liquid	15.88 (5/8")	19.05 (3/4")	19.05 (3/4")	19.05 (3/4")	22.2 (7/8")	22.2 (7/8")
SOUND PRESSURE LEVEL (dBA) @ 1m	Heating / Cooling	59.0 / 59.0	61.0 / 60.5	67.0 / 61.0	64.0 / 62.5	69.0 / 65.0	62.0 / 62.0
SOUND POWER LEVEL (dBA) @ 100% Capacity	Heating / Cooling	78.0 / 76.0	80.0 / 78.0	86.0 / 80.0	83.0 / 81.0	88.0 / 83.0	81.0 / 79.0
SOUND POWER LEVEL (dBA) @ 90% Capacity	Heating / Cooling	74.5 / 71.0	76.0 / 73.5	78.5 / 74.5	81.0 / 76.0	81.0 / 77.0	77.5 / 74.0
SOUND POWER LEVEL (dBA) @ 75% Capacity	Heating / Cooling	71.5 / 66.5	74.5 / 69.5	74.5 / 70.5	77.0 / 73.0	75.0 / 73.0	74.5 / 69.5
WEIGHT (kg)		214	223	225	269	269	214 + 214
DIMENSIONS (mm)	Width	920	920	920	1240	1240	920 + 920
	Depth	740	740	740	740	740	740
	Height	1858	1858	1858	1858	1858	1858
(1798mm without legs)							
ELECTRICAL SUPPLY ¹		380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz	380-415v, 50Hz
PHASE ¹		Three	Three	Three	Three	Three	Three
STARTING CURRENT (A) ¹		8	8	8	8	8	8
NOMINAL SYSTEM RUNNING CURRENT (A) ¹	Heating / Cooling [MAX]	8.5 / 8.4 [16.1]	11.8 / 11.6 [17.8]	15.2 / 14.4 [22.7]	17.8 / 17.6 [27.6]	22.0 / 23.4 [35.1]	17.6 / 17.5 [16.1 + 16.1]
GUARANTEED OPERATING RANGE (°C)	Heating / Cooling	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52	-20~-15.5 / -5~-52
FUSE RATING (MCB sizes BS EN 60947-2) - (A) ¹		1 x 20	1 x 20	1 x 25	1 x 32	1 x 40	1 x 20 / 1 x 20
MAINS CABLE No. Cores ¹		4 + earth	4 + earth	4 + earth	4 + earth	4 + earth	4 + earth / 4 + earth
CHARGE REFRIGERANT (kg) / CO ₂ EQUIVALENT (t) R410A (GWP 2088)		5.2 / 10.9	5.2 / 10.9	5.2 / 10.9	8 / 16.7	8 / 16.7	10.4 / 21.7
MAX ADDITIONAL REFRIGERANT (kg) / CO ₂ EQUIVALENT (t) R410A (GWP 2088)		31.8 / 66.4	37.8 / 78.9	37.8 / 78.9	41.3 / 86.2	47.3 / 98.8	60.6 / 126.5

Figure 6.1 Manufacturer's data showing reduction in sound power level with reduced capacity

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