ACAACOUSTICS

Acoustic assessment of proposed new mechanical equipment at Com Laude, 28-30 Little Russell Street, London

Report Reference: 180201-R001

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Client:	Macair FMI Limited
Report Reference:	180201-R001

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0. SUMMARY

- ACA Acoustics Limited have been commissioned to assess noise emissions from a proposed new air-conditioning condensing unit at 28-30 Little Russell Street, London

- The assessment is required to provide evidence that noise emissions from the equipment will not be detrimental to the amenity of nearby noise sensitive properties and complies with the requirements of London Borough of Camden Council. London Borough of Camden Council's requirement, applicable at this site, is that the rating level of sound from the equipment shall ideally not exceed 10dB below the existing background LA90 outside nearby noise-sensitive properties.

- A sound level survey has been undertaken on the roof of the site in a position equivalent to the nearest noise sensitive window. Representative background sound level outside the closest noise-sensitive properties, measured during operating times of the new equipment, is LAF90 54dB. The rating level limit for the new equipment to outside nearest residential noise-sensitive windows should therefore ideally not exceed a level around 44dBA.

- While on site ACA Acoustics identified the closest residential properties to the new equipment as rear windows of student apartments at 5th floor level overlooking Gilbert Place. Current background sound levels comprise primarily of general traffic noise and existing mechanical services equipment

- Calculations using manufacturer's sound level data for the new mechanical equipment, confirm that the rating level for the new plant operating will be not exceed 42dBA and should not be detrimental to the amenity of nearby residents.

1. INTRODUCTION

A new air conditioning condensing unit is proposed at 28-30 Little Russell Street, London to serve offices at ground floor level.

The Planning Department of London Borough of Camden Council requires information in the form of an acoustic report regarding noise from the equipment. The report is required to demonstrate that noise emissions from the plant complies with London Borough of Camden Council's acoustic requirements applicable for mechanical services equipment affecting nearby noise-sensitive properties.

ACA Acoustics Limited has been commissioned by the client to carry out an assessment of noise from the new equipment and, where necessary, make recommendation to reduce sound levels from the equipment.

This report presents results of the sound level survey and assessment.

2. LONDON BOROUGH OF CAMDEN COUNCIL'S ACOUSTIC REQUIREMENTS

London Borough of Camden Council's policies relating to noise are set out in Appendix 2 of the Local Plan, which provides detailed noise thresholds to determine the potential acoustic impact of new developments.

In summary, London Borough of Camden requires an assessment to be carried out in accordance with British Standard 4142:2014 and the results compared against noise-related conditions set out in Table C of the Appendix, as shown in Table 1 below:

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 57dB LAFmax	Rating level between 9dB below and 5dB above background or noise events between 57dB and 88dB LAFmax	Rating level greater than 5dB above background and/or events exceeding 88dB LAFmax

Table 1: London Borough of Camden Noise Limits

The scope of BS 4142:2014 advises that "*this British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature … to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident*". BS 4142:2014 is commonly used to assess the potential for loss of amenity due to noise from mechanical services equipment and is considered appropriate for this application.

The assessment method of BS 4142:2014 corrects the specific sound level from the source under investigation to account for characteristics that could make the sound more intrusive to obtain a rating level. This rating level is compared against the prevailing background sound level outside the noise-sensitive property. Section 11 of BS 4142:2014 provides a commentary of the assessment result and advises that:

a) The greater the difference between the rating level and the background sound level, the greater the magnitude of the impact;
b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
c) A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context;
d) The lower the rating level is to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Assessment result criteria shown within Appendix A of Camden's Local Plan are significantly more stringent than those set out in the British Standard and can therefore be taken to ensure a robust assessment. Compliance with the "Green" criteria or lower half of the "Amber" range will generally ensure no loss of amenity to nearby residents, albeit, the context of the development must also be considered on a project-by-project basis which can alter the initial assessment result. This is discussed in more detail in Section 4.

3. REVIEW OF SITE LOCATION & DEVELOPMENT PROPOSALS

The development site is at 28-30 Little Russell Street, London, WC1A 2HN.

An application is to be submitted to include the installation of a new air-conditioning condensing unit, details of which can be found in section 5 of this report. No layout drawings are available showing the exact location of the proposed equipment, however it is the understanding of ACA Acoustics that the new unit is to be placed with the existing mechanical equipment on the roof.

During ACA Acoustics' visits to site, closest noise-sensitive properties were identified to be student flats at 5th floor level overlooking Gilbert Place, directly opposite 28-30 Little Russell Street. The nearest of these windows is approximately 14 metres from the new equipment.

A map showing closest noise-sensitive properties, proposed equipment location, and survey position is provided in Figure 1 below.

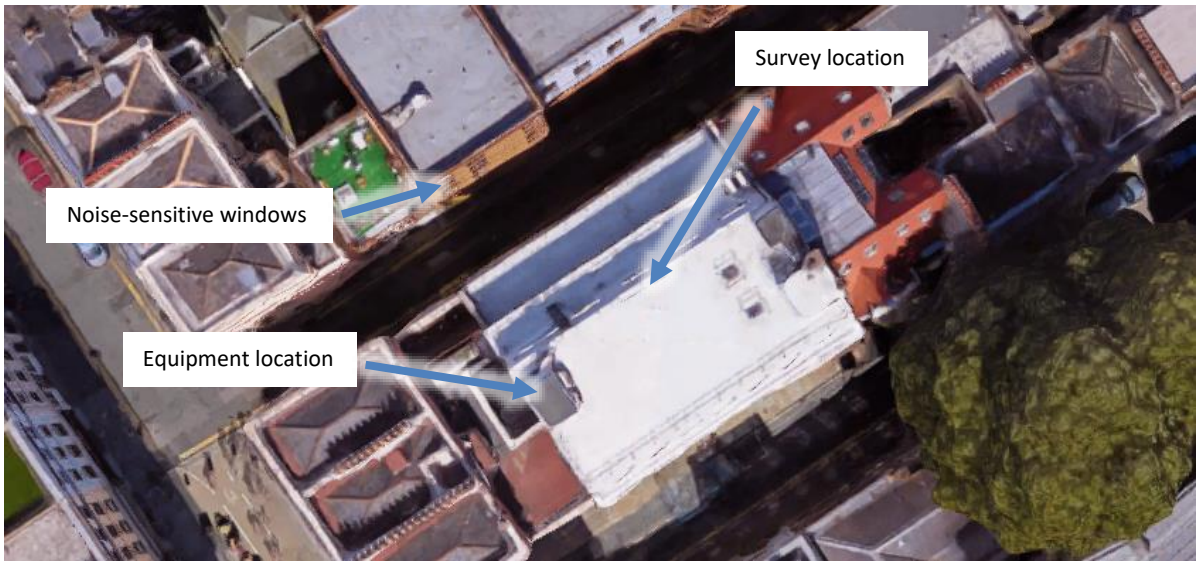


Figure 1: Map of local area [Available: google.com/maps]

4. SOUND LEVEL SURVEY

To assess sound levels from the mechanical services equipment in accordance with London Borough of Camden Council's requirements, it is necessary to establish representative background sound levels at the nearest noise-sensitive properties. Details of the background sound level survey carried out by ACA Acoustics Limited are provided below.

4.1 Sound Level Survey Measurement and Assessment Procedure

The background sound level survey measurement position was selected on the roof of the site overlooking Gilbert Place; a position equivalent to the nearest noise sensitive properties. The existing acoustic climate is dominated by general traffic noise and existing mechanical services equipment.

An unattended survey was undertaken over a nominally 24-hour period between Wednesday 7th and Thursday 8th February 2018. During the survey, the weather was dry and calm. The survey was conducted typically following procedures set out in BS 4142:2014 and BS 7445 Parts 1 to 3.

The following equipment was used during the noise survey; the sound level meter was calibrated before the survey and checked after with no change noted:

Equipment	Serial Number	Calibration Certificate
NTi Audio sound level meter type XL2 Class 1 complete with weatherproof and lockable outdoor environmental kit	A2A-06294-E0	160915
Castle calibrator type 4226. Compliant to IEC 60942-1:2003 (Calibrated to a reference traceable to NIST)	1551589	044039/68679

Table 2: Equipment used

4.2 Sound Level Survey Measurement Results

As the new air-conditioning condenser is to serve offices, an assumed 'worst case' operational period of 07:00 – 20:00 is considered reasonable and is used as basis for the assessment. The lowest LA90 background sound level measured over this period is confirmed in Table 3 below. Measured sound levels are provided in graphical format on the following page.

Equipment	Operational Period	Lowest Background LA90
Air-conditioning condensers	07:00 – 20:00	54dB

Table 3: Summary sound level survey results

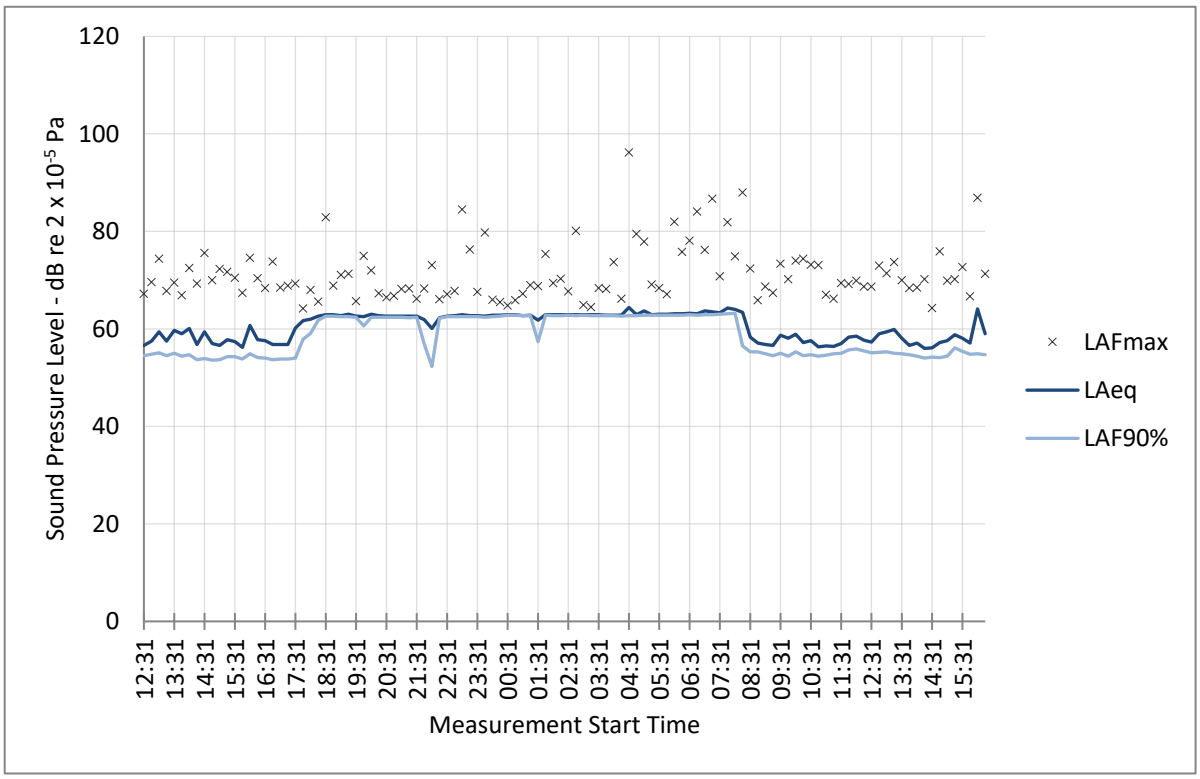


Figure 2: Sound level survey results

A noise source was measured switching on at around 18:00 and runs almost continuously overnight, until around 08:00. As the source was not running during both visits to site, this source remains unidentified. For equipment serving offices, we are most interested in sound levels measured during the day and so this has negligible impact on the assessment, and in fact means that a later or earlier operating time would have no effect on the measured representative background sound level.

5. ACOUSTIC ASSESSMENT

The proposal is for one new air-conditioning condensing unit. Confirmation of the equipment model used in the assessment is provided in Table 4 below.

Description	Equipment Model	Quantity
Condensing unit (CU1)	Panasonic U-10MF2E8	1

Table 4: Proposed new mechanical equipment used in the assessment

Sound emissions from the mechanical equipment can be determined from manufacturer's published data. Note that alterations in equipment selection may be possible, so long as sound power levels for the new item does not exceed levels used in the calculation model.

A computer model has been used to calculate the noise contribution from the proposed equipment to outside nearest noise-sensitive windows. The model uses the assessment method set out in ISO 9613-2:1996.

The cumulative calculated specific sound level from the plant to outside the potential closest residential windows, along with comparison against the measured background sound level and Camden's criteria is shown in Table 5. Summary print-outs from the calculation models are included in Appendix A.

Equipment	Calculated Equipment Sound Level
CU1	39dBA

Table 5: Summary assessment results

Assessment of the calculated specific sound level in accordance with BS 4142:2014 is provided in Table 6 on the following page.

Table 6: BS 4142:2014 Assessment

Description		Relevant Clause	Commentary
Calculated specific sound level to closest noise-sensitive windows	LAeq 39dB	7.1 7.3.6	Refer calculation sheets in Appendix A.
Background sound level	LA90 54dB	8.1.3 8.3	Representative background sound level measured between 07:00 – 20:00
Acoustic feature correction	+3dB	9.2	Calculations do not indicate any tonal element however the condensing unit is likely to operate intermittently, therefore, in accordance with Section 9.2 a +3dB correction is applied.
Rating level	LAr 42dB		
Excess of rating level over background sound level	**-12dB**	**11**	**Assessment indicates negligible likelihood of adverse impact**

Table 6: BS 4142:2014 Assessment

Table 6 shows that the overall rating level of the proposed new plant will be at least 12dBA below the background LA90 sound level outside the closest noise-sensitive properties.

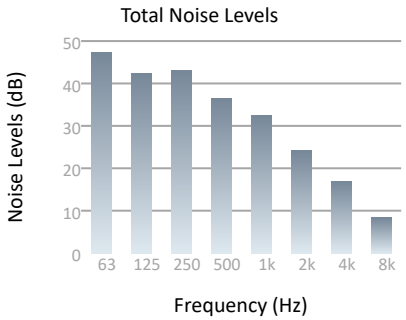
BS 4142:2014 requires an assessment to consider the context of the development, rather than simply adhering to numerical figures. Other mechanical equipment is currently located in the same location as the proposed equipment, therefore the addition of a new condensing unit will not alter the acoustic characteristic in the vicinity.

The author therefore concludes that achieving the 'green criteria' is acceptable, and that sound levels from the new mechanical equipment should not be detrimental to the amenity of nearby residents and no noise mitigation measures are necessary.

APPENDIX A

Acoustic Calculations

Project Name	Com Laude, 28-30 Little Russell Street, London
Project Reference	180201
Reference	Residential receiver
Description	Student flats, Gilbert Place
Noise Limit	44
dBA	38.8



Noise Sources

Reference	Quantity	Noise Levels (dB)							
		63	125	250	500	1k	2k	4k	8k
CU1	1	47.4	42.3	43	36.5	32.6	24.1	16.9	8.3

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Calculation Sheet

CU1 to Residential receiver

	Octave Band Centre Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Noise Source								
Noise Source - CU1								
Noise Levels	**84.0**	**79.0**	**80.0**	**74.0**	**71.0**	**64.0**	**59.0**	**54.0**
Noise Control Treatments								
Treatment - none								
	0.0	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*	*0.0*
ISO 9613 Calculation								
Direct Lp	**55.3**	**47.3**	**48.3**	**42.3**	**39.3**	**32.2**	**26.8**	**20.6**
ISO 9613 Barrier Attenuation								
	-7.9	*-5.1*	*-5.4*	*-5.9*	*-6.7*	*-8.1*	*-9.9*	*-12.2*
External Receiver								
External Receiver - Residential receiver								
Sound Pressure, Lp:	**47.4**	**42.3**	**43.0**	**36.5**	**32.6**	**24.1**	**16.9**	**8.3**

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