

# Acoustic assessment of proposed new mechanical services equipment

32 Cwrt-Y-Castell, Caerphilly



Client: Estama (UK) Limited

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## 0. SUMMARY

- 0.1. ACA Acoustics Limited has been commissioned to assess the acoustic impact of proposed new mechanical services equipment associated with a new restaurant to be installed at the rear of 32 Cwrt-Y-Castell, Caerphilly.
- 0.2. 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 Caerphilly Council's requirements.
- 0.3. A survey has been carried out in the vicinity to establish existing background sound levels during the latest proposed operating times of the new equipment. The background sound levels during the most sensitive time of the proposed operating hours are LA90 54dB at the monitoring position. Based on Caerphilly Council's criteria, the rating level from the new plant should not exceed the measured background sound level when assessed in accordance with the methodology of BS 4142:2014+A1:2019 outside the closest noise-sensitive windows.
- 0.4. The most noise-sensitive residential receptor (NSR) has been assessed as the residential windows overlooking North View Terrace.
- 0.5. The operator of the development unit has not yet been selected, and as such layout and selection of mechanical plant has not yet been finalised. A maximum permissible sound level for any proposed plant has therefore been recommended.
- 0.6. When assessed in accordance with BS 4142:2014+A1:2019, and the measured background sound level as proposed within this report, future mechanical plant complying with the maximum permissible noise limit set out in this report will not be disturbing or detrimental to the amenity of any nearby residential or other noise-sensitive receptors and will comply with the planning requirements of Caerphilly Council.

## 1. INTRODUCTION

New mechanical services equipment associated with a proposed restaurant is to be installed at 32 Cwrt-Y-Castell, Caerphilly.

ACA Acoustics Limited has been commissioned by the client to carry out an assessment of noise emissions from the future mechanical plant.

Specific plant layout and selection have not yet been finalised, and so this report presents results of the sound level survey and assessment of the acoustic criteria to form a basis of future assessment of the plant once the selection is finalised.

## 2. ACOUSTIC CRITERIA

Based on planning conditions imposed on a recent similar development, it is anticipated that Caerphilly Council will require the rating sound level from the new equipment, when assessed in accordance with BS 4142:2014+A1:2019, to not exceed the background sound level.

The scope of BS 4142:2014+A1:2019 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+A1:2019 is commonly used to assess the potential for loss of amenity due to noise from industrial and commercial processes and is considered appropriate for this application.

The assessment method of BS 4142:2014+A1:2019 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+A1:2019 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.*

BS 4142:2014+A1:2019 requires that assessment of noise be conducted considering the context of the development.

### 3. REVIEW OF SITE LOCATION

New mechanical equipment is proposed to the rear of 32 Cwrt-Y-Castell, Caerphilly. The proposed operator has not yet been selected, and so specific equipment selections or layout are not yet available.

The most noise-sensitive residential receptor (NSR) has been assessed as windows of properties overlooking North View Terrace, indicated by the NSR1 label below.

A marked-up aerial image is included in Figure 1, identifying the location of the proposed equipment and sound level survey measurement position.



Figure 1: Equipment location, measurement position, and closest receptor (available at [google.com/maps](https://www.google.com/maps))

It is proposed that the equipment will operate until 23:00 hours.

#### 4. SOUND LEVEL SURVEY

To assess sound levels from the new mechanical equipment, it is necessary to establish representative background sound levels in the vicinity during the proposed plant operating times.

The measurement position was considered secure and therefore an unattended sound level survey was set up by Tommy Burn of ACA Acoustics between the 17<sup>th</sup> – 18<sup>th</sup> October 2023. Measurements were taken at the position as shown in Figure 1.

The microphone was set up at street level at a position representative of the residential windows across the road, overlooking the site boundary wall. During the survey, the soundscape in the vicinity was influenced predominantly by road traffic and pedestrian activity in the area, along with low levels of mechanical plant serving retail premises in the vicinity.

The following equipment was used during the survey. An on-site calibration check was conducted on the sound level meter prior to the survey and repeated after with no deviation noted.

Equipment	Serial Number
Svantek Class 1 sound level meter type SV 307	84914
Svantek calibrator type SV33B. Compliant to IEC 60942-1:2003	83826

*Table 1: Equipment used for the sound level survey*

Weather conditions at the time of setting up the survey were warm, dry, and calm, and remained predominantly calm and dry with wind speeds below recommended limits during the proposed equipment operation times. Meteorological conditions are considered acceptable and will not have adversely impacted the survey results.

Results of the survey are shown in graphical form in Figure 2 below.

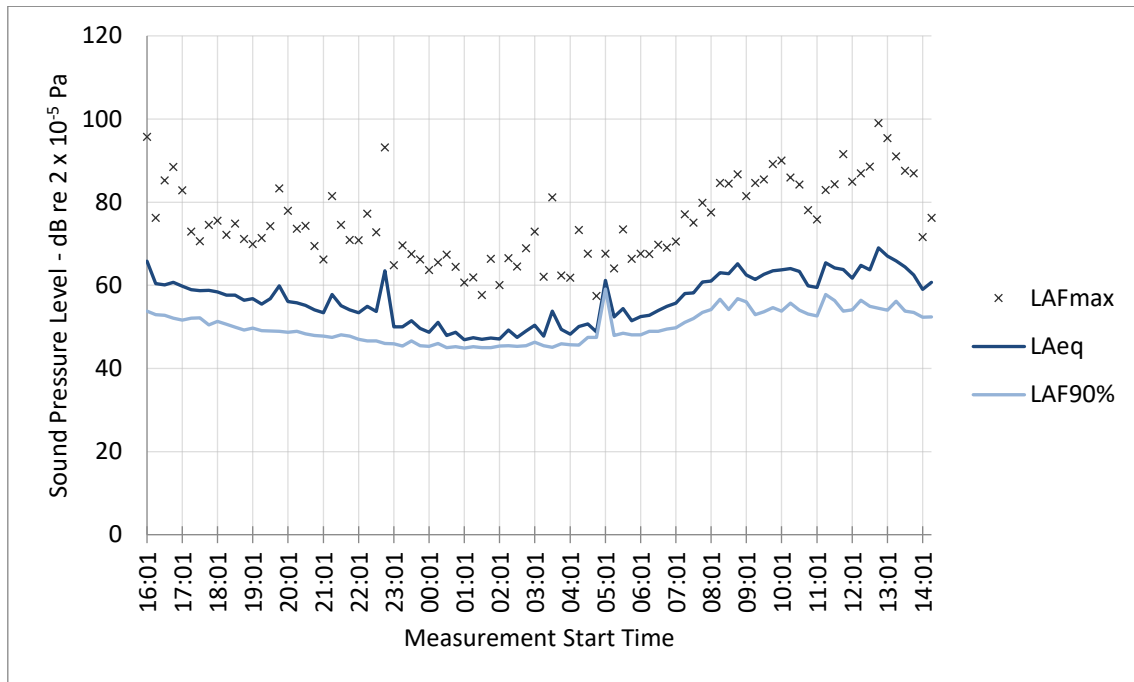


Figure 2: Sound level survey results – 19<sup>th</sup> September 2023

In accordance with the methodology set out in BS 4142:2014+A1:2019, the background sound level is not necessarily the lowest recorded value. Instead, the background sound level should be a level which is representative of the underlying soundscape at the receptor location.

A statistical analysis of the measured LA90 results during the evening period is shown in Figure 3 below, and during the night time period is shown in Figure 4, following guidance set out in the Standard.

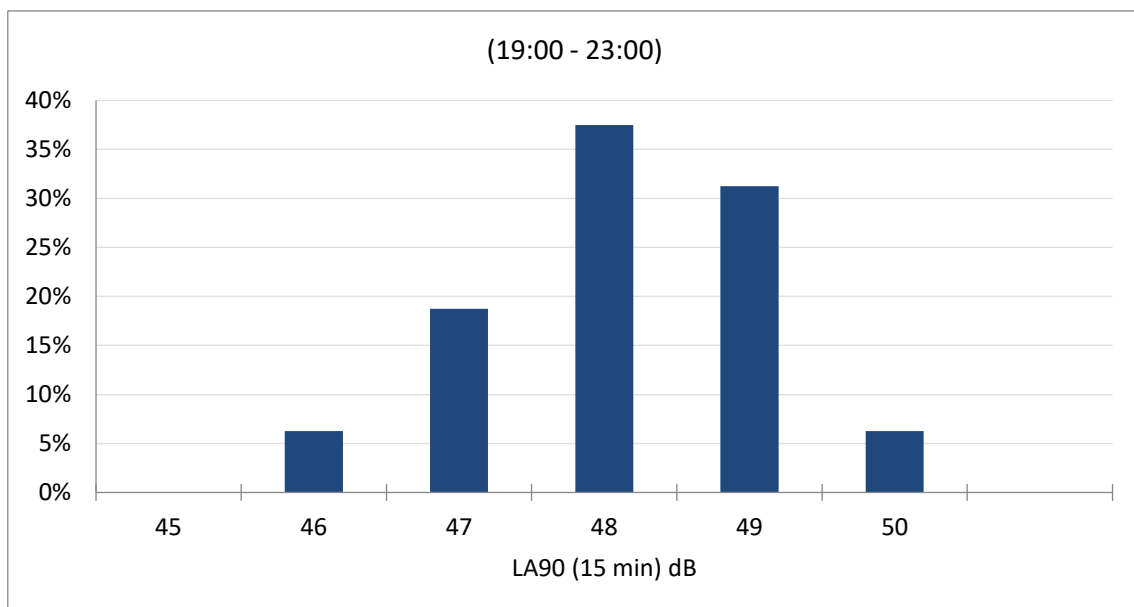


Figure 3: Statistical analysis of measured LA90 sound levels during the assessment period



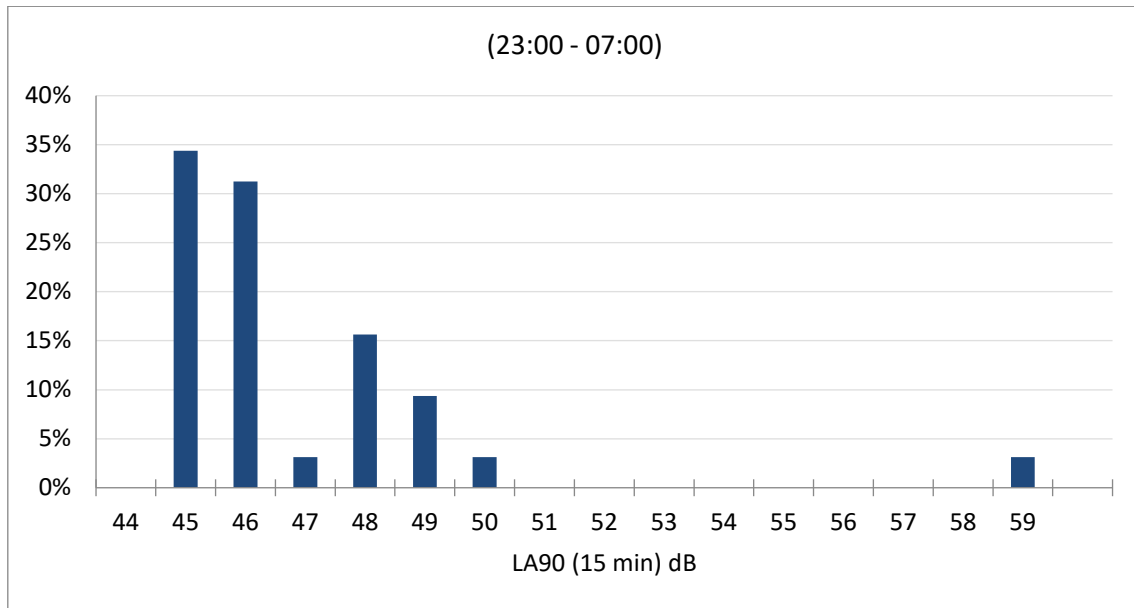


Figure 4: Statistical analysis of measured LA90 sound levels overnight

Based on the statistical analysis of the survey results, the author considers that levels of LA90 48dB during the evening and LA90 45dB during the night are representative of the background sound level in the vicinity.

Summary results of the survey are provided in Table 2 below.

Receptor	Period	Typical Background Sound Level During Operating Period LA90
NSR1	19:00 - 23:00	48dB
	23:00 - 07:00	45dB

Table 2: Summary sound level survey results

## 5. ACOUSTIC ASSESSMENT

The proposed operator of the development unit has not yet been selected, and therefore equipment selections and layouts are not yet available. As a result, an assessment of maximum permissible sound levels from any proposed equipment has been undertaken.

Background sound levels in the vicinity have been measured at LA90 48dB until 23:00 hours and LA90 45dB overnight. In order to meet the requirements of Caerphilly Council it is recommended that rating levels from any proposed equipment are designed to not exceed LAr 48dB at the nearest

residential windows during the proposed restaurant operating hours, and LAr 45dB for equipment operating overnight.

At this level the plant will achieve a “low” impact when assessed at the nearest residential windows.

BS 4142:2014+A1:2019 requires an assessment to consider the context of the development, rather than simply adhering to numerical values.

The proposals involve new items of mechanical equipment being introduced to an area with other commercial and retail uses in the vicinity. In this scenario, the change in acoustic character, and subsequent potential for loss of amenity, is lower than if, say, there were no other similar businesses in the area.

The author considers that the context of the assessment does not alter the initial estimate of the impact, and that when rating sound levels are designed to not exceed the background sound level then sound levels from the new mechanical equipment should not be detrimental to the amenity of any residential occupiers in the vicinity.

## 6. CONCLUSION

A planning application is to be submitted for the installation of new mechanical plant and equipment associated with a new restaurant at 32 Cwrt-Y-Castell, Caerphilly.

Specific equipment selection and layout are not yet available, and so maximum permissible sound levels from the plant have been calculated based on measured sound levels in the vicinity of nearest residential windows. When designed to not exceed the background sound level the proposed equipment will achieve a “low” impact at the nearest residential windows. This will achieve the Local Authority’s planning requirements for this development and will not be detrimental to the amenity of nearby noise-sensitive occupants.

Once the equipment selection and layouts are finalised ACA Acoustics can undertake full design assessment of the equipment to ensure the acoustic criteria of Caerphilly Council is achieved.

