

# NOISE IMPACT ASSESSMENT

Address: Proposed Specsavers Opticians at: 7 Church Street, Clitheroe, Lancashire, BB7 2DD

Proposal: Proposed installation of 2no. condenser units to rear yard of the property.

Application no: 3/2025/1005

Drawing reference no: 2582-03

## OVERVIEW

Sound power is the total acoustic energy emitted by a source, while sound pressure is the local effect of that sound at a specific location. Sound power is fixed to the source, but sound pressure depends on distance and environment.

Therefore, the sound pressure data, taken at 1m should be used to calculate the noise impact. For the purpose of this project, we will use the loudest condenser units reading for noise pressure taken at 1m = 53 dB.

## POINT SOURCE FORMULA

Point Source is a single object like a machine or loudspeaker. Noise drops by 6 dB for every doubling of distance.

If you know the sound level ( $L_1$ ) at a reference distance ( $d_1$ , often 1 meter), the level at the new distance ( $d_2 = 7m$ ) is:  $\emptyset$

$$L_2 = L_1 - 20 \cdot \log_{10} \left( \frac{d_2}{d_1} \right)$$

- $L_1$ : Reference sound pressure level (dB).
- $d_1$ : Reference distance (e.g., 1 m).
- $d_2$ : Target distance (7 m).  $\emptyset$

Calculation: (Source measured at 53 dB at 1 m):

Divide target distance by reference distance: 7 divided by 1 = 7

Find the log:  $\log_{10}(7) = 0.845$

Multiply by 20:  $20 \times 0.845 = 16.9$

$53 \text{ dB} - 16.9 \text{ dB} = 36.1 \text{ Db @ } 7m$

## RULE OF THUMB FORMULA

With the rule of thumb method, you can simply subtract 6db for each doubling of distance from the point source object. Therefore, at 8m away, which is X3 doublings of distance away from the source object (1m-2m-4m-8m) you can subtract approximately 18 dB from the point source of noise.

$53 \text{ dB} - 18 \text{ dB} = 35 \text{ db @ } 8m$

## DECIBEL ADDITION

As there are X2 point sources for this proposal (X2 condenser units) there may be a decibel addition of the highest overall noise level by 1.5 dB. This is calculated as there are two different sources of noise, using the below calculator for decibel addition:

<https://www.noisemeters.com/apps/db-calculator/>

Therefore, the maximum sound pressure for the proposed condenser units at the first-floor window could be seen to be 37.5 dB.

## ACOUSTIC ENCLOSURE

An acoustic enclosure can be included that will have acoustic louvres installed as the front panels to retain air flow.

The acoustic louvres will be the 'weak point' of the design (acoustically speaking) so we can use their acoustic data/efficiency to calculate the overall effectiveness of the design. The louvres are manufactured by acoustic specialists and conform to BS EN ISO 11546-1:2009.

<https://www.cecoenviro.com/wp-content/uploads/2023/12/Acoustic-Louvres-8pp-A4-FINAL-1.pdf>

The acoustic louvres provide the following acoustic attenuation:

Louvre			Sound Reduction (dB) at Octave Band Centre Frequency (Hz)							
Depth	Style	Product Code	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz
150mm	Single Bank	WA-ACL-150SB	4	4	6	8	10	11	11	10

Therefore, if we were to be conservative and estimate the noise reduction of the acoustic enclosure to be only 4 dB, we can reapply the formulas to calculate the noise data at the first-floor window with the mitigation applied.

Max 37.5 db – 4 dB = 33.5 dB

## SUMMARY OF FINDINGS

With the condenser units relocated further away from the building, we calculate this will reduce the noise level at the point of the first-floor window, without any mitigation, to 37.5 dB.

This level is a maximum possible level based on conservative estimation. We feel the levels will most realistically be at around 35 dB @ 7-8 metres distance.

With an acoustic enclosure installed to the condenser units, this should represent further noise reduction, to a conservative estimate of 33.5 dB at the first-floor window.

We therefore feel the revised designs satisfies the concerns raised by the local authority.

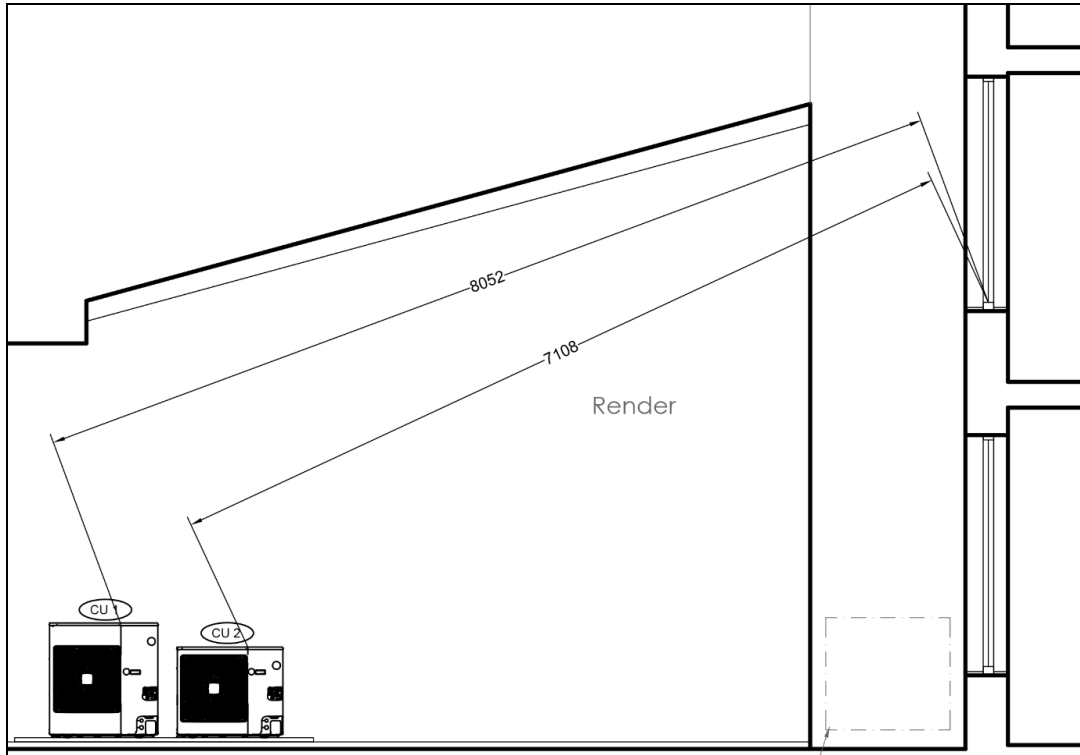


Figure shows distance of condensers from the first-floor window identified.



Photo shows the rear yard where the condensers will be located.