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Dear Marcus

**AS13322 PIRATE PASTIES, HAMBLE-LE-RICE****Walk-In Freezer Sound Impact Assessment**

Acoustic assessment and advice are sought for an existing external walk-in freezer and associated plant at Pirate Pasties, situated on the High Street in Hamble.

Clarke Saunders Acoustics (CSA) has undertaken an investigative sound survey at the above site in the aim of determining the prevailing daytime background sound climate and the acoustic impact of the plant associated with the external freezer on nearby residential receptors. Plant sound calculations have been conducted to provide specifications for acoustic mitigation.

The walk-in freezer is located in a small courtyard to the west of Pirate Pasties and accessed via the external seating area. The freezer is on a circa 20 cm raised wooden platform and has a surrounding wooden frame with a corrugated plastic roof. It is understood that the initial intention was to cover the wooden frame with trellis planting and to install a sedum green planted roof on the corrugated plastic.

The surrounding area is of a mixed-use, typical for a High Street. Most notably, a hairdresser shop is located at ground floor level facing into the courtyard, The Victory pub is adjacent to the site, The River Rat pub is on the other side of the High Street, and there are also some residential properties in the vicinity.

The most affected off-site residential receptor is understood to be Pump Cottage, which has a window at upper floor level facing into the courtyard, and at a window and garden at ground floor level to the rear.

The tenanted floors above the Pirate Pasties business and courtyard are under the same ownership as Pirate Pasties, however, assessment has also been conducted to the most affected of the habitable room windows, to satisfy the Local Authority. We have been informed that the tenant window facing the entrance to the freezer and condenser is a store cupboard, so assessment has been made to the adjacent window, which is screened from view by the freezer itself.

The attached AS13322/SP1 shows the location of the receptor windows and the freezer.

### Site Visit Investigations

Attended measurements of  $L_{Aeq}$ ,  $L_{Amax}$ ,  $L_{A10}$  and  $L_{A90}$  sound pressure levels were taken on Monday 5<sup>th</sup> November 2023, between 12:00 and 13:00 hours.

The following equipment was used during the survey:

- Rion sound level meter type NL52;
- Rion sound level calibrator type NC74.

The calibration of the sound level meter was verified before and after use. No significant calibration drift was detected. Weather conditions during the survey were dry with light winds.

Measurements were made following procedures in BS7445:1991 (ISO1996-2:1987) *Description and measurement of environmental noise Part 2 – Acquisition of data pertinent to land use* and BS4142:2014 + A.1:2019 *Methods for rating and assessing industrial and commercial sound* (BS4142).

The results of the survey concluded that the condenser serving the walk-in freezer is the primary source of sound at nearby receptors. The condenser is located outside the freezer, in-between its north façade and the boundary of the site to the neighbouring residential garden. The condenser was also surrounded with insulation at the time of the survey. The survey also concluded that the compressor located inside the freezer is of little concern with respect to the local sound climate.

The sound pressure levels measured at the receptor's windows indicated that the current sound levels are currently higher than desirable. Mitigation is, therefore, advised.

### Calculations and Specifications

In order to assess suitable noise mitigation, we have completed plant sound calculations for the condenser associated with the freezer, utilising data measured at site to best ensure the geometry of the courtyard and reflections are accounted for. These calculations have followed the procedures details in BS4142.

To decrease the likely impact on nearby residential receptors, we advise that a solid and imperforate close-boarded timber fence is installed on the site boundary with the neighbouring garden to the north. The plastic corrugated roof will also benefit from the additional mass provided by the sedum green planted roof. It is important to note that the roof and fence to the north must join together and extend to the wall to the west of the freezer, with any gaps filled. This will result in the solid barriers effectively screening the condensers from the Pump Cottage receptor windows.

Suitable acoustically absorptive products should be installed on the side of the freezer and fence adjacent to the condenser, which will reduce acoustic reflections.

To account for the likelihood that the low frequency sound may be just perceptible at the receptor positions, a +2 dB correction has been applied to the Specific Sound Levels.

A +3 dB correction has also been applied to account for the intermittency of the condenser operation.

Table 1 shows a summary of the predicted sound levels, once the mitigation measures are implemented.

| PARAMETER                                                    | PUMP COTTAGE<br>UPPER FLOOR<br>WINDOW                    | PUMP COTTAGE<br>GROUND FLOOR<br>WINDOW | TENANT UPPER FLOOR<br>WINDOW |
|--------------------------------------------------------------|----------------------------------------------------------|----------------------------------------|------------------------------|
| Specific Sound Level of<br>condenser, $L_{Aeq,T}$ at 1m      | 60 dB                                                    | 60 dB                                  | 60 dB                        |
| Distance loss                                                | -16dB                                                    | -14 dB                                 | -14 dB                       |
| Screening loss                                               | -16 dB                                                   | -17 dB                                 | -14 dB                       |
| Specific Sound Level at<br>receptor position, $L_{Aeq,T}$    | 28 dB                                                    | 29 dB                                  | 32 dB                        |
| Feature Corrections                                          | Just perceptible tonality: +2 dB<br>Intermittency: +3 dB |                                        |                              |
| Rating Sound Level at<br>receptor position, $L_{A,r,Tr}$     | 33 dB                                                    | 34 dB                                  | 37 dB                        |
| Range of measured<br>daytime background<br>levels, $L_{A90}$ | 35-38dB                                                  |                                        |                              |

**Table 1 – Sound level predictions at Pump Cottage**

The calculations are shown in the attached Appendix A.

The predicted Rating Sound Levels with advised mitigation are below the daytime background sound levels at the off-site receptor locations, indicating a very low likelihood of adverse impact. The Rating Level at the tenanted window above the Pirate Pasties shop is commensurate with the daytime background sound levels, also indicating a low likelihood of adverse impact.

The predicted Specific Sound Levels are also low in absolute terms, commensurate with or below the desirable internal noise levels within dwellings for daytime and night-time periods, as stated within BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*. This indicates that even when the residential windows are open, the internal noise levels would be significantly below the desirable levels and, therefore, should still allow good internal acoustic conditions to be achieved.

The sound levels may decrease further if the insulation surrounding the condenser was removed, as this may be causing the condenser to run at a higher duty than would otherwise be necessary. This is anticipated to reduce the low frequency sound levels in particular, which would decrease the distinctiveness of the sound at the receptor locations.

The context of the surrounding area needs to be taken into account when considering the condenser sound impact. The mixed-use High Street location comprises a number of commercial premises, including pubs, which generate noise emissions from sources such as external plant and patron activity. The potential for condenser sound to be occasionally noticeable in a High Street location is not, therefore, considered unreasonable.

It should be noted that at the time of the survey the neighbouring hairdressers that faces directly onto the courtyard was not in operation. It is understood that when in operation, the windows are usually open with hairdryers operating frequently throughout the day, contributing to the ambient sound climate. This would further decrease the potential noticeability of the condenser sound during the daytime periods.

The freezer can be fitted with a timer switch, that can restrict the operation to daytime hours only (07:00 – 23:00 hours).

Summary

Clarke Saunders Acoustics has conducted an investigation of mechanical services sound emissions from the walk-in freezer at Pirate Pasties, High Street, Hamble. Assessment has been made to off-site receptors, and to the most affected habitable room window of the tenanted dwellings above Pirate Pasties.

The following noise mitigation measures have been advised:

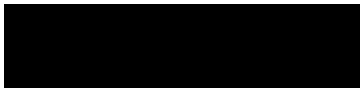
- Solid and imperforate close-boarded timber fence on the boundary with the residential garden;
- Sedum planted green roof on top of wooden structure surrounding the freezer;
- Installation of absorptive panels on side of freezer and fence;
- A timer switch is fitted, to restrict the operation to daytime hours only (07:00 – 23:00 hours).

These mitigation measures will reduce the condenser sound levels well within the daytime background, also below or commensurate with the desirable internal noise levels within dwellings, as specified within BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*.

There is expected to be a low likelihood of adverse impact as a result of condenser sound, particularly when considering the High Street location.

We trust the above to be of assistance. Please do not hesitate to contact us with any queries you may have.

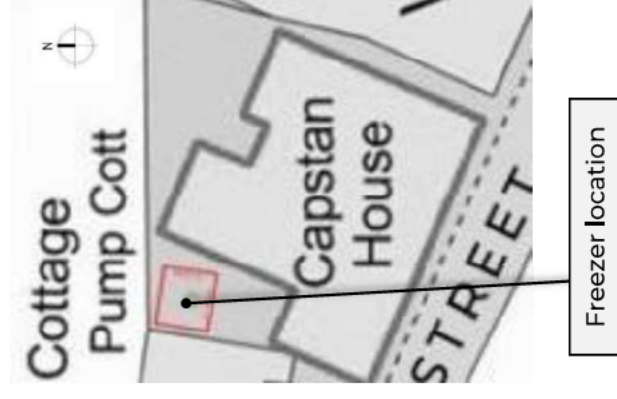
Yours sincerely  
for CLARKE SAUNDERS ASSOCIATES



**Michael Symmonds**



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**APPENDIX A**  
**AS13322 Pirate Pasties, Hamble**  
**PLANT SOUND CALCULATIONS**

| Condenser to top floor window |                     | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | dB(A) |
|-------------------------------|---------------------|-------|--------|--------|--------|-------|-------|-------|-------|-------|
| Condenser                     | Lp @ 1m             | 57    | 61     | 67     | 56     | 47    | 42    | 35    | 31    | 60    |
| Screening Loss                | Source A            | -10   | -13    | -15    | -18    | -18   | -18   | -18   | -18   | -11   |
| Distance Loss                 | 6m                  | -16   | -16    | -16    | -16    | -16   | -16   | -16   | -16   |       |
|                               | Subtotal            | 31    | 33     | 36     | 22     | 13    | 8     | 1     | 0     | 28    |
| Specific Level at receptor    | L <sub>eq 1hr</sub> | 31    | 33     | 36     | 22     | 13    | 8     | 1     | 0     | 28    |
| Perceptible tonality          |                     |       |        |        |        |       |       |       |       | +2    |
| Intermittency                 |                     |       |        |        |        |       |       |       |       | +3    |
| Rating Level at receptor      |                     |       |        |        |        |       |       |       |       | 33    |

Screening loss limited to 18dB

| Condenser to ground floor window |                     | 63 Hz | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | dB(A) |
|----------------------------------|---------------------|-------|--------|--------|--------|-------|-------|-------|-------|-------|
| Condenser                        | Lp @ 1m             | 57    | 61     | 67     | 56     | 47    | 42    | 35    | 31    | 60    |
| Screening Loss                   | Source A            | -12   | -14    | -17    | -18    | -18   | -18   | -18   | -18   | -11   |
| Distance Loss                    | 5m                  | -14   | -14    | -14    | -14    | -14   | -14   | -14   | -14   |       |
|                                  | Subtotal            | 31    | 33     | 36     | 24     | 15    | 10    | 3     | 0     | 29    |
| Level at receptor                | L <sub>eq 1hr</sub> | 31    | 33     | 36     | 24     | 15    | 10    | 3     | 0     | 29    |
| Perceptible tonality             |                     |       |        |        |        |       |       |       |       | +2    |
| Intermittency                    |                     |       |        |        |        |       |       |       |       | +3    |
| Rating Level at receptor         |                     |       |        |        |        |       |       |       |       | 34    |

Screening loss limited to 18dB

| Condenser to tenant window |          | 63 Hz               | 125 Hz | 250 Hz | 500 Hz | 1 kHz | 2 kHz | 4 kHz | 8 kHz | dB(A) |    |
|----------------------------|----------|---------------------|--------|--------|--------|-------|-------|-------|-------|-------|----|
| Condenser                  | Lp @ 1m  | 57                  | 61     | 67     | 56     | 47    | 42    | 35    | 31    | 60    |    |
| Screening Loss             | Source A | -9                  | -11    | -13    | -16    | -18   | -18   | -18   | -18   | -10   |    |
| Distance Loss              | 5m       | -14                 | -14    | -14    | -14    | -14   | -14   | -14   | -14   |       |    |
|                            | Subtotal | 34                  | 36     | 40     | 26     | 15    | 10    | 3     | 0     | 32    |    |
| Level at receptor          |          | L <sub>eq 1hr</sub> | 34     | 36     | 40     | 26    | 15    | 10    | 3     | 0     | 32 |
| Perceptible tonality       |          |                     |        |        |        |       |       |       |       |       | +2 |
| Intermittency              |          |                     |        |        |        |       |       |       |       |       | +3 |
| Rating Level at receptor   |          |                     |        |        |        |       |       |       |       |       | 37 |

Screening loss limited to 18dB