

# Technical Assessment

|                       |                                                                |
|-----------------------|----------------------------------------------------------------|
| Site Address:         | 5 – 9 Merchants Place, Reading, RG1 1DT                        |
| Project Reference No: | NP-012613-2                                                    |
| Subject:              | Assessment of Noise Emissions for a Prior Approval Application |
| Client:               | Fin Kneafsey                                                   |
| Reported By:          | C Hawkins-Smith, PGDip, MIOA                                   |
| Checked By:           | M. Caley, MSc, MIOA                                            |
| Date:                 | 24/06/2025                                                     |

## Introduction

NOVA Acoustics has been commissioned to provide an acoustic assessment of the suitability of a commercial building for partial conversion into residential dwellings. The application for the change of use is made under Schedule 2, Class MA of the Town and Country Planning (General Permitted Development Amendment) Order 2024 (as amended).

The purpose of this technical assessment is to detail the level of commercial noise emissions incident on the proposed development building and develop a scheme of mitigation measures, where required.

Both external and internal noise surveys have been undertaken to establish the baseline noise levels. The results of the surveys have been used to inform this assessment and determine if the existing building envelope provides sufficient levels of sound insulation.

## Relevant Noise Guidance

The guidance and legislation documents used in the assessment are as follows:

- Town and Country Planning Act (General Permitted Development) Order 2024 (as amended)
- National Planning Policy Framework (2023)

### Town and Country Planning Act (General Permitted Development)

As previously stated, the application falls under permitted development guidance, which is assessed under the Town and Country Planning Act. The latest revision of the Town and Country Planning Act (General Permitted Development), which was published in 2024, provides details of permitted development under Schedule 2, Part 3 – 'Class MA'. This is defined on the following page.

*“Development consisting of a change of use of a building and any land within its curtilage from a use falling within Class E (commercial, business and service) of Schedule 2 to the Use Classes Order to a use falling within Class C3 (dwellinghouses) of Schedule 1 to that Order.”*

The following is stated regarding factors that should be assessed as part of a permitted development application of this nature:

*“Before beginning development under Class MA, the developer must apply to the local planning authority for a determination as to whether the prior approval of the authority will be required as to—*

- (a) transport impacts of the development, particularly to ensure safe site access;*
- (b) contamination risks in relation to the building;*
- (c) flooding risks in relation to the building;*
- (d) impacts of noise from commercial premises on the intended occupiers of the development”***

Further planning practice guidance is provided on the government's website, with the following stated regarding permitted development:

*“The statutory requirements relating to prior approval are much less prescriptive than those relating to planning applications. This is deliberate, as prior approval is a light-touch process which applies where the principle of the development has already been established. Where no specific procedure is provided in the General Permitted Development Order, local planning authorities have discretion as to what processes they put in place. It is important that a local planning authority does not impose unnecessarily onerous requirements on developers, and does not seek to replicate the planning application system.”.*

#### **National Planning Policy Framework (2024)**

Whilst it is understood that a prior approval application should be assessed using a 'light touch' towards planning, it is thought that the aims of the NPPF are still relevant and should also be considered.

The following is stated paragraph 198, section 15:

*“Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

- a) Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- b) Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*
- c) Limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.”*

Further to the above, it is thought that the 'Agent of Change' principle should be also considered in relation to the application. This will ensure that unreasonable restrictions are not imposed on the neighbouring businesses as a result of the residential development. Regarding this, the following is stated in paragraph 200 of the NPPF:

*"Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."*

Considering the requirements of the Town and Country Planning Act, it is thought that the site should be assessed based the contribution of noise from **commercial sources exclusively**. This should ensure that the agent of change principle is fully considered, which is in accordance with the requirements of the NPPF.

## Local Authority Correspondence

Since the submission of the application, the following condition has been set by the LPA with regards to the ventilation strategy:

*"In addition, the detailed scheme shall include the provision of a mechanical ventilation system with mechanical heat recovery (MVHR) system with cool air bypass as a means of cooling and ventilation to serve each dwelling hereby approved. Noise from the system shall not result in BS8233 internal levels being exceeded".*

Although outside the remit of a permitted development application, this technical assessment does also include assessment of the plant required to support the ventilation strategy.

## Site Description

The proposed development site is an existing four storey commercial building, comprising of a lower ground floor, upper ground floor, first floor and second floor. At present, the lower ground floor is primarily occupied by a hairdressing salon, with the upper floors occupied by offices.

As part of the proposed scheme, the existing commercial and office use on the lower ground floor is to be retained. The converted upper floors shall contain 2no. one-bedroom flats per floor.

## Environmental Noise Survey

Two sound level meters were utilised during the long-term survey; one located on the front façade directly overlooking the nearby commercial properties and one on the rear façade. An additional attended short-term measurement was undertaken within one of the proposed bedrooms on the first floor, with all façade openings closed.

The following table outlines the measurement dates and particulars. In all instances the external microphones were fitted with their proprietary environment kit, including a 130mm windshield. Field calibrations were performed before and after each measurement and negligible drift was noted. A -3dB façade correction has been applied to MP1 and MP2 to account for any additional façade reflections, due to the microphones being situated within 2m from the external façade. No corrections have been applied to the internal spot measurement (MP3).

| Location | Survey Dates                | Measurement Particulars                                                                                                    |
|----------|-----------------------------|----------------------------------------------------------------------------------------------------------------------------|
| MP1      | 02 – 06/04/25               | Equipment protruding 1.5m out of a first-floor window on the front façade, overlooking Merchants Place.                    |
| MP2      | 02 – 06/04/25               | Equipment protruding 1.5m out of a first-floor window on the southern façade, overlooking a rear courtyard area.           |
| MP3      | 02/04/25<br>(10:04 – 10:34) | Microphone attached to a tripod approximately 1.5m above the floor and located internally on the first floor to the front. |

Table 1 – Measurement Methodology

The surrounding commercial premises and measurement locations are outlined in the figure below:



Imagery ©2025 Google, Imagery ©2025 Maxar Technologies, Map data ©2025

Figure 1 – Measurement Locations and Site Surroundings

## Context & Subjective Impression

The proposed development is located within a built-up urban area of Reading, approximately 130m south the main Reading train station. The surrounding area is mixed in nature, with a combination of high-rise residential flats, hotels, low risk offices and commercial businesses, and a bar. There is also an existing hairdressing salon on the lower ground floor of the proposed development building, which is understood will be retained.

Of the surrounding businesses, only the 'Milk Bar Reading' is noted to operate into the night-time period, remaining open until 00:00 hours Wednesday to Saturday.

External outdoor condenser units were identified on the rear façade. These are used by the associated offices and commercial businesses currently present within the proposed development building. Subjectively noise from these units was inaudible internally during the site visits and they did not appear to be in use, however, the time history graph from MP2 indicates that plant noise does influence the soundscape at the rear façade.

During both site visits, no commercial noise was identified. The faint noise from a mobile crane being used further to the south of the site was just perceptible internally, however this is viewed to be a temporary atypical noise source and is not commercial in nature.

The dominant noise source to the front of the building was intermittent vehicle movements along Merchants Place and Garrard Street, with conversational noise from passing pedestrians secondary in nature. To the rear, the acoustic environment was noticeably quieter due to road noise being screened by the surrounding buildings and the enclosed nature of this area. Overall, the existing sound climate is deemed to be moderate in level.

The existing façade construction is understood to be masonry brick outer walls (assumed to be 200mm thick), with standard double glazing (4mm glass, 16mm cavity, 4mm glass). The composite performance of the outer façade including the contribution from the masonry and glazed elements is expected to be upwards of 35 dB  $R_w$ .

## Measurement Results Summary & Results

The sound levels measured during both the long-term environmental survey and the short-term internal spot measurement are shown in the tables overleaf. The time history graphs showing the full measurement periods can be found in Appendix C.

| Location       | Measurement Period ('T')    | Octave Frequency Band (Hz, dB) |     |     |     |    |    |    | L <sub>Aeq,T</sub> (dB) | 'Typical' L <sub>AFmax,1min</sub> (dB) [1] |
|----------------|-----------------------------|--------------------------------|-----|-----|-----|----|----|----|-------------------------|--------------------------------------------|
|                |                             | 63                             | 125 | 250 | 500 | 1k | 2k | 4k |                         |                                            |
| MP1 (External) | L <sub>eq,16hr</sub> (Day)  | 59                             | 57  | 52  | 52  | 50 | 46 | 42 | 54                      | --                                         |
|                | L <sub>eq,8hr</sub> (Night) | 56                             | 55  | 49  | 48  | 47 | 43 | 37 | 51                      | 75                                         |
| MP2 (External) | L <sub>eq,16hr</sub> (Day)  | 56                             | 52  | 52  | 49  | 47 | 44 | 43 | 52                      | --                                         |
|                | L <sub>eq,8hr</sub> (Night) | 53                             | 49  | 50  | 44  | 43 | 40 | 35 | 48                      | 70                                         |

**Notes:**

[1] The typical L<sub>AFmax,1min</sub> is the value exceeded fewer than 10 times throughout the night-time period.

Table 2 – Sound Level Results Summary – Long-term Measurements

| Location       | Measurement Period ('T')    | Octave Frequency Band (Hz, dB) |     |     |     |    |    |    | L <sub>Aeq,T</sub> (dB) | L <sub>AFmax,1min</sub> Range (dB) |
|----------------|-----------------------------|--------------------------------|-----|-----|-----|----|----|----|-------------------------|------------------------------------|
|                |                             | 63                             | 125 | 250 | 500 | 1k | 2k | 4k |                         |                                    |
| MP3 (Internal) | L <sub>eq,30min</sub> (Day) | 40                             | 41  | 41  | 28  | 27 | 26 | 24 | 36                      | 34 – 57                            |

Table 3 – Sound Level Results Summary – Internal Spot Measurement

## Commercial Noise Analysis

### Low Frequency Analysis

As can be seen in both Table 2 and Table 3, the sound levels measured at both positions are very similar. The only exception to this is the 125Hz frequency band, where the content is noticeably higher at MP1 than MP2 during the night-time period. This is thought to be due to the operations of the bar opposite.

To ascertain if entertainment (music) noise is likely to have been audible during the survey, a low frequency analysis has been undertaken at each position. In cases where entertainment noise is dominant, this typically presents as increased low frequency content before sharply declining to the residual level once the entertainment venue closes. The low frequency time history graph for MP1 is presented in the figure overleaf.

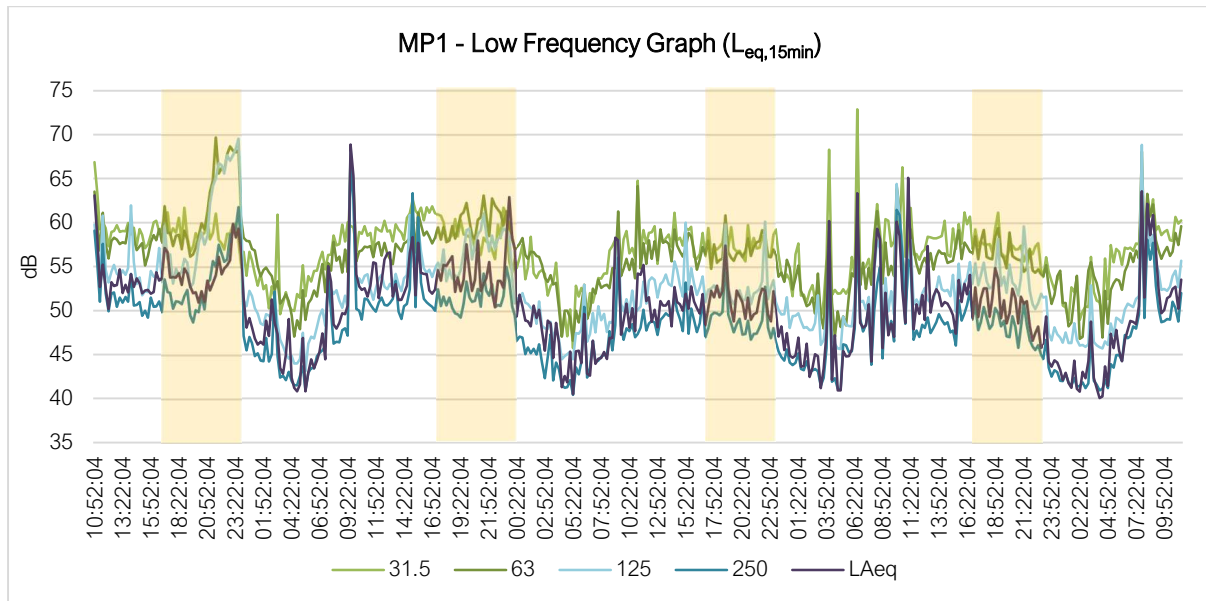


Figure 2 – Low-frequency Graph – MP1

As can be seen above, there is a significant low frequency presence at 63Hz and 125Hz between 21:00 and 00:00 hours on Friday night. Further research into 'Milk Bar Reading', located opposite the front façade of the site, indicates that on the first Friday of every month the bar hosts a 'soul time vinyl night' with pre-recorded amplified music. The last known event is understood to have occurred during the survey period. The above indicates that the site is influenced by commercial noise, however this is only during events as the other nights show no indication of entertainment noise despite the bar being open.

### Plant Noise Analysis

To evaluate whether plant noise is likely to have been audible during the survey, an assessment has been undertaken of the measured background noise levels.

Where plant noise is audible, this generally forms an artificial 'noise floor' in the measurement, which presents as a 'flat' line in the L<sub>A90</sub> result. As shown in the graph in Appendix C, the trend at MP1 is mostly diurnal, indicating that excluding Friday night, the front of the site is mostly dominated by anonymous steady state sources, such as transport noise. However, the background noise measurement at MP2 is relatively flat throughout the measurement period, which suggests that the acoustic environment may be influenced by plant noise. It is thought that the source of this is likely to be the wall mounted units currently serving the offices associated with the building. A time history graph showing the background noise measurement at this position can be seen overleaf.

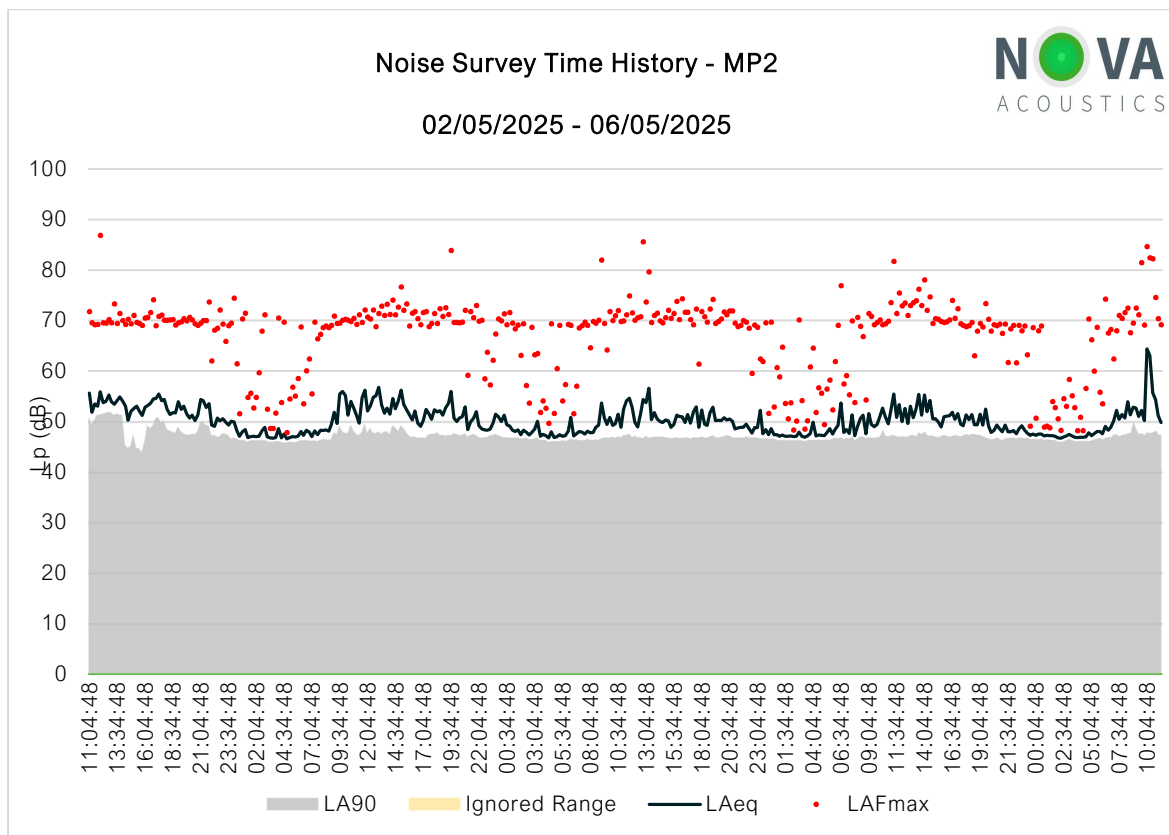


*Figure 3 – Plant Noise Assessment*

Whilst typically a BS4142 assessment would be undertaken, this is not possible as the background sound level in the absence of plant or commercial sources cannot be obtained.

Despite the likelihood that plant noise is present, the overall sound level to the rear is still low and there is significant acoustic shielding.

The subjective impression of the site engineer was that plant noise was inaudible internally, with no discernible tonal, intermittent or impulsive characteristics present. Nevertheless, to allow for a robust assessment, the sound level measured at MP2 has had a +5dB correction applied to account for any just perceptible tonal or intermittent acoustic character features that may be present.

Even with the +5dB correction applied, the existing glazing allows for internal sound levels below NR30 in the living rooms and below NR25 in the bedrooms to be achieved. This combined with the subjective impression of the engineer is a strong indication of low impact.

## Discussion

Although the internal spot measurement is brief, it provides an indicator of the internal sound levels within the dwellings. The internal measurement shows a negligible 1dB exceedance of the daytime BS8233:2014 criteria for living rooms and bedrooms, however, the subjective impression of the site engineer combined

with the detailed analysis indicates that this exceedance is due to traffic noise ingress rather than noise of a commercial origin.

An assessment has been undertaken using the long-term external measurements and the predicted performance of the existing glazing and outer walls. Based on the proposed room dimensions and the external sound levels measured at MP1 (the worst-case position), the internal sound levels within the worst-case bedroom are not predicted to exceed the BS8233 criteria, even during the worst-case period on the Friday between 22:00 and 23:00 hours.

Further to this, the low-frequency noise (noise in the 63Hz and 125Hz) is predicted to be within the Moorhouse Curve criteria during this period, which suggests that there is a low-risk of adverse impact due to low-frequency music noise. This equates to an internal sound level below NR30 in living rooms and below NR25 in the bedrooms; inclusive of the more onerous Moorhouse curve criteria being applied to the front façade.

The predicted internal  $L_{AFmax, 1min}$  sound levels are not predicted to exceed 44dB from all existing sources – including traffic noise which is beyond the scope of a Class MA Permitted Development application. This is also a strong positive indicator of the site's suitability for residential use.

Considering these factors alongside the site engineer's subjective impression and the internal sound levels measured during the spot measurement, this demonstrates that the proposed development is suitable for residential use. Despite the presence of commercial noise in the area, these calculations suggest that the future occupants are unlikely to be adversely affected by noise of a commercial nature.

It should be noted that this outcome relies on windows within the development being closed, however, the applicant has agreed that the proposed apartments will be ventilated via mechanical means, ensuring that suitable levels of thermal comfort can be achieved. The adopted ventilation strategy must be compliant with Approved Document F.

The existing construction of the separating floor between the retained hairdressing salon and the proposed residential is unknown. Although the hairdressing salon is deemed to be low risk in terms of noise generation, it is recommended that this floor should achieve at least 53dB  $D_{nT,w} + C_{tr}$  (+10dB above Part E requirements) to provide better protection for future residents against potential commercial noise on the ground floor.

A specification that can achieve the required sound insulation standard is outlined below. Although a minimum criterion of 53dB  $D_{nT,w} + C_{tr}$  has been set, this construction is capable of achieving upwards of 55dB  $D_{nT,w} + C_{tr}$ .

- 22mm cement particle board (min. surface mass 23kg/m<sup>2</sup>)
- 60mm batten and cradle system (iKoustic MuteCradle™ or equivalent) partially filled with 25mm acoustic mineral wool insulation (min. density 10kg/m<sup>3</sup>)
- Existing 50mm concrete screed (assumed min. density 2000kg/m<sup>3</sup>)
- Existing 175mm pre-cast concrete plank (assumed min. density 1600kg/m<sup>3</sup>)

- Existing MF ceiling system (assumed min. drop 100mm)
- 1no. 12.5mm plasterboard (assumed min. surface mass 8kg/m<sup>2</sup>) sealed with flexible mastic at the perimeter.

## Assessment of Adopted Ventilation Strategy

To demonstrate compliance with the issued planning condition, an assessment of the mechanical plant required for the ventilation strategy is included. It is understood that the existing ventilation system that previously served the offices will be retained to serve the proposed dwellings.

The plant includes the following outdoor units manufactured by Samsung:

- 2no. AC071MXADKH/EU
- 1no. AC052MXADKH/EU

The above are used in conjunction with the following internal cassettes, as are existing within the property. One cassette will service each proposed flat.

- AC052RNNDKG/EU
- AC071RNNDKG/EU

Each cassette has four operating modes – ‘silent’, ‘low’, ‘medium’ and ‘high’. The manufacturer has provided internal sound power levels for the two internal cassettes, as presented in the table below. It is understood that these correspond to the high operating mode.

Note that no sound power levels are provided at 63Hz, therefore the same value as 125Hz has been used. Considering the sound pressure level graphs, this follows a similar trend and is therefore deemed to be an appropriate assumption.

| Manufacturer | Model          | Octave Frequency Band (L <sub>w</sub> , Hz, dB) |     |     |     |    |    |    |    | Overall L <sub>w</sub> (dB) |
|--------------|----------------|-------------------------------------------------|-----|-----|-----|----|----|----|----|-----------------------------|
|              |                | 63                                              | 125 | 250 | 500 | 1k | 2k | 4k | 8k |                             |
| Samsung      | AC052RNNDKG/EU | 56                                              | 56  | 56  | 57  | 50 | 44 | 37 | 31 | 56                          |
| Samsung      | AC071RNNDKG/EU | 57                                              | 57  | 58  | 58  | 52 | 47 | 39 | 33 | 58                          |

Table 4 – Manufacturers Sound Power Levels

As it is not known which cassette type is in each flat, this assessment is based on a conservative worst-case scenario and assumes that the louder AC071RNNDKG/EU cassette is used throughout. The manufacturers data (available in Appendix D) provides a sound pressure level at 1.5m from the cassette of 36dBA, 40dBA and 42dBA respective of the low, medium and high operating modes. It can therefore be assumed that when operating on low, the sound power level would be approximately 6dB quieter than that provided in the table above.

Flats 2-6 will have 150mm diameter splits coming from the existing cassette to serve the different rooms within the dwelling. Flat 1 is to use the main cassette only, with no additional splits or take offs proposed.

In line with BS8233, an NR20 criteria has been adopted for bedrooms. Whilst this is recommended for hotel bedrooms, the same principle is still applicable. For living rooms, an NR25 criterion has been adopted. This ensures that contribution from the mechanical ventilation system does not actively contribute to the internal sound pressure level within the flats.

Calculations including duct attenuation and end reflections show that mitigation will be necessary to meet the above criteria. The table below highlights the required insertion loss values to meet the criterion. An example in-line silencer suitable for Flats 2-6 is the Acoustica CP01-M15-120 Cylindrical 150mm silencer, which should be installed between the cassette and the end termination in each room.

| Location  | Minimum Insertion Loss Values (Hz, dB) |     |     |     |    |    |    |    |
|-----------|----------------------------------------|-----|-----|-----|----|----|----|----|
|           | 63                                     | 125 | 250 | 500 | 1k | 2k | 4k | 8k |
| Flat 1    | 0                                      | 10  | 19  | 26  | 23 | 22 | 16 | 12 |
| Flats 2-6 | 10                                     | 14  | 17  | 34  | 41 | 40 | 36 | 20 |

*Table 5 – Required Insertion Loss Values*

Due to the proposed ventilation set up in flat 1, an in-line silencer cannot be specified as the cassette is located within the living room. Instead, it is recommended that the cassette is either replaced with a quieter system or is moved into a non-sensitive area, such as a corridor or WC. It must be ensured that the adjusted system complies with Approved Document F.

The ventilation system should not give rise to any whistling or rattling noise which could be intrusive.

## Conclusion

A baseline survey has been conducted to assess the prevalence of noise associated with commercial sources incident on the proposed development building. Based on the subjective impression of the visiting consultant and the measured data from the survey, it is concluded that whilst the site would be influenced by commercial noise, this can be adequately mitigated with the existing façade construction. As permitted development applications only require the assessment of commercial noise, the site is considered suitable for a Prior Approval application. It should be noted however that this outcome relies on windows within the development being closed, and as such, it must be ensured that adequate levels of background ventilation can be provided via other means. This does not mean that it is recommended that windows are 'sealed closed', and opening windows could still be used to provide purge ventilation at the occupants' discretion.

The existing separating floor between the lower ground floor commercial space and the upper ground floor residences should be upgraded to the specification provided, capable of achieving upwards of 55dB  $D_{nT,w} + C_{tr}$ .

In order to provide appropriate levels of ventilation, the applicant intends to utilise mechanical systems. Providing the advice provided in this report is adhered to, internal noise levels are expected to be within



the required criteria (NR20 in bedrooms and NR25 in living rooms). It should be noted that this includes the installation of silencers and the relocation of the cassette unit in flat 1. The criteria have been selected in order to ensure the internal ambient sound levels defined within BS8233 are achieved, and also ensures that the contribution per octave band frequency is also controlled.

The findings of this report will require written approval from the Local Authority prior to work commencing.

## Appendix A – Measurement Equipment

| Piece of Equipment                     | Serial No. |
|----------------------------------------|------------|
| Svantek 971A Class 1 Sound Level Meter | 141417     |
| Svantek 971A Class 1 Sound Level Meter | 141420     |
| Svantek Calibrator SV33B               | 125636     |

*Table 6 – Measurement Equipment*

All equipment used during the survey was field calibrated at the start and end of the measurement period with negligible deviation noted. All sound level meters are calibrated every 24 months, and all calibrators are calibrated every 12 months by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

## Appendix B – Meteorological Conditions

As the environmental noise survey was carried out over a long un-manned period no localised records of weather conditions were taken. However, all measurements have been compared with met office weather data of the area, specifically the closest weather station, and the data from the weather station is outlined in the table below. When reviewing the time history of the noise measurements, any scenarios that were considered potentially to be affected by the local weather conditions have been omitted. The analysis of the noise data includes statistical and percentile analysis and review of minimum and maximum values, which aids in the preclusion of any periods of undesirable weather conditions. The weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 Description and Measurement of Environmental Noise. The table below presents the average temperature, wind speed and rainfall range for each 24-hour period during the entire measurement.

| Weather Conditions – Tilehurst (Approx. 4.5m NW of Site) |               |               |                           |                  |
|----------------------------------------------------------|---------------|---------------|---------------------------|------------------|
| Time Period                                              | Air Temp (°C) | Rainfall (mm) | Prevailing Wind Direction | Wind Speed (m/s) |
| 02/05/25 – 00:00 – 23:59                                 | 12.9 – 25.0   | 0.0           | SSW                       | 0.0 – 2.4        |
| 03/05/25 – 00:00 – 23:59                                 | 7.2 – 21.3    | 0.0           | SW                        | 0.0 – 3.8        |
| 04/05/25 – 00:00 – 23:59                                 | 5.6 – 15.5    | 0.1           | SSW                       | 0.0 – 3.2        |
| 05/05/25 – 00:00 – 23:59                                 | 4.3 – 14.5    | 0.0           | SSW                       | 0.0 – 2.5        |

*Table 7 – Weather Conditions*

## Appendix C – Noise Survey Time History Graphs

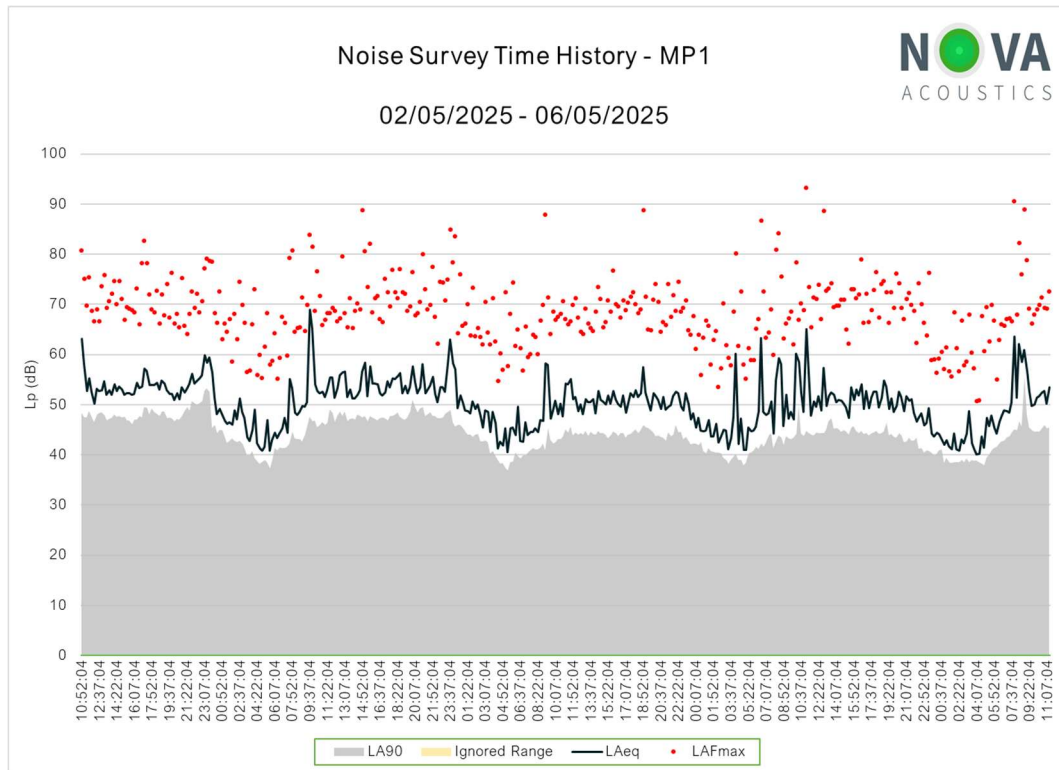


Figure 4 – MP1 Noise Survey Time History (External)

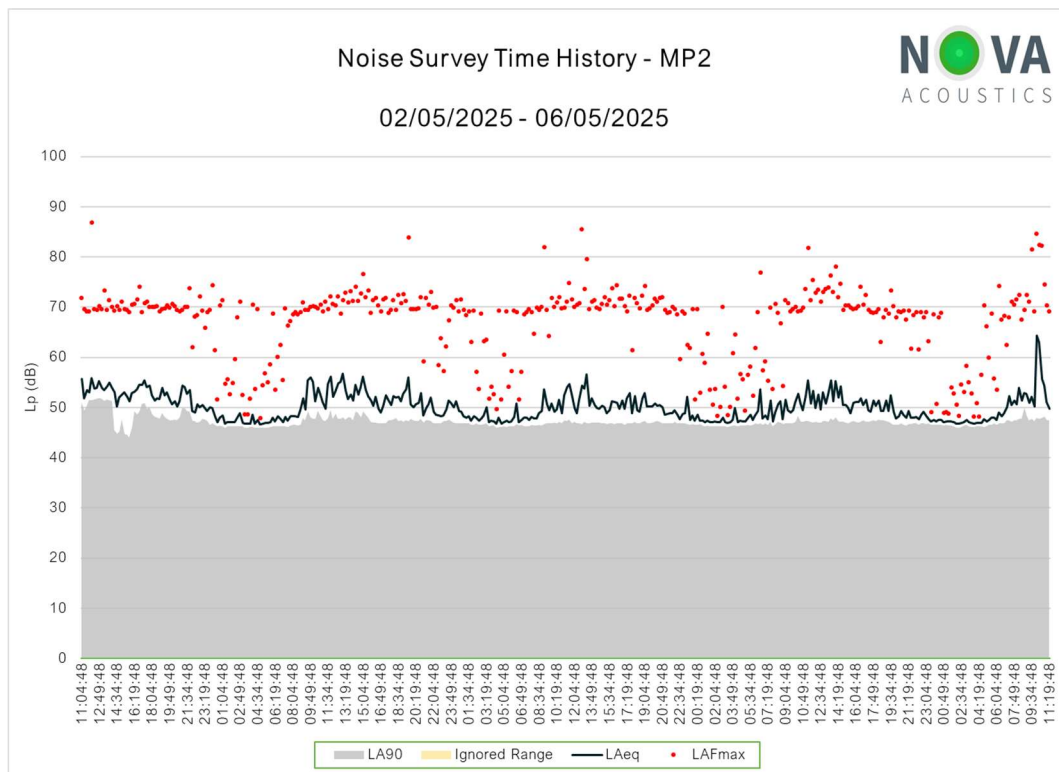


Figure 5 – MP2 Noise Survey Time History (External)

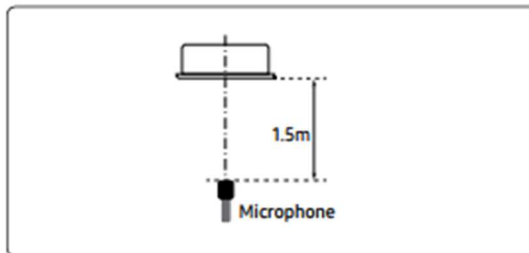
## Appendix D – Manufacturers Data Sheet

### 7. Sound Data

#### Wind-Free 4Way Cassette (600x600)

##### Sound Pressure level

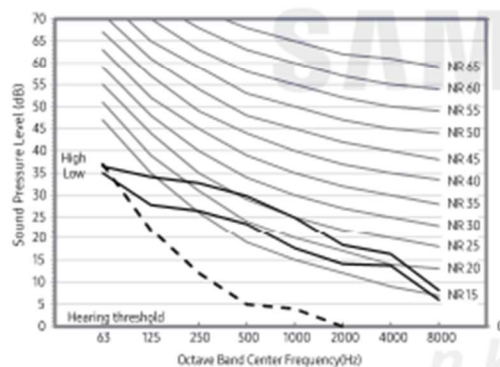
Unit: dB(A)



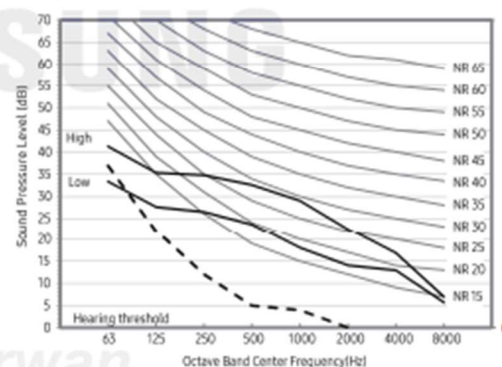
| Model          | HIGH | MID | LOW |
|----------------|------|-----|-----|
| AC026RNNDKG/EU | 31   | 28  | 25  |
| AC035RNNDKG/EU | 34   | 30  | 25  |
| AC052RNNDKG/EU | 39   | 34  | 29  |
| AC071RNNDKG/EU | 42   | 40  | 36  |

##### NR Curve

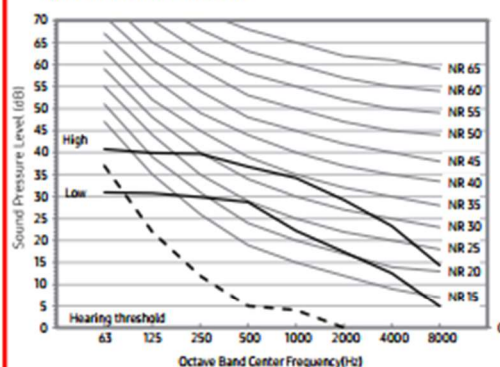
###### 1) AC026RNNDKG/EU



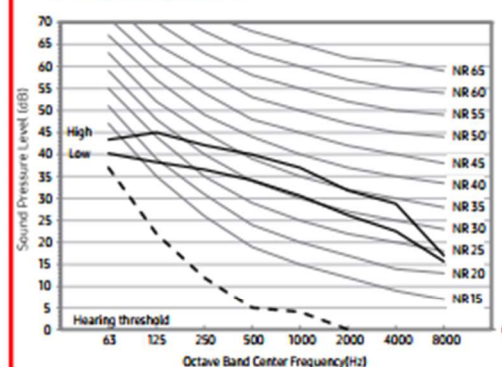
###### 2) AC035RNNDKG/EU



###### 3) AC052RNNDKG/EU



###### 4) AC071RNNDKG/EU



##### NOTE

- Specifications may be subject to change without prior notice.
- Sound pressure level is obtained in an anechoic room.
- Sound pressure level is a relative value, depending on the distance and acoustic environment.
- Sound pressure level may differ depending on operation condition.
- dBA = A weighted sound pressure level
- Reference acoustic pressure 0 dB = 20μPa

## 7. Sound Data

### Wind-Free 4Way Cassette (600x600)

#### Sound Power level

##### NOTE

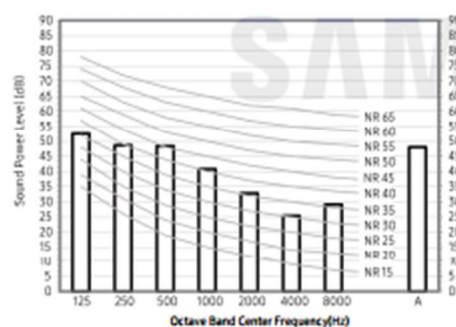
- Specifications may be subject to change without prior notice
- Sound power level is an absolute value that a sound source generates.
- dB(A) = A-weighted sound power level.
- Reference power : 1pW.
- Measured according to ISO 3741.

Unit: dB(A)

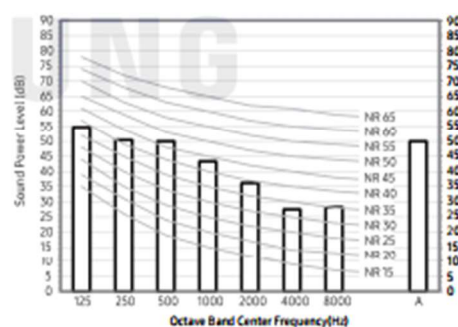
| Model          | Power |
|----------------|-------|
| AC026RNNDKG/EU | 48    |
| AC035RNNDKG/EU | 50    |
| AC052RNNDKG/EU | 56    |
| AC071RNNDKG/EU | 58    |

#### NR Curve

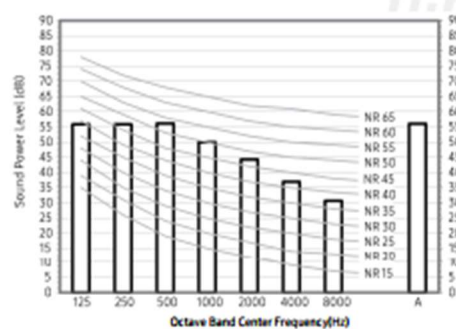
##### 1) AC026RNNDKG/EU



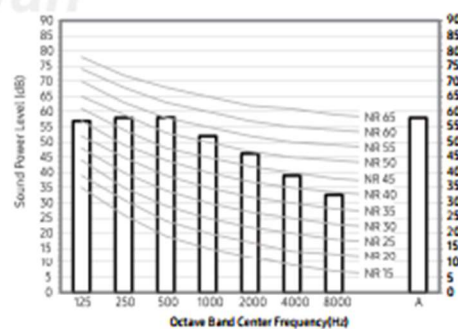
##### 2) AC035RNNDKG/EU

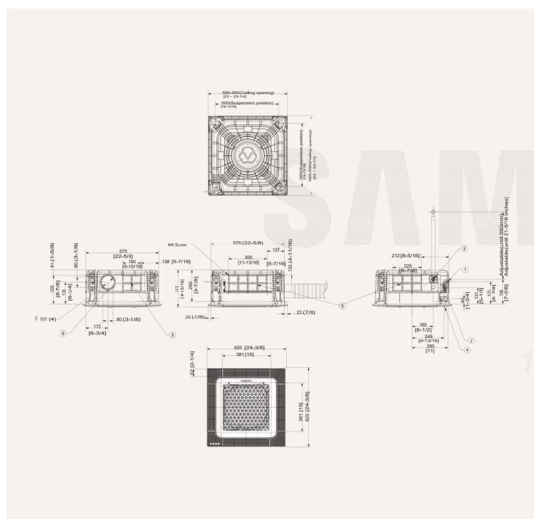


##### 3) AC052RNNDKG/EU



##### 4) AC071RNNDKG/EU





# Specifications



Wind-Free™ Mini 4-Way Cassette **R32** **NEW**

| Indoor Unit<br>Outdoor Unit- Mono-Phase<br>Outdoor Unit- Tri-Phase |                                      |        | AC026RNNDKG/EU<br>AC026RXADKG/EU | AC035RNNDKG/EU<br>AC035RXADKG/EU | AC052RNNDKG/EU<br>AC052RXADKG/EU | AC071RNNDKG/EU<br>AC071RXADKG/EU |
|--------------------------------------------------------------------|--------------------------------------|--------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
| <b>Capacity</b>                                                    |                                      |        |                                  |                                  |                                  |                                  |
|                                                                    | Cooling (Min/Nominal/Max)            | kW     | 0.87 / 2.60 / 4.10               | 0.88 / 3.50 / 4.50               | 1.30 / 5.00 / 6.20               | 1.50 / 6.80 / 8.30               |
|                                                                    | Heating up to +7°C (Min/Nominal/Max) | kW     | 0.98 / 3.40 / 4.10               | 1.00 / 4.00 / 4.80               | 1.30 / 5.50 / 7.50               | 1.90 / 7.50 / 9.00               |
|                                                                    | Heating @ -5°C                       | kW     | 3.3                              | 3.9                              | 5.4                              | 7.4                              |
|                                                                    | Heating @ -15°C                      | kW     | 3.00                             | 3.5                              | 4.8                              | 6.5                              |
| <b>Performance</b>                                                 |                                      |        |                                  |                                  |                                  |                                  |
| Energy Efficiency<br>Cooling                                       | SEER                                 | W/W    | 7.1 / A++                        | 7.0 / A++                        | 6.7 / A++                        | 6.1 / A++                        |
|                                                                    | Consumption                          | kWh/a  | 128                              | 175                              | 251                              | 390                              |
|                                                                    | Pdesignc                             | kW     | 2.6                              | 3.5                              | 5.0                              | 6.8                              |
|                                                                    | EER                                  | W/W    | 3.88                             | 3.4                              | 3.27                             | 2.47                             |
| Energy Efficiency<br>Heating                                       | SCOP                                 | W/W    | 4.3 / A+                         | 4.3 / A+                         | 4.2 / A+                         | 3.8 / A                          |
|                                                                    | Consumption                          | kWh/a  | 684                              | 684                              | 800                              | 1474                             |
|                                                                    | Pdesignh (average)                   | kW     | 2.1                              | 2.1                              | 2.4                              | 4.0                              |
|                                                                    | COP                                  | W/W    | 3.69                             | 3.33                             | 3.62                             | 2.68                             |
| AirFlow Rate                                                       | Indoor Unit (High/Mid/Low)           | m3/min | 30.0                             | 30.0                             | 40.0                             | 51.0                             |
| Sound Power                                                        | Indoor Unit                          | dB(A)  | 48                               | 50                               | 56                               | 58                               |
|                                                                    | Outdoor Unit                         | dB(A)  | 59                               | 61                               | 62                               | 65                               |
| Sound Pressure                                                     | Indoor Unit (Silent/Low/Mid/High)    | dB(A)  | 25 / 28 / 31                     | 25 / 30 / 34                     | 29 / 34 / 39                     | 36 / 39 / 42                     |
|                                                                    | Outdoor Unit                         | dB(A)  | 46/47                            | 48/48                            | 48/48                            | 49/51                            |
| Fan/ Outdoor unit                                                  | Type                                 |        | Turbo                            | Turbo                            | Turbo                            | Turbo                            |
|                                                                    | Power                                | W      | 65                               | 65                               | 65                               | 65                               |
|                                                                    | Number                               | EA     | 1                                | 1                                | 1                                | 1                                |

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