



EASTLEIGH COURT, BISHOPSTROW, WARMINSTER
PLANNING NOISE ASSESSMENT

On behalf of:
Kindred Living Project Ltd



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PLANNING NOISE ASSESSMENT

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1. INTRODUCTION

- 1.1 Hepworth Acoustics was commissioned by Kindred Living Project Ltd to carry out a planning noise assessment in connection with a proposed new pavilion building and pool house facilities at Eastleigh Court, Bishopstrow, Warminster.

Application Description from Planning Consultant

- 1.2 Kindred Living Project propose to turn Eastleigh Court and the former Eastleigh Court Stables into luxury short stay self-catering accommodation where guests can also hold celebrations and events.
- 1.3 Planning permission is sought for the change of use of Eastleigh Court from Use Class E Offices to short stay rental accommodation. In addition, planning permission and listed building consent is sought for internal and external repair, restoration and enhancement works, including the demolition of the existing ground floor extension and the provision of a new single storey extension.
- 1.4 The scheme also proposes the construction of a new pavilion building to deliver an ancillary acoustically treated events space and pool house facilities, along with a new outdoor swimming pool.
- 1.5 As part of their stay, guests will be able to use the new extension in Eastleigh Court for seated dining of up to 60 people. For events involving more than 60 seated guests the option will be available to hire a marquee, and a designated landscaped space will be provided away from neighbouring properties.
- 1.6 Following Kindred Living Project's purchase of the adjacent former Eastleigh Court stables building, the properties have been reunited under a single ownership. The former stables are currently in Use Class C3 use and planning permission is also sought for the change of use of the property from residential to short stay. It will be possible for the former stables and Court properties to be rented together or separately. It will not be possible for either the Court or the former stables to be rented by the room.
- 1.7 Both properties will only be available for short-term rentals with a minimum rental period of 3 nights and 4 days. The properties will be managed by a house manager who lives in Bishopstrow village. No staff will be living on site.
- 1.8 A detailed landscaping masterplan is proposed, which seeks to optimise the introduction of new planting including a large number of new trees and a pond. The design and layout has been configured to introduce biodiverse planting and areas of both formal planting and low maintenance grasses.
- 1.9 Sufficient new parking spaces are proposed within the grounds to provide for the parking requirements of overnight and day guests, contractors and staff. A new substation is also proposed within the grounds to serve the entire property.

Scope of Noise Assessment

- 1.10 An aerial view of the development site and immediate local area is shown in **Figure 1**. The Eastleigh court premises is located to the west of Bishopstrow Road and south of Bishopstrow College.
- 1.11 The proposals include a new pavilion that will host weddings and corporate events to accommodate up to 120 guests, which, along with associated activities is the focus of the noise assessment. The location of the pavilion is indicated in **Figure 1**.
- 1.12 The nearest dwellings to the pavilion and associated parking are located to the north-east off Bishopstrow Road, as highlighted in **Figure 1**.
- 1.13 This planning noise assessment has been requested based on the following feedback received from Wiltshire Council during pre-application discussions:

Noise may be a concern from events and guests so details of how the applicant intends to address this and limit disturbance should be supplied with any future application.

- 1.14 The proposed Development layout is shown in **Figure 2**.
- 1.15 The noise assessment has included:
- An inspection of the development site and environs;
 - A baseline noise survey over weekday and weekend periods;
 - Assessment of the potential noise impact from entertainment music noise breakout;
 - Assessment of the potential noise impact from guests using outdoor amenity areas;
 - Assessment of the potential noise impact from guest vehicles arriving, leaving and parking;
 - Assessment of the potential noise impact from new external plant; and,
 - Recommendations for noise insulation, mitigation measures and management strategies.
- 1.16 This report does not include assessment of potential noise ingress into the Eastleigh Court guestrooms themselves, as Eastleigh Court will only be used in association with the pavilion (i.e. unrelated guests will not be able to book out accommodation at Eastleigh court during an event at the pavilion, only guests attending the event at the new pavilion will be able to book Eastleigh Court accommodation). Furthermore, Eastleigh court is an existing listed building meaning that scope for modification to the building envelope is limited, and external ambient noise levels in the area are low due to the distance the building is set back from the nearest road.
- 1.17 The proposals for the small extension to the existing court building do not include amplified entertainment such as music and live DJs and as it is an enclosed building, there is not anticipated to be any adverse noise impacts from use of the court extension.

- 1.18 While planning permission is sort for the change of use of the former Eastleigh Court Stables to short stay accommodation, no physical works are involved. The property is currently in residential use following refurbishment works.
- 1.19 Guests will be able to hire the former Eastleigh Court Stables in conjunction with Eastleigh Court to provide accommodation for people attending a celebration or wedding. However, the former will only be used as sleeping accommodation and all the activities associated with the celebration or wedding will be held within the Pavilion or Court dining space. DJ sets and other amplified music will be located within the Pavilion which is acoustically attenuated.
- 1.20 When guests hire the former stables without the Court, this will only be for sleeping accommodation and the enjoyment of the existing facilities associated with that property in the same way that the residential use is operated now.
- 1.21 The recommendations in this report have been provided with respect to acoustic considerations only. All compliance with other aspects of the development design (e.g. structural, fire, ventilation, overheating, transportation etc.) will need to be checked and confirmed by others. The various acoustics indices referred to in this report are described in **Appendix A**.

2. POLICY & GUIDANCE

National Planning Policy Framework 2025

- 2.1 The National Planning Policy Framework February 2025 (NPPF) includes the following relevant paragraphs with respect to noise and planning:

Paragraph 187

Planning policies and decisions should contribute to and enhance the natural and local environment by:

... e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. ...

Paragraph 198

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 impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

Noise Policy Statement for England 2010

- 2.2 The Noise Policy Statement for England 2010 (NPSE) includes three aims:

- I. Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
- II. Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*
- III. Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.*

British Standard 4142:2014+A1:2019

- 2.3 British Standard 4142:2014+A1:2019, *Methods for rating and assessing industrial and commercial sound* (BS4142) is appropriate guidance for assessing the potential noise impact from new plant noise sources.
- 2.4 BS 4142 requires a Rating Level ($L_{A,r,T,r}$), which is calculated from the operation of the noise source, to be compared with the Background Sound Level ($L_{A90,T}$), which is measured in the absence of the noise source. This is evaluated over a 1-hour period for daytime operations and a 15-minute period for night-time operations.
- 2.5 The Rating Level ($L_{A,r,T,r}$) is based on the Specific Sound Level ($L_{Aeq,T,r}$) attributed to the operating noise source, with 'character corrections' added for noise sources where 'certain acoustic features can increase the significance of impact'.
- 2.6 The character correction applied to the Specific Sound Level in order to obtain the Rating Level can take into account tonality, intermittency, impulsivity and characteristics otherwise distinctive against the prevailing noise climate in the area.
- 2.7 An initial estimate of the potential noise impact from the operating noise source is determined by comparing the difference between the Rating Level and the Background Sound Level.
- 2.8 Regarding the outcome of the initial numerical estimate, BS 4142 states that:
- Typically, the greater this difference, the greater the magnitude of impact;
 - A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;
 - A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,
 - The lower the Rating Level is relative to the measured background level, the less likely it is that the operation will have an adverse impact or a significant adverse impact. Where the Rating Level is does not exceed the Background Sound Level, this is an indication of the specific sound source having low impact, depending on the context.
- 2.9 BS 4142 states that all pertinent factors must be taken into account regarding the context in which the noise occurs, including:
- The absolute level of sound.
 - The character and level of the residual sound compared to the specific sound; and,
 - The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that ensure good internal and/or outdoor acoustic conditions such as acoustic screening.

- 2.10 The initial numerical assessment and the context are then both taken into account when determining the potential noise impact in line with BS 4142 guidance.

Planning Consultation Guidance Notes – Wiltshire Council

- 2.11 URL: <https://www.wiltshire.gov.uk/article/8694>, last accessed on Friday 7 November 2025.
- 2.12 Planning Consultation Guidance Notes – Wiltshire Council includes guidance on the Wiltshire Council expectations and requirements for noise assessment for various application types. The relevant requirements have been set out below.

Loud Music from Entertainment Premises

A planning application for a new entertainment venue that is structurally detached from other building uses should demonstrate that music noise from the proposal will not be 'audible' in nearby residential properties, assuming that the residential properties in question have their windows open. The criterion here is:

Music noise Level (LAeq,5min) should be controlled to 5 dB below the typical background noise level (LA90) in each octave band at façade of the nearest noise sensitive property.

People Noise from Entertainment Premises

Any noise assessment for entertainment premises must assess the impact of people noise on residential dwellings. This is especially important if there are outdoor areas where people will use/congregate. For such locations, we expect the noise assessment to assume that each person is talks in raised voices at a level 64 dB LAeq - this assumes a 50/50 split between male and female. ...

Noise calculations should assume that 50% of people are talking at any given time. ...

When assessing people noise, it is important for any noise assessment to consider the context of the location where any impact occurs and an assessment in consideration of background levels calculated at the most sensitive period of the entertainment venue's operating hours is an important part of this impact assessment process. The final 30 minutes prior to closing is considered the most appropriate time to calculate the background level as this is the time when roads are likely to be quietest and occupiers in nearby residential dwellings will be trying to sleep. It is the comparison between the background and ambient sound levels that identifies whether mitigation is considered necessary and whether this mitigation is adequate to reduce the noise impact from patrons.

People noise (LAeq,5min) should not exceed the typical background noise level (LA90) at the façade of the nearest noise sensitive location.

Introduction of New Commercial Noise Source

For most proposed industrial and commercial noise sources, an assessment in line with BS4142 should be carried out at the façade of noise sensitive premises. One of the indications of the impact of a BS 4142 assessment is the lower the rating level is relative 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.

New developments should contribute and enhance the area in which they are located and where possible i.e. prevent 'noise creep', contribute to the improvement of people's health and quality of life as per the NPSE. Therefore, the design objective should be:

The development should be designed so as to achieve a rating level of 5 dB (LAeq) below the typical background (LA90) level at the nearest noise sensitive location.

Where this criterion cannot be achieved, the various noise control measures considered as part of the assessment should be fully explained (i.e. relocation of noise sources, use of quieter equipment, enclosures, screening, restriction of the hours of operation) and the achievable noise level should be identified. This information will allow a judgement to be made concerning the application and its likely impact on the surrounding area. In addition to the above, maximum noise levels should also be adequately controlled.

Background and ambient noise levels shall be representative of the existing noise levels at the most sensitive time during the proposed period(s) of operation. Where different operating regimes are proposed (for example daytime, evening and night-time), background and ambient noise levels shall be determined for each operating period.

In addition to the above assessment, the applicant should assess the maximum noise levels (LAFmax) from the development that are expected to occur between the hours of 19:00 and 07:00. Overnight monitoring will be necessary where the external LAFmax sound levels are likely to exceed 60 dB during the night period at the façade of the nearest noise sensitive dwelling.

Deliveries and collections are usually controlled by restricting operational hours but depending on the extent of these activities, a Noise Management Plan (NMP) may be requested, which would include an assessment of noise. This would usually involve assessing the noise upon arrival, loading/unloading period and then departure. ...

Noise from fixed plant or equipment should be selected, located and designed to achieve the criteria above. ...

3. NOISE SURVEY

- 3.1 Noise monitoring was carried out to quantify the prevailing existing noise climate in the area, at a location representative of the nearest dwellings to the north-east.
- 3.2 Automated noise monitoring was carried out at **Location A** shown in **Figure 1** between 13:15 on Thursday 3 April 2025 and 02:10 on Tuesday 8 April 2025, to establish the existing ambient and background noise levels in the area during weekday and weekend periods.
- 3.3 Some landscaping works were being undertaken on the site at the time of the noise monitoring, generally in the area highlighted in **Figure 1**. Location A was selected as suitably representative of the noise climate at the nearest dwellings, whilst also being far enough back from the landscaping works so that contributions to the noise monitoring from the works were minimised.
- 3.4 Fully calibrated ‘Class 1’ sound instrumentation was used for the noise monitoring with associated outdoor noise monitoring kit and windshield. Full details of the measurement equipment used for the monitoring is provided in **Appendix B**.
- 3.5 The noise measurements were taken in 5-minute periods at a microphone height of approximately 1.4 metres above the ground. Calibration checks were carried out both before and after the noise surveys with no variance in calibration level outside of normal drift tolerance (± 0.2 dB). The equipment was setup with 1/3 octave band frequency analysis and continuous audio recording for post processing sound source identification.
- 3.6 Weather conditions during the noise monitoring were suitable for sound level measurements, being generally dry with low wind speeds. Full details of the weather conditions during the noise monitoring are provided in **Appendix B**.
- 3.7 The noise monitoring results were reviewed using NTi Audio Data Explorer software, including audio recording playback and sonogram analysis. The noise climate was generally comprised of distant road traffic noise and bird song, with the occasional noise from distant aircraft. The most noticeable peaks of noise were the result of loud motorbikes passing on Bishopstrow Road. Some brief periods were identified where noise from the landscaping works were noticeable on the audio recordings and therefore contributing to the measured sound pressure level. These periods of works noise are excluded from the noise survey results discussed in the body of this report, and a list of the excluded data points is provided in **Appendix B**.
- 3.8 The full unprocessed results of the noise monitoring are shown in **Appendix B** and a summary of the processed results (i.e. excluding brief periods of rain and noise from extraneous landscaping works) showing the range of measured sound levels during different periods, as well as the corresponding arithmetic ($L_{A90,T}$ and L_{Amax}) and logarithmic ($L_{Aeq,T}$) means is shown in **Table 1**.

Table 1: Summary of Noise Monitoring Results at Location A – Minimum-Maximum (Mean) [dB]

Period	$L_{A90,5\text{ min}}$	$L_{Aeq,5\text{ min}}$	L_{Amax}
Thursday 3, Day (13:15-23:00)	27-48 (40)	33-54 (46)	43-74 (55)
Thursday 3, Night (23:00-07:00)	24-46 (31)	26-50 (40)	35-66 (45)
Friday 4, Day (07:00-23:00)	32-52 (43)	35-54 (48)	43-74 (57)
Friday 4, Night (23:00-07:00)	27-45 (32)	28-50 (41)	31-65 (45)
Saturday 5, Day (07:00-23:00)	30-48 (41)	33-57 (49)	40-74 (58)
Saturday 5, Night (23:00-07:00)	25-47 (30)	26-53 (42)	33-76 (45)
Sunday 6, Day (07:00-23:00)	29-44 (39)	34-55 (46)	41-72 (57)
Sunday 6, Night (23:00-07:00)	23-48 (30)	25-54 (37)	31-68 (45)
Monday 7, Day (07:00-23:00)	31-47 (38)	36-55 (45)	43-80 (58)
Monday 7, Night (23:00-02:10)	26-36 (30)	29-41 (36)	36-53 (44)

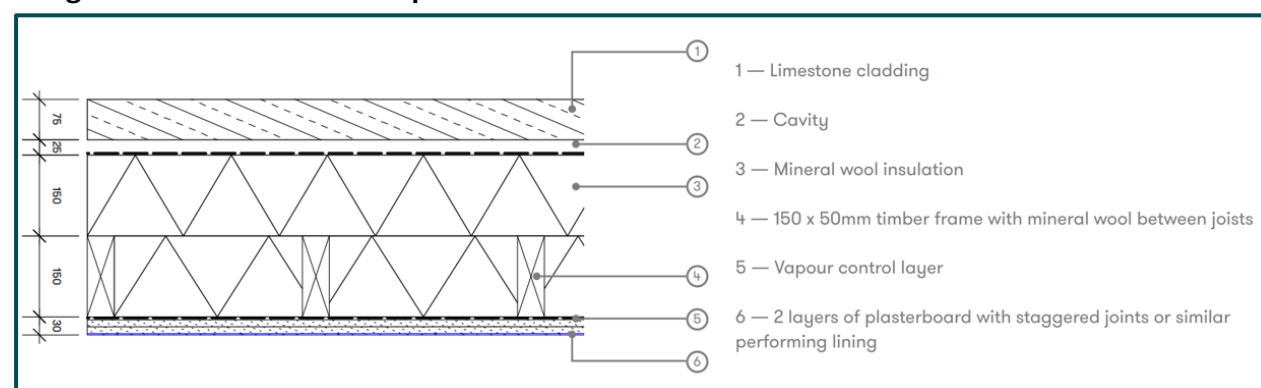
- 3.9 The noise monitoring results in **Table 1** are fairly low/moderate sound levels. The results of the noise survey provide a baseline of the existing noise climate conditions in the area, which is used in the assessment of potential noise impacts from various noise sources throughout the rest of this report.

4. NOISE FROM ENTERTAINMENT MUSIC

Proposals

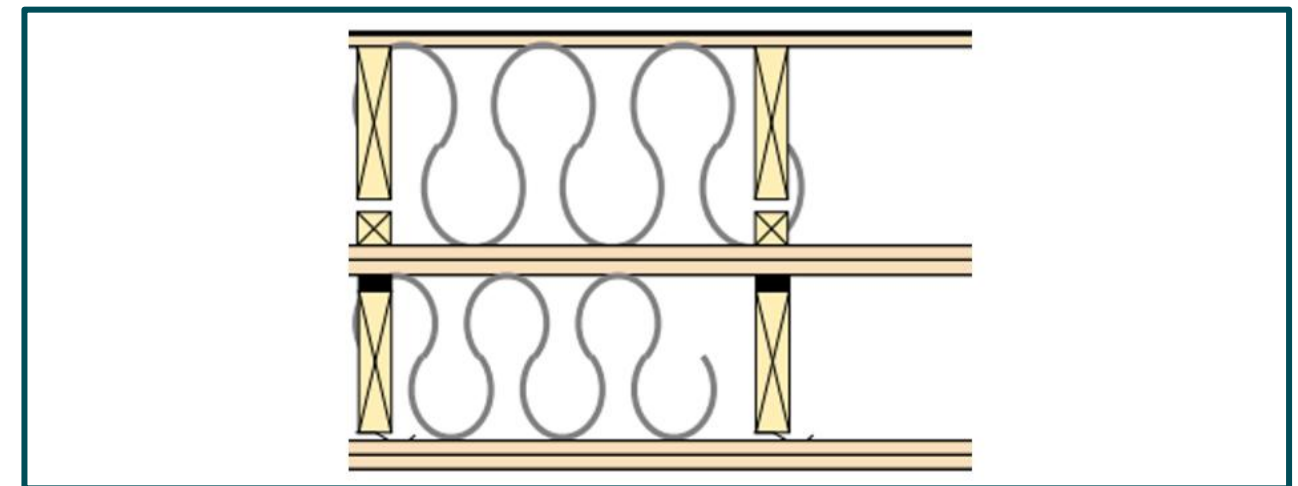
- 4.1 The layout proposals for the new pavilion building are shown in **Figure 3**. The proposals include a main central event space with a stage and a bar. The layout is arranged so that much of the event space is buffered from the external elevations by intervening rooms including the gym and plant rooms etc.
- 4.2 We have been informed that event space will be used for celebrations and parties including wedding breakfasts, normal dining background music, speeches/public address using microphones, as well as late evening music entertainment/dance. This could include live musicians as well as DJs.
- 4.3 We have been asked to consider entertainment music noise that could potentially play up until 00:00 midnight.
- 4.4 The proposed elevation drawings for the new pavilion are shown in **Figures 4-7**, and a section drawing is shown in **Figures 8**.
- 4.5 The architect has provided a sketch of the proposed external wall build-up as shown in **Image 1**. The construction is as follows (external to internal):
- 50-100mm thick limestone block.
 - 25mm gap and damp proof membrane.
 - 150mm thick mineral wool.
 - Timber studs with 150mm thick mineral wool between them.
 - 25mm gap and damp proof membrane.
 - Internal wall to be determined, but likely plasterboard.

Image 1: External Wall Build-up Sketch



- 4.6 We have worked with the architect to specify a high sound insulation performance roof construction as shown in **Image 2**.

Image 2: Pavilion Event Space Roof Construction



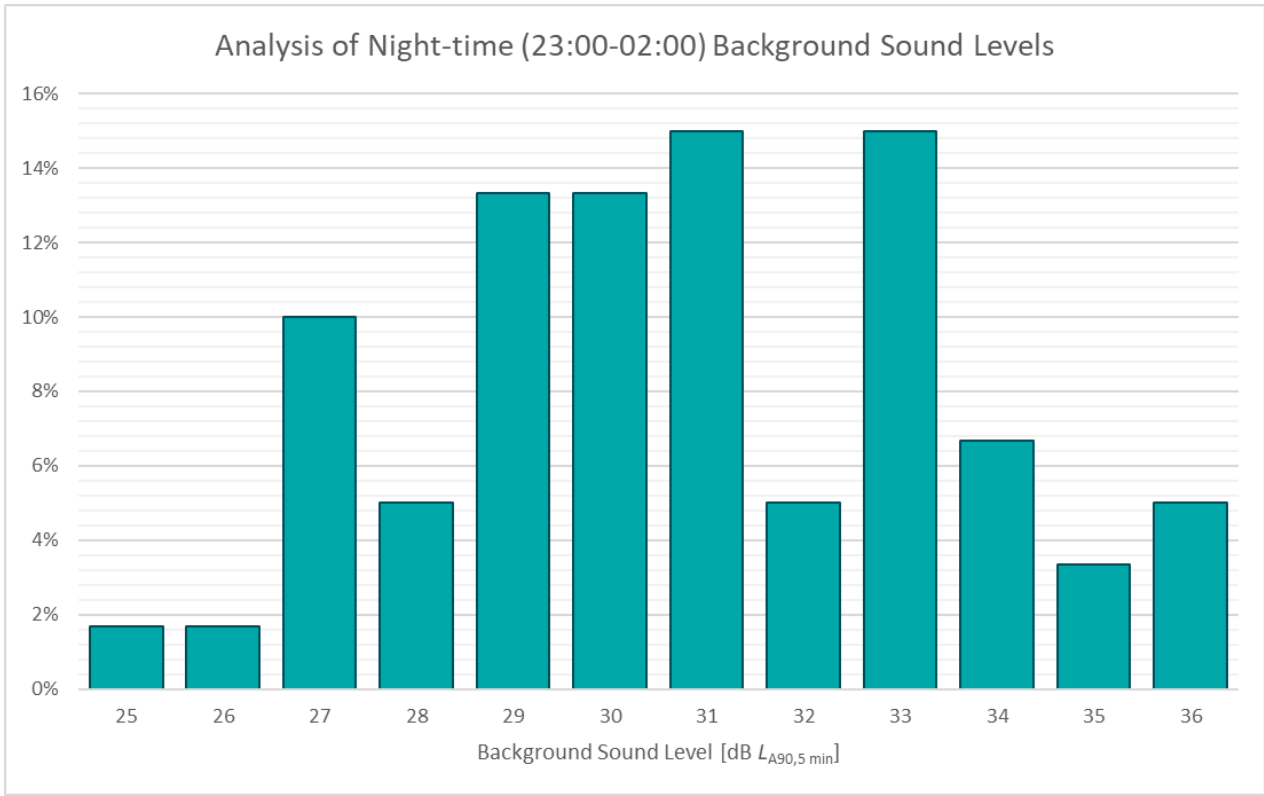
- 4.7 The roof construction build-up is as follows (top down):
- 1mm thick standing seam copper roof, on membrane on 1 x 22mm plywood.
 - 300mm mineral wool.
 - 2 x 22mm plywood.
 - Resilient batten system forming minimum 250mm cavity with 250mm mineral wool.
 - 2 x 22mm plywood.
- 4.8 Originally, proposals for the glazed elements of the building envelope are for Jansen Janisol Hi triple glazing, however secondary glazing (which has better low frequency sound insulation performance) has now been incorporated into the designs as per our recommendations. Proposals for entrances and exits are lobbied, to provide good resistance to noise breakout.
- 4.9 The proposals for the pavilion ventilation system are an internally housed air handling unit with separate intake, supply, extract and exhaust fans/ducts, with only the intake and exhaust ducts terminating externally. On this basis, the building will not rely upon passive ventilation via openable windows. The proposed mechanical ventilation system layout is shown in **Figure 9**.

Entertainment Music Noise Limits

Typical Background Sound Levels

- 4.10 We have analysed the background noise data for the periods between 23:00 and 00:00 (midnight), which are the most noise sensitive periods during which entertainment music would play in the pavilion event space. **Graph 1** shows the distribution of background sound levels during these periods from the noise survey. The arithmetic mean and mode during these periods is 31 dB $L_{A90,5 \text{ min}}$, which has been selected as representative of the typical background sound level during the late night entertainment music between 23:00 and 00:00 (midnight).

Graph 1: Distribution of Background Sound Levels from 23:00-00:00 (midnight)



Entertainment Music Noise Design Limits

4.11 Taking into account the relevant Wiltshire Council guidance summarised in **Section 2** of this report, the entertainment music noise limits outside the façade of the nearest dwelling should be 5 dB below the typical background sound level for the period of interest. The entertainment music noise limits are provided in **Table 2**.

Table 2: Entertainment Music Noise Limits Outside the Façade of the Nearest Dwelling

Entertainment Music Noise Limit [dB $L_{\text{Zeq},5 \text{ min}}$] at Octave Band Centre Frequency [Hz]								A
63	125	250	500	1k	2k	4k	8k	
33	26	22	24	23	15	11	13	26

Entertainment Music Noise Breakout Calculations

Typical Entertainment Music Noise Levels

4.12 Entertainment music noise levels in wedding venues are often louder than a bar but typically not as loud as a night club. We have adopted typical wedding entertainment music noise levels in our assessment of 95 dB $L_{\text{Aeq},5 \text{ min}}$, taken from our library of in-house noise data for similar venues. The adopted entertainment music noise levels are shown in **Table 3**.

Table 3: Adopted Wedding Venue Entertainment Music Noise Levels

Entertainment Music Noise Levels [dB $L_{\text{Zeq},5 \text{ min}}$] at Octave Band Centre Frequency [Hz]								A
63	125	250	500	1k	2k	4k	8k	
93	90	95	92	90	86	81	80	95

Building Envelope Sound Insulation Properties

- 4.13 We have used INSUL Version 8 sound insulation prediction software by Marshall Day Acoustics, to estimate the sound insulation performance of the proposed elements of the pavilion building envelope. The INSUL calculations are shown in **Appendix C**.
- 4.14 The proposed external wall construction with a single 12.4mm thick plasterboard internal lining provides an estimated sound insulation performance of 56 dB $R_w + C_{tr}$.
- 4.15 The proposed roof construction over the pavilion event space has an estimated sound insulation performance of 69 dB $R_w + C_{tr}$.
- 4.16 The proposed triple glazing has an estimated sound insulation performance of 35 dB $R_w + C_{tr}$. The proposals have high sound insulation performance properties aside from the triple glazing, which forms a limit on the sound insulation of the building at 500 Hz and below. Therefore, we have based our calculations on secondary glazing, as follows:
- 10mm glass – 200mm cavity – 6mm glass.
- 4.17 We have calculated noise breakout paths through the proposed ventilation system, including noise breakout via the ducts to the terminations and via the duct walls through the perimeter roof. The calculations have been carried out in line with CIBSE Guide B4, *Noise and vibration control for building services*, 2016.
- 4.18 The design proposals are for the AHU to be housed in a separate plant room from the pavilion event space as shown in **Figure 9**. The supply and extract ducts will be routed around the centralised pavilion event space within the perimeter roof void above the perimeter rooms as illustrated in **Figure 8**. The ducts will not be directly exposed to the centralised pavilion event space and will instead connect to the space via 13 (eight on the supply duct and five on the extract duct) smaller duct branches. The supply and extract ducts connect to the AHU in the pavilion plant room, and the AHU will then connect to separate intake and exhaust ducts, which will terminate externally at the walls via ~1m² louvres.
- 4.19 Calculating music noise break-in to the duct systems, transmission along the duct paths and breakout via the wall mounted terminations is readily possible and based on standard calculations in CIBSE Guide B4. The AHU itself will be compartmentalised with separate chambers and filters, which will provide some resistance to the passage of music noise transmission through the AHU from the supply duct to the intake duct and from the extract duct to the exhaust duct.

- 4.20 However, there is no readily available transmission loss data or guidance on calculating losses through AHU systems, which will also vary according to the exact AHU model. In this case, we have adopted a conservative estimate of a 5dB loss through the AHU itself in the music noise breakout transmission path.
- 4.21 The music noise breakout calculations via the ventilation system also take into account the duct breakout within the perimeter roof service cavity and subsequent breakout from the roof.

Music Noise Breakout Calculations

- 4.22 The nearest dwelling to the pavilion is to the north-east off Bishopstrow road (labelled **R1** in **Figure 1**) and the distance to the nearest dwelling façade is approximately 85 metres.
- 4.23 The results of our noise breakout calculations are shown in **Appendix C** and summarised in **Table 4**.

Table 4: Summary of Music Noise Breakout Calculations

Description	Values at Octave Band Centre Frequency [Hz]								A
	63	125	250	500	1k	2k	4k	8k	
Music levels in pavilion event space [dB $L_{Aeq,5min}$]	93	90	95	92	90	86	81	80	95
Music levels at nearest dwelling façade from combined paths [dB $L_{Aeq,5min}$]	31	19	18	14	12	5	6	11	18
Music noise limits [dB $L_{Aeq,5min}$]	33	26	22	24	23	15	11	13	26
Excess of level over limit [dB]	-2	-7	-4	-10	-11	-10	-5	-2	-8
Conclusion	Design with additional recommendations included in the calculations is capable of meeting limits								

Recommendations

- 4.24 To ensure that the music noise breakout calculations are representative of the finished design and to allow the pavilion event space to operate with entertainment and music until 00:00 midnight, we have provided the following recommendations:
- **Ventilation:** The mechanical ventilation system will be installed with four inline acoustic attenuators each meeting the minimum performance values shown in **Table 5**, based on SORDO-A-400-1100 (910655307). Note that the exact attenuator selection will also depend on other non-acoustic factors such as airflow requirements etc. The attenuators should be placed on the intake, exhaust, supply and extract ducts as illustrated in **Figure 10**. Note the duct layout may need to be slightly adjusted to allow for a straight duct run length of the duct diameter (400mm) or greater between any attenuators and duct bends to reduce turbulence.
 - **Ventilation:** To align with the current proposals and our assumptions in the ventilation system noise breakout calculations, the walls of the supply and extract ducts will be 20 gauge or thicker.

- **Glazing:** All glazing within the pavilion event space, windows, wall to ceiling height glazing and the rooflight, will need to be formed of secondary glazing with a minimum performance in line with the values provided in **Table 6** or better. Such a glazing system capable of achieving these performance values would be formed of 10mm glass – 200mm cavity – 6mm glass or similar.
- **Roof:** To ensure that the roof provides adequate low frequency sound insulation performance we recommend a roof build up as proposed: 1 x 18mm plywood - 300mm mineral wool - 2 x 22mm plywood - Resilient batten system forming minimum 250mm cavity with 250mm mineral wool - 2 x 22mm plywood. The high performance roof build-up directly above the event space will be separated from the perimeter roof service cavity with a baffle formed of 2 x 22mm plywood or similar.
- **Walls:** Whilst our calculations indicate that the sound insulation of the external wall should be suitable with just 1 x layer of 12.5mm thick plasterboard to the internal face, in practice two layers of plasterboard will be used with staggered and sealed joints/parameters, to avoid gaps reducing the performance. We also recommend ensuring that the outer limestone block is not rigidly connected into the building structure and is instead fixed with resilient anchor bars such as Ancon Acoustic Wall Ties or similar.
- **Doors:** The doorsets to the pavilion event space are lobbied, which is a good solution for reducing noise breakout. The doorsets themselves will also be acoustically rated and properly sealed to ensure good sound insulation via this path. Both the inner and outdoor doorsets within the lobbied entrances should ideally be rated to provide a rating of 40 dB R_w and the Store and Bin Store external doors will be rated as 40 dB R_w , as illustrated in **Figure 10**. This is at the upper performance range of acoustic doorsets so will need to be sourced and installed by a specialist acoustic doorset company.
- **Marquee:** The client will not permit loud amplified or live music played in the marquee and sound reinforcement (microphone and small speakers) in the marquee will only be used for speeches and low level background music during daytime hours only. There will be no low-frequency subwoofer style speakers in the marquee, and it will not be used for dance/entertainment.

4.25 The recommendations above have been incorporated into the design proposals moving forwards.

Table 5: Minimum Recommended Attenuator Specifications

Sound Reduction Index [dB IL] at Octave Band Centre Frequency [Hz]							
63	125	250	500	1k	2k	4k	8k
2	4	7	15	22	13	7	3

Table 6: Minimum Recommended Glazing Sound insulation Performance Specifications

Sound Reduction Index [dB R] at Octave Band Centre Frequency [Hz]								$R_w + C_{tr}$
63	125	250	500	1k	2k	4k	8k	
29	35	46	46	46	56	65	68	45

5. NOISE FROM GUESTS USING OUTDOOR AMENITY AREAS

Calculations from Guest Noise in Outdoor Amenity Areas

- 5.1 Wiltshire Council guidance summarised in **Section 2**, suggests that the background noise levels from the final 30-minutes of the proposed operating hours are used for the basis of a comparative assessment for noise from guests using designated outdoor amenity areas.
- 5.2 The arithmetic mean of the background sound levels between 23:30 and 00:00 (midnight) was 29 dB $L_{A90,5\text{ min}}$, which is considered representative of the background noise climate during this time period and has been adopted for the basis of assessment.
- 5.3 The assessment of noise from guests using the outdoor amenity spaces during the late evening operating hours for the premises has been based on the outdoor seating areas shown in **Figure 3**. It is not anticipated that all of the guests would remain on site until 23:30-00:00 (midnight) and of the remaining guests, not everyone will want to sit outside. Nevertheless, we have based our calculations on all of the outdoor seating provision around the new pavilion being used simultaneously as a worst-case, which includes 29 covers.
- 5.4 The nearest dwellings in terms of distance are located to the north-east; however, they are acoustically screened from the outdoor seating areas by the new pavilion building itself. The nearest dwelling with no acoustically significant intervening structures is the dwelling to the east. Both dwelling locations have been taken into account in our calculations and are labelled **R1** and **R2** in **Figure 1**. The calculations for guest noise are shown in **Table 7**.

Table 7: Calculations of Guest Noise in Outdoor Areas [dB]

Description	Dwelling to the north-east (R1)	Dwelling to the east (R2)
Sound Level for single voice [L_{pA} at 1 metre]	64.0	64.0
Correction for 29 guests using outdoor seats	14.6	14.6
Correction for 50% ‘on-time’	-3.0	-3.0
Acoustic screening	-6.0*	0.0
Correction for distance attenuation	-40.3 ¹	-44.5 ²
Total sound level at dwelling	29.3	31.2
Typical background sound level (23:30-00:00)	29.0	29.0
Excess of people noise over background	0.3	2.2

*Acoustic screening calculation shown in **Appendix C**.

¹ Based on a distance of 104 metres to nearest residential elevation.

² Based on a distance of 167 metres to nearest residential elevation.

- 5.5 The results in **Table 7** indicate that for the dwellings to the north-east off Bishopstrow Road (**R1**), noise from guests using the outdoor seating areas is likely to be at or below the typical background sound level even between 23:30 and 00:00 (midnight).
- 5.6 However, the calculations also indicate noise from guests in the outdoor seating areas being 2 dB above the typical background sound level for 23:30 to 00:00 (midnight) at the nearest dwelling to the east (**R2**). The Wiltshire Council guidance states that:
- People noise ($L_{Aeq,5min}$) should not exceed the typical background noise level (L_{A90}) at the façade of the nearest noise sensitive location.*
- 5.7 However, use of the outdoor spaces will be seasonal/generally only during good weather, and 2 dB is not a noticeable difference in sound level, and the guest noise is very low in absolute terms, being calculated as 31 dBA. For context, sound reduction through a partially open window typically ranges between 10-15 dB, thus the indoor noise level would be between 16-21 dBA inside the nearest dwelling to the north with the windows open. This is a very low level of noise. BS 8233:2014, which provides guidance for suitable indoor noise level criteria for new dwellings, provides an *indoor* noise design target of 30 dBA. Although it is acknowledged that BS 8233 refers to noise sources without a specific character, such as transportation noise, this would still be more than 9 dBA lower than the BS 8233 design targets.
- 5.8 With the context of the very low absolute level of noise taken into account, we consider that 2 dBA above background is acceptable in terms of planning for the development if proper noise management is implemented at the new pavilion as recommended below.

Recommendations

- 5.9 The following noise management controls should be implemented as part of the operations at the new pavilion to ensure that noise from guests in outdoor amenity areas is minimised:
- Signs must be displayed at the entrance/exit requesting customers to keep noise to a minimum.
 - Staff must be on site for the duration of events and any events lasting until 00:00 (midnight) will be fully supervised during gatherings and celebrations.
 - The outside area used by guests must be regularly inspected and monitored by staff when in use during gatherings and celebrations.
 - Staff must be trained to encourage guests to arrive/depart quietly.
 - Notices will be displayed requesting guests to leave quietly and in an orderly manner out of consideration to neighbours and their attention must be drawn to these notices by members of staff.
- 5.10 The recommendations above have been incorporated into the Operational Management Plan for the development.

Calculations from Guest Noise in the Proposed Marquee

- 5.11 The proposals include for use of a marquee for dinning and speeches during the daytime hours between 12:00-20:00. The proposed marquee location is shown in **Figure 1** and **Figure 2**. We have been informed that the venue will not have a specific marquee, but instead clients will hire a marquee of their choice, and this could include an open sided marquee.
- 5.12 An open sided marquee in terms of acoustics will essentially behave as outdoor seating, on this basis Wiltshire Council guidance and assessment methodology summarised in **Section 2**, is the relevant basis for assessing noise from guests using an open sided marquee as a worst-case.
- 5.13 We have calculated potential people noise from the marquee in line with the Wiltshire Council guidance. We consider this to be a suitable basis for assessment with other potential noise sources associated with use of the marquee being lower risk: i.e. any background music will be low level (below conversation noise) with no low-frequency subwoofers, and speeches made using a microphone and speakers would also not exceed the level of all 120 guests engaged in conversation. Given that staff will be present on site for the duration of the events and mindful of these considerations, as per the Operational Management Plan, we consider that misuse of any microphone/speaker for daytime speeches would be unlikely and acted on quickly by staff if guests are not conducting themselves in a manor respectful of the neighbours.
- 5.14 The last 30-minutes of time during which the marquee would be in use would be between 19:30-20:00, which has an arithmetic mean background sound levels of 40 dB $L_{A90,5\text{ min}}$ based on the noise survey data. This has been adopted as the representative background level for assessment of marquee noise.
- 5.15 The two nearest dwelling locations have been taken into account in our calculations and are labelled **R1** and **R2** in **Figure 1**. The calculations for guest noise are shown in **Table 8**.

Table 8: Calculations of Guest Noise in the Marquee [dB]

Description	Dwelling to the north-east (R1)	Dwelling to the east (R2)
Sound Level for single voice [L_{pA} at 1 metre]	64.0	64.0
Correction for 120 guests using open sided marquee	20.8	20.8
Correction for 50% ‘on-time’	-3.0	-3.0
Correction for distance attenuation	-43.5 ¹	-45.1 ²
Total sound level at dwelling	38.3	36.7
Typical background sound level (23:30-00:00)	40.0	40.0
Excess of people noise over background	-1.7	-3.3

¹ Based on a distance of 150 metres to nearest residential garden.

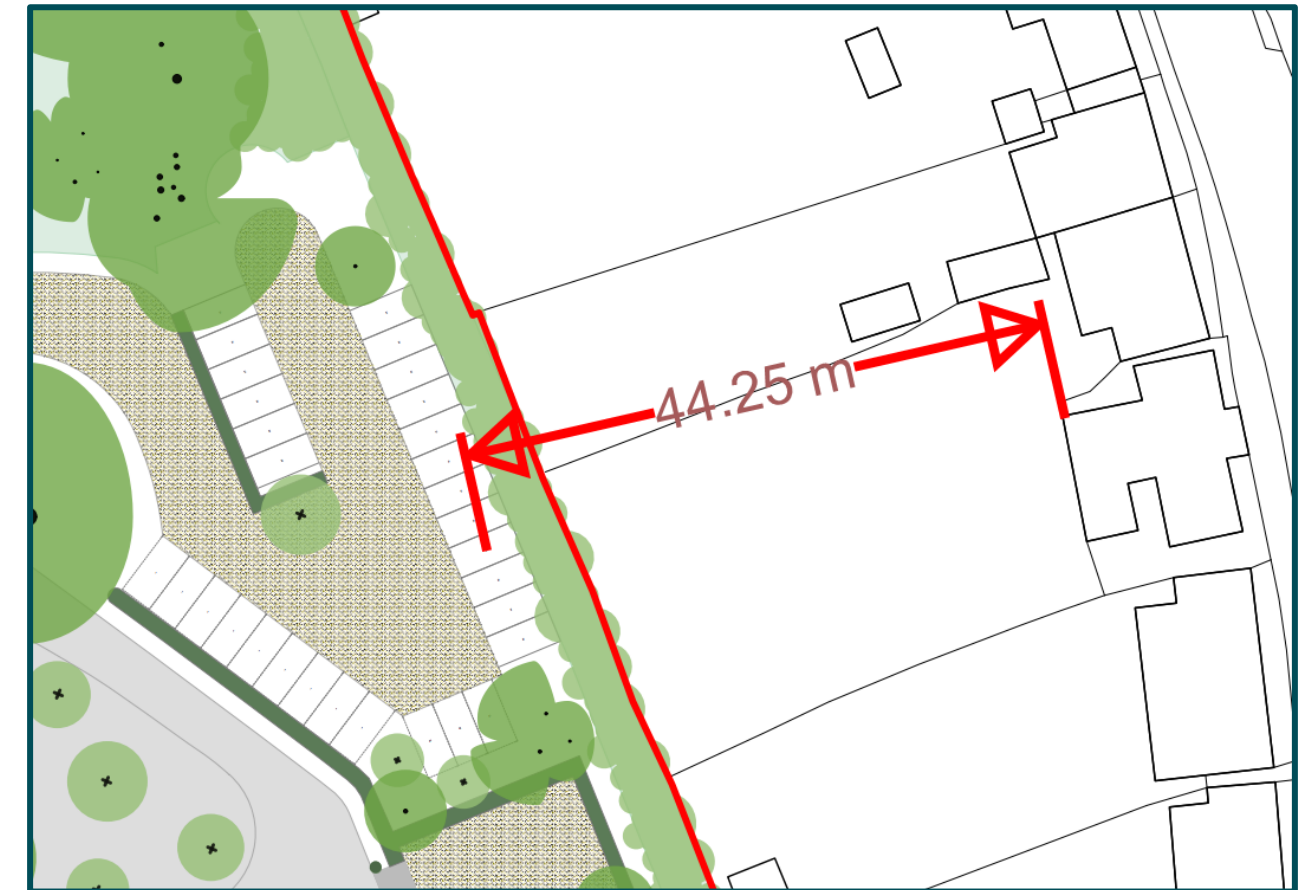
² Based on a distance of 180 metres to nearest residential garden.

- 5.16 The results in **Table 8** indicate that noise from guests using the marquee is likely to be below the typical background sound level even between 19:30 and 20:00. On this basis, no adverse noise impact from the proposed use of the marquee is anticipated.

6. NOISE FROM GUEST VEHICLES ARRIVING, LEAVING & PARKING

- 6.1 There are no specific standards or guidelines available for assessing noise from car arrivals/departures and parking. The NPPF provides some general guidance to local authorities on taking noise into account in planning policies and decisions. This includes guidance that local authorities should ‘*aim to avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development*’. However, there is as yet no specific guidance on acoustic assessment/design criteria relevant to this development provided in the NPPF, nor British Standards.
- 6.2 Whilst there is a general British Standard on noise (BS 8233:2014) and there are specific standards or guidelines for construction noise (BS 5228), industrial/commercial noise (BS 4142), road traffic noise (Noise Insulation Regulation/CRTN), etc., none of these are relevant for noise from car arrivals/departures and parking.
- 6.3 Therefore, a pragmatic approach must be adopted taking into account calculation of likely noise levels from car arrivals/departures and parking, the context of the prevailing noise climate, the times and likely pattern of use.
- 6.4 Cars manoeuvring at slow speeds within car parks (~10mph) do not generate significant levels of noise, but higher noise levels are produced, albeit briefly, by closing of car doors and car engines starting up and vehicles initially pulling off. We have undertaken calculations based on typical noise levels from car doors being closed and car engines being started with the vehicle in higher rpm when pulling off (i.e. dB L_{AE} values measured at a distance of 10 metres) that we have measured at other sites.
- 6.5 It is necessary to evaluate this noise over an appropriate time period. Daytime noise is usually assessed over the whole daytime period (i.e. 07:00-23:00) and night-time noise over the whole night period (i.e. 23:00-07:00) or typically over the proposed hours of use, or for an hourly period. For a ‘worst case’ assessment we have used a 1-hour period.
- 6.6 We have based our calculations on the worst case number of cars that would be expected to leave site between 00:00 (midnight) and 01:00 in the morning, which is the following event end time. The transport assessment for the development, ref: 10109934-Pef-Xx-Xx-Rp-Tr-000003, dated 03 November 2025, by Pell Frischmann, indicates that 81% guests are expected to depart from site via car or van. Based on the event capacity of 120 guests, and on site accommodation for 56 guests, up to 64 guests will leave the site following an event, 81% would result in 52 guests leaving by car or van. We have assumed that all 52 trips would take place between 00:00 (midnight) and 01:00 in the morning as a worst-case and calculated the noise level over a 1-hour period (dB $L_{Aeq,1h}$) for assessment.
- 6.7 Our calculations have been based on a reference locations **R3** near the proposed car parking spaces and distances taken from the nearest 52 proposed parking bays as illustrated in **Image 5**.

Image 5: Car Parking Bay Assessment Basis



- 6.8 The arithmetic mean of the residual sound levels between 00:00 (midnight) and 01:00 in the morning is 34 dB $L_{Aeq,1h}$.
- 6.9 Using a measured L_{AE} value of 59 dB at 10m for car doors being closed (free-field) and 57 dB L_{AE} at 10m for a car engine being started and driving off (free-field), which combined is 61 dB L_{AE} at 10m, the calculation formula is as follows:

$$L_{Aeq,1h} = L_{AE} + 10 \log_{10} \left(\frac{N}{T_s} \right) - 20 \log_{10} \left(\frac{d}{10} \right)$$

Where N is the number of events over the 1-hour period, T_s is the number of seconds in 1-hour, and d is the distance.

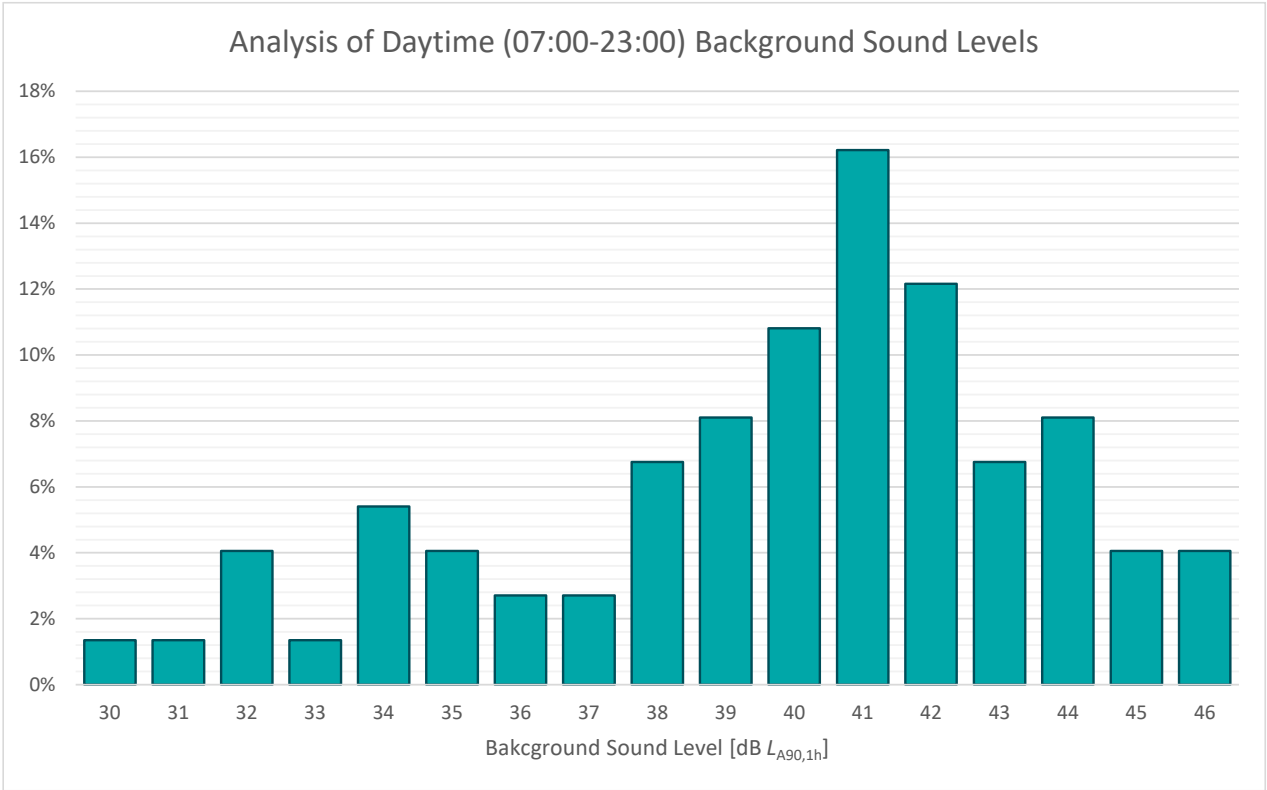
- 6.10 The calculations are shown in **Appendix C**.
- 6.11 The calculated noise level is 26 dB $L_{Aeq,1h}$, which is 8 dB below the prevailing residual sound level of 34 dB $L_{Aeq,1h}$ between 00:00 (midnight) and 01:00 in the morning. No adverse noise impacts are anticipated from guest vehicles arriving, parking and leaving.

7. NOISE FROM EXTERNAL PLANT

Typical Background Sound Levels

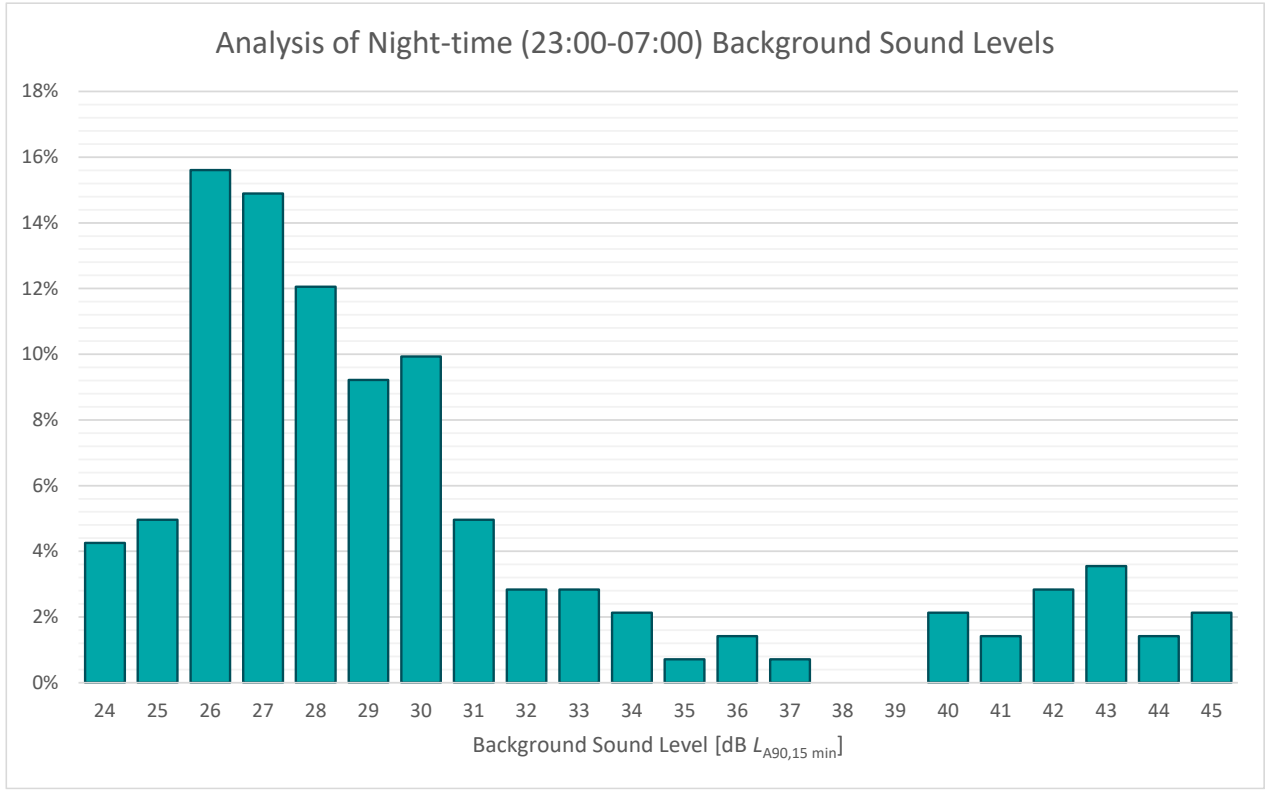
- 7.1 We have used NTi Audio Data Explorer software to reprocess the baseline noise survey results into 1-hour values for the daytime and 15-minute values for the night-time in for analysis in line with BS 4142 guidance. We have analysed the background noise data for daytime (07:00-23:00) and night-time periods (23:00-07:00) to determine the representative background sound level for each period, to form the basis of plant noise design limits.
- 7.2 **Graph 2** shows the distribution of daytime background sound levels. Whilst the mode of the distribution is 41 dB $L_{A90,1h}$, in this case we have selected the arithmetic mean, which is 40 dB $L_{A90,1h}$, as the representative daytime background sound level.

Graph 2: Distribution of Daytime Background Sound Levels from 07:00-23:00



- 7.3 **Graph 3** shows the distribution of night-time background sound levels. We have selected the arithmetic mean, which is 30 dB $L_{A90,1h}$, as the representative daytime background sound level.
- 7.4 The representative background sound level have been used as the basis for plant noise design limits that need to be achieved at the nearest dwellings during plant operations during the respective time periods.

Graph 3: Distribution of Night-time Background Sound Levels from 23:00-07:00



Plant Noise Design Limits

- 7.5 Taking into account the relevant Wiltshire Council guidance summarised in **Section 2** of this report, the plant noise limits outside the façade of the nearest dwelling should be 5 dB below the typical background sound level for the period of interest. The plant noise limits are provided in **Table 9**.

Table 9: Plant Noise Design Limits Outside the Nearest Dwelling

Daytime (07:00-23:00)	Night-time (23:00-07:00)
35 dB $L_{Ar,1h}$	25 dB $L_{Ar,15 min}$

Proposals for External Plant

- 7.6 We have been informed that the only externally located or externally terminating proposed plant for the development is a follows:
- **AHU:** Swegon Gold RX HC 012, shown in **Figure 9**.
 - **MVHR:** Swegon CASA R4-C Genuis, shown in **Figure 9**.
 - **ASHPs:** 4 x Mitsubishi Ecodan CAHV-R450YA-HPB, shown in **Figure 12**.
- 7.7 For the AHU and MVHR the fan noise will propagate through the duct systems before existing the terminations; calculations of fan noise losses through the duct system are shown in **Appendix C**.

- 7.8 The ASHPs noise emissions are up to 64 dB L_{pA} at 1m from the unit under normal operating conditions. Four ASHPs operating simultaneously at full capacity would result in a noise emission level of up to 70 dB L_{pA} at 1m. At a distance of 92m to the nearest dwelling (R1), this results in a specific sound level of 31 dB $L_{Aeq,T}$.
- 7.9 The nearest dwelling to the proposed external and externally terminating plant is located at reference position **R1**, shown in **Figure 1**.

Assessment of Plant Noise Against Limits

Character Corrections

- 7.10 The following consideration have been made with respect to acoustic character corrections for the BS 4142 initial numerical assessment:
- **Tonality:** For newly installed and properly maintained ASHPs and ducted fan systems, there should be no tonal acoustic characteristics present in the noise. No tonality character correction is considered applicable in this case.
 - **Intermittency:** The ASHPs will switch on and off as needed and it is considered that this may be a noticeable characteristic at the assessment location, albeit at a low level. A +3 dB character correction has been applied to account for intermittency in this case.
 - **Impulsivity:** The ASHP and ducted fan systems noise do not feature any noticeable impulsive characteristics. No impulsivity character correction is considered applicable in this case.
 - **Other sound characteristics:** There are no other distinctive or noticeable acoustic characteristics that would otherwise be associated with the ASHP and ducted fan systems operations that would warrant any additional acoustic character corrections in this case.

Comparison of Rating Level with Design Limits

- 7.11 We have been informed that the ASHPs and ducted fan systems will operate between the hours of 07:00-02:00. **Table 10** shows a summary of the calculated plant noise levels and a comparison with the plant noise design limits.

Table 10: Plant Noise Levels

Description	Daytime (07:00-23:00) Location R1	Night-time (23:00-07:00) Location R1
Specific Sound Level [dB $L_{Aeq,T} = dB L_s$]	31	31
Character corrections [dB]	+3	+3
Rating Level [dB $L_{Ar,T}$]	34	34
Plant Noise Design Limits [dB $L_{A90,T}$]	35	25
Excess of Rating Level over Plant Noise Design Limits	-1	+9

- 7.12 The results in **Table 10** show that during the daytime plant noise emissions would be within the plant noise design limits, but during the night-time the limits would be exceed by up to 9 dBA.
- 7.13 The noise from the ASHPs is the dictating factor in the rating levels outside the nearest dwellings and will need to be mitigated with acoustic barriers in order to meet the plant noise design limits.

Recommendations

- 7.14 A 2.4m high acoustic barrier will be installed around the northern and eastern elevations of the ASHP area as illustrated in **Figure 13**. Any proprietary acoustic barrier can be installed at the location and heights shown in **Figure 13**, as long as they provide the following minimum specifications:
- Minimum mass per unit area of 10 kg.m⁻². However, most proprietary acoustic barriers will have a surface density noticeably greater than this minimum to account for density loss over time etc.
 - The acoustic barrier must be a solid sealed construction with no holes or gaps.
 - The acoustic barrier must be properly installed with the base of the barrier sealed into the ground along the base.
 - Junctions between any lengths of the acoustic barrier must also be properly sealed with no holes or gaps.
- 7.15 We have allowed for a 1m clearance gap between the ASHPs and the acoustic barrier in our calculations, but the suitability of this with respect to ASHPs air flow requirements etc. must be checked by others.

Assessment Outcome with Recommendations

- 7.16 With the recommended 2.4m high acoustic barrier in place, our barrier calculation in **Appendix C** indicates that a suitable reduction in noise levels would be achieved to meet the plant noise design targets. The assessment results with the acoustic barrier are summarised in **Table 11**.

Table 11: Plant Noise Levels with Acoustic Barrier

Description	Daytime (07:00-23:00) Location R1	Night-time (23:00-07:00) Location R1
Specific Sound Level [dB $L_{Aeq,T} = dB L_s$]	22	22
Character corrections [dB]	+3	+3
Rating Level [dB $L_{Ar,T}$]	25	25
Plant Noise Design Limits [dB $L_{A90,T}$]	35	25
Excess of Rating Level over Plant Noise Design Limits	-10	0

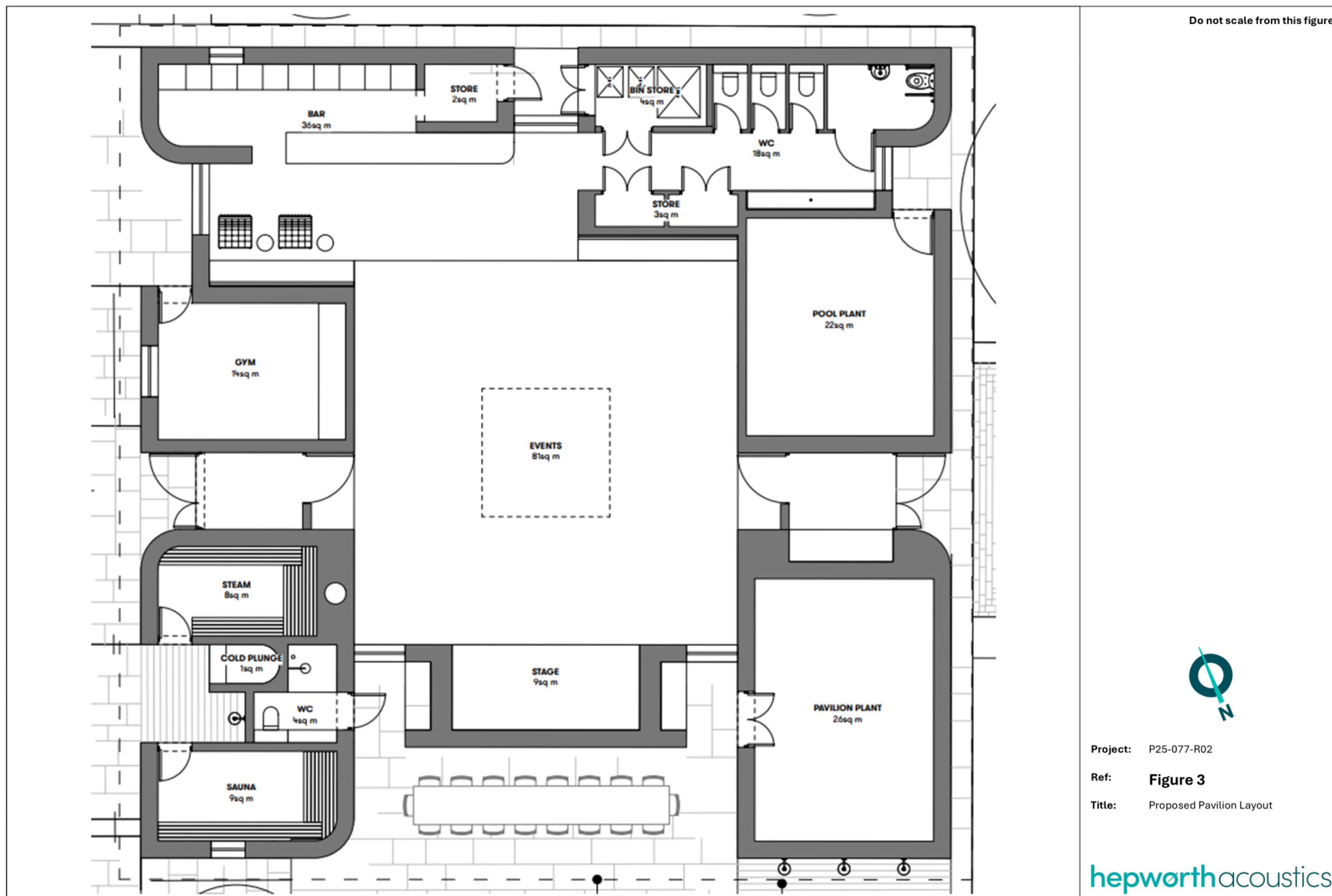
- 7.17 Taking into account the recommendations above, the plant noise design limits will be met in accordance with BS 4142 and local authority guidance.

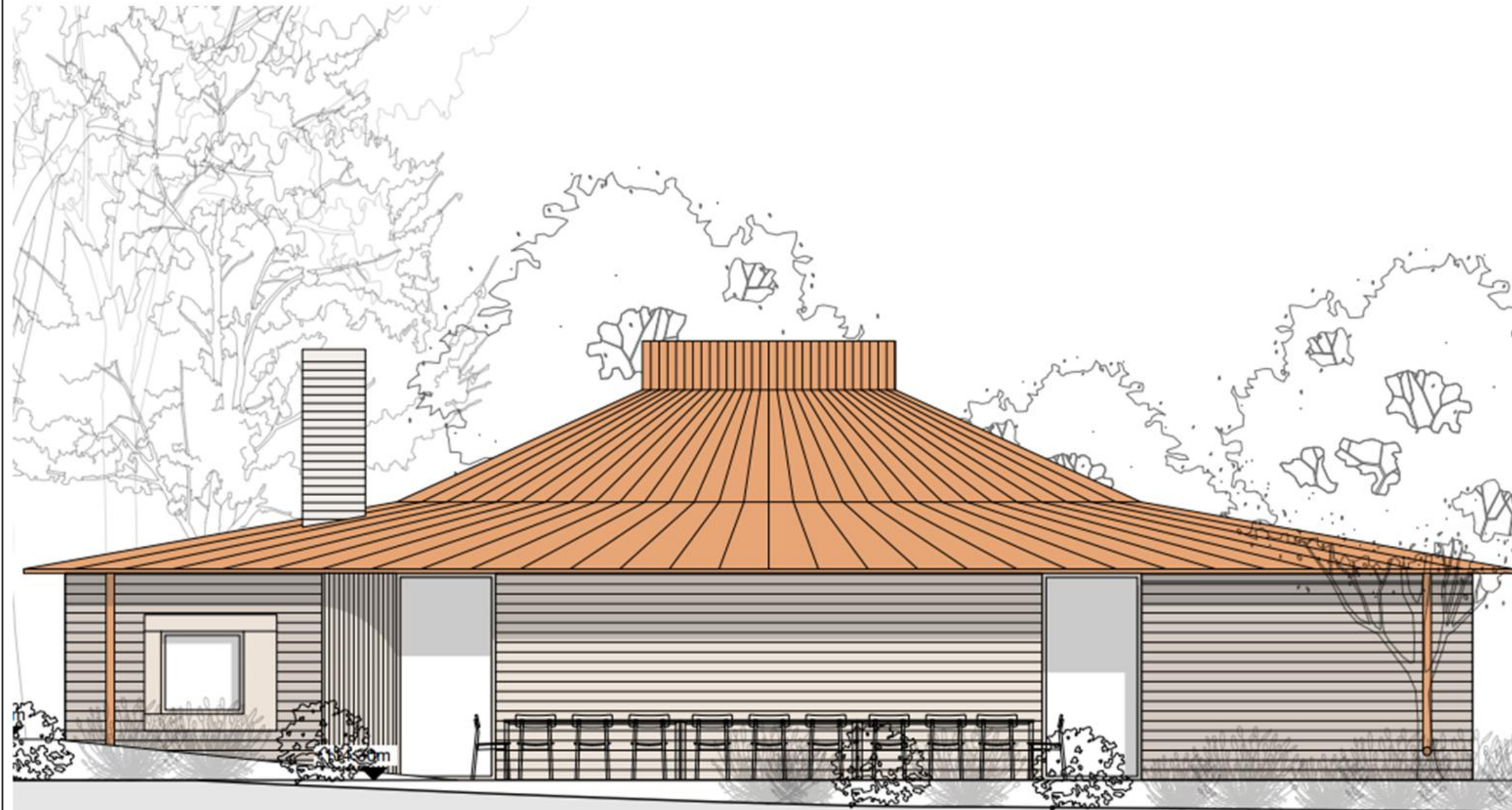
8. SUMMARY & CONCLUSION

- 8.1 Hepworth Acoustics was commissioned by Kindred Living Project Ltd to carry out a planning noise assessment in connection with a proposed new pavilion building and pool house facilities at Eastleigh Court, Bishopstrow, Warminster.
- 8.2 Noise monitoring has been carried out including weekday and weekend periods to quantify the prevailing existing noise climate in the area.
- 8.3 Potential entertainment music noise breakout has been assessed from the proposed new pavilion, and our findings indicate that it will be possible to operate within the Wiltshire Council criteria, taking into account recommendations for AHU acoustic attenuators, building sound insulation constructions, and high performance secondary glazing.
- 8.4 Potential noise associated with guests using outdoor amenity spaces has been assessed in line with Wiltshire Council Guidance and no adverse noise impacts are anticipated, taking into account recommendations for good practice site management operational control measures.
- 8.5 The potential noise associated with guest vehicles arriving/leaving and parking has been assessed by comparison with the residual noise levels during a worst-case 1 hour period and no adverse noise impacts are anticipated.
- 8.6 Noise from external plant proposals has been assessed against the Wiltshire Council criteria and the results show that the plant noise levels will operate within the limits including for a 2.4m high acoustic barrier around the ASHPs.
- 8.7 Subject to the recommendations in this report being implemented, there is no noise related reason why planning permission for this development should be withheld.





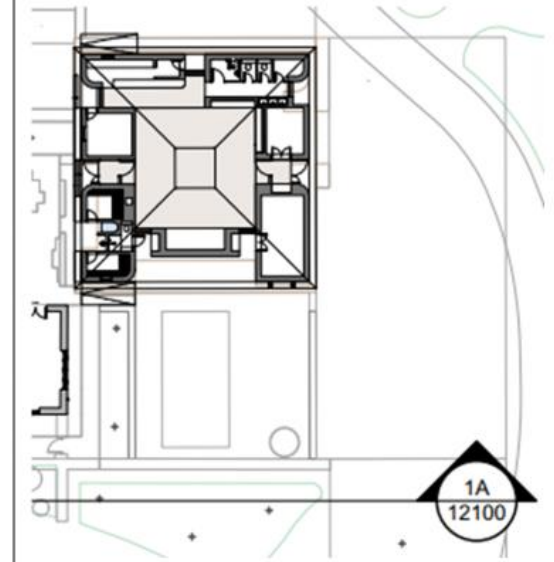




Proposed Pavilion

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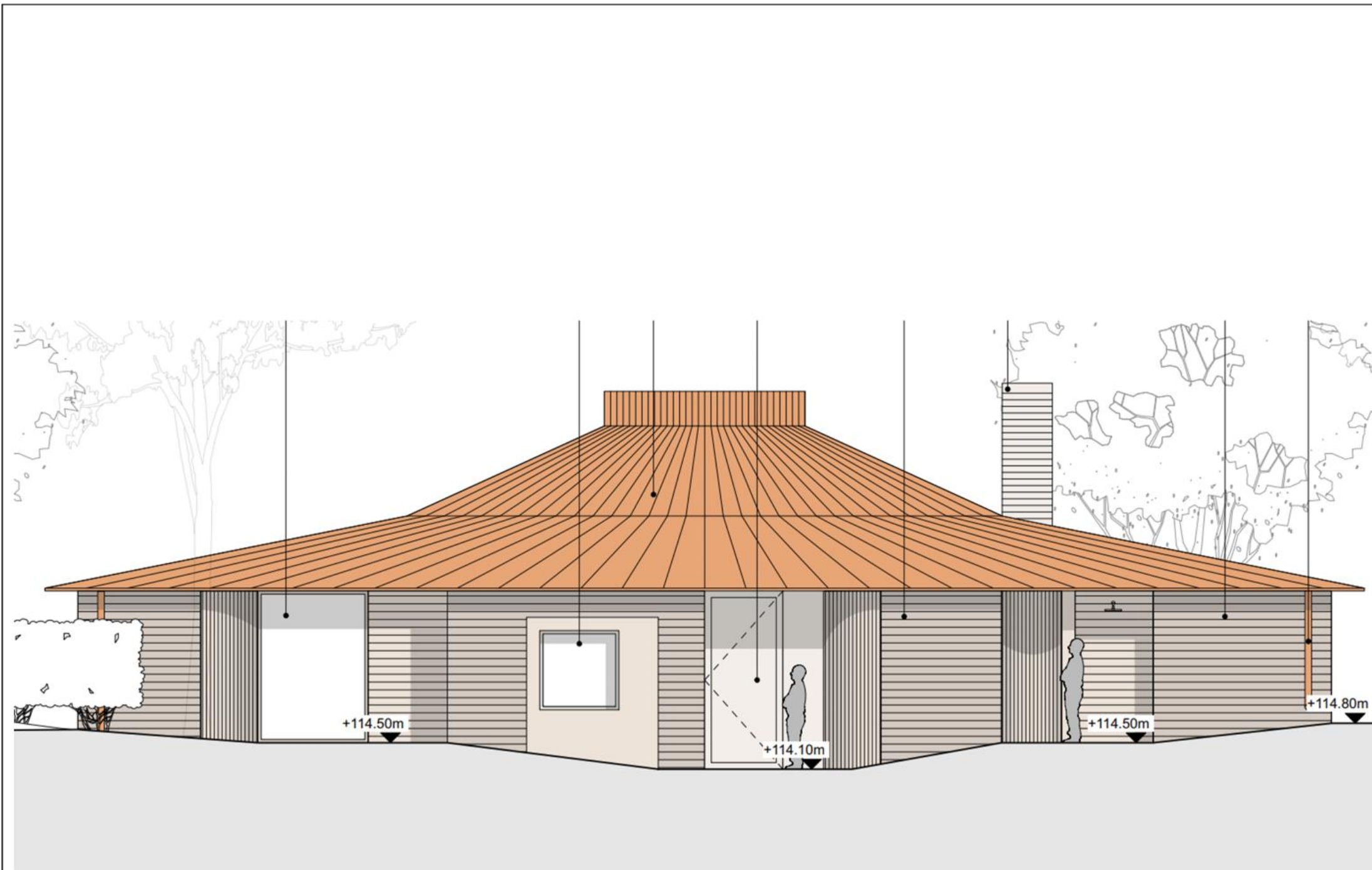


Project: P25-077-R02

Ref: **Figure 4**

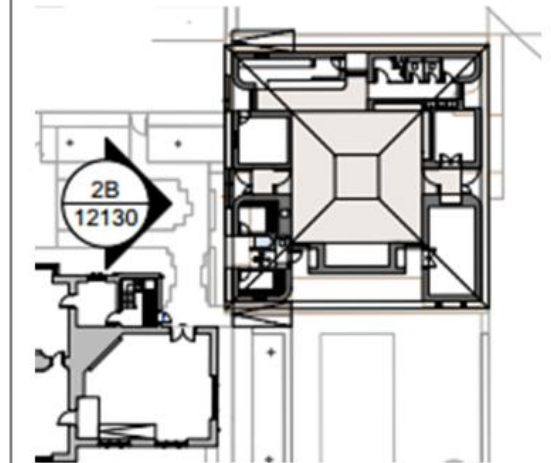
Title: Proposed Pavilion Elevation 1A

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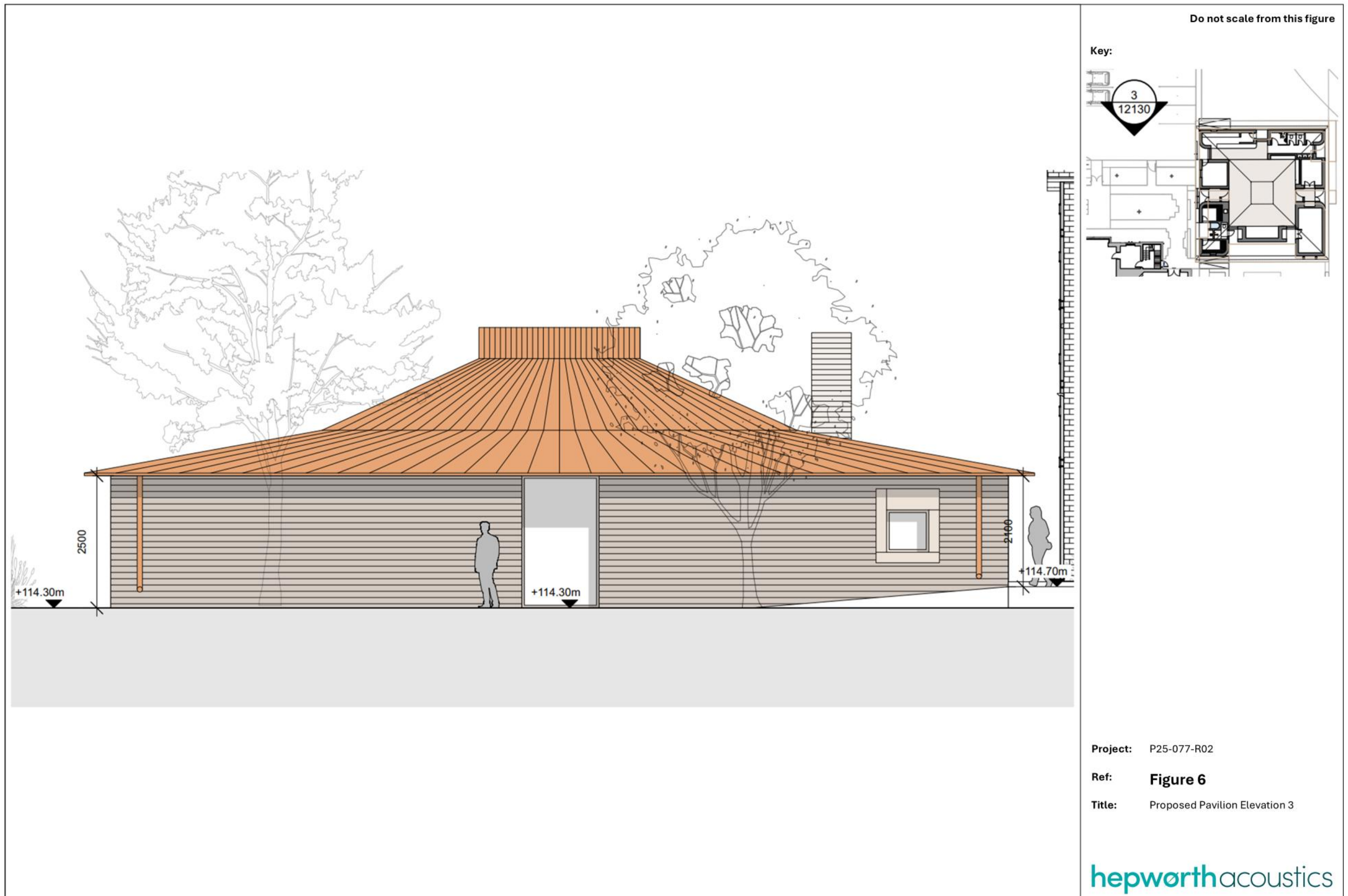


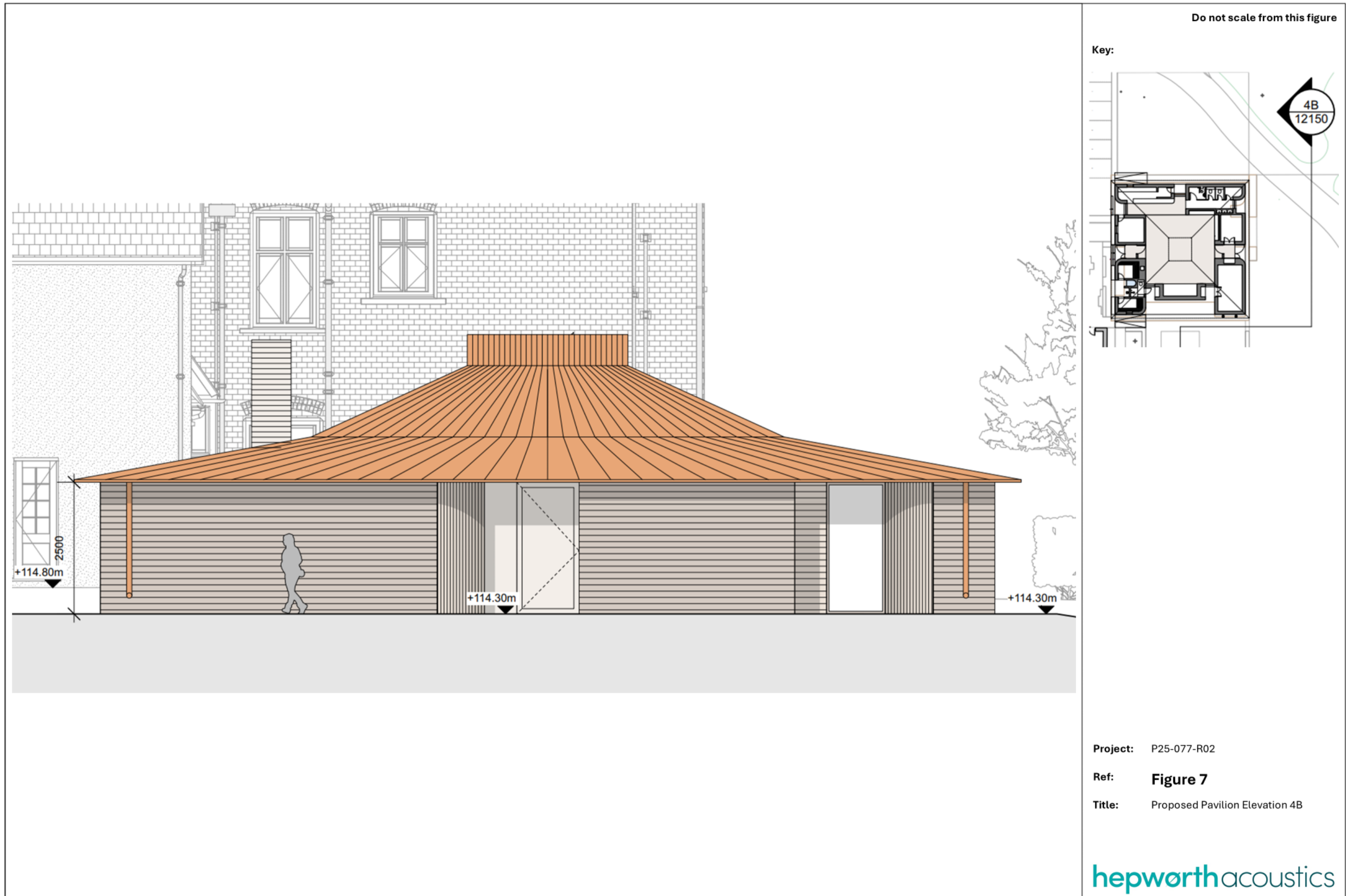
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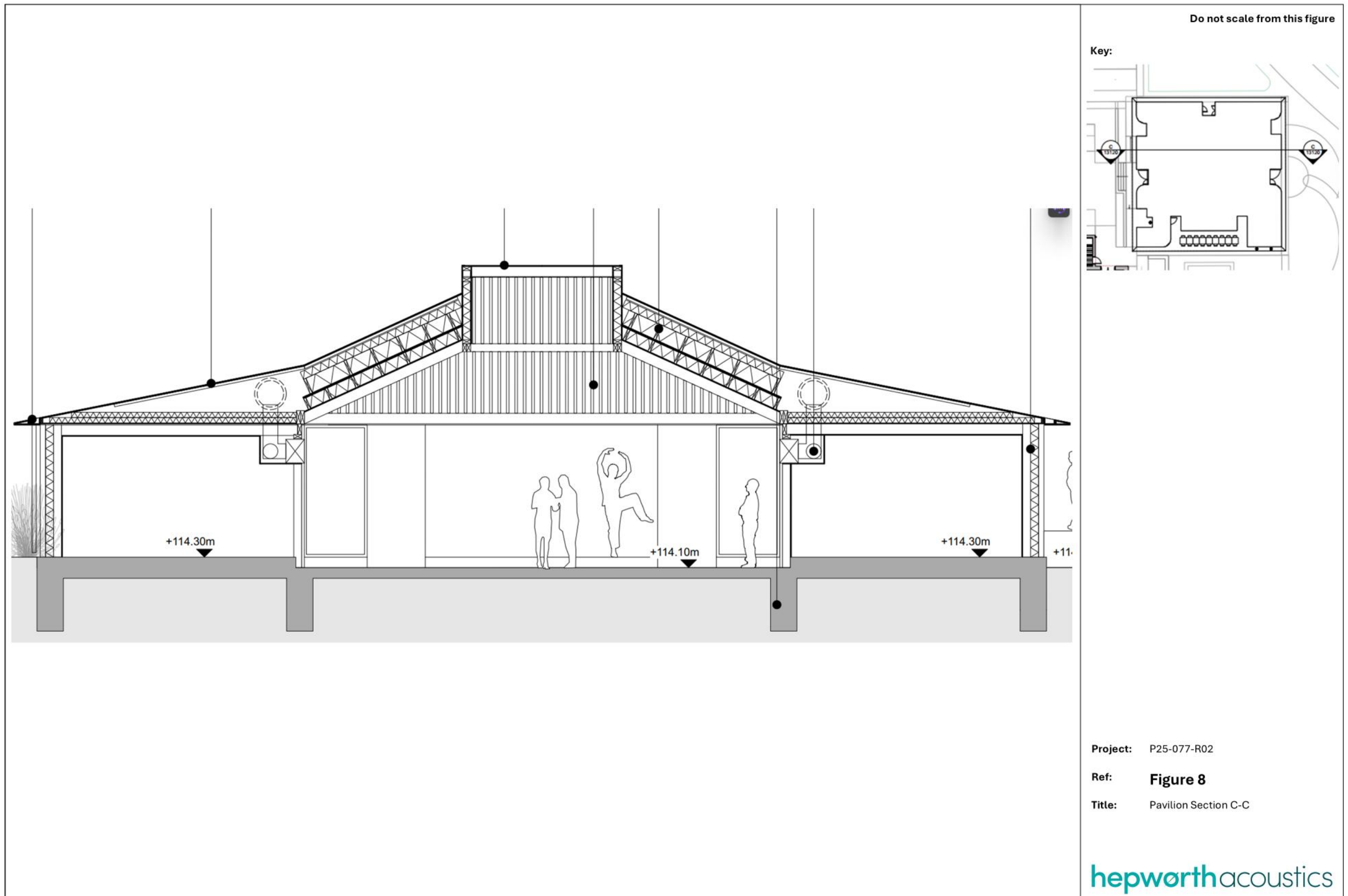
Ref: **Figure 5**

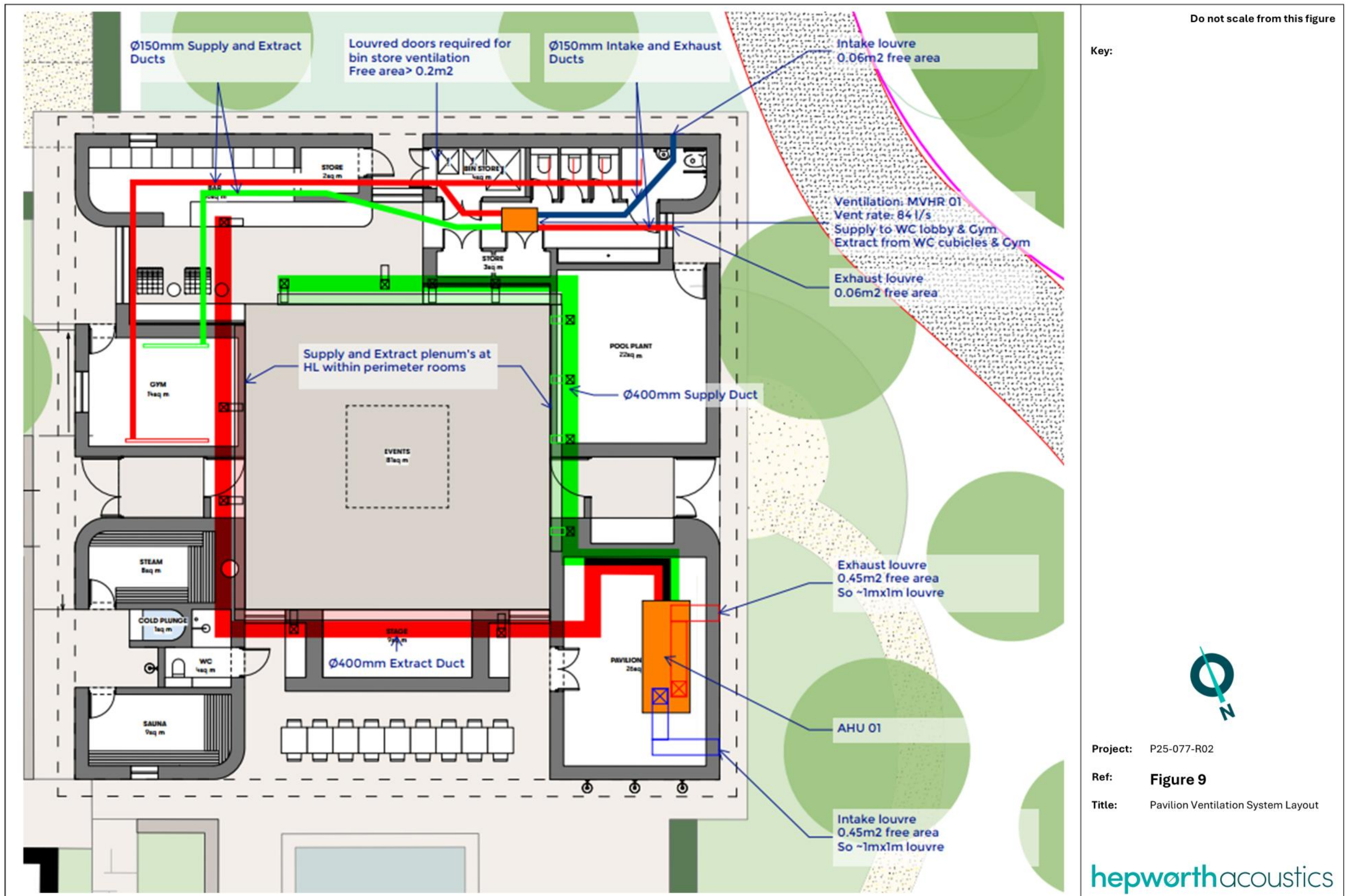
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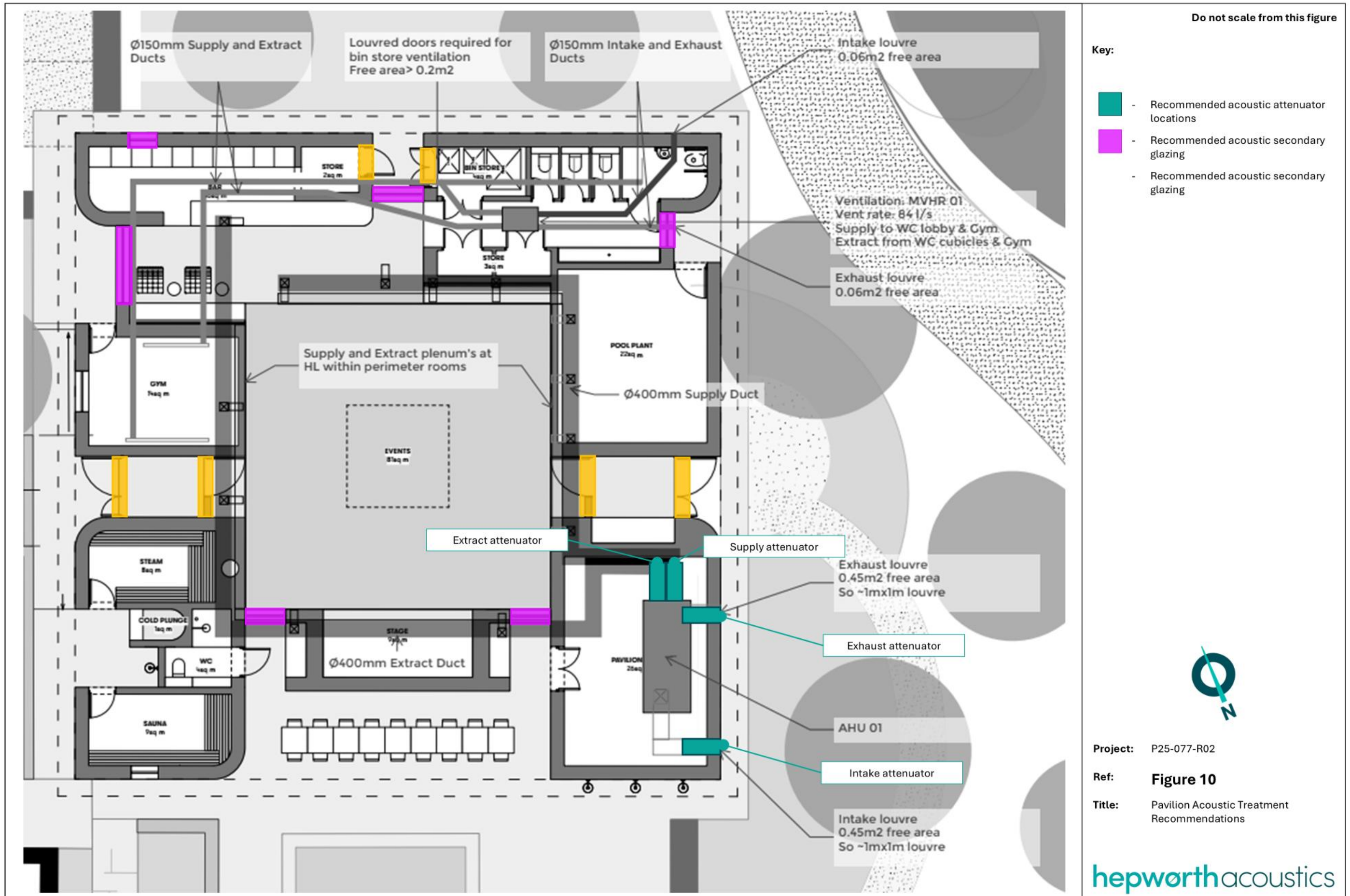
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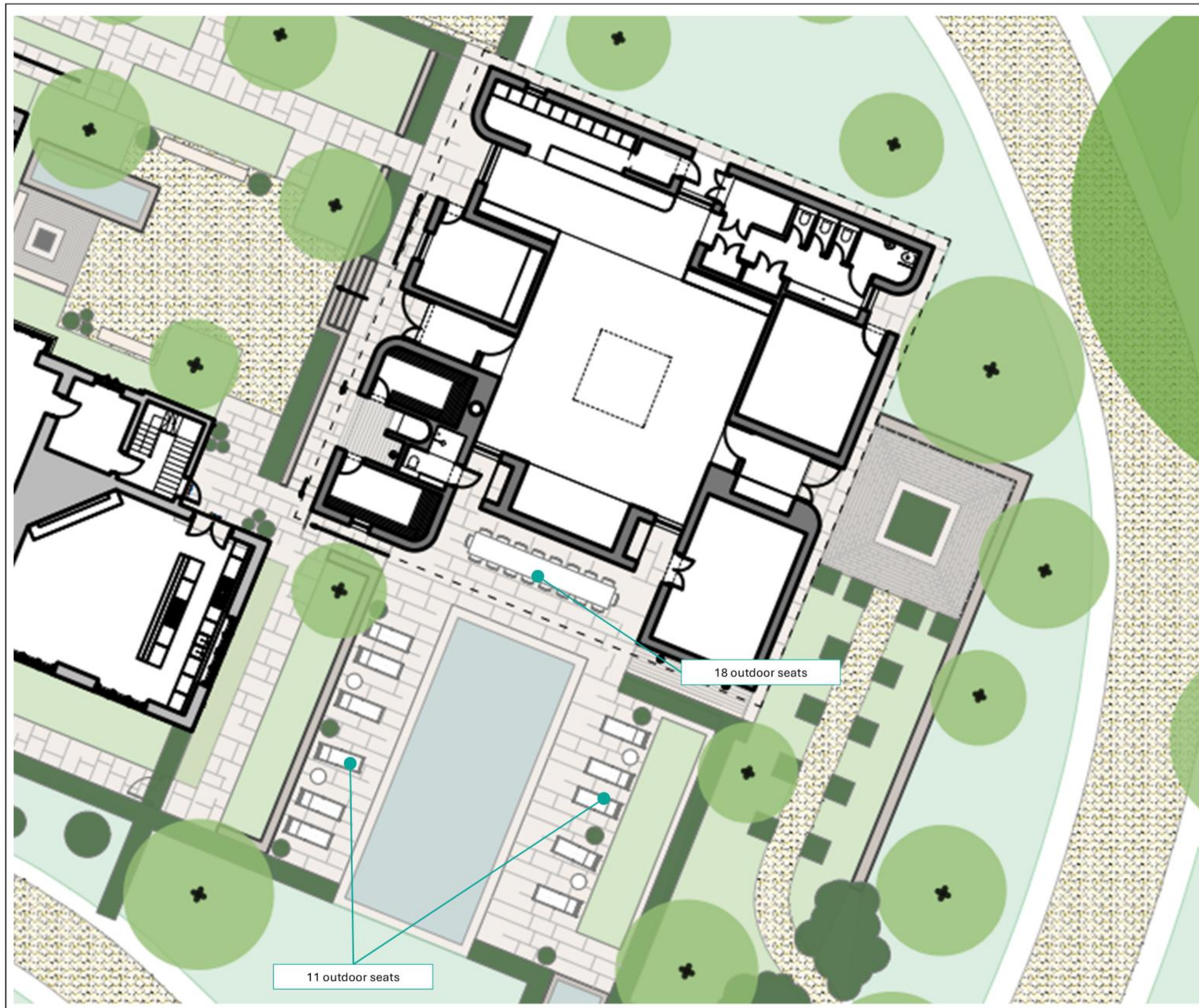












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Project: P25-077-R02

Ref: **Figure 11**

Title: Outdoor Seating Areas

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APPENDIX A: ACOUSTICS UNITS & INDICES

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived ‘loudness’, a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to ‘weight’ each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the ‘A’ weighting, which is built into sound level meters. Noise levels measured using the ‘A’ weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. There are also a number of ways to describe sound insulation performance.

The indices used in this report are described below.

$L_{Aeq,T}$	A-weighted Equivalent Continuous Sound Level: An average of the total sound pressure measured over a specified time period (T). In other words, $L_{Aeq,T}$ is the level of a steady sound which has the same total A-weighted sound pressure as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for most forms of environmental noise.
L_{Amax}	Maximum A-weighted Sound Level with Fast Time-weighting: The maximum A-weighted sound pressure level during the measurement period, using the Fast time-weighting of 125ms. L_{Amax} used in this report refers throughout to L_{AFmax} with the Fast time weighting, denoted L_{AFmax} or $L_{Amax,f}$ in other documents but L_{Amax} in BS 8233:2014 standard notation.
$L_{A90,T}$	A-weighted 90 Percentile Level: The A-weighted sound level exceeded for 90% of a measurement time period (T). $L_{A90,T}$ is generally used as a measure of Background Sound Level.
$L_{Ar,Tt}$	Rating Level: An A-weighted value most commonly used in BS 4142 assessments, which is the sound level of the noise source under assessment, at the assessment location, evaluated over the reference assessment period (T_r) and includes numerical adjustments for the characteristic features of the sound.
L_{AE}	A-weighted Sound Exposure Level: A metric used for measuring discrete noise events. Essentially it is a measure of the sound energy of the whole noise event normalised to a period of 1 second. The L_{AE} value can be used to calculate the actual $L_{Aeq,T}$ value for a given time period if the number of noise events is known.
R	Sound Reduction Index: A laboratory measure of the sound insulation performance of a building element or construction arrangement (e.g. a wall) in a stated frequency band.
R_w	Weighted Sound Reduction Index: A single figure frequency weighted laboratory sound insulation performance metric of a building element or construction arrangement (e.g. a wall).

APPENDIX B: NOISE SURVEY RESULTS

Dates	13:15 on Thursday 3 April 2025 to 02:10 on Tuesday 8 April 2025
Equipment	NTi Audio XL2-TA ‘Class 1’ sound analyser (SN: A2A-20259-E0) NTi Audio CAL200 ‘Class 1’ sound calibrator (SN: 19360) Kestrel 2500 portable weather meter (SN: 2556870) Associated windshield, environmental monitoring case, external batteries and tripod
Weather	Thursday 3, day: Dry, ~17°C, moderate cloud coverage and low E wind speeds <5 m.s ⁻¹ Thursday 3, night: Dry*, ~11°C, moderate cloud coverage and low SE wind speeds <2 m.s ⁻¹ Friday 4, day: Dry, ~18°C, moderate cloud coverage and low E wind speeds <4 m.s ⁻¹ Friday 4, night: Dry, ~10°C, low cloud coverage and low NE wind speeds 5 m.s ⁻¹ Saturday 5, day: Dry, ~16°C, low cloud coverage and low NE wind speeds <4 m.s ⁻¹ Saturday 5, night: Dry, ~6°C, low cloud coverage and low NE wind speeds <3 m.s ⁻¹ Sunday 6, day: Dry, ~15°C, low cloud coverage and low E wind speeds <3 m.s ⁻¹ Sunday 6, night: Dry, ~5°C, low cloud coverage and low NE wind speeds <2 m.s ⁻¹ Monday 7, day: Dry, ~13°C, low cloud coverage and low E wind speeds <2 m.s ⁻¹ Monday 7, night: Dry, ~5°C, low cloud coverage and low SE wind speeds <1 m.s ⁻¹ *The weather on the night of Thursday 3 was dry aside from two short periods of <i>light</i> rain: 02:00-02:05 and 02:22-02:26. There two brief periods of light rain have been excluded from the processed data used in the body of the report. The record of site weather conditions during the noise monitoring detailed above has been derived from BBC weather forecasts, on-site weather meter measurements and observations during site visits and a review of the audio and spectrogram data from the noise monitoring using NTi Audio Data Explorer software.

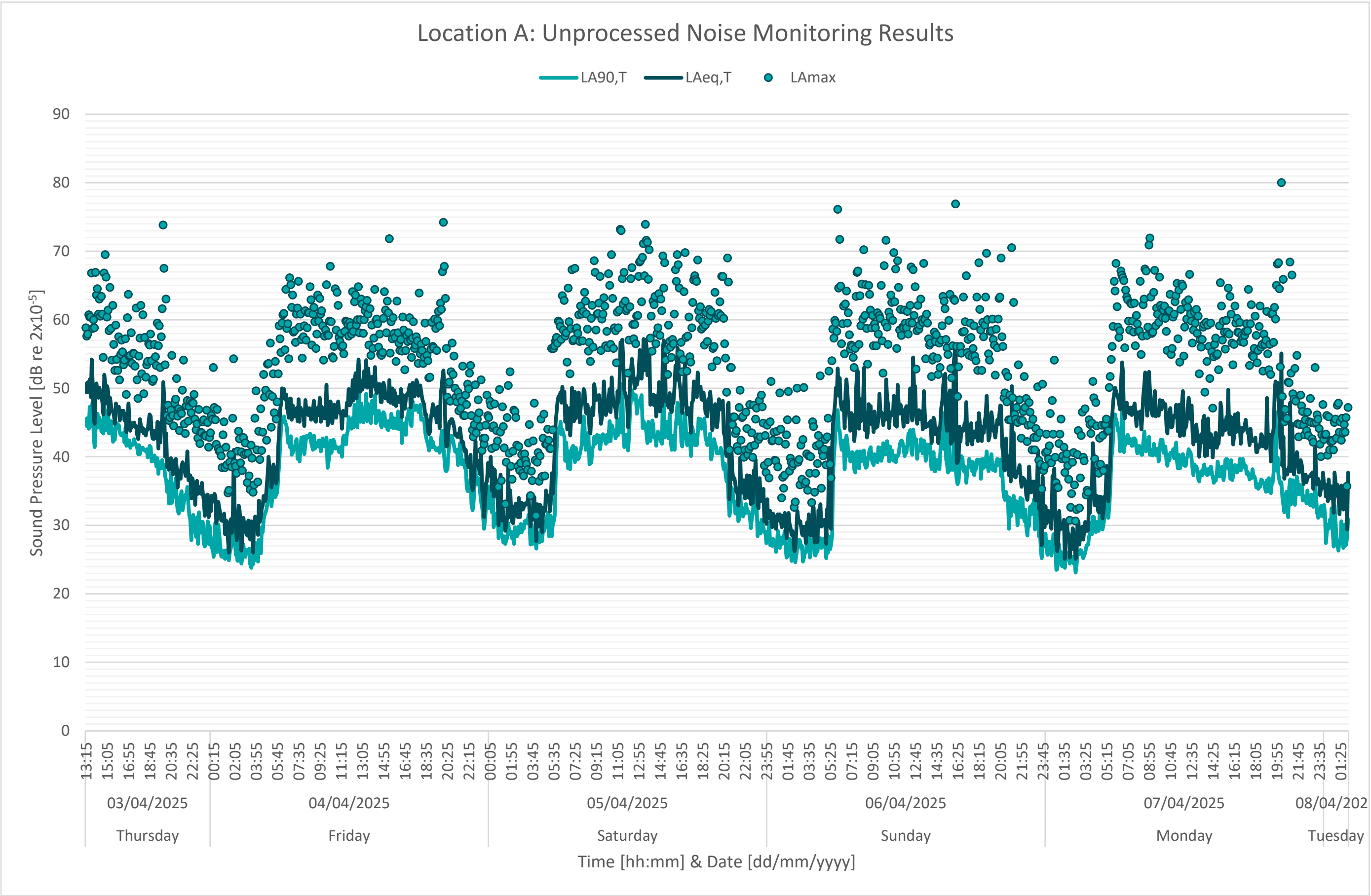
The unprocessed noise monitoring results are shown in the graph overleaf.

Data excluded from the processes results used in the body of the report.

Type	Start	Duration
-Rain (2)		0:08:05
-Rain	2025-04-04 02:00:30	0:04:30
-Rain	2025-04-04 02:22:40	0:03:35
-Works Noise (7)		2:41:06
-Works Noise	2025-04-05 11:25:00	0:24:00
-Works Noise	2025-04-05 12:08:00	1:13:00
-Works Noise	2025-04-05 14:58:00	0:19:00
-Works Noise	2025-04-06 14:59:26	0:18:26
-Works Noise	2025-04-06 15:18:37	0:05:50
-Works Noise	2025-04-06 15:38:20	0:09:50
-Works Noise	2025-04-06 16:06:30	0:11:00

Rain: Periods of light rain that can be heard on the audio recordings/seen in the sonogram.

Works Noise: Noise identifiable on the audio recordings associated with the landscaping works that were taking place on site during part of the noise monitoring.



APPENDIX C: CALCULATIONS**INSUL Calculation – Pavilion Event Space External Wall Construction****Sound Insulation Prediction (v8.0.12)**

Program copyright Marshall Day Acoustics 2015

Hepworth Acoustics - Key No. 0377

Margin of error is generally within $R_w \pm 3$ dB

Job Name: Eastleigh Court

Job No.: P25-077

Page No.:

Date: 10 Nov 25

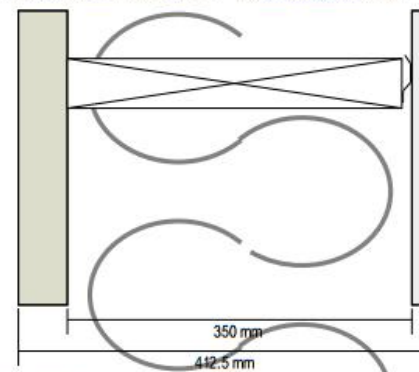
Initials: SO

File Name: Pavilion external walls 50mm - 1 x 12 plasterboard.kl



Notes:

External wall construction

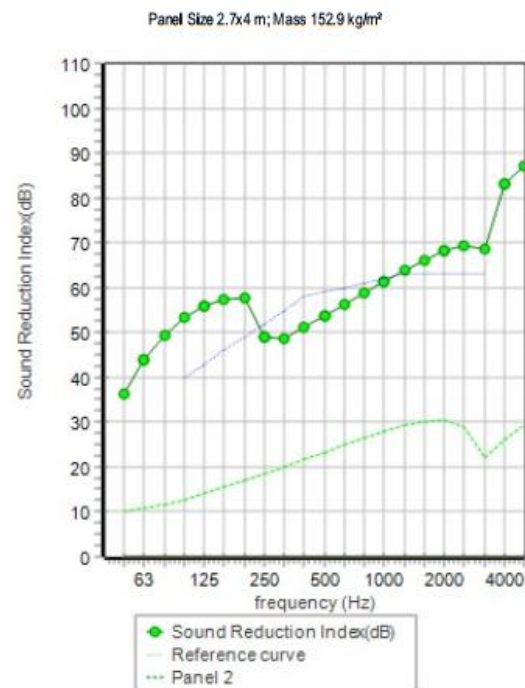


R_w	59 dB
C	0 dB
C_{tr}	-3 dB
D_{nTw}	61 dB

System descriptionPanel 1 : 1 x 50.0 mm Limestone block (p:2700 kg/m³, E:77 GPa, η :0.02, ps:135 kg/m², fc:243 Hz)Cavity: Timber stud + resilient rail/bar: Stud spacing 600 mm, Infill Rockwool (33 kg/m³) Thickness 300 mm (p:33 kg/m³, Rt:13400 Pa.s/m²)Panel 2 + 1 x 12.5 mm Gyproc Wallboard 12.5mm (p:640 kg/m³, E:1.6 GPa, η :0.01, ps:8 kg/m², fc:3263 Hz)

Mass-air-mass resonant frequency = 31 Hz

frequency (Hz)	R(dB)	R(dB)
50	36	
63	44	40
80	49	
100	53	
125	56	55
160	57	
200	58	
250	49	50
315	48	
400	51	
500	54	53
630	56	
800	59	
1000	61	61
1250	64	
1600	66	
2000	68	68
2500	69	
3150	69	
4000	83	73
5000	87	

**INSUL Calculation – Pavilion Event Space Roof Construction****Sound Insulation Prediction (v8.0.12)**

Program copyright Marshall Day Acoustics 2015

- Key No. 0377

Margin of error is generally within $R_w \pm 3$ dB

Job Name: Eastleigh court

Job No.: P25-077

Page No.:

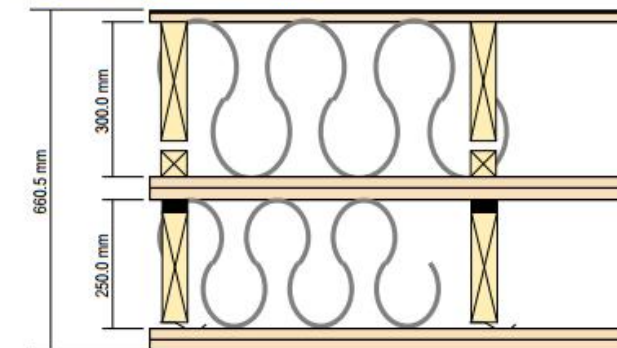
Date: 15 May 25

Initials: SO

File Name: Ceremony Room Roof 2.kl

Notes:

Recommended ceremony roof construction



R_w	81 dB
C	-5 dB
C_{tr}	-12 dB
D_{nTw}	85 dB

System description

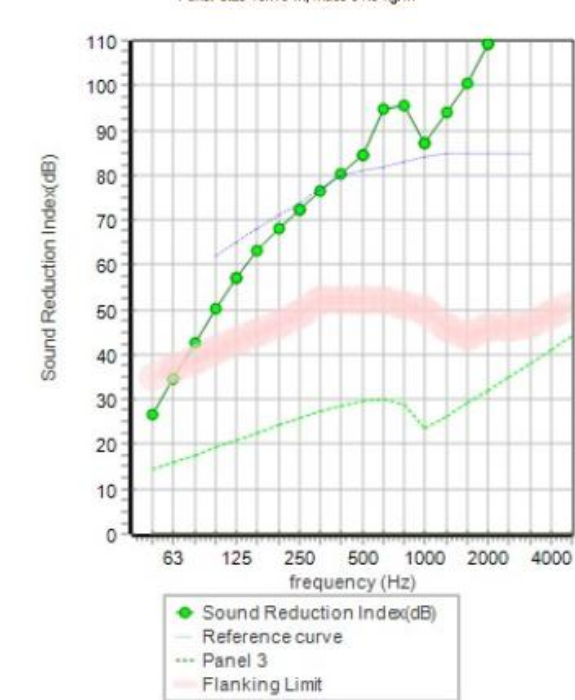
Panel 1 : 1 x 4.5 mm Nuraply waterproof membrane

+ 1 x 18.0 mm Plywood (p:560 kg/m³, E:4.4 GPa, η :0.01, ps:10.1 kg/m², fc:1290 Hz)Cavity: Separate joists: Stud spacing 600 mm, Infill Rockwool (48 kg/m³) Thickness 300 mm (p:48 kg/m³, Rt:19400 Pa.s/m²)Panel 2 + 2 x 22.0 mm Plywood (p:560 kg/m³, E:4.4 GPa, η :0.01, ps:12.3 kg/m², fc:1055 Hz)Cavity: Resilient batten and steel rail: Stud spacing 600 mm, Infill Rockwool (48 kg/m³) Thickness 250 mm (p:48 kg/m³, Rt:19400 Pa.s/m²)Panel 3 + 2 x 22.0 mm Plywood (p:560 kg/m³, E:4.4 GPa, η :0.01, ps:12.3 kg/m², fc:1055 Hz)

Mass-air-mass resonant frequency = 26 Hz, 42 Hz

Panel Size 16x16 m; Mass 91.8 kg/m²

frequency (Hz)	R(dB)	R(dB)
50	27	
63	35	31
80	43	
100	50	
125	57	54
160	63	
200	68	
250	72	71
315	76	
400	80	
500	84	83
630	95	
800	95	
1000	87	91
1250	94	
1600	101	
2000	109	105
2500	117	
3150	123	
4000	128	126
5000	133	



Entertainment Music Noise Breakout Calculations – Building Fabric

Project Number	P25-077-R02									Noise Break-out	v2018
Description	Pavilion Event Space - Music noise breakout to nearest dwelling									Source - Woods	
	63	125	250	500	1k	2k	4k	8k	A	hepworthacoustics	
SPL _{int}	93	90	95	92	90	86	81	80	95		
Element 1 - Glazing inc. rooflight											
SPL _{int}	93	90	95	92	90	86	81	80	95	10:200:6 mm	
Element SRI	29	35	46	46	46	56	65	68			
Area (S) =	27.7	14	14	14	14	14	14	14			
Distance (r) =	85.0	-39	-39	-39	-39	-39	-39	-39	-39		
At receiver	26	17	11	8	6	-8	-22	-26	10	→ = SPL _{int} - SRI + 10 log S - 20 log(r) - 14	
Element 2 - Walls											
SPL _{int}	93	90	95	92	90	86	81	80	95	External Wall - 50mm limestone - 300mm mineral wool - 12.4mm plasterboard	
Element SRI	40	55	50	53	61	68	73	73			
Area (S) =	142.6	22	22	22	22	22	22	22			
Distance (r) =	85.0	-39	-39	-39	-39	-39	-39	-39	-39		
At receiver	22	4	14	8	-2	-13	-23	-24	9	→ = SPL _{int} - SRI + 10 log S - 20 log(r) - 14	
Element 6 - Roof											
SPL _{int}	93	90	95	92	90	86	81	80	95	single ply membrane, 18mm plywood, 300mm mineral wool, 2 x 22mm plywood, 2 x 15mm soundBloc ceiling on joists with resilient channel forming 250mm cavity filled with 200mm mineral wool	
Element SRI	31	54	71	83	91	105	126	126			
Area (S) =	131.0	21	21	21	21	21	21	21			
Distance (r) =	85.0	-39	-39	-39	-39	-39	-39	-39	-39		
At receiver	28	2	-10	-25	-35	-53	-79	-80	2	→ = SPL _{int} - SRI + 10 log S - 20 log(r) - 17	
Overall Results											
	63	125	250	500	1k	2k	4k	8k	A		
Resulting	30	17	16	11	6	0	0	0	14		
Limits	33	26	22	24	23	15	11	13	26		
Difference	-3	-9	-6	-13	-17	-15	-11	-13	-13		

Entertainment Music Noise Breakout Calculations – Ventilation System

Description	Ref	Unit	Value	A	63	125	250	500	1k	2k	4k	8k
Music noise ingress into duct system												
Music noise levels within pavilion event space (HAL data)	1	dB Lp		94.7	93.0	90.0	95.0	92.0	90.0	86.0	81.0	80.0
Surface area of single internal duct termination within pavilion event space	2	m ²	0.158									
Effective diameter of rectangular duct termination (CIBSE Guide B4 2016 - eq. 4.7)	3	m	0.45									
Impedance change reflection loss from pavilion event space to duct (CIBSE Guide B4 2016 - eq. 4.6)	4	dB			9.7	5.2	2.1	0.7	0.2	0.1	0.0	0.0
Sound pressure level within duct from one grille termination (ref 1-6)	5	dB Lp		94.2	83.3	84.8	92.9	91.3	89.8	85.9	81.0	80.0
Conversion from sound pressure level to sound power level within duct (Flakt Woods PGtNC Equation 3.6)	6	dB			-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2	-8.2
Music noise sound power level within duct from single grille termination (ref 5+6)	7	dB Lw		86.0	75.1	76.6	84.7	83.1	81.6	77.7	72.8	71.8
Number of grille terminations exposed to the pavilion event space	8	n	13									
Combined music noise sound power level within ducts from all grille terminations	9	dB Lw		97.1	86.2	87.7	95.8	94.2	92.7	88.9	83.9	82.9
Music noise breakout via duct terminations												
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	10	dB/m			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Average duct path length	11	m	12									
Straight duct run losses, pavilion side of AHU (ref 10*11)	12	dB			1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Width of main round duct runs (mm)	13	400										
Frequency(kHz) x duct width (mm)	14				25.2	50.0	100.0	200.0	400.0	800.0	1600.0	3200.0
Attenuation of unlined elbows (CIBSE Guide B4 2016 - Table 4.24)	15	dB			1.0	1.0	2.0	3.0	3.0	3.0	3.0	3.0
Minimum number of duct bends between event space grille terminations and AHU	16	2										
Minimum losses due to duct bends, pavilion side of AHU	17	dB			2.0	2.0	4.0	6.0	6.0	6.0	6.0	6.0
Conservative estimate of transmission loss through AHU	18	dB			5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	19	dB/m			1.0	0.7	0.3	0.2	0.1	0.1	0.1	0.1
Average duct path length	20	m	3									
Total straight duct run losses, external side of AHU (ref 10*11)	21	dB			3.0	2.1	1.0	0.6	0.3	0.3	0.3	0.3
Frequency(kHz) x duct width (mm)	22				25.2	50.0	100.0	200.0	400.0	800.0	1600.0	3200.0
Attenuation of unlined elbows (CIBSE Guide B4 2016 - Table 4.22)	23	dB			0.0	1.0	5.0	5.0	8.0	4.0	3.0	3.0
Minimum number of duct bends between event space grille terminations and AHU	24	2										
Minimum losses due to duct bends, external side of AHU	25	dB			0.0	2.0	10.0	10.0	16.0	8.0	6.0	6.0
Surface area of external termination	26	m ²	0.160									
Effective diameter of rectangular duct termination (CIBSE Guide B4 2016 - eq. 4.7)	27	m	0.45									
Duct termination end reflection loss (CIBSE Guide B4 2016 - eq. 4.6)	28	dB			9.7	5.2	2.1	0.7	0.2	0.1	0.0	0.0
Attenuator 1 - pre-AHU performance (SORDO-A-400-1100 (910655307))	29	dB IL			2.0	4.0	7.0	15.0	20.0	13.0	7.0	3.0
Attenuator 2 - post-AHU performance (SORDO-A-400-1100 (910655307))	30	dB IL			2.0	4.0	7.0	15.0	20.0	13.0	7.0	3.0
Resulting music noise breakout sound power level (ref 9-12-17-18-21-25-28-29-30)	31	dB Lw		59.5	61.3	62.3	58.5	40.8	24.0	42.3	51.4	58.4
Approximate distance to nearest dwelling	32	m	99									
Lp from point source Lw accounting for attenuation over distance (Flakt Woods PGtNC Equation 5.4)	33	dB Lp		12.2	13.4	14.4	10.6	0.0	0.0	0.0	3.5	10.5
Music noise breakout via duct walls and through roof												
Duct breakout transmission loss circular duct (CIBSE Guide B4 2016 - Table 4.22)	34	dB TL _{circ,out}			47.0	42.0	36.0	31.0	30.0	35.0	39.0	40.0
Duct length (L)	35	m	48.2									
Duct cross-sectional diameter (D)	36	m	0.4									
Sound power level music noise breakout from duct walls (CIBSE Guide B4 2016 - eq. 4.11)	37	dB Lw		92.1	66.0	72.5	86.6	90.1	89.5	80.7	71.7	69.7
Approximate sectional area of perimeter roof service cavity	39	m ²	1.8									
Approximate extent of perimeter roof service cavity	40	m	42									
Approximate apparent volume of perimeter roof service cavity	41	m ³	75.6									
Reverberant correction (CIBSE Guide B4 2016 - Table 4.37) (R1)	42	dB			11.0	9.0	6.0	5.0	3.0	2.0	1.0	1.0
Total <i>internal surface area</i> of perimeter roof service cavity (S)	43	m ²	403.2									
Surface area correction (CIBSE Guide B4 2016 - 10lg4/S) (R2)	44	dB			-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0	-20.0
Resulting reverberant sound pressure within perimeter roof service cavity (CIBSE Guide B4 2016 - eq. 4.17)	45	dB Lp		75.8	57.0	61.5	72.6	75.0	72.5	62.7	52.7	50.7
Estimated sound insulation performance of the perimeter roof build-up INSUL	46	dB R			18.0	22.0	27.0	31.0	28.0	29.0	38.0	38.0
Total external surface area of perimeter roof (S)	47	m ²	176.4									
Average distance of roof area to nearest dwelling (r)	48	m	94.0									
Resulting sound pressure level at nearest dwelling from music noise duct breakout via roof (Flakt Woods)	49	dB Lp		13.3	5.0	5.5	11.6	10.0	10.5	0.0	0.0	0.0
Combined music levels from all ventilation breakout paths												
	50	dB Lp		15.8	14.0	14.9	14.2	10.4	10.9	3.0	5.1	10.9
Music noise breakout level outside dwellings from other building elements (see separate breakout calculation sheet)												
	51	dB Lp		13.6	30.5	17.2	15.7	10.9	6.5	0.0	0.0	0.0
Combined levels from all breakout paths, ventilation and building fabric	52	dB Lp		17.8	30.6	19.2	18.0	13.7	12.2	4.8	6.3	11.2
Limits at the nearest dwellings												
	53	dB Lp		26.4	33.3	26.1	22.1	24.1	23.1	14.8	11.1	12.8

Acoustic Screening Calculation Outdoor Guests Noise to R2

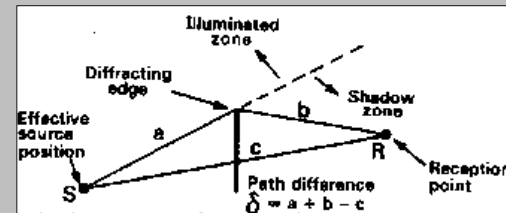
hepworthacoustics

Barrier Attenuation	h (Source)	h(Receiver)	h(Barrier)	d(S-B)	d(B-R)	d(S-B-R)	d(SBR)	d(SR)
	1.5	4.0	2.5	8.0	96.0	104.0	104.07	104.03

a	b	c	Path Diff	Log
8.06	96.01	104.03	0.043932	-1.36E+00

Frequency (Hz)	500	h(S)-H(R)	S)-H(R)/SB	Theta	min shado	Zone
Speed (c)	344	2.5	0.024038	0.024034	1.692308	Shadow

	Freq Hz	Barrier Correction dB
CRTN		-8
CRN	Reflective Barrier	-7
	Absorptive Barrier	-8
BS5228	Approximation	-10
ISO9613	At Frequency (Hz)	-6
Fresnel		-7
Octave Band	63	-5
	125	-6
	250	-6
	500	-7
	1000	-9
	2000	-11
	4000	-14
	8000	-16



Minimum mass kg/m ²	2.2	BS5228						
	63	125	250	500	1k	2k	4k	8k
Fresnel	-5.2	-5.6	-6.3	-7.4	-9.1	-11.2	-13.7	-16.4
ISO9613	-4.9	-5.0	-5.1	-5.8	-6.6	-7.9	-9.7	-11.9
difference	0	1	1	2	2	3	4	4

Guest Vehicle Noise Calculations

Description	Value			
Number of seconds in 1 hour [s]	3600			
Source measurement reference distance [m]	10			
Car door closing LAE	59.4			
engine start-up and pull off LAE	56.6			
combined LAE	61.2			
Number of parking events within 1 hour	52			
Number of events	Bay no.	Total distance from bay to Nearest Dwellings (m)	Distance attenuation	Resulting Sound Pressure Level at Dwellings LAeq
1	1	43	-12.7	13.0
1	2	44	-12.9	12.8
1	3	44	-12.9	12.8
1	4	44	-12.9	12.8
1	5	45	-13.1	12.6
1	6	45	-13.1	12.6
1	7	46	-13.3	12.4
1	8	47	-13.4	12.2
1	9	48	-13.6	12.0
1	10	49	-13.8	11.8
1	11	50	-14.0	11.7
1	12	63	-16.0	9.7
1	13	62	-15.8	9.8
1	14	61	-15.7	9.9
1	15	60	-15.6	10.1
1	16	59	-15.4	10.2
1	17	58	-15.3	10.4
1	18	48	-13.6	12.0
1	19	50	-14.0	11.7
1	20	53	-14.5	11.2
1	21	57	-15.1	10.5
1	22	59	-15.4	10.2
1	23	60	-15.6	10.1
1	24	61	-15.7	9.9
1	25	62	-15.8	9.8
1	26	63	-16.0	9.7
1	27	64	-16.1	9.5
1	28	65	-16.3	9.4
1	29	67	-16.5	9.1
1	30	69	-16.8	8.9
1	31	125	-21.9	3.7
1	32	128	-22.1	3.5
1	33	131	-22.3	3.3
1	34	133	-22.5	3.2
1	35	135	-22.6	3.0
1	36	138	-22.8	2.8
1	37	140	-22.9	2.7
1	38	142	-23.0	2.6
1	39	144	-23.2	2.5
1	40	147	-23.3	2.3
1	41	150	-23.5	2.1
1	42	123	-21.8	3.8
1	43	126	-22.0	3.6
1	44	129	-22.2	3.4
1	45	131	-22.3	3.3
1	46	134	-22.5	3.1
1	47	137	-22.7	2.9
1	48	138	-22.8	2.8
1	49	141	-23.0	2.7
1	50	143	-23.1	2.5
1	51	145	-23.2	2.4
1	52	148	-23.4	2.2
				26

AHU Fan Noise Calculations

Description	Ref	Unit	Value	A	63	125	250	500	1k	2k	4k	8k
AHU: Swegon Gold RX HC 012 fan in-duct sound power level - Intake	1	dB Lw			83.0	78.0	73.0	66.0	64.0	60.0	55.0	45.0
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	2	dB/m			1.0	0.7	0.3	0.2	0.1	0.1	0.1	0.1
Average duct path length	3	m	3									
Total straight duct run losses, esxternal side of AHU (ref 2*3)	4	dB			3.0	2.1	0.9	0.6	0.3	0.3	0.3	0.3
Duct width	5	mm	400									
Frequency(kHz) x duct width (mm)	6				25.2	50.0	100.0	200.0	400.0	800.0	1600.0	3200.0
Attenuation of unlined elbows (CIBSE Guide B4 2016 - Table 4.22)	7	dB			0.0	1.0	5.0	5.0	8.0	4.0	3.0	3.0
Minimum number of duct bends between event space grille terminations and AHU	8	2										
Minimum losses due to duct bends, external side of AHU	9	dB			0.0	2.0	10.0	10.0	16.0	8.0	6.0	6.0
Surface area of external termination	10	m ²	0.160									
Effective diameter of rectangular duct termination (CIBSE Guide B4 2016 - eq. 4.7)	11	m	0.45									
Duct termination end reflection loss (CIBSE Guide B4 2016 - eq. 4.6)	12	dB			9.7	5.2	2.1	0.7	0.2	0.1	0.0	0.0
Attenuator 2 - post-AHU performance (SORDO-A-400-1100 (910655307))	13	dB IL			2.0	4.0	7.0	15.0	20.0	13.0	7.0	3.0
Resulting fan noise breakout sound power level (ref 1-4-9-12-13)	14	dB Lw		51.9	68.3	64.7	53.0	39.7	27.5	38.6	41.7	35.7
Approximate distance to nearest dwelling	15	m	99									
Lp from point source Lw accounting for attenuation over distance (Flakt Woods PGtNC Equation 5.4)	16	dB Lp		8.3	20.4	16.8	5.1	0.0	0.0	0.0	0.0	0.0
AHU: Swegon Gold RX HC 012 fan in-duct sound power level - Exhaust	17	dB Lw			80.0	70.0	77.0	68.0	66.0	64.0	57.0	50.0
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	18	dB/m			1.0	0.7	0.3	0.2	0.1	0.1	0.1	0.1
Average duct path length	19	m	3									
Total straight duct run losses, esxternal side of AHU (ref 18*19)	20	dB			3.0	2.1	0.9	0.6	0.3	0.3	0.3	0.3
Duct width	21	mm	400									
Frequency(kHz) x duct width (mm)	22				25.2	50.0	100.0	200.0	400.0	800.0	1600.0	3200.0
Attenuation of unlined elbows (CIBSE Guide B4 2016 - Table 4.22)	23	dB			0.0	1.0	5.0	5.0	8.0	4.0	3.0	3.0
Minimum number of duct bends between event space grille terminations and AHU	24	2										
Minimum losses due to duct bends, external side of AHU	25	dB			0.0	2.0	10.0	10.0	16.0	8.0	6.0	6.0
Surface area of external termination	26	m ²	0.160									
Effective diameter of rectangular duct termination (CIBSE Guide B4 2016 - eq. 4.7)	27	m	0.45									
Duct termination end reflection loss (CIBSE Guide B4 2016 - eq. 4.6)	28	dB			9.7	5.2	2.1	0.7	0.2	0.1	0.0	0.0
Attenuator 2 - post-AHU performance (SORDO-A-400-1100 (910655307))	29	dB IL			2.0	4.0	7.0	15.0	20.0	13.0	7.0	3.0
Resulting fan noise breakout sound power level (ref 17-20-25-28-29)	30	dB Lw		52.0	65.3	56.7	57.0	41.7	29.5	42.6	43.7	40.7
Approximate distance to nearest dwelling	31	m	99									
Lp from point source Lw accounting for attenuation over distance (Flakt Woods PGtNC Equation 5.4)	32	dB Lp		8.0	17.4	8.8	9.1	0.0	0.0	0.0	0.0	0.0
Combined AHU fan noise at nearest dwelling	33	dB Lp		11.1	22.2	17.5	10.6	3	3	3	3	3

MVHR Fan Noise Calculations

Description	Ref	Unit	Value	A	63	125	250	500	1k	2k	4k	8k
MVHR: Swegon CASA R4-C Genuis fan in-duct sound power level - Intake	1	dB Lw			64.0	65.0	62.0	50.0	37.0	33.0	24.0	19.0
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	2	dB/m			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Average duct path length	3	m	5.5									
Total straight duct run losses, esxternal side of AHU (ref 2*3)	4	dB			0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Duct diameter	5	mm	150									
Frequency(kHz) x duct width (mm)	6				9.5	18.8	37.5	75.0	150.0	300.0	600.0	1200.0
Attenuation of unlined elbows (CIBSE Guide B4 2016 - Table 4.24)	7	dB			0.0	0.0	1.0	2.0	3.0	3.0	3.0	3.0
Minimum number of duct bends between event space grille terminations and AHU	8	2										
Minimum losses due to duct bends, external side of AHU	9	dB			0.0	0.0	2.0	4.0	6.0	6.0	6.0	6.0
Duct termination end reflection loss (CIBSE Guide B4 2016 - eq. 4.6)	12	dB			18.2	12.8	7.7	3.7	1.3	0.4	0.1	0.0
Resulting fan noise breakout sound power level (ref 1-4-9-12-13)	14	dB Lw		45.2	45.2	51.7	51.7	41.8	29.1	26.0	17.3	12.4
Approximate distance to nearest dwelling	15	m	85									
Lp from point source Lw accounting for attenuation over distance (Flakt Woods PGtNC Equation 5.4)	16	dB Lp		7.3	0.0	5.1	5.2	0.0	0.0	0.0	0.0	0.0
MVHR: Swegon CASA R4-C Genuis fan in-duct sound power level - Exhaust	17	dB Lw			70.0	69.0	69.0	59.0	54.0	51.0	47.0	41.0
Straight duct run losses per metre (CIBSE Guide B4 2016 - Table 4.19)	18	dB/m			0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Average duct path length	19	m	4									
Total straight duct run losses, esxternal side of AHU (ref 18*19)	20	dB			0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Duct termination end reflection loss (CIBSE Guide B4 2016 - eq. 4.6)	21	dB			18.2	12.8	7.7	3.7	1.3	0.4	0.1	0.0
Resulting fan noise breakout sound power level (ref 17-20-21)	22	dB Lw		58.4	51.4	55.8	60.9	54.9	52.3	50.2	46.5	40.6
Approximate distance to nearest dwelling	23	m	85									
Lp from point source Lw accounting for attenuation over distance (Flakt Woods PGtNC Equation 5.4)	24	dB Lp		12.0	4.8	9.2	14.3	8.3	5.7	3.6	0.0	0.0
Combined MVHR fan noise at nearest dwelling	25	dB Lp		13.3	6	10.6	14.8	8.9	6.7	5.2	3	3

Acoustic Screening Calculation ASHPs to R1

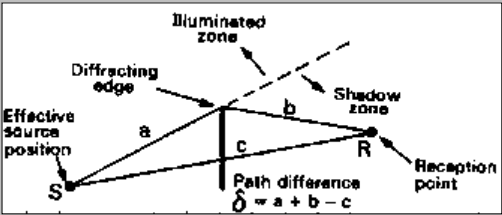
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Barrier Attenuation	h (Source)	h(Reciever)	h(Barrier)	d(S-B)	d(B-R)	d(S-B-R)	d(SBR)	d(SR)
	1.7	4.0	2.4	1.0	91.0	92.0	92.23	92.03

a	b	c	Path Diff	Log
1.22	91.01	92.03	0.205975	-6.86E-01

Frequency (Hz)	500	h(S)-H(R)	S)-H(R)/SB	Theta	min shadow	Zone
Speed (c)	344	2.3	0.025	0.024995	1.725	Shadow

Freq Hz		Barrier Correction dB
CRTN		-11
CRN	Reflective Barrier	-10
	Absorptive Barrier	-12
BS5228	Approximation	-10
ISO9613	At Frequency (Hz)	-9
Fresnel		-12
Octave Band	63	-7
	125	-8
	250	-10
	500	-12
	1000	-14
	2000	-17
	4000	-20
	8000	-23



Minimum mass kg/m ²	3.4	BS5228							
	63	125	250	500	1k	2k	4k	8k	
Fresnel	-6.5	-7.8	-9.5	-11.8	-14.3	-17.1	-19.9	-22.9	
ISO9613	-5.7	-6.4	-6.9	-9.3	-11.5	-14.0	-16.7	-19.6	
difference	1	1	3	2	3	3	3	3	