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# TECHNICAL REPORT

**HAMPTON PRE-PREP SCHOOL**

**Proposed Hall extension**

# Adrian James Acoustics Document Control Sheet

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**Revision History**

| Rev | Details |
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| A | S3.2 minor wording amendment |
| B | Minor wording amendments - S1, S2.1, S2.2 |
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## 1 INTRODUCTION

We have been appointed by Hampton School to assess noise from a proposed single-storey hall extension at Hampton Pre-Prep School and provide outline advice on noise control measures. We understand that the existing Pre-Prep School accommodates 90 pupils from ages 3 to 7. The existing ground floor plan is shown in Figure 1.


**Figure 1 – Existing ground floor plan**

The proposed works will involve the demolition of an existing temporary building housing the kindergarten, and the erection of a new single-storey modular building housing a hall, kitchen and WCs, and a single-storey extension to the existing building to form an enlarged reception classroom and an internal link to the hall. We understand that the capacity of the school will remain unchanged.

We understand that a planning application for a previous scheme, which proposed a new building directly adjacent to the boundary of 45 Wensleydale Road, was rejected, in part due to concerns of noise to that property. There are no formal standards or guidance relating to activity noise from schools, but guidance set out in the National Planning Policy Framework and Noise Policy Statement for England are discussed in Appendix A.

We have estimated and compared activity noise breakout from the existing and proposed buildings and provided outline advice on noise mitigation measures.

## 2 PROPOSED SCHEME

### 2.1 Proposed extension

We understand that the proposed hall building will be a prefabricated modular construction with a maximum height of 3.6 metres. The proposed ground floor plan is shown in Figure 2.

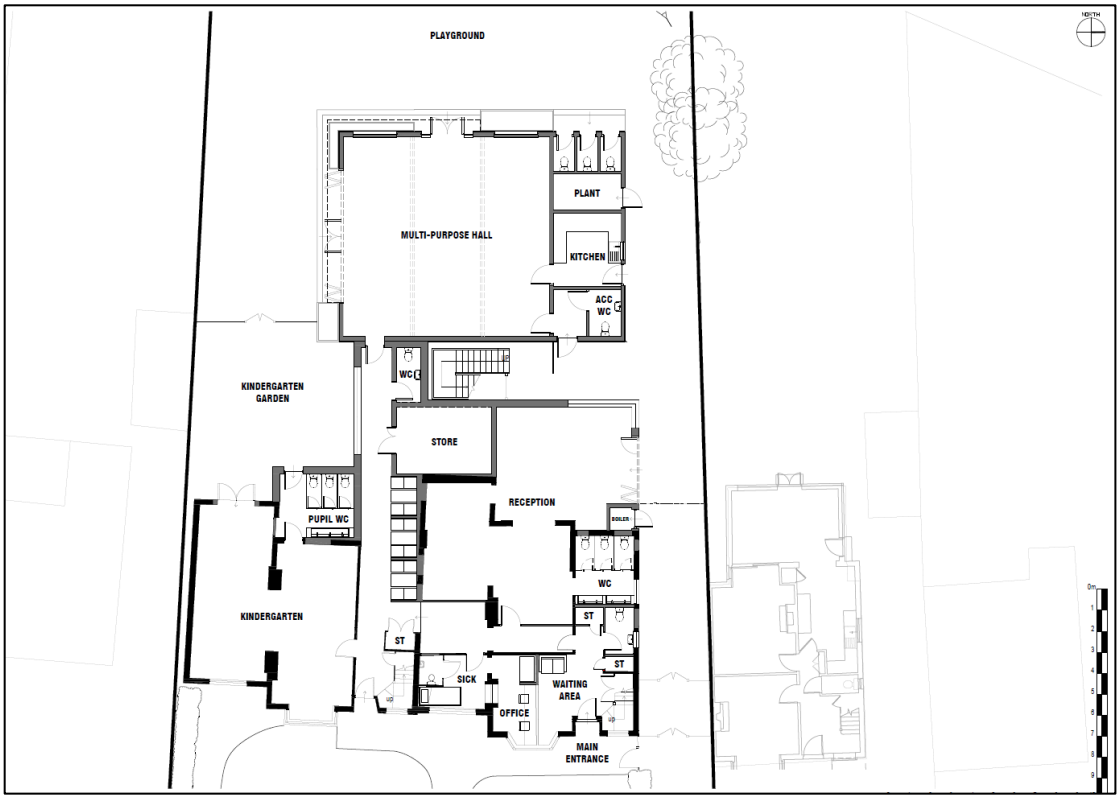


**Figure 2 – Proposed ground floor plan**

The proposed hall will be located centrally within the site, set back from the north, west and south boundaries with neighbouring residences. We understand that the external walls of the hall extension will be timber clad, with a flat roof. We understand that the detailed construction of the building is yet to be determined but based on our experience of similar modular constructions, we would recommend the following measures to provide a reasonable standard of building envelope sound insulation.

- **Walls and roof:** We recommend that a dense cement-impregnated chipboard or calcium silicate sheathing board is used on the outside of the structural frame behind the timber weatherboarding. Mineral wool insulation should be used between the structural framing elements. The internal face of the structural frame should be clad with two layers of plasterboard with a combined mass per unit area of at least 16kg/m². We would expect such a construction to be capable of achieving a weighted sound reduction index of at least 45 dB Rw.
- **Glazing:** Windows and external glazed doors should achieve a weighted sound reduction index of at least 30 dB Rw. This should be achievable with good quality thermal double-glazing set within well-sealed hardwood frames. Any non-glazed external doors should also achieve at least 30 dB Rw. Typically, if in wood, 30 dB Rw doors will be close-fitting, solid-core doors at least 45 mm

thick, or 4 mm plywood faced laminated solid core construction with no gaps or hollows in the core, and with 8 mm hardwood edging. Vision panels, if fitted, should consist of glass at least 8 mm thick and should be sealed into the door using non-hardening mastic under a hardwood bead to create an air-tight join between glass and wood. Doors should be close-fitting and fitted with efficient compressible seals at the head and jamb, installed and adjusted in accordance with the manufacturer's recommendation to be compressed when the doors are closed. Doors must not be undercut or fitted with transfer grilles. Double doors should be fitted with compressible seals at the meeting stile or with efficient rubber or neoprene wipe seals at the central vertical join, which shall be radiused and shaped to ensure a smooth and continuous seal when closed.

- **Ventilation:** We understand that the hall will be ventilated via opening windows on the west façade. We recommend that external doors, including the bifold doors on the south façade, are closed where possible if noisy activities are planned in the hall. We understand that the hall will normally be accessed via the internal door linking to the main building. If additional ventilation is needed to reduce overheating, we recommend that acoustically attenuated MVHR units are used, such as Gilberts Mistrale Fusion or equivalent.
- **Room acoustics:** We understand that the existing kindergarten building has minimal acoustically absorbent internal finishes. To meet reverberation time criteria set out in Building Bulletin 93:2014, the proposed hall will require an acoustically absorbent ceiling or a combination of acoustically absorbent ceiling and wall treatments. These should significantly reduce internal reverberant noise levels in the hall compared to those in the kindergarten. This would allow the hall to accommodate larger groups from multiple classes without increasing internal noise levels above those generated in the existing kindergarten.

### 2.2 Reception extension and link building

We understand that the single-storey reception extension and link building will be masonry constructions with green roofs. We recommend that windows and external glazed doors should achieve a weighted sound reduction index of at least 30 dB Rw. This should be achievable with good quality thermal double-glazing set within well-sealed hardwood frames. Due to the proximity of the reception extension to the site boundary, we recommend that this is ventilated via opening windows on the west façade only. We recommend that external doors, including the bifold doors on the north façade of the reception extension, are closed where possible if noisy activities are planned in the reception classroom.

### 2.3 Boundary fencing

We understand that new acoustic fencing is proposed to the boundaries with neighbouring residences. This should be close-boarded timber fencing at least 1.8 metres high, with a mass per unit area of at least 10 kg/m$^3$. There should be no gaps between boards or between the base of the fence and the ground. Proprietary acoustic fence systems, such as Jacksons 12K Envirofence or equivalent, may be capable of meeting this specification. Planting on the playground side of the fence may help to scatter and reduce reflected sound from the fencing.

# 3 NOISE BREAKOUT LEVELS

## 3.1 Internal activity noise

We have used CadnaA mapping software to estimate internal activity noise breakout from the existing kindergarten and proposed hall. We have assumed an average internal activity noise level of 73dB $L_{Aeq,5min}$ in all teaching spaces, based on activity noise measurements taken in similar settings. We have estimated internal noise breakout from the existing and proposed ground floor teaching rooms assuming that windows are opened for ventilation and that boundary fencing is installed as recommended in Section 2.3 of this report. We understand that no significant changes are proposed to first-floor teaching spaces in the main building and therefore we have not included breakout from these in the models.

Figures 3 and 4 compare estimated internal activity noise break-out from the existing kindergarten and proposed hall extension. The results show relatively little change in breakout levels at the nearest residences because of the proposed development, with breakout noise varying by approximately +/- 1 dB(A). A change of 1 dB(A) is unlikely to be perceptible and therefore the proposed development is likely to have a minimal noise impact on surrounding residents.

## 3.2 External activity noise

We understand that there will be no changes in overall pupil numbers arising from the development. External activity noise levels in the playground during breaktimes are therefore unlikely to change significantly in level or character compared to existing playground activity. From our experience of similar settings, we would expect average playground noise to be approximately 50 to 55 dB $L_{Aeq,5min}$ outside neighbouring residences. Although external activity noise will be significantly louder than the internal noise breakout from either the existing or proposed teaching buildings, this is to be expected and the proposal will not result in an increase in the external noise above the existing levels.

## 3.3 Plant noise

We understand that mechanical plant for the proposed hall extension has not yet been determined, but it is likely to be small in scale, including heating plant and extract fans for WCs and the kitchen. Plant noise may be subject to further assessment once the design has been finalised, but we would provisionally recommend that plant noise should be designed to not exceed 35dB $L_{Aeq,T}$ outside the nearest residences during daytime operation.

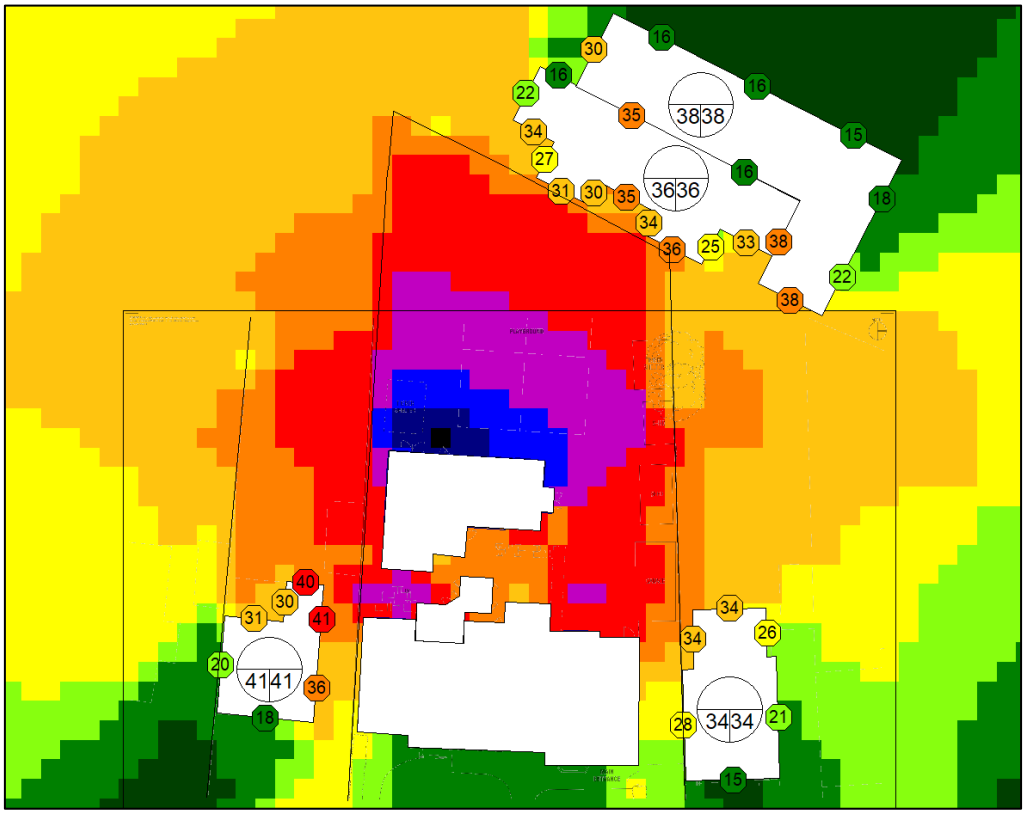


**Figure 3 – Estimated internal noise breakout from existing kindergarten**

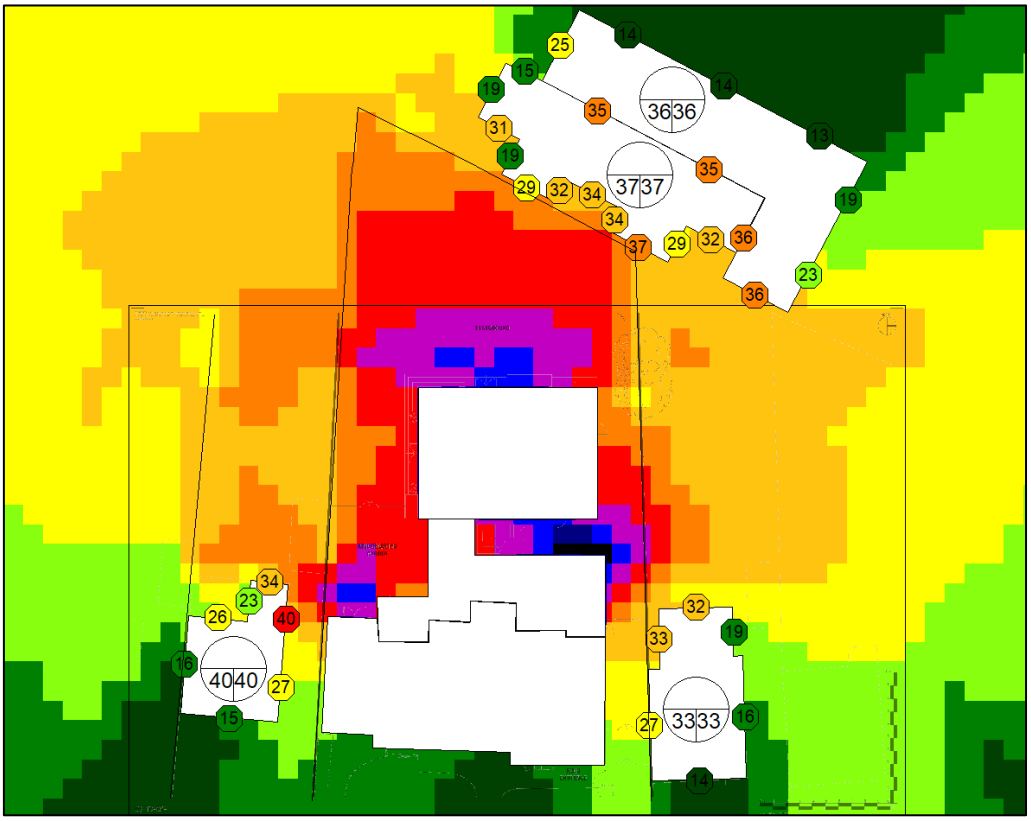


**Figure 4 – Estimated internal noise breakout from proposed hall extension**

## APPENDIX A NATIONAL PLANNING POLICY

### A1 National Planning Policy Framework

The latest version of the National Planning Policy Framework (NPPF) was released in February 2019 and was last updated in July 2021

The NPPF does not set out quantitative criteria for assessing noise affecting proposed developments, but in paragraph 174 states that planning policies and decisions should actively contribute to the enhancement of the natural and local environment by:

> *"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."*

According to paragraph 185, planning policies and decisions should also ensure new development is appropriate for its location, particularly considering the likely effects on health and living conditions. Planning policy and decision makers should aim to:

> *"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".*

The *'agent of change principle'* has been part of the NPPF since the July 2018 revision. This principle means that a person or business (i.e. the agent) introducing a new land use is responsible for managing the impact of that change. Paragraph 187 states:

> *"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."*

The NPPF also promotes *"good design"* (including good acoustic design) as a means of ensuring that development creates high quality, sustainable buildings, and places. Paragraph 124 states that *"good design is a key aspect of sustainable development"* while paragraph 128 promotes the benefits of good design early in the process.

## A2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) published by DEFRA in March 2010 sets out the Government's policy on noise, which is:

> *"to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."*

The aims of the NPSE are to:

- *"avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life."*

The NPSE also introduces concepts from toxicology currently being applied to noise impacts by the World Health Organisation. These are:

- NOEL – No Observed Effect Level: This is the level below which no effect can be detected.
- LOAEL – Lowest Observed Adverse Effect Level: This the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level: This is the level above which significant adverse effects on health and quality of life occur.

Together, the first two aims of the NPSE indicate that where a noise level falls between the lowest observable adverse effect level (LOAEL) and a significant observed adverse effect level (SOAEL), then according to the explanatory notes in the statement:

> *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development."*

This does not necessarily mean that adverse effects cannot ever occur.

## A3 National Planning Practice Guidance

Guidance on interpretation of the policy aims of the NPPF and NPSE is provided in the online National Planning Practice Guidance (NPPG) published in March 2014.

It reiterates the guidance within the NPPF, stating that:

> *"Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment."*

The NPPG provides advice regarding how to determine the impact of noise, including whether or not a significant adverse effect or adverse effect is occurring or likely to occur and whether or not a good standard of amenity can be achieved.

The NPPG proposes a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in Table 1.

| Perception | Examples of Outcomes | Increasing Effect Level | Action |
|---|---|---|---|
| Not noticeable | No effect | No Observed Effect | No specific measures required |
| Noticeable and not intrusive | Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life. | No Observed Adverse Effect<br>Lowest Observed Adverse Effect Level | No specific measures required |
| Noticeable and intrusive | Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life. | Observed Adverse Effect<br>Significant Observed Adverse Effect Level | Mitigate and reduce to a minimum |
| Noticeable and disruptive | The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant Observed Adverse Effect | Avoid |
| Noticeable and very disruptive | Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory | Unacceptable Adverse Effect | Prevent |

**Table 1 – NNPG proposed noise exposure hierarchy**