



**Project:** J 06404  
Noise Impact Assessment v1.4:  
102 Bedhampton Road, Havant

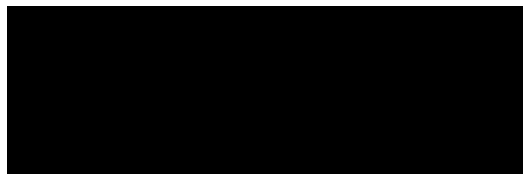
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**Dated:** 9<sup>th</sup> October 2026



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## 1. BACKGROUND

- 1.1. The application concerns the change of use of an existing building to a nursery.

See APPENDIX 2 - Site Location/Plans.

- 1.2. Sound Planning understands that the following activities will contribute to the noise emissions from the nursery:

- Children outside play in the rear garden area of the site.
- A limit of 8 children outside at once has been volunteered by the site operator.

- 1.3. Sound Planning has been retained to evaluate potential noise impact on the nearest noise sensitive receivers using appropriate methodologies and assessment criteria, and to design a suitable noise mitigation strategy if required.

- 1.4. Jake Willmott is a Member of the Institute of Acoustics (M.I.O.A) having attained appropriate qualifications in acoustics and has eight years' experience undertaking acoustic assessments including significant experience of a wide variety of noise assessments in the context of planning applications.

Jake has attained the following qualifications within the field of acoustics:

- Institute of Acoustics (IOA) Diploma
- Master's Degree - Applied Acoustics (Solent University)

- 1.5. Site and Location

- 1.5.1. The site is in primarily residential area.

See APPENDIX 2 - Site Location/Plans.

- 1.5.2. The nearest noise sensitive receivers to the rear garden are residential properties to the west (100 Bedhampton Road (NSR 1) and north (1A Lester Road, NSR 2). The adjacent property at 104 Bedhampton Road is currently in use as a dentist's surgery so would not normally be considered a noise sensitive receiver.

See APPENDIX 2 - Site Location/Plans.

- 1.5.3. The area of the site to be used as outside play space for children is in the rear garden of the existing property.



1.6. Proposed Operation Times:

- Monday – Friday: 07:30 – 18:00 hours

2. **ASSESSMENT CRITERIA**

2.1. An assessment should be made of the relative change in noise level based on the IEMA guidelines for noise impact assessment to determine the relative change in noise level experienced at nearby noise sensitive receiver. Secondary reference should be made to infer criteria from general guidance and standards relating to community noise, such as the WHO Community Noise Guidelines, with reference to guidance documents applicable to other recreational noise sources, such as sports pitches, which are broadly similar in character. The assessment should be made with reference to the requirements of Local and National Planning Policy.

2.2. National Planning Policy Framework

2.2.1. The National Planning Policy Framework (NPPF) was released in March 2012 and last updated in December 2023.

2.2.2. Paragraph 174 of the NPPF states: ‘Planning policies and decisions should contribute to and enhance the natural and local environment by... preventing new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by, unacceptable levels of... noise pollution...’.

2.2.3. Paragraph 185 of the NPPF states that; ‘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:

- *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 (see Explanatory Note to the Noise Policy Statement for England (DEFRA)).*
- *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and*



- *limit the impact of light pollution from artificial light on local amenity, intrinsically dark landscapes and nature conservation.*

2.2.4. Paragraph 193 of the NPPF states that; *'Planning policies and decisions should ensure that new development<sup>4</sup> can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where 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.'*

2.2.5. Therefore, the NPPF requires that significant impacts are avoided, adverse impacts be mitigated and reduced to a minimum, and places an obligation on developers to not unduly constrain the operation of existing businesses and other noise sources in the area (the 'agent of change' principle).

### 2.3. Noise Policy Statement for England (NPSE)

2.3.1. The NPSE requires that developments:

- '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'

### 2.4. Local Planning Policy (Havant Borough Council)

2.4.1. Havant Borough Council have requested a noise impact assessment for the site with regards to the WHO Guidelines for Community Noise and the IEMA Guidelines on Noise Impact Assessment.

2.4.2. Since the original written feedback, the Environmental Health officer has requested additional information which has been included in the latest version of this report.



2.5. Noise Measurement Protocol - British Standard 7445-1: 2003<sup>1</sup>

2.5.1. The methods and procedures described in BS 7445 are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site.

2.5.2. The aim of the BS 7445 series is to provide authorities with material for the description of noise in community environments. Based on the principles described in this standard, acceptable limits of noise can be specified and compliance with these limits can be controlled.

2.5.3. BS 7445 does not specify limits for environmental noise.

2.6. BS4142: 2014+A1: 2019 – Methods for rating and assessing industrial and commercial sound

2.6.1. Noise from children's play is fundamentally different to the types of noise intended to be assessed using the methodology from BS4142, which is intended to assess noise from mechanical plant and industrial processes.

2.6.2. Section 1.3 of BS4142 specifically states that the standard is:

... ***“not intended to be applied to the rating and assessment of sound from:***

- a) ***Recreational activities, including all forms of motorsport;***
- b) *Music and other entertainment;*
- c) *Shooting grounds;*
- d) *Construction and demolition;*
- e) *Domestic animals;*
- f) ***People...”;***

2.6.3. BS4142 is the only assessment standard which compares proposed noise sources with the  $L_{A90}$  background noise level, and that the standard is specific in assessing noise of commercial and industrial character. This includes noise sources such as air conditioning, ventilation systems and heavy machinery including mobile plant and industrial processes, but as indicated in 2.6.2 specifically is not applicable to recreational noise or noise from people.

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<sup>1</sup> Description and measurement of environmental noise. Part 1 – Guide to quantities and procedures.



- 2.6.4. The commercial and industrial sources covered by this type of assessment are distinctly mechanical in character are especially intrusive and impactful on residential amenity as they are highly distinctive against general noise experienced in community settings. Thresholds for annoyance (and by extension impact) from mechanically generated noise are relatively low compared to other noise sources due to the distinctive character of the noise generated and its patterns of operation, which are in general steady-state and include relatively little time-variance and therefore have a greater capacity to be audible and intrusive even at generally low levels relative to other noise sources.
- 2.6.5. Comparison of commercial/industrial noise to the  $L_{A90}$  background noise level is appropriate as the  $L_{A90}$  is a calculated value which represents the lowest reliably measurable noise level in a given measurement period and a very low level of audibility for commercial/industrial is appropriate given the potential to impact residential amenity.
- 2.6.6. The  $L_{A90}$  background noise level is calculated level for each measurement time period and represents the level exceeded for 90% of that time period. It is important to understand that it does not represent the noise level actually measured for 90% of the time period, and that for 90% of each measurement period the noise level will be higher than the  $L_{A90}$  value, often significantly higher.
- 2.6.7. The thresholds for impact indicated in BS4142 apply to noise sources fundamentally different to noise from children playing. Comparing noise from children playing to the  $L_{A90}$  background noise level does not give a reliable assessment of impact and will drastically overstate the level of impact when compared to more relevant assessments. A comparison of noise levels generated against the background noise level is an approach only applied in the BS4142 standard and given the specific exclusion of noise from People and Recreation from the scope of that standard, there is no basis to apply this approach to noise from a nursery where the primary noise source is children's recreation
- 2.6.8. There is no evidential basis for using this type of comparison as a reliable indication of impact for noise from recreation and more relevant and applicable guidance documents are considered in 2.7, 2.8 and 2.9 of this report.
- 2.6.9. For noise generated by community facilities (such as nurseries) in a community setting, the appropriate assessment is against the  $L_{Aeq}$  ambient



noise level to determine whether the noise levels experienced at nearby noise sensitive uses are likely to change, and if so what the magnitude of that change is likely to be, and therefore the level of impact. Noise from community noise sources often includes a level of variation over time and time period averaging to determine the ‘typical’ level of noise generated over a representative time period is therefore appropriate to determine impact.

- 2.6.10. The  $L_{Aeq}$  ambient noise level better correlates to human perception of an acoustic environment than the  $L_{A90}$ , and the  $L_{A90}$  is often not directly or consistently perceptible as it is a calculated value only used in assessment of commercial/industrial noise.
- 2.6.11. Assessment against the  $L_{Aeq}$  ambient noise level and determination of impact based on the IEMA Guidelines on Noise Impact Assessment is a more suitable approach applied and is commonly applied to recreational noise and noise from human voices in a variety of settings including playgrounds and sports pitches which are more similar to noise from nurseries than commercial/industrial noise.

2.7. Institute of Environmental Management & Assessment (IEMA) – Guidelines on Noise Impact Assessment.

- 2.7.1. This document gives guidance as to how changes in noise level may be categorised. The categorisation shown in the IEMA table below therefore takes this as its basis, with changes made as appropriate to reflect the site’s own circumstances, as defined in the guidelines. The classification process as defined within the IEMA guidelines is the relevant guidance to apply to noise generated by community facilities in community settings:

| Noise Change dB(A) | Effect(s)            | NPSF Assessment |
|--------------------|----------------------|-----------------|
| < 2.9              | None/Not Significant | NOEL            |
| 3.0 - 4.9          | Slight/Moderate      | LOAEL           |
| 5.0 - 9.9          | Substantial          | SOAEL           |
| $\geq 10$          | Very Substantial     | SOAEL           |

## 2.8. World Health Organisation: Guidelines for Community Noise<sup>2</sup>

- 2.8.1. The W.H.O document covers a wide array of environmental noise issues and appropriate assessment criteria in relation to acceptable noise levels in various situations.
- 2.8.2. The Guidelines look at appropriate assessment methodology and statistical parameters which are most relevant when looking at particular noise sources; whether they cause annoyance and to what degree.
- 2.8.3. The capacity of a noise to induce annoyance depends upon its physical characteristics, including the sound pressure level, spectral characteristics and variations of these properties with time. Noise with low-frequency components require lower guideline values. For intermittent noise, it is emphasized that it is necessary to take into account both the maximum sound pressure level and the number of noise events.
- 2.8.4. W.H.O – Residential Amenity Criteria (external):

| Specific Environment | Critical Health Effects                                            | L <sub>Aeq</sub> (dB) | Time Base (hours) | L <sub>AF</sub> max (dB) |
|----------------------|--------------------------------------------------------------------|-----------------------|-------------------|--------------------------|
| Outdoor Living Area  | Serious annoyance, daytime evening                                 | 55                    | 16                |                          |
|                      | Moderate annoyance, daytime evening                                | 50                    | 16                |                          |
| Dwelling, Indoors    | Speech intelligibility and moderate annoyance, daytime and evening | 35                    | 16                |                          |

## 2.9. Other relevant guidance:

- 2.9.1. The ANC Sports and Leisure ProPG<sup>3</sup> (draft) also aims to provide a framework for assessing recreational noise in a community setting albeit from sports pitches rather than children's play. The noise sources are in general terms quite similar and are both examples of recreational noise with the human voice as the primary noise source.

<sup>2</sup> World Health Organisation Recommended Levels for Community Noise 2000.

<sup>3</sup><https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2026/06/ProPG-Sport-and-Leisure-Noise.pdf>



- 2.9.2. The Sports and Leisure ProPG recommends an approach similar to the IEMA Guidelines (i.e. assessing the relative change in noise levels expected at nearby noise sensitive properties) with additional consideration for of the absolute level of the sound against a threshold similar the limits from the WHO Guidance on Community Noise (i.e. 50 dB  $L_{Aeq}$  being the level above which adverse impacts may be expected).
  - 2.9.3. This is further confirmation of the principle that assessing noise emissions in terms of time period averages, comparison with existing  $L_{Aeq}$  noise levels to determine the relative change in noise levels, and a secondary comparison against an absolute criteria in the region of 50 dB  $L_{Aeq}$  is the appropriate method for assessing such noise sources.
  - 2.9.4. The approach recommended to assess maximum noise levels, drawing on guidance relating to noise sources which include significant maximum noise level events or other criteria from which a reasonable target level for  $L_{AFmax}$  can be inferred is to attempt to limit  $L_{AFmax}$  levels to below 65 dB at the nearest noise sensitive receiver, but this is not suggested as an absolute limit but instead is proposed as the level above which adverse impacts may begin to onset, dependent on context, roughly equivalent with LOAEL as defined by the Noise Policy Statement for England. If maximum noise levels are predicted above this level then management procedures should be introduced to reduce the incidence of such  $L_{Amax}$  events.
  - 2.9.5. The Sports and Leisure ProPG recommends modelling such noise sources as area sources at a specific height using BS ISO 9613 compliant noise modelling software as suitably representative of recreational uses taking place over an activity area with multiple possible combinations of noise source positions. This in line with industry standard approaches for such scenarios.
  - 2.9.6. The Sports and Leisure ProPG also references the Sports England AGP (Artificial Grass Pitch) guidance which recommends a noise emissions limit of 50 dB for noise from recreation at sports pitches and recommends time period averaging over a worst-case 1-hour period to determine impacts.
- 2.10. Consideration of the frequency content of the noise source:
- 2.10.1. Assessing noise levels from noise sources which largely consist of human voices is best assessed using A-weighted noise levels. A-weighting applies a frequency spectrum correction to measured noise levels which accounts



accurately for the response of the human ear to noise, which is not linear. The response of the human ear is closely related to the frequency content of human voices (including children's voices) as a primary evolutionary influence and the two are closely related.

- 2.10.2. Therefore, assessing A-weighted noise levels accurately captures both the frequency content of human voices and the response of the human ear to noise in a representative manner and is a well-established means of assessing human response across all types of noise, with additional relevance to noise from human voices. This is the specific intent and purpose of the use of A-weighting in noise measurement and assessment standards and has a strong evidential basis.

### **3. NOISE SURVEY METHODOLOGY**

- 3.1. Sound Planning attended the site on Wednesday 22<sup>nd</sup> to Thursday 23<sup>rd</sup> July 2026 to undertake a noise survey.

3.1.1. The sound measurements were undertaken in accordance with BS 7445<sup>4</sup>

- 3.2. Environmental Noise Measurements:

- 3.2.1. Sound monitoring equipment was in the rear garden of the existing property at the site. The position is representative of noise levels experienced at the rear façade of NSR's nearby.

See APPENDIX 2 – Site Location & APPENDIX 3 – Site Photographs.

- 3.2.2. The environmental noise measurements were carried out over a 24-hour period.

- 3.2.3. The sound level meter was Class 1 – details provided in 3.3. The microphone was positioned 1.5m above ground level and at least 3.5m from any vertical reflective façade.

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<sup>4</sup> British Standard 7445-1: 2003 – *Description and measurement of environmental noise*.



### 3.3. Sound Level Measurement Equipment

| Equipment        | Make     | Model   | Class | Serial Number | UKAS Calibration          |
|------------------|----------|---------|-------|---------------|---------------------------|
| SLM              | Svantek  | 971A    | 1     | 173077        | 1516641-1<br>(12/03/2026) |
| Field Calibrator | Norsonic | NOR1255 | 1     | 125525638     | U55078<br>(05/06/2026)    |

3.3.1. The Sound Level Meter (SLM) was field calibrated before and after the on-site noise measurements. No deviation was detected (1kHz). UKAS accredited calibration certificates are available on request.

3.3.2. The noise measurements were undertaken in accordance with BS 7445.

3.3.3. See APPENDIX 4 – Noise Measurement Data.

3.3.4. Noise at the measurement location was dominated by road traffic noise from the surrounding road network and nature noise (birds in trees, wind rustling leaves).

### 3.4. Source Noise Measurements for nursery play:

3.4.1. Source noise measurements were taken by Sound Planning at a nursery site in Church Crookham between Thursday 17<sup>th</sup> and Friday 18<sup>th</sup> October 2024.

3.4.2. A sound level meter was installed on the boundary of an external learning/play area of a nursery operating at the site.

3.4.3. The nursery used for source noise measurements operated the outside area with groups of 20 children with a staff to child ratio of approximately 6 children for each staff member (3 staff members outside).

3.4.4. During the noise survey children's activities outside included rowdy play including running, children becoming excited and shouting/screaming, nursery worker led singing with a small stereo system placed outside and general noisy play.



- 3.4.5. The worst-case 1-hour  $L_{Aeq}$  has been taken as representative of worst-case noise output from 20 children during rowdy play with a relatively low staffing ratio.
- 3.4.6. Short audio recordings were taken at intervals during the noise survey and they confirm that the noise recorded included shouting, screaming, and excited children playing.
- 3.4.7. Noise measurement data and survey results from the source noise measurement exercise are presented in APPENDIX 4 – Noise Measurement Data.

#### **4. NOISE LEVEL CALCULATION METHODOLOGY**

- 4.1. A noise model using SoundPLAN Essentials 6.0 has been created to predict sound propagation between the outside play space and the nearby NSR's.
- 4.2. SoundPLAN Essentials 6.0 implements the ISO 9613-2: 2024 for noise propagation calculations which is an appropriate British Standard calculation methodology.
- 4.3. Topography data for the model was imported from Google Maps.
- 4.4. Ground effects have been modelled based on a site inspection and available satellite imagery available for the site.
- 4.5. A 2m boundary fence around the gardens of the NSR's has been included in the model based on site inspection.
- 4.6. No screening effect has been assumed as a worst-case for foliage as hedges and bushes on the propagation path between the water play area and the receiver are not solely evergreen plants, so any noise attenuation provided will not be effective in winter months.
- 4.7. The reflection order for the model has been set to 4.
- 4.8. The outside play area has been modelled as an area sound source at a height of 0.5m above ground level to represent children playing.
- 4.9. The sound power level for children playing has been based on measurements taken at another similar nursery site by Sound Planning and scaled to account for the number of children present using the formula:

$$L_2 = L_1 + 10*\log(n)$$



Where 'n' is the result of the new capacity divided by the old capacity

- 4.10. The sound power of the area source has been set to 86 dB  $L_{wA}$ <sup>5</sup> based on reverse calculation of the equivalent sound power of an area source at the original measurement site, and correction to account for the reduced number of children at the site under consideration.
- 4.11. Receiver points were added at the building façade of each NSR (representing daytime use of habitable rooms) at 1.5m elevation.
- 4.12. A receiver point has also been added in the centre of the lawn of the adjacent property (NSR 3).
- 4.13. To verify that an ISO 9613 area source calculation is giving a worst-case result, a calculation based on point propagation from individual child locations has been provided in APPENDIX 6 in response to comments from Havant Borough Council officers.

## 5. NOISE MEASUREMENT RESULTS

### 5.1. Measured Existing Noise Levels – 102 Bedhampton Road, Havant

| Location                                 | Period (hours) | dB $L_{Aeq,T}$ |
|------------------------------------------|----------------|----------------|
| MP1 – rear garden of 102 Bedhampton Road | 09:00-16:00    | 54             |

See APPENDIX 4 – Noise Measurement Data

### 5.2. Source Noise Measurement Data – from nursery site in Church Crookham:

| Location                                     | Period (hours)                                            | dB $L_{Aeq,T}$ | dB $L_{AFmax}$<br>(typical,<br>exceeded <5x<br>during<br>measurement<br>period) | dB $L_{AFmax}$<br>(highest single<br>value,<br>occurred once<br>during 1-hour<br>period) |
|----------------------------------------------|-----------------------------------------------------------|----------------|---------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Directly adjacent to<br>children's play area | 14:45 – 17:15<br>(highest 1-hour<br>period of operations) | 66             | 81                                                                              | 88                                                                                       |

<sup>5</sup> Sound power level of 20 children playing measured at previous site by Sound Planning (area source) = 90 dB  $L_{wA}$ . Sound power of 8 children playing is therefore  $90 + 10 \log (8/20) = 86$  dB  $L_{wA}$ .



## 6. NOISE LEVEL CALCULATION RESULTS

### 6.1. Noise Model Output:

| Location                              | Area                                                                                | L <sub>Aeq</sub> |
|---------------------------------------|-------------------------------------------------------------------------------------|------------------|
| NSR 1 – 100 Bedhampton Road           | <i>Ground Floor, children's play noise level incident on habitable room windows</i> | 48               |
| NSR 2 – 1A Lester Road                | <i>Ground Floor, children's play noise level incident on habitable room windows</i> | 39               |
| NSR 3 – Garden of 100 Bedhampton Road | <i>Ground Floor level, children's play noise in garden</i>                          | 46               |

## 7. NOISE IMPACT ASSESSMENT

- 7.1. The noise level predicted from the children's play area is below both the upper and lower guideline values from the WHO Community Noise Guidelines at all locations assessed.
- 7.2. The predicted noise level in terms of L<sub>Aeq</sub> is 6 dB below the existing ambient noise level at the worst case NSR (NSR 1).
- 7.3. The predicted noise level in terms of L<sub>Aeq</sub> at NSR 2 is 15 dB below the existing ambient noise level.
- 7.4. The predicted noise level at NSR 3 is 8 dB below the existing ambient noise level.
- 7.5. Comparison of the predicted noise level for the nursery outside area at the worst affected NSR (NSR 1) with reference to the IEMA Guidelines for Noise Assessment shows that an increase in ambient noise levels at the receiver of +0.9 dB is likely, which would normally be classified as 'None/Not Significant', NOEL.
- 7.6. This level of change in noise level is not significant and while due to the character of noise children playing may at times be audible, it is not indicative of adverse impacts on health and quality of life.
- 7.7. The source noise measurement data indicates that maximum noise levels (L<sub>AFmax</sub>) from children's play are likely to be 15 – 22 dB higher than the L<sub>Aeq</sub> levels emitted by



children's play with a frequency of occurrence <7 times per hour. Extrapolating from the predicted  $L_{Aeq}$  levels at noise sensitive receivers this indicates that  $L_{AFmax}$  from children's play will be in the range 63 – 70 dB  $L_{AFmax}$  with the highest value in that range occurring once per hour or less with 20 children playing.

- 7.8. It is very likely that the incidence of maximum noise levels at this level will be significantly less common with only 8 children outside, and higher staffing to child ratios as proposed by the site operator.  $L_{AFmax}$  levels presented in 7.6 are therefore very much a worst case. Appropriate mitigation to manage children's behaviour and reduce the incidence of  $L_{AFmax}$  noise level events will be proposed in Section 8 and should be enforced via the sites noise management plan.
- 7.9. The measurement time history presented in APPENDIX 4 for the existing noise at the site indicates that maximum noise levels during the hours of operation are in the range 62 – 90 dB  $L_{AFmax}$ . The maximum noise levels predicted are within the range currently experienced at the site without the nursery in operation, so aside from their potential frequency would not be expected to otherwise cause adverse impacts.
- 7.10. The use of the site as a nursery falls within daytime hours on weekdays only, which is the time least likely to disturb residential amenity.
- 7.11. During the course of daily operations there will be significant periods where children are not outside and noise generation is likely be minimal, this includes periods at the beginning of the day (before 09:00), at lunchtime and at the end of the day (after 16:00). Over the course of a full day of operations the noise level generated will therefore be lower than assessed, as the assessment of impact has been made based on a worst-case 1-hour period of operation to ensure a robust assessment.

## **8. NOISE MITIGATION STRATEGY**

- 8.1. The noise management plan submitted with the application details procedures for managing the children's outside activities. The operator of the site is proposing to carefully manage both the numbers of children and the activities available to them outside which is in line with best practise for operating a nursery.
- 8.2. In consideration of whether other noise mitigation has been implemented in the proposed nursery use it is important to consider that a reduction of the number of children outside at once has been implemented prior to this assessment from 16 to 8 children to manage potential noise impacts from the site.



- 8.3. The fencing to either side of the rear garden of the property provides significant acoustic screening to neighbouring properties and should be considered as part of the noise mitigation volunteered by the applicant for the site.
- 8.4. Acoustic barriers are typically defined according to BS EN 14388 which provides minimum criteria to be met to ensure that noise is adequately reflected from barriers and does not significantly transmit through them. The standard specifically relates to transportation noise (including road traffic) which has significant low frequency content.
- 8.5. To be considered an effective noise barrier (i.e. to ensure that noise diffracting over the top of the barrier is the primary noise propagation path and that noise transmission through the barrier itself is kept to a reasonably low level), the barrier must be constructed of material without gaps to meet a surface mass of  $10 \text{ kg/m}^2$ . Noise from children and human voices more generally is primarily at middle and high frequencies where acoustic barriers are most effective, and even standard garden fences can provide significant acoustic screening for middle and high frequency noise, providing they are competently installed and free from gaps.
- 8.6. Specialist acoustic barrier products, but they are not strictly necessary and close boarded wooden garden fencing is typically very close to the surface mass criteria and should be considered to be effective at providing screening for middle and high frequency noise. A calculation to demonstrate that close boarded wooden fencing of the type installed at the site provides adequate surface mass is provided in APPENDIX 6.
- 8.7. Maintenance of the boundary fences will be necessary for the security of the site, as any gaps that form would be exploitable by exploring children. As part of daily operation of the site the operator will have to ensure that the fence is appropriately maintained for the duration of the nursery use, and this requirement will ensure that its function as an acoustic barrier. It is common for Local Authorities to apply conditions requiring that the development (which would include boundary fences) is implemented in line with the application documents and maintained thereafter, so it is reasonable to conclude that the fence will be maintained in an appropriate manner and additional considerations or conditions around its maintenance would not usually be necessary.
- 8.8. To manage the potential for noise impacts due to  $L_{AFmax}$  noise levels, a noise management plan should be implemented for the site. We recommend that the following means should be included in the noise management plan with the primary aim of managing child behaviour when outside to ensure considerate conduct, and to provide traceable and enforceable noise management documentation to Local Authority officers:



- 8.8.1. Minimum staffing levels for the nursery to ensure appropriate staffing levels when children are outside
- 8.8.2. A defined schedule of outside activities times which is adhered to by staff
- 8.8.3. A single point of contact for both neighbouring residents and Local Authority officers to ensure that site management is suitably available for contact
- 8.8.4. Training to be given to staff to ensure they are both aware of the requirement to manage noise, and the means by which managing noise is achieved
- 8.8.5. While children are outside, care should be taken to manage children's behaviour, particularly shouting, screaming and other similar behaviours to reduce the incidence of  $L_{AFmax}$  noise level events.
- 8.8.6. Planned activities for outside play should be implemented where possible to ensure that outside play noise is well controlled.
- 8.8.7. Children should be discouraged from grouping on the edge of the play area closest to the noise sensitive receiver and any whole group activities with all 8 children should use areas of the play area further away from NSR 1.
- 8.8.8. Outside use of hi-fi systems or amplified music should not be permitted
- 8.8.9. A log sheet should be filled out by site management daily with a record of means implemented to control noise and identifying any risky activities for noise emissions.
- 8.8.10. In the event of particularly badly behaved children attending the nursery, efforts should be made to manage activity times and choices to ensure that children who are highly likely to behave poorly are managed appropriately with the sanction of moving those children indoors available if behaviour does not improve.

## 9. CONCLUSIONS

- 9.1. Sound Planning has carried out an environmental noise impact assessment in accordance with relevant standards and guidance.
- 9.2. The noise levels predicted from the use of the outside area for children's activities, which is the main noise source proposed at the site, are predicted to be within below guideline ranges from the WHO Community Noise Guidelines.



- 9.3. Use of the proposed nursery will result in a change in noise levels of 0.9 dBA at the worst-case noise sensitive receiver, which should be considered as 'None/not significant' and 'NOEL' when assessed against the IEMA Guidelines for noise impact assessment.
- 9.4. The ambient noise level at the worst affected NSR with the nursery in operation will be below the upper guideline level from the WHO Community Noise Guidelines after the predicted change in noise level, which is an acceptable level and indicates that adverse impacts are unlikely. Noise from the nursery in isolation falls below the WHO Guidelines.
- 9.5. Noise emissions from the nursery at other NSRs in the surrounding area are predicted to be significantly below the existing ambient noise level and are also indicative of low or no adverse impact.
- 9.6. Subject to the proper implementation of an appropriate noise management plan to monitor and manage children's behaviour to manage  $L_{AFmax}$  noise level events, the operation of the nursery will avoid adverse and significant adverse impacts on nearby noise sensitive receivers in terms of both  $L_{Aeq}$  and  $L_{AFmax}$  noise levels.
- 9.7. Noise emissions from the site will be compliant with the requirements of local and national planning policy. Adverse and significant adverse impacts due to noise will be avoided.



## APPENDIX 1

### Glossary of Acoustic Terms

#### The Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0 dB (which corresponds to a reference sound pressure of  $2 \times 10^{-5}$  pascals) and the threshold of pain is around 120 dB. The sound energy radiated by a source can also be expressed in decibels. The sound power is a measure of the total sound energy radiated by a source per second, in watts. The sound power level,  $L_w$  is expressed in decibels, referenced to  $10^{-12}$  watts.

#### Frequency, Hz

Frequency is analogous to musical pitch. It depends upon the rate of vibration of the air molecules that transmit the sound and is measure as the number of cycles per second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is normally divided up into discrete bands. The most commonly used bands are octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency, and one-third octave bands, in which each octave band is divided into three. The bands are described by their centre frequency value and the ranges which are typically used for building acoustics purposes are 63 Hz to 4 kHz (octave bands) and 100 Hz to 3150 Hz (one-third octave bands).

#### Noise Rating

The Noise Rating (NR) system is a set of octave band sound pressure level curves used for specifying limiting values for building services noise. The Noise Criteria (NC) and Preferred Noise Criteria (PNC) systems are similar.

#### A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

#### Noise Descriptors

Where noise levels vary with time, it is necessary to express the results of a measurement over a period of time in statistical terms. Some commonly used descriptors follow.

$L_{Aeq, T}$  *The most widely applicable unit is the equivalent continuous A-weighted sound pressure level ( $L_{Aeq, T}$ ). It is an energy average and is defined as the level of a notional sound which (over a defined period of time,  $T$ ) would deliver the same A-weighted sound energy as the actual fluctuating sound.*



- $L_{AE}$  Where the overall noise level over a given period is made up of individual noise events, the  $L_{Aeq, T}$  can be predicted by measuring the noise of the individual noise events using the sound exposure level,  $L_{AE}$  (or SEL or  $L_{AX}$ ). It is defined as the level that, if maintained constant for a period of one second, would deliver the same A-weighted sound energy as the actual noise event.
- $L_{A1}$  The level exceeded for 1% of the time is sometimes used to represent typical noise maxima.
- $L_{A10}$  The level exceeded for 10% of the time is often used to describe road traffic noise.
- $L_{A90}$  The level exceeded for 90% of the time is normally used to describe background noise.

### Sound Transmission Descriptors

- $D_{nT}$  Standardised level difference
- $D_{nT, w}$  Weighted standardised level difference
- $L_1$  The average sound pressure level in the source room
- $L_2$  The average sound pressure level in the receiving room
- $T$  Reverberation time (receiving room)
- $T_0$  Reference reverberation time = 0.5s
- $C_{tr}$  Adaption spectrum which takes account for low to medium speed road/rail/air traffic; disco music; and factory noise (medium to low frequency noise).
- $C$  Adaptation spectrum which takes account of domestic activities including speech, music, radio and television.

### Frequency Analysis

- Octave Band *A band of frequencies the upper limit of which is twice the lower limit. They are known by their centre frequency, e.g., 63, 125, 250, 500, 1000, 2000 Hz...*
- One Third Octave *The logarithmic frequency interval between a lower frequency  $f_2$ , when  $f_2/f_1$  equals  $2^{1/3}$  apart. Frequencies include: 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000Hz.*

### Sound Transmission in the Open Air

Most sources of sound can be characterised as a single point in space. The sound energy radiated is proportional to the surface area of a sphere centred on the point. The area of a sphere is proportional to the square of the radius, so the sound energy is inversely proportional to the square of the radius. This is the inverse square law.

In decibel terms, every time the distance from a point source is doubled, the sound pressure level is reduced by 6 dB. Road traffic noise is a notable exception to this rule, as it approximates to a line source, which is represented by the line of the road. The sound energy radiated is



inversely proportional to the area of a cylinder centred on the line. In decibel terms, every time the distance from a line source is doubled, the sound pressure level is reduced by 3 dB.

## **Factors Affecting Sound Transmission in the Open Air**

### **Reflection**

When sound waves encounter a hard surface, such as concrete, brickwork, glass, timber or plasterboard, it is reflected from it. As a result, the sound pressure level measured immediately in front of a building façade is approximately 3 dB higher than it would be in the absence of the façade.

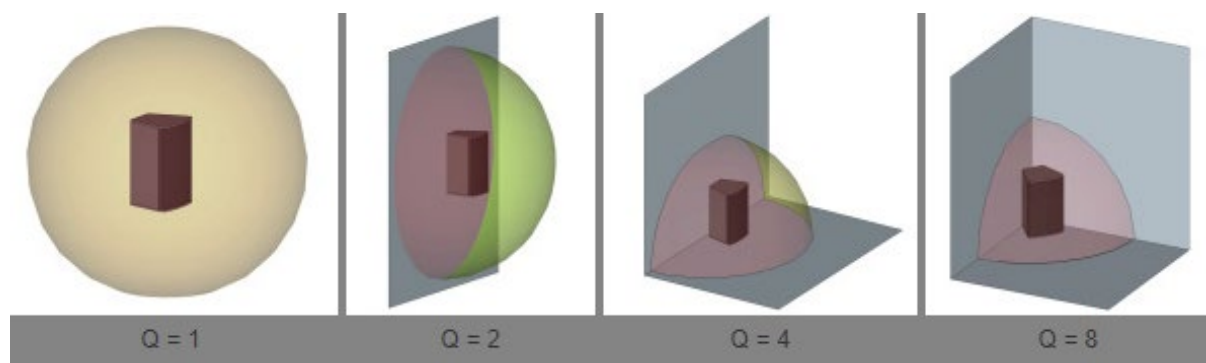
### **Screening and Diffraction**

If a solid screen is introduced between a source and receiver, interrupting the sound path, a reduction in sound level is experienced. This reduction is limited, however, by diffraction of the sound energy at the edges of the screen. Screens can provide valuable noise attenuation however. For example, a timber boarded fence built next to a motorway can reduce noise levels on the land beyond, typically by around 10 dB(A). The best results are obtained when a screen is situated close to the source or close to the receiver.

### **Meteorological Effects**

Temperature and wind gradients affect noise transmission, especially over large distances. The wind effects range from increasing the level by typically 2 dB downwind, to reducing it by typically 10 dB upwind – or even more in extreme conditions. Temperature and wind gradient are variable and difficult to predict.

### **Directivity Index**



**APPENDIX 2**  
**Site Location/Plans**  
*Google Earth*



**Key:**

-  NSR 1 – Residential Property
-  NSR 2 – Residential Property
-  Site Boundary (approx.)
-  Noise Monitoring Position (MP1)
-  Outside Play/Learning Area (approx.)

**APPENDIX 3**  
**Site Photographs**

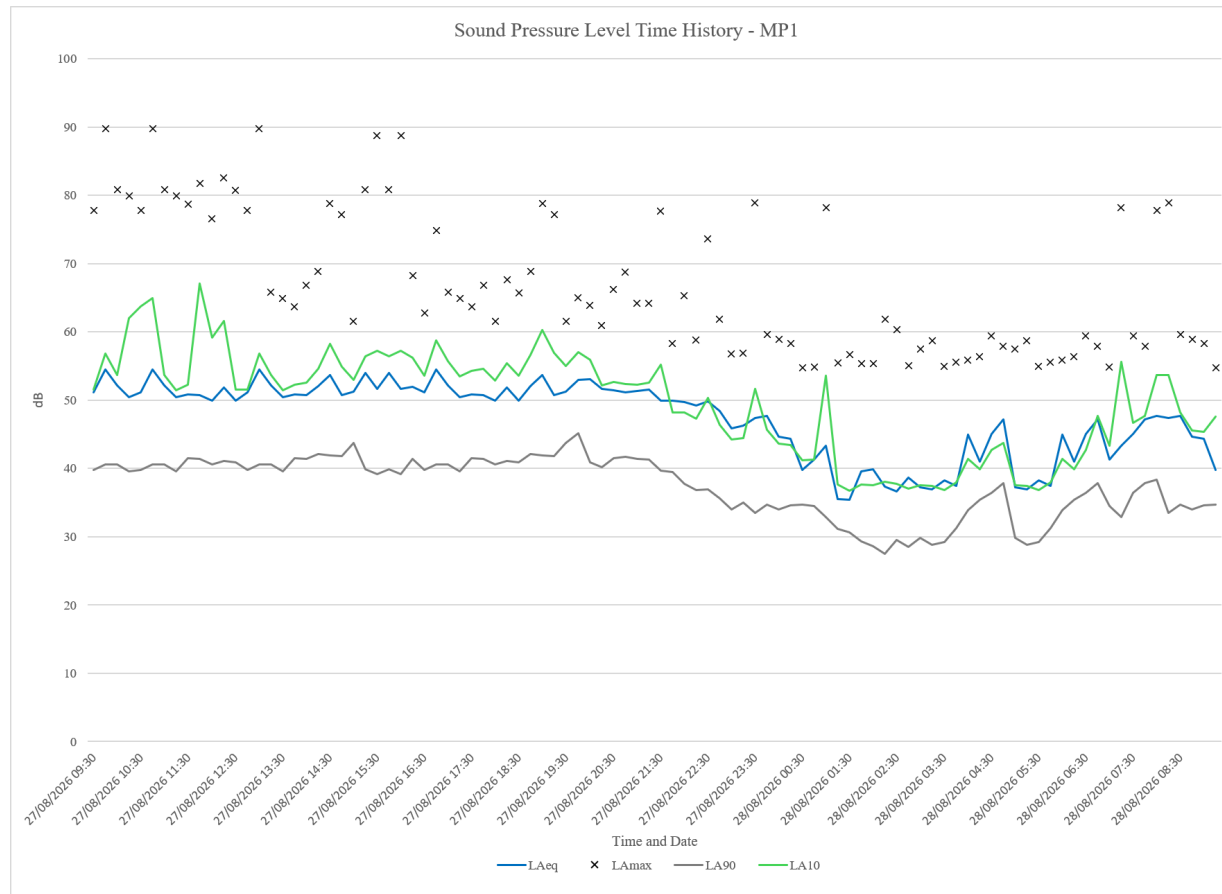


*Noise Measurement Position*



## APPENDIX 4

### Noise Measurement Data – 102 Bedhampton Road, Havant



**Source Noise Measurement Survey**

**(screenshot from Sound Planning Report J 05543, October 2024)**

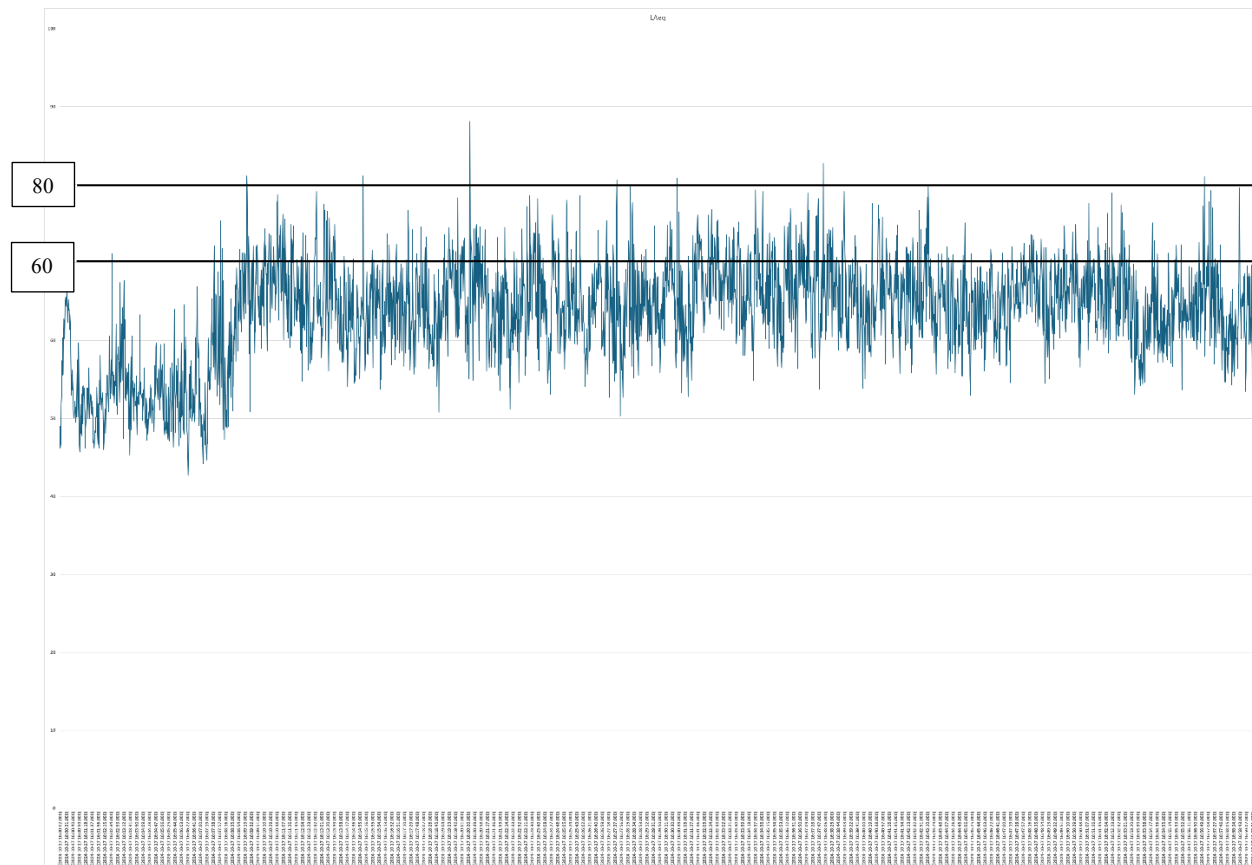




## Source Noise Measurement Data

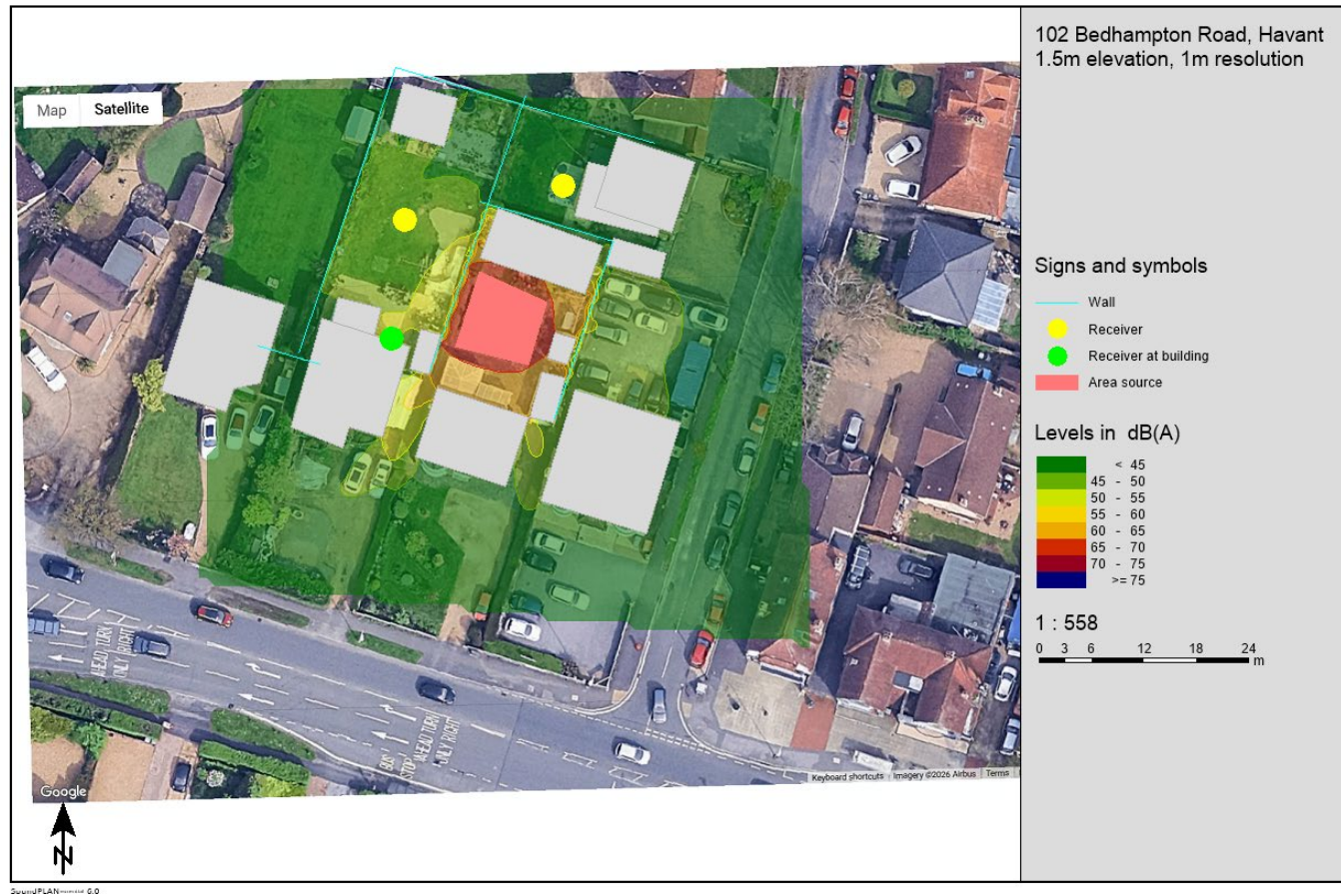
### Time history for worst-case 1-hour of nursery noise generation

66 dB  $L_{Aeq, 1hr}$



## APPENDIX 5

### Noise Map



## APPENDIX 6

### Calculations

#### *Close boarded fence surface mass – kg/m<sup>2</sup>*



**Forest Garden Traditional Closeboard Pressure treated 6ft Timber Fence panel (W)1.83m (H)1.83m**  
Sold & shipped by B&Q

★★★★★ (34)

**£59**

Pay in 30 days with [PayPal](#). Credit option: [Learn more](#)

Height (m)

1.83

**Product Features**

- ✓ Closeboard fence panels are perfect for boundary marking and are more robust than common waney-edge panels
- ✓ Heavy duty closeboard construction, the strongest of UK made panels
- ✓ Thick overlapping square cut 8mm boards, arranged vertically and mounted to a perimeter frame make an attractive looking panel

[View all features and specifications](#)

| Specifications    |                  |
|-------------------|------------------|
| Brand             | Forest Garden    |
| Construction type | Closeboard       |
| Height (cm)       | 182.6cm          |
| Made in           | UK               |
| Material          | Wood             |
| Model name/number | BQVBP66PTR       |
| Pack quantity     | 1                |
| Slat orientation  | Horizontal       |
| Style             | Traditional      |
| Panel height (ft) | 6ft              |
| Timber type       | Softwood         |
| Treatment         | Pressure treated |
| Weight (kg)       | 32.2kg           |
| Width (cm)        | 182.8cm          |
| Product code      | 5013053204573    |

$$\text{Panel Area (m}^2\text{)} = 1.826 \times 1.828 = 3.34\text{m}^2$$

$$\text{Panel Weight} = 32.2 \text{ kg}$$

$$\text{kg/m}^2 = 32.2 / 3.34 = 9.7 \text{ kg/m}^2$$

Sufficiently close to 10 kg/m<sup>2</sup> to be considered as providing effective acoustic screening for mid and high frequency noise.



### Calculation of noise emissions based on point sources

Sound power of 2 children calculated using method from Section 4.9

$$90 - 10\log(20/2) = 80 \text{ dB } L_{wA}$$

Sound power level sound propagation formula (free field):

$$L_p = L_{wA} - 20\log_{10}(r) - 11$$

| Noise Source and Location | Sound Power Level | Distance from Receptor | Distance Attenuation | Directivity | Screening Correction | Level at NSR 1 |
|---------------------------|-------------------|------------------------|----------------------|-------------|----------------------|----------------|
|                           | dB $L_{wA}$       | m                      | (dB)                 | (db)        | (dB)                 | dB $L_{pA}$    |
| Location A – 2 children   | 80                | 10.5                   | -31.4                | +3          | -10                  | 41.6           |
| Location B – 2 children   | 80                | 13                     | -33.3                | +3          | -10                  | 39.7           |
| Location C – 2 children   | 80                | 15.5                   | -34.8                | +3          | -10                  | 38.2           |
| Location D – 2 children   | 80                | 14                     | -33.9                | +3          | -10                  | 39.1           |
| <b>Total</b>              | -                 | -                      | -                    | -           | -                    | <b>45.8</b>    |

Comparison with the result from the ISO 9613 area source calculation (48 dB  $L_{pA}$ ) shows that calculating based on point sources gives a lower result. This validates the use of area sources as the worst-case calculation method.

**Locations Assessed (point source calculation):**

