

Acoustic Associates Sussex Ltd

Planning Condition Assessment

Site: Manor Nursery
Client: Roffey Homes

Report by: George Orton BEng(Hons) MIOA

Date: 06/05/2020
Project: J2933
Issue 1



Acoustic Associates

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1 Introduction

Acoustic Associates have been appointed to undertake an acoustic assessment of the proposed Manor Nursery development.

Noise Levels created by another consultant have been used to create a noise model

The noise levels for the day and the night time period have been assessed in terms of BS8233 and ProPG.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context

The reserved matter application decision notice includes a condition (3) relating to noise:

Prior to the commencement of development, a noise mitigation scheme shall be submitted for approval to the Local Planning Authority. The noise mitigation scheme shall include details relating to acoustic barriers for properties (on Plots 5, 6 and 24) facing the A280; and the facade treatment of all houses facing onto the A280. The approved noise mitigation shall be implemented in accordance with the details submitted.

2.2 Criteria

Based upon Sussex planning guidance it is recommended that criteria are provided by: BS8233 (Sound insulation and noise reduction for buildings) 2014. Reference is also made to the 2017 ProPG "Planning & Noise Document"

2.3 BS8233 Indoor Noise Criteria

Table 5 of BS8233 provides the following guideline values:

Activity	Location	Time period of day	
		07:00-23:00	23:00-07:00
Resting	Living Rooms	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room/Area	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1: BS8233 Criteria

2.4 BS8233 Indoor Noise Criteria

BS8233 states the following (7.7.3.2 Design criteria for external noise):

For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.

2.5 ProPG –Planning and Noise: new residential development

The following has been copied from the Association of Noise Consultants' (ANC) website:

Over recent years, we have seen the introduction of the Noise Policy Statement for England, as well as substantial changes in national planning policy. But these developments have not been accompanied by detailed technical acoustic advice.

The lack of detailed guidance can lead to inconsistent application of policy, that may in turn result in unsatisfactory development and affect quality of life.

To fill that gap and facilitate efficient and consistent decision-making in the development control process, the Institute of Acoustics, the Association of Noise Consultants and the CIEH have joined to produce a Professional Practice Guidance (ProPG) focussing on noise sensitive development.

The following extract has been taken (Figure 2, Page 13) from the ProPG document:

ACTIVITY	LOCATION	INTERNAL NOISE LEVELS	INTERNAL NOISE LEVELS
Resting	Living room	35 dB $L_{Aeq,10hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,10hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,10hr}$	30 dB $L_{Aeq,8hr}$ 45 dB L_{Amax} (Note 4)

NOTE 1 The Table provides recommended internal L_{Aeq} target levels for overall noise in the design of a building. These are the sum total of structure-borne and airborne noise sources. Ground-borne noise is assessed separately and is not included as part of these targets, as human response to ground-borne noise varies with many factors such as level, character, timing, occupant expectation and sensitivity.

NOTE 2 The internal L_{Aeq} target levels shown in the Table are based on the existing guidelines issued by the WHO and assume normal diurnal fluctuations in external noise. In cases where local conditions do not follow a typical diurnal pattern, for example on a road serving a port with high levels of traffic at certain times of the night, an appropriate alternative period, e.g. 1 hour, may be used, but the level should be selected to ensure consistency with the internal L_{Aeq} target levels recommended in the Table.

NOTE 3 These internal L_{Aeq} target levels are based on annual average data and do not have to be achieved in all circumstances. For example, it is normal to exclude occasional events, such as fireworks night or New Year's Eve.

NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,10hr}$, depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,10hr}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events (see Appendix A).

NOTE 5 Designing the site layout and the dwellings so that the internal target levels can be achieved with open windows in as many properties as possible demonstrates good acoustic design. Where it is not possible to meet internal target levels with windows open, internal noise levels can be assessed with windows closed, however any facade openings used to provide whole dwelling ventilation (e.g. trickle ventilators) should be assessed in the "open" position and, in this scenario, the internal L_{Aeq} target levels should not normally be exceeded, subject to the further advice in Note 7.

NOTE 6 Attention is drawn to the requirements of the Building Regulations.

NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal L_{Aeq} target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved. The more often internal L_{Aeq} levels start to exceed the internal L_{Aeq} target levels by more than 5 dB, the more that most people are likely to regard them as "unreasonable". Where such exceedances are predicted, applicants should be required to show how the relevant number of rooms affected has been kept to a minimum. Once internal L_{Aeq} levels exceed the target levels by more than 10 dB, they are highly likely to be regarded as "unacceptable" by most people, particularly if such levels occur more than occasionally. Every effort should be made to avoid relevant rooms experiencing "unacceptable" noise levels at all and where such levels are likely to occur frequently, the development should be prevented in its proposed form (see Section 3.0).

Figure 2. ProPG Internal Noise Level Guidelines (additions to BS8233:2014 shown in blue)

Figure 1: ProPG Guidance

3 Planning Application Noise Survey Baseline Conditions and Results

A noise survey was carried out between the 4th and 5th March 2014 to assess noise affecting the proposed development.

The survey was carried out by Acoustic Consultants Ltd and full details of the report have been submitted to the Local Authority within the original planning application.

The survey positions can be seen in the noise model and a summary of the measurements can be found below:

Position	Freefield L _{AeqT} dBA	
	07:00-23:00	23:00-07:00
Position 1	59	50

Table 2: Planning Noise Survey Results

4 Computer Noise Model

In order to see how noise varies at different positions around the proposed development it is possible to produce a noise contour map.

A computer noise model has been completed using the computer package IMMI. The survey data and drawings of the proposed development have been used to complete the noise models. IMMI faithfully implements the propagation method of ISO-9613:1996; Acoustics – Attenuation of sound during propagation outdoors. An “existing site” noise model was completed first to allow the calibration of the noise sources (road).

The proposed development was added to the model. New reception points were added at different heights and locations. The Gnd floor day night time contour plot can be seen below:

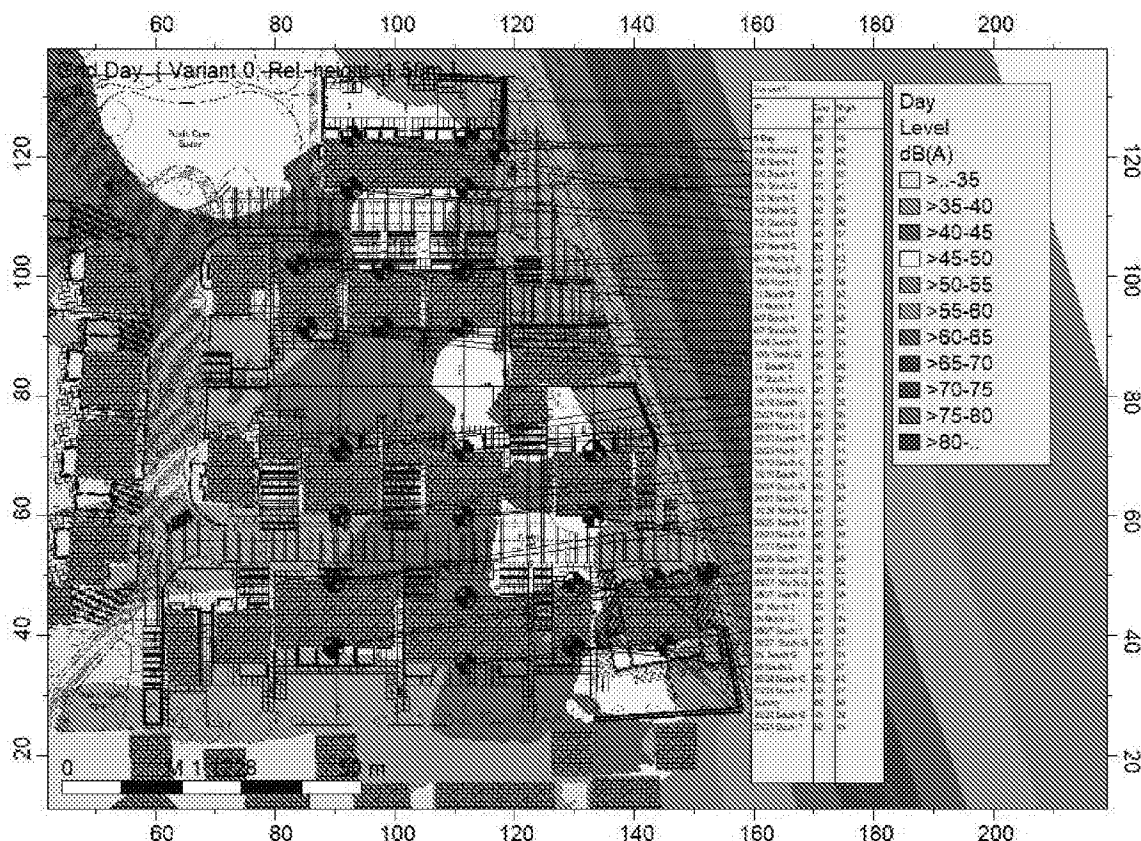


Figure 2: Noise Model

5 Required Sound Insulation of Building Envelope

5.1 Noise Criteria

5.1.1 Continuous Noise Levels

The BS8233 2014 noise criteria will be used to specify the noise mitigation measures for all habitable rooms. The maximum internal noise level for each area is as follows:

- Bedrooms 30dBA Night
- Lounges 35dBA Day

5.1.2 Road Noise Maximum Noise Levels

For L_{Amax} events the ProPG noise L_{Amax} criterion will be used to specify the noise mitigation measures for bedrooms only:

For a reasonable standard in noise sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45dB LAF_{max} more than 10 times a night.

5.2 Location Specific Sound Reduction (SRI)

5.2.1 Continuous Noise L_{Aeq,T}

The sound reduction of the building envelope (SRI) quantifies how well the building fabric will attenuate noise created outside of the building. The required sound reduction (SRI) has initially been calculated so that the continuous noise level criteria can be achieved (35/30)

5.2.2 L_{Amax}

The L_{Amax} survey data has been used to predict the L_{Amax} events, inside a bedroom, that are over 45dBA.

This was completed by using the survey data closest to the road and a correction factor relating to the difference in noise level between survey location and receptor location (In this case the worst case receptor night time level was 3 dB lower than the survey data).

The SRI of the building was adjusted until, on average, there were less than 10 L_{Amax} events, over 45dBA

In this case the L_{Amax} criteria will be achieved if the L_{Amax} Sound reduction is 7dB higher than the L_{Aeq,night} sound reduction:

RP	Lounge		Bedrooms		L _{Amax} events over 45dBA
	RP	SRI	RP	SRI	
Worst Case	56	21	47	24	5 per night (closed window)
Best Case	34	<0	25	<0	1 per night (open window)

Table 3: Required Sound Reduction

5.3 Glazing/Ventilation

The SRI of a standard window/trickle vent set within a timber frame or masonry façade would usually achieve at least 21dB (possibly higher in most cases).

Therefore, it should be acceptable to install standard thermal double glazing and standard trickle vents on the majority of facades.

5.3.1 Areas Requiring Up-rated Glazing/Vents

For the following areas higher performance ventilators and glazing would be recommended to ensure that the worst case 24dB reduction is achieved on site:

Plots	Facade	Room	Floor
6	East	Lounge	Gnd Bay Window
7/6	North	Bedrooms	1 st Floor
25/24	North	Lounge/ Bedrooms	Gnd & 1 st Floor
22/23	North	Bedrooms	1 st Floor

Table 4: Areas Requiring Up-rated Glazing/Vents

The worst case SRI of 24dBA would be easily exceeded with marginally up-rated acoustic double glazing and acoustic trickle vents (Possibly trickle vents would be needed as it is often the case that an MEV system would be preferable).

Example specifications could be as follows:

- Bedroom/Lounge Windows - $R_w + C_{tr}$ 29dB (Minimum)
- Bedroom/Lounge Window vents - $D_{n,ew}$ 33dB

Total for all vents I.E if two vents are needed the $D_{n,e,w}$ of each vent should be at least 36dB

5.3.2 Areas Requiring Standard Glazing Vents

Any other areas (not detailed in the above table) would only require standard glazing and trickle ventilators.

6 Noise Barrier

The noise barrier locations have been shown in the planning and construction drawings. It is understood that the barrier will be 2m tall.

6.1 Proposed Construction

It is proposed that a propitiatory barrier system is installed (Jakoustic noise fence detailed below):

https://www.jacksons-security.co.uk/acoustic-security-barriers/reflective-acoustic-barrier?sc_campaign=75F280A84FEE4F3EB634D35B379C3317

The literature states that the system should provide a minimum weighted sound reduction level of 28dB.

6.2 Noise Model

The noise model has been altered to show the noise levels in the most affected gardens.

The noise level in the gardens (with fence sound reduction level set at 28dB) does not exceed the upper limit of 55dBA. However it should be noted that there is also a shared garden area that is subject to noise levels under the lower limit of 50dBA. The noise model is shown below:

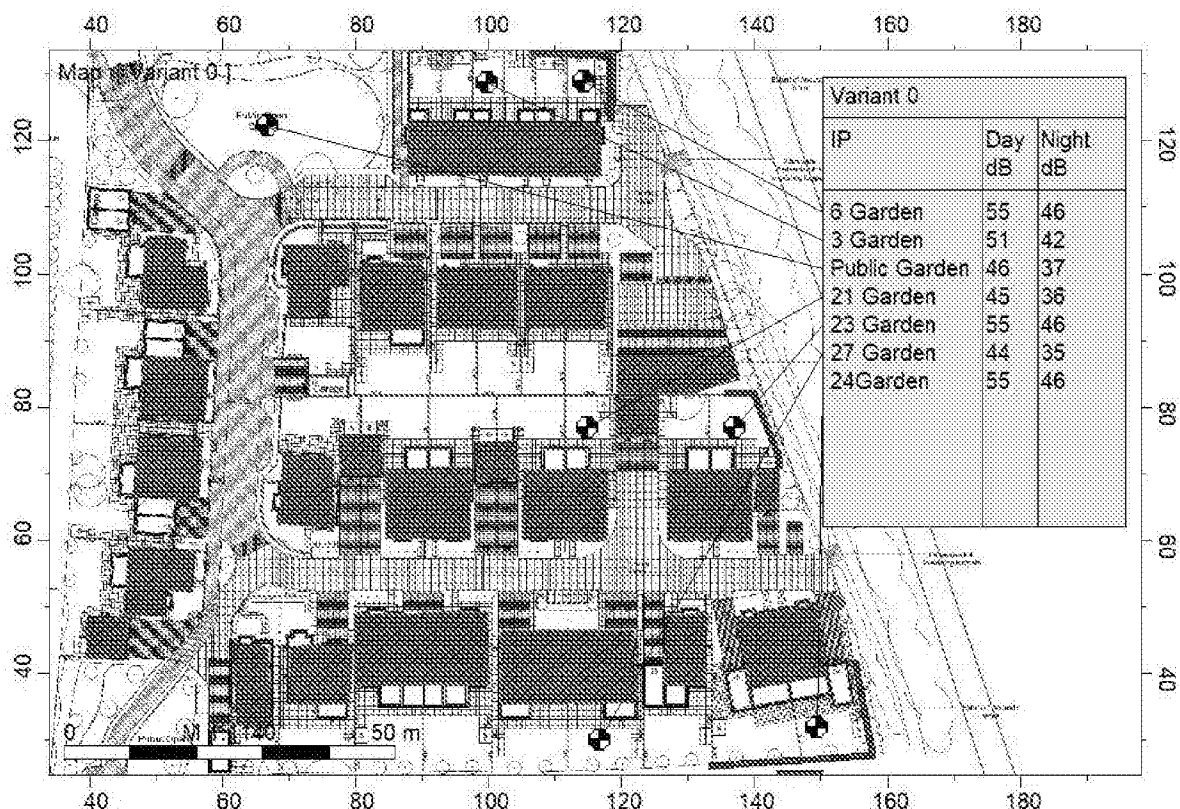


Figure 3: Garden Noise Model

7 Conclusion

Acoustic Associates have been appointed to undertake an acoustic assessment of the proposed Manor Nursery development.

Noise Levels created by another consultant have been used to create a noise model

The noise levels for the day and the night time period have been assessed in terms of BS8233 and ProPG.

The assessment is required based on the wording of condition 3:

Prior to the commencement of development, a noise mitigation scheme shall be submitted for approval to the Local Planning Authority. The noise mitigation scheme shall include details relating to acoustic barriers for properties (on Plots 5, 6 and 24) facing the A280; and the facade treatment of all houses facing onto the A280. The approved noise mitigation shall be implemented in accordance with the details submitted.

7.1 Façade Treatment

For the BS8233 and ProPG criteria (indoor levels) to be achieved the worst case areas will require glazing and ventilators that achieve the following:

- Bedroom/Lounge Windows - $Rw+Ctr \geq 29dB$
- Bedroom/Lounge Window vents - $Dn,ew \geq 33dB$

The areas requiring enhanced glazing/ventilators are detailed in Table 4.

For the majority of the development standard glazing and vents will be acceptable.

7.2 Acoustic Barrier

It is proposed that a propitiatory barrier system is installed that achieves a minimum weighted sound reduction level of 28dB.

With the barrier in place the levels in the gardens will not exceed the upper limit of 55dBA.

The majority of private gardens and the public garden, will be subject to noise levels below the 50dBA lower limit.

If the measures in this report are implemented by the developer condition 3 should be fully satisfied.