Noise Assessment Report

Proposed Residential Park Home Development
Former Willowpool Nurseries Site
Burford Lane, Lymm WA13 0SH

Prepared for: Willowpool Land Ltd.
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Signed:
NOISE ASSESSMENT REPORT FOR
A RESIDENTIAL DEVELOPMENT AT:
FORMER WILLOWPOOL NURSERIES SITE
BURFORD LANE, LYMM WA13 0SH

Report date: 26th February 2016

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1.0 Introduction

Azymuth Acoustics is appointed by Willowpool Land Ltd. to provide an acoustic assessment of a site at Burford Lane in Lymm. The proposed development comprises 15 no single storey lightweight park homes on the site of a former garden centre.

This report is intended to provide information relating to potential noise levels affecting the site as required by Warrington Borough Council in order to support the detailed planning application for the residential development. In particular the report sets out the following details:

- The results of a baseline noise survey undertaken at the proposed development site.
- The appropriate assessment criteria and guidance relating to noise in the environment as associated with this kind of development.
- An assessment of the appropriate level of protection against noise that should be provided as part of the development.

2.0 Baseline Noise Survey

2.1 Measurement Procedures

The instrumentation used for the environmental noise survey consisted of a SvanTek 959 Type 1 precision sound level meter and calibrator as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Type no.</th>
<th>Manufacturer</th>
<th>Serial no.</th>
<th>Last calibration date</th>
<th>Calibration certification number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1 sound level meter</td>
<td>959</td>
<td>SvanTek</td>
<td>12976</td>
<td>14/02/2015</td>
<td>14684</td>
</tr>
<tr>
<td>Microphone</td>
<td>40AE</td>
<td>GRAS</td>
<td>93507</td>
<td>14/02/2015</td>
<td>14684</td>
</tr>
<tr>
<td>Preamplifier</td>
<td>SV12L</td>
<td>SvanTek</td>
<td>17287</td>
<td>14/02/2015</td>
<td>14684</td>
</tr>
<tr>
<td>Sound calibrator</td>
<td>Cal 01</td>
<td>01dB</td>
<td>990492</td>
<td>16/02/2015</td>
<td>14685</td>
</tr>
</tbody>
</table>

Stratton Barrett carried out the first noise measurement survey on 23rd & 26th November 2015. A subsequent survey was undertaken on 24th February 2016. The sound level meter was positioned at the following measurement locations on the site:

<table>
<thead>
<tr>
<th>Measurement Location</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Vicinity of kennel blocks, north of site (worst-case location re potential dog barking noise)</td>
</tr>
<tr>
<td>2</td>
<td>Vicinity of Burford Lane, east of site</td>
</tr>
<tr>
<td>3</td>
<td>Location of nearest proposed park home as relates kennels</td>
</tr>
</tbody>
</table>

Table 0.5: Schedule of measurement equipment

Table 1: Summary of Noise Measurement Positions
2.2 Summary of Measured Noise Levels

Full results of the noise levels recorded by Azymuth Acoustics during the course of the survey are included in Appendix B of this report.

The following table summarises the results of the noise measurements undertaken at the proposed site in terms of the average daytime (07:00 to 23:00 hours) and night-time (23:00 to 07:00 hours) statistical noise levels.
### Table 2: Summary of Noise Survey Results (dBA, free field, fast response time)

<table>
<thead>
<tr>
<th>Position</th>
<th>Period</th>
<th>L$<em>{A</em>{\text{max}}}$</th>
<th>L$<em>{A</em>{\text{eq}}}$</th>
<th>L$<em>{A</em>{10}}$</th>
<th>L$<em>{A</em>{90}}$</th>
<th>NEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Day 15:00 – 16:00</td>
<td>67</td>
<td>57</td>
<td>58</td>
<td>56</td>
<td>B</td>
</tr>
<tr>
<td>1</td>
<td>Night 23:00 – 00:00</td>
<td>53</td>
<td>45</td>
<td>47</td>
<td>43</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>Day 15:00 – 16:00</td>
<td>69</td>
<td>57</td>
<td>58</td>
<td>56</td>
<td>B</td>
</tr>
<tr>
<td>2</td>
<td>Night 23:00 – 00:00</td>
<td>52</td>
<td>45</td>
<td>47</td>
<td>43</td>
<td>B</td>
</tr>
<tr>
<td>3 (24/02/16)</td>
<td>Day 07:00 – 08:55</td>
<td>71</td>
<td>56</td>
<td>58</td>
<td>52</td>
<td>B</td>
</tr>
<tr>
<td>3 (24/02/16)</td>
<td>Night 04:40 – 07:00</td>
<td>72</td>
<td>52</td>
<td>53</td>
<td>48</td>
<td>B</td>
</tr>
</tbody>
</table>

### 2.3 Description of the Noise Climate

Average noise levels on the site are dominated by road traffic on the nearby M56 motorway during daytime periods.

Dog barking noise from the next door pets’ hotel was measured during the survey at Position 1 during both day and night time periods (see Appendix B). Position 1 should be seen as worst-case re kennel noise as the proposed nearest façade location is significantly further away from perimeter (i.e. at Position 3).

Road traffic noise was measured at Position 2 (no barking events during survey).

Aircraft passing overhead from Manchester Airport made a significant contribution to average noise levels affecting the site during the 24th February 2016 survey.

Extended durations of dog barking / howling / yelping were encountered at Position 3 during the 24th February 2016 survey between around 05:20 – 09:00 (covering morning feeding time). It would be assessed that the measured period would be typical worst-case operation noise from the business. Noise from dogs had an effect on average ambient levels during this measurement period, along with noise from passing aircraft.

Road traffic on Burford Lane also makes a contribution to noise levels in the vicinity of the proposed park homes.

### 3.0 Noise Assessment Criteria

In order to assess the extent of any measures required in order to comply with suitable conditions relating to potential noise sources, Azymuth Acoustics has reviewed various guidance documents and standards, these include:

- National Planning Policy Framework (NPPF) 2012
- PPG24 - Planning and Noise (now withdrawn)
- World Health Organisation Guidance
- British Standard 8233:2014
3.1 National Planning Policy Framework 2012

The NPPF provides guidance to local authorities taking into account noise in making planning decisions. Paragraph 123 of the National Planning Policy Framework (NPPF) states that planning policies and decisions should aim to:

- Avoid noise giving rise to significant adverse impacts on health and quality of life as a result of new development;
- Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions

The National Planning Policy Framework states that the planning system should ‘prevent both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability’.

Further to local authority feedback it is understood that there may be a requirement (from environmental health) to protect the kennel business from the potential for noise complaint due to land change of use at the Willowpool site. Reference for the requirement has been drawn from NPPF 2012 Paragraph 123 as follows:

‘Planning policies and decisions should aim to recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use’.

Furthermore, specific feedback from Warrington Environmental Health Officer Steve Smith as follows:

*Consideration needs to given to ‘potential impacts on the adjacent kennels should noise complaints be made about their existing activities should permission for residential uses in close proximity to the site…If a future occupier opened a window and then complained about noise from the kennels then an investigation would warrant being carried out with potential impacts on the kennel’s viability’.*

3.2 Planning Policy Guidance Note PPG24

PPG24 has now been withdrawn but does provide specific guidance on acoustic assessment and design criteria for residential developments, which is not provided in the current NPPF document. PPG24 sets out government guidance on the use of planning powers by local authorities in order to minimise the adverse effects of noise in the built environment.

In particular, PPG establishes Noise Exposure Categories that are applicable in the case of new residential developments affected by transport noise or by mixed noise sources in which industrial noise does not dominate.

The site would be deemed to fall within Noise Exposure Category B for both day and night time periods. As such, PPG24 would suggest that noise should be taken into account when determining planning applications and, where appropriate, conditions imposed to ensure an adequate level of protection against noise.

3.3 World Health Organisation

In 1980 the World Health Organisation proposed environmental health criteria for community noise including consideration of noise levels at which sleep disturbance may take place. These guidelines were amended by the World Health Organisation in 1999. The guidance suggests that an internal $L_{Aeq}$ below 30 dB is required to fully preserve the restorative process of sleep.

The document also provides guideline values for community noise in specific environments including outdoor living areas. A level of 55dB $L_{Aeq,10hr}$ is put forward as the limit above which serious annoyance can be expected.
3.4 British Standard 8233:2014

BS 8233 provides a code of practice for the sound insulation of a variety of building types affected by general environmental noise.

It provides recommendations for control of noise in and around buildings and suggests appropriate criteria / limits for a variety of different situations including residential properties.

The following table summarises the noise limits suggested by BS 8233:2014 applying to residential properties.

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Noise limit 07:00-23:00 $L_{Aeq,16hr}$</th>
<th>Noise limit 23:00-07:00 $L_{Aeq,8hr}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living Room</td>
<td>35</td>
<td>-</td>
</tr>
<tr>
<td>Dining Room</td>
<td>40</td>
<td>-</td>
</tr>
<tr>
<td>Bedroom</td>
<td>35</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 3: Noise Limits for Residential Properties Suggested in BS 8233:2014

3.5 Summary of Noise Assessment Criteria

Based on the guidance outlined above, Azymuth Acoustics has carried out a noise assessment with the primary aim of providing satisfactory conditions inside the houses themselves. The recommended criteria can be summarised as follows:

- Daytime noise levels not to exceed 35dB $L_{Aeq, 16hr}$ in living rooms
- Daytime noise levels not to exceed 40dB $L_{Aeq, 16hr}$ in dining rooms
- Noise levels in bedrooms not to exceed 35dB $L_{Aeq, 16hr}$ for daytime periods
- Night-time noise levels in bedrooms not to exceed 30dB $L_{Aeq, 8hr}$

It is important to note that in both cases the noise levels detailed above should be deemed to apply with windows closed but with other forms of ventilation open (e.g. trickle vents or other passive systems).

4.0 Assessment of Noise Levels

4.1 Assessment of Noise Levels

Daytime measured noise levels across the site are in the range 54-58dB $L_{Aeq, T}$, with night time levels mainly in the range 43-52dB $L_{Aeq, T}$.

Daytime and evening (07:00 – 23:00) averaged levels would be expected to be in the range 54-56dB $L_{Aeq, 16hr}$. As such this would be generally in line with WHO criterion on limiting serious annoyance in outdoor amenity areas.

On the basis of the measured noise levels it is estimated that an overall noise reduction of around 25dB will be required through the fabric of the new park homes in order to achieve satisfactory conditions inside habitable rooms.
4.2 Noise from Nearby Kennels

The repeat survey of 23rd February 2016 (Position 2) covered the period advised as morning feeding time at the next door boarding kennels. It is understood that dog food preparation starts at 05:00 with feeding directly after this up to around 06:30.

There appeared to be several (large, loud) dogs within the main boarding kennel area building (see Figure 2 below), which is close to the perimeter with proposed development site. This building is a typical industrial unit construction with single layer metal sheet pitched roof.

Reverberant noise appeared to be mainly breaking out through the boarding kennel building roof structure. Other low-level buildings on the site may have had dogs within however the main source would be defined as the roof of the main boarding building.

Noise from the kennels measured during feeding time consisted of periods of multiple dogs barking, yelping, howling etc.

Dog barking was encountered during the original survey of November 2015 however this was significantly quieter, likely due to fewer / less noisy dogs in the main boarding building.

![Figure 2: marked aerial photo showing site layout of boarding kennels](image)

It would be assessed that, while not generally elevating the average ambient noise levels to a point where the building fabric of the park homes would require enhanced sound insulation, dog barking noise could potentially cause annoyance to residents who need to open windows to provide rapid ventilation during hot weather.
5.0 Recommendations for Noise Mitigation

This section sets out the recommended minimum noise mitigation measures required in order to satisfy the requirements of the noise assessment criteria and ensure satisfactory noise conditions inside the residential properties.

5.1 Glazing Specifications

The appropriate specification for the glazing to residences based on the current proposed layout is summarised in Table 4 below.

<table>
<thead>
<tr>
<th>Location</th>
<th>Glazing Specifications</th>
<th>Appropriate Glazing Types</th>
</tr>
</thead>
<tbody>
<tr>
<td>All locations (based on current proposed layout)</td>
<td>Airborne sound insulation $R_W$ 31dB</td>
<td>Standard good quality thermal double glazing</td>
</tr>
</tbody>
</table>

Table 4: Recommended glazing specifications for new dwellings

The specification outlined above would result in satisfactory noise levels inside the park homes as set out in Section 3.5 of this report.

The double glazing units detailed in Table 4 should be fitted into a frame which provides a good acoustic (as well as thermal) seal.

5.2 Other Elements of the Building Envelope

Other elements of the building envelope should have the following minimum sound insulation performance:

External Walls: minimum sound insulation $R_W$ 45dB. The proposed external wall of the buildings is understood to provide $R_W$ 46dB (based on Salford University test data) i.e. would comply with minimum requirements.

The proposed wall build-up is understood to comprise of the following:

- 12.5mm plasterboard inner wall
- 98mm timber batten with Knauf Earthwool mineral wool quilt insulation lining (full fill)
- 9mm external plywood sheathing
- Canexel outer metal skin on timber battens

Roof: minimum sound insulation $R_W$ 42dB. This minimum would be achieved using the proposed mineral wool insulated metal panel design with plasterboard internal ceiling.

5.3 Ventilation

Based on the measured average noise levels affecting the site, it would be assessed that the new park homes may be naturally ventilated throughout i.e. by means of opening windows.

However, during the warmest weeks of the year, occupiers of the park homes will likely be forced to open windows to provide rapid ventilation. Due to the potential for annoyance caused by dog barking from the kennels, incorporation of some form of mechanically assisted system would be of benefit in order to reduce the need to open windows.
5.4 Screening between Kennels & Dwellings

Provision of noise screening fencing between the new dwellings and kennels would be an option with the aim of reducing kennel noise impact at new receptors. It is understood that the local authority (Steve Smith) has suggested that breaking line of sight between dwellings and kennel buildings using an earth bund or acoustic fencing would be a viable option to address local authority concerns re potential complaint (see Section 3.1).

Azymuth Acoustics has assessed that noise is breaking out through the roof of the main boarding kennel building. Thus, in order to be effective any acoustic barrier fence would need to fully visually screen the roof of this building from any habitable room window in facing façades to park homes nearest the kennels.

6.0 Conclusions

Azymuth Acoustics has undertaken an environmental noise assessment of the proposed residential park home development at Burford Lane in Lymm.

Daytime measured noise levels across the site are in the range 54-58dB $L_{Aeq,T}$, with night time levels mainly in the range 43-52dB $L_{Aeq,T}$. Based on noise survey data, the proposed construction of the park homes would be sufficient to mitigate typical environmental noise levels affecting the site. The building fabric may be of a standard mineral wool insulated metal composite panel construction (plasterboard internal walls and ceiling) along with good quality sealed thermal double-glazing, min. $R_w$ 31dB throughout.

It would be expected that 16hr averaged daytime levels affecting the site would be generally at or below the WHO recommended limit criterion to avoid serious annoyance in outdoor amenity areas.

Dog barking noise is clearly audible on the site and has the potential to cause annoyance to future residents inside dwellings during the warmest weeks of the year, during which period residents would be forced to open windows for rapid ventilation.

In terms of average daytime and night time levels affecting the site, it would be recommended that the dwellings may be ventilated naturally. However, the potential for annoyance due to dog barking should be considered and as such the incorporation of a basic mechanically assisted ventilation system within the park homes should be explored.

The proposed park home construction would provide sufficient mitigation of environmental noise affecting the site; as such it would be assessed that the proposal would satisfy the normal requirements to discharge residential noise planning conditions.
Appendix A

Glossary of Acoustic Terms
Decibel (dB)
This is the unit used to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro Pascal to 100 Pascal.)

dB(A)
This is a measure of the overall noise level of sound across the audible spectrum with a frequency weighting (i.e. A-weighting) to compensate for the sensitivity of the human ear to sound of different frequencies. The A-weighting curve is implemented in sound level meters using an electronic filter that approximately corresponds to the frequency response of the ear.

Octave Band Noise Level
The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz. The ear is also generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum can be divided into frequency bands. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it.

$L_{A\text{eq}}$
This is the equivalent steady sound level in dB(A) containing the same acoustic energy as the actual fluctuating sound level over a given time period.

Sound Reduction Index (SRI)
Difference measured between the amount of energy flowing towards the wall in the source room and the total amount of energy flowing towards the wall in the source room and the total amount of energy entering the receiving room (usual range 100 - 3150 Hz for one third octave band values). The SRI varies with frequency and is measured in a laboratory in either octave or one-third octave bands.

$$SRI = L_1 - L_2 + 10 \log \left( \frac{S}{A} \right)$$
Where:
- $L_1$ = Noise level in the source room
- $L_2$ = Noise levels in the receiving room
- $S$ = Surface area of test specimen
- $A$ = Equivalent acoustic absorption area in the receiving room

Weighted Sound Reduction Index ($R_w$)
This is a weighted single figure descriptor of the sound insulation performance of a partition measured under laboratory conditions. The procedure used to quantify the $R_w$ is to compare the sound reduction index (SRI) in each of the one-third octave bands from 100Hz to 3150Hz against a set of standard reference curves.

Vibration Dose Value (VDV)
VDV is defined in BS6472: 1992 and is calculated by taking the fourth root of the integral (with respect to time) of the fourth power of acceleration after it has been frequency-weighted, i.e. VDV takes account of both the spectral and the time domain characteristics of the vibration. The frequency-weighted acceleration is measured in m/s$^2$ and the time period over which the VDV is measured is in seconds. This yields VDVs in m/s$^{1.75}$. 
Appendix B

Full Results of Noise Survey
<table>
<thead>
<tr>
<th>Start</th>
<th>Location</th>
<th>Time</th>
<th>$L_{A_{max}}$</th>
<th>$L_{A_{eq}}$</th>
<th>$L_{A_{10}}$</th>
<th>$L_{A_{90}}$</th>
<th>Octave Band Centre Frequency (Hz)</th>
<th>Total dBA</th>
</tr>
</thead>
<tbody>
<tr>
<td>15:11</td>
<td>Barking</td>
<td>00:05'00</td>
<td>67.3</td>
<td>57.5</td>
<td>61.6</td>
<td>58.7</td>
<td>56.0</td>
<td>62.1</td>
</tr>
<tr>
<td>15:16</td>
<td>1</td>
<td>00:05'00</td>
<td>60.6</td>
<td>56.7</td>
<td>58.8</td>
<td>57.8</td>
<td>55.5</td>
<td>62.3</td>
</tr>
<tr>
<td>15:21</td>
<td>1</td>
<td>00:05'00</td>
<td>60.7</td>
<td>56.8</td>
<td>58.8</td>
<td>57.8</td>
<td>55.8</td>
<td>62.2</td>
</tr>
<tr>
<td>15:26</td>
<td>1</td>
<td>00:05'00</td>
<td>60.8</td>
<td>57.2</td>
<td>59.3</td>
<td>58.3</td>
<td>56.1</td>
<td>62.0</td>
</tr>
<tr>
<td>15:31</td>
<td>1</td>
<td>00:05'00</td>
<td>60.7</td>
<td>57.0</td>
<td>58.8</td>
<td>57.8</td>
<td>56.0</td>
<td>61.3</td>
</tr>
<tr>
<td>15:40</td>
<td>2</td>
<td>00:05'00</td>
<td>66.8</td>
<td>57.2</td>
<td>59.6</td>
<td>58.2</td>
<td>56.1</td>
<td>61.0</td>
</tr>
<tr>
<td>15:45</td>
<td>2</td>
<td>00:05'00</td>
<td>67.7</td>
<td>57.8</td>
<td>63.9</td>
<td>58.7</td>
<td>56.2</td>
<td>61.3</td>
</tr>
<tr>
<td>15:50</td>
<td>2</td>
<td>00:05'00</td>
<td>69.4</td>
<td>57.8</td>
<td>65.2</td>
<td>58.6</td>
<td>56.1</td>
<td>61.4</td>
</tr>
<tr>
<td>15:55</td>
<td>2</td>
<td>00:05'00</td>
<td>60.6</td>
<td>56.9</td>
<td>58.9</td>
<td>57.9</td>
<td>56.0</td>
<td>61.5</td>
</tr>
<tr>
<td>16:00</td>
<td>2</td>
<td>00:05'00</td>
<td>59.5</td>
<td>56.7</td>
<td>58.7</td>
<td>57.7</td>
<td>55.6</td>
<td>62.3</td>
</tr>
<tr>
<td>23:14</td>
<td>1</td>
<td>00:05'00</td>
<td>51.1</td>
<td>46.6</td>
<td>49.6</td>
<td>48.0</td>
<td>45.0</td>
<td>51.7</td>
</tr>
<tr>
<td>23:19</td>
<td>1</td>
<td>00:05'00</td>
<td>51.3</td>
<td>46.7</td>
<td>49.8</td>
<td>48.4</td>
<td>44.7</td>
<td>51.5</td>
</tr>
<tr>
<td>23:24</td>
<td>Barking</td>
<td>00:05'00</td>
<td>53.0</td>
<td>45.6</td>
<td>50.4</td>
<td>47.1</td>
<td>43.5</td>
<td>51.1</td>
</tr>
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<td>1</td>
<td>00:05'00</td>
<td>51.5</td>
<td>45.5</td>
<td>48.8</td>
<td>46.9</td>
<td>43.7</td>
<td>52.7</td>
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<td>00:05'00</td>
<td>51.7</td>
<td>45.7</td>
<td>49.6</td>
<td>47.4</td>
<td>43.3</td>
<td>52.4</td>
</tr>
<tr>
<td>23:40</td>
<td>2</td>
<td>00:05'00</td>
<td>50.0</td>
<td>44.4</td>
<td>47.6</td>
<td>45.9</td>
<td>42.5</td>
<td>51.4</td>
</tr>
<tr>
<td>23:45</td>
<td>2</td>
<td>00:05'00</td>
<td>50.8</td>
<td>45.4</td>
<td>49.3</td>
<td>47.1</td>
<td>43.3</td>
<td>51.7</td>
</tr>
<tr>
<td>23:51</td>
<td>1</td>
<td>00:05'00</td>
<td>49.0</td>
<td>43.9</td>
<td>47.1</td>
<td>45.4</td>
<td>42.2</td>
<td>51.6</td>
</tr>
<tr>
<td>23:56</td>
<td>1</td>
<td>00:05'00</td>
<td>48.2</td>
<td>43.7</td>
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Appendix B1: Full results of noise survey, former Willowpool nursery site 23rd & 26th November 2015 (dB, free field, fast response time)
<table>
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<th>Notes</th>
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<th>L_{A_{max}}</th>
<th>L_{A_{eq}}</th>
<th>L_{A_{10}}</th>
<th>L_{A_{50}}</th>
<th>L_{A_{90}}</th>
<th>Octave Band Centre Frequency (Hz)</th>
<th>Total (dBA)</th>
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</tbody>
</table>

Appendix B2: Full results of noise survey, former Willowpool nursery site 24th February 2016 (dB, free field, fast response time)