Dear David

Kettering Buccleuch Academy – Noise from Fixed Plant and Equipment

Introduction

We visited Kettering Buccleuch Academy on 18th and 19th November 2010, and measured day time and night time noise levels at various positions around the proposed site. We also left a noise monitoring station which continuously logged noise levels over a 24 hour period.

The survey details are given in Appendix A, measurement positions are shown in Figure 1, and full survey results are given in Appendix B. An explanation of acoustic terms is given in Appendix C.

The main noise source is road traffic from Weekley Glebe Road. The nearest noise sensitive location to the site is the residential dwellings on Weekley Glebe Road.

We have considered two proposed areas of plant: the roof top plant and the new energy centre which will contain a biomass boiler. The roof top plant will run no later than 22:00hr, however the biomass boiler may run at any time.

Noise Criteria

Noise from fixed plant and equipment needs to be related to the background noise. A reasonable approach is for noise from any fixed plant and equipment to have a Rating Level which is equivalent to the existing lowest background $L_{Aeq}$ noise level, measured 1m away from the nearest noise sensitive facades, which in this case are the residential dwellings on Weekley Glebe Road. Rating Level is defined in BS4142:1997. This approach matches the criterion given in BREEAM Education 2008, Credit Pol 8, and therefore meeting our proposed noise limits will help you to achieve this credit.
Proposed Noise Limits

The current quietest background noise levels measured on site are shown in Table 1. To meet the expected noise criteria, the Rating Level of noise from the plant should not exceed these levels at 1m from the facade of the nearest residential properties. Note that the Rating Level includes a 5dB penalty for any characteristics of the noise.

The 5dB penalty is likely to apply to most types of plant noise. Therefore the plant noise must be controlled so that the $L_{eq}$ of the plant is at least 5dB(A) below the lowest background noise levels at the quietest time which the plant is running. Plant that could run at any time during a 24 hour period must therefore be 5dB(A) below the night-time background noise levels.

In addition plant noise must be controlled to no higher than 50dB(A) in external teaching areas and to no more than 45dB(A) outside any windows where the ventilation strategy relies on them being open. This is for the total plant noise outside any window.

| Table 1 - Lowest Measured Background Noise Levels, $L_{90}$, dB(A) |
|-------------------|-------------------|
| **Daytime plant** (07:00-22:00h) | **Night time plant** (22:00-07:00h) |
| 41 | 27 |

| Table 2 - Plant Noise Limits at Nearest Residential Dwellings, $L_{eq}$, dB(A) |
|-------------------|-------------------|
| **Daytime plant** (07:00-22:00h) | **Night time plant** (22:00-07:00h) |
| 36 | 22 |

The daytime plant noise limits apply to the roof top plant (as it will only run between 07:00 and 22:00), and the night time plant noise limits apply to the energy centre (as plant inside the energy centre could run at any point over a 24hr period).

Details of the proposed plant and its location have not been finalised yet. During design development, the M&E supplier will need to check these levels are achievable, based on the proposed plant type, location and achievable noise control equipment.

All mechanical services must be sufficiently attenuated so that the internal noise levels detailed in BB93 are not exceeded within the school.

Yours sincerely

Chris Wright

For and on behalf of
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Figure 1 - Survey positions
Appendix A - Survey Details

A1. Location of Survey
Kettering Buccleuch Academy, Weekley Glebe Road

A2. Date & Time of Survey

Unmanned measurements
1100h 18th November to 1100h 19th November 2010

Manned measurements
18th November 2010 0000h - 1400h, 2200h - 2300h
19th November 2010 0200h - 0300h

A3. Personnel Present During Survey
Josh Smith - SRL

A4. Instrumentation

Manned measurements:
Bruel and Kjaer
Type 2250 Sound Level Meter (SRL No. 750)
Type 4231 Sound Level Calibrator (SRL No. 753)

Unmanned measurements:
Bruel and Kjaer
Type 2231 Sound Level Meter (SRL No. 144)
Type 4230 Sound Level Calibrator (SRL No. 169)

A5. Calibration Procedure

Before and after the survey the measurement apparatus was check calibrated to an accuracy of ±0.1 dB using the type 4231/4230 Sound Level Calibrator. This calibrator produces a sound pressure level of 93.8 dB re 2 x 10^-5 Pa at a frequency of 1 kHz.

A6. Survey Procedure

Ambient noise levels were monitored at various positions around the site as shown on Figure 1. The measurements are tabulated in Appendix B, and explanations of the parameters used are listed in Appendix C.

A7. Weather Conditions

Dry, overcast, windspeed 1-4 m/s
Appendix B

Measured Ambient Noise Levels (Day)
18th November 2010

<table>
<thead>
<tr>
<th>Position</th>
<th>Measurement Time</th>
<th>$L_{Aeq}$</th>
<th>$L_{A90}$</th>
<th>$L_{Amax}$</th>
<th>$L_{A1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1115h-1125h</td>
<td>50</td>
<td>42</td>
<td>71</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>1200h-1210h</td>
<td>49</td>
<td>44</td>
<td>70</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>1300h-1311h</td>
<td>54</td>
<td>44</td>
<td>83</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>1128h-1138h</td>
<td>48</td>
<td>45</td>
<td>60</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>1211h-1221h</td>
<td>54</td>
<td>46</td>
<td>73</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>1313h-1323h</td>
<td>48</td>
<td>45</td>
<td>60</td>
<td>54</td>
</tr>
<tr>
<td>3</td>
<td>1140h-1150h</td>
<td>48</td>
<td>45</td>
<td>63</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>1223h-1233h</td>
<td>48</td>
<td>45</td>
<td>67</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>1325h-1335h</td>
<td>48</td>
<td>45</td>
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</table>

All measurements in dB re 20 μPa

Measured Ambient Noise Levels (Night)
18th and 19th November 2010

<table>
<thead>
<tr>
<th>Position</th>
<th>Measurement Time</th>
<th>$L_{Aeq}$</th>
<th>$L_{A90}$</th>
<th>$L_{Amax}$</th>
<th>$L_{A1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2200h-2210h</td>
<td>44</td>
<td>36</td>
<td>70</td>
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<tr>
<td></td>
<td>0200h-0210h</td>
<td>49</td>
<td>36</td>
<td>70</td>
<td>62</td>
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<tr>
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<td>0212h-0222h</td>
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<td>38</td>
<td>55</td>
<td>47</td>
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<tr>
<td>6</td>
<td>2223h-2233h</td>
<td>44</td>
<td>39</td>
<td>64</td>
<td>53</td>
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<tr>
<td></td>
<td>0223h-0233h</td>
<td>47</td>
<td>39</td>
<td>63</td>
<td>56</td>
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</tbody>
</table>

All measurements in dB re 20 μPa
Noise levels from 24hr noise monitoring station

Noise Levels at Kettering Buccleuch Academy (18/11/10 to 19/11/10)

LA90 / dB

LAeq

LAmmax

LA90

Noise Levels at Kettering Buccleuch Academy, LA90 / dB re 2 x 10^-5 Pa

LA90 / dB

Time / Hrs
Appendix C

Noise Measurement Parameter Definitions

\( L_{\text{Aeq},T} \) - The equivalent continuous (A-weighted) sound level. This may be thought of as the "average" sound level over a given time \( T \). It is used for assessing noise from various sources: industrial and commercial premises, construction sites, railways and other intermittent noises.

\( L_{\text{A90},T} \) - The (A-weighted) sound level that is exceeded for 90% of the time \( T \). It reflects the quiet periods during that time and is often referred to as the "background noise level". It is used for setting noise emission limits for industrial and commercial premises.

\( L_{\text{Amax}} \) - The maximum (A-weighted) sound level during a given time.

\( L_{\text{A1},T} \) - The (A-weighted) sound level that is exceeded for 1% of the time \( T \).