



STROMA[®]

BUILT ENVIRONMENT

Plant Noise Assessment

Willow Tree School

Harrogate

HG2 7SG

Ref: 01-19-73061 NC1

Revision History

Revision	Date	Description	
v1	01/07/2019	Draft for comment	
		Compiled By	Authorised By

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Executive Summary

Stroma Built Environment has been commissioned by Eco Modular Buildings Ltd (The Client) to undertake testing in accordance with British Standards 4142:2014 Methods for rating and assessing industrial and commercial sound (BS 4142) at Willow Tree School, Wetherby Road, Harrogate, HG2 7SG (The Site), for the purposes of demonstrating compliance with the requirements of North Yorkshire County Council Planning Conditions as outlined on Decision Notice C6/18/03983/CMA.

In situ measurements of the operating plant noise have been undertaken at the façade of the development.

Calculations have been performed following the measurements to give an indication of the rating noise level of the plant at the boundary of the nearest sensitive receptor. The assessment has been undertaken to the nearest identified noise sensitive property, that being a residence on Fairfax Avenue located directly opposite the newly installed classroom block.

The results of the assessment indicate that measured noise levels from the plant meet the requirements of Planning Condition 5.

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1. Introduction

- 1.1 Eco Modular Buildings Ltd (The Client) has appointed Stroma Built Environment Ltd. to carry out an acoustic assessment relating to discharge of Planning Condition 5 of Decision Notice C6/18/03983/CMA, as set down by North Yorkshire County Council at Willow Tree School, Wetherby Road, Harrogate, HG2 7SG (The Site).
- 1.2 The purpose of this report is to provide a calculated noise level due to operating plant following in-situ measurements of operating plant equipment. The report will consider the acoustic impact on the existing noise climate by the new development and whether specific requirements have been met.
- 1.3 The specific requirements of the decision notice are as follows:

Condition 5.

Prior to the first use of the new classroom by pupils a noise assessment of the proposed plant in the new classroom, indicated on the 'Proposed site Plan' dated 28 February 2018, shall be submitted to the Local Planning Authority for approval in writing. If the noise levels indicated in the assessment are considered acceptable then the Local Planning Authority will confirm that no further information will be required. If the noise levels are considered too high, then a further scheme will be required to be submitted by the applicant to alleviate the noise. The details of the further scheme, if required, will need to be submitted, approved and implemented prior to occupation of the new classroom by the first pupils.

Informatives

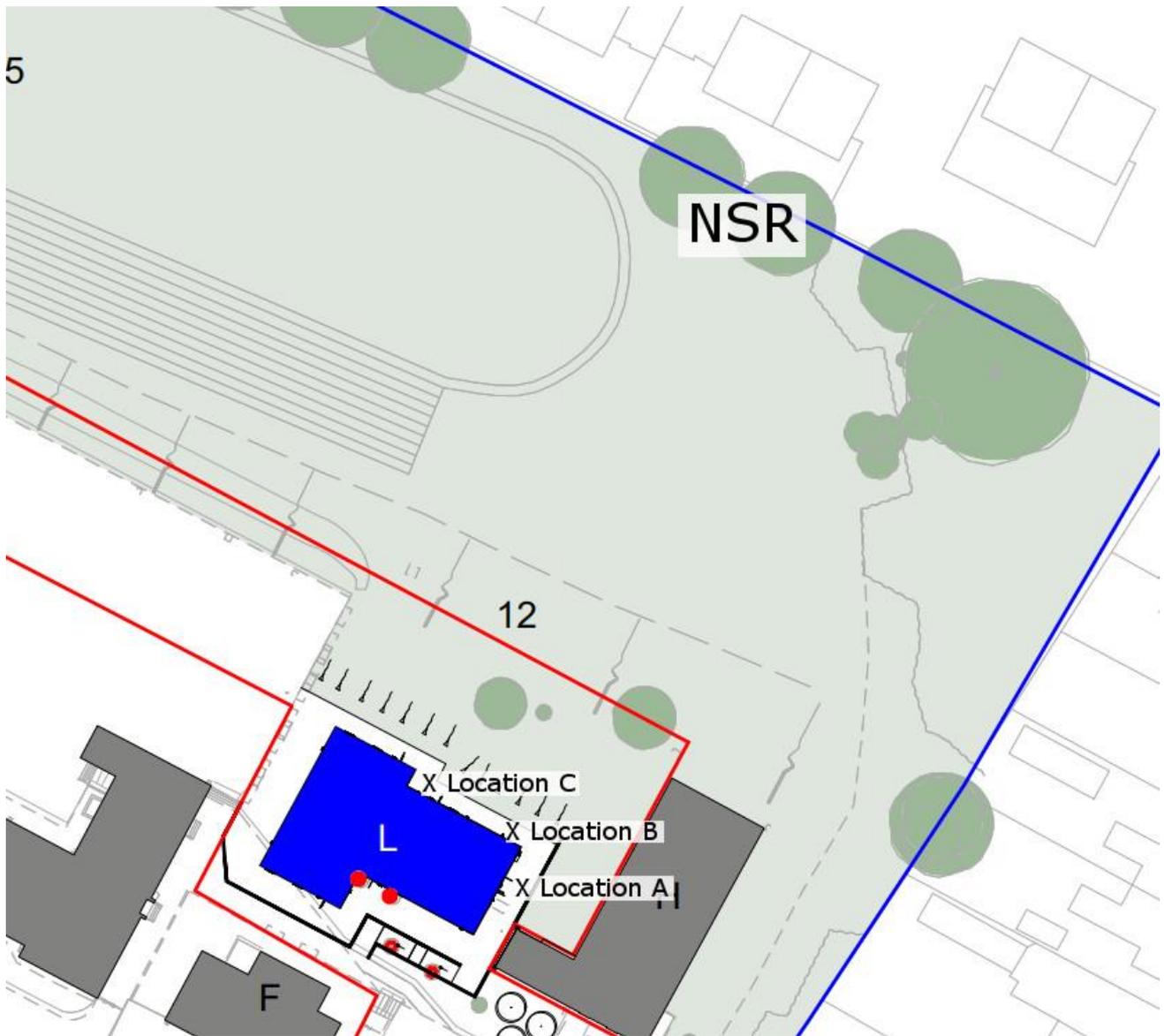
7. The noise assessment undertaken for the plant room in the new building should show that noise does not exceed background sound levels between the hours of 19:00 and 07:00. All measurements shall be made in accordance with the methodology of BS4142 (2014) and/or its subsequent amendments.

- 1.4 A BS4142 assessment has been conducted on the operating plant noise levels and compared to a measured background noise level in the absence of any noise generated by the new building.
- 1.5 This document has been prepared for the sole use, benefit and information of Eco Modular Buildings Ltd for the purposes set out in the document or instructions commissioning the works. The liability of Stroma Built Environment in respect of the information contained herein will not extend to any third party.

2. Site Description & Noise Survey

- 2.1 The development is a single story modular-based building located at Willow Tree School, Harrogate. The surrounding area is primarily comprised of residential buildings.
- 2.2 The nearest noise sensitive receptor has been established as a residential property located on Fairfax Avenue, at a distance of approximately 64 metres from the nearest façade containing noise generating items of plant.
- 2.3 Background noise levels were established by measuring existing noise levels in the absence of noise from the site at the boundary of the nearest noise sensitive receiver. These measurements were taken by Richard Whitfield between 00:00 & 02:00hrs on 1st July 2019.
- 2.4 On completion of the installation and commissioning of the plant equipment, Stroma attended site to measure the noise levels of the plant operating at full capacity, as indicated by site staff. Measurements were collected by Jav Javed of Stroma Built Environment on 27th June 2019.
- 2.5 The plant consists of boilers and ventilation units associated with the classroom and an attached server room. The majority of plant is located in a small plant room on the east side of the building with a louvered door. Next to this plant room is the server room, which has a single extract vent mounted in the wall.
- 2.6 Measurements were made with a Bruel & Kjaer 2250 calibrated Class 1 precision integrating sound level meter. Calibration checks were carried out both before and after the measurements with no variance observed.
- 2.7 The meteorological conditions during the survey were dry with little wind and minimal cloud coverage.
- 2.8 The location of the measurements and noise sensitive receiver are shown below in Figure 1.

Figure 1: Location of plant measurements and noise sensitive receiver



3. Standards and Guidelines

- 3.1 BS 4142:2014 Methods for rating and assessing industrial and commercial sound (BS 4142) describes a method for assessing the likelihood of complaints from noise sources that are of an industrial nature (e.g. fans, pumps, chillers, air handling units etc.). The assessment methodology is based upon determining a 'rating level' for the equipment being assessed, which is the level of noise from the item or items of plant being assessed (expressed as a rating level $L_{A,r,T,r}$).
- 3.2 The rating level is then compared with the underlying measured L_{A90} background noise level in the absence of noise from the item or items of plant being assessed. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- 3.3 A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- 3.4 The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.
- 3.5 BS 4142 states that a correction should be added for any plant which gives rise to noise features that may increase disturbance such as tonal, impulsive or intermittent characteristics. With respect to the acoustic feature correction, BS 4142 states that:

“Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level.”

4. Measurement Results and Analysis

- 4.1 Using the measurement results from the site an assessment has been carried out as per the methodology provided in BS 4142.
- 4.2 A night time assessment has been undertaken in accordance with the planning condition and is presented in Table 1. Measurements of the specific plant noise have been collected during the day time period, as it is assumed that the full capacity plant noise will remain the same, regardless of time of day. This will likely provide a more onerous assessment for the night time period, as it is unlikely the plant will operate at full capacity during this time.
- 4.3 No acoustic features were noted when on site, therefore no penalties have been applied.
- 4.4 Equation 1 was used to calculate the resultant noise at the nearest noise sensitive receptor based on the calculated combined noise level

$$L_2 = L_1 + 20 \log \frac{r_1}{r_2} \quad \text{Equation 1}$$

Where:

L_1 = Sound pressure level at reference distance r_1

L_2 = Resultant sound pressure level at distance r_2

r_1 = Reference distance from noise source

r_2 = Distance from source to receiver

Table 1: BS 4142 assessment

		Measurement Location		
		A	B	C
<i>a</i> (L_1)	Measured $L_{Aeq(5min)}$ (dB)	50	61	63
<i>b</i> (r_2)	r = Distance to receiver (m)	68	64	64
<i>c</i> (r_1)	r = near field distance (m)	1	1	1
<i>d</i> (L_2)	Calculated L_{Aeq} @ receiver (dB)	13	25	27
<i>e</i>	Combined noise level L_{Aeq} @ receiver (dB)	29		
<i>f</i>	Representative Existing Background level $L_{A90(60min)}$ (dB)	36		
<i>g</i>	Difference over background (<i>e-f</i>) (dB)	-7		

Measurement Locations:

A = Plant Room Louvres

B = Server Room Extract

C = Classroom Louvres – sum of 4 discreet measurements

5. Conclusion

- 5.1 As can be seen from the assessment shown in Table 1, the predicted noise levels at the nearest noise sensitive receptor fall below the existing night-time background noise levels by 7dB.
- 5.2 Subjectively plant noise from the site was not audible at the NSR location.
- 5.3 Based on this assessment the requirements of Planning Condition 5 (and Informative 7) have been met.