

MIMWEP | Rhondda Cynon Taff
Council

RCT Schools

Plant Noise Emission Limits for
Llanilltud Faerdref Primary School

RH0301-ARP-XX-XX-RP-Y-00031

P01 | 22 October 2021

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Contents

	Page	
1	Introduction	1
2	Standards	1
3	Baseline noise survey	1
	3.1 Application site and context	1
	3.2 Measurement locations	2
	3.3 Instrumentation	2
	3.4 Measurement methodology	3
	3.5 Measurement results	3
4	Noise emission limits at nearby receptors	6
	4.1 Local planning authority requirements	6
	4.2 Deriving the BS4142 background sound level	6
	4.3 Noise emission limits	7
	4.4 Noise mitigation strategies	7
5	Noise from school children	8
6	Summary	8

Appendices

Appendix A

Full measurement results

1 Introduction

Building services noise emission limits have been set for Llanilltud Faerdref Primary School following the requirements of the local authority for the planning application. This report summarises the baseline noise climate for the site determined from a site-specific noise survey and the methodology for setting building services noise emission limits.

2 Standards

The site noise survey and building services noise emission limits follow the following British Standards:

1. BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound
2. BS7445:2003 Description and measurement of environmental noise

3 Baseline noise survey

An environmental baseline noise survey was undertaken to determine the existing noise climate and character of noise, with attended measurements taken on 28 September 2021 and unattended measurements taken between 27 September and 29 September 2021. The survey consisted of 30-minute attended measurements at two positions and longer-term unattended noise logging for each site. A summary of the results for each site is provided in Section 3.5.

3.1 Application site and context

The site features an existing, operational primary school with three main buildings. Proposals are for a new school development to replace two of the existing school buildings.

The site boundary, current building layout (the existing Llanilltud Faerdref Primary School) and overlay of the proposed new building are shown in Figure 1.

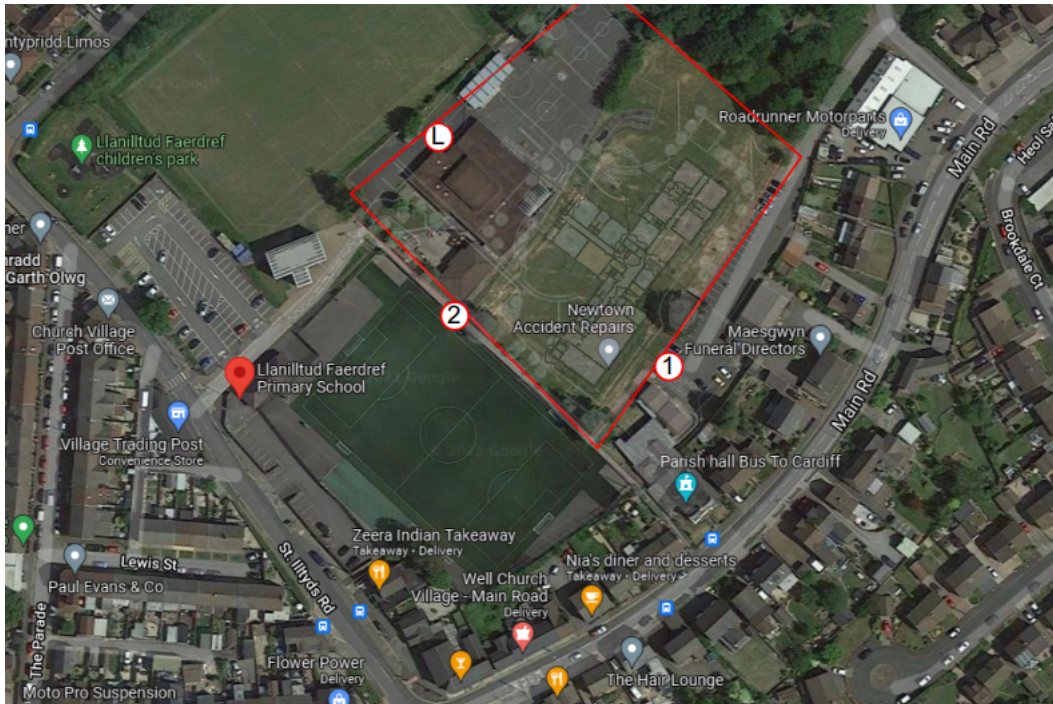


Figure 1: Site boundary and baseline noise measurement locations at the Llanilltud Faerdref Primary School site

The dominant source of background noise is road traffic on St. Illtyds Road and the B4595 (Main Road) to the South of the site.

3.2 Measurement locations

Figure 1 shows the measurement locations for the baseline noise survey.

Measurement location 1 was chosen to be representative of the existing noise environment at the nearest noise sensitive receptors.

Measurement location 2 was chosen to be representative of the noise exposure of the proposed new school building.

Measurement location L was chosen to be representative of the noise exposure of the proposed new school building. Outside of school hours, the logger measured noise from nearby road traffic that was representative of the existing noise environment of the area.

The unattended measurements and attended measurements at location 1 were used to calculate the existing background sound level for the purpose of this assessment. For completion we include all measurement locations in our report.

3.3 Instrumentation

The sound level meters (SLMs), microphones and sound pressure level calibrators used by Arup are Class 1 instruments, conforming to BS EN 61672-1:2013. All Arup instrumentation is calibrated annually and has full traceable calibration to

national and international standards, which are undertaken by an accredited calibration laboratory. Calibration certificates can be provided upon request.

The SLM was checked for correct calibration before and after each series of measurements. No significant fluctuation in level was noted throughout each survey period.

All the SLMs and other related noise monitoring instrumentation used to undertake the survey is described in below.

Description	Serial Number	Item Type
B&K 4189 Microphone	3004621	Microphone
B&K ZC-0032 Preamp	23264	Microphone
B&K 4231 Calibrator	2022703	Sound level meter
B&K 2250	3008744	Sound level meter
RION NC74	34773051	Calibrator
RION NH 21 preamp	15278	Microphone
Rion NL-32	00451285	Sound level meter
Rion UC53A	308532	Equipment

Table 1 below.

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Table 1: Measurement instrumentation

3.4 Measurement methodology

At each location, the L_{Aeq} , L_{A90} , L_{A10} and L_{Amax} metric parameters were measured and recorded. All broadband measurements were A-weighted and used a fast time constant (0.125s).

At each measurement location, the SLM was mounted on a tripod with the microphone set between 1.2m to 1.5m above local ground level. All measurements were taken under acoustically free-field conditions. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

Attended measurements of 5 minutes duration for 30 minutes total duration were made at locations 1 and 2. Unattended measurements of 5 minutes duration were made at location L. In each case, the time period was appropriate to provide a good representation of the typical noise climate at each measurement location.

3.5 Measurement results

Table 2 summarises the baseline noise levels measured at the Llanilltud Faerdref site (locations shown in Figure 1) for each measurement location. A logarithmic average of the individual measurements during each time period is used for L_{Aeq} , an arithmetic average for L_{AFmax} and a modal average for L_{A90} typical of the background noise level.

Measurement position	Daytime noise levels (0700-2300)			Night time (2300-0700) typical background noise level, $dB L_{A90}$
	Ambient (average) $dB L_{Aeq,T}$	Background (typical) $dB L_{A90}$	Maximum (average) $dB L_{AFmax}$	
1	46	43	60	-
2	51	48	62	-
Logger	58	47	66	33

Table 2: Summary of average baseline noise measurements at the Llanilltud Faerdref site

A summary of the measurement results is provided in the Appendix for reference.

A time history of the noise measurements recorded by the logger is provided in Figure 2.

Location 1 was located next to the neighbouring residential receptors to the South of the site and the measurements were dominated by road traffic, with distant noise from the children playing during outside play in the daytime.

The noise logger was located next to a school building and the measurements were dominated by school activity and children playing during outside play in the daytime (peaks in the measured parameters at school playtimes can be seen clearly in

Figure 2) and road traffic at other times.

These locations are representative of the existing noise environment and the measurements therefore provide a basis on which to calculate the BS4142^[1] background sound level.

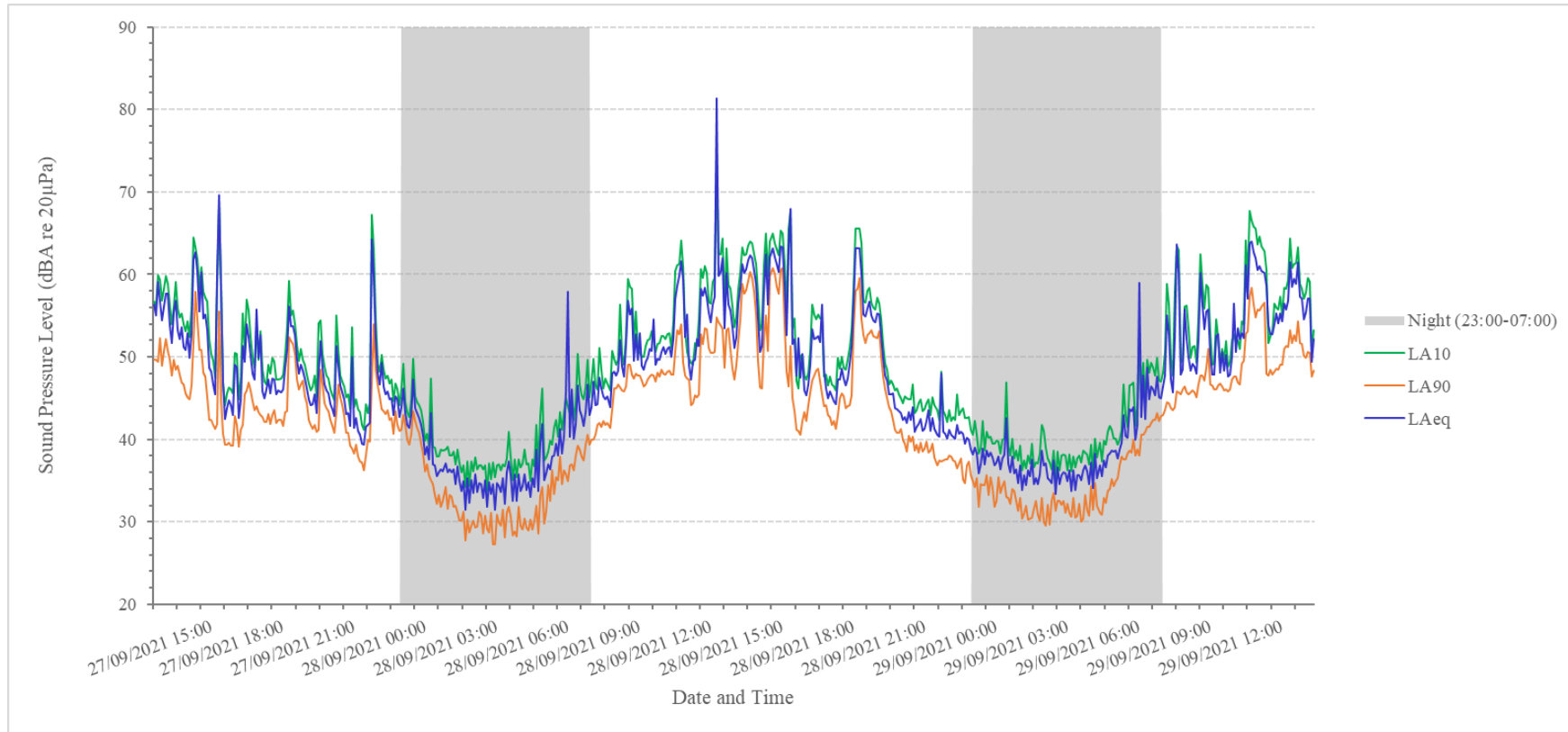


Figure 2: Time history for the unattended measurement at location L

4 Noise emission limits at nearby receptors

4.1 Local planning authority requirements

Building services noise emission limits have been set according to BS4142^[1].

Rhondda Cynon Taff Council requires the BS4142^[1] rating level to be 5dB below the typical background noise level at the nearest and/or most exposed noise sensitive receptors. These are the residential properties to the South of the site, on the B4595 (Main Road), as agreed with RCT Council.

The BS4142^[1] rating level is the specific sound level plus any character corrections for plant that exhibits any audible tones, impulsivity, or other nuisance characteristics.

4.2 Deriving the BS4142 background sound level

The background sound level for the daytime period is calculated based on statistical analysis of the noise monitoring results in general accordance with BS4142^[1].

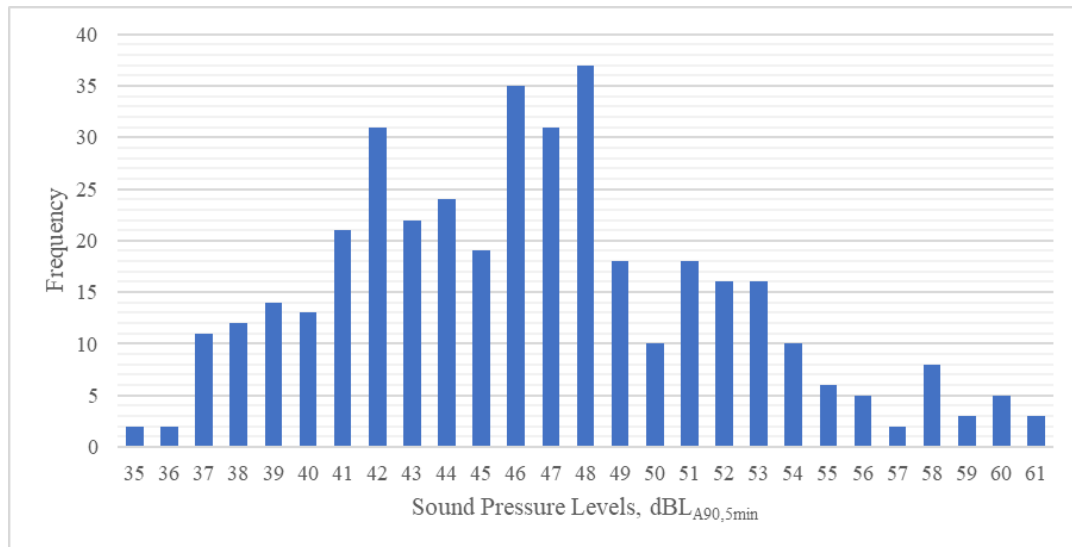
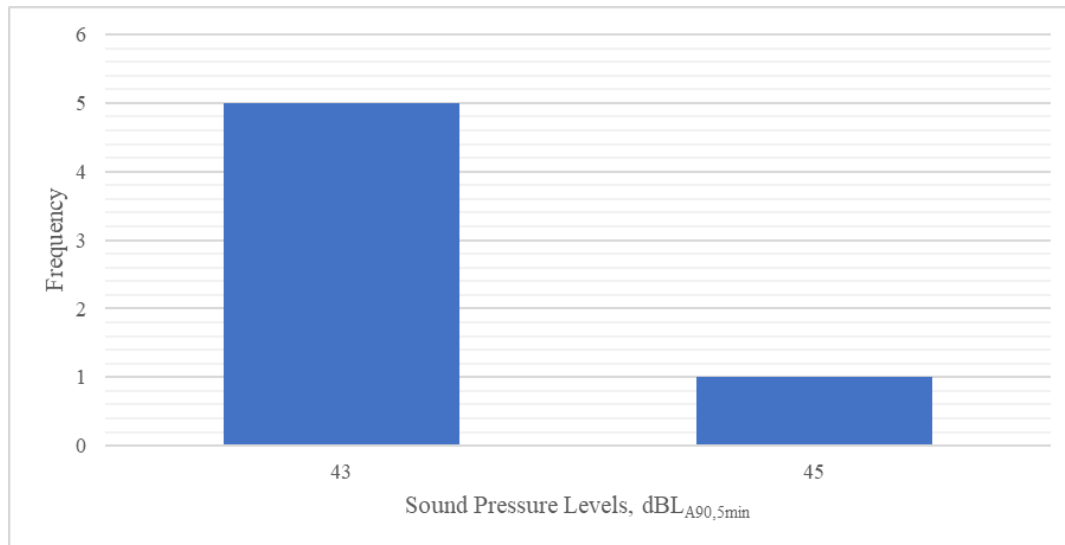


Figure 3: Distribution of daytime 5 minute L_{A90} noise levels at location LFigure 4: Distribution of daytime 5 minute L_{A90} noise levels at location 1

The most commonly occurring (mode) background sound level at the logger location in the daytime is 48 dB $L_{A90,5minutes}$, which is considered representative of the nearest noise sensitive receptors to the South outside of school activity times. However, the typical background sound level at location 1 in the daytime was lower at 43 dB $L_{A90,5minutes}$.

For a worst-case assessment, the lower figure will be used to establish daytime plant noise limits for all receptors.

At the logger position, the mode background sound level at night was 33 dB $L_{A90,5minutes}$, which is representative of the nearest noise sensitive receptors.

4.3 Noise emission limits

Table 3 lists the rating level limit for the proposed building services noise emissions to satisfy the planning requirements.

School	Nearest sensitive receptor / assessment location	Building services noise emission limit, dBL _{Ar,Tr} (normal operation)		Emergency plant noise limit dBL _{Ar,Tr} (all times)
		Day (0700-2300)	Night (2300-0700)	
Llanilltud Faerdref	Residential properties on the B4595 (Main Road)	38	28	53

Table 3: Building services noise emission limits

4.4 Noise mitigation strategies

The main sources of building services noise emissions associated with the proposed development are:

- air source heat pumps in a compound at grade

- intake and discharge in the façade for MVHR units serving spaces in the development

At this stage, the design and selection of building services plant items has not been progressed in enough detail to inform either detailed noise prediction calculations or mitigation. Examples of potential noise control measures include:

- an acoustic louver around the air source heat pumps
- ducted attenuators on the intake and exhaust connection of the MVHR units

It is suggested building services noise emissions be incorporated into the conditions for the development and be discharged as a reserved matter.

5 Noise from school children

This assessment is based on noise emissions from proposed fixed plant. The site is an existing school and the increase in school capacity with the new development is minor. Therefore, noise from school children has been considered a part of the existing noise environment at the site. Further, there is no policy or standard that requires noise from school children to be assessed. On this basis, our assessment does not include noise from school children playing outside.

6 Summary

A site-specific noise survey has been completed at Llanilltud Faerdref Primary School to establish existing baseline noise levels.

Site noise is dominated by road traffic on St. Illtyds Road and the B4595 (Main Road) and this is considered representative of the existing noise environment at the nearest noise sensitive receptors on the B4595 (Main Road).

Building services noise emission limits have been set according to RCT Council requirements that the BS4142^[1] rating level does not exceed 5dB below the existing background sound level.

It is suggested building services noise emissions be incorporated into the conditions for the development and be discharged as a reserved matter.

Appendix A

Full measurement results

A1 Measurement Results

A1.1 Attended Measurements

The summary tables for each measurement location provide an arithmetic average of the individual measurements during each time period for L_{A90} and L_{A10} , a logarithmic average for L_{Aeq} and a range of the values for L_{Amax} .

A1.1.1 Location 1

Location Description:

Location 1 is to the South East of the site on the edge of B4595 (Main Road). It is the school's playing field. It is the closest measurement location to the nearest noise sensitive receptors on the B4595 (Main Road).

Environment and Observations:

Dominant source of noise is road traffic from St Illtyds Road and East of the site on the edge of B4595 (Main Road).

Measurement Duration:

Tue 28/09/2021 09:33
to
Tue 28/09/2021 11:20

Weather Conditions:

Wind Speed: 3.3
Wind Direction: S
Summary: Full cloud cover, temperature of 12 degrees C, light rain.

Personnel:

Matthew Gray and Grace Lampkin

Additional Comments:



Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-23:00)	44	46	48	50 - 64

Table A1: Summary of averaged sound pressure levels at Location 1

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L_{90}	L_{eq}	L_{10}	L_{max}	
Day							
28/09/2021	09:33	00:05:00	43.2	45.9	47.5	61.0	

28/09/2021	09:39	00:05:00	43.4	46.2	47.5	62.3	
28/09/2021	09:46	00:05:00	44.5	46.8	48.5	55.1	
28/09/2021	11:03	00:05:00	43.5	46.1	47.8	58.9	
28/09/2021	11:09	00:05:00	43.1	44.9	46.6	49.8	
28/09/2021	11:15	00:05:00	43.4	46.7	47.4	63.7	

Table A2: Measured sound pressure levels at Location 1

A1.1.2 Location 2

Location Description:

Location 2 is to the South West of the site between the school's nursery and sports pitches. The measurement location is considered representative of the highest noise exposure to the proposed new school building.

Environment and Observations:

Dominant source of noise is road traffic from St Illtyds Road and West of the site on a footpath B4595 (Main Road).

Measurement Duration:

Tue 28/09/2021 09:54 to Tue 28/09/2021 11:01

Weather Conditions:

Wind Speed: 3.6
 Wind Direction: S
 Summary: Full cloud cover, temperature of 13 degrees C, light rain.



Personnel:

Matthew Gray and Grace Lampkin

Additional Comments:

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L ₉₀	L _{eq}	L ₁₀	L _{max}
Day (07:00-23:00)	48	51	52	56 - 67

Table A3: Summary of averaged sound pressure levels at Location 2

Date	Time		Sound Pressure Level, dB(A) (re 20 µPa)				Comments
	Start [hh:mm]	Duration [hh:mm:ss]	L ₉₀	L _{eq}	L ₁₀	L _{max}	
Day							

28/09/2021	09:54	00:05:00	48.4	51.0	53.1	59.8	
28/09/2021	09:59	00:05:00	47.6	49.3	50.7	55.9	
28/09/2021	10:05	00:05:00	47.0	48.9	50.9	57.1	
28/09/2021	10:44	00:05:00	48.8	51.3	53.1	62.5	
28/09/2021	10:50	00:05:00	48.1	51.0	52.5	67.4	
28/09/2021	10:56	00:05:00	48.1	51.9	54.3	63.0	

Table A4: Measured sound pressure levels at Location 2

A1.2 Unattended

A1.2.1 Location L

Location Description:

The noise logger was located next to the main school building on the North West side of the site.

Environment and Observations:

The daytime noise levels reflect the sound of nearby school activities. Outside of school hours, the noise levels capture the noise exposure of the school from road traffic on St. Illtyds Road and B4595 (Main Road).

Measurement Duration:

Mon 27/09/2021 12:36
to
Wed 29/09/2021 13:26

Logging Interval:

00:05:00

Weather Conditions:

Conditions were generally cloudy with a moderate breeze and daytime temperatures around 14 degrees C. There were periods of heavy rain on 28/09/21 between 13:00-16:00 and 18:00-20:00.

Additional Comments:

