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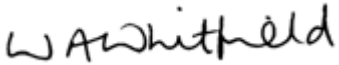
Environmental Noise Assessment

20th May 2021

Proposal Number:	21058-1-R1
Client:	Melin Consultants
Site Address:	Ysgol Treferthyr Criccieth

noise.co.uk

1. Quality Management

Report Number	21058 - 1
Issue	Issue 1 – Dated 8th November 2020 Revision 1 – (Current) Report has been updated to reflect the latest layout plan. Changes relevant to this report include the presence of a substation external to the main building.
Prepared	20th May 2021
Prepared By	 Bill Whitfield PhD, MSc, MIOA

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https://www.ukas.com/wp-content/uploads/schedule_uploads/00002/2694Testing%20Multiple.pdf

UKAS TESTING 2694

2. Executive Summary

An environmental noise assessment has been carried out to assess the potential noise impact of Ysgol Treferthyr, Criccieth, on existing nearby noise-sensitive premises. The new school will introduce a number of new sources of environmental sound to the area, including:

- fixed plant (heating, ventilation and air-conditioning);
- a Multi-Use Games Area (MUGA) and other outdoor spaces;
- activity in the car park, particularly at the start and end of the school day.

2.1. Measurement, Assessment and Evaluation

The survey was carried out to BS7445-1:2003[1] and BS7445-2:1991[2] which are covered under our UKAS Accreditation.

The interpretation of the data and the specification of suitable mitigation or treatment are outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

2.2. Scope

This report covers all aspects of the noise survey, including:

- the identification of acoustic design criteria;
- an objective sound pressure level survey of the existing site;
- analysis of the data; and,
- creation of a 3D noise model.

2.3. Consultant's Qualifications

The person responsible for this report was Bill Whitfield. They hold a Masters degree in Environmental Engineering and a PhD in Acoustics from the University of Liverpool. They have more than 30 years experience in acoustics and are a full corporate member of the Institute of Acoustics.

2.4. Summary & Conclusions

The sound from outdoor activities and the car park during peak-hours has been predicted. Considering the attenuation of sound through an open-window, it is likely that both the internal and external guideline values from BS8233:2014 would be met at the nearest noise-sensitive premises.

To meet the BREEAM POL5 credit criteria**, sound pressure level limits have been set 1m from the plant areas' interface with the atmosphere, typically this would be expected to be 1m from a louvered door or screen enclosing the plant:**

- **66dB(A) re µPa from each plant area containing heating, ventilation and air-conditioning plant.** This applies to the two plant areas and the kitchen extract plant separately.
- **59dB(A) re µPa from the substation**

The assessment of sound from fixed plant indicates that, should the noise limits be adhered to, the development would be eligible for a single credit using the BREEAM POL5 credit criteria. This excess of the rating over the background sound level would generally be an ''indication that the specific sound will have a low impact''.

[1] BS7445-1:2003 ''Description and measurement of environmental noise – Part 1: Description of quantities and procedures''

[2] BS7445-2:1991 ''Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use''

3. Limitations

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The methodology adopted and the sources of information used by Noise in providing its services are outlined in this report. The work described in this report was undertaken between the 14th October 2020 and the 20th May 2021 and is based on the conditions encountered and the information available up to the said date. The scope of this report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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4. Contents

5. Introduction

noise.co.uk Ltd has been appointed by Melin Consultants to carry out an environmental noise assessment of Ysgol Treferthyr, Criccieth (the "Proposed Development"). The location of the Proposed Development has been illustrated in Figure 1.

5.1. Existing Noise Climate

The attending survey technician reported that, at the time of the survey visits, the noise climate was dominated by transient road traffic noise from the A497 High Street. The general noise climate was considered to be very quiet and the sound of light wind in foliage and birdsong was clearly audible.

5.2. Nearby Noise Sensitive Premises

The nearest noise sensitive premises are the residential dwellings and guest houses on Lon Fel. The locations of the nearest noise-sensitive premises have been highlighted in Figure 1 in blue. They are within 800m of the Proposed Development.

5.3. New Environmental Sound Sources

There are a number of new sources of environmental sound that will be introduced to the area as part of the Proposed Development:

- fixed plant (heating, ventilation, air-conditioning and the substation;
- the multi-use games area (MUGA) and other outdoor spaces;
- activity in the car park, particularly at the start and end of the school day.

New fixed plant will be located in ground floor and first floor plant areas and there will be some additional equipment associated with the kitchens. The locations of the plant areas, kitchen extracts and MUGA are illustrated in red in Figure 1.

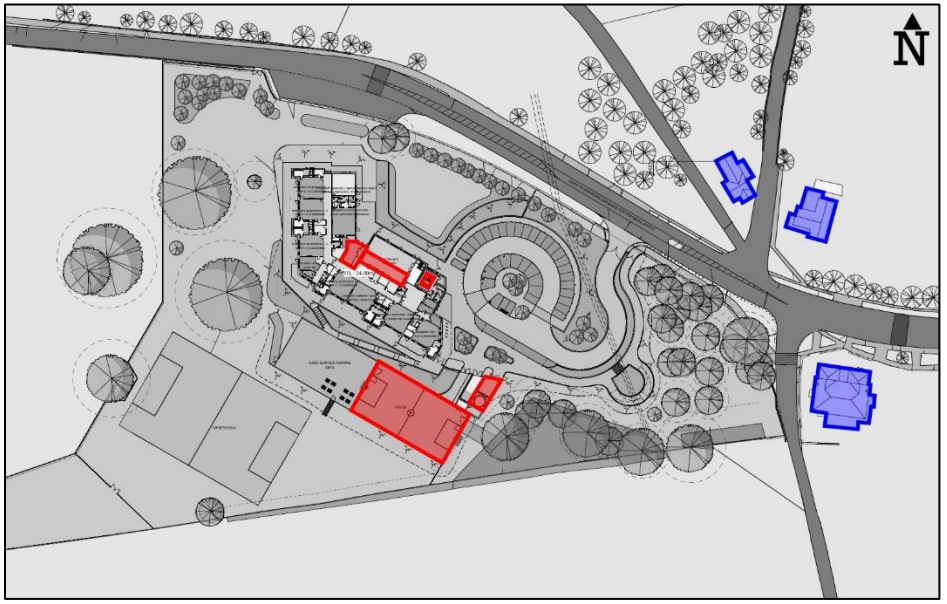


Figure 1 – Location and layout of the Proposed Development (red) and the nearest noise-sensitive premises (blue)

6. Assessment Criteria

6.1. BREEAM New Construction 2018

BREEAM is a sustainability rating scheme that aims to mitigate the life-cycle impacts of buildings on the environment and provide a credible way to rate and label them. The rating system is comprised of a number of credits which span the range of issues that affect the environmental impact of a building including: management, health and wellbeing, energy, transport, water, materials, waste, land use and ecology, pollution and innovation.

Within the range of issues there are two credit issues that consider noise and buildings: HEA05 Acoustics and POL 05 Reduction of Noise Pollution.

i. POL 05: Reduction of Noise Pollution

Noise can have a detrimental effect on the use and enjoyment of private property such as dwellings and business premises. It can also cause disruption for wildlife.

Where there are no noise sensitive areas or buildings within 800m of the assessed site the credit can be awarded by default. Where there are noise sensitive areas or buildings within 800m of the site, one credit can be awarded where a noise impact assessment in compliance with BS4142:2014[3] has been carried out and:

- The existing background sound pressure level and expected rating sound level of the new noise sources have been compared;
- The rating sound level is at least 5dB less than the existing background sound levels during the daytime and night-time;
- If this is not that case, mitigation will be applied to ensure that the above criteria are adhered to.

6.2. BS4142:2014

BS4142 provides methods for rating and assessing **specific sound sources** of an industrial and/or commercial nature, which includes: industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant/vehicles associated with industrial/commercial premises (e.g. fork-lift trucks). The **assessment location** is outside a residential receptor. The standard is specifically precluded from being used to assess the likely impact inside a building or from the assessment of various sound sources for which other (more relevant) guidance exists, including: music/entertainment noise, noise from people and construction noise.

The foundation of the assessment is to establish the following quantities, either by measurement or prediction:

- **Ambient sound**: The overall sound at the assessment location
- **Residual sound**: The ambient sound without the specific sound source operating
- **Specific sound**: The ambient sound with the specific sound source operating, corrected for residual sound
- **Background sound**: Residual sound present for 90% of the time

Once the specific sound level has been determined, this must be corrected for the presence of acoustic features that are audible at the assessment location to determine the **rating level**:

$$\text{Rating Level} = \text{Specific Sound Level} + \text{Character Corrections}$$

[3] BS4142:2014, 'Method for rating and assessing industrial and commercial sound'

Normally it is possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:

- Tonality: +2dB for a 'just perceptible' tone, +4dB for 'clearly perceptible', and rising to +6dB for 'highly perceptible' tones.
- Impulsivity (rapidity of change and overall chance in level): +3 dB for 'just perceptible' impulsivity, +6dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
- Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3dB.

It should be noted that. where one feature is clearly perceived as dominant, it may be appropriate to apply a single correction. Where both tonal and impulsive features are likely to affect perception and response, each should be added arithmetically.

An estimate of the magnitude of the impact is evaluated by subtracting the measured background sound level at the assessment location from the rating level

Assessment Level = Rating Level – Background Sound Level

Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific. As an initial estimate, BS4142 states that:

- A difference (between the background and rating level) of around +10 dB or more is likely to be indicative of significant adverse impact, depending on context
- A difference (between the background and rating level) of around +5 dB or more is likely to be indicative of adverse impact, depending on context
- Where the rating level does not exceed the background level, this is an indication that the specific sound will have a low impact, depending on context

Where the initial estimate of the impact needs to be modified due to the context, other factor should be considered, including: absolute sound levels, the character and level of the residual sound and the sensitivity of the receiver.

6.3. Sport England Guidance

Sport England provides general guidance on the assessment of noise from outdoor sports pitches.[4] It provides details of acoustic implications associated with such facilities and follows on from an acoustic research programme involving detailed analysis of relevant noise guidance documents and site testing in a range of locations. It proposes appropriate noise criteria, assessment methods and outlines practical measures that can be applied to reduce noise in particularly sensitive areas.

The document provides 'typical' noise levels for outdoor sports pitches. Noise levels were measured during nine sports sessions on three separate AGPs. The sessions included football, hockey and rugby and participation by men, women and children. Noise level measurements were taken at a distance of 10 metres behind the mid-way points along goal lines and sidelines. They were found to be highest behind the sideline halfway line.

From the measurement data, a typical free-field noise level of 58dB $L_{Aeq(1\text{-}hour)}$ at a distance of 10m from the sideline halfway marking has been determined as representative.

The document references World Health Organisation (WHO) guidance that states that in order to enable normal conversation indoors during the daytime, the sound level of interfering noise should not exceed 35dB L_{Aeq}.

Based on a 15dB sound reduction of a partially open window, the noise level outside a residential property during the daytime about 1 metre from façades of living spaces should not exceed 50dB L_{Aeq}.

[4] Artificial Grass Pitch Acoustics – Planning Implications, New Guidance for 2015, Sport England

The WHO document also provides guidance for outdoor living areas. It states that to avoid 'moderate annoyance' during the daytime and evening the external noise level should not exceed 50dB L_{Aeq}.

6.4. Guideline Values

BS8233:2014 draws on the results of research and experience to provide guidance on the design of buildings to provide internal acoustic environments appropriate to their function. It gives guideline internal values for dwellings for steady external noise sources, which have been summarised in Table 1.

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35dB $L_{Aeq,16hour}$	-
Dining	Dining Room	40dB $L_{Aeq,16hour}$	-
Sleeping (daytime resting)	Bedroom	35dB $L_{Aeq,16hour}$	30dB $L_{Aeq,8hour}$

Table 1 – BS8233:2014 guideline values for internal ambient noise levels from steady external noise sources

The guideline values are issued by the World Health Organisation (WHO) and assume normal diurnal fluctuations in external noise. They are expected to be achieved based on normal annual data and not in all circumstances. For example, it is normal to exclude occasional events such as fireworks night or New Year's Eve.

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 recognised that these guideline values are not achievable in all circumstances where development might be desirable. In such cases, the lowest practicable levels should be achieved.

7. Survey

7.1. Measurement Instrumentation

The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003 before and after the surveys. The calibration details can also be found in the appendix.

7.2. Measurement and Timescale

Unattended noise monitoring took place over a typical weekday period between Wednesday 14th October 2020 and Thursday 15th October 2020. The following quantities were measured:

$$L_{A90,15\text{-}min}$$

The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2. All sound pressure levels are in dB (re 20μPa).

7.3. Meteorology

During the survey the weather information was noted. This is shown in Table 2.

	Wednesday 14th October 2020	Thursday 15th October 2020
Roads(Wet/Dry)	Dry	Dry
Wind Speed (ms^{-1}) / Direction	5 SW	4 SW

Table 2 - Meteorological data noted during the survey

7.4. Monitoring Locations

The background sound level monitoring location was located at the eastern boundary of the Proposed Development, closest to the nearest noise-sensitive premises. This is illustrated in Figure 2.

Figure 2 – Plan showing the location of the monitoring equipment

The monitoring equipment was located 1.5m from the ground and at least 3m from the next nearest reflecting surface.

7.5. Measurement Results

The typical background sound levels have been evaluated in terms of the frequency of occurrence of each data value and this has been presented in Figure 3. The time-series has been presented in Figure 4.

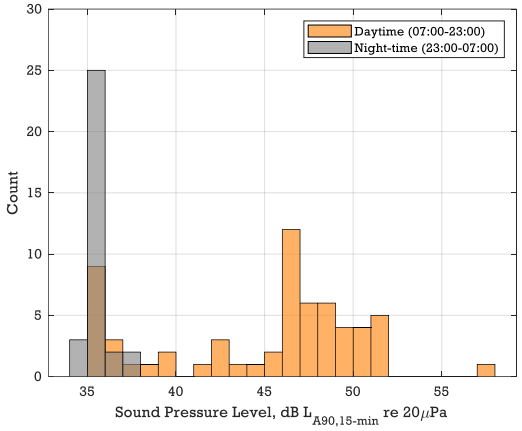


Figure 3 – Histogram showing the distribution of the background sound level during the night-time

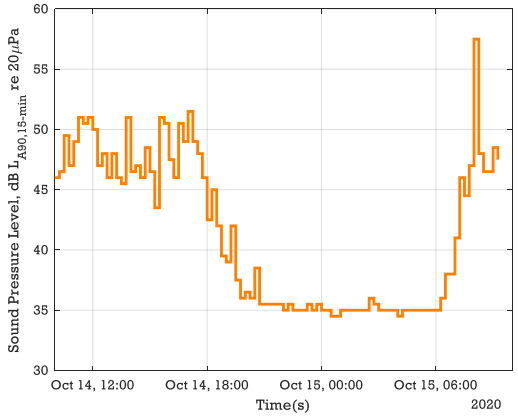


Figure 4 – Time history showing the background sound levels through the monitoring period

As can be seen in Figure 3 the background sound levels ranged between 34dB $L_{A90,15\text{-}min}$ and 38dB $L_{A90,15\text{-}min}$ during the night-time period and between 35dB $L_{A90,15\text{-}min}$ and 58dB $L_{A90,15\text{-}min}$ during the night-time period

The typical background sound level has been taken to be 36dB $L_{A90,15\text{-}min}$ because it was the most common value by some margin.

8. Sound from Fixed Plant

8.1. Rating Level

The items of fixed plant have not yet been installed; it is, therefore, not possible to make a subjective judgment of the character of the specific sound. Character corrections have been applied for these sources based on experience of similar items of plant.

i. Tonality

Most items of heating, ventilation and air conditioning plant have rotating components that would be likely to produce modest tones. It is possible that these tones could be just perceivable at the nearest noise-sensitive premises; therefore, a +2dB correction for tonality has been allowed for.

ii. Impulsivity

The sound from continuously running plant would not be expected to contain impulsive noise character; therefore, no correction has been applied for impulsivity.

iii. Intermittency

It is possible that the fixed plant will not operate 100% of the time. However, in any 15-minute reference period the plant would not be expected to switch on and off more than once. Therefore, no correction for intermittency has been made.

8.2. Initial Estimate (Numerical Assessment)

The BS4142 assessment is detailed in Table 3.

	Level
Background sound level, dB $L_{A90,15min}$	36
BREEAM POL 5 Criteria	-5
Target Rating Level, dB	31
Character corrections Tonality Impulsivity Intermittency	 2 0 0
Target Specific Sound Level Rating Level - corrections	29

Table 3 - The assessment procedure from BS4142

8.3. Fixed Plant Noise Limits

The precise locations of all items of fixed plant and/or the ventilation exhaust/intake locations are not yet known; therefore, a noise limit has been derived based on the intervening distance between the closest part of the proposed new school building and the nearest noise-sensitive premises, which is 125m for the main building and 100m to the substation. The ratio of the energy between these locations is such that (a) limits from previous report issues remain valid and (b) they reflect that the substation is likely to emit less sound than the heating, ventilation and air condition.

i. Heating, Ventilation and Air conditioning (Main School Building):

The distance between the nearest noise-sensitive premises and the main school building is 125m:

$$L_{p,Limit@1m} = L_{p,receiver} + 20\log_{10}(d)$$

$$L_{p,Limit@1m} = 29 + 20\log_{10}(125)$$

$$L_{p,Limit@1m} = 71dB(A)$$

ii. Substation

Taking into account the noise limit for the heating ventilation and air conditioning plant, the sound from the substation must be at least 10dB below the background sound level at the nearest noise sensitive premises, which is 100m away:

$$L_{p,Limit@1m} = L_{p,receiver} + 20\log_{10}(d) - 10dB$$

$$L_{p,Limit@1m} = 29 + 20\log_{10}(100)$$

$$L_{p,Limit@1m} = 59dB(A)$$

iii. Summary

In order to comply with BREEAM POL5 credit criteria, the overall sound pressure level 1m from the heating, ventilation and air-conditioning plant should be 71dB(A). If this combined level were to be divided between each plant room and the kitchen plant transfer grilles, this would be a limit of 66dB(A), 1m from the interface with the atmosphere.

The overall sound pressure level 1m from the louvered doors of the substation should not exceed 59dB(A) at 1m.

9. Sound from MUGA

The Sport England guideline values have been used to calibrate an area source in a noise model created using SoundPLAN™. The model uses the calculation method from ISO9613-1:1996[5] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings.

Ordinance Survey Open Data has been used to create the existing roads and buildings. Terrain data has been taken from BlueSky Mapping. The Proposed Development has been created using drawings provided by the client.

Outputs from the noise model are given in Figure 5.

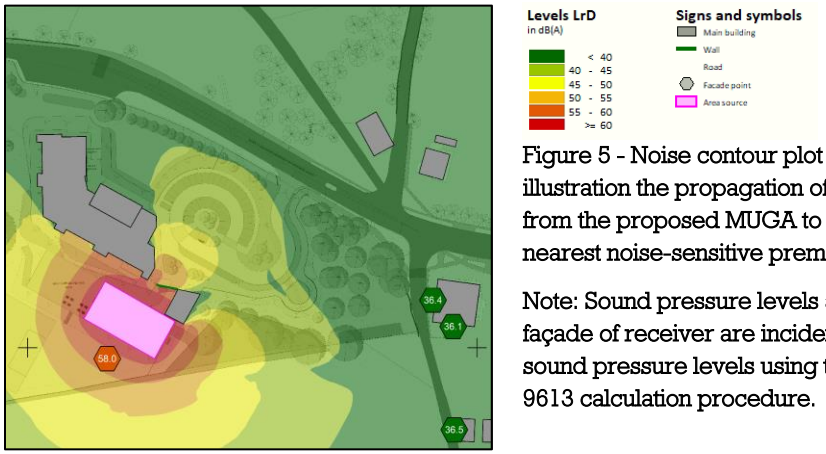


Figure 5 - Noise contour plot illustration the propagation of sound from the proposed MUGA to the nearest noise-sensitive premises

Note: Sound pressure levels at façade of receiver are incident sound pressure levels using the ISO 9613 calculation procedure.

The sound pressure levels resulting from the proposed new MUGA are expected to be less than 37dB(A) at the facades of the nearest noise-sensitive premises during the worst-case hour. Taking into account the attenuation of sound through an open-window, it is likely that both the internal and external guideline values from BS8233:2014 would be met.

[5] ISO9613-1:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"

10. Sound from Car Park

There is a total of eight year-group classrooms at the Proposed Development, which could pessimistically host 30 children. If each of these children were to be dropped-off and collected in an individual car, this would result in 240 vehicles during the peak hour.

The noise model has been used to predict the resulting sound pressure levels at the nearest noise-sensitive premises due to the noise in the car park using the CRTN[6] calculation procedure. The vehicles have been assumed to travel at 50kph on a bituminous surface. Outputs from the noise model are given in Figure 5.

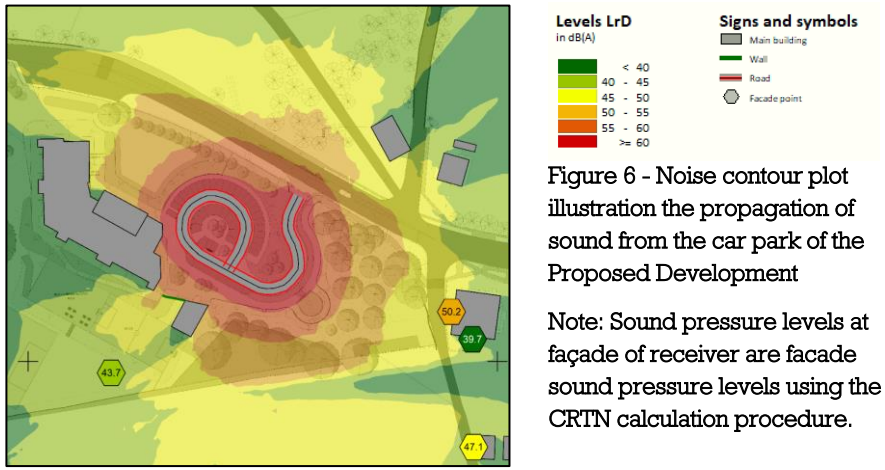


Figure 6 - Noise contour plot illustration the propagation of sound from the car park of the Proposed Development

Note: Sound pressure levels at façade of receiver are facade sound pressure levels using the CRTN calculation procedure.

The sound pressure levels resulting from activity in the car park during the peak-hour are expected to be less than 50dB(A) at the facades of the nearest noise-sensitive premises. Taking into account the attenuation of sound through an open-window, it is likely that both the internal and external guideline values from BS8233:2014 would be met.

[6] Calculation of Road Traffic Noise, Department for Transport, 1988

11. Uncertainty

It is acknowledged that all calculation-based modelling practices are ultimately an approximation. However, rather than ignore this fact or consider the results absolute, it is considered good practice to honestly report factors which can affect the robustness of any assessment.

11.1. Background Sound Complexity and Variability

The ambient noise climate at the assessment site is reasonably simple and the background sounds levels measured (which include busier and quieter periods) are considered typical for an urban area. Wind speeds during the survey visits were typically under 5ms^{-1} and the effect of wind generated noise is not considered to have been significant.

There will inevitably be times when the background level at nearby residential receivers is higher or lower than that used in assessment; however, using the typical level is considered to represent the most pragmatic and reasonable solution.

11.2. Noise Model

The attenuation of sound propagating outdoors between fixed source and receivers fluctuates due to variations in the meteorological conditions along the propagation path. ISO9613:1996 restricts the prediction to moderately downwind conditions of propagation. There is an expected uncertainty of ±3dB in the predicted sound pressure levels.

Ultimately, algorithms used to calculate distance attenuation are approximations. However, within all calculations,ground absorption and diffusion (which can be helpful in terms of attenuating sound with distance) have been set to pessimistic levels and worst-case source levels have been considered. In this way, a worst-case scenario can be modelled, increasing the robustness of the assessment.

11.3. Instrumentation

The instrumentation used in noise.co.uk's surveys has been calibrated by UKAS-approved laboratories. It is, however, noted that the degree of measurement tolerance of most Class1 sound level analysers is approximately 1-2 dB, meaning that two independently-verified meters could measure the same sound level and report marginally differing values.

12. Summary & Conclusions

An environmental noise assessment has been carried out to assess the potential noise impact of Ysgol Treferthyr, Criccieth, on existing nearby noise-sensitive premises. There are several new sources of environmental sound that will be introduced to the area as part of the Proposed Development, including:

- fixed plant (heating, ventilation and air-conditioning);
- the multi-use games area (MUGA) and other outdoor spaces;
- activity in the car park, particularly at the start and end of the school day.

12.1. Sound from Fixed Plant

Details of the proposed new fixed plant have not yet been finalised; therefore, noise limits have been specified that, if adhered to, would allow the BREEAM POL5 credit criteria to be achieved. This is 5dB below the threshold to be an ''indication that the specific sound will have a low impact'' in a numerical BS4142 assessment.

In order to meet the BREEAM POL5 credit criteria, sound pressure level limits have been set 1m from the plant areas' interface with the atmosphere, typically this would be expected to be 1m from a louvered door or screen enclosing the plant:

- **66dB(A) re µPa from each plant area containing heating, ventilation and air-conditioning plant.** This applies to the two plant areas and the kitchen extract plant separately.
- **59dB(A) re µPa from the substation**

12.2. Sound from MUGA

Using Sport England guidance for predicting and assessing sound from outdoor sports facilities, the sound pressure levels resulting from the proposed new MUGA are expected to be less than 37dB(A) at the facades of the nearest noise-sensitive premises during the worst-case hour. Taking into account the attenuation of sound through an open-window, it is likely that both the internal and external guideline values from BS8233:2014 would be met during worst-case activities.

12.3. Sound from Car Park

Sound from the use of the school car park could be a significant source of sound during peak hours, i.e. at the start and the end of the school day.

Predictions show that the sound pressure levels resulting from activity in the car park during the peak-hour are expected to be less than 50dB(A) at the facades of the nearest noise-sensitive premises. Taking into account the attenuation of sound through an open-window, it is likely that both the internal and external guideline values from BS8233:2014 would be met.

12.4. Recommendations

The assessment of sound from fixed plant indicates that, should the noise limits be adhered, the development would be eligible for a single credit in the BREEAM POL5 credit criteria. This level of noise impact would generally be an ''indication that the specific sound will have a low impact''.

It is strongly recommended that this report be passed to the BREEAM Assessor and the local planning authority for approval before any works are carried out.

Appendix

APPENDIX A: Summary Information

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 4142:2014 BREEAM Pol 5 BS8233: 2014 Sport England Guidance
B	Organisation performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	Melin Consultants	
D	Full site address	Ysgol Treferthyr Criccieth	
E	Date of surveys	Survey Date: 14th October 2020 – 15th October 2020	
F	Description & identification of Proposed Development	Noise assessment of fixed plant, outdoor activities and a car park associated with a proposed new primary school.	
G	Brief Description of details of Procedure & equipment	See Section 5 of this report.	

APPENDIX B: Technical Appendix

Measurements were made using the following equipment:

Monitoring Position	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
Unattended	Norsonic 140 (1405560)	Norsonic 1251 (33825)

The equipment has traceable calibration. The sound level meter was calibrated immediately prior to and immediately after the measurements were carried out.

Sound Level Meter	Before	After
Norsonic 140 (1405560)	114.0 dB	114.0 dB

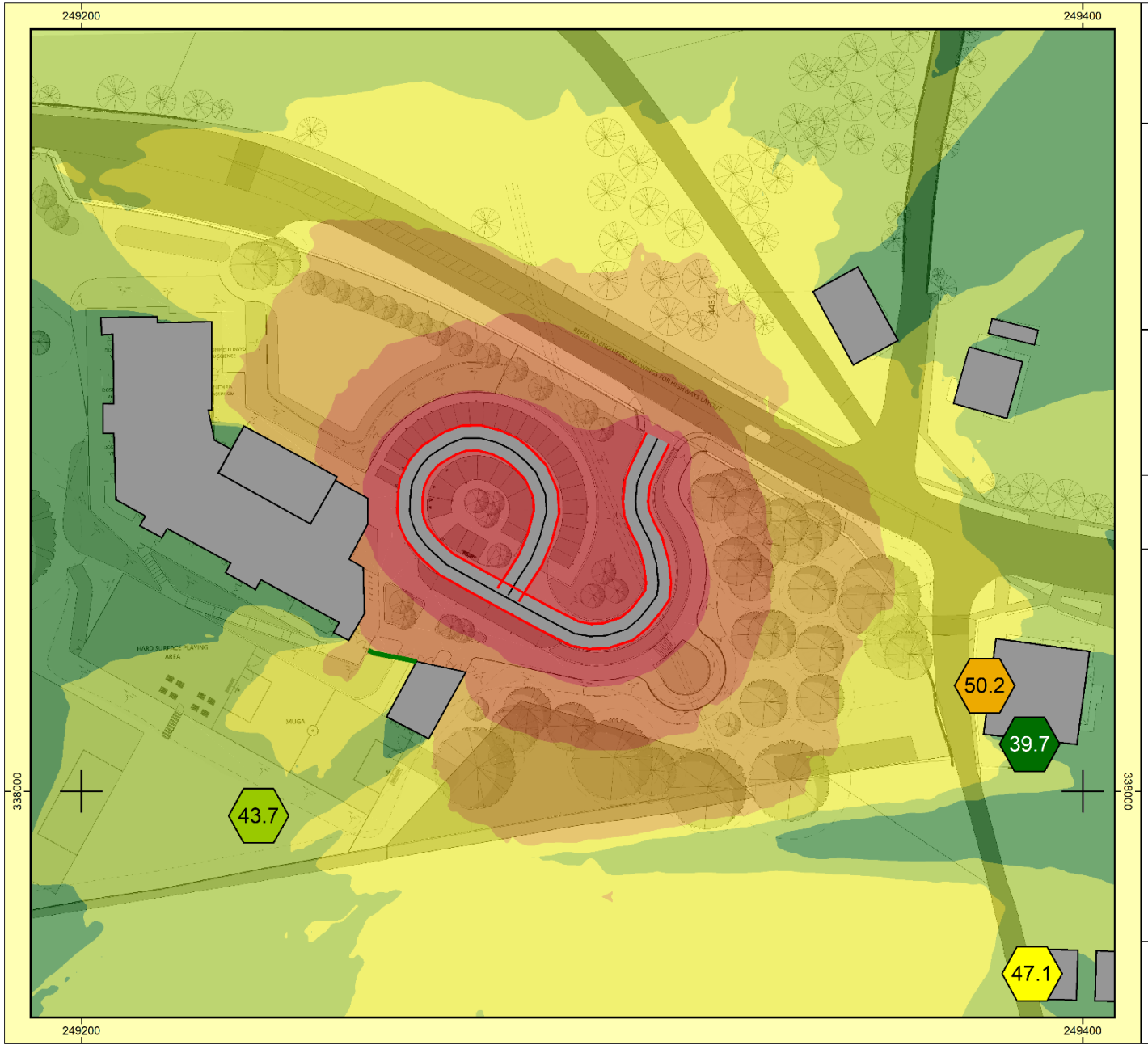
There was no adverse deviation.

APPENDIX C: Background Sound Level Data

Time	$L_{Aeq,15\text{-}mins}$	$L_{Aeq,15\text{-}mins}$
14/10/2020	10:00:00	46.0
14/10/2020	10:15:00	46.5
14/10/2020	10:30:00	49.5
14/10/2020	10:45:00	47.0
14/10/2020	11:00:00	49.0
14/10/2020	11:15:00	51.0
14/10/2020	11:30:00	50.5
14/10/2020	11:45:00	51.0
14/10/2020	12:00:00	50.0
14/10/2020	12:15:00	47.0
14/10/2020	12:30:00	48.0
14/10/2020	12:45:00	46.0
14/10/2020	13:00:00	48.0
14/10/2020	13:15:00	46.0
14/10/2020	13:30:00	45.5
14/10/2020	13:45:00	51.0
14/10/2020	14:00:00	46.5
14/10/2020	14:15:00	47.0
14/10/2020	14:30:00	46.0
14/10/2020	14:45:00	48.5
14/10/2020	15:00:00	46.5
14/10/2020	15:15:00	43.5
14/10/2020	15:30:00	51.0
14/10/2020	15:45:00	50.5
14/10/2020	16:00:00	47.5
14/10/2020	16:15:00	46.0
14/10/2020	16:30:00	50.5
14/10/2020	16:45:00	49.0
14/10/2020	17:00:00	51.5
14/10/2020	17:15:00	49.0
14/10/2020	17:30:00	48.0
14/10/2020	17:45:00	46.0
14/10/2020	18:00:00	42.5
14/10/2020	18:15:00	45.0
14/10/2020	18:30:00	42.0
14/10/2020	18:45:00	39.5
14/10/2020	19:00:00	39.0
14/10/2020	19:15:00	42.0
14/10/2020	19:30:00	37.5
14/10/2020	19:45:00	36.0
14/10/2020	20:00:00	36.5
14/10/2020	20:15:00	36.0
14/10/2020	20:30:00	38.5
14/10/2020	20:45:00	35.5
14/10/2020	21:00:00	35.5
14/10/2020	21:15:00	35.5
14/10/2020	21:30:00	35.5
14/10/2020	21:45:00	35.5
14/10/2020	22:00:00	35.0
14/10/2020	22:15:00	35.5
14/10/2020	22:30:00	35.0
14/10/2020	22:45:00	35.0
14/10/2020	23:00:00	35.0
14/10/2020	23:15:00	35.5
14/10/2020	23:30:00	35.0
14/10/2020	23:45:00	35.5
15/10/2020	00:00:00	35.0
15/10/2020	00:15:00	35.0
15/10/2020	00:30:00	34.5
15/10/2020	00:45:00	34.5
15/10/2020	01:00:00	35.0
15/10/2020	01:15:00	35.0
15/10/2020	01:30:00	35.0
15/10/2020	01:45:00	35.0
15/10/2020	02:00:00	35.0
15/10/2020	02:15:00	35.0
15/10/2020	02:30:00	36.0
15/10/2020	02:45:00	35.5
15/10/2020	03:00:00	35.0
15/10/2020	03:15:00	35.0
15/10/2020	03:30:00	35.0
15/10/2020	03:45:00	35.0
15/10/2020	04:00:00	34.5
15/10/2020	04:15:00	35.0
15/10/2020	04:30:00	35.0
15/10/2020	04:45:00	35.0

Time	$L_{Aeq,15\text{-}mins}$	$L_{Aeq,15\text{-}mins}$
15/10/2020	05:00:00	35.0
15/10/2020	05:15:00	35.0
15/10/2020	05:30:00	35.0
15/10/2020	05:45:00	35.0
15/10/2020	06:00:00	35.0
15/10/2020	06:15:00	36.0
15/10/2020	06:30:00	38.0
15/10/2020	06:45:00	38.0
15/10/2020	07:00:00	41.0
15/10/2020	07:15:00	46.0
15/10/2020	07:30:00	44.5
15/10/2020	07:45:00	47.0
15/10/2020	08:00:00	57.5
15/10/2020	08:15:00	48.0
15/10/2020	08:30:00	46.5
15/10/2020	08:45:00	46.5
15/10/2020	09:00:00	48.5
15/10/2020	09:15:00	47.5

APPENDIX D: Noise Contour Maps



Customer: Melin Consultants
Project: Ysgol Treferthyr Cricieth
Project-No. 21058

Car Park (SP)

Project engineer: MT
Created: 20/05/2021
Processed with SoundPLAN 8.2, Update 18/05/2021

Levels LrD
in dB(A)

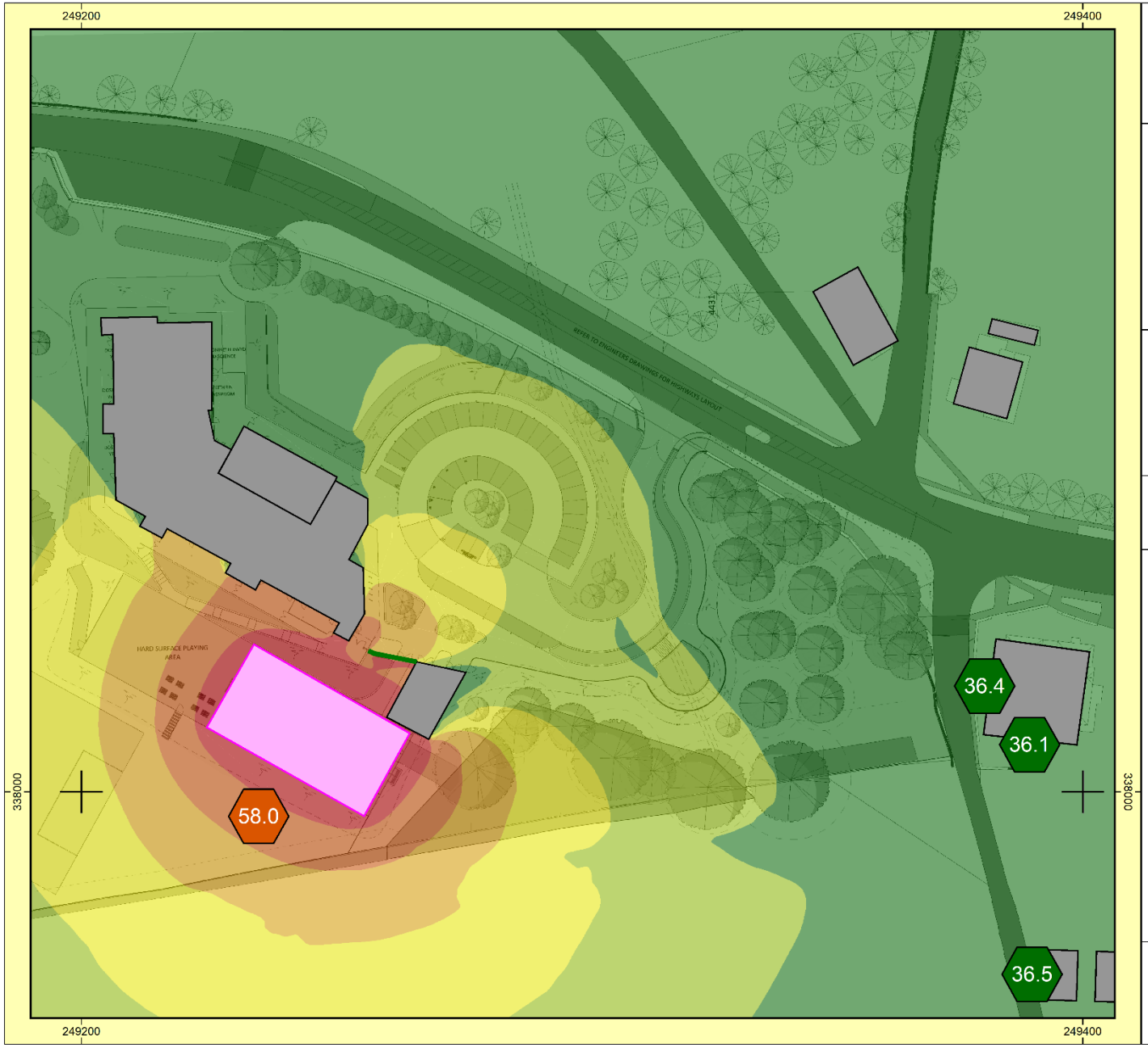
	< 40
	40 - 45
	45 - 50
	50 - 55
	55 - 60
	>= 60

Signs and symbols
- Main building
- Wall
- Road
- Facade point

Length scale 1:1067
0 5 10 20 30 40 m

noise.co.uk
noise and vibration consultants

C:\Users\SoundPLANAdmin\Noise.co.uk\Noise Documents - Documents\Projects\2020-V\21058\21058-1 (POL5 & Noise Impact)\Reports\Revision\Calculations\SoundPLAN\21058 - Ysgol Treferthyr Cricieth - Melin - BB93 - BREEAM - BS4142 - 201109\Car Park.cgs



Customer: Melin Consultants
Project: Ysgol Treferthyr Cricieth
Project-No. 21058

MUGA Noise (Grid)

Project engineer: MT
Created: 17/05/2021
Processed with SoundPLAN 8.2, Update 18/05/2021

Levels LrD
in dB(A)

	< 40
	40 - 45
	45 - 50
	50 - 55
	55 - 60
	>= 60

Signs and symbols

- Main building
- Wall
- Road
- Facade point
- Area source

N

Length scale 1:1067

0 5 10 20 30 40 m

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C:\Users\SoundPLANAdmin\Noise.co.uk\Noise Documents - Documents\Projects\2020-V\21058\21058-1 (POL5 & Noise Impact)\Reports\Revision\Calculations\SoundPLAN\21058 - Ysgol Treferthyr Cricieth - Melin - BB93 - BREEAM - BS4142 - 201109\MUGA Noise.sgs