



ACOUSTIC
CONSULTANTS LTD

Noise Impact Assessment

**Proposed Residential Development
Leiros Park, Bryncoch, Neath**

Reference: 10975/JA

Client



Document Control

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The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Codi Group appointed Acoustic Consultants Ltd (ACL) to undertake a noise impact assessment for the proposed residential redevelopment at Leiros Park, Bryncoch, Neath.

This report provides a noise impact assessment of the external noise sources in relation to the proposed residential development.

An on-site noise survey has been undertaken and noise data collected of the external noise sources.

Prior to the survey, contact was attempted to be made on numerous occasions with the nearby quarry to the application site to investigate expected blasting events/times. No response was had. As the client wished to progress with the assessment, the survey went ahead.

Noise mitigation measures in the form of façade build up, glazing and ventilation strategy are provided in order to suitably reduce external noise ingress within habitable rooms of the redevelopment.

The noise impact assessment has been undertaken in accordance with the guidance in BS8233:2014, MTAN, Planning Policy Wales (PPW) and Technical Advice Note Wales 11 (TAN11).

2. The Site

The application site is located on vacant land north of Leiros Parc Drive, SA10 (7EW), in a predominantly residential area.

Approximately 490m to the north of the nearest boundary edge to the proposed development site is Gylfach Quarry, part of the Breedon group. This is an aggregate extraction site processing predominantly sandstone and gritstone as we understand from our research.

Proposals are to construct 270 dwellings across the site. The site location and layout plan are provided below.

Figure 1: Site Location (*Highlighted in Red*)



Figure 2: Proposed Site Layout



3. Planning and Noise

3.1. Planning Policy Wales (PPW)

Planning Policy Wales (PPW) Edition 12 dated February 2024 sets out the land use planning policies of the Welsh Government. Section 1 states:

1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs¹, MTANs² and policy clarification letters comprise national planning policy.

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:

- address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
- not create areas of poor air quality or inappropriate soundscape; and*
- seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- traffic management and road safety;*
- ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- supporting low or zero emissions public transport;*
- providing active travel infrastructure; and*
- incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of people to pollution will be unacceptable. Whilst some uses may be appropriate with

the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications.

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. Technical Advice Note (Wales) - Noise

The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:

"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business. It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining planning applications for development which will either generate noise or be exposed to existing noise sources".

Table 1 provides Noise Exposure Categories (NECs), which relate to proposed residential developments near to a transportation and mixed noise sources. NECs are addressed in ranges according to the free-field equivalent noise levels ($L_{Aeq, T}$) measured at the position of the proposed dwellings.

Table 1: TAN 11 noise exposure categories

NOISE SOURCE	NOISE EXPOSURE CATEGORY			
	A	B	C	D
Road Traffic & Mixed Sources				
07.00 - 23.00 hours	<55	55 – 63	63 – 72	>72
23.00 - 07.00 hours	<45	45 – 57	57 – 66	>66

The Technical Advice Note (Wales) 11 gives advice to Local Planning Authorities on assessing proposals for residential developments near a source of noise, depending upon which of the four Noise Exposure Categories the proposed site falls into:

NEC A. *Noise need not be considered as a determining factor in granting planning permission, although the noise level at the high end of the category should not be regarded as desirable.*

NEC B. *Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection.*

NEC C. *Planning permission should not normally be granted. Where it is considered that permission should be given, for example because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise.*

NEC D. *Planning permission should normally be refused.*

In addition, it states: *"Night-time noise levels (23.000 - 07.00): sites where individual noise events regularly exceed 82 dB L_{Amax} (S time weighting) several times in any hour should be treated as being in NEC C, regardless of the $L_{Aeq, 8h}$ (except where the $L_{Aeq, 8h}$ already puts the site in NEC D)."*

Where the Noise Exposure Category for a site falls into NEC B, C or D mitigation will be necessary to control external noise observed within a dwelling.

TAN11 provides noise exposure categories (NEC) for proposed residential sites that are affected by transport related noise sources.

The document also states:

"The "mixed source" NECs should only be used where no individual noise source is dominant."

In assessing noise impact at Leiros Park, the application site does not seem to be affected by one dominant noise source of either road, or industrial noise. The assessment will provide an NEC based on the measured noise data from the survey.

3.3. Minerals Technical Advice Note 1

Minerals Technical Advice Note 1: Aggregates provides useful guidance. The following are the most relevant extracts:

Introduction

"This Minerals Technical Advice Note (Wales) sets out detailed advice on the mechanisms for delivering the policy for aggregates extraction by mineral planning authorities and the aggregates industry. It should be read in conjunction with Minerals Planning Policy Wales which sets out the general policies for all mineral development."

Background

Aggregates are the basic constituents used in construction. For the purposes of this note they are placed into three categories:

- primary aggregates - naturally occurring bulk materials - rock, sand and gravel - which are extracted directly from land or marine sources for use in construction;*
- mineral waste - material arising as a by-product of mineral extraction that is capable of use, either with or without further treatment, as a primary aggregate substitute, for example crushed rock fines and slate waste; and,*
- secondary/recycled aggregates – previously used materials that are capable of substituting for primary aggregates. These include waste material from construction operations; the demolition of buildings or structures; the by-products of industrial processes such as steel slag or pulverised fuel ash from power stations.*

88. Noise limits – noise limits should relate to the background noise levels⁵⁴, subject to a maximum daytime noise limit of 55 dB(A) where background noise levels exceed 45 dB(A). 55dB(A) is the lower limit of the daytime noise levels where serious annoyance is caused. Where background noise is less than 45 dB(A), noise limits should be defined as background noise levels plus 10 dB(A). Night-time working limits should not exceed 42 dB(A) at noise sensitive properties. Including Daytime working is defined as 0700-1900 hours and night-time as 1900-0700 hours. Noise limits should be set in terms of $L_{Aeq,T}$ over a 1-hour measuring period. L_{Aeq} is the noise index used to describe the "average" level of noise that varies with time (T) and should be measured "free-field" that is, at least 3.5 metres away from a façade to prevent reflection of noise by any façade that faces the noise source. During temporary and

short-term operations higher levels may be reasonable but should not exceed 67 dB(A) for periods of up to 8 weeks in a year as specified noise sensitive properties."

4. Assessment Criteria

The below informative section is based on British Standard 8233:2014 and WHO 1999. By meeting the below criteria, the residential amenity should not be adversely affected.

As noted above, assessing the site to an NEC is not considered appropriate due to the determining source noise of quarry operations.

4.1. Internal Equivalent Noise Levels

British Standard 8233:2014 entitled "Guidance on sound insulation and noise reduction for buildings" came into effect on 28th February 2014.

Section 7.7.2 Table 4 of the British Standard 8233:2014 provides internal ambient noise levels for dwellings from noise sources 'without a specific character'.

The British Standard guideline states that noise levels should not exceed those as noted in Table 2 of the British Standard. These criteria are based on the guidance provided within WHO 1999 and are summarised below:

Table 2: British Standard 8233:2014 Internal Noise Criteria

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

4.2. Maximum Noise Levels

Section 7.7.2 Note 4 of the British Standard states "Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

British Standard BS8233 provides no definitive criteria for maximum noise levels from individual events ($L_{Amax,F}$). Section 3.4 of the "Guidelines for Community Noise" published by the World Health Organisation in 1999 (WHO 1999) states *"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 L_{Amax} more than 10-15 times per night (Vallet & Verbey 1991)"*.

As such, maximum noise levels would be considered acceptable if the maximum noise level from individual events does not exceed 45 dB $L_{Amax(F)}$ no more than 10 to 15 times during the night-time period.

4.3. Approved Document O - Overheating Conditions

Approved Document O (ADO) is a building regulations requirement in Wales from November 2022. ADO (Wales) states:

2.2 High levels of external noise could limit the use of cross-ventilation to mitigate the risk of summer overheating. External noise is a material consideration considered when applying for Planning permission and mitigating measures may be required in the design in order to obtain Planning permission and controlled through a condition imposed on the consent. In exceptional cases, this could include non-openable windows. More commonly, windows will be openable in order to enable natural ventilation to occur at less sensitive times of day, when there is lower noise, when people are not present in the room, or when they are present but not engaged in noise-sensitive activities. But those windows may need to be kept closed at times to maintain acceptable indoor acoustic conditions, for example when people are using the rooms for sleep or office work. A noise issue may be identified at the Planning stage but rely on occupants to close windows at noise sensitive times rather than prevent them from ever opening them, and in those cases overheating strategies should assume windows will be closed during noise-sensitive periods even if they are not fixed closed.

2.3 When the removing excess heat as part of the overheating strategy, noise levels in bedrooms should be kept to a minimum during the sleeping hours of 23:00-07:00. Building control bodies may accept as evidence that this requirement is satisfied:

- a. documentation to demonstrate that the local planning authority did not consider external noise to be an issue at the site at the planning stage or;*
- b. if the local planning authority did consider external noise to be an issue that should be controlled through a condition at planning stage, then documentation to demonstrate that the proposals for heat removal (during the sleeping hours of 23.00 – 07.00) are accommodated within or do not conflict with documentation provided to the local planning authority to satisfy any related planning permission condition(s). (For example any expectation that windows on one or more façade, or in certain rooms, will need to be kept closed during noise-sensitive periods.)”*

ADO (Wales) does not apply any clearly defined noise limits. ADO (Wales) relies on the noise criteria within planning conditions or documentation submitted at planning stage. As such it is our opinion that the most relevant guidance for overheating noise limits (at night) is ADO (England) which states:

3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

- a. **40dB $L_{Aeq,T}$** , averaged over 8 hours (between 11pm and 7am).*
- b. **55dB L_{AFmax}** , more than 10 times a night (between 11pm and 7am).*

5. Noise Survey

A partially attended noise survey was carried out at the site from 28th November 2024 to 3rd December 2024. Four hours of attended site work were undertaken at the site on 28th of November 2024.

Prior to the survey, contact was attempted to be made with the quarry operator to understand the site's planned blasting times. Calls were made on a number of occasions, but no answer was had from the quarry after being passed to the correct phone number.

In addition to this, documentation and information on blasting was attempted to be sourced online through planning information and other sources. No blasting information could be sourced.

5.1. Monitoring Equipment

Sound pressure levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Equipment and Calibration Status for Device used in North-Facing Window

Equipment Description / Manufacturer / Type	Serial Number	Date of Calibration	Calibration Certification Number
SLM, NTI, XL2	A2A-09705-E0	10/10/2023	UK-23-113
Pre-Amp, NTI, MA220	5332	10/10/2023	UK-23-113
Microphone, NTI, MC230A	A14374	10/10/2023	UK-23-113
Calibrator, NOR-1251	35230	24/10/2024	1510319-1

The measurement systems were checked before and after use with the calibrators and no significant drift was detected.

5.2. Weather Conditions

The approximate weather conditions during the survey are provided in the table below. These are sourced from multiple online sources.

Periods of unsuitable weather occurred over the survey duration. These accounted for wind and/or rain and have been omitted from the assessment dataset. All other weather conditions are not expected to adversely affect the data obtained.

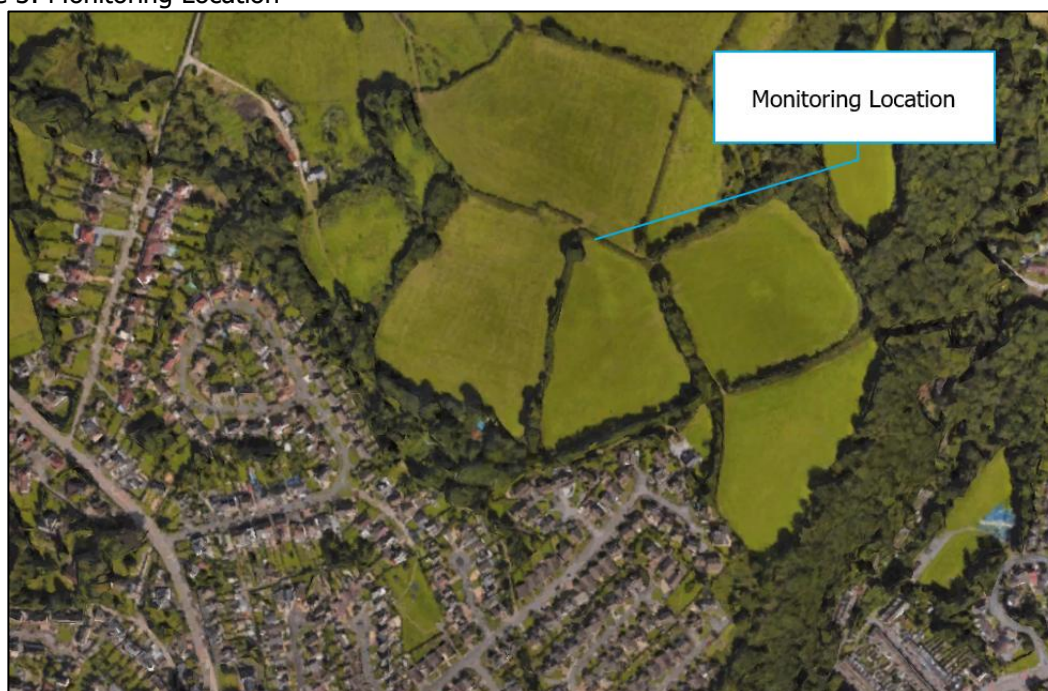
Table 4: Weather Conditions at Monitoring Location

Date	Wind Speed (m/s)	Prevailing Wind Direction	Temperature Range (°C)	Precipitation Time (hrs)	Cloud Cover (%)
Thursday 28/11/24	≤6	SE	6 to 10	0	70
Friday 29/11/24	4 to 8	SE	10 to 13	0	--
Saturday 30/11/24	≤6	S	12 to 14	0	--
Sunday 01/12/24	≤8	S	10 to 13	3	--
Monday 02/12/24	≤5	SW	7 to 10	0	--
Tuesday 03/12/24	≤4	E	0 to 9	0	100

5.3. Monitoring Procedure

One monitoring location was chosen at the north boundary edge closest to the noted quarry. The sound level meter was set to obtain 2-minute repeat periods, with a 1-second trace log. The microphone was in a free-field environment. The monitoring location is given in the figure below:

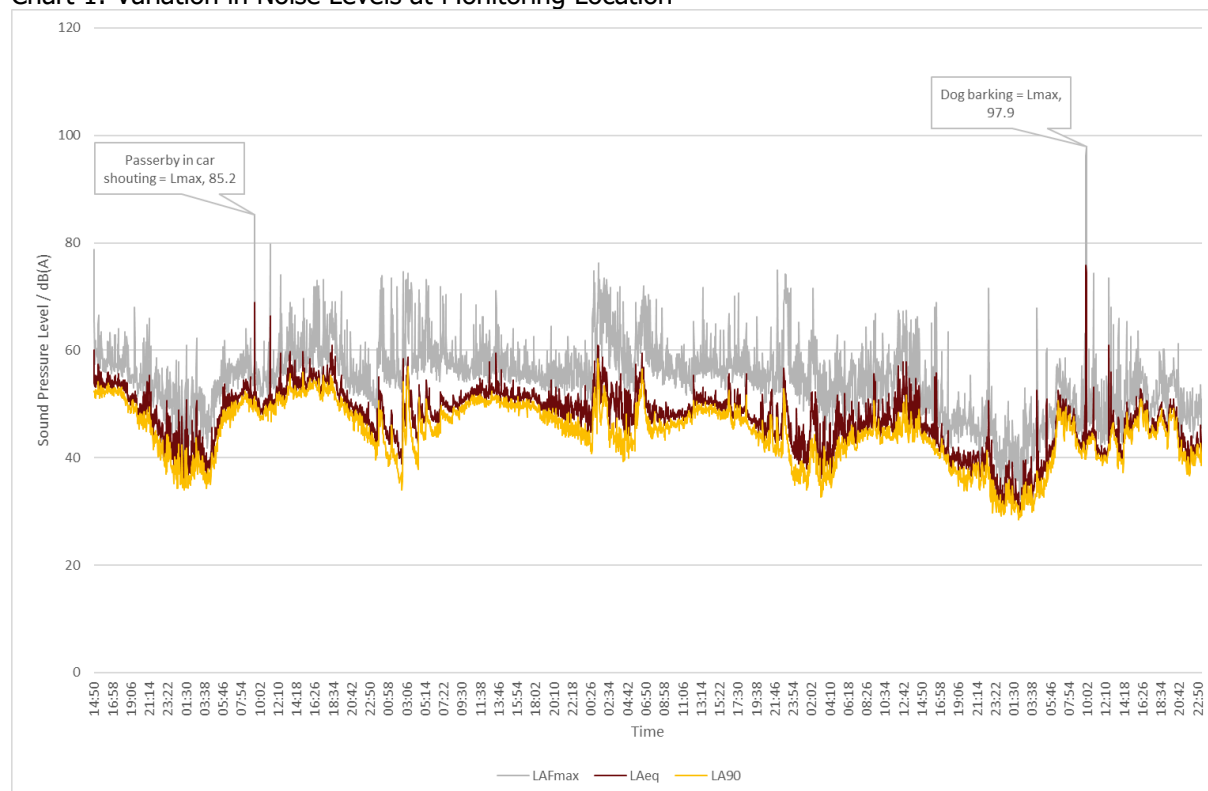
Figure 3: Monitoring Location



5.4. Measured Noise Levels

A chart providing the variation in noise levels for the equivalent ($L_{Aeq,2minutes}$), maximum (L_{AFmax}) and statistical ($L_{A90,2minutes}$) is provided in the chart below.

Chart 1: Variation in Noise Levels at Monitoring Location



From the measured noise data, we have determined the following façade level octave-band design 'daytime' and 'night-time' equivalent noise levels, and maximum night-time noise levels at the monitoring location. The noise levels in the table below have been corrected to a free-field level.

Table 5: Measured Octave Band Design Noise at Monitoring Location (free-field levels)

Parameter	63	125	250	500	1000	2000	4000	8000	dB(A)
Day $L_{eq,(16hr)}$	56	51	46	46	49	42	38	37	52
Night $L_{eq,(8hr)}$	54	48	45	43	43	41	40	38	48
Night $L_{max(F)}$	52	51	56	56	49	47	45	44	57

From the site survey and attendance over a number of hours, no industrial noise from the quarry could be heard.

The measured noise data and audio obtained does not provide any blasting noise information for assessment. This does not mean that the site does not undertake blasting.

6. Noise Exposure Category

From the noise measurements noted above, the application site falls into NEC B, which states:

"Noise should be taken into account when determining planning applications and where appropriate, conditions imposed to ensure an adequate level of protection."

The measured noise data, along with our attendance at site indicate that distant road traffic and wind through surrounding treelines were the main source of noise at the site. The measured data across the survey duration also reaffirms this.

No blasting noise from the quarry was obtained during the survey. No operational noise from the quarry was audible at the site during the attended portion of the survey. The measured data from the survey duration also reaffirms this.

7. Internal Ambient Noise Levels

Based on the site plan provided above in Figure 2, noise control measures can be consistent across all plots and façades.

7.1. Calculation Method

Calculations for the internal ambient noise levels due to external noise have been undertaken using the calculation method provided in Annex G Section G.2 of British Standard 8233:2014.

The calculations have been undertaken using the building façade constructions specified below and measured octave band noise levels.

Calculations are based on standard room dimensions and the following typical room details:

- Reverberation time of 0.5 seconds within all habitable rooms.
- We have considered each habitable room to have 2 ventilators.

Alternative constructions to those noted below could be used, however, they are required to meet the minimum sound reduction spectra stated below.

7.2. Building Façade Construction

7.2.1. External Wall Construction

Within all zones the external walls could comprise either a masonry or lightweight construction.

- The masonry construction could comprise of at least two skins of block (one of density 1880 kg/m^3 , 100mm cavity, 100mm block (density of 400 kg/m^3). Room side of the block work would be plastered or have plaster on dabs.
- The lightweight construction could comprise a single frame construction with an external leaf of 100mm brick or block (density 1600 kg/m^3), 100mm timber stud with 50 millimetres of mineral wool insulation within the cavity and inner lining comprising two layers of dense plasterboard (minimum total surface mass 16 kg/m^2).

The above constructions are expected to achieve the following sound reduction indices:

Table 6: Required Minimum Sound Insulation Performance of External Walls

Construction Type	Sound Reduction Index per Octave Band / dB								R _w
	63	125	250	500	1k	2k	4k	8k	
Masonry	31	38	46	45	55	66	77	70	52
Lightweight	25	40	45	46	53	60	65	60	

Any alternative constructions must achieve the above noted performance.

7.2.2. Roof Construction

The roof could be constructed using traditional techniques, such as a timber construction with concrete tiles (minimum density 30 kg/m²) with a loft space and a plasterboard ceiling above the habitable rooms.

The above constructions are expected to achieve the following sound reduction indices:

Table 7: Required Minimum Sound Reduction Index of Roof

Frequency (Hz)	63	125	250	500	1k	2k	4k	8k	R _w
R (dB)	39	42	40	43	51	58	63	63	49

Any alternative constructions should achieve the above noted performance.

7.2.3. Window Construction

The windows at all elevations could be openable at occupier discretion. However, they need to be sealed airtight to control external noise when the windows are closed, within all areas above. There should be no un-attenuated vents or openings in the building façade.

Table 8: Required Minimum Sound Reduction Indices of windows

Room Type	Minimum Sound Reduction Index (dB) per Octave Band								R _w	Typical Construction
	63	125	250	500	1k	2k	4k	8k		
Bedrooms	20	24	20	25	35	38	35	36	31	4/12/4
Living Rooms	20	24	20	25	35	38	35	36	31	4/12/4

Please note that the above minimum performances are requirements for the whole window element, to include frame and seals, not just the glass. The window supplier should confirm the above performances are achievable when tested to the current British Standards.

7.3. Ventilation Provisions

7.3.1. Background Ventilation

There is a need for attenuated ventilation provisions to habitable rooms within the development.

The following sets out the minimum performance required to habitable rooms for window-fitted trickle ventilation. We have worked on the basis of two vents per habitable room. The table below provides the element normalised level differences ($D_{n,e}$), in the open position, required for trickle vents to habitable rooms across the redevelopment.

Table 9: Required Minimum Element Normalised Level Difference of Ventilators (open position)

Room	D _{ne} / dB per Octave Band (Hz)								D _{new} (dB)	Typical Construction (open)
	63	125	250	500	1k	2k	4k	8k		
Bedrooms	30	35	35	36	34	29	33	34	32	Standard Trickle Vent
Living Rooms	30	35	35	36	34	29	33	34	32	Standard Trickle Vent

Any alternative constructions should achieve the above noted performance. The ventilation supplier should confirm the above performance is achievable when tested to the current British Standards.

7.3.2. Overheating Conditions

It should be noted under overheating conditions the windows may need to be opened. Approved Document O may need to be considered.

The Welsh Approved Document O does not set out noise thresholds above which overheating should be considered. As no thresholds are set in the Welsh guidance, we would consider it reasonable to apply the limits set in the English Approved Document O.

On the basis that a partially open window achieves up to 13 dB attenuation, the external threshold façade noise levels equate to 53dB L_{Aeq}, 8 hours and 68dB L_{AFmax}.

These limits are not expected to be exceeded during night-time periods based on the measured noise data provided above. This indicates that ADO criteria can be achieved with an open window to control night-time overheating conditions.

7.4. Effect of Mitigation Measures

With the mitigation measures installed to habitable rooms across the whole site, the predicted internal ambient noise levels are suitably controlled and within the BS8233:2014 criteria. The predictions for the worst-case rooms are provided in the figures below.

Figure 4: IANL predictions for bedrooms

Free Field Level at Façade									
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,10hr}$	56	51	46	46	49	42	38	37	51
Night $L_{eq,10hr}$	54	48	45	43	43	41	40	38	48
Night-time $L_{max(Tot)}$	52	51	56	56	49	47	45	44	57
Building Façade Construction									
External Element	63	125	250	500	1000	2000	4000	8000	
Standard Trickle - XS13 4400 EA+XC13 412 Canopy - 32 Dnew	D_{eq}	30	35	35	36	34	29	33	34
	Number of	2							
		0	0	0	0	0	0	0	0
100mm concrete block, fairfaced, 147kgm ² , 1470kgm ³ - 48 Rw		30	34	38	41	51	59	65	65
	Area	8							
		0	0	0	0	0	0	0	0
Double Glazed: 4/12/4 - 31 Rw		20	24	20	25	35	38	35	36
	Area	2							
		0	0	0	0	0	0	0	0
Pitched Roof - 56 Rw		25	39	47	53	58	56	60	55
	Area	12							
		0	0	0	0	0	0	0	0
Calculations to BS EN 12354									
	63	125	250	500	1000	2000	4000	8000	
Sum	0.00375	0.000788497	0.001057766	0.000484756	0.000394437	0.001178545	0.000486697	0.000387937	
10log sum	-24.25715029	-31.03199795	-29.75610308	-33.14476471	-34.0402209	-29.28653657	-33.12741638	-34.11239007	
10log S/A	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	3.699112851	
correction factor +3	3	3	3	3	3	3	3	3	
Octave Band	63	125	250	500	1000	2000	4000	8000	dBA
Day, $L_{eq,10hr}$	38	27	23	20	22	19	12	10	26
Night $L_{eq,10hr}$	36	24	22	17	16	18	14	11	23
Night-time $L_{max(Tot)}$	34	27	33	30	22	24	19	17	31

7.5. Amenity Spaces

The measured noise data indicates that the guidelines for amenity space noise can be achieved.

The proposed site layout shows that garden spaces are typically shielded from distant road traffic noise by other plots. Therefore, the daytime amenity space noise level criteria is expected to comfortably be achieved.

8. Summary and Conclusions

Codi Group appointed Acoustic Consultants Ltd (ACL) to undertake a noise impact assessment for the proposed residential redevelopment at Leiros Park, Bryncoch, Neath.

A site noise survey has been carried out at the application site. Prior to the survey, contact was attempted to be made with the quarry operator on several occasions with no luck. No blasting information could be sourced online either.

An attended portion of the site survey, for approximately 4-hours, indicates that operational noise from the quarry was not audible at the nearest boundary edge. No blasting noise was obtained from the whole duration of the noise survey.

The noise impact assessment has been undertaken in accordance with the guidance in BS8233:2014, Planning Policy Wales (PPW) and Technical Advice Note Wales 11 (TAN11).

Based upon the measured noise levels, the site falls into NEC B in terms of TAN11.

With the above noise control measures applied to the scheme, the aims of TAN11 and PPW can be achieved and acceptable internal conditions met. Noise levels in amenity spaces are expected to fall within the BS8233 criteria.

Based on the above, it is considered that the application site could be suitable for residential development in terms of noise, and PPW and TAN11.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure p_A – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} – quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$$L_{pA} = 10 \log_{10} (p_A/p_0)^2$$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
 p_0 is the reference sound pressure (20 μ Pa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{Aeq,T} = 10 \lg_{10} \left\{ (1/T) \int_{t_1}^{t_2} [p_A(t)^2/p_0^2] dt \right\} \quad (1)$$

where:

p_0 is the reference sound pressure (20 μ Pa); and

$p_A(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,T_r}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r .

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, L_{A,r,T_r} – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, $eVDV$ – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).



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