ARUP

Carmarthenshire County Council

Machynys Hotel

Operational and Construction Noise and Vibration Impact Assessment for Outline Planning

Reference: R01

| 10 October 2024

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Job number 278688-02

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1. Introduction

Arup has been appointed to carry out an operational and construction noise and vibration impact assessment to support the planning application for a proposed new hotel (Machynys Hotel) at Llanelli, Carmarthenshire, Wales.

This report assesses the potential impact of operational and construction noise and vibration from the proposed development on sensitive receptors in the surrounding area, providing requirements for mitigation where appropriate. The assessment follows the planning requirements set out by Carmarthenshire County Council (CCC) and relevant national policies and guidelines.

The scope of the assessment includes:

- Baseline sound surveys undertaken to establish the existing sound environment at noise sensitive receptors.
- Consultation with CCC regarding the assessment approach.
- Building services plant noise. The details of the building layout, location and extent of services plant are unknown at outline planning stage. Therefore, the assessment specifies appropriate sound levels to be secured by planning conditions for relevant receptors based on the baseline sound levels and CCC's requirements.
- Entertainment noise from events within the proposed hotel building.
- Noise from vehicle movements in the proposed car park.
- Construction noise and vibration effects. Given the distance between the proposed development and vibration sensitive receptors (greater than 100m) it is unlikely that vibration would cause any significant adverse effects and therefore construction vibration assessment is scoped out.
- Additional traffic during the construction and operational phase of the proposed development on the local road network is anticipated to be small, i.e. no more than approximately 10 more vehicles during peak hour. This level of additional traffic would not result in increased road traffic noise and therefore construction and operational road traffic noise and vibration assessment is scoped out.

A glossary of acoustic terminology is provided in Appendix A.

2. Project description

2.1 Proposed development

The proposed development would consist of a 120-bed hotel with associated car parking, access roads, landscape and infrastructure works. The hotel may include function rooms, spa facilities or other health and wellbeing offers, but this is currently unknown.

The proposal would accord with the adopted Local Development Plan, which allocates the application site for mixed use development, incorporating residential, amenity and commercial leisure in Machynys (Site Reference GA2/MU3; Policy Reference: EMP5). The site would support the delivery of this allocation whilst providing new employment and a location to support tourism in Llanelli. It is considered that the proposed development would be of a high quality and contribute positively to the surrounding natural and built environment and would add value to the visitor economy.

The proposed outline site layout and site access junctions are shown in Figure 1 and Figure 2.

Figure 1: Aerial view of proposed site (original image from Google Maps, https://www.google.com/maps)

Figure 2: Proposed outline development layout

2.2 Description of the existing site

The proposed site is bounded by:

- The Llanelli Coastal Road (B4304) to the north
- Pentre Nicklaus Avenue to the west
- Open green space to the east and south

2.2.1 Sensitive receptors

Directly to the north of the site is currently being constructed as part of the Pentre Awel development which will be mixed used ranging from leisure, educational to research facilities. To the west of the site is the Maes

Y Blwch Housing Development. Beyond the open space to the south is Pentre Nicklaus Village. The sensitive receptors considered in this assessment are shown in Figure 3.

Figure 3: Site boundary with sensitive receptors.

3. Planning policy and guidance

In response to the pre-application for the development, the CCC Environmental Health Officer (EHO) provided guidance on the requirements of the noise and vibration assessment. These requirements are presented in Sections 3.1 to 3.3.

Where necessary, reference to other national policies and guidelines on noise and vibration are made in addition to those from the local authority. Planning Policy Wales (PPW) Edition 12 describes the planning development policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs).

3.1 Planning Policy Wales

Paragraph 6.7.4 of PPW provides guidance on noise generation near protected areas:

"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."

3.2 Noise and Soundscape Plan for Wales 2023-2028 – Our national strategy on soundscapes

The Noise and Soundscape Plan for Wales 2023-2028 provides Wales's national strategy on soundscapes, meaning the sound environment as perceived or experienced and/or understood by a person or people, in

context. It considers all forms of airborne sound and aims to discharge requirements under the Environment (Air Quality and Soundscapes) (Wales) Bill[1] and The Environmental Noise (Wales) Regulations 2006[2]

3.3 Technical Advice Note 11 (TAN 11)

TAN 11 provides technical guidance on noise generating developments. It states:

"Local planning authorities must ensure that noise generating development does not cause an unacceptable degree of disturbance. They should also bear in mind that if subsequent intensification or change of use results in greater intrusion, consideration should be given to the use of appropriate conditions."

TAN 11 recommends the use of BS 4142: 1990 *Method for rating industrial noise affecting mixed residential and industrial areas* to assess the likelihood of complaints from industrial development. The cited version of BS 4142 has been superseded by BS 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*.

3.4 Carmarthenshire County Council guidance – Planning and Noise

CCC noise policy[3] states:

"Industrial/commercial/fixed plant

Some industrial, commercial and fixed plant/machinery are likely to give rise to noise disturbance to nearby residents. The assessment that should be used to determine the likely impact on noise sensitive properties is BS4142:2014+A1:2019[4]. This assessment determines the likely noise impact by comparing the rating noise level from the proposed development with the background noise levels of the locality.

Through a consultation with the EHO at CCC, it is recommended that the rating noise level of developments should not exceed the existing background noise level.

Entertainment Venues

Developments associated with premises used for public entertainment, including clubs, pubs, bars, restaurants and other recreational uses such as wedding venues, may also require a Premises License (Licensing Act 2003) and the applicant should approach the Licensing Authority as early as possible to ensure that the proposed final use of the premises complies with their Licensing Policy.

Additionally, these developments can pose particular difficulties, not least because associated activities are often at their peak in the evening and late at night. Therefore, developers need to bear in mind that noise is generated within the premises and also the attendant problems of noise that may be made by customers in the vicinity. Disturbance that can be caused by traffic and associated car parking should not be underestimated.

Construction/demolition works

We would recommend that construction or demolition works should only be undertaken between the following times, unless prior written consent is received from the Local Authority:

Monday to Friday, 07:30 – 18:00

Saturday: 08:00 – 14:00

No noise generating works shall be carried out on Sunday, bank or public holidays.

Some applications will be subject to undertaking a noise assessment to determine the likely impact of construction/demolition noise on noise sensitive properties. This assessment has been undertaken in

[1] https://business.senedd.wales/mgIssueHistoryHome.aspx?IId=40984

[2] https://www.gov.wales/noise-and-soundscape-action-plan-2018-2023-0

[3] https://www.carmarthenshire.gov.wales/media/1219476/planning-and-noise.pdf

[4] BS4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

accordance with BS5228-1:2009+A1:20145 or its subsequent amendments. The assessment should also include mitigation measures that will be employed to ensure that the noise is kept to as low as practicable."

3.5 Consultation

From consultation with the EHO regarding the assessment approach, two additional points have been raised:

- *Noise Sensitive Receptors – While I acknowledge the residential receptors you've indicated, I would like to point out the large "Pentre Awel" development currently under construction near your proposed site. This development will house various end users, ranging from leisure, educational to research and development, including some medical and clinical settings. As such, I believe some of these end users may have different sensitivities to noise compared to those in residential areas. Would you be able to account for this in your Noise Impact Assessment (NIA), and would these end users have specific standards to assess against (e.g., HTM 08 or BB93)?*
- *Piling Activities – During the construction of the Pentre Awel development, significant amount of pile driving took place over an extended period, which resulted in several noise complaints. Could you ensure that this is addressed in any NIA submitted?*

The future noise sensitive receptors have been considered in the assessment in Sections 5 to 8.

4. Existing environmental sound climate

4.1 Baseline measurements

A baseline environmental sound survey was carried out in September 2024. The measurement positions are shown in Figure 4.

Figure 4: Measurement locations L1 and L2

The survey aimed to establish the current background sound levels representative of the nearest noise sensitive receptors to the proposed site. Attended measurements have been undertaken over 15-minute periods during the daytime between 10:00 and 19:00; between 19:00 and 23:00 during the evening; and 23:00 to 03:00 during the night. For each location, three measurements were taken during day and evening periods; and two measurements during the night period. For each measurement, observations on the sound environment were recorded, along with wind speed and direction. The typical ambient sound level, L_{Aeq}, are logarithmic averaged levels and the typical background sound level, L_{A90}, are arithmetic averaged levels from the attended measurements. A summary of the measurements is given in Table 1.

[5] BS5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Noise*

Location	Sound level, dB(A) (free field)					
	Typical background sound level, $L_{A90,15min}$			Typical ambient sound level, $L_{Aeq,15min}$		
	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)	Day (07:00-19:00)	Evening (19:00-23:00)	Night (23:00-07:00)
L1 – Maes Y Blwch	48	42	30	59	57	36
L2 – Pentre Nicklaus Village	49	42	30	51	45	34

Table 1: Summary of measured sound levels

During the site visit, the Pentre Awel development was under construction. Construction noise was just noticeable when the traffic on B4304 was not busy.

The future noise sensitive receptor, Pentre Awel, is considered in the assessment as if the facility is used for residential dwellings. The measurements made at L1, are considered to be representative of the future sound climate at Pentre Awel when the current construction work is completed. The road traffic on the B4304 dominates the existing sound climate in the area and would be the dominant sound source contributing to the sound climate at Pentre Awel.

Full survey details are provided in Appendix B.

5. Environmental noise emissions from plant

5.1 Criteria

Detail of the fixed mechanical and electrical plant and equipment related to the proposed development is not available at this stage. To avoid likely significant effects from this source, the equipment would be designed to ensure that noise emission levels are limited to a level which complies with CCC's noise criteria described and as shown in Section 3.

5.2 Discussion

As defined in BS4142:2014+A1:2019, the rating level $L_{Ar,T}$ is the A-weighted sound pressure level of the combined building services noise adjusted with the necessary correction for tonality, impulsivity and other characteristics defined in BS4142.

6. Event noise emission

It is assumed that noise-generating events (e.g. parties, weddings, corporate events) will be hosted in the proposed hotel and therefore an assessment of event noise at the nearby noise sensitive receptors has been carried out.

It is assumed that the noise-generating events would only occur inside the hotel.

An assessment of night-time event noise has been included but it is uncertain at this time whether events after 23:00 will be hosted which will require an entertainment license.

6.1 Criteria

In the absence of specific CCC policy for control of entertainment noise, this assessment uses the recommendations outlined in NANR163 Noise from Pubs and Clubs (Phase II)[6].

NANR163 suggests that an assessment of the "Absolute $L_{Aeq,5mins}$" aligns best with the subjective response from residents as to the intrusiveness and acceptability of music noise intrusion into residential properties. The guidance suggests that an "Absolute $L_{Aeq,5mins}$" of lower than 34dB indoors is just acceptable to the majority of occupants. It does however stress that a higher noise level may be permitted if the existing ambient is significantly above this "Absolute $L_{Aeq,5mins}$" level and that the music noise has to be clearly audible and intelligible to a familiar listener for it to cause a significant impact.

For daytime outdoor amenity at noise sensitive receptors (e.g. gardens), WHO Guidelines for Community noise provide guidance within outdoor amenity area that noise emission should not exceed the limits recommended by WHO for the amenity of outdoors areas, at 50dBL_{Aeq}.during day and evening time periods.

It is not yet known whether there is an intention that events or music noise will occur after 23:00 within the hotel, however a limit for internal noise level within bedrooms of the noise sensitive receptors during the night of lower than 34dB$L_{Aeq,5mins}$ in indoors is proposed.

6.2 Calculated event noise levels

It is assumed that noise from an event will consist mainly of music or speech noise associated with a sound system, and that this will be playing back the audio at a moderate sound level. For this assessment, the sound levels presented in Table 2 have been assumed within the hotel function rooms during an event based on our experience on similar type of developments.

dB(A)	Sound pressure level (dB) at each octave band centre frequency, Hz						
	63	125	250	500	1k	2k	4k
82	77	75	76	82	78	70	60

Table 2: Assumed sound levels within the hotel due to music and/or speech reproduced via a sound system

It is assumed that:

- The event room where entertainment noise is generated is a double-height space and its façade is 13m wide and 4m tall
- The façade of the event room is double-glazed and has a minimum sound reduction performance of R_w+C_{tr} 32, e.g. 6.4mm / 12mm gas space filled with air or argon / 6mm
- The event space is mechanically ventilated and cooled so it does not rely on open windows and will not have doors kept open directly to outside.

Based on the above assumptions, the calculated event noise levels for the worst-case night-time assessment are presented in Table 3.

Item	Sound pressure level outside receptors, dB(A)		
	Maes Y Blwch	Pentre Awel	Pentre Nicklaus Village
Event noise level outside receptor	22	16	15

Table 3: Event noise levels calculated outside noise sensitive receptors

[6] DEFRA (2006): NANR163: Noise from Pubs and Clubs (Phase II) Final Report

6.3 Discussion

Based on the assumptions, the predicted noise levels at noise sensitive receptors indicate that the entertainment noise target levels of 34 $dBL_{Aeq, 5min}$ in indoors would not be exceeded given the predicted event noise emission levels outside receptors are below the target level. Therefore, no likely significant effect has been identified due to events taking place in the proposed hotel.

7. Car park noise

The proposed development includes a car park, which is located on the east side of the site (see Figure 2). Night-time use of the car park is expected to be much lower than that during the day, but an allowance has been made as a conservative scenario that an event being held in the proposed hotel and associated vehicle movements could take place beyond 23:00 when people are leaving the venue.

7.1 Calculation methodology

The overall noise level from vehicle movements in the car parks at the nearest noise sensitive receptors has been predicted using the methodology set out in BayLfU/Parking Area Noise:2007[7].

The determination of the sound power level associated with the car park is based on the frequency of cars arriving and departing, number of parking spaces, parking area type, impulse character, type of surface and total area of the car park. The number of vehicle movements per bedroom occurring each hour during a typical day or night period are set out in the methodology which provides a penalty addition to the noise level when hotels are to be used for discos/events.

The sound propagation from the car park to the receptor is determined in accordance with ISO9613-2:2024[8], taking into account the propagation correction over the intervening distance, attenuation due to air absorption, ground effect and shielding by sound obstacles.

7.2 Criteria

In the absence of specific CCC guidance, it is proposed for the noise emissions from the car park do not exceed the existing ambient sound level (L_{Aeq}) at each receptor as shown in Table 1. By targeting this limit, it is anticipated that the car park noise emissions will not contribute significantly to the current noise climate.

It should be noted that noise emission from a car park cannot be guaranteed to a certain limit. Targets are used only as an aid to guide design features.

7.3 Calculated car park noise levels

The following assumptions have been made for the assessment:

- The frequency of car movement is assumed to be the same for the entire car park area
- The calculated sound power level is uniform over the full parking area extent

The predicted operational sound level outside each receptor from vehicle movements in the proposed car park is presented in Table 4.

[7] Bayerisches Landesamt für Umwelt (2007) *Parking Area Noise: Recommendations for the Calculation of Sound Emissions of Parking Areas, Motocar Centers and Bus Stations as well as Multi-Storey Car Parks and Underground Car Parks*

[8] ISO9613-2:2024 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors*

Item	Sound pressure level, dB(A)		
	Daytime (07:00-19:00)	Evening time (19:00-23:00)	Night-time (23:00-07:00)
Maes Y Blwch	31	30	22
Pentre Awel	31	31	23
Pentre Nicklaus Village	38	37	29

Table 4: Hourly car park sound levels calculated outside noise sensitive receptors

7.4 Discussion

The predicted car park noise levels would not exceed the existing ambient noise level. Therefore, it is expected that the noise impact of vehicle movements in the proposed car park will not result in significant effect.

8. Entertainment with car park noise

Entertainment and car park noise emission levels at noise sensitive receptors have been assessed separately in the above. As a worst-case scenario is when an event is held at the hotel the uses of car park would be maximised. Therefore, combined noise emission levels at noise sensitive receptors are considered.

In the absence of specific CCC guidance, it is proposed for the noise emissions from the car park do not exceed the existing ambient sound level (LAeq) at each receptor as shown in Table 1. By targeting this limit, it is anticipated that the noise emissions from entertainment and car park activities will not contribute significantly to the current noise climate. predicted below. The combined noise emission levels are shown in Table 5.

Item	Sound pressure level, dB(A)		
	Daytime (07:00-19:00)	Evening time (19:00-23:00)	Night-time (23:00-07:00)
Maes Y Blwch	32	31	25
Pentre Awel	31	31	24
Pentre Nicklaus Village	38	37	29

Table 5: Combined entertainment and car park noise levels outside noise sensitive receptors.

The predicted noise emissions from the entertainment and car park at noise sensitive receptors are below the existing ambient noise levels.

9. Construction noise

9.1 Scenarios

At this stage, no detailed construction programme is available and therefore assumptions on the type of construction activity and equipment have been assumed based on similar developments. It is understood that no impact piling is expected for this development.

Activities and equipment are grouped into the following assumed scenarios:

- Scenario 1 – Site preparation and remediation

- Scenario 2 – Foundations and piling
- Scenario 3 – Erection of structure
- Scenario 4 – External and internal fitting out
- Scenario 5 – Groundworks and landscaping

In the absence of a detailed construction method statement at this stage, it has assumed that a large rotary bored piling technique would be used for the required piling works. The predicted construction noise levels are presented in this section using the assumptions listed in Appendix C.

Appendix C provides more details on the construction scenarios.

9.2 Criteria

This assessment uses the ABC method described in BS5228-1:2009+A1:2014. Based on the existing noise climate in Section 4, the maximum noise limit for all daytime construction scenarios of the development site at the receptors are presented in Table 6.

Receptor	Daytime threshold value, dBL_{Aeq}
Maes Y Blwch	65
Pentre Nicklaus Village	65

Table 6: Noise limits for each construction scenario

9.3 Calculated construction noise levels

The construction method would use best practicable means (BPM) to control noise and vibration. BS5228-1:2009+A1:2014 recommends the following as guidance on best available techniques to be implemented on site at all times to minimise noise and vibration from the construction works:

- Hours of working should be planned, taking into account the nature of land use in the areas concerned and duration of the work;
- Where practicable, quiet working methods should be employed, including the use of the most suitable plant, and suitably sized plant;
- Haulage vehicles required to deliver construction equipment or materials should not access the site outside of daytime periods;
- On-site noise levels should be monitored regularly;
- Switch off equipment when not required;
- Keep internal haul routes well maintained and avoid steep gradients;
- Minimise drop height of materials;
- Start up plant and vehicles sequentially rather than all together;
- Use of broadband (i.e. white noise) reversing alarms rather than tonal;
- Use and siting of plant – plant from which the noise generated is known to be directional should, where practicable, be orientated so that the noise is directed away from noise sensitive receptors; and
- Noise barriers in the form of temporary hoarding, stacks of materials such as bricks, timber or topsoil, may provide suitable screening to nearby sensitive receptors.

Predicted construction noise levels from the construction activities at noise sensitive receptors are presented in Table 7.

Receptor	Predicted noise level (dBL_{Aeq}), Scenario					Noise limit (dBL_{Aeq}) outside receptor (see)
	1	2	3	4	5	
Maes Y Blwch	59	63	61	53	62	65
Pentre Nicklaus Village	57	61	58	51	60	65

Table 7: Construction noise impacts at receptors for all scenarios

9.4 Discussion

The predicted construction noise levels at noise sensitive receptors are below the threshold level of 65dB. No potential significant effect from construction noise is identified at any receptor.

10. Conclusion

In the absence of detailed information of the proposed development, as this is for an outline planning application, reasonable assumptions have been made in this report. At the later stage, the assumptions and conclusions should be verified once the detailed information is available.

Based on the assumptions for the proposed hotel, no potential significant effect at any noise sensitive receptor has been identified due to the proposed development.

Appendix A

Acoustic terminology

Decibel (dB)

The ratio of sound pressures which we can hear is a ratio of 10^6:1 (one million:one). For convenience, therefore, a logarithmic measurement scale is used. The resulting parameter is called the 'sound pressure level' (L_p) and the associated measurement unit is the decibel (dB). As the decibel is a logarithmic ratio, the laws of logarithmic addition and subtraction apply.

dB(A)

The unit used to define a weighted sound pressure level, which correlates well with the subjective response to sound. The 'A' weighting follows the frequency response of the human ear, which is less sensitive to low and very high frequencies than it is to those in the range 500Hz to 4kHz.

In some statistical descriptors the 'A' weighting forms part of a subscript, such as L_{A10}, L_{A90}, and L_{Aeq} for the 'A' weighted equivalent continuous noise level.

Equivalent continuous sound level

An index for assessment for overall noise exposure is the equivalent continuous sound level, L_{eq}. This is a notional steady level which would, over a given period of time, deliver the same sound energy as the actual time-varying sound over the same period. Hence fluctuating levels can be described in terms of a single figure level.

Frequency

Frequency is the rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the hertz (Hz), which is identical to cycles per second. A 1000Hz is often denoted as 1kHz, e.g. 2kHz = 2000Hz. Human hearing ranges approximately from 20Hz to 20kHz. For design purposes the octave bands between 63Hz to 8kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.

Sound power level

The sound power level (L_w) of a source is a measure of the total acoustic power radiated by a source. The sound power level is an intrinsic characteristic of a source (analogous to its volume or mass), which is not affected by the environment within which the source is located.

Sound pressure level

The sound power emitted by a source result in pressure fluctuations in the air, which are heard as sound.

The sound pressure level (L_p) is ten times the logarithm of the ratio of the measured sound pressure (detected by a microphone) to the reference level of 2×10^{-5}Pa (the threshold of hearing).

Thus L_p (dB) = $10 \log (P1/P_{ref})^2$ where P_{ref}, the lowest pressure detectable by the ear, is 0.00002 pascals (i.e. $2x10^{-5}$ Pa).

The threshold of hearing is 0dB, while the threshold of pain is approximately 120dB. Normal speech is approximately 60dBL_A and a change of 3dB is only just detectable. A change of 10dB is subjectively twice, or half, as loud.

Typical levels

Some typical dB(A) noise levels are given below:

Noise level, dB(A)	Example
130	Threshold of pain
120	Jet aircraft take-off at 100m

110	Chainsaw at 1m
100	Inside disco
90	Heavy lorries at 5m
80	Kerbside of busy street
70	Loud radio (in typical domestic room)
60	Office or restaurant
50	Domestic fan heater at 1m
40	Living room
30	Theatre
20	Remote countryside on a still night
10	Sound insulated test chamber

Appendix B

Baseline sound survey report

B.1 Introduction

An environmental baseline sound survey has been undertaken to determine the existing sound climate and character in and around the proposed development. This appendix details the baseline sound survey and results.

The survey was carried out by Sarah Dennison and Gina Mackworth of Arup, from 12 to 13 September 2024.

B.1.1 Site description

The site is southwest of Llanelli town centre, north of the River Loughor. The surrounding area is mainly open space immediately to the south and bounded by roads to the north and west. The surrounding buildings are majority residential to the west and commercial and light industrial to the north.

Figure B1: Site location and measurement locations

B.1.2 Instrumentation

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.

The SLM used to undertake the survey is described in Table B1 below.

Description	Serial number	Item type
B&K 4231 Calibrator	2313749	Calibrator
B&K 4189 Microphone	2920105	Microphone
B&K 2250	3007325	Sound level meter
B&K ZC-0032	21724	Preamp

Table B1: Measurement instrumentation

B.1.3 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, except where otherwise stated. The appropriate windshield for the SLM was fitted to the microphone throughout to minimise wind-induced noise.

Attended measurements of 15 minutes duration were made at each location, dependent upon conditions at the measurement location. In each case, the time period was appropriate to provide a good representation of the typical noise climate at each measurement location.

B.2 Measurement results

B.2.1 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}.

B.2.1.1 Location 1

Location description:
Measurement location is on an embankment adjacent to Pentre Nicklaus Avenue, approximately 7m from the edge of the road.

Measurement duration:
Thu 12/09/2024 14:25
to
Fri 13/09/2024 02:51

Weather conditions:
Wind speed: 0.5 to 1.5 m/s in the day. 0 m/s in the evening and night.
Wind direction: East

Environment and observations:
Dominant source contributions from the B4304 roundabout to the north with around 1.5 car passbys a minute.

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	48	59	63	73
Evening (19:00-23:00)	42	57	61	72
Night (23:00-07:00)	30	36	37	67

Table B2: Summary of averaged sound pressure levels at Location 1

B.2.1.2 Location 2

Location description:
Measurement locations with the grass land south of the proposed development and north of the residences of Pentre Nicklaus Village.

Measurement duration:
Thu 12/09/2024 14:51
to
Fri 13/09/2024 03:29

Weather conditions:
Wind speed: 1.2 – 2.5 m/s in the day. 0 m/s in the evening and night.
Wind direction: Northeast

Environment and observations:
Dominantly road traffic noise from B4304 with some nature sounds. Construction noise from the site to the north of B4304, 300m from the measurement location, is intermittent and noticeable in daytime only.

Period	Sound Pressure Level, dB(A) (re 20 µPa)			
	L_{90}	L_{eq}	L_{10}	L_{max}
Day (07:00-19:00)	49	51	52	61
Evening (19:00-23:00)	42	45	47	54
Night (23:00-07:00)	30	34	36	49

Table B3: Summary of averaged sound pressure levels at Location 2

Appendix C

Construction noise assumptions

C.1 Construction noise assumptions

This appendix provides the construction activity assumptions which form the basis for the prediction of construction noise in accordance with BS5228-1:2009+A1:2014.

The following activities are assumed to take place during the construction of the proposed development:

- Activity 1 – Site preparation and remediation
- Activity 2 – Foundations and piling
- Activity 3 – Erection of structure
- Activity 4 – External and internal fitting out
- Activity 5 – Groundworks and landscaping

These activities would take place in different stages of the project and would require different plant items. This is reflected in the table below which details the plant items used in the assessment construction noise calculations as required.

Plant	BS5228 reference	Construction activity										Plant sound power level, dB(A)
		1		2		3		4		5		
		No.	% on time	No.	% on time	No.	% on time	No.	% on time	No.	% on time	
Articulated Dump Truck	Table C 4-2	N/A	N/A	1	10	N/A	N/A	N/A	N/A	N/A	N/A	106
Bentonite Pump	Estimated	N/A	N/A	1	25	N/A	N/A	N/A	N/A	N/A	N/A	109
Concrete Mixer	Estimated	N/A	N/A	1	30	N/A	N/A	N/A	N/A	N/A	N/A	110
Concrete mixer truck	Table C 4-20	N/A	N/A	1	30	1	30	N/A	N/A	N/A	N/A	108
Concrete Placing Boom	Table C 4-37	N/A	N/A	1	50	N/A	N/A	N/A	N/A	N/A	N/A	93
Concrete pump	Table D 6-31	N/A	N/A	1	30	1	30	N/A	N/A	N/A	N/A	110
Concrete Pump + Concrete Mixer Truck (Idling)	Table C 4-26	N/A	N/A	1	40	N/A	N/A	N/A	N/A	N/A	N/A	103

Plant	BS5228 reference	Construction activity										Plant sound power level, dB(A)
		1		2		3		4		5		
		No.	% on time	No.	% on time	No.	% on time	No.	% on time	No.	% on time	
Diesel Generator	Table C 6-39	1	100	2	100	2	100	N/A	N/A	N/A	N/A	93
Hand-held Circular Saw (Petrol-Cutting concrete blocks)	Table C 4-72	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	60	107
Large Rotary Bored Piling Rig	Table C 3-14	N/A	N/A	1	10	N/A	N/A	N/A	N/A	N/A	N/A	111
Lorry	Table C 9-25	1	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	110
Mobile Telescopic Crane	Table C 4-39	N/A	N/A	N/A	N/A	1	30	N/A	N/A	N/A	N/A	105
Poker Vibrator	Table C 4-34	N/A	N/A	1	20	N/A	N/A	N/A	N/A	N/A	N/A	97
Power Float	Estimated	N/A	N/A	N/A	N/A	1	10	N/A	N/A	N/A	N/A	100
Road Sweeper	Table C 4-90	1	25	1	25	1	25	N/A	N/A	N/A	N/A	104
Skip Wagon	Table C 8-21	1	10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	106
Small tools	Estimated	N/A	N/A	N/A	N/A	N/A	N/A	2	40	N/A	N/A	100
Telescopic Handler	Table C 4-55	N/A	N/A	N/A	N/A	1	60	1	60	N/A	N/A	98
Tower Crane	Table C 4-49	1	25	1	25	1	25	1	25	N/A	N/A	105
Tracked crane	Table D 6-18	N/A	N/A	1	50	N/A	N/A	N/A	N/A	N/A	N/A	104
Tracked Excavator	Table C 1-12	1	30	1	30	N/A	N/A	N/A	N/A	1	100	110
Truck Mounted Concrete Pump + Boom Arm (idling)	Table C 4-31	N/A	N/A	N/A	N/A	1	50	N/A	N/A	N/A	N/A	103
Vibratory Roller	Table C 5-26	N/A	N/A	1	20	N/A	N/A	N/A	N/A	N/A	N/A	105
Wheeled Loader	Table C 2-28	N/A	N/A	N/A	N/A	1	50	N/A	N/A	N/A	N/A	112

Table D1: Construction plant assumptions