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Site Address:	Llanderis Road, Caernarfon
Report no:	2425-530
Date of Report:	9th September 2024
Authors:	Andrew Hunt
Scope of Work:	Baseline Noise Survey with design advice

Contents

Appendices

1. Introduction

1.1 REDFAN Solutions have been instructed to assess the background noise and impact on a proposed building development on Llanberis Road, Caernarfon.

1.2 Planning consent is being sought to build 36 properties in phase 1 at Llanberis Road, Caernarfon.

1.3 A noise impact report has been requested by the Local Authority to demonstrate that the amenity of occupiers is not adversely affected by noise.

1.4 This report outlines the background noise levels at the site as well also provides any acoustic performance specifications that are required to enable the internal noise criteria to be achieved.

1.5 The analysis has been based on the proposed site plane drawn by Ainsley Gommon Architects dated 9th February 2024.

1.6 Monitoring of the prevailing background noise was undertaken over a 24hr period.

2. Criteria

2.1 Part 1 of BS 7445 establishes guidelines to quantities and procedures for environmental noise measurements. Guidance provided on instrumentation and calibration, measurement positions, meteorological effects, and information to be recorded.

2.1.1 All equipment shall be calibrated and the configuration for calibration shall be in accordance with the manufacturer's instructions.

2.1.2 A comprehensive recalibration at certain time intervals may be prescribed by authorities responsible for the use of measurement results.

2.1.3 A field check shall be made by the user at least before and after each series of measurements, preferably including an acoustic check of the microphone.

2.1.4 "Outdoor measurements near buildings": these measurements shall be carried out at places where the noise to which a receiver is exposed is of interest. If not otherwise specified, the preferred measurement positions are 1m to 2m from the façade and 1.2m to 1.5m above the ground.

2.1.5 Measurements indoors. These measurements shall be carried out in enclosures where the noise is of interest. At least 1m away from walls and 1.2m to 1.5m above the ground.

2.2 Government guidelines for planning assessment is the National Planning Policy Framework (NPPF) which came into force in March 2012, in July 2018 and the National Planning Policy Guidance (NPPG). This was undated and in the main replaces previous PPG and PPS documentation.

2.3 The NPPF 2021 sets out the Government's economic, environmental and social planning policies for England and Paragraph 174 states,

> *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution.*

Paragraph 185 states,

> *Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> > *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;

2.4 BS 4142: 2014+A1:2019 "Method for rating and assessing industrial and commercial sound".

This British Standard describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises;
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

The significance of sound impact is to be determined according to the following summary process:

- Determine the background sound levels, in terms of the index LA90, at the receptor locations of interest.
- Determine the specific sound level of the source being assessed, in terms of its LAeqT level (T = 1 hour for day or 15 minutes for night), at the receptor location of interest.
- Apply a rating level acoustic feature correction if the source sound has tonal, impulsive, intermittent, or other characteristics which attract attention.
- Compare the rating sound level with the background sound level; the greater the difference between the two, the higher the likelihood of adverse impact.
- A difference (rating – background) of around +10 dB is an indication of significant adverse impact, depending on the context; a difference of +5 dB is an indication of an adverse impact, depending on the context. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon context.

2.5 BS 4142 introduced the concept of 'context' to the process of identifying noise impact. Section 11 of BS 4142: 2014+A1:2019 explains "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs" (our emphasis). An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context" (our emphasis).

There are many context points to consider when undertaking an assessment of sound impact including:

- The absolute level of sound;
- The character and level of the specific sound in the context of the existing noise climate; for example, is the sound to occur in a location already characterised by similar activities as those proposed?
- The sensitivity of the receptors;
- The time and duration that the specific sound is to occur;
- The conclusions of assessments undertaken using alternative assessment methods, for example, WHO guidelines noise values or change in noise level;

2.6 BS4142:2014+A1:2019 notes that:

"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact." BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for *"the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention".*

• **Tonality** – *"For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;*

• **Impulsivity** – *A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;*

• **Intermittency** – *When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and*

• **Other Sound Characteristics** – *Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."*

2.7 It is therefore entirely possible that whilst the numerical outcome of a BS 4142: 2014+A1:2019 assessment is indicative of adverse or significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level.

2.8 The NPPG introduces the concept of a noise exposure hierarchy based on likely average response. The guidance contained in the NPPG is summarised in the table below:

Table 1: Noise Exposure Hierarchy Perception Examples

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Noticeable and Intrusive	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Adverse Effect Prevent

2.9 In March 2010 the Department for Environment, Food and Rural Affairs (DEFRA) produced "Noise Policy Statement for England" (NPSE), which states three policy aims, as follows:

> "Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:
>
> - avoid significant adverse impacts on health and quality of life;
> - mitigate and minimise adverse impacts on health and quality of life; and
> - where possible, contribute to the improvement of health and quality of life."

2.10 The "Noise Policy Statement for England", (NPPF) and (NPPG) state that no significant adverse impact should occur through development, but where noise levels fall between a lowest observable adverse effect and a level which represents a significant observed adverse effect, then according to the explanatory notes in the statement:

> *"... all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur."*

2.11 BS8233:2014 Local Authorities usually stipulate internal noise criteria for new build residential uses based on British Standard 8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings'.

2.12 BS 8233:2014 provides references and guideline values for desirable indoor ambient noise levels for dwellings as shown in Table 2.9 below.

2.13 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

Table 4 **Indoor ambient noise levels for dwellings**

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

2.14 The table is noted to apply to external noise as it affects the internal acoustic environment from sources without a specific character.

2.15 The above internal ambient noise levels are therefore considered appropriate within this assessment.

2.16 BS 8233:2014 states that '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 an upper guideline value of 55dB LAeq, which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances…in higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited'.

2.17 The following table summarises the response to changes in noise level (known as the Semantic Scale).

Table 2: Change in noise level – response and impact.

Change in noise level LAeqT dB	Response	Impact
<3	Imperceptible	None
3 – 5	Perceptible	Slight
6 – 10	Up to a doubling	Significant
11 – 15	More than a doubling	Substantial
> 15	-	Severe

2.18 For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45dB LAmax more than 10–15 times per night.

2.19 WHO Guidelines for Community Noise

2.19.1 The WHO Guidelines (1999) recommends indoor nighttime guidelines in order to avoid sleep disturbance, the document states these to be 30dB (LAeq)and 45dB (LAfmax) for continuous and individual noise events respectively.

2.19.2 The document states that the number of noise events should also be considered and that individual noise events should not exceed 45dB (LAfmax) more than 10 – 15 times per night.

2.20 The unattended survey was undertaken between 08:00 on 3rd September 2024 and 07:00 on 4th September 2024. Three positions were tested at the site due to the size of the proposed development. Each position was tested to best represent the different acoustic environments on site. Measurements taken were (LAeq), (LA90), (LcfMax) and (LcfMax).

3. Site Description and Observations

3.1 The proposed construction area hereafter referred to as 'the site', is a phase 1 development of 36 properties to the south of the A4086/Llanberis Road of the outskirts of Caernarfon. The CIBYN Industrial Estate borders the south and easy access to the A487 to the East.

3.2 The noise survey was manned; therefore, a subjective assessment of background and ambient noise sources can be undertaken for the whole monitoring duration for each position.

P1 – traffic from Llanberis Road and pedestrians.
P2 – Condensing plant equipment noise from Readyfoods storage facility on the Industrial Estate and Industrial Estate traffic.
P3 – Commercial extraction unit noise from the Welcome Furniture factory and Industrial Estate traffic.

Secondary noise at each position is local wildlife (seagulls in particular).

3.3 During the afternoon from 2pm 'till 5pm there was noise from aircraft that sounded like "stunt" plans. However due to the overcast nature of the day and low cloud cover no planes were spotted to confirm this.

3.4 Red lines outline approximate site and green dot shows positions tested.

4. Environmental Noise Survey

4.1 The manned Environmental Noise Survey was undertaken between 08:00 on 3rd September 2024 and 07:00 on 4th September 2024.

4.2 Ambient (L_{Aeq}), (L_{A90}), (L_{cfMax}) and (L_{cfMax}) level measurements were taken for a continuous 1-hour period in 5- and 15-minute increments.

4.3 The recordings were taken in 5 minute and 15-minute intervals to prevent any other single noises that would be seen as not representational from affecting the measurements. Prior knowledge of any out of the ordinary potential noise was limited and could have had an impact on the test.

4.4 The sound level meters were positioned as for an outdoor free field measurement and is more than 4m from the façade of any buildings and 1.2m to 1.5m above the ground. No adjustments will be made to the recorded measurements. The position was chosen to best represent the ambient noise environment.

4.5 Equipment used for the survey.

Item	Make/Model	Serial no	Calibration Cert no
Calibrator	Norsonic 1255	125525488	U45621
P3 - Sound Level Meter	Norsonic 140	1404818	U46539
P2 – Sound Level Meter	Norsonic 140	1404520	U48312
Microphone	Norsonic 1211-C	14141	48315
P1 – Sound Level Meter	Norsonic 145	14529308	U42077

4.6 Measurements were made following procedures in BS7445:1991 (ISO1966-2:1987) Description and Measurement of Environmental Noise Part 2- Acquisition of data pertinent to land use and BS4142:2014 Method for rating and assessing industrial and commercial sound.

4.7 The weather during the survey was overcast with light rain, the conditions are considered suitable for the measurement of environmental noise. Wind had a south westerly direction throughout the test and speeds did not exceed (<5m/s), cloud cover varied throughout testing.

4.8 The noise monitoring equipment used was calibrated before and after both the noise survey periods. No significant drift was recorded for either. Equipment calibration certificates can be provided upon request.

5. Uncertainty

5.1 All measurements onsite were taken with a sound level meter manufacturer's margin of uncertainty at typically +/- 1.1dB. It is due to the tolerances associated with Class 1 sound level meters and calibrator equipment used to measure background noise.

6. Results

6.1 The table below gives the averaged Baseline Noise Survey readings taken at site.

Location	Time Period	Sound pressure level dB (L_{Aeq})
Test Position 1	Daytime (07:00-23:00hrs)	57dB
	Nighttime (23:00-07:00hrs)	51dB
Test Position 2	Daytime (07:00-23:00hrs)	53dB
	Nighttime (23:00-07:00hrs)	50dB
Test Position 3	Daytime (07:00-23:00hrs)	55dB
	Nighttime (23:00-07:00hrs)	46dB

6.2 The average ambient (L_{Aeq}) noise levels at the measurement position during the survey has been based on an analysis of the monitored data.

7. Summary of Acoustic Environment

7.1 Due to the sites positioning within the town consideration must be given to the acoustic environment as well as the actual levels recorded.

7.2 Position 1

The noise in this area consists of the standard sounds associated with any development based within a town or village. The levels are consistent with most developments and the levels from cars pedestrians and other sources are not considered extraneous.

7.3 Position 2

The main noise source at this position is the refrigeration equipment which is fitted to external containers which are used as storage. These had a consistent sound pressure level throughout the survey and with very little difference between daytime and nighttime. Although a full assessment of the "specific" noise produced by the plant equipment has not been undertaken given that these were on 24hrs; the Tonality of the plant equipment will be incorporated into this assessment. The equipment is not impulsive, however, subjectively a 6dB penalty can be applied to the final (LAeq)15mins as the equipment has a prominent tonal quality that is perceptible.

7.4 Position 3

The main source of noise at this position during the day was the extraction system used at the furniture factory (Welcome Furniture). The extraction system was turned off at 6.30 on the evening of the testing. A conversation with the manager of the site resulting in this being the normal approximate times that the extraction is turned off, they are governed by regulations and these times are unlikely to change. As with

position 2 although a full assessment of the "specific" noise produced by the plant equipment has not been undertaken as it is clearly the dominant noise during this time the Tonality of the plant equipment will be incorporated into this assessment. The equipment is not impulsive, however, subjectively a 6dB penalty can be applied to the final (LAeq)1hr as the equipment has a prominent tonal quality that is perceptible.

7.5 These defined noise sources are considered to represent the main sound to negatively to affect the amenities of the new development. There are other businesses on the estate as well as a church, but these are not considered as important acoustically.

7.6 For testing position 3 the loudest recorded 1hr daytime (L_{Aeq}) will be used when calculating façade attenuation.

7.7 Final noise level from loudest recorded levels and after tonal quality penalty.

Location	Time Period	Sound pressure level dB (L_{Aeq})
Test Position 1	Daytime (07:00-23:00hrs)	57dB
	Nighttime (23:00-07:00hrs)	51dB
Test Position 2	Daytime (07:00-23:00hrs)	60dB
	Nighttime (23:00-07:00hrs)	59dB
Test Position 3	Daytime (07:00-23:00hrs)	64dB
	Nighttime (23:00-07:00hrs)	46dB

7.8 Minimum single figure weighted sound reduction figure at each position of glazing requirements.

Façade/Room	Minimum single figure weighted sound reduction figure
Position 1 daytime	22dB
Position 1 nighttime	21dB

Façade/Room	Minimum single figure weighted sound reduction figure
Position 2 daytime	25dB
Position 2 nighttime	29dB

Façade/Room	Minimum single figure weighted sound reduction figure
Position 3 daytime	29dB
Position 3 nighttime	16dB

8. Building Fabric Performance

8.1 The following design review is based on the architectural drawings for the proposed construction and targets the internal noise levels set out in section 2.

8.2 It has been assumed that all non-glazed elements, i.e. façade walls and the roof systems, will provide the following minimum sound insulation performance, if tested in accordance with ISO 10140-2:2010.

Element	Rw
Double skinned external brick, plastered	55-58dB

8.3 The acoustic performance requirements for glazing of the noise-sensitive rooms of Phase 1 are shown in the drawings below.

8.4 It is important that the quoted minimum sound reduction specifications are met by the panels and windows, including frames, seals, etc. glass performance alone is not an acceptable means of demonstrating compliance with the specification for window performance.

8.5 For window attenuation, this should include the Rw (C;Ctr). The window supplier should supply test data or modelled predictions for the window system proposed to show compliance with the attenuation detailed. This is critical to ensure that the sound insulation requirements will be met. Good levels of workmanship are required throughout the build.

8.6 Below is window make up and their attenuation.

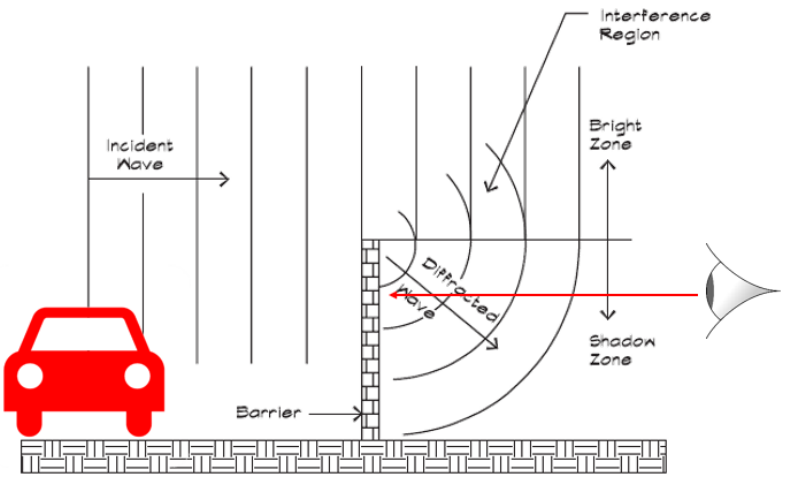
Unit make up	Rw	Ctr	C
4/20/4	33 dB	28 dB	29 dB
6/16/6	33 dB	28 dB	32 dB
6/12/10	37 dB	34 dB	36 dB
6/16/6.4	33 dB	28 dB	32 dB
6/16/6.8A	39 dB	33 dB	37 dB

*Based on Pilkington Glass Laboratory testing

8.7 Plots within phase 1 have garden areas which can be affected by the external noise produced by the plant equipment discussed. As the noise is being produced from a specific area and taking into account the height and position of the condensing equipment, a barrier can be created to reduce levels to a more acceptable level.

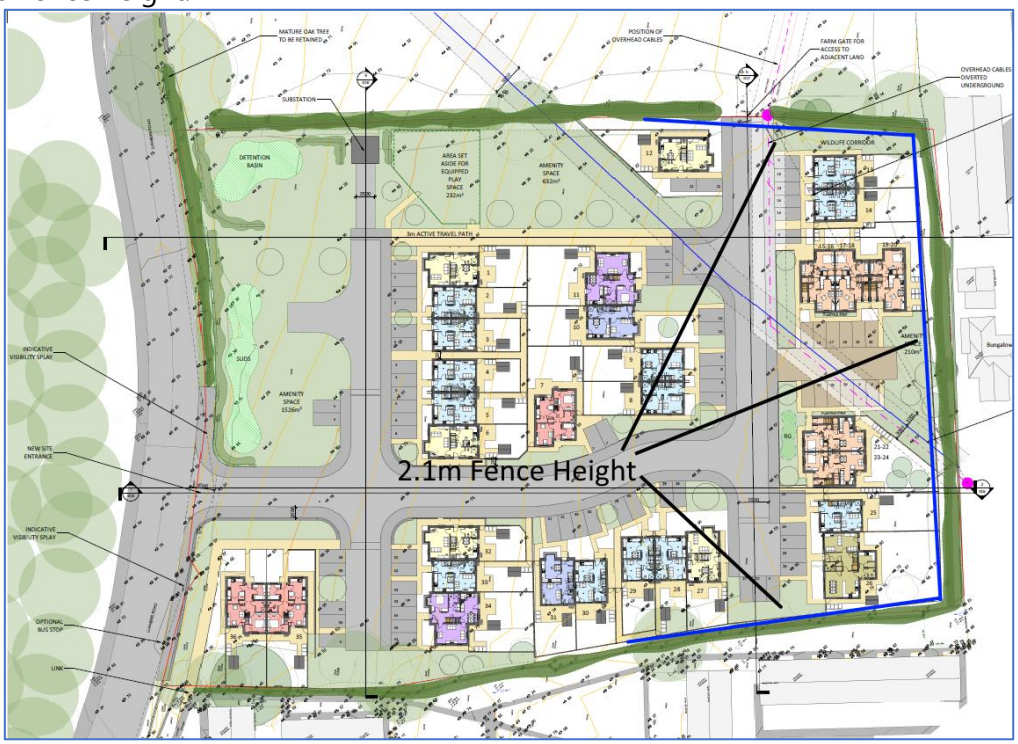
8.8 Rule of thumb diagram of barrier attenuation.

If it significantly cuts the line-of-sight then a **10 dB reduction** can be expected.



8.9 A 2.1m high close boarded fence of good quality and well maintained will be capable of achieving the required noise levels of traditional external areas that are used for amenity space, such as gardens and patios. (example below)

8.10 Fence height.



9. Noise Assessment

9.1 To maintain the internal noise levels, windows are required to remain closed and an alternative means of background ventilation will be required.

9.2 Trickle vents, air bricks and passive ventilation systems may be used to meet the requirements of the Building Regulations Approved Document F for background ventilation, subject to full ventilation system design.

9.3 The sound reduction of the windows should be met with any proposed trickle vents installed and open. If this cannot be met, then mechanical ventilation may be required.

9.4 With the above recommendations implemented, the noise levels within the residential dwellings are expected to achieve those recommended in BS8233:2014 guidance.

9.5 BS 8233:2014 acknowledges that its guidance might not be achievable in all circumstances where development is desirable. It states that, in noisy areas, such as city centre or urban areas in close proximity to transport networks, a compromise between the potential for elevated noise levels and other factors, such as the convenience of living in such locations or making efficient use of land resources to ensure that development needs can be met, should be considered.

10. Conclusion

10.1 Measurements have been made of the prevailing noise climate at Llanderis Road, Caernarfon.

10.2 The assessment outlined national and local guidance and considers this in relation to the likely operational activity and use of the building.

10.3 The surveyed and predicted noise levels have been assessed to determine the minimum sound reduction requirements of the external building façade elements to achieve suitable internal noise levels based on the requirements of BS8233:2014.

10.4 Mitigation measures including higher than average fences heights to some properties and higher than standard double glazing has been stipulated for plots 10-27.

10.5 Given the assessment undertaken, it is considered that a good level of residential amenity will be provided for residents and that the noise impacts associated with the development can be controlled to acceptable level now and in the future.

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Appendices

1. These are the main noise indices in use in the UK.

- dB(A): The human ear does not hear all frequencies with the same intensity. It is most sensitive to sounds in the 500Hz-8kHz range. Above and below this range the ear becomes progressively less sensitive. To compensate for this, sound level meters incorporate electronic filtering to correspond with the varying sensitivity of the ear. This filtering is called A-weighting and Sound Pressure Levels obtained with this weighting are referred to as A-weighted and signified as dB(A).

- LA90: The sound level (in dBA) exceeded for 90% of the time. This unit gives an indication of the sound level during the quieter periods of time in any given sample. It is used to describe the "background noise level" of an area.

- LAeq,T: The equivalent continuous sound pressure level over a period of time, T; (in dBA) This unit may be described as "the notional steady noise level that would provide, over a period, the same energy as the varying noise in question". In other words, the energy average level. This unit is now used to measure a wide variety of different types of noise of an industrial or commercial nature, as well as road traffic, aircraft and trains.

- LA1: The sound pressure level (in dBA) exceeded for 1% of the time. This unit can give an indication of a regular maximum noise level from such activities as dance music.

- LAe: The sound exposure level, (previously denoted SEL) is the noise level of an event, such as a train or aircraft event, normally expressed in a 1 second time period.

- LAmin: The minimum sound pressure level (in dBA) measured over the time period.

- LAmax: The maximum level of sound (in dBA), i.e. the peak level of sound measured in any given period. This unit is used to measure and assess transient noises, i.e. gun shots, individual vehicles, etc.

- LArT: sound rating level, the a-weighted, leq sound level of an industrial noise during a specified time period, adjusted for tonal character and impulsiveness.

2. Leq (1hr) from test

Position	3	2	1
Time	LAeq	LAeq	LAeq
08:00	51.4	51.7	57.5
09:00	54.2	54.4	58.2
10:00	54.6	52.1	59.1
11:00	58.6	54.5	60.2
12:00	58.4	52.6	57.8
13:00	58.2	52.3	57.5
14:00	58.3	52	57.8
15:00	58.4	52.5	56.6
16:00	58.6	52.7	58
17:00	58.8	53.7	58
18:00	58.8	53.5	56.9
19:00	52.4	53.2	57.6
20:00	46.4	53.6	55.3
21:00	46.4	50.2	55.9
22:00	46.7	51.2	54.6
23:00	47.7	52.4	53.8
23:15	47.5	50.4	50.4
23:30	47.2	50.7	51.7
23:45	47.6	51.7	51.5
00:00	44.2	48.3	51.2
00:15	45.2	49.3	51.6
00:30	46.4	50.5	51.6
00:45	44.4	48.5	52
01:00	44.7	5.1	51.8
01:15	45.7	53.1	51.7
01:30	45.5	52.9	50.6
01:45	45.2	52.6	51.9
02:00	45.6	53	49.6
02:15	42.2	49.6	48.3
02:30	43.3	50.6	47.8
02:45	43.6	51.8	48.9
03:00	44.6	49.8	47.3
03:15	44.4	50.1	45.6
03:30	44.1	51.3	48.9
03:45	44.5	50.8	47.4
04:00	41.1	51.1	48.3
04:15	48.7	51.2	49.9
04:30	45.3	49.9	50.2
04:45	46.3	51.2	48.9
05:00	47.5	50.8	49.8
05:15	45.5	52.3	49.9
05:30	47.2	52.4	51.2
05:45	47.6	53.1	53.3
06:00	47.6	51.9	55.2
06:15	50.4	52.7	54.6
06:30	48.2	53.4	56.7
06:45	48.1	52.3	54.9

3. Site Plan


MATURE OAK TREE TO BE RETAINED
SUBSTATION
POSITION OF OVERHEAD CABLES
FARM GATE FOR ACCESS TO ADJACENT LAND
OVERHEAD CABLES DIVERTED UNDERGROUND
WILDLIFE CORRIDOR
DETENTION BASIN
AREA SET ASIDE FOR EQUIPPED PLAY SPACE 232m²
AMENITY SPACE 632m²
3m ACTIVE TRAVEL PATH
SUDS
AMENITY SPACE 152m²
AMENITY SPACE 210m²
Bungalow
INDICATIVE VISIBILITY SPLAY
NEW SITE ENTRANCE
INDICATIVE VISIBILITY SPLAY
OPTIONAL BUS STOP
LINK