Prosiect Maen Hir

Solar a Storio Ynni

Preliminary Environmental Information Report

Volume III

Appendix 10-2: Noise and Vibration Policy, Standards and Guidance

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Appendix 10-2 Noise and Vibration Policy, Standards and Guidance

Legislation

Control of Pollution Act 1974

10.2.1 The Control of Pollution Act (COPA) details powers available to Local Authorities to deal with noise nuisance from individuals and/or businesses/premises.

Environmental Protection Act 1990, Part III

10.2.2 Part III of The Environmental Protection Act deals with statutory nuisance and clean air, and aligns with COPA in relation to noise. It sets out the responsibilities of the Local Authority in inspecting, investigating and following up complaints relating to statutory nuisance.

Policy

National Policy Statements

10.2.3 The following NPSs are relevant to the Project:

- Overarching NPS for Energy (EN-1);
- NPS on Renewable Energy Infrastructure (EN-3); and
- NPS for Electricity Networks Infrastructure (EN-5).

Overarching National Policy Statement for Energy (EN-1), 2023

10.2.4 The Overarching NPS for Energy (EN-1), published in November 2023, and designated in January 2024, sets out the national policy for delivering major energy infrastructure in England and Wales. The relevant technology specific NPS, National Policy for Renewable Energy Infrastructure (EN-3), together with the NPS (EN-5), provides the primary basis for decisions made by the Examining Authority. It makes specific reference to the generation of solar energy and recognises that there is an urgent need for new electricity generating capacity to meet UK objectives.

National Policy Statement for Renewable Energy Infrastructure (EN-3), 2023

10.2.5 The NPS EN-3 was published in November 2023, and designated in January 2024. Paragraphs 2.10.73 - 2.10.144 of the NPS EN-3 provides topic-specific requirements detailing how applicants should consider impacts within technical assessments, the development of proposed mitigation measures and decision-making for solar development. The following topics are included:

- Biodiversity, ecological, geological conservation and water management;
- Landscape, visual and residential amenity;
- Glint and glare;
- Cultural heritage; and
- Construction including traffic and transport noise and vibration.

National Policy Statement for Electricity Networks Infrastructure (EN-5), 2023

10.2.6 The NPS EN-5 was published in November 2023, and designated in January 2024, and recognises that new electricity networks required for electricity generation, storage and interconnection infrastructure are vital to achieving the nation's transition to net zero.

10.2.7 Paragraphs 2.9.26 to 2.9.43 relate to noise and vibration from high voltage transmission lines, substations and transformers. This includes details on the assessment of noise from these sources and the guidance and tools to be used.

10.2.8 Paragraphs 2.10.9 to 2.10.10 details mitigation measures for reducing noise including, but not limited to, positioning of lines, conductor arrangement, avoiding damage to components during transportation, on-going maintenance and selection of quieter plant.

10.2.9 The document goes on to state that noise from overhead lines is unlikely to lead to the Secretary of State refusing the application, but appropriate requirements may need to be considered to ensure that noise is minimised as far as practicable.

Planning Policy Wales (PPW)

10.2.10 Planning Policy Wales, last updated in February 2024, details the land use planning policies for Wales, to ultimately contribute to sustainable development through a well-functioning planning system. As part of this, exposure to and mitigation against noise pollution is noted as part of developing healthier places.

10.2.11 Notable to the Project, it is stated in the context of renewable and low carbon energy that:

"Planning authorities should also identify and require suitable ways to avoid, mitigate or compensate adverse impacts of renewable and low carbon energy development. The construction, operation, decommissioning, remediation and aftercare of proposals should take into account:

- *The need to minimise impacts on local communities, such as from noise and air pollution, to safeguard quality of life for existing and future generations."*

10.2.12 Section 6.7 Air Quality and Soundscape discusses the importance of air and noise pollution. It is highlighted that certain sounds contribute to tranquillity and that noise action plans prepared by public bodies aim to prevent and reduce noise levels where necessary. The importance of using good design and best practice in acoustic design is also noted.

10.2.13 At paragraph 6.7.6, the document states the following;

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.

10.2.14 The document notes that air and noise pollution are often emitted from the same sources which can result in areas of poor air quality also experiencing high noise levels. Where air and noise pollution are generated from the same source, these should be considered together, and strategies should be provided to reduce or minimise pollution to ensure an appropriate soundscape.

10.2.15 It is also noted at paragraph 6.7.24 that impacts arising from existing development should be fully considered to ensure that any effects as a result of new development can be adequately controlled, and that any measures are introduced as part of the proposed development.

10.2.16 During the construction phases, planning authorities must consider the potential for temporary environmental risks, which where appropriate should be controlled through a construction management plan.

10.2.17 The document includes a section on 'Location of Commercial, Industrial and other Potentially Polluting Development'.

Relevant considerations in making planning decisions for potentially polluting development are likely to include:

location, including the reasons for selecting the chosen site itself;

impact on health and amenity;

effect of pollution on the natural and built environment and the enjoyment of areas of landscape and historic and cultural value;

[…]

the risk and impact of potential pollution from the development, insofar as this might lead to the creation of, or worsen the situation in, an air quality management area, a noise action planning priority area or an area where there are sensitive receptors;

[…]

10.2.18 It is further stated that where health and amenity impacts cannot be minimised through appropriate design and mitigation measures, development adjacent to sensitive receptors will not be acceptable.

Planning Guidance (Wales), Technical Advice Note 11: Noise

10.2.19 A Technical Advice Note (TAN) on noise was published in October 1997. This document relates to noise and the planning system and outlines some key considerations that should be taken into account when developing local planning policies and when determining planning applications.

10.2.20 TAN 11 includes guidance on development control by local planning authorities, and states that noise generating developments should not cause an unacceptable degree of disturbance. It is noted that the noise characteristics and

levels from a development should be considered. TAN 11 also highlights possible mitigation measures that could be introduced to control the source of, or limit exposure to, noise.

CL-01-15 Updates to Tan 11 Noise - Noise Action Plan (2013-18) Commitments

10.2.21 A Circular Letter (CL) was published in November 2015 and details the updates to TAN 11 following the revision of relevant legislation and British Standards.

10.2.22 An updated version of the guidance 'Technical Advice Note 11: Air Quality, Noise and Soundscape and Supporting Document 1: Soundscape Design' is currently being consulted on and has not yet been adopted. Should this document be adopted prior to the submission of the application, then it will be considered.

Noise and Soundscape Action Plan 2018 - 2023

10.2.23 Published in December 2018, this document relates to noise in significantly populated areas or noise from major roads and major railways. The action plan provides guidance on noise and soundscape; however, no specific guidance of relevance to the Project is included.

Future Wales: The National Plan 2040

10.2.24 Published in February 2021, this document is the national development framework for Wales and provides a spatial plan for development to 2040. Within this, Policy 18 – Renewable and Low Carbon Energy Developments of National Significance sets out the criteria for such proposals, including that:

- there are no unacceptable adverse impacts by way of shadow flicker, noise, reflected light, air quality or electromagnetic disturbance.

Local Policy

Anglesey and Gwynedd Joint Local Development Plan – Written Statement

10.2.25 The Isle of Anglesey County Council and Gwynedd Council adopted a joint Local Development Plan in July 2017. This details a land use development strategy

covering the period between 2011 and 2025. The following policies are of relevance to noise and vibration:

POLICY PCYFF 2: DEVELOPMENT CRITERIA

"Additionally, planning permission will be refused where the proposed development would have an unacceptable adverse impact on:

7. The health, safety or amenity of occupiers of local residences, other land and property uses or characteristics of the locality due to increased activity, disturbance, vibration, noise, dust, fumes, litter, drainage, light pollution, or other forms of pollution or nuisance".

POLICY ADN 2: PV SOLAR ENERGY

"Proposals for Solar PV Farms of 5MW or more and other solar schemes of up to 5MW will be permitted provided that the proposal conforms to the following criteria:

1. All impacts on landscape character, heritage assets and natural resources have been adequately mitigated, ensuring that the special qualities of all locally, nationally and internationally important landscape, biodiversity and heritage designations, including, where appropriate, their settings are conserved or enhanced;

2. The proposal will not result in significant harm to the safety or amenity of sensitive receptors including effect from glint and glare and will not have an unacceptable impact on roads, rail or aviation safety;

3. The proposal will not result in significant harm to the residential visual amenities of nearby residents;

4. The proposal will not have unacceptable cumulative impacts in relation to existing solar PV farms and those which have permission and other prominent landscape features

5. The panels and associated infrastructure will, at the end of the operational life of the facility, be removed in accordance with a restoration and aftercare scheme submitted to and agreed by the Local Planning Authority.

6. That a Construction Environmental Management Plan (CEMP) is provided to demonstrate that any potential negative effects arising during construction and decommissioning phases are avoided."

Standards and Guidance

BS7445-1:2003 Description and Measurement of Environmental Noise. Guide to Quantities and Procedures

10.2.26 This standard describes basic quantities used for the description of noise and procedures to determine the quantities. It details the instrumentation to be used,

including required specifications and calibration procedures, and measurement procedures to be adopted, including positions, weather conditions and information to be reported.

ISO 9613-2: Acoustic Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation

10.2.27 This standard details a method for calculating the attenuation of sound as it propagates across an area outdoors. This allows noise to be calculated at a given distance from various sources, including but not limited to, road or rail traffic, industrial noise sources and construction activities. The method accounts for geometrical divergence, atmospheric absorption, ground effects, screening, reflections and meteorological conditions.

BS5228-1:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise

10.2.28 This standard sets out techniques to predict the likely noise effects from construction works, based on detailed information on the type and number of plant being used, their location and the length of time they are in operation.

10.2.29 The noise prediction methods can be used to establish likely noise levels in terms of the $L_{Aeq,T}$ over the core working day. This standard also documents a database of information, including previously measured sound pressure level data for a variety of different construction plant undertaking various common activities.

10.2.30 Three example methods are presented for determining the significance of construction noise impacts. In summary, these methods adopt either a series of fixed noise level limits, are concerned with ambient noise level changes as a result of the construction operations or a combination of the two.

10.2.31 With respect to absolute fixed noise limits, those detailed within Advisory Leaflet 72: 1976: Noise control on building sites are presented. These limits are presented according to the nature of the surrounding environment, for a 12-hour working day. The presented limits are:

- 70 dB(A) in rural, suburban and urban areas away from main road traffic and industrial noise; and

- 75 dB(A) in urban areas near main roads and heavy industrial areas.

10.2.32 The above noise level limits are applicable at the façade of the receptor in question (not free-field).

10.2.33 The standard goes on to provide methods for determining the significance of construction noise levels by considering the change in the ambient noise level that would arise as a result of the construction operations. Two example assessment methods are presented. These are the 'ABC method' as summarised within **Table 10.2.1** and the '5 dB(A) change' method as described below.

Table 10.2.1: Example threshold of potential significant effect at dwellings (construction noise) – ABC method

Assessment category and threshold value period	**Threshold value, in decibels (dB)**		
	Category A[A])	**Category B[B])**	**Category C[C])**
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends[D])	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75
NOTE 1: A significant effect has been deemed to occur if the total LAeq noise level, including construction, exceeds the threshold level for the Category appropriate to the ambient noise level. NOTE 2: If the ambient noise level exceeds the threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a significant effect is deemed to occur if the total LAeq noise level for the period increases by more than 3 dB due to construction activity			
[A)] Category A: threshold values to use when ambient levels (when rounded to the nearest 5 dB) are less than these values. [B)] Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values. [C)] Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. [D)] 19.00-23.00 weekdays, 13.00-23.00 Saturdays and 07.00-23.00 Sundays			

10.2.34 The 5 dB method states the following:

"Noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB L_{Aeq}, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact."

BS5228-:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration

10.2.35 This standard provides recommendations for basic methods of vibration control relating to construction and open sites. The legislative background to vibration control is described and guidance is provided concerning methods of measuring vibration and assessing its effects on the environment.

10.2.36 Guidance criteria are suggested for the assessment of the significance of vibration effects; such criteria are provided in terms of Peak Particle Velocities (PPV) and are concerned with both human and structural responses to vibration. Those applicable to human perception and disturbance are presented within **Table 10.2.2**.

Table 10.2.2 Guidance criteria for the assessment of significance of vibration for human perception and disturbance

Vibration Level	Effect
0.14 mms-1	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mms-1	Vibration might be just perceptible in residential environments.
1.0 mms-1	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mms-1	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

10.2.37 The standard goes on to present guidance criteria applicable to the vibration response limits of buildings in terms of the component PPV. These are presented within **Table 10.2.3**. It should be noted that the values presented within **Table 10.2.3** are applicable to cosmetic damage only. It is stated within BS 5228-2:2009+A1:2014 that minor damage is possible at vibration magnitudes which are greater than twice those given in the table.

Table 10.2.3 Guidance criteria for the assessment of significance of transient vibration for cosmetic building damage

Type of Building	Peak component particle velocity in frequency range of predominant pulse	
	5 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	50 mm/s at 15 Hz and above
Unreinforced or light framed structures Residential or light industrial buildings	15 mm/s at 4 Hz increasing to 20 mm/s at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above
NOTE 1: Values referred to are at the base of the building. NOTE 2: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded (Unreinforced or light framed structures, Residential or light industrial buildings only).		

Design Manual for Roads and Bridges LA111 Noise and Vibration, Revision 2

10.2.38 The Design Manual for Roads and Bridges (DMRB): LA11 Revision 2: Noise and Vibration document sets out procedures for undertaking the environmental assessment of new road schemes, including the assessment of noise impacts from road traffic. When undertaking a DMRB assessment, the methodology contained within the Department for Transport 1988 document Calculation of Road Traffic Noise (CRTN) should be used to calculate levels of road traffic noise.

10.2.39 Although the DMRB strictly applies to new road schemes, the principles of the approach contained within the document can also be applied to the assessment of noise from construction road traffic in general. The Project has the potential to affect road traffic noise levels along existing roads during the construction phase, hence there is a need for such an assessment.

10.2.40 The methodology suggests that the magnitude of noise changes from a project should be classified into levels of impact.

10.2.41 The example classification scale for short term changes is the most stringent and is presented in **Table 10.2.4**.

Table 10.2.4 Classification for short-term changes

Noise Change, $L_{A10, 18h}$, dB	**Magnitude of Change**
≥5	High
3 to 4.9	Medium
1 to 2.9	Low
<1	Very Low

Department of Transport – Calculation of Road Traffic Noise 1988 (CRTN)

10.2.42 The document Calculation of Road Traffic Noise (CRTN) describes procedures for calculating noise from road traffic. The procedures are necessary to enable entitlement under the Noise Insulation Regulations to be determined but they also provide guidance appropriate to the calculation of traffic noise for more general applications e.g. environmental appraisal of road schemes, highways design and land use planning.

BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

10.2.43 The BS 4142 standard describes methods for rating and assessing the following:

- 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; and
- 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 movements on or around an industrial and/or commercial site.

10.2.44 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential

purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.

10.2.45 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{Ar,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.

10.2.46 The standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.

10.2.47 Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of impact.

A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. 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 on the context."

BS 8233:2014 Guidance On Sound Insulation And Noise Reduction For Buildings

10.2.48 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

10.2.49 The standard does advise on the criteria to be achieved for external amenity space such as gardens and patios. It is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres, urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

10.2.50 However, BS 8233 does not provide guidance on external noise levels in areas other than outdoor amenity areas associated considered to be suitable in the absence of specific criteria.

World Health Organization (WHO) Guidelines for Community Noise (1999)

10.2.51 The L_{AFmax} criterion in BS8233 is largely concordant with the World Health Organisation (WHO) guidance: 1999: Guidelines for community noise. This document draws upon guidance from Vallet and Vernay, which states: "*For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB LAFmax more than 10-15 times per night*"

World Health Organization (WHO) Environmental Noise Guideline for the European Union (2018)

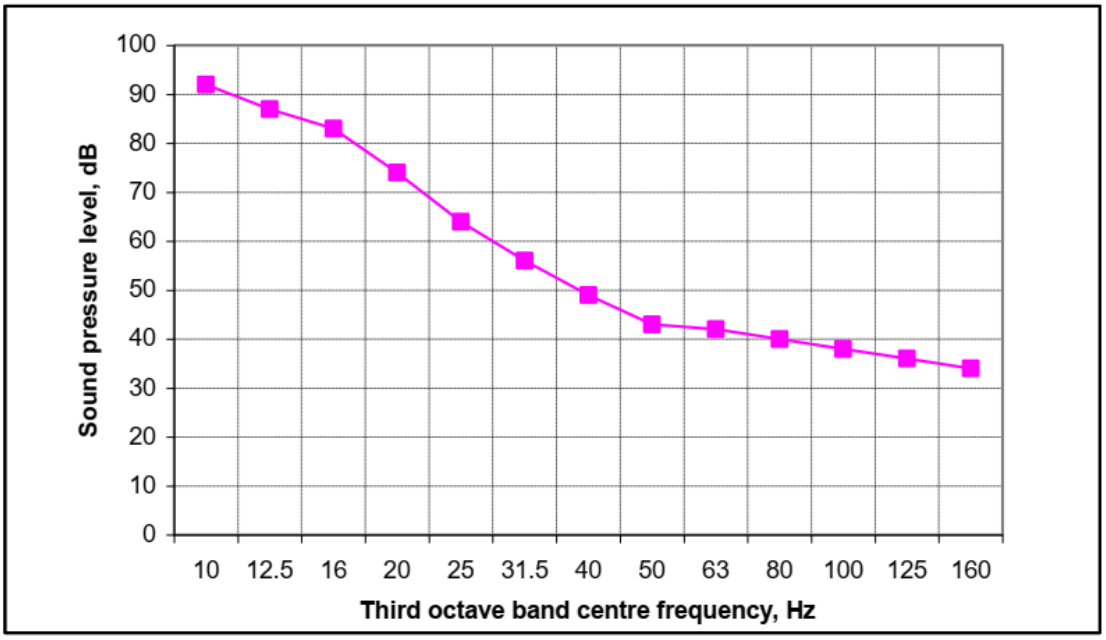
10.2.52 The guidelines detail health-based recommendations based on noise exposure from sources including road traffic, rail, aircraft, leisure and wind turbines. The aim of the guidelines is to inform policy and legislation. The guidelines provide further detail on the relationship between noise exposure and health, and broadly aligns with the World Health Organisation Guidelines for Community Noise.

NANR45 Procedure for the assessment of low frequency noise complaints (revision 1), A. Moorhouse, D Waddington and M. Adams, University of Salford (2011)

10.2.53 The 'Procedure for the assessment of low frequency noise complaints (revision 1)' prepared for Defra by A, Moorhouse, D Waddington and M Adams of the

University of Salford provides a procedure to help determine whether a low frequency environmental noise exists that could be the cause of complaints. The reference curve for the assessment of low frequency noise is detailed on Figure 10.2.1 below:

Figure 10.2.1 Criterion Curve for assessment of low frequency noise



10.2.54 If the noise occurs only during the day, then a 5dB relaxation may be applied to all third octave bands.

10.2.55 The procedure states that noise levels inside the noise sensitive rooms should be compared to the criterion curve to identify any third octave bands for which the criterion is exceeded. If the 80-160Hz bands exceed the curve, this may be due to traffic (occasionally this may also apply to the 63Hz band). The criterion curve below 31.5Hz is based on the average threshold of audibility for steady sounds. Unsteady sounds around 5dB below the criterion curve may still be audible.