

Prosiect Maen Hir

Solar a Storio Ynni



Preliminary Environmental Information Report Volume III

Appendix 10-4: Construction and Decommissioning Phase Assessments

Prosiect Maen Hir - September 2024

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lightsourcebp



10.4 Construction and Decommissioning Phase

Overview

10.4.1 For the purposes of assessing noise and vibration, the construction activities have been grouped into five categories that represent high Noise Generating Activities (NGA). These activities are most likely to generate likely significant effects and are as follows:

- Construction of inverters and transformers;
- Construction of ground mounted solar PV Arrays;
- Cable Route Corridor installation (general works);
- Cable installation; and
- Horizontal Directional Drilling (HDD) activities at the Grid Connection Corridor and the Interconnecting Cable Route Corridor.

10.4.2 To provide a robust assessment, the assessment has assumed a single 24-month construction period. Detailed information on construction and decommissioning of the Project can be found in Chapter 5.

Prediction Methodology

10.4.3 Noise levels experienced by sensitive receptors during construction and decommissioning works depend upon several variables, the most significant of which are:

- The noise generated by plant or equipment used on site, generally expressed as sound power levels (Lw) or the vibration generated by the plant;
- The periods of use of the plant on site, known as its on-time;
- The distance between the noise/vibration source and the receptor;
- The noise attenuation due to ground absorption, air absorption and barrier effects;
- In some instances, the reflection of noise due to the presence of hard surfaces such as the sides of buildings; and
- The time of day or night the works are undertaken.

10.4.4 The assessment of construction and decommissioning noise has been undertaken in accordance with the ABC method detailed in BS 5228-1:2009+A1:2014, set out in full in Appendix 10.2. The determined daytime noise limits at NSRs are detailed below in Table 10.4.1, which are based on the results of the baseline noise surveys. The measured ambient noise levels are below 65dB at all locations, when rounded to the nearest 5dB. Therefore, in accordance with the ABC methodology, the assessment criterion for all receptors is the lower category value.

Table 10.4.1: Determination of Construction and Decommissioning Phase Noise Limits – Existing NSRs, dB(A)

Receptor	Category Value in Accordance With BS5228-1	Criterion: Daytime (0700 – 1900) and Saturdays (0700 – 1300)
All	A	65

10.4.5 Where construction and decommissioning noise is within these limits, the magnitude of impact is predicted to be low, at worst.

10.4.6 Table 10.4.2 sets out the typical plant type, number and assumed utilisation (percentage ‘on-time’) used in the prediction of noise levels during the key construction activities.

Table 10.4.2: Construction Plant

Work Package	Plant / Equipment	BS 5228 Reference	Sound Power Lw (dBA)	Quantity
Construction of inverters and transformers	Tracked excavator	C.2, Item 14	107	1
	Wheeled loader	C.2, Item 27	108	1
	Wheeled mobile telescopic crane	C.2, Item 38	112	1
	Dump truck (tipping fill)	C.2, Item 30	107	2
	Telescopic Handler	C.2, Item 35	99	1

Work Package	Plant / Equipment	BS 5228 Reference	Sound Power Lw (dBA)	Quantity
	Cement mixer truck (discharging)	C.4, Item 18	103	1
PV Module construction	Articulated dump truck	C.5, item 16	104	1
	Wheeled mobile telescopic crane	C.4, item 38	106	1
	Diesel generator	C.4, item 85	94	1
	Continuous flight auger piling	C.3, item 17	104	1
	Cement mixer truck (discharging)	C.4, item 18	103	1
	Dumper	C.4, item 18	103	1
Construction of grid connections	Tracked excavator	C.2, item 14	107	2
	Lorry	C.2 Item 34	108	4
	Telescopic Handler	C.2, item 35	99	2
	Continuous flight auger piling	C.3, item 17	104	1
	Wheeled mobile crane	C.3, item 30	98	4
	Hand held welder (welding piles)	C.3, item 31	101	4
	Generator for welding	C.3, item 32	101	4
	Gas cutter (cutting top of pile)	C.4, item 34	96	4
	Mobile telescopic crane	C.4, item 41	99	2
	Lifting platform	C.4, item 57	95	4
	Site lift for workers	C.4, item 62	94	4
	Diesel generator	C.4, item 85	94	2

Work Package	Plant / Equipment	BS 5228 Reference	Sound Power Lw (dBA)	Quantity
Cable installation	Tracked excavator	C.4, item 63	105	1
	Wheeled backhoe loader	C.4, item 66	97	1
	Dumper	C.4, item 9	105	2
	Telescopic Handler	C.4, item 55	98	1
	Vibratory Roler	C.5, item 27	95	1
Horizontal directional drill (HDD)	Directional drill (generator)	C.2, item 44	105	1
	Water pump	C.2, item 45	93	1
	Tracked excavator	C.2, item 14	107	1
	Drilling rig	C.3, item 15	110	1

10.4.7 Predictions have been carried out to determine noise levels likely to be generated during the construction and decommissioning stage at increasing distances from the effective noise source (i.e. 50m from source, 100m from source, 150m from source and 200m from source) during the core daytime. For the purpose of these predictions, it is assumed that the intervening ground between the construction and decommissioning noise sources and the receivers will be acoustically hard such that there will be no additional attenuation of sound due to ground absorption, and that no acoustic barriers such as local buildings will be present, thus informing a worst-case assessment. Noise levels above 65 dB are in **bold**.

10.4.8 For noise levels in the range of 65-70 dB $L_{Aeq,T}$, this would indicate the magnitude of impact to be Medium, with levels above this indicating a High impact. Levels in the range of 60-65 dB $L_{Aeq,T}$ would indicate the magnitude of impact to be low, with levels below this indicating a very low impact.

Table 10.4.3: Predicted Unmitigated Construction Noise Levels at increasing distances, $L_{Aeq,T}$

Distance from effective noise source	Phase				
	Construction of inverters and transformers	PV Module construction	Construction of grid connections	Cable installation	Horizontal directional drill (HDD)
50	74	69	76	71	69
100	68	63	70	64	63
150	64	60	66	61	60
200	62	57	64	58	57

- 10.4.9 For NSRs within 50m of noise generative works, there is likely to be a medium to high impact through the construction and decommissioning phases. This is in contrast to NSRs at 150m or more away from noise generative works, which are generally likely to be exposed to a low or very low impact for the vast majority of phases. This is prior to the consideration of any mitigation.
- 10.4.10 The receptors are considered to be of high sensitivity. Therefore, the unmitigated effect of construction and decommissioning noise is likely to be a temporary, major adverse at worst for NSRs, based on construction taking place close to NSRs. However, for the majority of receptors, for construction activities which are located at a greater distance than 50m, the noise levels are predicted to be below the criterion of 65dB, resulting in a temporary, minor adverse effect.
- 10.4.11 However, the above assessment does not take in account any screening afforded by onsite buildings or any mitigation. It is likely that the effect would be lower than this, and any major adverse effect would be short-term.
- 10.4.12 Based upon the above, recommendations for appropriate mitigation are presented in the mitigation measures section below.
- 10.4.13 At this stage of the PEIR, the construction programme for The Project has been set out in an indicative programme in Chapter 5. More detail on construction traffic movements will be included for the final submission, including details of material removal, construction traffic management and environmental management. Further detail on this information will be included in the Construction Environmental Management Plan (CEMP).

- 10.4.14 The above preliminary assessment allows a more focussed study that will be completed at the ES Stage.

Construction Traffic Noise

- 10.4.15 Where significant effects are likely to occur due to road traffic noise associated with the construction phase, these will be assessed within the final ES Noise and Vibration Chapter, based on further calculations using the methodology set out in DMRB LA111 once detailed traffic flow information is available to inform this.

Construction Vibration

- 10.4.16 Construction and decommissioning vibration has the potential to impact upon occupants of existing buildings within the vicinity of the works. BS 5228-2 provides guidance on the perception of vibration within occupied buildings and provides a simple method of determining annoyance alongside evaluation of cosmetic damage associated with vibration.
- 10.4.17 In order to determine the potential impact from vibration during the construction and decommissioning phase, groundborne vibration calculations have been performed for typical site preparation/construction and decommissioning activities/machinery based on the empirical prediction procedures presented within BS 5228-2 and RR 246 Traffic induced vibrations in buildings (TRL RR 246)¹ (applicable to HGV induced vibration).
- 10.4.18 Such predictions have been performed in order to determine the possible distances at which the adopted magnitude of impact criteria may be registered. In this regard, table 10.4.4 identifies the groundborne vibration levels and associated distances for a sample of typical construction and decommissioning vibration sources.
- 10.4.19 It should be noted that there may be a variety of different potential vibration generating activities employed during construction and decommissioning stages other than those presented below, although it is considered that those presented

¹ Transport and Road Research Laboratory (1990) RR 246 Traffic induced vibrations in buildings

represent some of the worst that could be encountered. The data presented within **Table 10.4.4** are general in nature and not specific to any one site; however, the vibration levels and associated distances can be used to determine the typical distances at which specific impacts may be registered.

Table 10.4.4: Predicted Groundborne Vibration Levels Generally Applicable to Typical Vibration Generating Site Preparation / Construction Activities

Operation	Distance (m)	PPV (mm/s)
Rotary Bored Piling – Auger hitting base	45	0.3
	14	1.0
	1.4	10
HGVs	50	0.3
	17	1.0
	2.5	10

- 10.4.20 With due consideration to Table 10.2.2 of Appendix 10.2, where the observed effect of vibration for human perception and disturbance is identified in line with BS5228-2, it is considered likely that PPVs below 0.3 mm/s would be considered a very low magnitude of impact, between 0.3 and 1.0 mm/s being a low magnitude of impact, between 1.0 and 10mm/s being a medium magnitude of impact and above 10mm/s a high magnitude of impact.
- 10.4.21 Based on this, low or very low impacts are anticipated from distances of more than 17m from the source before mitigation is considered. For distances of 2.5m or closer there is likely to be a high impact.
- 10.4.22 The above activities are likely to result in a temporary minor, adverse effect, at the majority of NSRs, which would result in vibration levels between 0.3mm/s and 1.0mm/s. There is the potential for a temporary, moderate adverse effects to be experienced should proposed works be undertaken at distances closer than 17m. Should works be taken closer than 2.5m away, then a temporary, major adverse effect is likely to be experienced.
- 10.4.23 However, should any vibration generating works be undertaken close to the PEIR Boundary, any effect would be short-term and temporary in nature.

10.4.24 In addition to human annoyance, building structures may be damaged by high levels of vibration. BS 6472-1:2008: Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting² states that “the likelihood of building damage is very low even when vibration levels are well above perception thresholds”. Consequently, if vibration levels are controlled to those relating to annoyance then it is highly unlikely that buildings will be damaged by demolition and construction vibration levels, and even where annoyance is likely this does not necessarily mean that the likelihood of building damage is also likely.

²British Standards Institute (2008) BS 6472-1:2008: Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting