

rappor



Cil-Lonydd Solar Farm

Cenin Renewables Limited

Noise Assessment

April 2024





Document Control

Job No.	24-0264	
Project Name	Cil-Lonydd Solar Farm	
Document Title	Noise Assessment	
Status	ISSUED	
Client	Cenin Renewables Limited	
	Name	Date
Prepared By	Trevor Olver	April 2024
Checked By	Freya Hoyle	April 2024
Approved By	Brendan Quinn	April 2024

Record of Revisions

Revision	Date	Details	Made By

Rappor Consultants Ltd

A: CTP House, Knapp Road, Cheltenham, GL50 3QQ

W: www.rappor.co.uk

T: 01242 523696

E: hello@rappor.co.uk

© Rappor Consultants Limited. All rights reserved. The contents of this document must not be copied or reproduced in whole or in part without the written consent of Rappor Consultants Ltd and Cenin Renewables Limited.



Contents

Document Control.....	i
1 Introduction	3
2 Site Description and Background	4
3 Consultation & Guidance.....	5
4 Noise Survey.....	8
5 Noise Assessment.....	11
6 Summary and Conclusions.....	14

List of Figures and Tables

Figure 2.1 Site Location	4
Table 3.1 Impact Assessment	7
Figure 4.1 Noise Monitoring Location	8
Table 4.1 Summary of noise levels at NML1	9
Figure 4.2 Occurrences of Background Sound Level.....	10
Table 5.1 Nearest Noise-sensitive Receptor	11
Table 5.2 Operational Plant.....	11
Table 5.3 Predicted Operational Noise Levels.....	12
Table 5.4 BS4142 Assessment	12

Appendices

- Appendix A - Acoustic Terminology
- Appendix B – Monitoring Equipment



1 Introduction

General

- 1.1 Rappor Consultants Limited (Rappor) was instructed by Cenin Renewables Limited (Cenin) to undertake an operational noise assessment of the proposed Solar Farm and Battery Energy Storage System (BESS) at Cil-Lonydd, to the east of Newbridge, Newport ('the Site').
- 1.2 This report sets out the results of a baseline noise survey at a location representative of the nearest noise-sensitive receptors, predictions of operational noise and assessment in accordance with the guidance contained within BS4142.
- 1.3 A glossary of acoustic terminology is provided in **Appendix A – Acoustic Terminology**.



2 Site Description and Background

Site Location

- 2.1 The Site is located to the east of Newbridge and lies within the administrative area of Caerphilly County Borough Council (CCBC).
- 2.2 Cenin proposes to develop a solar photovoltaic electricity generating station (or 'solar farm') with an installed generation capacity of approximately 35 MW and associated ancillary development, including a substation. The point of connection is proposed to be located at an existing 132 kV substation to the southeast on Mynydd Maen Common, which would be connected to the Site by a cable route of 3km.
- 2.3 The closest noise-sensitive receptors to the Site are isolated farm buildings at Blawngwrney Farm to the north and Cil-Lonydd to the south.
- 2.4 The Site location is shown in **Figure 2.1**.

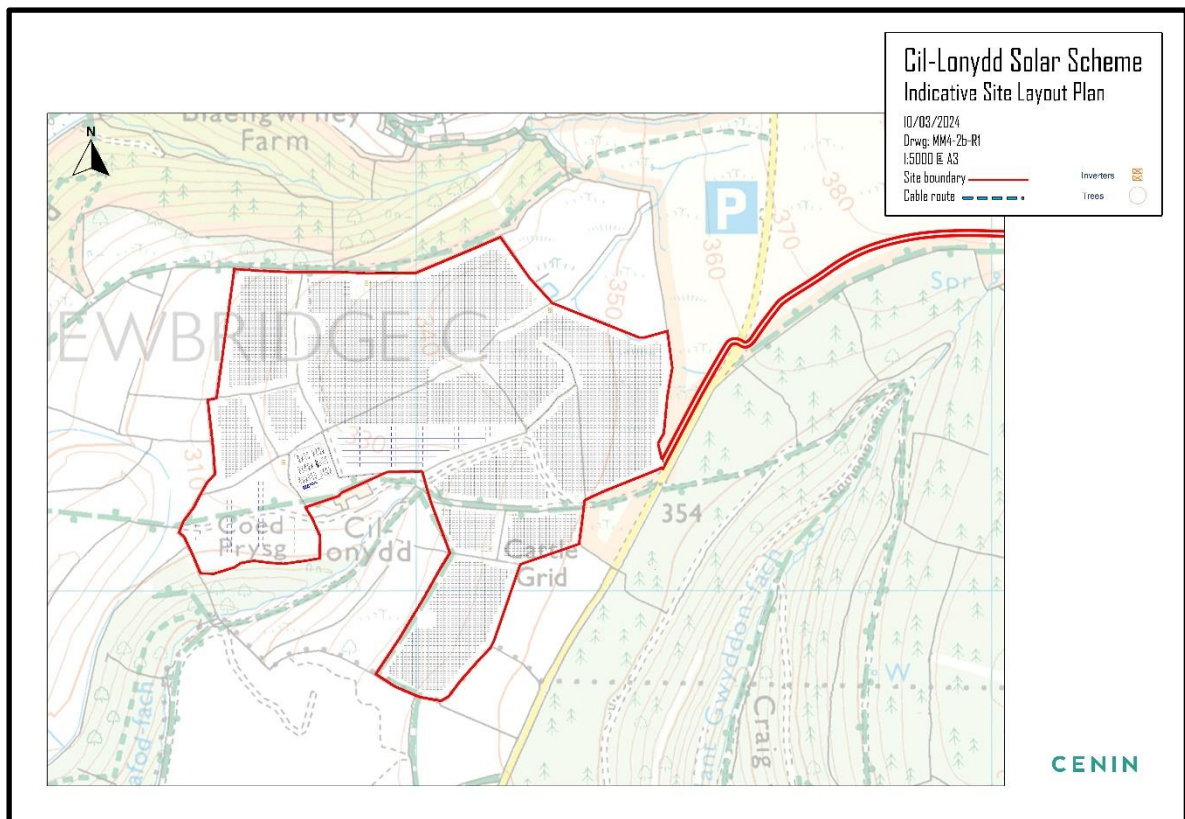


Figure 2.1 Site Location



3 Consultation & Guidance

Consultation

- 3.1 Prior to undertaking the noise assessment, Rappor consulted with the Environmental Health Officer (EHO) at CCBC to confirm the requirements of the noise assessment.
- 3.2 It was agreed that a baseline survey covering a minimum 72-hr period would be undertaken to establish the prevailing background sound levels. Furthermore, it was agreed that noise levels from the operation of the proposed development would be assessed in accordance with BS4142:2014+A1:2109.

Guidance

- 3.3 Current government planning advice to Local Authorities in Wales concerning noise takes two forms. General guidance is provided by 'Planning Guidance (Wales): Planning Policy'. This guidance document is then supplemented by 'Technical Advice Note (Wales) 11: Noise' (TAN11). The introduction to TAN11 sets out the importance of appropriately considering noise in planning applications and states how the planning system can be used to:

“minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.”

- 3.4 Annex B of TAN11 provides guidance on the assessment of environmental noise from different sources. General advice for the assessment of noise from industrial and commercial developments is set out in paragraph B17. Reference is made to the then current BS4142: 1990. This standard has since been superseded with BS4142:2014+A1:2019.
- 3.5 A summary of the assessment methodology outlined in BS4142:2014+A1:2019 is provided below along with the draft national strategy on soundscapes.

Noise and Soundscape Plan for Wales 2023-2028 (DRAFT)

- 3.6 The national strategy on soundscapes is currently in draft for consultation but is considered relevant to this assessment.
- 3.7 The strategy sets out five ways of working that should be followed when carrying out activities that may affect soundscapes in Wales. These are:
 - a) looking to the long term so that we do not compromise the ability of future generations to meet their own needs;
 - b) taking an integrated approach;
 - c) involving a diversity of the population in the decisions affecting them;
 - d) working with others in a collaborative way to find shared sustainable solutions; and
 - e) acting to prevent problems from occurring or getting worse.



- 3.8 Within Annex E – guidance to support decision-making, BS4142 is referenced as a guidance document for the assessment and control of noise in industrial and commercial activities.

British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

- 3.9 BS4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The method uses 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.
- 3.10 The standard requires the determination at the assessment location(s) of the representative background sound level without the specific sound source, the level of the specific sound (distinct and free from other influences contributing to the ambient sound), and the acoustic features of the specific sound (which increases the significance of impact).
- 3.11 A character correction is applied to the specific sound level to account for the acoustic features to obtain a rating level. The corrections to be considered are:
- 3.12 Tonality – For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.
- 3.13 Impulsivity – A correction of up to +9 dB 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 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.
- 3.14 Intermittency – When the specific sound has identifiable on/off conditions, the specific sound level should be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.
- 3.15 Other sound characteristics - Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.
- 3.16 An initial estimate of the impact is found by subtracting the background sound level from the rating level with the results compared to the criteria presented in **Table 3.1**.



Rating Level	Impact
Equal to or less than Background	Indication of Low Impact, depending on context
+5dB above Background	Indication of Adverse Impact, depending on context
+10dB or more above Background	Indication of Significant Adverse Impact, depending on context

Table 3.1 Impact Assessment

- 3.17 However, the significance of the sound depends on both the margin above background and the context in which the sound occurs. The above estimate should therefore be modified to consider factors such as absolute level of sound, character and level of residual sound, and the sensitivity of the receptor.

4 Noise Survey

Survey Details

- 4.1 A baseline noise survey was undertaken between Friday 22nd and Monday 25th March 2024 to capture the prevailing noise climate in the area.
- 4.2 The noise meter was installed near to Cil-Lonydd which is considered representative of both of the nearest noise-sensitive receptors with the location indicated in **Figure 4.1** below.



Figure 4.1 Noise Monitoring Location

- 4.3 The noise meter was at a height of approximately 1.5m in free-field conditions with the data logged every 15-minutes.
- 4.4 Details of the monitoring equipment can be found in Error! Reference source not found.. On-site calibration was undertaken before and after measurements with no significant drift observed.



Weather Conditions

- 4.5 Weather conditions during the equipment installation and collection were suitable for environmental noise monitoring being dry with negligible wind. There were periods of rainfall during the survey, but these have been excluded from the assessment.

Noise Climate

- 4.6 During installation and collection, the noise climate was rural with natural sounds including livestock.

Monitoring Results

- 4.7 A summary of the measured noise levels is presented in **Table 4.1**.

Date	Period	L _{Aeq, 15min}	L _{A10, 15min}	L _{A90, 15min}	L _{Amax}
22/03/24	12:30 – 23:00	42.7	41.9	34.2	77.8
	23:00 – 07:00	41.8	41.6	34.1	70.2
23/03/24	07:00 – 23:00	45.9	45.5	39.0	75.3
	23:00 – 07:00	39.2	38.9	32.2	71.1
24/03/24	07:00 – 23:00	45.5	42.3	32.1	83.7
	23:00 – 07:00	44.1	42.9	33.0	67.7
25/03/24	07:00 – 13:00	52.0	53.5	43.2	73.8

Table 4.1 Summary of noise levels at NML1

- 4.8 To determine a representative background sound level during the worst-case period (night-time), the number of occurrences of the measured sound level during this period has been considered. As noted above, data during periods of rainfall have been removed. The results are presented in **Figure 4.2**.

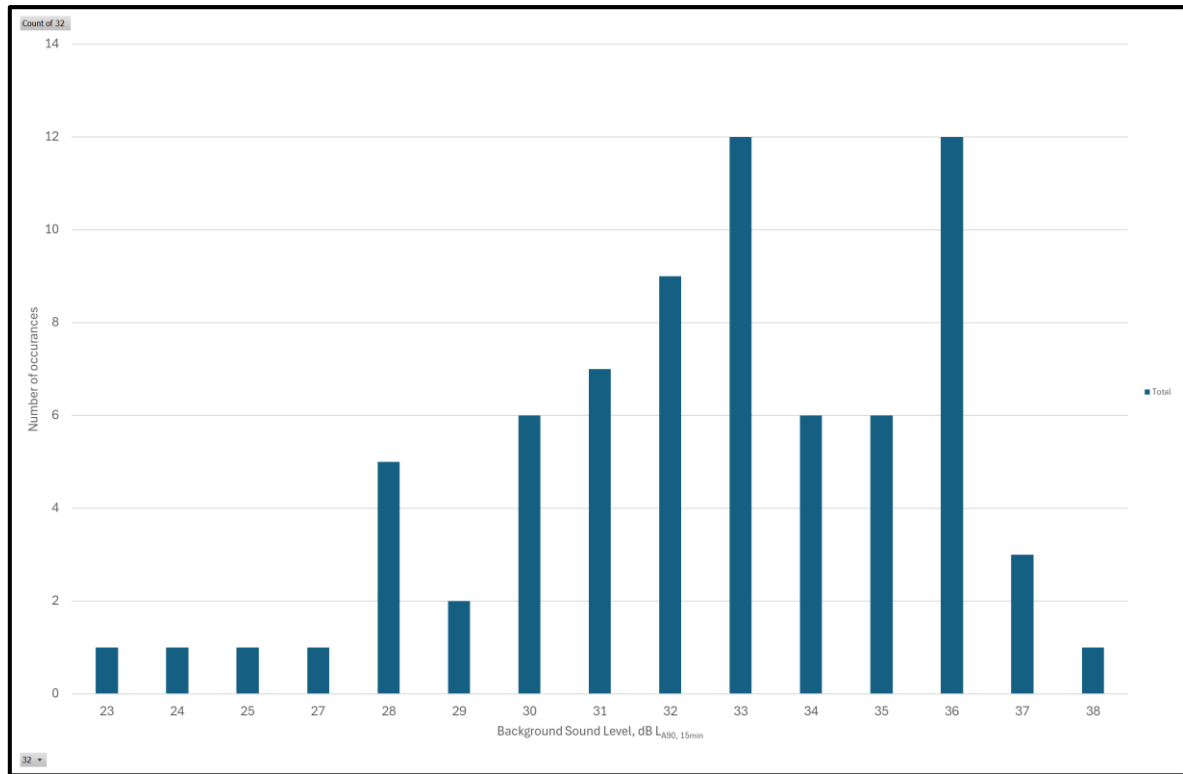


Figure 4.2 Occurrences of Background Sound Level

4.9 As part of the commentary presented in BS4142 it states:

“In using the background sound level in the method for rating and assessing industrial and commercial sound it is important to ensure that values are reliable and suitably represent both the particular circumstances and periods of interest. For this purpose, the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods.”

4.10 Whilst a level of 33dB $L_{A90, 15min}$ is the most commonly occurring background sound level, a level of 32dB $L_{A90, 15min}$ considered representative of the background sound level with noise levels less than 32dB only experienced for 33% of the time.



5 Noise Assessment

Noise-sensitive Receptors

- 5.1 For the assessment of operational noise, the closest noise-sensitive receptors have been identified and set out in **Table 5.1**.

Type of Machinery	Coordinates		Approximate Distance to BESS	Direction
	X	Y		
Blawngwrney Farm	492044	5724729	560m	North
Cil-Lonydd	491935	5724105	75m	South

Table 5.1 Nearest Noise-sensitive Receptor

- 5.2 It is noted that there are a number of buildings at Cil-Lonydd, with the residential dwelling protected from the proposed BESS by intervening non-sensitive buildings which have been included in the noise model.

Operational Noise Assessment

- 5.3 Predictions of the proposed operational noise of the proposed Substation and Battery Storage have been carried out to consider these against the results of the baseline survey.
- 5.4 Details of the proposed noise generating equipment to be installed on Site have been provided by the applicant. Sound power levels for the candidate plant is provided in **Table 5.2**.

Type of Machinery	Quantity on Site	Sound Power Level, dB
Battery Unit	27	75
Substation	1	78

Table 5.2 Operational Plant

- 5.5 The noise predictions have been undertaken using the proprietary software IMMI; a 3-D noise mapping package which implements a wide range of national and international standards, guidelines and calculation algorithms, including those set out in ISO9613-2.
- 5.6 The noise map model has assumed:
- downwind propagation, i.e. a wind direction that assists the propagation of sound from source to receptor;
 - a maximum reflection factor of three where buildings and barriers are assumed to have a 'smooth' reflective façade, as a worst case; and
 - that noise sources do not have strong radiation patterns and therefore radiate equally in all directions.
- 5.7 The predicted noise levels at the nearby noise-sensitive receptors are presented in **Table 5.3**.



Sensitive Receptor	Predicted Noise Level, dB
Blawngwrney Farm	12
Cil-Lonydd	26

Table 5.3 Predicted Operational Noise Levels

5.8 Analysis of the impact in accordance with BS4142 has been undertaken as presented in **Table 5.4**.

Results	Blawngwrney	Commentary	Cil-Lonydd	Commentary
Background sound level	32dB LA90, 15min	Representative of background sound levels in the area	32dB LA90, 15min	Representative of background sound levels in the area
Specific sound level predicted	12dB LAeq, 15min		26dB LAeq, 15min	
Acoustic feature correction	0dB	Based on the distance between source and receptor and the low predicted specific sound level, it is not considered that the noise would have a distinct character	4dB	There is potential that the noise could have a perceptible tone.
Rating level	(12 + 0) dB = 12dB		(26 + 4) dB = 30dB	
Background sound level	32dB LA90, 15min		32dB LA90, 15min	
Excess of rating over background sound level	(12 - 32) dB = -20dB	The assessment indicates likelihood of low impact	(30 - 32) dB = -2dB	The assessment indicates likelihood of low impact
Uncertainty of the assessment	Based on night-time period when background is lower and measurements undertaken over a number of days. Noise from BESS mainly due to cooling which is less likely at night. Would require a significant increase in source level or reduction in background sound level to increase impact to adverse.		Based on night-time period when background is lower and measurements undertaken over a number of days. Noise from BESS mainly due to cooling which is less likely at night.	

Table 5.4 BS4142 Assessment



- 5.9 As presented in **Table 5.4**, the results of the BS4142 assessment indicates a low impact based on the worst-case assessment period during the night-time. Noise is mainly generated during cooling which is more likely during the daytime when background noise levels are higher.
- 5.10 Notwithstanding the above, a suitably worded condition to limit noise from the development should be included if permission is approved.



6 Summary and Conclusions

Summary

- 6.1 Rappor was instructed by Cenin to undertake an operational noise assessment of the proposed the Solar Farm and Battery Energy Storage System at Cil-Lonydd, to the east of Newbridge, Newport.
- 6.2 Noise predictions of the proposed operation of the solar farm have been assessed against the results of a baseline noise survey in accordance with BS4142.
- 6.3 The BS4142 assessment indicates that the operation of the solar farm would result in a low impact at the nearby noise-sensitive receptors Notwithstanding the above, a suitably worded condition to limit noise from the development should be included if permission is approved.

Conclusions

- 6.4 Rappor concludes that based on the results of the noise assessment, it is considered that noise does not represent a material constraint to the development.

Appendix A – Acoustic Terminology

Glossary of Acoustic Terminology

Term	Description
Ambient Sound Level, $L_{Aeq, T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T
Background Sound Level, $L_{A90, T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting, F, and quoted to the nearest whole number of decibels
Specific Sound Level	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r
Rating level, $L_{Ar, Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound

Appendix B – Monitoring Equipment

Details of Monitoring Equipment

Item Description	Serial Number
Svantek SV307A Class 1 Sound Level Meter	116148
Svantek SV36 Acoustic Calibrator	122250

rappor



Rappor Consultants Ltd

www.rappor.co.uk

Cheltenham
Bristol
London
Bedford
Exeter
Manchester

