



MINETY SOLAR FARM

NOISE ASSESSMENT FOR S73 AMENDMENT

Acoustics Report A1579 R03

May 2025

Report for: RWE Renewables UK Solar and Storage Ltd

Issued to: Pegasus Planning Group
FAO Jon Appleby

Prepared by:
Mark Harrison BSc (Hons) MIOA
Principal Consultant

Checked by:
Gavin Irvine BSc (Hons) MIOA
Director

Issue/Revision number:
A1579 R03

Date:
19/05/2025

Contents

1	Introduction	2
2	Consented Development	2
2.1	Site Location	2
2.2	Consented Scheme	3
2.3	Proposed Variation	3
3	Planning Conditions and Noise Limits	5
3.1	Planning Conditions	5
4	Operational Noise Predictions	6
4.1	Noise Assessment Details	6
4.2	Noise Source Levels	7
4.3	Noise Mitigation Measures	7
4.4	Predicted Noise Levels at Receptors	8
4.5	Uncertainty and Context	10
5	Summary	10

Appendix A: Manufacturer's Data

Appendix B: Noise Contour Plots

1 Introduction

Ion Acoustics is appointed by Pegasus Planning Group to carry out a noise assessment for RWE Renewables UK Solar and Storage Ltd as part of a Section 73 variation to the consented Solar farm at Minety, near Malmesbury, Wiltshire. The proposed variation would see changes to both the equipment used at the site and the consented layout plan.

The scheme was originally granted conditional consent in April 2020 under application ref: 20/03528/FUL. A subsequent variation was granted in April 2024 under application reference PL/2023/03501. Both applications were supported by noise assessments prepared by Ion Acoustics, documented in reports with references A1579 R01 and R02b respectively.

The assessment presented in this report adopts the same methodology as the previous noise assessments. New calculations using computer modelling have been prepared to demonstrate that operational noise levels from the revised site adhere to the noise limits granted for the consented scheme.

2 Consented Development

2.1 Site Location

The consented site is located on farmland in a rural area of Wiltshire, approximately 6.5km east of Malmesbury. The B4040 is the nearest road and runs broadly east / west across the southern site boundary. The consented solar farm is on land west, north and east of the Minety substation which is located approximately 680m to the north of the B4040. A battery storage scheme has been built south of the substation.

There are several noise sensitive receptors around the site, to the north, south, east and west at varying distances to the site boundary. Ten assessment locations (AL01 etc) were identified in the previous assessment and have been carried forward in to this variation. Ordnance Survey grid coordinates for each assessment location are given in Table 1 below, together with the approximate distance to the site boundary. The location AL01, Purlieus Farmhouse, is occupied by a landowner associated with the development. Therefore, this location is not regarded to be as sensitive to noise as the other third-party locations.

Table 1 - Noise Assessment Locations

Assessment Location	Approximate OS Grid Co-ordinates, (E, N)	Distance to Application boundary (m)
AL01 - Purlieus Farm House	400737, 189503	16
AL02 - Purlieus House	400882, 189164	24
AL03 - 2 Summerhouse Cottages	401333, 189356	22
AL04 - Kembles Farm	401763, 189614	208
AL05 - Woodward's Farm	401410, 189997	255
AL06 - Fairholme Farm	401251, 190363	210
AL07 - Emmett Hill	400867, 190528	360
AL08 - Woburn Cottage	400500, 190707	340
AL09 - Cherry Tree Cottage	399577, 190586	290
AL10 - 2 High View	399536, 189209	30

The assessment locations are presented on Figure 1 below.

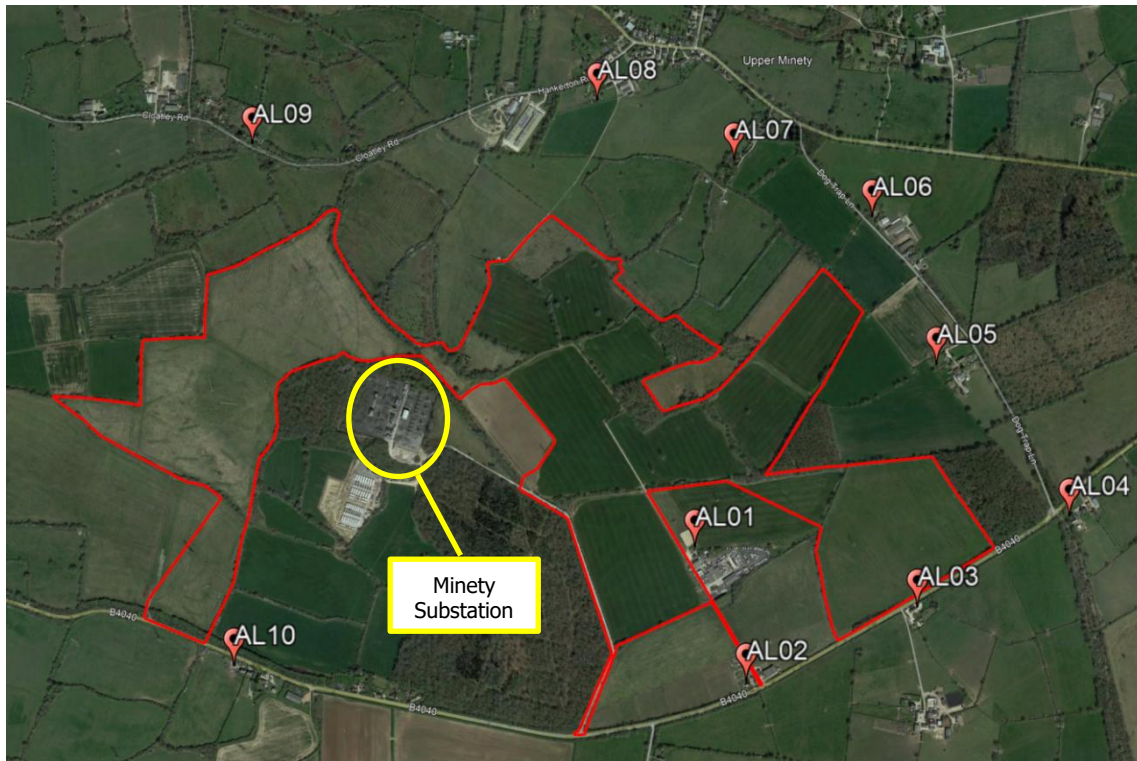


Figure 1 – Site Boundary and assessment locations. © Google.

2.2 Consented Scheme

Consent for the solar farm was originally granted under application reference 20/03528/FUL dated April 2022. The consent granted was for a *'renewable led energy scheme comprising ground mounted photovoltaic solar arrays and battery based electricity storage containers together with transformer stations; access; internal access track; landscaping; security fencing; security measures; access gate; and ancillary infrastructure.'*

The consented scheme is a 50MW solar farm with the principal noise-generating elements being 16no. inverter substations and 12no. battery energy storage units.

The original planning application was supported by Ion Acoustics report reference A1579 R01 dated April 2020. The assessment included a noise survey from which the operational noise limits were derived. Calculations demonstrated that the operational facility would largely adhere to the identified noise limits during both the daytime and night-time periods. The exception being AL01 where the background sound level was exceeded by +6dB.

A subsequent variation to the consent was granted in April 2024 under application reference PL/2023/03501 which increased the number of inverters to 19 and the number of batteries to 22. That variation was supported by Ion Acoustics report reference A1579 R02b and identified that noise mitigation measures were necessary to achieve the operational noise limits.

2.3 Proposed Variation

The scheme proposed as part of this S73 application is broadly similar to the consented scheme in so far as the development consists principally of solar panels arranged over 15 land parcels located around the Minety substation. The principal elements which have changed relative to the consented scheme are:

- Increasing the hybrid battery / inverter compound areas from 11 to 13;
- Changes to the layout and access tracks;
- Relocation of Construction Compound;
- Various micro adjustments to field panels and fence locations, including southern boundary of panel Field 7 to enable the required buffer to the SSSI; and,
- Requirement to install cable between Field Panels 3 and 4 in a narrow strip of site

The only elements which would result in any significant changes to the predicted operational noise impact are the changes to the number and location of the hybrid inverter / battery compounds. The revised layout plan is presented in Figure 2 below. The location of the various hybrid inverters and other inverters are circled in red and blue respectively.

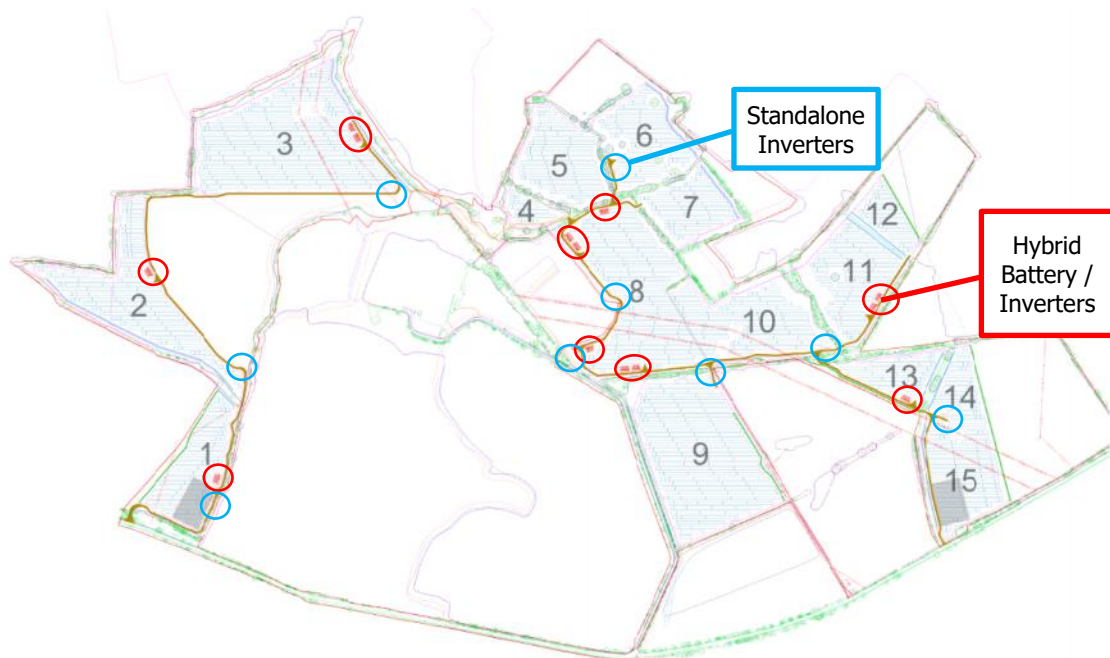


Figure 2 – Proposed Site Layout Plan

The varied site would accommodate the following noise-generating plant and equipment:

- 13 No. Hybrid Inverter compounds; and,
- 9 No. Standalone Inverter Units.

The hybrid battery / inverters are compounds accommodating the following plant items:

- 1 No. Containerised Inverter Unit;
- 4 No. DC to DC Converter Unit; and,
- 4 No. CATL Containerised Battery Units.

The layout of a hybrid battery / inverter compound is presented in Figure 3 below.

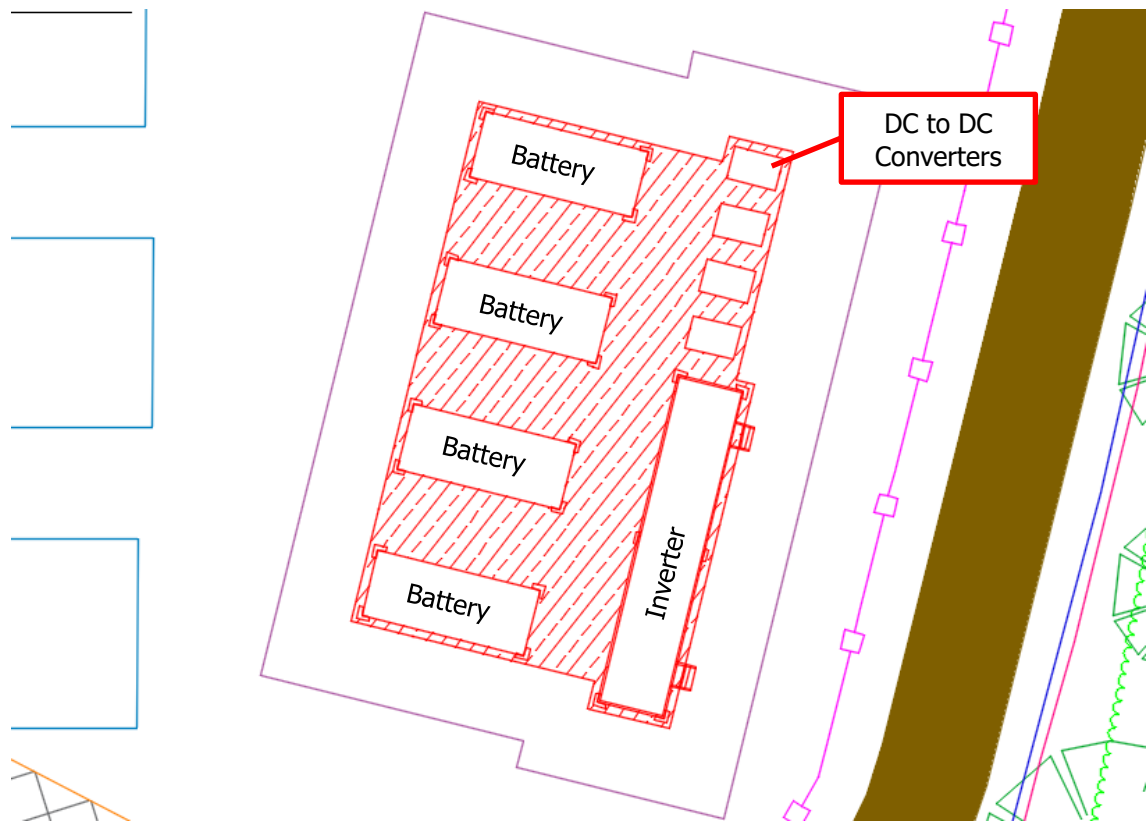


Figure 3 – Hybrid Battery / Inverter Compound Layout

3 Planning Conditions and Noise Limits

3.1 Planning Conditions

Condition 24 of the original planning approval under reference 20/03528/FUL is presented below:

"The noise rating level (BS 4142:2014) of plant shall be no more than those specified in Table 13 of Ion Acoustics report A1579 during daytime (0700–2300hrs) at identified residential receptors and no more than a rating level of 20dB during night-time (2300–0700hrs) at any residential receptor."

A subsequent variation to this consent was granted in April 2024 under reference PL/2023/03501 which was supported by Ion Acoustics Report reference A1579 R02b dated March 2023. Conditions 21 and 22 related to noise and state:

"21 The mitigation measures detailed within section 4.2 of the Noise Assessment (March 2023) report by Ion Acoustics shall be implemented along with further noise reduction kits being fitted to all invertors."

The noise rating level (BS4142:2014) of plant shall be no more than those specified in Table 13 7 & 8 of the Noise Assessment; A1579 R02b during daytime (0700–2300hrs) and during night-time (2300–0700hrs) at all residential receptors."

REASON: To ensure the creation/retention of an environment free from intrusive levels of noise and activity in the interests of the amenity of the area and to protect the amenities of the occupiers of neighbouring residential properties."

And;

"22 A post installation noise assessment shall be carried out within 3 months of completion of the development to confirm compliance with the submitted Noise Assessment (March 2023) report by Ion Acoustics and submitted to the Local Planning Authority for approval in writing. Any additional steps required to achieve compliance shall thereafter be taken in accordance with a timetable to be agreed with the Local Planning Authority. The details as submitted and approved shall be implemented and thereafter be permanently retained.

Reason: To protect local amenity from adverse effects of noise."

The noise limits detailed in Condition 21 of PL/2023/03501 supersede those in Condition 24 of the original consent. For the avoidance of doubt, the noise limits used in this assessment (taken from report A1579 R02B) are presented in Table 2 below.

Table 2: Rating Level Noise Limits

Assessment Position	Daytime Limit (dB L _{Af})	Night Limit (dB L _{Af})
AL01 – Purlieus Farm House	34	32
AL02 – Purlieus House	34	
AL03 – 2 Summerhouse Cottages	34	
AL04 – Kembles Farm	34	
AL05 – Woodward's Farm	38	
AL06 – Fairholme Farm	38	
AL07 – Emmett Hill	38	
AL08 – Woburn Cottage	36	
AL09 – Cherry Tree Cottage	36	
AL10 – 2 High View	34	

The noise limits above are rating levels and include character correction factors as appropriate, in accordance with BS4142.

4 Operational Noise Predictions

4.1 Noise Assessment Details

A noise model has been constructed using IMMI¹ noise modelling software to predict noise levels to the identified noise-sensitive receptor locations. As indicated above, these are common with the original noise assessment.

Within the modelling software, the propagation of noise has been calculated in accordance with BS ISO 9613-2: 2014² with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be less),
- Soft ground between the noise source and the receiver locations ($G = 1.0$);
- 70% Relative Humidity and appropriate ambient air temperatures; and,
- Barriers and screening influence calculated in accordance with ISO 9613-2.

As above, these parameters are common with the preceding assessments.

¹ IMMI noise mapping <https://www.immi.eu/en/noise-mapping-with-immi.html>

² BS ISO 9613-2: 2014 Attenuation of sound during propagation outdoors.

4.2 Noise Source Levels

The input source data for the model is described below. The data has been provided by RWE Renewables UK Solar and Storage Ltd. Manufacturer's noise data for the proposed equipment has been provided for the units on site. Excerpts from the Manufacturer's specification sheets are presented in Appendix A where available.

Inverter Units

The site will accommodate 22no. power inverter units in total. Nine of these are 'standalone' inverter units and address power generated from the solar farm alone. A further 13no. inverters form part of the hybrid inverter arrangement and work in conjunction with the battery units and DC to DC converters.

Information provided by RWE indicates the inverters would be Power Electronics HEMK FS4390K or similar and generate a sound pressure level of *less than* 79dB at 1m according to the manufacturer's specification (Appendix A). In the scope of this assessment, this is assumed to be L_{pA} 78dB at 1m with a derived sound power level of **86 dB L_{WA}** assuming hemispherical radiation.

DC to DC Converter Units

Each hybrid inverter would accommodate four DC to DC converter units giving a total of 52no. DC to DC converter units across the site. These are to be Power Electronics FD1200 or similar and function as part of the energy storage scheme, regulating the voltage to the battery units.

Information made available by the client indicates that the DC to DC converters would generate a sound power level of **L_{WA} 76.9dB**.

Battery Container

The hybrid inverters would each include four CATL battery units, with a total of 52no. batteries across the site. The information provided by RWE indicates the batteries generate a sound pressure level of L_{pA} 76.2dB at 1m which is equivalent to a sound power level of **84.2 dB L_{WA}**. No further information is available i.e. spectrum data, alternative operating modes etc.

4.3 Noise Mitigation Measures

In keeping with the preceding assessments, noise mitigation measures are proposed for a number of plant items towards the south-west and south-east of the site area. This is to address specific exceedances over the prescribed noise limits at receptors in the vicinity.

Through detailed consideration of the layout plan and the practicalities of delivering the required reductions, it is considered most practical to attenuate the noise levels at source rather than providing acoustic barriers. In this regard, the following levels of attenuation are required on the attenuated plant items:

- Inverter Units: -5dB reduction in noise levels, resulting in a maximum permissible sound pressure level of **73dB(A) at 1m**;
- CATL Battery Unit: -3dB reduction in noise levels, resulting in a maximum permissible sound pressure level of **73.2 dB(A) at 1m**.

The mitigation measures would apply to the plant items identified in Figure 4 below.

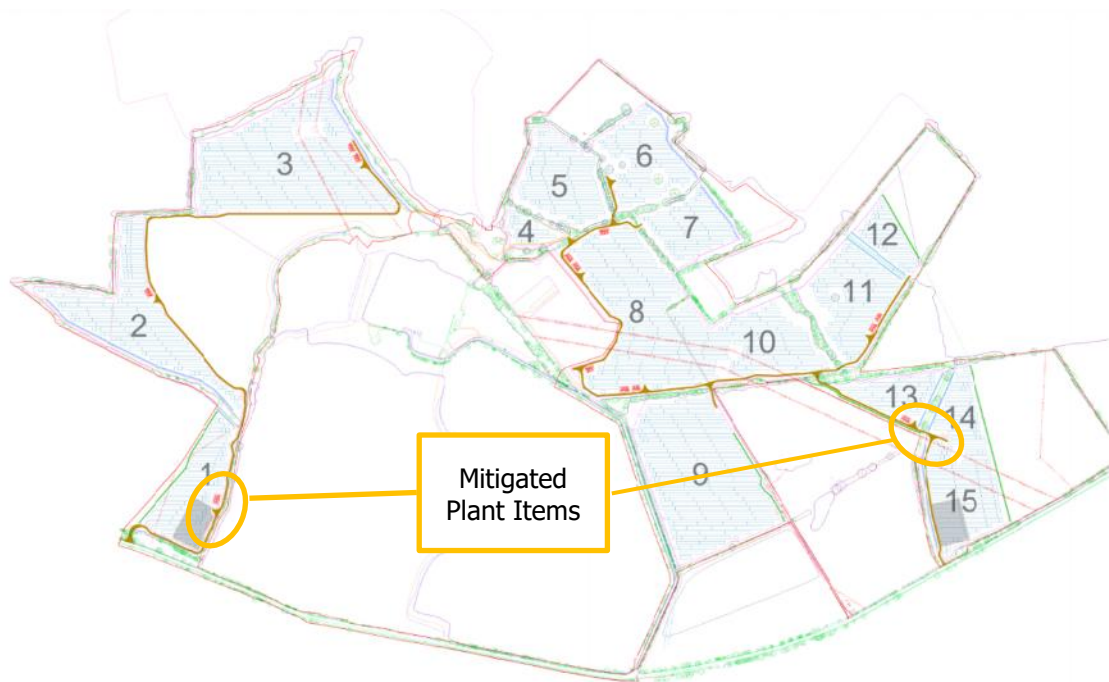


Figure 4 – Mitigation Locations

4.4 Predicted Noise Levels at Receptors

The computer model has been used to calculate specific noise levels at the receptor locations identified above. These predicted levels have been used to evaluate the noise impact following the methodology detailed in BS 4142. The assessments are set out in Tables 3 and 4 below. Noise contour plots for both the daytime and night-time scenarios are presented in Appendix B.

As indicated above, the noise data for the various items of plant and equipment has been as single figure, broadband noise levels, with no spectral information available. Given this, it is plausible that some level of tonal noise may be generated by the facility. However, given the very low predicted noise levels, it is unlikely to be readily identifiable at the receptor locations. To that end, no character corrections have been applied in the derivation of the rating noise level. This approach is consistent with the preceding assessment.

The assessment has been undertaken for both the daytime and night-time periods. During the daytime period, noise levels are predicted to a height of 1.5m above local ground level. During the night, predictions are made to a height of 4m above local ground level, approximating a first-floor bedroom window height. This assumption can result in higher night-time noise levels as the shielding provided by the noise barrier is reduced.

Daytime

During the daytime period all hybrid inverters and standalone inverters are assumed to be operating at their technical maximum capacity for the duration of the assessment period.

The contour plot presented in Figure B1 of Appendix B, indicates that noise generated by the proposed development is relatively constrained around the development, with the 35dB L_{Aeq} contour line not extending as far as the nearest third-party noise sensitive receptors. Note that the contour plots present the specific noise level, without any weighting factors.

The BS4142 assessment for the daytime period is presented in Table 3 below.

Table 3: Noise Impact Assessment - Daytime

Receptor Location	Predicted (Specific) Level, dB L_{Aeq}	Character Correction (dB)	Rating Level, dB L_{Ar}	Noise Limit, dB L_{Ar}	Difference, dB
AL01 Purlieus Farm House	34.2	0	34	34	+/-0
AL02 Purlieus House	30.5	0	31	34	-3
AL03 2 Summerhouse Cottages	30.9	0	31	34	-3
AL04 Kembles Farm	26.6	0	27	34	-7
AL05 Woodward's Farm	30.8	0	31	38	-7
AL06 Fairholme Farm	29.5	0	30	38	-8
AL07 Emmett Hill	30.1	0	30	38	-8
AL08 Woburn Cottage	30.5	0	31	36	-5
AL09 Cherry Tree Cottage	30.7	0	31	36	-5
AL10 2 High View	32.3	0	32	34	-2

The assessment indicates that during the daytime period, noise levels generated by the revised site meet the noise limits detailed in Condition 21 of the extant planning consent. Given this, the resultant assessments indicate a low noise impact in accordance with BS4142 and the overall changes to the site are not considered to be material.

Night-time

During the night-time period, the solar farm would not generally generate any electricity though the battery storage units could operate. To that end, only the hybrid inverter stations are considered to operate.

The predicted noise levels during the night-time period are presented in Figure B2 of Appendix B. Table 4 below presents the night-time noise assessment. As indicated above, the impact during the night-time period is assessed against a 32dB limit as for the previous consented application.

Table 4: Noise Impact Assessment – Night-time

Receptor Location	Predicted (Specific) Level, dB L_{Aeq}	Character Correction (dB)	Rating Level, dB L_{Ar}	Noise Limit, dB L_{Ar}	Difference, dB
AL01 – Purlieus Farm House	33.3	0	33	32	+1
AL02 – Purlieus House	29.9	0	30	32	-2
AL03 – 2 Summerhouse Cottages	30.0	0	30	32	-2
AL04 – Kembles Farm	25.7	0	26	32	-6
AL05 – Woodward's Farm	30.1	0	30	32	-2
AL06 – Fairholme Farm	28.6	0	29	32	-3
AL07 – Emmett Hill	29.2	0	29	32	-3
AL08 – Woburn Cottage	29.6	0	30	32	-2
AL09 – Cherry Tree Cottage	30.1	0	30	32	-2
AL10 – 2 High View	31.1	0	31	32	-1

During the night-time period the predicted rating noise levels would not generally exceed the identified noise limit at the assessment locations. This is considered to be indicative of a low noise impact in accordance with BS4142.

The exception to this being receptor AL01 where the noise limit is exceeded by 1dB. The property is understood to be owned and occupied by the landowner therefore is financially linked to the development. In addition, the absolute (specific) noise level at this location is very low and is likely to be masked by the prevailing ambient noise climate. Indeed, the ambient noise level in the vicinity, measured during the preceding noise survey, is L_{Aeq} 46dB during the night-time period. This is significantly above the predicted rating level of 33dB indicating that a significant level of masking would render the noise from the development largely inaudible.

Given the above, the assessments during the night-time period are considered to represent a low noise impact in accordance with BS4142 and the overall changes to the site are not considered to be material.

4.5 Uncertainty and Context

BS 4142 requires an assessment of uncertainty and context. The prediction methodology in BS ISO 9613-2 is considered accurate to ± 3 dB. However, conservative input assumptions are adopted, and downwind propagation is assumed. Noise levels for upwind and crosswind propagation will be lower.

Additional uncertainty may occur in the noise source data used in the calculations. Single figure, broadband noise levels have been provided which are assumed to represent the respective plant items operating at 100% of their rated capacity.

The context of the development is of a consented site situated in a rural area, with a number of other energy-related developments in the vicinity i.e. an existing, BESS and the Minety sub-station.

5 Summary

A noise assessment has been carried out for the proposed variation to the consented solar farm near the Minety substation, Minety, Wiltshire. The potential impact arising from the variation has been derived against noise limits established from a preceding variation for the site.

Operational noise levels have been calculated using noise source data provided by RWE Renewable UK Solar and Storage Ltd. The data has been used to provide robust calculations of noise levels at the identified receptor locations which are common to the preceding assessments.

To ensure the limits are met, mitigation is required to two hybrid battery / inverter stations as identified in Section 4.3 and Figure 4.

With the mitigation, the facility would operate at, or below the noise levels predicted for the consented scheme during the daytime period. During the night, the facility would exceed the noise limit at receptor AL01, which is associated with the development, though the resultant impact would still be low in accordance with BS4142.

Overall, the calculations for the operational noise levels indicate that noise from the facility would be low in absolute terms and would be at the no observed adverse effect level.

Given the above, it is considered that there are no noise-related issues associated with the Minety solar farm that would prevent the S73 application being granted.

Minety Solar Farm
Noise Assessment for S73 Amendment
Appendix A: Manufacturer's Data
Inverter Unit

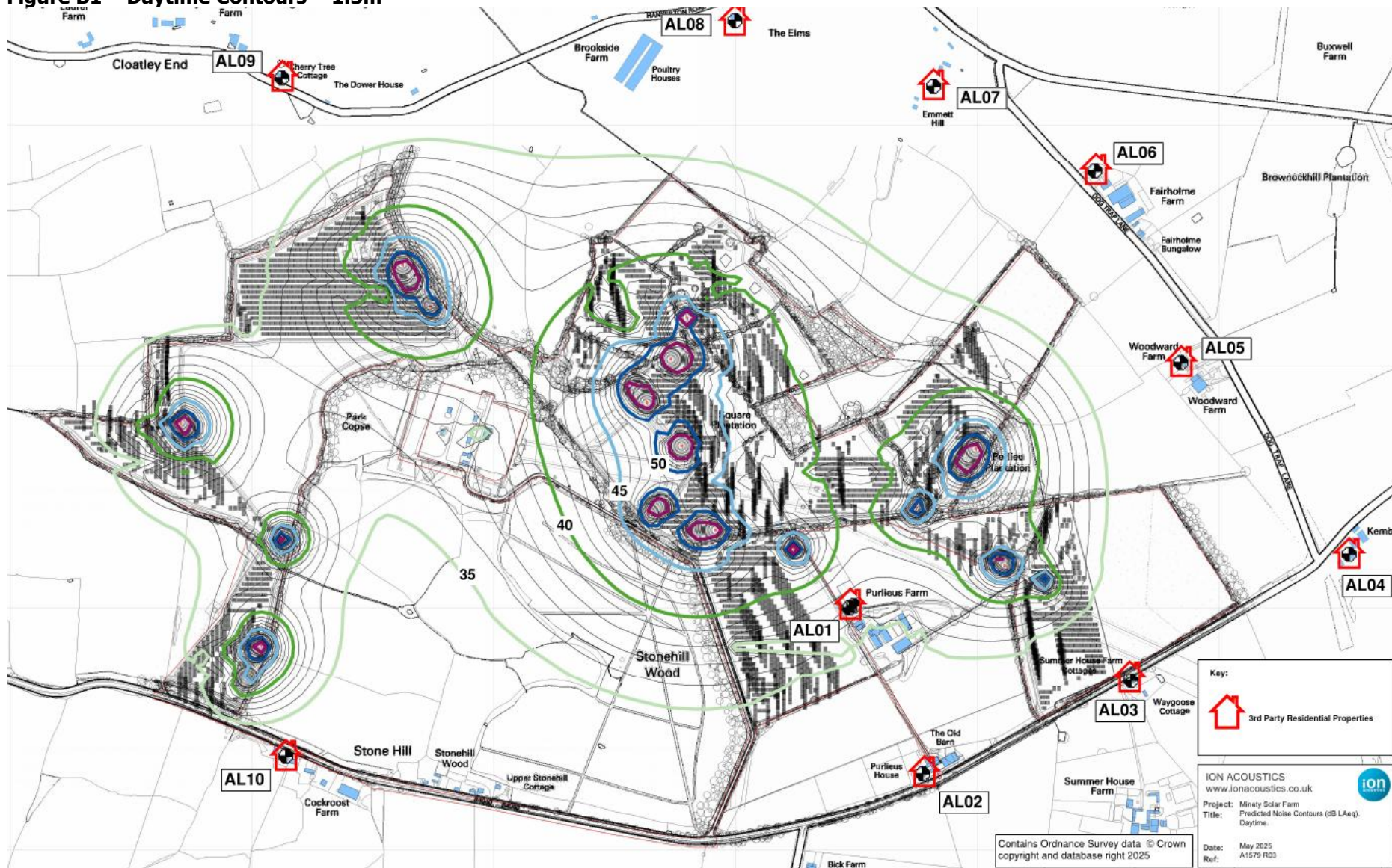


TECHNICAL CHARACTERISTICS

HEMK 690V

		FRAME 2	FRAME 3	FRAME 4
REFERENCES		FS2195K	FS3290K	FS4390K
OUTPUT	AC Output Power (kVA/kW) @40°C ^[1]	2195	3290	4390
	AC Output Power (kVA/kW) @50°C ^[1]	2035	3055	4075
	Max. AC Output Current (A) @40°C	1837	2756	3674
	Operating Grid Voltage (VAC) ^[2]	690V ±10%		
	Operating Grid Frequency (Hz)	50 Hz / 60 Hz		
	Current Harmonic Distortion (THDi)	< 3% per IEEE519		
	Power Factor (cosine phi) ^[3]	0.5 leading ... 0.5 lagging adjustable / Reactive power injection at night		
INPUT	MPPT @Full Power (VDC) ^[4]	976V-1500V		
	Maximum DC voltage	1500V		
	Number of PV inputs ^[5]	Up to 40		
	Max. DC Continuous Current (A) ^[6]	2295	3443	4590
	Max. DC Short Circuit Current (A) ^[6]	3470	5205	6940
	Number of MPPT (isolated poles)	1	1	1, 2 or 4
EFFICIENCY & AUX. SUPPLY	Efficiency (Max) (η) (preliminary)	98.84%	98.87%	98.93%
	Euroeta (η) (preliminary)	98.45%	98.48%	98.65%
	Max. Power Consumption (kVA) (preliminary)	8	9	10
CABINET	Dimensions [WxDxH] (ft)	9.8 x 6.6 x 7.2		
	Dimensions [WxDxH] (m)	3.0 x 2.0 x 2.2		
	Weight (lbs) (preliminary)	11465	11795	12125
	Weight (kg) (preliminary)	5200	5350	5500
	Type of Ventilation	Forced air cooling		
ENVIRONMENT	Degree of Protection	NEMA 3R - IP55		
	Permissible Ambient Temperature	-35°C to +60°C, >50°C / Active Power derating		
	Relative Humidity	4% to 100% non condensing		
	Max. Altitude (above sea level)	2000m ; >2000m power derating (Max. 4000m)		
	Noise Level ^[7]	< 79 dBA		
CONTROL INTERFACE	Communication Protocol	Modbus TCP		
	Plant Controller Communication	Optional		
	Keyed ON/OFF Switch	Standard		
PROTECTIONS	Ground Fault Protection	GFDI and Isolation monitoring device		
	General AC Protection	Circuit Breaker		
	General DC Protection	Fuses		
	Overvoltage Protection	AC and DC inverter and auxiliary supply type 2		
CERTIFICATIONS	Safety	UL1741, CSA 22.2 No.107.1-16, UL62109-1, IEC62109-1, IEC62109-2		
	Compliance	NEC 2017 / IEC		
	Utility Interconnect	IEEE 1547.1-2005 / UL1741SA-Feb. 2018 / IEC62116:2014		

Minety Solar Farm
Noise Assessment for S73 Amendment
Appendix B: Noise Contour Plot
Figure B1 – Daytime Contours – 1.5m



Minety Solar Farm
Noise Assessment for S73 Amendment
Appendix B: Noise Contour Plot
Figure B2 – Night-time Contours – 4m.

