



Parc Ynni Calon y Gwynt

ENVIRONMENTAL STATEMENT

Appendix 11P: BESS Facility Noise Assessment





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CONTENTS

1

BESS FACILITY NOISE ASSESSMENT

1

TABLES

Table 11P 1 – Sound Power Level Data	2
Table 11P 2 – Plant coordinates	2
Table 11P 3 – Predicted Noise Levels	3
Table 11P 4 – BS4142 Daytime Noise Assessment at H3	4
Table 11P 5 – BS4142 Night-time Noise Assessment at H3	4
Table 11P 6 – BS4142 Daytime Noise Assessment at H4	5
Table 11P 7 – BS4142 Night-time Noise Assessment at H4	5

1 BESS FACILITY NOISE ASSESSMENT

1.1 NOISE PREDICTIONS

- 1.1.1. Noise from the BESS facility has been modelled using software to implement the ISO 9613-2:2024¹ methodology.
- 1.1.2. Operational noise predictions have been carried out assuming 50% soft ground ($G=0.5$), atmospheric absorption corresponding to 20°C and 70% humidity and no topography (flat ground assumed). The prediction model has not been modified to include the effects of wind direction (i.e. worst-case downwind conditions in all directions) and no screening from any buildings or substation structures has been included.

OPERATIONAL NOISE FROM BESS FACILITY

- 1.1.3. The electrical connection to the substation will be in operation continuously day and night and, whilst it is unlikely that the BESS would be discharging at night, it could be charging at any time. Therefore, a receiver height of 4 m (representative of a typical 1st floor bedroom height) has been assumed. It should be noted that this represents a worst-case and predicted noise levels at the height of ground floor windows would be lower.
- 1.1.4. The candidate technology for the BESS facility is a Sungrow PowerTitan 2.0 designed to discharge at 1.25 MW over a period of up to 4 hrs. It is a combined unit including battery storage with a liquid cooling system alongside AC inverters and there are 32 units proposed within the BESS compound giving a total rated power of 40 MW. Sound power levels for the units have been based on manufacturer's data for a worst-case cooling requirement where they are operating in ambient temperatures of 45°C and in practice the noise output would be lower. Each unit has been modelled as a point source at a height of 2 m.
- 1.1.5. Electrical plant associated with the substation adjacent to the BESS facility consists of a range of switchgear equipment and a 40MVA power transformer for connection to the electrical grid. Electrical switchgear equipment generally produces minimal continuous noise and would not contribute meaningfully to any potential noise impacts.
- 1.1.6. The grid transformer is a large item of plant but is relatively distant from the nearest receptor and has been modelled as a point source at a height of 5 m as a worst case. An overall sound power level has been taken from a Siemens specification document and an average spectrum has been derived from a test report and normalised to the overall level.

The sound power levels assumed for the BESS plant and grid transformer are given at **Table 11P 1** below.

¹ ISO 9613-2:2024. "Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors".

Table 11P 1 – Sound Power Level Data

Equipment Description	L _{WA}	Sound Power Level (L _{WA}) at Octave Band Centre Frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
40MVA Grid Transformer	94.0	55.7	76.4	78.0	93.8	73.3	58.5	57.6	-
PowerTitan 2.0	86.3	66.8	70.8	74.7	79.0	82.9	78.7	73.4	68.3

- 1.1.7. In order to assess the level of noise from the proposed BESS facility, initially, the predicted rating level has been compared with the adopted daytime and night-time criteria set out in the noise chapter. The representative background sound level during the day is: 29 dB L_{A90} and 25 dB L_{A90}, at H3 and H4 respectively. Therefore, the adopted significance criterion is 5 dB above this value and the rating levels should not exceed 34 dB or 30 dB, at H3 and H4 respectively.
- 1.1.8. The representative background sound levels at night are well below 30 dB L_{A90} and therefore, the adopted significance criterion is an internal rating level of no higher than 30 dB. The coordinates of the plant assumed for the predictions are provided below at **Table 11P 2**.

Table 11P 2 – Plant coordinates

ID	Description	Height	Easting	Northing
1	Power Titan	2	300526.0	297957.6
2	Power Titan	2	300525.7	297961.0
3	Power Titan	2	300525.1	297966.3
4	Power Titan	2	300525.1	297969.9
5	Power Titan	2	300524.7	297975.1
6	Power Titan	2	300524.4	297978.5
7	Power Titan	2	300524.0	297984.0
8	Power Titan	2	300523.9	297987.2
9	Power Titan	2	300523.5	297992.6
10	Power Titan	2	300523.3	297996.0
11	Power Titan	2	300510.3	297956.6
12	Power Titan	2	300510.1	297959.9
13	Power Titan	2	300509.9	297965.3
14	Power Titan	2	300509.7	297968.9
15	Power Titan	2	300509.4	297974.3
16	Power Titan	2	300509.1	297977.7
17	Power Titan	2	300509.0	297982.9
18	Power Titan	2	300508.9	297986.3

19	Power Titan	2	300508.2	297991.7
20	Power Titan	2	300508.1	297995.2
21	Power Titan	2	300495.1	297955.6
22	Power Titan	2	300495.1	297959.1
23	Power Titan	2	300494.9	297964.4
24	Power Titan	2	300494.6	297967.7
25	Power Titan	2	300494.3	297973.3
26	Power Titan	2	300494.0	297976.7
27	Power Titan	2	300493.6	297982.1
28	Power Titan	2	300493.5	297985.2
29	Power Titan	2	300493.2	297990.9
30	Power Titan	2	300493.0	297994.4
31	Power Titan	2	300492.7	297999.0
32	Power Titan	2	300499.4	297999.5
1	Grid Transformer	5	300569.5	297970.5

1.1.9. Worst-case downwind noise contours showing the predicted rating levels from the BESS facility, as well as the noise sensitive receptor locations, are shown at **Figure 11.4**. It can be seen from this figure that the predicted specific sound levels are well below 35 dB at both of the closest receptor locations. The predicted specific sound levels at each of the closest locations are provided at **Table 11P 3** below.

Table 11P 3 – Predicted Noise Levels

Description	Coordinates		Specific Sound Level (dB L _{Aeq})	
	Easting	Northing	Day (1.5 m height)	Night (4 m height)
H3 Llyn Mawr	301049	297366	31	32
H4 Lakeside View	301127	297083	27	28

When the grid transformer is operating, tonal noise is likely to be evident at close range and could potentially be audible at the nearest residential locations. To account for tonal noise being just audible, a tonal penalty of 2 dB has been added to the predicted specific sound level. There will be no impulsive noise from the BESS facility that requires a character correction, and it is assumed that no other character corrections apply. It is generally accepted that a window partially open for ventilation offers 10-15 dB of attenuation which is relevant for calculating an internal L_{ATr} within bedrooms at night.

1.2 BS 4142 ASSESSMENT RECEPTOR H3

Table 11P 4 – BS4142 Daytime Noise Assessment at H3

Results	H3	Description or Commentary
Background Sound Level	29 dB L_{A90}	Representative background sound level daytime
Assessment reference time interval	1 hour	Daytime assessment period according to BS4142:2014
Total on time correction	none	Assuming that the plant is operating for 100 % of the time
Specific Sound Level (not corrected for on time)	31 dB L_{Aeq}	Predicted plant noise levels at assessment location (rounded to 1 dB)
Specific Sound Level	31 dB L_{Aeq}	Including no on-time correction.
Penalties	2 dB	A character penalty of 2 dB has been assumed as tonal character could be just perceptible at the receptor locations.
Rating level	33 dB	$L_{Ar,Tr}$
Excess of rating over background sound level	+4 dB	Where the rating level is no more than 5 dB above the background sound level, this is an indication of a low impact.

Table 11P 5 – BS4142 Night-time Noise Assessment at H3

Results	H3	Description or Commentary
Background Sound Level	17 dB L_{A90}	Representative background sound level daytime
Assessment reference time interval	15 minute	Night-time assessment period according to BS4142:2014
Total on time correction	none	Assuming that the plant is operating for 100 % of the time
Specific Sound Level (not corrected for on time)	32 dB L_{Aeq}	Predicted plant noise levels at assessment location (rounded to 1 dB)
Specific Sound Level	32 dB L_{Aeq}	Including no on-time correction.
Penalties	2 dB	A character penalty of 2 dB has been assumed as tonal character could be just perceptible at the receptor locations.
Rating level	34 dB	$L_{Ar,Tr}$

Results	H3	Description or Commentary
Excess of rating over background sound level	+17 dB	In the context of very low background sound levels, this is not considered to be indicative of an adverse impact. An alternative criterion of an internal rating level no higher than 30 dB has been adopted
Internal Rating Level	19 – 24 dB	Allowing for 10 -15 dB through an open window, an internal rating level no higher than 24 dB can be expected which is below the adopted criterion and not considered to generate a significant adverse impact.

1.3 BS 4142 ASSESSMENT RECEPTOR H4

Table 11P 6 – BS4142 Daytime Noise Assessment at H4

Results	H4	Description or Commentary
Background Sound Level	25 dB L_{A90}	Representative background sound level daytime
Assessment reference time interval	1 hour	Daytime assessment period according to BS4142:2014
Total on time correction	none	Assuming that the plant is operating for 100 % of the time
Specific Sound Level (not corrected for on time)	27 dB L_{Aeq}	Predicted plant noise levels at assessment location (rounded to 1 dB)
Specific Sound Level	27 dB L_{Aeq}	Including no on-time correction.
Penalties	2 dB	A character penalty of 2 dB has been assumed as tonal character could be just perceptible at the receptor locations.
Rating level	29 dB	L_{Ar}, Tr
Excess of rating over background sound level	+4 dB	Where the rating level is no more than 5 dB above the background sound level, this is an indication of a low impact.

Table 11P 7 – BS4142 Night-time Noise Assessment at H4

Results	H4	Description or Commentary
Background Sound Level	17 dB L_{A90}	Representative background sound level daytime
Assessment reference time interval	15 minutes	Night-time assessment period according to BS4142:2014
Total on time correction	none	Assuming that the plant is operating for 100 % of the time

Results	H4	Description or Commentary
Specific Sound Level (not corrected for on time)	28 dB L _{Aeq}	Predicted plant noise levels at assessment location (rounded to 1 dB)
Specific Sound Level	28 dB L _{Aeq}	Including no on-time correction.
Penalties	2 dB	A character penalty of 2 dB has been assumed as tonal character could be just perceptible at the receptor locations.
Rating level	30 dB	L _A r,Tr
Excess of rating over background sound level	+13 dB	In the context of very low background sound levels, this is not considered to be indicative of an adverse impact. An alternative criterion of an internal rating level no higher than 30 dB has been adopted
Internal Rating Level	15 – 20 dB	Allowing for 10-15 dB through an open window, an internal rating level no higher than 20 dB can be expected which is below the adopted criterion and not considered to generate a significant adverse impact.



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