

Technical Note

Date: 27/10/2022
Ref: A1851 TN01
To: Adam Crews, Third Revolution Projects
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Newfields Farm BESS – Response to EHO Comments – Ref: smd/2022/0180

1 Introduction

This note sets out a response to comments made by Staffordshire Moorlands District Council Environmental Health relating to the proposal for a Battery Energy Storage System (BESS) at Newfields Farm under planning reference smd/2022/0180. The planning information submitted included Ion Acoustics report A1851 R01A, and this report is referenced within the Environmental Health response which was dated 15th July 2022.

The comments may be categorised into the following topics:

- Financially Linked Properties
- Rating Level Used During Assessment of Night Operations
- Cumulative Impact

These factors are addressed in turn below.

2 Financially Linked Properties

AP03 Newfields Farm in Ion Report A1851 R01A is not to be used after the development of the BESS by anyone other than the landowner of the development and therefore this has been removed from the assessment. It should be noted that this excludes the possibility of the landowner renting out the property to others not financially benefiting from the BESS scheme.

3 Rating Level used for assessment

As documented in Ion Acoustics report A1851 R01A a noise survey was conducted to quantify the existing background noise level representative of the nearest receptors. The EH response made no comment on the survey itself, methodology used, or the derivation of background noise levels. Plant noise limits were proposed at a value relative to the quantified background noise level, specifically no more than 5 dB above during the day and the night resulting in a limit at receptors AP01-02 of 41 dB L_{Ar} during the day and 35 dB L_{Ar} during the night.

The EH response agreed with the approach during the day, however proposed a more onerous limit of parity with the background noise limit during the night. This would result in a limit at receptors AP01-02 of 30 dB L_{Ar} during the night.

Where background levels are already low BS 4142:2014 +A1: 2019 indicates that the absolute sound level should also be considered along with other factors such as context. Specifically, the standard states:

"Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

Following this approach we propose that an absolute noise level assessment is more relevant than the relative margin and setting plant noise limits lower than 32 dB L_{Ar} does not provide any greater amenity for a resident during the night than any other lower value. The proposed night limit of 32 dB L_{Ar} would provide residents with 3 dB more protection during the night than the night limit proposed in our report which was 35 dB L_{Ar}.

The value of 32 dB L_{Ar} is derived from internal noise criteria from the World Health Organisation (WHO)¹ Guidance and BS 8233:2014² which provide external noise criteria to protect residential amenity. These are detailed in the Table below.

Table showing WHO/BS 8233:2014 Guideline Noise Levels

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB L _{Aeq} , 8hours ⁽¹⁾
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB L _{Aeq} , 16 hours ⁽²⁾ 55dB L _{Aeq} , 16 hours ⁽²⁾	--
Notes: From WHO Community Noise Guidelines (1999) BS 8233: 2014 and WHO Community Noise Guidelines			

The WHO guideline of 45 dB L_{Aeq}, 8hr represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, equivalent free field level would be approximately 3dB lower, that is 42 dB L_{Aeq}.

The daytime limits apply to relatively anonymous noises without character and are commonly applied to traffic noise, however the limits could equally apply continuous plant noise without strong impulsivity, tonality, intermittency or other character.

Absolute Noise Level Assessment

In instances of low rating and background noise levels, BS 4142 indicates that assessment in line with absolute noise limits might be as, or more, appropriate than a relative noise level assessment.

To ensure a development is not a significant or prohibiting factor in achieving the relevant WHO guideline values at sensitive receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in Table 3. For the night-time, this would equate to 35 dB L_{Aeq} as a façade value, or 32 dB L_{Aeq} as a free-field value.

With external noise from plant at 32 dB L_{Aeq} even with windows open approximately 10 dB attenuation would be expected from an external freefield value to an internal value, and therefore internal noise would be approximately 22 dB L_{Aeq} or less if windows were closed. This value range is significantly below BS 8233:2014 recommended internal noise levels for bedrooms at night.

As such plant limits set below 32 dB L_{Ar} are not expected to provide any further protection to amenity than is already provided.

It is therefore proposed to agree with the environmental health team to provide a more onerous limit during the night, but it is considered that a limit of 32 dB L_{Ar} is sufficiently low to protect amenity irrespective of the background noise. This limit has been adopted for other renewable energy projects.

The proposed limits at AP1-2 are given below:

- Day 07:00-23:00 41 dB L_{Ar}
- Night 23:00-07:00 32 dB L_{Ar}

Review of Mitigation Measures

The calculated rating level at AP1-2 in Ion Report A1851 R01A was 35 at AP1 and 34 at AP2, and therefore the mitigation measures have had to be reviewed to meet the more onerous night limit.

Barrier

To meet the new night limit it is proposed to amend the acoustic barrier only, with all other aspects remaining as specified in A1851 R01A. The newly proposed barrier would be amended in location, to run along both the west and south BESS boundary (except for a vehicle access road) and would need to be increased from a height of 3.0m to 3.5m. The new barrier has been indicated on Figure 1 below:

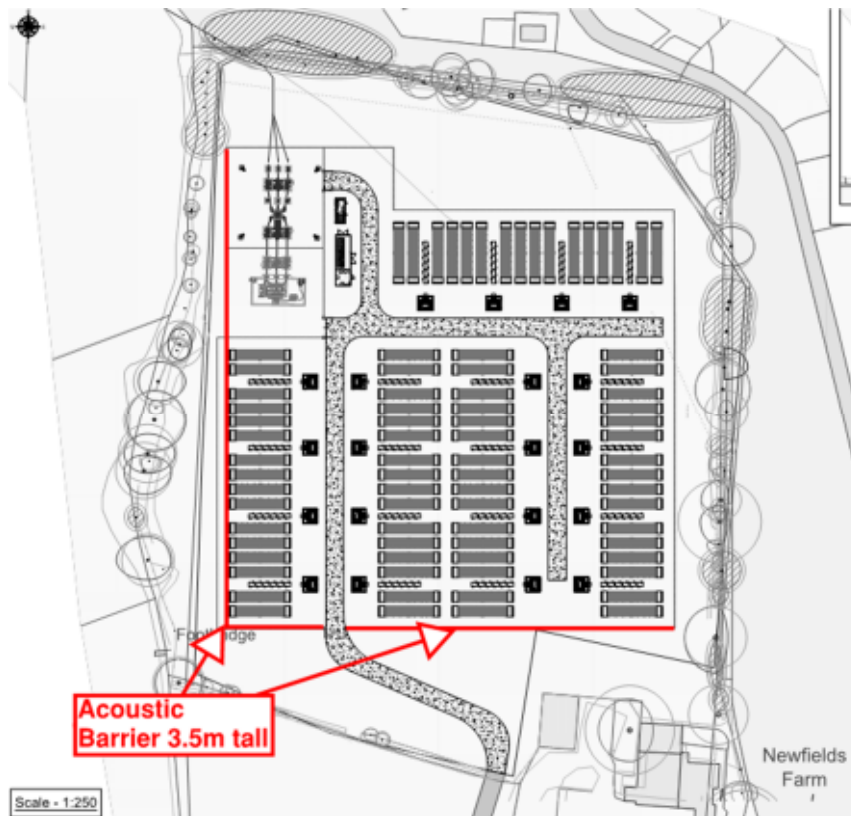


Figure 1 – Proposed new Acoustic Barrier at 3.5m

Review of Noise Levels

Previously the DNO Power Transformer sound power level was input at 83 dB L_{WA} , however a review of more recent data sheets suggests the likely value will be lower, and a more conservative value of 67.4 L_{WA} has been used in the calculation from a Sungrow MVS6300-LV.

Additionally the BESS units were previously considered to have a power level of 84.0 dBA L_w during both the day and the night. Whilst this is still expected to be representative of the day operation, during the night there is expected to be less cooling load and therefore reduced noise levels are expected. A sound power level of 81.0 dB L_{WA} from each Battery unit has therefore been considered during the night, and 84.0 dB L_{WA} is retained during the day. When specific equipment is selected for the site, it must be ensured that these values are referenced, and not exceeded, otherwise additional assessment would be necessary.

Updated Noise Model Results

The noise model has been updated with the barrier alteration as detailed above, and new sound power levels as detailed above. The point receptor locations for AP01 and AP02 are shown in Table 2 below along with the summary BS 4142:2014 calculation.

Table Showing Results of Updated Model

Receptor Location	Predicted (Specific) level, dB L _{Aeq}		BS 4142:2014 Correction, dB	Rating Level dB L _{Ar}		Proposed Limit, dB L _{A90}		Difference Rating Level to Proposed Limit, dB	
	Day	Night		Day	Night	Day	Night	Day	Night
AP01 Greenfields Farm	32.5	30.2	2	35	32	41	32	-6	+/- 0
AP02 Rownall Road	31.9	28.2	2	34	30	41	32	-7	-2

The results in the table above demonstrate that with the updated mitigation measures the noise from the site will comply with the more onerous plant noise limits during the night and therefore provide the enhanced protection to amenity during the night sought by the EHO

4 Cumulative Impact

It is understood the other applications referred to have been refused permission and therefore there is not anticipated to be any issues regarding cumulative impact.

5 Summary

This note has set out the Ion Acoustics response to comments made by the Staffordshire Moorlands District Council Environmental Health Team in relation to the planning application for the Newfields Farm BESS site. A lower noise limit has been set during the night and additional mitigation provided to meet the noise limit. The revised night-time noise limit is considered sufficiently low to protect amenity irrespective of the background noise.