NVC
Noise &
Vibration
Consultants Ltd.

International House
22-28 Wood Street
Doncaster
DN1 3LW

Tel No: 01773 603331

E-mail: nvc.acoustics@btopenworld.com

Axis
Camelia House
76 Water Lane
Wilmslow
Cheshire
SK9 5BB

Date: 14th July 2026
Our Ref: R26/0703/DRK

FAO: Hannah Walsh

Ref: Bicker Fen Solar & BESS – Update to Design & Review

Technical Note 5: Noise

We have been instructed by Axis to undertake further noise predictions in respect of the proposed BESS and Solar development at Bicker Fen, Boston, Lincolnshire.

1. Development Scenario:

Following previous design reviews and Technical Notes in respect of the change in BESS layout and plant selection, we have been instructed to provide additional noise predictions in respect of the updated site layout (ref: 2920-01-03 General Arrangement Rev H).

2. Operating Hours:

Operating hours to consider:

(i) BESS plant operating during any daytime or night-time hours (0700-2300 hours & 2300-0500 hours).

(ii) Solar + BESS plant during sunrise hours in Summertime (0500-0700 hours).

(iii) Solar + BESS plant during daytime hours (0700-2300 hours)

3. Plant Noise Levels:

Client advised plant noise levels upon which the noise predictions have been carried out:

a) Jinko Sun Tera 5MW BESS with test levels at full power ranging from 60dB to 73.4dB L_{Aeq} at 1m and half power ranging from 48dB to 75dB L_{Aeq} at 1m under maximum fan speed.

b) Freemaq PCSK FP4390K20H inverter (Power Electronics) HEMK/PCSK GEN3 Inverter (with 80% ventilation) and fitted with attenuation kit producing a sound power level of 87.9dB(A) during daytime and sunrise hours and 60% ventilation at sound power level of 83.9dB(A) during night-time.

c) Transformer noise levels not provided we have therefore assumed a sound power level of 84dB(A) @ 1m (circa 67dB L_{Aeq} at 1m).

d) Substation switchgear assumed noise level of 65dB $LAeq_{15mins}$ @ 1m sound pressure level.

e) Centralised Transformer enclosures: 84dB(A) to 85dB(A) sound power levels (circa 70dB(A) @ 1m).

f) String Inverters 77dB(A) sound power level.

4. Noise Limits in accordance with Planning Consent 21 (Ref: H04-0849-22)

"21. Noise from fixed plant and machinery shall not exceed the representative background noise level by more than a rating value of 5 dB(A) when measured as a 15 minute L(A)eq at any residential boundary not within the applicant's ownership, when measured in accordance with BS 4142:2014+A1(2019).

Reason: To ensure that there is no noise nuisance to nearby residents. This Condition is imposed in accordance with Policies 2, 3 and 30 of the South East Lincolnshire Local Plan, 2019."

5. Established Representative Background Sound Levels (November 2021)

Table 1: Daytime Background Sound Levels at Monitoring Positions

Monitoring Position	Time Period	Grid Ref X Y	LAeq dB	LA90 dB	LAmax dB	Representative[1] LA90 dB
A. Northorpe Rd	0700-2300	519635 336709	49	40	40-98	34
B. Hammond Beck	0700-2300	519904 337134	48	38	41-94	33
C. Ing Road	0700-2300	520458 337872	42	36	38-82	32
D. Cowbridge Rd	0700-2300	520947 338308	50	42	41-85	34

[1]Takes into account the mean and most commonplace LA90 based on statistical analysis, whichever is lowest.

Table 2: Night-time Background Sound Levels at Monitoring Positions

Monitoring Position	Time Period	Grid Ref X Y	LAeq dB	LA90 dB	LAmax dB	Representative[1] LA90 dB
A. Northorpe Rd	2300-0700	519635 336709	41	36	41-68	32
B. Hammond Beck	2300-0700	519904 337134	43	39	38-71	28
C. Ing Road	2300-0700	520458 337872	41	36	39-64	28
D. Cowbridge Rd	2300-0700	520947 338308	44	39	38-71	32

[1]Takes into account the mean and most commonplace LA90 based on statistical analysis, whichever is lowest.

Table 3: Existing Sunrise Background Sound Levels at Monitoring Positions

Monitoring Position	Time Period	Grid Ref X Y	LAeq dB	LA90 dB	LAmax dB	Representative[1] LA90 dB
A. Northorpe Rd	0500-0700	519635 336709	41	36	40-71	35
B. Hammond Beck	0500-0700	519904 337134	41	37	38-65	34
C. Ing Road	0500-0700	520458 337872	39	34	42-60	32
D. Cowbridge Rd	0500-0700	520947 338308	41	36	40-71	35

[1]Takes into account the mean and most commonplace LA90 based on statistical analysis, whichever is lowest.

6. Noise Predictions

For site operational noise, the assessment used ISO9613-2 prediction modelling and CadnaA noise prediction software for producing a noise map of the highest likely generated noise during peak noise operations. The Input settings for the noise model include:

Ground factor (G) = 0 (hard ground at BESS compound) and 1.0 (soft ground absorption) on intervening land.
Temperature = 10degC
Relative humidity = 70%
Receptor height = Assumed to be 4m above ground for daytime and night-time periods (i.e. robust assessment during daytime periods as residents are generally at ground floor level).

Table 4: Predicted Noise from Proposed Solar Farm & BESS (Full Power) with 3.5m high acoustic screen around 4 sides of compound (absorbent facing to inside of screen i.e. facing the plant)

Receptor Position (Refer to Figure 1)	Period	Power Setting	Representative Background Sound Level L_{A90} dB [L_{Aeq}]	Predicted highest rating[1] noise level L_{Aeq}(dB)	Level Difference dB(A)	Impact Magnitude BS4142:2019
Daytime (noise map 1)						
R1. Cowbridge Road (Northeast of Site)	Daytime	100% Speed Jinko BESS 28degC	34 [49]	**30-33**	-4 to -1	**Low**
R2. Ing Road (East of Site)	Daytime	100% Speed Jinko BESS 28degC	33 [48]	**26-38**	-7 to +5	**Low to Adverse**
R3. Hammond Beck (South of Site)	Daytime	100% Speed Jinko BESS 28degC	32 [42]	**31-35**	-1 to +3	**Low to Below Adverse**
R4. Northorpe Road (Southwest of Site)	Daytime	100% Speed Jinko BESS 28degC	34 [50]	**26-29**	-8 to -5	**Low**
Sunrise (noise map 1)						
R1. Cowbridge Road (Northeast of Site)	Sunrise	100% Speed Jinko BESS 28degC	35 [41]	**30-33**	-5 to -2	**Low**
R2. Ing Road (East of Site)	Sunrise	100% Speed Jinko BESS 28degC	34 [41]	**26-38**	-8 to +4	**Low to Below Adverse**
R3. Hammond Beck (South of Site)	Sunrise	100% Speed Jinko BESS 28degC	32 [39]	**31-35**	-1 to +3	**Low to Below Adverse**
R4. Northorpe Road (Southwest of Site)	Sunrise	100% Speed Jinko BESS 28degC	35 [41]	**26-29**	-9 to -6	**Low**
Night-time (noise map 2)						
R1. Cowbridge Road (Northeast of Site)	Night-time	100% Speed Jinko BESS 28degC	32 [41]	**27-30**	-5 to -2	**Low**
R2. Ing Road (East of Site)	Night-time	100% Speed Jinko BESS 28degC	28 [43]	**22-32**	-6 to +4	**Low to Below Adverse**
R3. Hammond Beck (South of Site)	Night-time	100% Speed Jinko BESS 28degC	28 [41]	**20-22**	-8 to -6	**Low**
R4. Northorpe Road (Southwest of Site)	Night-time	100% Speed Jinko BESS 28degC	32 [44]	**16-20**	-16 to -12	**Low**

Note: Column 5 is the subtraction of column 4 from column 3.
[1] Noise characteristics at receptor locations do not include a penalty as this would be controlled by mitigation and design.

7. Noise Mitigation Measures:

The noise predictions include for an acoustic screen around the BESS compound based on a screen height of 3.5m with an acoustically absorbent inner facing (i.e. facing the plant e.g. Tilon Supabarrier or similar with minimum mass of 13kg/m2).

8. Conclusions:

The results of the noise prediction modelling with the assumed plant noise levels and layout provided by the client shows that with the 3.5m high acoustic screen and the 100% power option with the proposed Jinko BESS and Inverter PCSK GEN 3 (80% ventilation daytime/sunrise & 60% ventilation night-time) the noise levels at NSR would be within the

limits set out in planning condition 21. This is on the assumption that the noise level at the NSR contains no tonal noise character (this would be checked during commissioning tests).

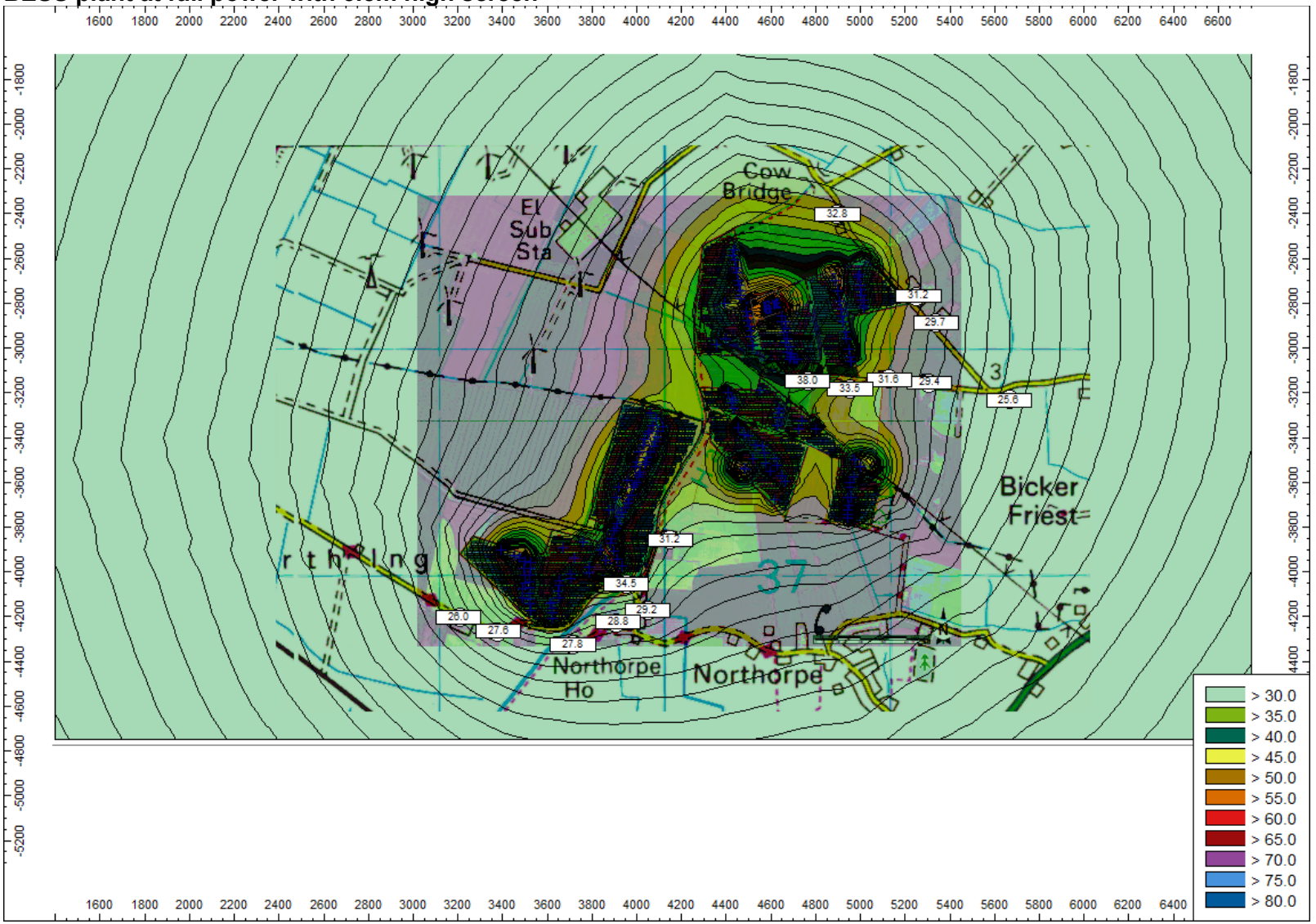
We hope the above provides sufficient information in respect of the review of the noise impacts at NSR and conclusions for the updated development layout.

Yours sincerely,

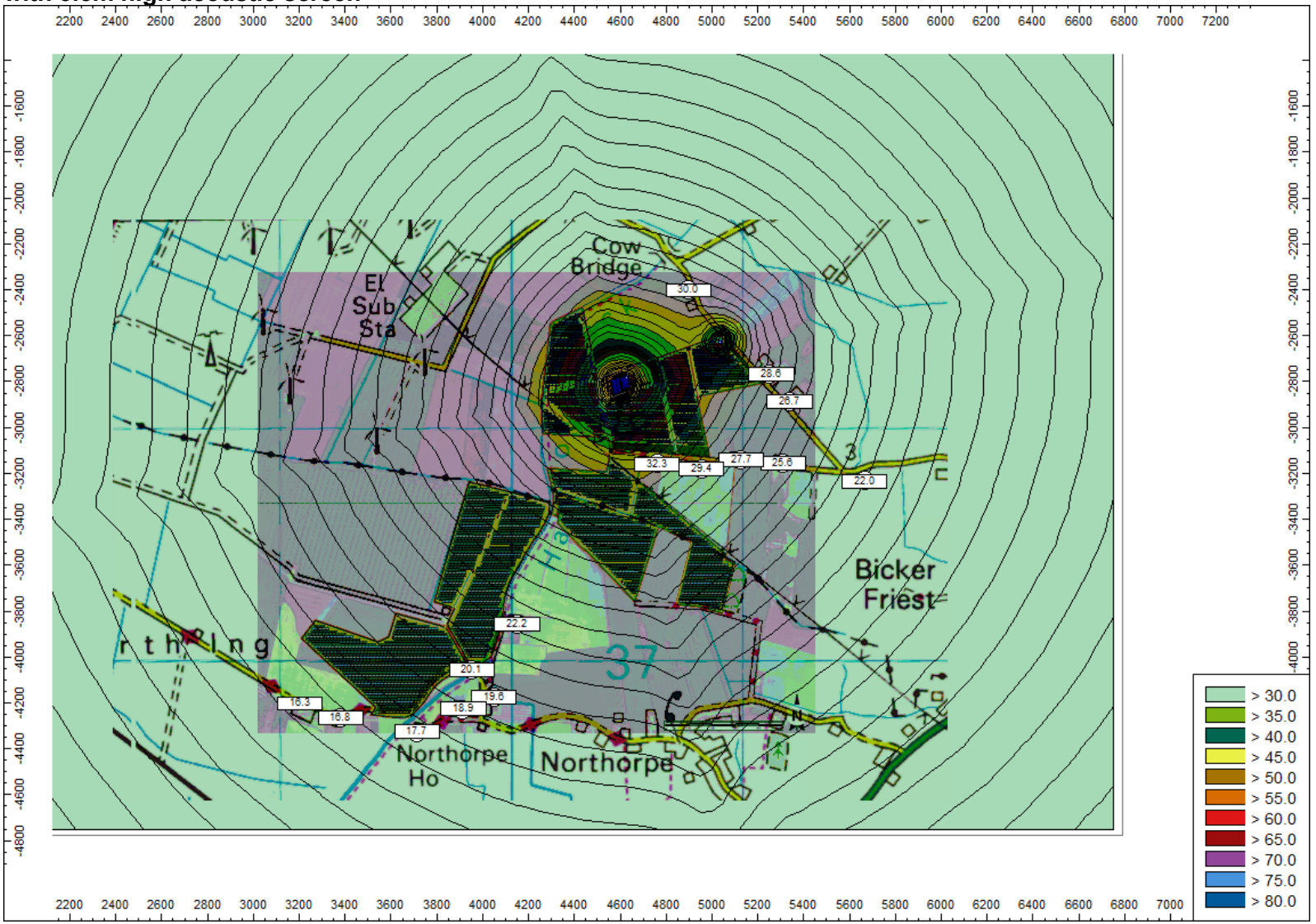


D R Kettlewell MSc MIOA MAE I.Eng
Managing Director
Principal Acoustic Consultant

Noise Map 1: Results of Daytime (0700-2300 hours) or Sunrise (0500-0700 hours) Operations (4m AGL) with Solar and BESS plant at full power with 3.5m high screen



Noise Map 2: Results of Night-time Operating Hours (4m AGL) with BESS plant in operation at full power (2300-0500 hours)
w Noise Map 2: Results of Night-time Operating Hours (4m AGL) with BESS plant in operation at full power (2300-0500 hours) with 3.5m high acoustic screen



Appendix 1:

Jinko BESS Plant Noise Levels

浙江晶科储能有限公司
www.jinkosolar.com
嘉兴市海宁市黄湾镇采宝路6号
No. 6 Caibao Road, Huangwan Town, Haining City, Jiaxing City
电话：18687107504
Tel: 18687107504

Acoustic Emission Report for SunTera 5.015MWh BESS

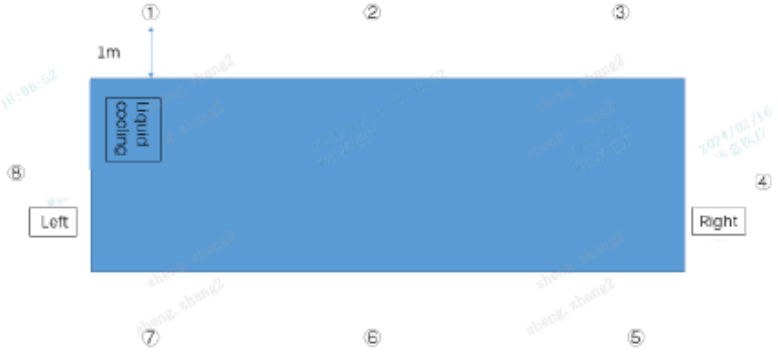
NDA REQUIRED



Version 1.0

2. Testing Items

No.	Check Point	Testing Method	Reference Standard
1	Noise Check	1.Tests should be conducted during quiet periods with minimal background noise. 2.Testing point selection and distance from the container: 1m, with a height from the ground of 1.5m Four surfaces are measured at eight points (as per test point location image). 3.First, record the background noise. Then, activate the fan of the liquid cooling unit of the energy storage system to capture the maximum noise value of the fan under the following PWM settings: 100% PWM	ISO3746:2010



Test Point Location

3. Testing Data

3.1 Background Noise Test & 1/3 Octave Data							
Test condition: Fan is not turned on and energy storage system is not energized.							
Testing Point	Max. Value (dBA)	Testing Point	Max. Value (dBA)	Testing Point	Max. Value (dBA)	Testing Point	Max. Value (dBA)
①	37.10	②	28.37	③	32.10	④	33.92
⑤	26.09	⑥	26.22	⑦	25.22	⑧	32.10

3.2 HVAC only (Fan's speed100%) & 1/3 Octave Data		
Testing Point	1m Max. Value (dBA)	Notes
①	55.02	Environment Temperature:28℃
②	52.98	
③	51.06	
④	48.82	
⑤	58.02	
⑥	62.78	
⑦	68.50	
⑧	74.78	

3.3 HVAC (Fan's speed 100%) and liquid cooling system & 1/3 Octave Data		
Testing Point	1m Max. Value (dBA)	Notes
①	55.34	Environment Temperature:28℃
②	53.29	
③	51.28	
④	48.60	
⑤	58.25	
⑥	63.02	
⑦	68.96	
⑧	74.72	