

# SHARPS REDMORE

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## Report 1c

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Proposed BESS, Muttonhole  
Road, Hamilton

Environmental Noise  
Assessment

### Prepared by

Ian Harley BSc (Hons) MSc MIOA

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Project No 2422373

### Scotland

#### Sharps Redmore

Suite 225, Castle House, 1 Baker Street,  
Stirling, Scotland, FK8 1AL

T 01786 357660

E [scotland@sharpsredmore.co.uk](mailto:scotland@sharpsredmore.co.uk)

W [sharpsredmore.co.uk](http://sharpsredmore.co.uk)

### Regional Locations

Scotland, South England (Head Office),  
North England, Wales

#### Sharps Redmore Partnership Limited

Registered in England No. 2593855

#### Directors

RD Sullivan BA(Hons), PhD, CEng, MIOA, MAAS, MASA;

KJ Metcalfe BSc(Hons), MIOA;

N Durup BSc(Hons), MSc, PhD, CEng, FIOA, MInstP, MASA, MAES;

GJ King MIOA, MCIEH

#### Company Consultant

TL Redmore BEng, MSc, PhD, MIOA



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## Contents

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- 1.0 Introduction
- 2.0 Assessment methodology and criteria
- 3.0 Environmental noise survey details
- 4.0 Noise assessment
- 5.0 Assessment conclusions

## Appendices

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- A. Location of application site
- B. Noise survey results

## AMENDMENT RECORD SHEET

The following table provides a summary of the amendments to this report.

Section amended	Report reference	Date of issue
Initial version	R1	4 <sup>th</sup> September 2024
Revised scheme layout	R1a	26 <sup>th</sup> November 2024
Revised scheme layout; 4.3 and 4.4 updated	R1b	2 <sup>nd</sup> April 2025
4.3 and 4.4 updated; Tables 4.1 & 4.3 updated	R1c	3 <sup>rd</sup> April 2025

### DISCLAIMER

This report has been prepared with all reasonable skill, care and diligence commensurate with an acoustic consultancy practice under the terms and brief agreed with our client at that time. Sharps Redmore provides no duty or responsibility whatsoever to any third party who relies upon its content, recommendations or conclusions.

The contents of this report should be reviewed by other disciplines to confirm that it is appropriate for their design.

## 1.0 Introduction

- 1.1 Sharps Redmore (SR) has been instructed by Cogeo Planning and Environmental Services to carry out a noise assessment for the installation of a Battery Energy Storage System (BESS) on land off Muttonhole Road, Hamilton.
- 1.2 The site lies to the north of Muttonhole Road to the south west of Hamilton. Although the road passes through a rural area, based on observation it appears to be a well-used cut through between more major roads which link Hamilton to Strathaven to the south and East Kilbride to the west. The location of the site is shown in Figure 1 below:

**Figure 1.1: Site Location**



- 1.3 The site is currently grassed farmland. The proposed site layout is shown in Appendix A to this report.
- 1.4 We understand that there will be four different noise-emitting sources associated with the development. These are the Power Conversion Units (PCU units), the Battery Storage Units (BSUs), the transformers, and the Switchroom/Substation.
- 1.5 The report is structured as follows:
- Section 2.0 - discussion of the available methods of assessment and assessment criteria.
  - Section 3.0 – Details of environmental noise survey
  - Section 4.0 – Assessment of operation noise
  - Section 5.0 – Summary and Conclusions

## 2.0 Assessment methodology and criteria

- 2.1 Planning Advice Note PAN 1/2011 Planning and Noise sets out the Scottish Government's advice and information on technical noise planning matters. PAN 1/2011 provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise. It has an accompanying Technical Advice Note (TAN) entitled "Assessment of Noise".
- 2.2 PAN 1/2011 states that *"the following issues may be relevant when considering noise issues"*:
- Avoidance of significant adverse noise impacts from new developments,
  - Applying criteria reasonably,
  - Use of mitigation measures to manage noise impacts
- 2.3 The Technical Advice Note goes on to define magnitudes of noise impacts in a number of different circumstances, although no specific advice is given for commercial developments affecting noise-sensitive buildings.

### Assessment using BS 4142:2014+A1:2019

- 2.4 This British Standard describes a method for rating and assessing sound of industrial and/or commercial nature according to the following summary process:
- i) Carry out a numerical assessment of the noise, taking into the character and areas of uncertainty, by comparing the noise against the existing background noise level. Where the new noise is higher than the existing background, the greater the difference between the two, the greater the impact.
  - ii) By considering the noise impact against the context in which it is placed. There are many contextual points to consider when considering an assessment of sound impact including the following:
    - The absolute level of sound.
    - The character and level of the specific sound compared to the existing noise climate.
    - The sensitivity of the receptors.
    - The time and duration that the specific sound occurs.
    - The ability to mitigate the specific sound through various methods, for example by screening, the selection of quiet plant equipment, the use of attenuators, through the imposition of noise management plans and good practice, façade design and layout/orientation.
    - The form and scale of a development. For example, does the proposed development involve a new industrial/commercial premises or is the proposal the installation of new plant or an extension to an existing premises?

- 2.5 It is therefore entirely possible that whilst the numerical outcome of a BS 4142 assessment is indicative of adverse or even significant adverse impact, when the proposal is considered in context the significance of the impact is reduced to an acceptable level.
- 2.6 It is noted that BS4142:2014+A1:2019 does not require the consideration of the absolute lowest background noise level, but rather the background level that can be considered to be typical of the location in question.

### 3.0 Environmental noise survey details

- 3.1 To determine the likely effects from noise from the development a survey of existing noise levels was carried out at the site between 26<sup>th</sup> and 28<sup>th</sup> February 2024. Measurements were taken at a location within the application site at a position which is considered to be representative of the existing noise climate at the nearest noise sensitive property to the development (the residential aspect of the Cozycatz Cattery which is approximately 450m to the east of the site).
- 3.2 The monitoring location is shown in Figure 3.1 below and described in Table 3.1 below.

**Figure 3.1: Monitoring Location**



**Table 3.1: Description of monitoring locations**

Equipment Used	Site Description	Weather Conditions
RION NL52 Class 1 Sound Level Meter	Microphone mounted on a pole which was attached to the perimeter fence in free-field conditions at a height of 1.5m	Variable conditions (see below)

- 3.3 Measurements were taken continuously at 15 minute intervals to determine the existing daytime (0700 – 2300 hrs) and night time (2300 – 0700 hrs) noise levels. Full details of the survey are included in Appendix B and are summarised in Table 3.2 below.

**Table 3.2: Summary of measured site noise levels**

Time	Noise level (dB)	
	$L_{Aeq,T}$	$L_{A90,T}$
Daytime (07:00-23:00hrs)	51.1-71.2	32.9-58.5
Night-time (23:00-07:00hrs)	38.1-64.3	31.4-56.7

- 3.4 Noise levels are dominated by regular road traffic noise on Muttonhole Road and that on the wider road network.
- 3.5 The survey was planned in line with relevant meteorological requirements regarding wind speed and rainfall. Based on observations of the weather forecast it was concluded that the data collected from the beginning of the survey and through the first night-time period is appropriate for use.
- 3.6 The selection of appropriate and defensible data is discussed in section 4 of this report to allow for a robust assessment of the potential for noise impact. This is also done in consideration of the requirements in BS4142:2014+A1:2019 with regards to uncertainty.



## 4.0 Noise assessment

- 4.1 As outlined in section 1.0 of this report, planning permission is being sought for the installation of a new BESS scheme on land off Muttonhole Road, Hamilton.
- 4.2 The nearest noise-sensitive residential property to the application site is Dykend Farm which is approximately 450m to the east of the nearest boundary of the application site.
- 4.3 The noise sources associated with the operating site will be 226 Battery Storage Units (BSUs), 113 Power Conversion Units (PCUs), two transformers, and a substation.
- 4.4 The distance from the nearest BSU and PCU to the noise-sensitive premises (Dykend Farm) is approximately 450m. The distance from the substation and transformers to Dykend Farm is approximately 675m. Due to these distances it is appropriate to only consider the 50% of units nearest to the receiver point as the more distant units will tend not to have an impact on the noise-sensitive receptor. The distance from the centre of the BSU/PSU development to the receptor at Dykend Farm is 530m.
- 4.5 The assessment of noise from the operating application site will be measured against the following criteria:
- dB(A) level compared to the measured background noise ( $L_{A90}$ ) with regard to BS4142:2014
  - Reference to external and internal NR levels
- 4.6 Information on the BSUs and PCUs that will be installed on site have been provided by the supplier of the units. It is noted, however, that relevant specific noise data is not available for the units. On review of the units, it is clear that the main noise sources from each will be the transformers, as is the case for the substations.
- 4.7 Sharps Redmore hold relevant library data for similar transformer units. This is to be used in the following assessments:
- BSUs and PCUs: similar to a small transformer (Sound Power of 59 dB(A))
  - Substations: similar to a large transformer (Sound Power of 72 dB(A))

#### Noise from the BSUs and PCUs

- 4.8 The following table shows the calculation process that has been used to demonstrate the noise level of the BSUs and PCUs outside the nearest noise-sensitive premises. Based on the layout, number of units, and distance to the noise-sensitive property the distance attenuation is calculated from the centre of the application site.

**Table 4.1: Prediction of BSU and PCU noise**

	dB(A)
Sound Power Level of a small transformer ( $L_{WA}$ dB)	59
Assessed number of BSUs (113) and PCUs (57): $10\log 170$	+22
Distance attenuation ( $10\log Q/4\pi r^2$ ) where $Q=2$ and $r=530m$	-62
Specific Sound Level of BSUs and PCUs outside the nearest noise-sensitive premises	19

#### Noise from substation and transformers

- 4.9 The assessment of substation noise is considered as a worst-case scenario that the transformers are open to the atmosphere. In reality the housing for the substation will provide some additional attenuation.
- 4.10 The following table shows the calculation process that has been used to demonstrate the noise level of the proposed substation and transformers outside the nearest noise-sensitive premises.

**Table 4.2: Prediction of substation and transformer noise**

	dB(A)
Sound Power Level of a large transformer ( $L_{WA}$ dB)	72
Total number of substations/transformers (3): $10\log 3$	+5
Distance attenuation ( $10\log Q/4\pi r^2$ ) where $Q=2$ and $r=675m$	-65
Specific Sound Level of the substations and transformers outside the nearest noise-sensitive premises	12

#### 4.11 Discussion of noise assessment

The following table combines the noise level of the BSUs, PCUs and substations as assessed to a location outside the front of Dykend Farm - the nearest noise-sensitive premises. The combined noise level is then compared to the existing background noise level to determine the likelihood of complaints due to noise from the proposed development.

**Table 4.3: Combined noise level and assessment value**

	dB(A)
Noise level of BSUs and PCUs outside noise-sensitive premises (table 4.1)	19
Noise level of substations outside noise-sensitive premises (table 4.2)	12
<b>Total Specific Sound Level</b>	<b>20</b>
Typical lowest $L_{A90}$ (15min) at night (23:00-07:00)	31
Typical lowest $L_{A90}$ (15min) in the day (07:00-23:00)	33
Night-time Specific level compared to night-time background level	-11
Daytime Specific level compared to daytime background level	-13

As noted previously, BS4142:2014+A1:2019 does not necessarily require the assessment to consider the absolute lowest background noise level but can reasonably consider the typical background noise level.

Notwithstanding this, and as a worst-case scenario, the above assessment has in fact considered the absolute lowest background noise level measured at the site. Even when comparing to this lowest background level, the noise level of the BSUs, PCUs and substations will be significantly below the background noise level ( $L_{A90}$ ) as assessed outside the nearest noise-sensitive property.

Whilst the methodology of BS4142:2014+A1:2019 allows for the consideration of noise corrections due to intermittency, tonality and impulsivity, it is also generally accepted that when a noise source is a significant distance from the receiver, and the resultant level is so significantly below the lowest measured background noise, these corrections are not appropriate. This is because the likelihood of human response to these characters of the noise in question is associated with the likelihood of being able to hear the noise in the first place.

The result of this assessment is a clear demonstration that noise from the BSUs, PCUs and substations will be acceptable at the nearest noise-sensitive premises. It is therefore predicted that there would not be a significant adverse impact from noise due to the proposed development.

Further to the above, with the accepted relationship of  $NR + 6 \approx dB(A)$ , the NR level outside the nearest noise sensitive property could be considered to be no higher than NR16. This should also be considered to be acceptable.

## **5.0 Assessment conclusions**

- 5.1 Planning permission is being sought for the installation of a Battery Energy Storage System (BESS) on land off Muttonhole Road, Hamilton.
- 5.2 Sharps Redmore have carried an assessment of the potential noise impact from the proposed use including:
  - Noise from the Power Conversion Units (PCU units);
  - Noise from the Battery Storage Units (BSUs);
  - Noise from the proposed substation and transformers
- 5.3 Against accepted methods of assessment this report objectively demonstrates that the proposal will not give rise to significant adverse noise impacts.
- 5.4 This conclusion is based on a worst-case scenario of the use of the absolute lowest background noise level.
- 5.5 Even with this worst-case assumption, it is concluded that the proposals can proceed in terms of noise.

## **APPENDIX A**

### **LOCATION OF APPLICATION SITE**

## Site Plan



## **APPENDIX B**

### **NOISE SURVEY RESULTS**

Start Time	L <sub>Aeq</sub>	L <sub>A90</sub>	L <sub>Amax</sub>
26/02/2024 14:45:00	59.6	34.9	77.2
26/02/2024 15:00:00	62.2	40	77.7
26/02/2024 15:15:00	62	38.6	76.1
26/02/2024 15:30:00	62.2	45.3	74.4
26/02/2024 15:45:00	63.2	44	74.2
26/02/2024 16:00:00	64.6	48.9	74.8
26/02/2024 16:15:00	63.9	48.1	79.8
26/02/2024 16:30:00	64.1	47	76.4
26/02/2024 16:45:00	65.1	49.9	76.2
26/02/2024 17:00:00	65.8	55.1	74.7
26/02/2024 17:15:00	65.9	51.9	75.6
26/02/2024 17:30:00	66	49.4	87.5
26/02/2024 17:45:00	64.7	49.2	76.4
26/02/2024 18:00:00	63.5	49.5	76.2
26/02/2024 18:15:00	63.3	48.2	74.2
26/02/2024 18:30:00	62.6	44.9	75.1
26/02/2024 18:45:00	61.3	37.9	75.4
26/02/2024 19:00:00	61.5	38.9	76.8
26/02/2024 19:15:00	63.4	45.3	74.3
26/02/2024 19:30:00	61	38.8	77.1
26/02/2024 19:45:00	61.3	38.4	74.9
26/02/2024 20:00:00	59.8	36.9	74.7
26/02/2024 20:15:00	58.5	38.6	74.2
26/02/2024 20:30:00	58.4	38.6	73.3
26/02/2024 20:45:00	56.9	36.2	72.9
26/02/2024 21:00:00	58.1	37.5	71.7
26/02/2024 21:15:00	57.2	36.6	71.2



26/02/2024 21:30:00	54.6	34.3	75.7
26/02/2024 21:45:00	54.7	32.9	71.4
26/02/2024 22:00:00	57.8	34.4	77.2
26/02/2024 22:15:00	55.8	33.5	73.2
26/02/2024 22:30:00	53.7	34.9	76.9
26/02/2024 22:45:00	51.1	37.8	73.1
26/02/2024 23:00:00	51.2	37.2	73.4
26/02/2024 23:15:00	50.3	37.5	71.8
26/02/2024 23:30:00	46.6	39.2	68.1
26/02/2024 23:45:00	50.6	40	73.6
27/02/2024 00:00:00	49.5	39.4	70
27/02/2024 00:15:00	49	39.7	70
27/02/2024 00:30:00	51.3	39.8	74.2
27/02/2024 00:45:00	43.1	40.4	49.7
27/02/2024 01:00:00	44	39.4	65.1
27/02/2024 01:15:00	42.9	39.9	53.8
27/02/2024 01:30:00	43	40.2	50.9
27/02/2024 01:45:00	43.5	39.9	53
27/02/2024 02:00:00	41.7	38.7	53.5
27/02/2024 02:15:00	45.8	41.4	53.7
27/02/2024 02:30:00	45.8	39.1	58.8
27/02/2024 02:45:00	49.2	44.8	57.7
27/02/2024 03:00:00	52	44.2	77.4
27/02/2024 03:15:00	49.9	45	59.1
27/02/2024 03:30:00	51.2	45.2	73.3
27/02/2024 03:45:00	49.2	43.8	62.5
27/02/2024 04:00:00	45.6	42.3	53.6
27/02/2024 04:15:00	52.5	45.8	74
27/02/2024 04:30:00	53.6	47.6	73.1

27/02/2024 04:45:00	55.1	47.9	71.4
27/02/2024 05:00:00	58.6	51.2	75.5
27/02/2024 05:15:00	57.2	50.2	71.9
27/02/2024 05:30:00	59.8	49.4	78.4
27/02/2024 05:45:00	61	51.9	75.4
27/02/2024 06:00:00	60.2	51.6	75.6
27/02/2024 06:15:00	61.9	51.6	76.7
27/02/2024 06:30:00	64.2	53.4	77.7
27/02/2024 06:45:00	64.3	56.7	78.8
27/02/2024 07:00:00	64.4	54.6	78.3
27/02/2024 07:15:00	66.6	52.8	78
27/02/2024 07:30:00	67.8	56.5	79
27/02/2024 07:45:00	68.3	56.1	78.4
27/02/2024 08:00:00	67.2	54.6	80.9
27/02/2024 08:15:00	69.6	58.5	79.3
27/02/2024 08:30:00	69.4	57.2	79
27/02/2024 08:45:00	69.4	56.8	93.5
27/02/2024 09:00:00	66	52.8	79.8
27/02/2024 09:15:00	64.8	51.3	77.6
27/02/2024 09:30:00	64.6	51	77.5
27/02/2024 09:45:00	64.7	50.9	77.5
27/02/2024 10:00:00	63.9	52	79.7
27/02/2024 10:15:00	63.1	51.8	78
27/02/2024 10:30:00	63.8	49	78.6
27/02/2024 10:45:00	63.2	48.4	78.2
27/02/2024 11:00:00	61.8	46.4	76.6
27/02/2024 11:15:00	61.9	44.8	75.7
27/02/2024 11:30:00	63.6	46.5	81.2
27/02/2024 11:45:00	61.4	48.8	76.2

27/02/2024 12:00:00	61	45.4	74.7
27/02/2024 12:15:00	61.7	45.3	74.8
27/02/2024 12:30:00	61.5	46.2	76.2
27/02/2024 12:45:00	62.7	46.5	74.5
27/02/2024 13:00:00	62.8	49.9	76.8
27/02/2024 13:15:00	63.5	54.1	75.4
27/02/2024 13:30:00	62.7	46.8	76.9
27/02/2024 13:45:00	61.9	45.8	77
27/02/2024 14:00:00	62.7	46.2	78.4
27/02/2024 14:15:00	62.2	45.8	75
27/02/2024 14:30:00	63.7	46.1	74.8
27/02/2024 14:45:00	63.1	47.7	75.7
27/02/2024 15:00:00	63.7	48.7	76.8
27/02/2024 15:15:00	64.2	49.7	75.9
27/02/2024 15:30:00	63.3	48.7	75.9
27/02/2024 15:45:00	65.4	49.8	77.6
27/02/2024 16:00:00	65.9	51.2	77.6
27/02/2024 16:15:00	66.7	54.3	77.5
27/02/2024 16:30:00	66	49.2	78.8
27/02/2024 16:45:00	66.6	52.9	76.2
27/02/2024 17:00:00	66.4	51.7	76.2
27/02/2024 17:15:00	66.9	52.7	76
27/02/2024 17:30:00	67	52.3	75.9
27/02/2024 17:45:00	64.5	45.5	75
27/02/2024 18:00:00	64.6	50.4	75.2
27/02/2024 18:15:00	62.9	45.6	78.4
27/02/2024 18:30:00	61.9	42.9	75.5
27/02/2024 18:45:00	62.2	45.2	78.2
27/02/2024 19:00:00	61.8	44.8	75.2

27/02/2024 19:15:00	62.9	44.5	78
27/02/2024 19:30:00	60.1	44.5	76.7
27/02/2024 19:45:00	61.2	44	77
27/02/2024 20:00:00	61.9	45.8	76.6
27/02/2024 20:15:00	59.6	43.3	75.8
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27/02/2024 21:45:00	55	40.2	72.8
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27/02/2024 23:45:00	49.3	40	68.4
28/02/2024 00:00:00	48	39.8	69.1
28/02/2024 00:15:00	47.8	39	67.8
28/02/2024 00:30:00	41.1	38.7	47.9
28/02/2024 00:45:00	39.8	37.4	46.4
28/02/2024 01:00:00	40.8	38.1	47.2
28/02/2024 01:15:00	39.4	36.3	47
28/02/2024 01:30:00	38.1	35.8	43.7
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28/02/2024 08:00:00	65.7	49.6	77
28/02/2024 08:15:00	66.8	52.1	75.1
28/02/2024 08:30:00	68.2	52.4	77.6
28/02/2024 08:45:00	65.9	49.2	80