



St. Austell Battery Site

Noise Assessment

For Aldustria

Date: 5 April 2024

Doc ref: 17716-HYD-ZZ-XX-RP-Y-1002

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Merchants House North Wapping Road Bristol BS1 4RW United Kingdom	T +44 (0)117 9459225 E bristolcentral@hydrock.com www.hydrock.com
Client	Aldustria	
Project name	St. Austell Battery Site	
Title	Noise Assessment	
Doc ref	17716-HYD-ZZ-XX-RP-Y-1002	
Project no.	C-17716	
Status	S2	
Date	05/04/2024	

Document Production Record		
Issue Number	P01	Name
Prepared by		Elena de Juan
Checked by		Chris Borak
Approved by		Vince Taylor

Document Revision Record			
Issue Number	Status	Date	Revision Details
P01	S2	18/02/2022	First Issue
P02	S2	05/04/2022	Updated Site Layout

Hydrock Consultants Limited has prepared this report in accordance with the instructions of the above named client for their sole and specific use. Any third parties who may use the information contained herein do so at their own risk.

CONTENTS

NOISE ASSESSMENT	1
St. Austell Battery Site	1
1. INTRODUCTION	1
2. OUTLINE DESCRIPTION OF THE DEVELOPMENT	2
3. ASSESSMENT METHODOLOGY	3
3.1 Local and National Policy	3
British Standard 4142:2014+A1:2019	4
BS8233:2014 and World Health Organisation (WHO) Guidelines for Community Noise, 1999	5
4. NOISE SURVEY	7
4.1 Methodology	7
4.2 Survey Results	8
5. NOISE ASSESSMENT	10
5.1 Fixed Plant and Equipment.....	10
5.2 Noise Modelling	10
6. BS4142 ASSESSMENT	13
7. SUMMARY	14

Tables

Table 1: Survey Equipment	8
Table 2: Weather Data	8
Table 3: Summary of Survey Results.....	9
Table 4: Battery Container Sound Levels.....	10
Table 5: Assumed Electrical Equipment Sound Levels.....	10
Table 6: BS4142:2014 Assessment	13

Figures

Figure 1: Proposed Development Site	2
Figure 2: Measurement Positions.....	7
Figure 3: Predicted Noise Levels at Receptors (dB)	12

Appendices

Appendix A Background Sound Level Distribution	
--	--

Noise Assessment

St. Austell Battery Site

1. INTRODUCTION

Hydrock is appointed to provide acoustic consultancy services in relation to the proposed Battery Energy Storage System (BESS) at Mount Stamper Road, St. Austell.

A noise survey of the site was carried out over the period 14th - 17th January 2022 to determine Background Sound Levels at existing noise sensitive receptors.

A noise assessment has been carried out based on the methodology described in BS4142:2014 + A1 2019, as require by Cornwall Council's "Development Sound Standard" (DSS), June 2017.

2. OUTLINE DESCRIPTION OF THE DEVELOPMENT

Proposals have been made for a new Battery Energy Storage System (BESS) adjacent to Mount Stamper Road. The proposed development site is shown in Figure 1.

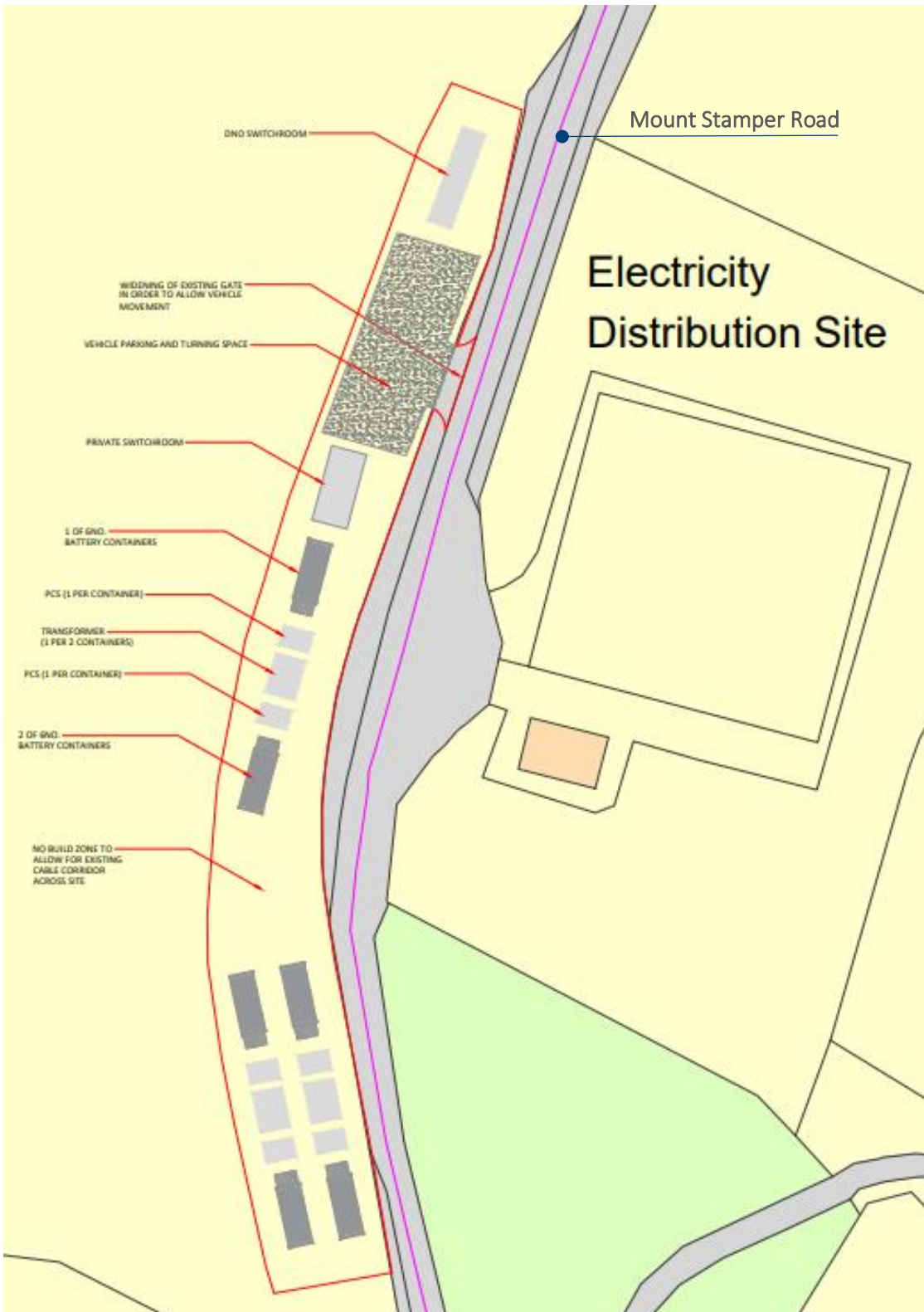


Figure 1: Proposed Development Site

3. ASSESSMENT METHODOLOGY

3.1 Local and National Policy

The site is located within the administrative boundary of Cornwall Council. The Cornwall Local Plan, Strategic Policies 2010-2030 states the following with regards to noise and development:

Policy 13: Development Standards

“All new development will be expected to achieve the provision of the following:

5.Avoidance of adverse impacts, either individually or cumulatively, resulting from noise, dust, odour, vibration, vermin, waste pollution and visual effects. Such adverse impacts should be avoided or mitigated during the construction, operation or restoration stage of development...”

Policy 16: Health and Wellbeing

“To improve the health and wellbeing of Cornwall’s communities, residents, workers and visitors, development should:

1.Protect, and alleviate risk to, people and the environment from unsafe, unhealthy and polluted environments by avoiding or mitigating against harmful impacts and health risks such as air and noise pollution and water and land contamination and potential hazards afforded from future climate change impacts...”

It should be noted that Cornwall Council’s Local Policies and planning decisions should be in line with the National Planning Policy Framework (NPPF), June 2021, which provides a general assumption in favour of sustainable development:

“The purpose of the planning system is to contribute to the achievement of sustainable development. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection”

The UNs 17 Global Goals for Sustainable Development include “Affordable and Clean Energy” and “Climate Action”. Adequate national energy storage provision is a vital part of the UK’s efforts to decarbonise the national grid and meet these two UN sustainable development goal. Therefore, the proposed development should be considered favourably as a necessary part of the UK’s sustainable development strategy.

3.1.1 Cornwall Council Development Sound Standard (DSS)

The DSS was developed to assist in assessing the impact of noise from new developments on health and quality of life.

The criteria are derived from the BS8233:2014 and BS4142:2014 standards. For industrial use, Criterion 2, based on BS4142:2014, is applicable to:

- *“the assessment of sound from proposed, new, modified or additional source(s) of an industrial and/or commercial nature, where new noise sources are brought to existing noise-sensitive receptors.*
- *the assessment of sound at proposed new dwellings or premises used for residential purposes, where the development will be affected by existing noise of an industrial/commercial nature*

Sound criterion 2

The rating level $L_{Ar,Tr}$ of sound from the proposed development at the curtilage of amenity areas at Noise Sensitive Receptors should not be greater than the L_{A90} background sound level. The rating level is to be determined in accordance with the methodology prescribed in BS 4142:2014.

Sound criterion 2 will not apply where there are no external amenity areas at the affected properties. The effect of the new sound source on existing noise sensitive receptors, should in most cases be assessed following the guidance in BS 8233:2014."

The development should aim to meet Criterion 2 as described above. Therefore, this assessment is based on the methodology described in BS4142:2014 and noise emissions will be controlled to below the existing Background Sound Level where practicable. However, guidance from the World Health Organisation (WHO) and BS8233:2014 will also be considered where applicable or in the event that the derived BS4142:2014 limits cannot be achieved. This approach is in line with the advice from BS4142:2014 and the DSS: *"Where Criterion 2 cannot be achieved, the sound assessment should include a justification as to why the proposed development should be considered acceptable in terms of noise."*

British Standard 4142:2014+A1:2019

The standard method for assessing the noise impact from industrial and commercial activity is British Standard BS4142 "Method for rating and assessing industrial and commercial sound". A BS4142 assessment is made by determining the difference between the intrusive noise under consideration (known as 'the specific noise') and the background noise at the receptor. The background noise, as represented by the L_{A90} parameter, is the noise level in the absence of the specific noise. The standard requires an assessment of the typical Background Sound Level.

The Specific Noise (from the proposed development) is assessed in terms of the L_{Aeq} parameter but a character penalty can be applied for tonal, impulsive or intermittent characteristics. Intermittency is defined as having an identifiable on/off condition and a penalty of 3dB is applicable if *"the intermittence is readily distinctive against the residual acoustic environment"*. The specific noise should be calculated or measured over a 1-hour period during the day and a 15-minute period during the night.

The Specific Sound Level (L_{Aeq}), with the character correction (if necessary), is known as the Rating Level, L_{Ar} . The standard then gives the following criteria for assessment based on the difference between the typical Background Sound Level (L_{A90}) and the Rating Level (L_{Ar}):

- "a) Typically, the greater this difference the greater the magnitude of the impact.*
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- c) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source has a low impact, depending on the context."*

The standard highlights the importance of considering the context in which a sound occurs. Factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

The standard notes the need to consider absolute sound levels where background sound levels are low:

"For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.

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

One of the significant differences between BS4142:2014 and previous editions of the Standard is the explicit requirement to consider context as part of the assessment.

It is no longer adequate to simply compare the Rating Level and the Background Sound Level without due regard to the context of the acoustic environment and the sound source. The context can significantly affect the outcome of the initial estimate, which is based solely on the difference between the Rating and Background Sound Levels.

Due to the way L_{90} is calculated it means that the difference between Rating and Background Sound Levels can be identical for two locations with very different acoustic characteristics and corresponding sensitivities to noise.

In addition to comparing the level and character of the specific and residual sound, the context also includes careful consideration of other factors such as the character of the locale e.g. quiet rural or predominantly industrial; receptors sensitivity e.g. outdoor amenity space or indoors; and duration and time of specific sound e.g. day or night.

Depending upon the context and in instances where the Background Sound Level is considered to be low, other guidance may be more appropriate, such as considering the potential impact of sound on residents during the night when the primary concern is to ensure that they are not disturbed whilst sleeping, possibly with open bedroom windows. In this case the difference between Background Sound Level and Rating Level outdoors may be of less significance than the indoor absolute sleep disturbance criteria from WHO Guidelines and BS8233:2014.

It is considered therefore on the basis of the above guidance that in addition to assessing noise impacts against existing Background Sound Levels at receptors, it may be appropriate to consider internal noise criteria for habitable rooms from BS8233:2014.

[BS8233:2014 and World Health Organisation \(WHO\) Guidelines for Community Noise, 1999](#)

For dwellings the main considerations are to protect sleep in bedrooms at night and to protect resting, listening and communicating in all rooms during the day. For noise without a specific character BS8233:2014 identifies desirable internal limits during the 8-hour night (2300-0700 hours) or 16-hour day time (0700-2300 hours) of 30dB L_{Aeq} and 35dB L_{Aeq} respectively.

For dwellings where windows may be opened, an internal target of 35 dB L_{Aeq} during the day, and 30 dB L_{Aeq} during the night, equates to around 50 dB L_{Aeq} and 45 dB L_{Aeq} during the day and night respectively outside noise sensitive rooms.

The BS8233:2014 noise limits are for noise without a specific character. The standard notes that people are often more tolerant of noise without a specific identifiable character and that noise from neighbours (or a specific businesses) can trigger "*complex emotional reactions*". Therefore, in the UK, the BS8233:2014 noise limits (which are derived from WHO Guidelines) are often applied only to what is termed "*anonymous noise*". That is, noise without a specific character and that cannot be easily identified as emanating from a single business, building, or neighbour.

It should be noted that the BS8233:2014 noise limits are derived from limits identified in the World Health Organisation (WHO) “*Guidelines for Community Noise*”, which are applicable to annoyance:

“The effects of noise in dwellings, typically, are sleep disturbance, annoyance and speech interference. For bedrooms the critical effect is sleep disturbance. Indoor guideline values for bedrooms are 30 dB L_{Aeq} for continuous noise and 45 dB L_{Amax} for single sound events. Lower noise levels may be disturbing depending on the nature of the noise source. At night-time, outside sound levels about 1 metre from facades of living spaces should not exceed 45 dB L_{Aeq} , so that people may sleep with bedroom windows open. This value was obtained by assuming that the noise reduction from outside to inside with the window open is 15 dB. To enable casual conversation indoors during daytime, the sound level of interfering noise should not exceed 35 dB L_{Aeq} .”

BS4142:2014 is the standard method for assessing commercial and industrial noise in the UK. However, in certain circumstances BS4142:2014 notes that alternative noise limits such as those contained in BS8233:2014 and WHO Guidelines may be applicable.

It is considered that the BS8233:2014 noise limits are applicable where the intrusive noise is from a single identifiable source (e.g. the proposed battery storage site) but, the affected residents are unlikely to exhibit “*complex emotional reactions*”; for example, because it is a welcome development. It is further considered that BS8233:2014/WHO may be more applicable to night-time noise affecting bedrooms than BS4142:2014 as the critical effect is sleep disturbance.

4. NOISE SURVEY

4.1 Methodology

A survey was undertaken over the period of 14th January to 17th January 2022 to measure background sound levels. The measurement location is shown in Figure 2.



Figure 2: Measurement Positions

The measurement was undertaken in accordance with the guidance outlined in BS 4142:2014 and BS 7445-1:2003.

The measurement position was 1.5m above ground and at least 3.5m from building facades, walls or fences.

A Rion type WS-15 double layer wind-shield was fitted to the monitoring equipment at all times.

Details of the monitoring locations and equipment used are provided in Table 1.

Table 1: Survey Equipment

Monitoring Location	Equipment Used				Type of Measurement	Time Interval	Description of Noise Climate
	Manufacturer	Instrument	Type	Serial No. / Version			
Logger	Rion	Sound Level Meter	NL52	775960	Long term unattended	5 min	Noise from nearby electricity distribution site was not audible.
		Pre-Amplifier	NH25	76077			
		Microphone	UC59	11690			
	Acoustic Calibrator	NC74	35157401	Calibration	N/A	94.0 dB @ 1kHz, drift within normal tolerances	

A record of the weather conditions as published by www.timeanddate.com is presented in Table 2.

Table 2: Weather Data

Period	Mean Temperature Degrees Celsius	Events	Wind Speed m/s	Prominent Wind Direction
Friday, 14 January 2022	8	Clear	5	SE
Saturday, 15 January 2022	8	Overcast	3	SW
Sunday, 16 January 2022	10	Clear	5	NW
Monday, 17 January 2022	7	Clear	2	N

Average recorded wind speeds during the survey did not exceed 5 m/s and therefore wind noise would not have significantly affected measurements. There was no rainfall recorded during the survey.

4.2 Survey Results

4.2.1 Logger

The main acoustic parameters were measured using a time interval of 15 minutes as described below.

- $L_{Aeq,T}$ dB, defined as the 'A' weighted equivalent continuous sound pressure level. Over a defined time period 'T', it is the sound pressure level equivalent to the acoustic energy of the fluctuating sound signal. It is often referred to as the 'ambient noise level'.
- $L_{A90,T}$ dB, defined as the 'A' weighted sound pressure level exceeded for 90% of the measurement period 'T'. It is a statistical parameter and cannot be directly combined with other acoustic parameters. It is generally used to describe the prevailing background noise level.

A summary of the survey results is presented in Table 3. The equivalent continuous noise levels (L_{Aeq}) are the logarithmic average of the 15-minute interval values over the stated period. Mean and mode averages of the measured 15-minute Background Sound Levels are also presented.

Table 3: Summary of Survey Results

Start Time	End Time	L_{Aeq} , dB	L_{90} Mean, dB	L_{90} Mode, dB
14/01/2022 13:00:00	14/01/2022 19:00:00	54.2	38.0	38.6
14/01/2022 19:00:00	14/01/2022 23:00:00	46.9	32.5	34.0
14/01/2022 23:00:00	15/01/2022 07:00:00	42.1	30.0	29.0
15/01/2022 07:00:00	15/01/2022 19:00:00	54.4	36.5	36.3
15/01/2022 19:00:00	15/01/2022 23:00:00	47.1	34.2	34.0
15/01/2022 23:00:00	16/01/2022 07:00:00	45.0	34.5	30.6
16/01/2022 07:00:00	16/01/2022 19:00:00	54.8	38.2	38.6
16/01/2022 19:00:00	16/01/2022 23:00:00	47.0	32.9	32.9
16/01/2022 23:00:00	17/01/2022 07:00:00	44.2	30.3	29.1
17/01/2022 07:00:00	17/01/2022 12:30:00	61.8	36.6	40.3

The full results are provided on the Noise Time History plots in Appendix A. Distribution plots of the 15-minute Background Sound Levels are also provided in Appendix A for weekday and weekend day, evening, and night-time periods.

5. NOISE ASSESSMENT

5.1 Fixed Plant and Equipment

The proposed battery storage containers will include mechanical cooling plant to reject heat generated by the batteries during charge and discharge.

The manufacturer of the battery containers has provided a sound pressure level at 1m. This relates to noise from the cooling system, specifically internal cooling fluid pump and external heat pump. However, details of the location of cooling plant on the container is not yet available. Therefore, for the purposes of this assessment, the container is assumed to radiate sound from all sides such that the sound pressure level at any point 1m from a container side is 75 dBA. This is expected to provide a worst-case assessment.

Table 4: Battery Container Sound Levels

Item	Manufacturer	Sound Pressure Level dB L _{Ap} @1m	Notes
Containerised BESS Block (3858.43kWh nominal capacity) with liquid cooling	Risen SYL	< 75	Model assumes sound is emitted from condenser units on the container sides, not roof.

There are a total of six battery containers proposed. In addition to the battery container cooling systems, noise will be generated by the Power Conversion System (PCS) Units and electrical transformers. Manufacturer data for these is not yet available. Data from similar schemes has been used for the assessment. The PCS unit may require enclosures. Sound Power Levels for the PCS and transformers, with enclosures if required, should not exceed the levels presented in Table 5, below.

Table 5: Assumed Electrical Equipment Sound Levels

Item	Sound Power Assumed for Assessment dB L _{Aw}	Notes
Transformer	74	Assumed based on 3500 kVA unit. Details of actual transformer are not available. If actual units exceed the stated sound power, enclosure may be required.
PCS	82	PCS units may be louder than this without enclosure. Therefore, PCS acoustic enclosures are likely to be required

A 2.8m solid perimeter fence is assumed around the BESS site. The need for the fence can be reviewed when full details of all proposed plant is available.

5.2 Noise Modelling

To determine the noise impact of the proposed battery site on nearby sensitive receptors, a noise model has been created using DataKustik CadnaA environmental noise prediction and mapping software.

The modelling was carried out based on the following assumptions:

- Ground absorption set to 1
- Order of reflection set to 1
- Reflection loss from buildings set to 2 dB
- Height of the receptors at 4 meters

The noise map includes data from the long-term noise monitoring measurements. Figures 3 presents the noise levels at the nearest sensitive receptors due to battery site operation.

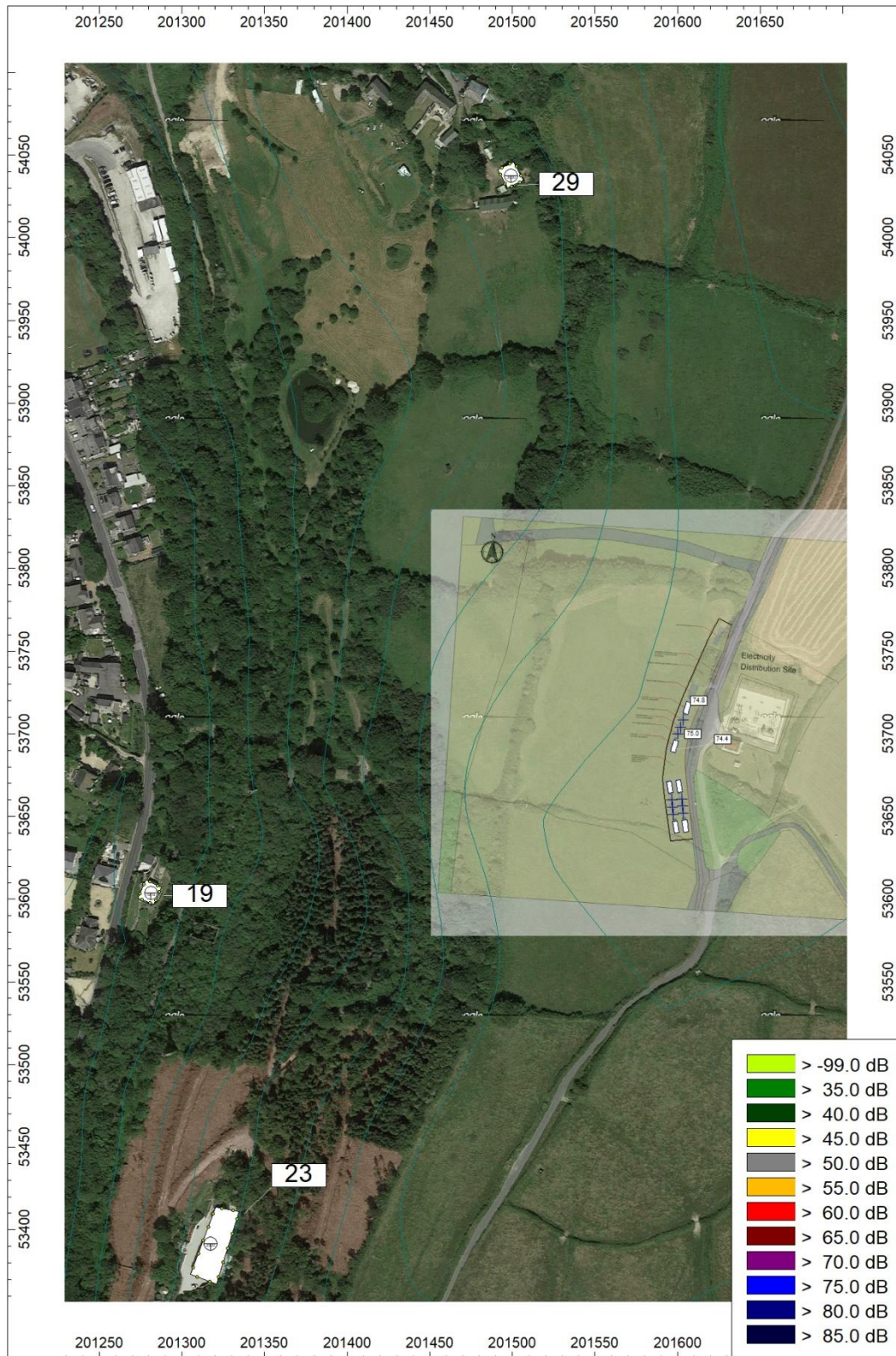


Figure 3: Predicted Noise Levels at Receptors (dB)

6. BS4142 ASSESSMENT

The nearest noise sensitive properties are:

- residential dwellings west of the development on B3274 approximately 300 meters away
- houses to the north of the development off Mount Stamper Road 370 meters away
- house to the south of the development 340 meters away

A BS 4142:2014 assessment of noise from the proposed battery storage development is presented in Table 4, below, using the predicted worst affected property.

Table 6: BS4142:2014 Assessment

Results		Commentary
Measured Background Sound Level (L _{A90} , dB)	29 dB	Lowest night-time mode average L _{A90} used.
Specific Sound Level - (L _{Aeq} , dB)	29 dB	Modelled prediction as per Section 5.
BS4142 Rating Level (L _{Ar})	29 dB	No character correction is deemed to apply as noise from the battery cabinet cooling system as noise from this is expected to be broadband. Transformers can be tonal; however, this is not expected to be perceptible at receptors, given the distance. PCS enclosures will also control any tonal noise from this source.
Excess of Rating Level over Background Sound level (dB)	0 dB	The assessment indicates that noise from the proposed battery development can be controlled such that it will have a low impact.

Noise from the proposed BESS is expected to be equal to the existing Background Sound Level at night, which is an indication of low impact. The requirements of Cornwall Council's Development Sound Standard (DSS) are achieved. Internal noise levels at night with a window open will be well below the criteria from BS8233:2014 and the WHO Guidelines.

Background Sound Levels during the daytime are higher and therefore, the noise impact during the daytime will be lower than during the night.

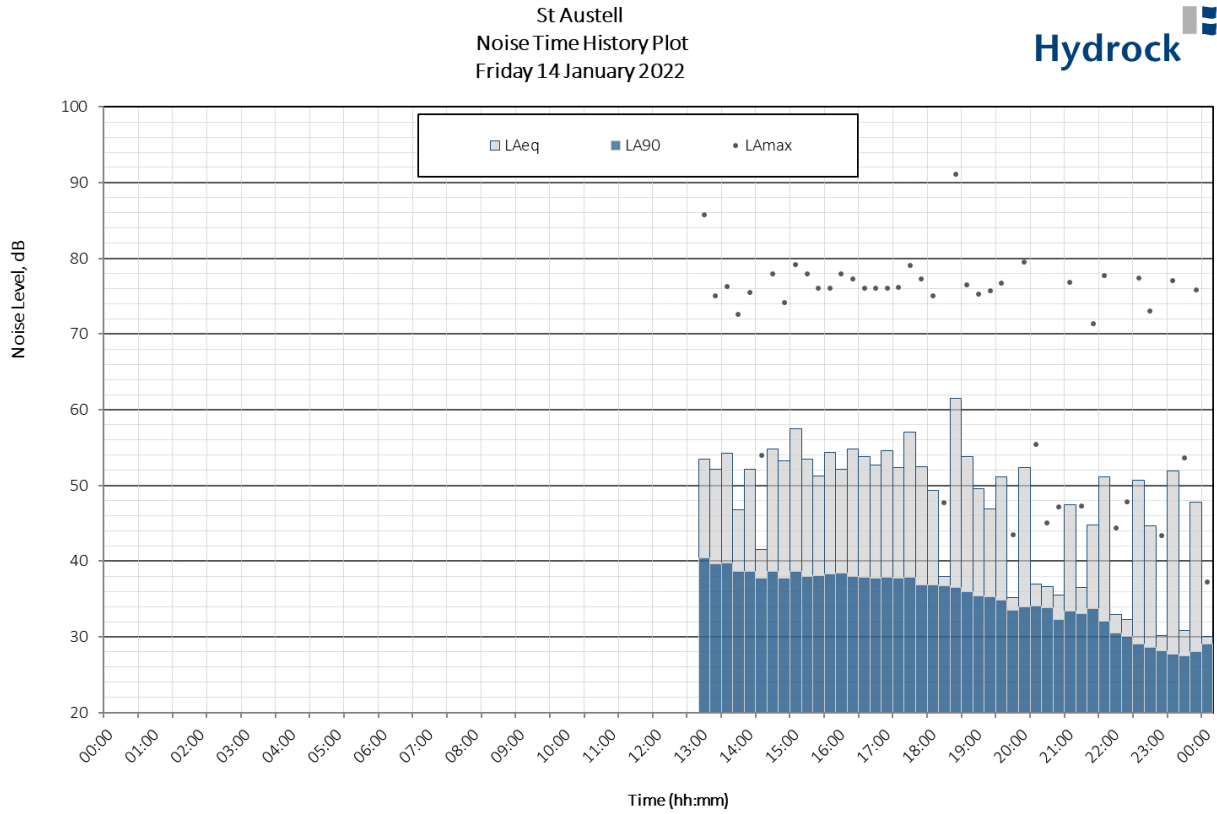
There is some uncertainty related to the final equipment selections and location of cooling plant on the battery cabinets. Full details of final plant selections should be reviewed by a suitably qualified acoustic engineer. With suitable enclosures for PCS units, consideration of battery container cooling unit location, and noise barriers (either around the perimeter or around individual equipment), noise levels below the background sound level at all receptors can be achieved.

7. SUMMARY

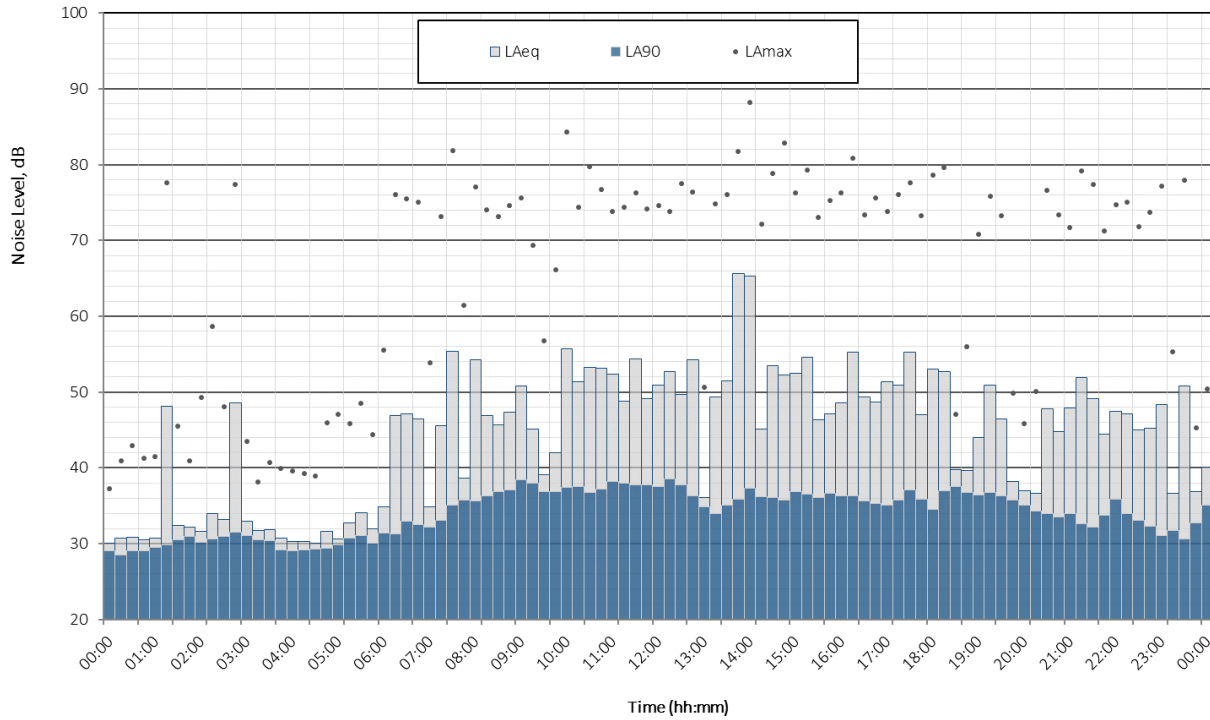
An assessment has been made of noise from the proposed battery site at Mount Stamper Road in line with the requirements from Cornwall Council's Development Sound Standard (DSS).

Noise emissions from the proposed development can be controlled to below the existing Background Sound Level at receptors. Therefore, there should not be a reason to refuse the planning application on the grounds of noise. However, a suitably qualified acoustic engineer should be engaged to review final plant selections and full details when available.

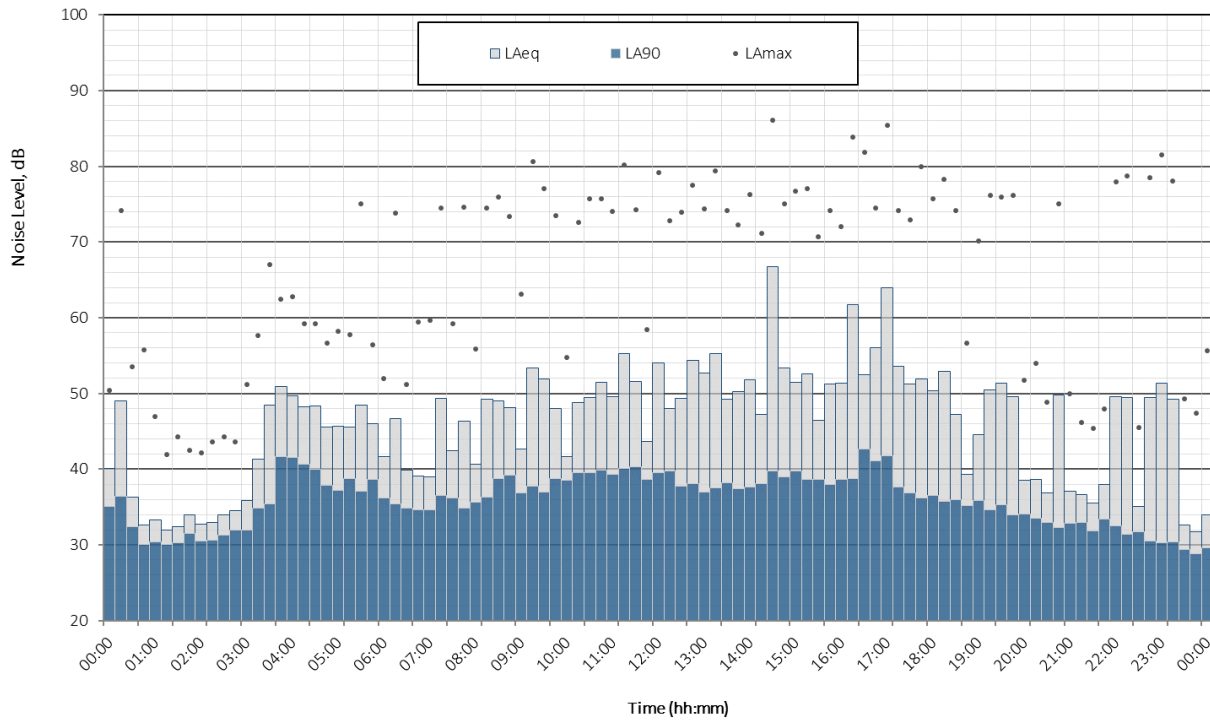
Appendix A Background Sound Level Distribution



St Austell
Noise Time History Plot
Saturday 15 January 2022



St Austell
Noise Time History Plot
Sunday 16 January 2022



St Austell
Noise Time History Plot
Monday 17 January 2022

