Technical Appendix 6:

Assessment of Acoustic Impact for the Proposed Derril Water Solar Farm

Author: Andrew Birchby **Date:** 17 February 2021 **Ref:** 04139-2128011

Revision History

Issue	Date	Author	Nature & Location Of Change
01	17 Feb 2021	Andrew Birchby	First created

CONTENTS

1.0 INTRODUCTION & SCOPE

This report contains an assessment of the acoustic impact of the proposed Derril Water solar farm. Two Members of the Institute of Acoustics have been involved in its production. Details of their experience and qualifications can be found in **Appendix A.**

The scope includes determining the baseline and predicting sound levels due to the Proposed Development in order to assess the level of impact in accordance with relevant planning guidance.

2.0 PLANNING GUIDANCE

2.1 National Planning Policy Framework

Within England, the treatment of noise is defined in the planning context by the National Planning Policy Framework (NPPF)[1] which details the Government's planning policies and how these are expected to be applied. The NPPF provides advice on the role of the planning system in helping to prevent and limit the adverse effects of noise, stating that planning policies and decisions should aim to avoid noise giving rise to significant adverse impacts, whilst at the same time mitigating and reducing to a minimum other adverse impacts on health and quality of life. At this point the NPPF refers to the Noise Policy Statement for England (NPSE)[2] which provides guidance on the categorisation of impact levels.

2.2 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy: to promote good health and quality of life through effective noise management within the context of sustainable development. In order to weigh noise impacts against the economic and social benefits of the activity under consideration, NPSE defines three categories of effect level:

- No Observed Effect Level (NOEL): noise levels below this have no detectable effect on health and quality of life;
- Lowest Observed Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL): the level above which effects on health and quality of life become significant.

2.3 National Planning Practice Guidance

National Planning Practice Guidance (NPPG)[3] puts the effect levels defined by NPSE into greater context by explaining how such noise levels might be perceived, providing examples of outcomes based on likely average response, and advising on appropriate actions. These are reproduced in Table 1 below.

[1] "National Planning Policy Framework", Department for Communities and Local Government, March 2012
[2] "Noise Policy Statement for England (NPSE)", Department for Environment, Food and Rural Affairs, March 2010
[3] "National Planning Practice Guidance", Department for Communities and Local Government, March 2014

Table 1 - Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not noticeable	No Effect	No Observed Effect	No specific measures required
No Observed Effect Level (NOEL)			
Noticeable and not intrusive	Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.4 National Policy Statements

In addition to the aforementioned guidance which is applicable to all forms of environmental noise, specific guidance relating to nationally significant energy infrastructure has been published by the Department of Energy and Climate Change (DECC). Whilst the Proposed Development is not of a scale that would be deemed nationally significant, the relevant National Policy Statements are informative in that they suggest an assessment methodology that would be considered appropriate for the type of development being proposed.

The Overarching National Policy Statement for Energy (EN-1)[4] outlines the need for new electricity capacity from renewable sources as the country transitions to a low carbon electricity

[4] "Overarching National Policy Statement for Energy (EN-1)", Department of Energy and Climate Change, July 2011

system. However, referring back to the NPSE, EN-1 recognises the potential for energy infrastructure to impact on health and quality of life if it results in excessive noise. It goes on to say that where noise impacts are likely to arise, they should be assessed according to the principles of the relevant British Standards.

Of the examples provided, BS 4142[5] and BS 8233[6] relate to operational sound. BS 4142 describes methods for rating and assessing sound of an industrial or commercial nature. Outdoor sound levels are used to assess the likely effects on people who might be inside or outside a residential property. BS 8233 provides guidance on the control of noise for new buildings or those undergoing refurbishment. It does not provide guidance on assessing the effect of changes in external noise levels on occupants of existing buildings.

The National Policy Statement for Electricity Networks Infrastructure (EN-5)[7], relevant to the transmission and distribution parts of the electricity network along with any associated infrastructure, such as substations and converter stations, again points to the appropriateness of BS 4142 in assessing the acoustic impact of such projects. The inverters and transformers deployed as part of the proposed project are examples of infrastructure of this kind.

3.0 METHODOLOGY

3.1 Overview

An assessment in accordance with BS 4142: 2014 has been undertaken in order to determine the acoustic impact of the Proposed Development. This approach is consistent with the guidance provided in the National Policy Statements published by DECC for this type of development. BS 4142: 2014 lends itself well to an assessment in accordance with NPPF, NPSE and NPPG as it allows the level of impact to be ascertained.

3.2 Baseline Conditions

In order to complete a BS 4142: 2014 assessment of the proposal, the background sound level at the times when the new sound source is intended to be operational should be measured. The background sound level is defined as the A-weighted sound pressure level that is exceeded for 90 % of the measurement time interval, or $L_{A90,\,T}$.

Measurements should be made at a location that is representative of the assessment locations, the time interval should be sufficient to obtain a representative value, and the duration should be long enough to reflect the range of background sound levels over the period of interest.

Precautions should be taken to minimise the influence on the results from sources of interference. Weather conditions that may affect the measurements should be recorded and an effective wind shield used to minimise turbulence at the microphone.

A statistical analysis, following the example given by BS 4142: 2014, should be used to determine an appropriate background sound level for the analysis from the range of results obtained.

3.3 Propagation

The ISO 9613-2[8] propagation model shall be used to predict the specific sound levels due to the Proposed Development at nearby residential properties. The propagation model takes account

[5] "Methods for rating and assessing industrial and commercial sound", The British Standards Institution 2014
[6] "Guidance on sound insulation and noise reduction for buildings", The British Standards Institution 2014
[7] "National Policy Statement for Electricity Networks Infrastructure (EN-5)", Department of Energy and Climate Change, July 2011
[8] "Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation", International Organisation for Standardisation 1996

of sound attenuation due to geometric spreading and atmospheric absorption. The assumed temperature and relative humidity are 10 ˚C and 70 % respectively.

Ground effects are also taken into account by the propagation model, with a ground factor of 0.5 adopted to reflect a mix of hard and porous ground between the site and the assessment locations. A 4 m receiver height shall be used. The effect of surface features such as buildings (except those located within the site boundary) and trees shall not be included in the model. There is a level of conservatism built into the model as a result of the adoption of these settings.

ISO 9613-2 is a downwind propagation model. Where conditions less favourable to sound propagation occur, such as when the assessment locations are crosswind or upwind of the Proposed Development, the sound levels would be expected to be less and the downwind predictions presented here would be regarded as conservative.

3.4 Assessment

Once the specific sound levels due to the proposed new sound source have been predicted the rating sound level can be calculated, it is this which is compared to the existing background sound level to determine the level of impact. The rating level is obtained by adding any penalties due to character that may be applicable to the predicted specific sound level.

Table 2 details how the difference between the rating sound level and background sound level is used to come to a judgement about the level of impact under BS 4142: 2014, although is noted that any assessment is context specific. These criteria relate well with the categories defined by NPSE: with the background sound level representing the NOEL, 5 dB above background representing the LOAEL and 10 dB above background the SOAEL.

Table 2 - BS 4142: 2014 Assessment Criteria

Rating Level	BS 4142 Assessment
Below background	Indicates low impact
5 dB above background	Indicates adverse impact
10 dB above background	Indicates significant adverse impact

Depending upon the diurnal variation in the background sound level, and the times when the proposed new sound source is scheduled to operate, it may be appropriate to undertake separate assessments for certain times of day e.g. day, evening and night.

4.0 BASELINE DATA

Baseline noise levels were determined in a survey undertaken by Hoare Lea Acoustics between Friday 8th January and Monday 11th January 2021. Full details of the survey including the methodology, results, equipment used, photos and charts are provided in Hoare Lea's report (**Appendix B**)[9].

The measured background sound levels during day, evening and night-time periods are shown in Table 3. The survey positions are shown in red on the map in Figure 1 (**Appendix C**). The data recorded at survey location L1 is assumed to be representative of houses H7, H8 and H11-H15. Data from survey location L2 is assumed to represent houses H1-H6, H9, H10 and H16.

[9] RES Solar Farm, Pyworthy, Devon. Baseline noise survey. Noise Assessment Report. Hoare Lea, 14 January 2021

Table 3 - Baseline Data

House ID	X, m	Y, m	Day Background, dB L_{A90}	Evening/Night Background, dB L_{A90}
H1	231069	102172	25	21
H2	231063	102674	25	21
H3	230058	102799	25	21
H4	230468	102956	25	21
H5	229437	103049	25	21
H6	228920	102833	25	21
H7	229117	102045	26	21
H8	229516	101841	26	21
H9	229831	102014	25	21
H10	229678	102131	25	21
H11	229460	101502	26	21
H12	228887	102046	26	21
H13	228714	101780	26	21
H14	229073	100933	26	21
H15	229867	101016	26	21
H16	230493	101515	25	21

5.0 ASSESSMENT

The main sources of sound within the Proposed Development are the 14 inverters and transformers located at the solar inverter substations along with two grid transformers at the grid substation. The inverters are assumed to be operating during daytime periods only when the solar farm is generating power. The transformers are assumed to be operating at all times.

Acoustic emission data for the proposed equipment is detailed in **Table 4.** The data corresponds to the maximum acoustic emission for each device as advised by the manufacturer. Predictions based on this data therefore represent the worst case and the noise levels would be expected to be less when the site isn't operating at maximum capacity.

Table 4 - Acoustic Emission Data

Equipment	Sound Pressure Level at 1m, dB L_{Aeq}
Solar inverter	85
Solar transformer	71
Grid transformer	84

The sound emitted by the inverter cooling fans and transformers can have distinctive character. Under the subjective method described in BS 4142: 2014, a correction of 4 dB has been applied as a conservative measure in the event that tones are clearly perceptible at the assessment locations.

Predicted specific sound levels and the resulting rating level at nearby properties are detailed in **Table 5** for daytime periods and **Table 6** for evening and night-time periods. The rating level is then compared to the background sound levels of **Table 3** to assess the impact at each location. An illustrative sound footprint for the Proposed Development showing the predicted specific sound level during daytime periods is provided in Figure 1 (**Appendix C**).

Table 5 - BS 4142: 2014 Assessment Results - Day

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Aeq}	Rating vs Background, dB	Potential Impact
H1	26	30	5	Minor
H2	23	27	2	Minor
H3	25	29	4	Minor
H4	21	25	0	Low
H5	23	27	2	Minor
H6	23	27	2	Minor
H7	33	37	11	Significant adverse
H8	38	42	16	Significant adverse
H9	35	39	14	Significant adverse
H10	34	38	13	Significant adverse
H11	40	44	18	Significant adverse
H12	27	31	5	Minor
H13	27	31	5	Minor
H14	25	29	3	Minor
H15	31	35	9	Adverse
H16	28	32	7	Adverse

Table 6 - BS 4142: 2014 Assessment Results - Evening/Night

House ID	Specific Level, dB L_{Aeq}	Rating Level, dB L_{Aeq}	Rating vs Background, dB	Potential Impact
H1	21	25	4	Minor
H2	18	22	1	Minor
H3	18	22	1	Minor
H4	16	20	-1	Low
H5	16	20	-1	Low
H6	15	19	-2	Low
H7	23	27	6	Adverse
H8	28	32	11	Significant adverse
H9	30	34	13	Significant adverse
H10	27	31	10	Adverse
H11	28	32	11	Significant adverse
H12	19	23	2	Minor
H13	18	22	1	Minor
H14	17	21	0	Low
H15	24	28	7	Adverse
H16	24	28	7	Adverse

Whilst the potential for significant adverse impact has been identified, BS 4142: 2014 states that absolute levels might be more relevant than the margin above background in circumstances where the background noise levels are low, as is the case at this site. Consultation with the Environmental Health Department at Torridge District Council has been undertaken to identify an appropriate absolute noise limit. A rating level of 35 dB L_{Aeq} at the curtilage of third-party properties was deemed to represent an acceptable level of impact. Excluding H8-H11, which are owned by landowners of the project, this level is met at all properties during the evening/at night and at all but H7 during the day.

Mitigation, in the form of acoustic barriers installed at the three nearest inverter substations, is proposed in order to reduce the noise levels at H7. An illustrative sound footprint for the Proposed Development showing the predicted specific sound level during daytime periods with mitigation applied is provided in Figure 2 (**Appendix C**). The rating levels for day, evening and night-time periods with such mitigation in place are shown in **Table 7.** A 4 dB penalty for tonality has again been applied. It can be seen that a rating level of 35 dB L_{Aeq} is not exceeded at any third-party property. Other forms of mitigation, such as the fitting of silencers to the inverter air outlets, are also available as an alternative to the use of barriers.

Table 7 - Rating Levels with Mitigation

House ID	Day Rating Level, dB L_{Aeq}	Evening/Night Rating Level, dB L_{Aeq}
H1	30	25
H2	27	22
H3	29	22
H4	25	20
H5	27	20
H6	27	19
H7	35	26
H8	40	31
H9	39	34
H10	38	30
H11	44	32
H12	31	23
H13	31	22
H14	29	21
H15	35	28
H16	32	28

A level of conservatism has been built into the assessment to compensate for the potential impact of uncertainty. The predicted specific sound levels presented in this assessment, and the sound footprints shown in **Figures 1 and 2**, reflect this. The amenity of nearby residents can be protected by the imposition of a planning condition relating to sound. A suggested appropriate form of wording for such a condition is provided in **Appendix D.**

6.0 CONCLUSIONS

An assessment of the acoustic impact of the proposed Derril Water solar farm has been undertaken in accordance with BS 4142: 2014. Whilst the margin by which the rating level exceeds the background indicates the potential for significant adverse impact, such an assessment may not be appropriate in the context of the low background sound levels at this site. BS 4142: 2014 allows for assessments to be made against absolute limits in this situation. An assessment against absolute limits, agreed with the Torridge District Council Environmental Health Department, demonstrates that such limits can be met with appropriate mitigation measures.

APPENDIX A – EXPERIENCE AND QUALIFICATIONS

Author:

Name	Andrew Birchby
Experience	Acoustic Specialist, Renewable Energy Systems, 2017-Present Senior Acoustic Analyst, Renewable Energy Systems, 2014-2016 Acoustic Analyst, Renewable Energy Systems, 2012-2014 Technical Analyst, Renewable Energy Systems, 2006-2012
Qualifications	MIOA, Member of the Institute of Acoustics MSc Environmental Governance, Manchester University IOA Postgraduate Diploma in Acoustics and Noise Control MEng Systems Engineering, Loughborough University

Checker/Approver:

Name	Dr Jeremy Bass
Experience	Head of Specialist Services/Senior Technical Manager, Renewable Energy Systems, 2000-Present Technical Analyst/Senior Technical Analyst, Renewable Energy Systems, 1990-2000 Foreign Exchange Researcher, Mechanical Engineering Laboratory, Tsukuba, Japan, 1989-1990 Research Associate, Energy Research Unit, Rutherford Appleton Laboratory, 1986-1989
Qualifications	MIOA, Member of the Institute of Acoustics MInstP, Member of the Institute of Physics PhD, The Potential of Combined Heat & Power, Wind Power & Load Management for Cost Reduction in Small Electricity Supply Systems, Department of Applied Physics, University of Strathclyde BSc Physics, University of Durham

APPENDIX B – BASELINE NOISE ASSESSMENT REPORT

RES Solar Farm.
Pyworthy, Devon.
Baseline noise survey.

ACOUSTICS
NOISE ASSESSMENT REPORT
HOARE LEA
REVISION 1 – 14 JANUARY 2021

Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
1	14/01/2021	First draft	RN	MMC	MMC

Project number: 1012302
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Contents.

1. Introduction.

Hoare Lea LLP have been appointed to undertake a background noise survey in relation to a proposed Solar Farm on land near Pyworthy, Devon.

This report sets out the existing noise climate and summarises the background survey undertaken.

The methodology within BS 4142:2014 has been considered in the survey, to assist with determining prevailing background noise levels at the closest noise-sensitive receptors.

2. Site Context

The nearby noise sensitive receptors are the cottage properties within Trelana Farm and Monks Farm, North Moor Barn neighbouring properties to the south of the site along Romasede Lane, and properties to the north west of the site area. The existing site was observed to be rural in nature, consisting primarily of empty fields owned by either Trelana Farm or Monks Farm. Figure 1 below illustrates the outline of the proposed development overlaid onto the existing rural site area.

Figure 1: Site context showing the outline of the proposed development site.

The local noise climate is typical of a remote rural location. Observed noise sources noted were vegetation, occasional farming vehicles and bird noise, all intermittently present however varying in dominance of the local noise climate.

3. Relevant guidance.

3.1 British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

Current Government advice to Local Planning Authorities in both England and Wales makes reference to BS 4142 as being the appropriate guidance for assessing commercial operations and fixed building services plant noise. The British Standard provides an objective method for rating the significance of impact from industrial and commercial operations. It describes a means of determining sound levels from fixed plant installations and determining the background sound levels that prevail on a site.

The assessment of the impacts is based on the subtraction of the pre-existing background sound level ($L_{A90,T}$) from the rating level ($L_{Ar,Tr}$).

The standard does not give a definitive method for determining the background sound level but instead, as a commentary, states that *"the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods"*.

Clause 8.1.4, which discusses the monitoring duration, states *"there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed."* As a note to this clause the following commentary is given on obtaining a representative backgrounds sound level:

"To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."

The rating level is defined objectively as the specific source noise level in question (either measured or predicted) with graduated corrections for tonality (up to +6 dB), impulsivity (up to +9 dB), intermittency (+3 dB) and other sound characteristics (+3 dB) which may be determined either subjectively or objectively, if necessary.

The background sound level is subtracted from the rating level and the difference used to assess the impact of the specific noise source:

- A difference of around +10 dB is likely to be an indication of a significant adverse impact, depending on context;
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on context; and
- A difference of +0 dB or less is an indication of the specific sound source having a low impact, depending on the context.

This method is only applicable for external noise levels. The scope of the method for assessing industrial and commercial sound is clearly defined in Section 1 of the Standard; music, entertainment and people are included in the list of noise sources not intended to be assessed by the method.

4. Acoustic survey.

A series of acoustic survey measurements have been undertaken at the site to quantify the existing background noise climate in the area. Locations of the acoustic survey measurements and the resultant noise levels are shown in Figure 2.

4.1 Methodology.

The acoustic survey included three attended and two unattended measurements, at locations spatially distributed across the site area, representative of nearby noise sensitive residential receptors. The unattended measurements were undertaken from Friday 8th January 2021 to Monday 11th January 2021. The Attended survey measurements were undertaken during the day on Friday 8th January 2021 to supplement the unattended survey data, synchronised with the 15-minute intervals of the unattended survey measurements.

Note that this survey was undertaken during a COVID-19 national lockdown in England. However, due to the remote nature of the site area, where background noise levels are likely to remain relatively quiet, it was still deemed reasonably representative of noise levels in the area, with local farming activities appearing to operate as normal. The likelihood is that, if the measured levels represent a departure from long-term conditions at the site, they will tend to be lower which represents a conservative assumption.

Measurements were made under free-field conditions, and weather conditions were generally suitable for the purpose of the measurements with calm and dry conditions for most of the survey (except as noted below).

The noise sources observed on visits to site were from intermittent bird noises, occasional diesel farm vehicle machinery operating in distant farms and occasional high-altitude passenger aircraft flying overhead. Very little to no vegetation noise was observed due to still weather conditions. Neither of these noise sources dominated a majority of the 15-minute attended measurements. On collection, wind and vegetation noise were more present due to less calm weather and light drizzle. A rain gauge was used on site at the L1 unattended position to assist with excluding periods potentially affected by rainfall during the attended measurements.

All survey equipment was field calibrated at the start and end of each set of measurements with no discernible drift in level observed. The measurement instrumentation used is listed in Appendix A attached.

4.2 Results.

Time history plots of the unattended measurements taken at L1 and L2 can be found in Appendix B attached. Rainfall was measured on site from 23:00 10/01/2021, up to the final measurement period on 13:30 11/01/2021. Therefore, all measured noise data from 00:00 on Monday 11th January 2021 was excluded from the analysis.

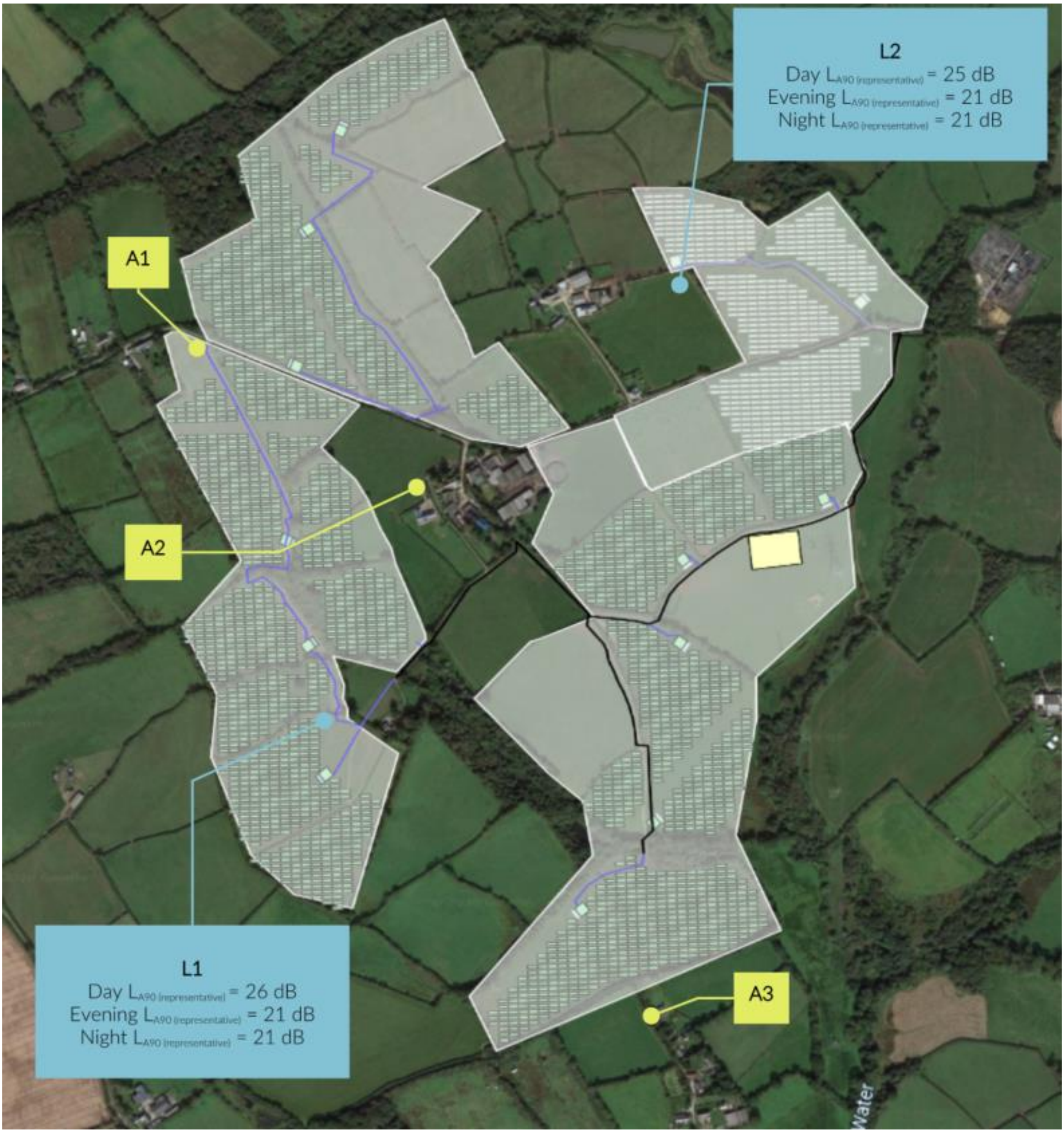


Figure 2: Acoustic survey locations, resultant typical lowest background sound levels at each unattended measurement position (L1 & L2) and attended measurement positions (A1, A2 & A3).

4.3 Background sound levels.

In line with the requirements of BS 4142, in order to "*quantify what is typical during particular time periods*", a statistical analysis of the measured background sound levels has been undertaken. The periods of interest have been taken as daytime (07:00 to 19:00), evening (19:00 to 23:00) and night-time (23:00 to 07:00).

Assessment durations of 15-minutes are used for both day and night-time periods. A single $L_{A90,1h}$ measurement would always be higher than the lowest of the four 15-minute duration background sound levels it comprises. Therefore, this represents a conservative case.

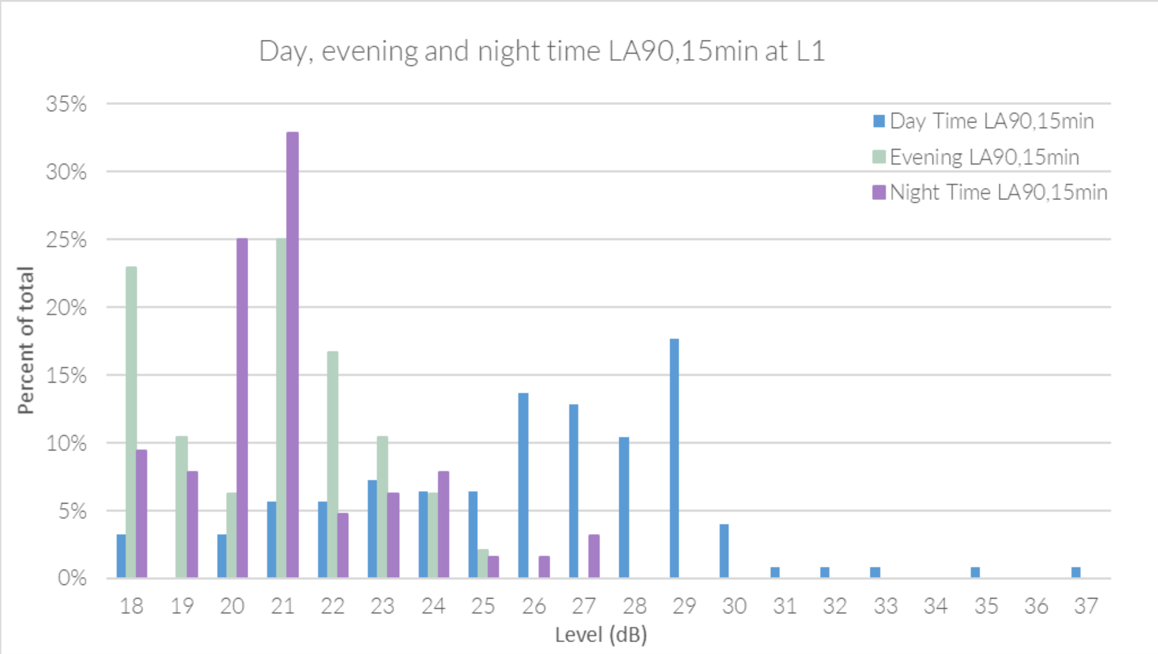


Figure 3: Statistical analysis of measured background noise levels at L1 (Unattended Position).

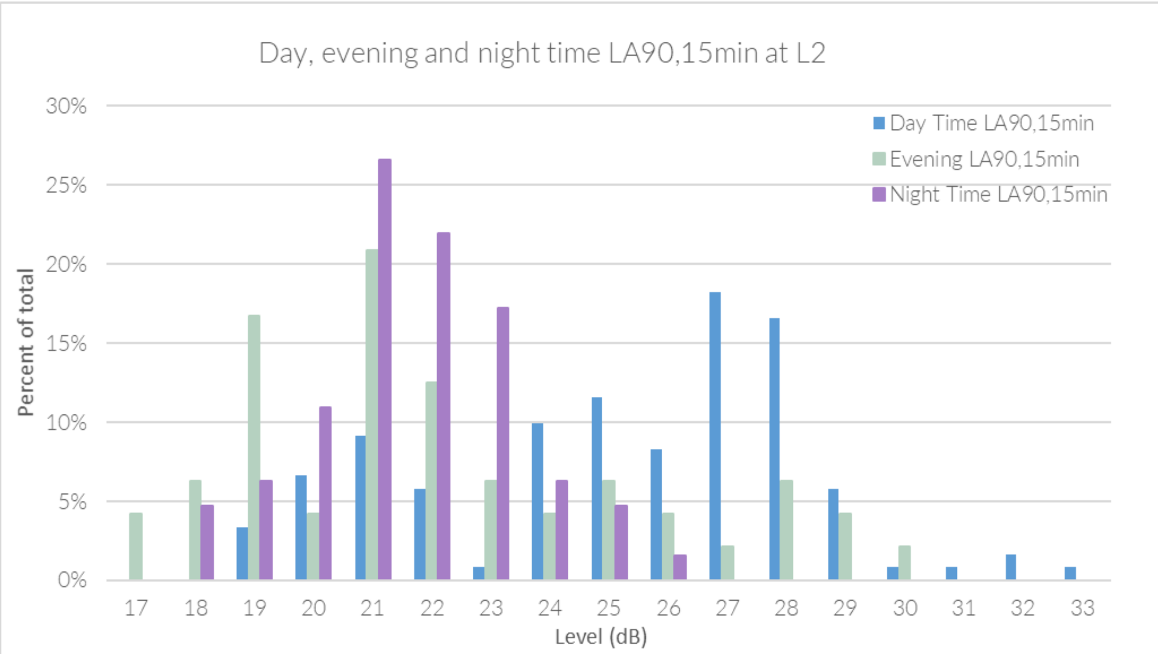


Figure 4: Statistical analysis of measured background noise levels at L2 (Unattended Position).

Using the above statistical analysis charts together with the time history charts included in Appendix B, given the context of the site, typical lowest background sound levels have been determined to represent each of the periods of interest. The results are set out in Figure 2 above and Table 1 below for the unattended measurement positions, L1 and L2.

Monitoring Location	$L_{A90,T}$ rep Background Noise Level (dB) measurement period (T) result		
	Day	Evening	Night
L1	26	21	21
L2	25	21	21

Table 1 - Resultant unattended measurement L_{A90} background noise levels

4.4 Attended measurements.

Attended noise measurements were carried out at three positions, over a 15-minute period per position on 08/01/2021 during day-time hours. The attended measurements carried out were synchronised with the unattended loggers.

Attended measurement position ID	Measurement period start time	Noise level at Attended measurement position $L_{A90,15min}$ (dB)	Unattended background noise level comparison against synchronised attended background noise levels	
			$L_{A90,\ 15min}$ (dB) Noise level at L1 Logger position	$L_{A90,\ 15min}$ (dB) Noise level at L2 Logger position
A1	08/01/2021 13:00	25	26	26
A2	08/01/2021 13:30	26	24	24
A3	08/01/2021 14:15	26	33	28

Table 2: Attended survey results.

Table 2 shows that differences between the background noise levels at the attended positions vary no greater than by 2 dB to the logger positions, which is typical of the natural variability of the noise environment.

An exception to this was between positions A3 and L1, where a difference of -7 dB occurred in the 14:15 measurement period. However, on further inspection of the time history of measured levels, background noise level at L1 were atypically elevated over this period, likely due to a temporary localised noise event around that time and this is therefore not representative of typical daytime L_{A90} levels at L1. This is supported by observations during this attended measurement.

This low variance between typical background noise levels at the attended and unattended positions indicates the background daytime noise levels remain relatively uniform across the site, supported by on site observations of the noise climate whilst undertaking measurements at each position. During the attended measurements, observations concluded no particular noise sources dominated the majority of each 15-minute measurement period. This means that the values determined at the unattended logger positions L1 and L2 in Table 1 can be considered representative of the other noise-sensitive locations located around the site.

5. Summary and conclusion.

Hoare Lea LLP have been appointed to undertake a noise survey in relation to the proposed development of a solar farm near Pyworthy, Devon, in line with the methodology of BS 4142:2014.

Typical lowest background noise levels at each of the unattended measurement positions were determined for the day, evening and night-time periods.

The results of supplementary synchronised attended noise measurements, undertaken nearby noise sensitive residential receptors, showed that the typical background noise environment was similar at other neighbouring properties.

Appendix A: Acoustic survey equipment & Photos.

Equipment	Type	Serial Number	Last Calibrated
Sound Level Meter	Rion NL-52	00832246	27/09/2019
Pre-amplifier	Rion NH-25	32274	27/09/2019
Microphone	Rion UC-59	05473	27/09/2019

Table B1 - Sound level meter L1

Equipment	Type	Serial Number	Last Calibrated
Sound Level Meter	Rion NL-52	00632047	24/09/2019
Pre-amplifier	Rion NH-25	32075	24/09/2019
Microphone	Rion UC-59	05214	24/09/2019

Table B2 - Sound level meter L2

Equipment	Type	Serial Number	Last Calibrated
Sound Level Meter	Rion NL-52	00632044	17/11/2020
Pre-amplifier	Rion NH-25	32072	17/11/2020
Microphone	Rion UC-59	17070	17/11/2020

Table B3 - Sound level meter 3 - attended survey

A field calibration was carried out at the start and end of the measurements, using:

Equipment	Type	Serial Number	Last Calibrated
Calibrator	Rion NC-74	34172706	29/06/2020

Table B4 - Calibrator


Figure B 1- Measurement Position **L**1 (1 of 4) - unattended


Figure B 2- Measurement Position L1 (2 of 4) - unattended


Figure B 3 - Measurement Position L1 (3 of 4) - unattended


Figure B 4- Measurement Position **L**1 (4 of 4)- unattended

Figure B 5- Measurement Position **L**2 (1 of 5) - unattended

Figure B 6 - Measurement Position 3 (2 of 5) - unattended


Figure B 7- Measurement Position **L**2 (3 of 5) - unattended


Figure B 8- Measurement Position **L**2 (4 of 5) - unattended

Figure B 9 – Measurement Position 2 (5 of 5) - unattended

Figure B 10 - Measurement Position **A1** (1 of 5) - attended

Figure B 11- Measurement Position **A1** (2 of 5) - attended

Figure B 12 - Measurement Position A1 (3 of 5) - attended

Figure B 13- Measurement Position A1 (4 of 5) - attended

Figure B 14- Measurement Position A1 (5 of 5) - attended

Figure B 15 - Measurement Position A2 (1 of 4) - attended

Figure B 16 - Measurement Position A2 (2 of 4) - attended


Figure B 17- Measurement Position A2 (3 of 4) - attended


Figure B 1**8**- Measurement Position **A2** (**4** of **4**) – attended

Figure B **19**- Measurement Position A3 (1 of 4) - attended

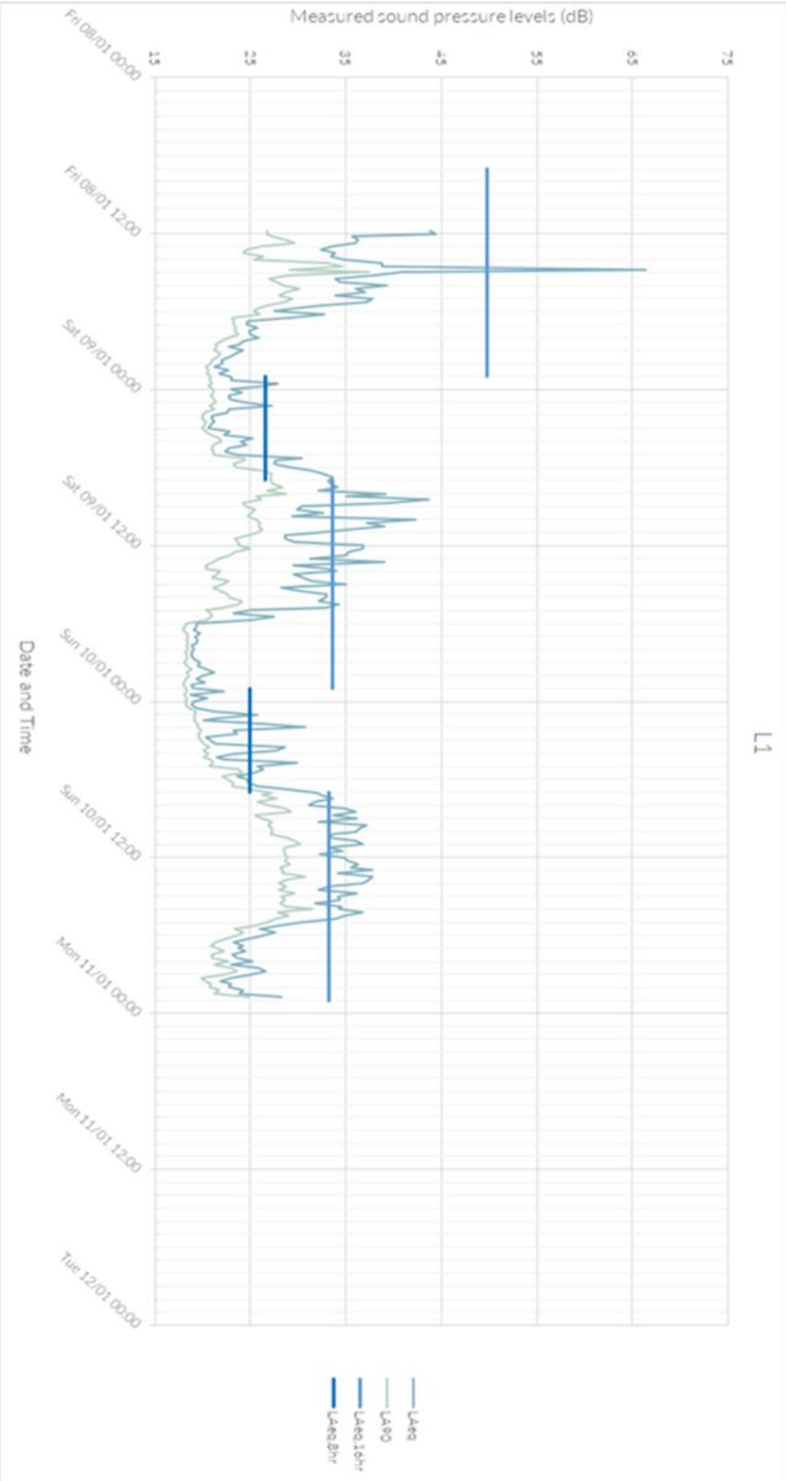
Figure B 20 - Measurement Position A3 (2 of 4) - attended

Figure B 21 - Measurement Position A3 (3 of 4) - attended

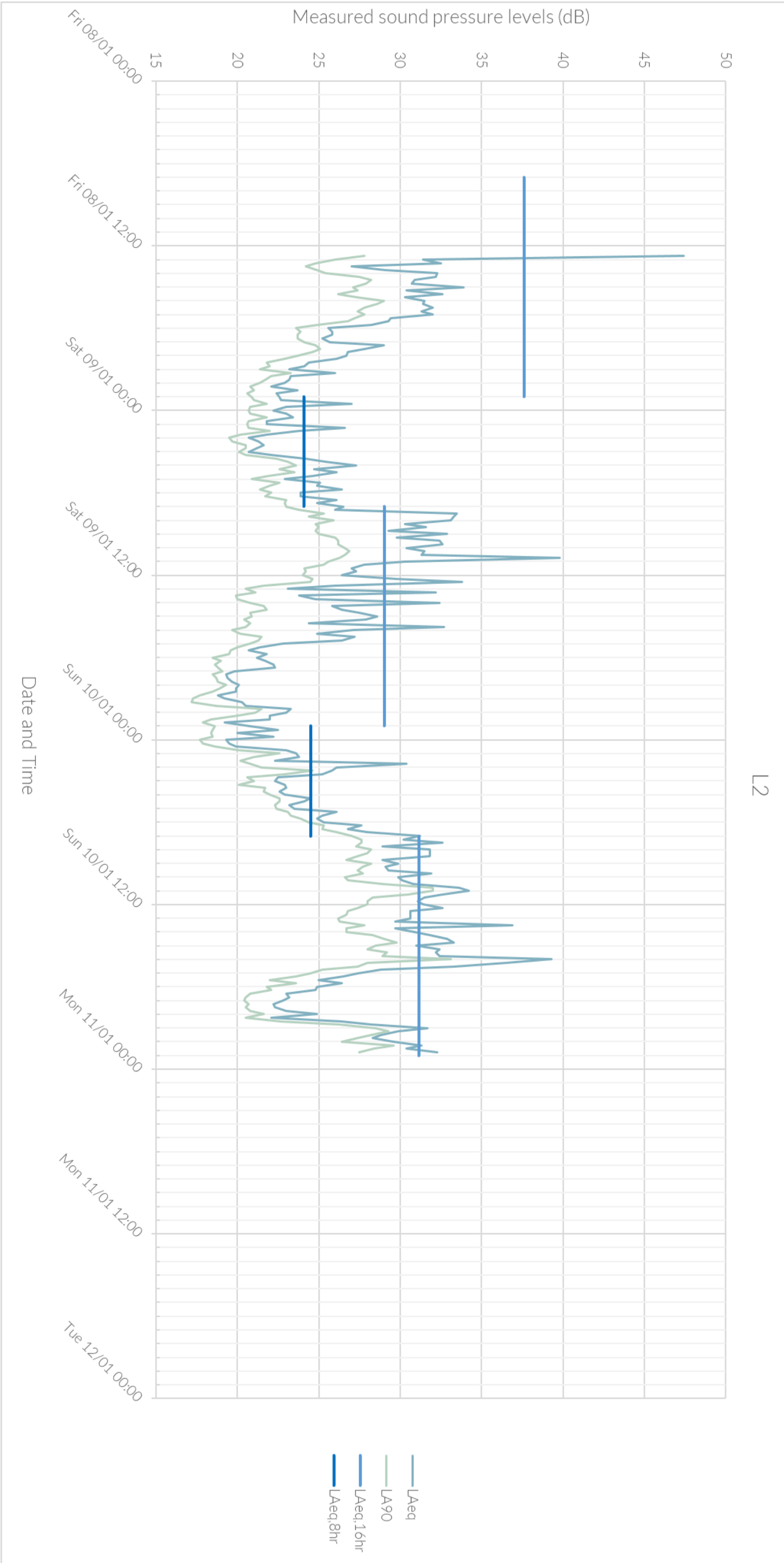
Figure B 22- Measurement Position A3 (4 of 4) - attended

Appendix B: Time history chart.

B.1 Unattended measurement position L1



B.2 Unattended measurement position L2



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APPENDIX C – FIGURES

Figure 1 – Predicted Specific Sound Footprint

The L_{Aeq} descriptor has been used
Grid intervals at 1km
Red receiver icons indicate survey locations

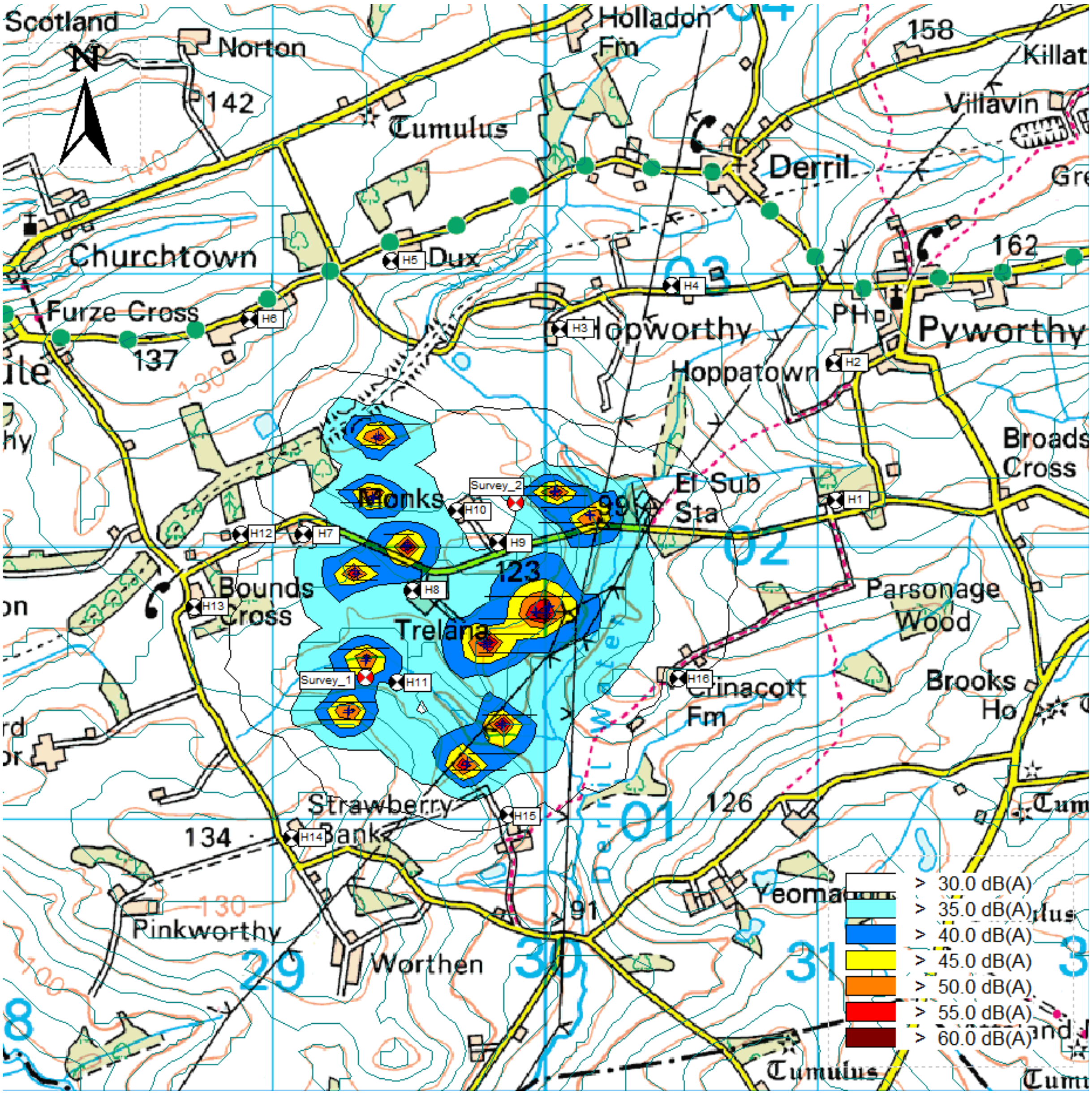
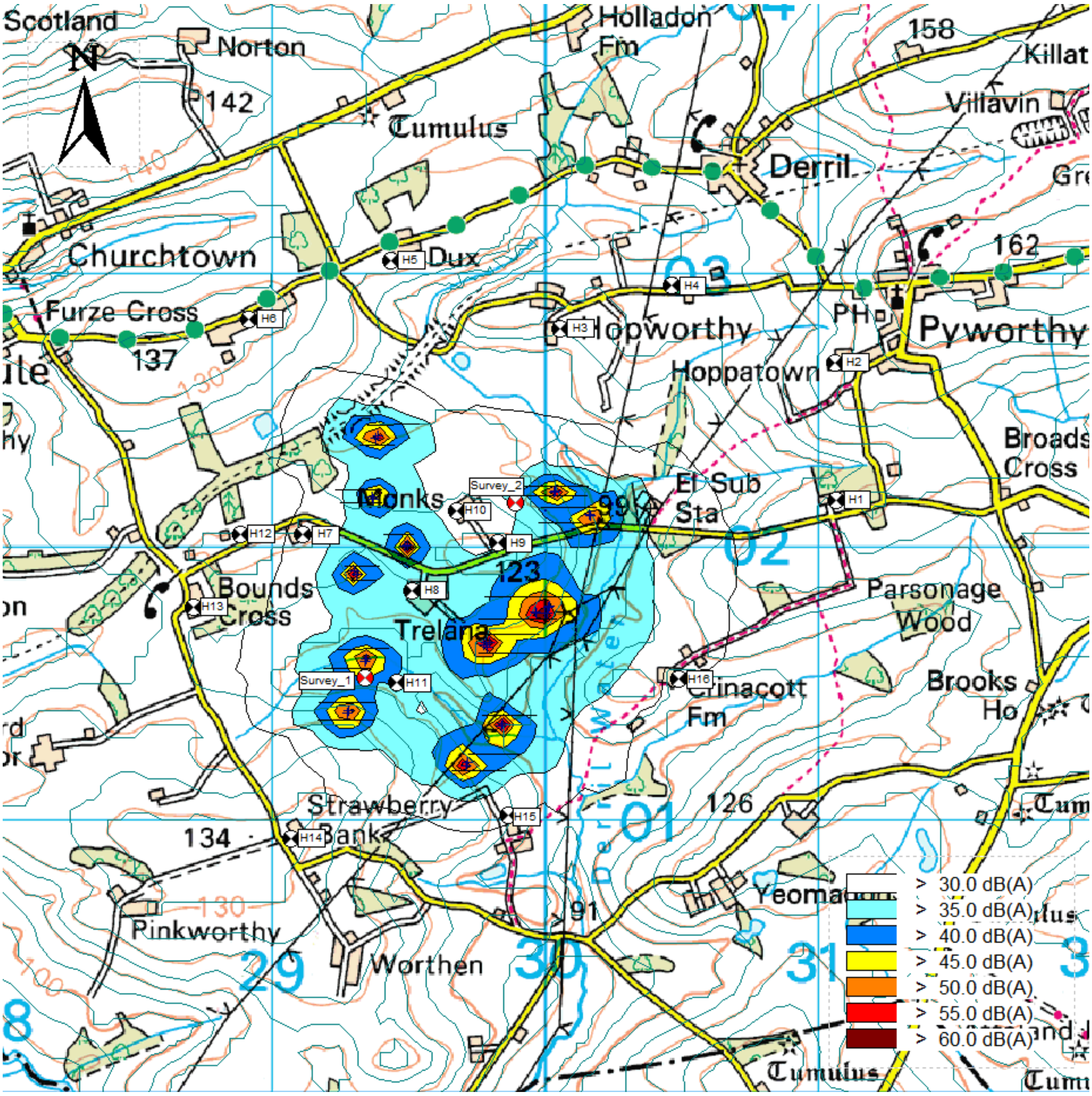


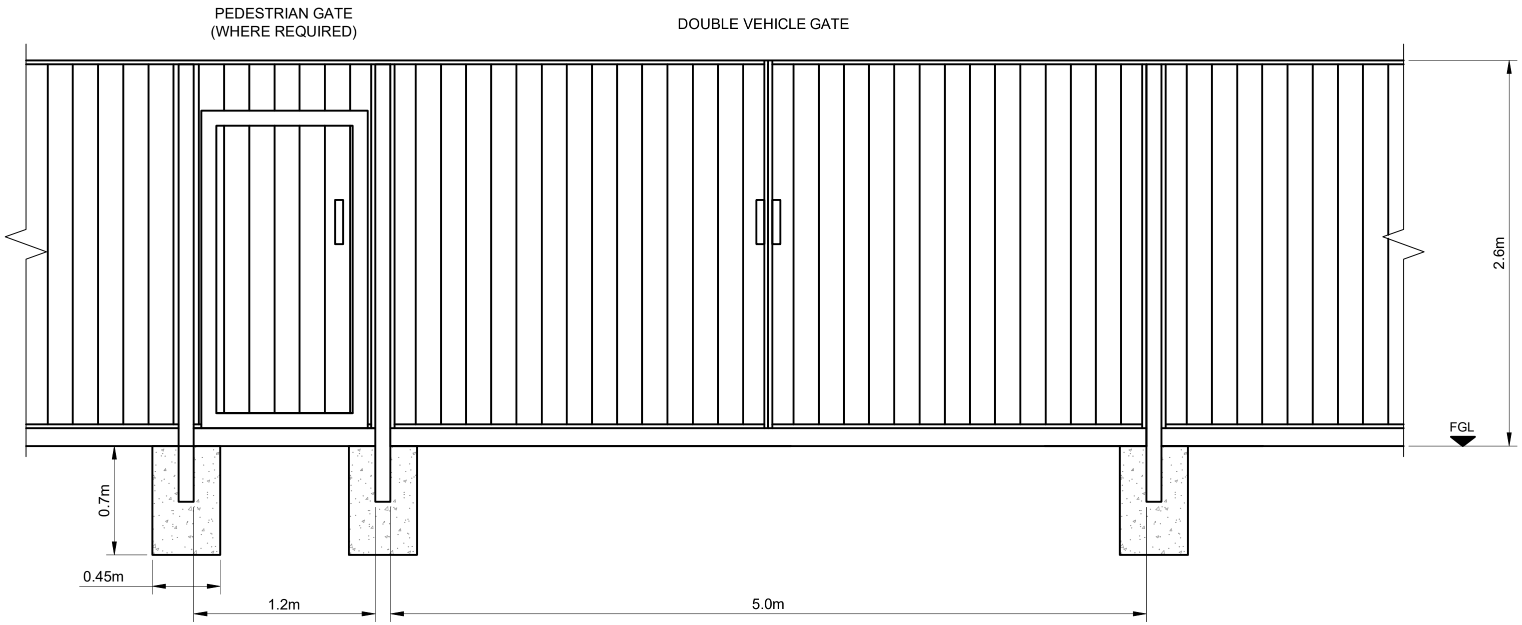
Figure 2 - Predicted Specific Sound Footprint with Mitigation

The L_{Aeq} descriptor has been used

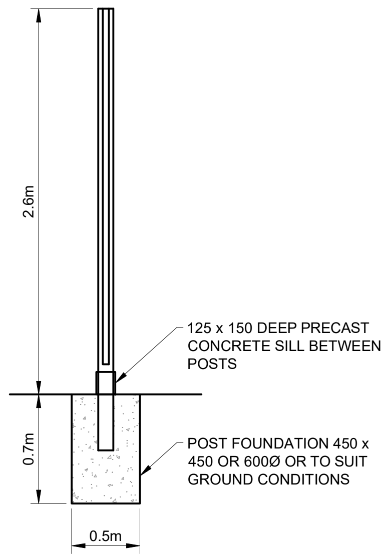
Grid intervals at 1km

Red receiver icons indicate survey locations





TYPICAL ELEVATION



TYPICAL CROSS SECTION

NOTES

1. ALL DIMENSIONS ARE MAXIMUM ANTICIPATED AND SUBJECT TO DETAILED DESIGN.
2. SUITABLE SAFETY SIGNAGE TO BE INSTALLED ON GATES.

Figure 14

ISSUE	DRAWN	CHKD	APPD	DATE	REVISION NOTES
2	JB	SR	EB	2021-02-26	Minor Updates
1	JB	SR	KM	2021-02-22	First Issue

PURPOSE: PRELIMINARY	PROJECTION: N/A
SCALE: 1:35 @A3	DATUM: N/A
LAYOUT DRAWING: N/A	T-LAYOUT NO: N/A

PROJECT TITLE: DERRIL WATER

DRAWING TITLE: ACOUSTIC FENCE FOR INVERTER

RES DRAWING NUMBER: 04139-RES-SEC-DR-PE-001 | REV: 2

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APPENDIX D – SUGGESTED PLANNING CONDITION WORDING

The facility shall be designed and operated to ensure that the rating sound level, determined using the BS 4142: 2014 methodology, shall not exceed 35 dB L_{Aeq} during both daytime and night-time periods at the nearest third party residential properties (as identified in RES report 04139-2128011-01).