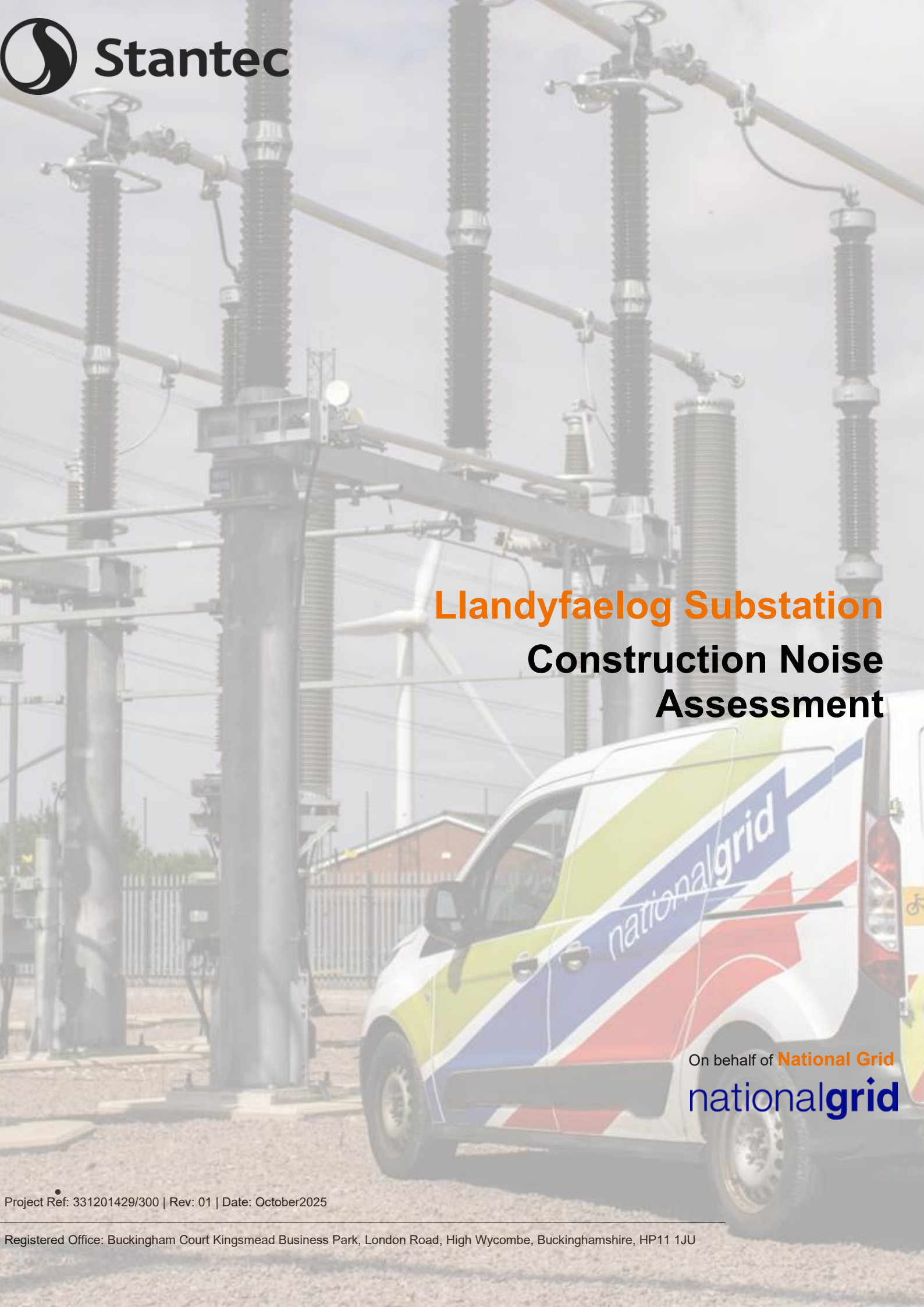

Llandyfaelog Substation

Construction Noise Assessment

On behalf of National Grid

Project Ref: 331201429/300 | Rev: 01 | Date: October2025

Registered Office: Buckingham Court Kingsmead Business Park, London Road, High Wycombe, Buckinghamshire, HP11 1JU

Document Control Sheet

Project Name: **Llandyfaelog Substation**
Project Ref: **331201429/300**
Report Title: **Construction Noise Assessment**
Doc Ref: **Revision 1**
Date: **October 2025**

	Name	Position	Signature	Date
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Approved by:	Lucy Bankhead	Project Manager	LB	June 2024
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
1	October 2025	Revision 1	MM	PT	LB

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1 Introduction

1.1 Background

1.1.1 National Grid (the 'Applicant') has commissioned Stantec to undertake a construction noise assessment to support the planning application for the proposed Llandyfaelog substation (the 'Site'). The Site is located within the administrative boundary of Carmarthenshire County Council (CCC).

1.1.2 This assessment covers noise from the construction phase of the development only. Operational noise will be considered in a separate report.

1.1.3 An environmental sound survey has been undertaken by Stantec, to establish the existing environmental sound levels representative of nearby noise sensitive receptors. The results of the environmental sound survey have been used to inform the assessment.

1.1.4 This report presents details of national planning policy, standards and guidance documents relevant to the proposed development, proposes assessment criteria based on these and presents the results of the construction noise assessment.

1.1.5 An explanation of the acoustic terminology used in this report is included in Table A.1 in **Appendix A**.

1.2 Site Location and Development Proposals

1.2.1 The Site is located in Llandyfaelog c.6km south of Carmarthen.

1.2.1 An indicative site location plan is provided in **Figure 1**.

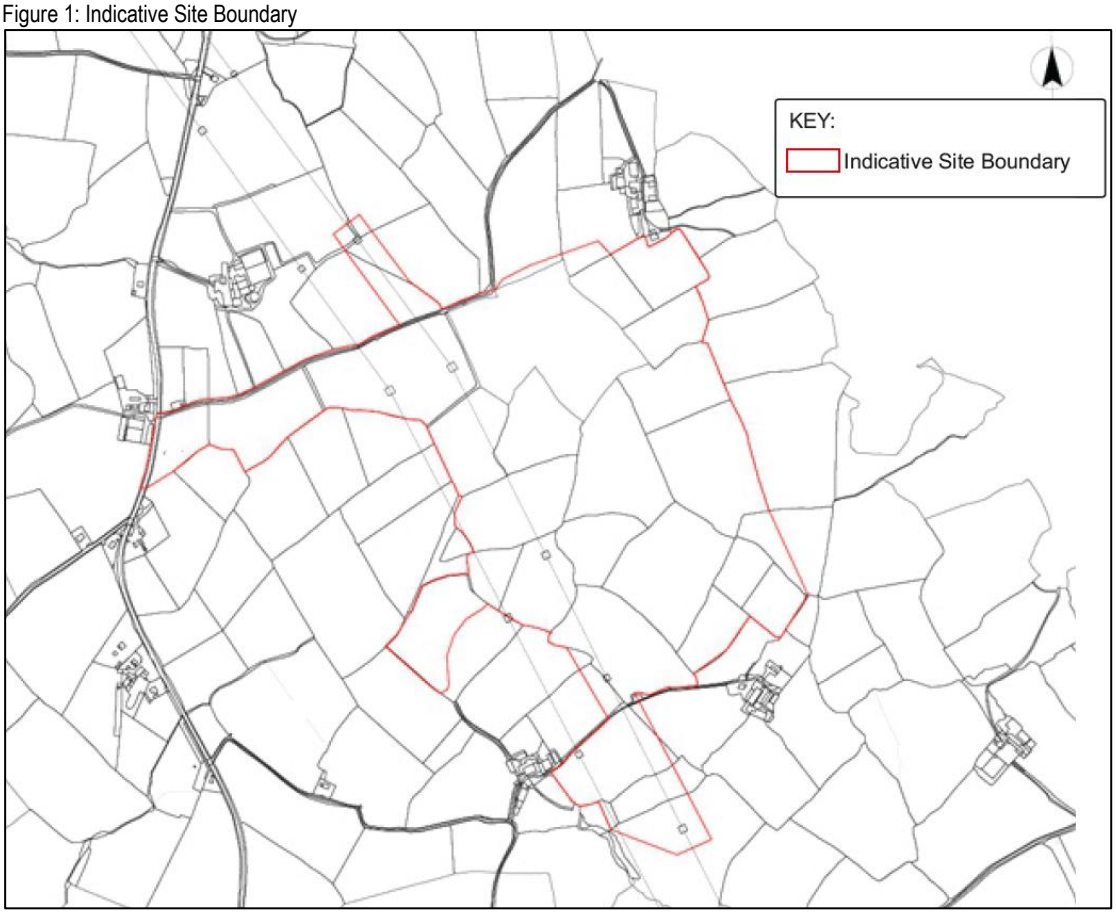
1.2.2 The Llandyfaelog Project is comprised of the following principal elements:

- Construction of a single level platform (260 metres by 640 metres) on which an Air Insulated Substation (AIS) is sited measuring 155 metres by 602 metres;
- Bellmouth access to the A484 with an operational access road to connect the platform to the A484;

1.2.3 Modification works to the existing 400kV Overhead Line (OHL) to connect the substation to the existing OHL involving the installation of two new towers (pylons) and one replacement tower (pylon) circa 18 metres and 62 metres; and

1.2.4 Associated drainage, and hard and soft landscaping.

Figure 1: Indicative Site Boundary



(Courtesy of National Grid)

2 Policy, Standards and Criteria

2.1 Local Authority

Environmental Health Consultation

2.1.1 The Environmental Health Department (EHD) at Carmarthenshire County Council was consulted to agree the location and extent of the baseline sound survey.

2.2 Planning Policy

National Planning Policy

Planning Policy Wales Edition 12

2.2.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.

2.2.2 Paragraph 1.2 states that "*the primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales...*"

2.2.3 Chapter 6 provides specific guidance on noise within Section 6.7 Air Quality and Soundscape. Paragraph 6.7.6 states that:

"In proposing new development, planning authorities and developers must, therefore:

- *address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors.*
- *not create areas of poor air quality or inappropriate soundscape; and*
- *seek to incorporate measures which reduce overall exposure to air and noise pollution and create soundscapes."*

Local Planning Policy

Carmarthenshire County Council Local Development Plan 2006 - 2021

2.2.4 The Carmarthenshire Local Development Plan (LDP) (Carmarthenshire County Council, 2014) was adopted on the 10th December 2014. The LDP sets out the spatial vision for the future of Carmarthenshire (excluding the area within the Brecon Beacons National Park) and a framework for the distribution and delivery of growth and development.

2.2.5 It sets out land-use planning policies and proposals which are used in the determination of planning applications and in guiding future opportunities for investment and growth. These policies include land-use allocations for different types of development (i.e. housing, employment, retailing, education, open space etc.) as well as criteria for assessing individual proposals.

2.2.6 Policy EP2 Pollution states:

"Proposals for development should wherever possible seek to minimise the impacts of pollution. New developments will be required to demonstrate that they:

c. Ensure that light and noise pollution are where appropriate minimised…"

Carmarthenshire County Council Second Deposit Revised Local Development Plan 2018 – 2033 (2023)

2.2.7 The Deposit Revised LDP (Carmarthenshire County Council, 2023) sets out the strategy, vision, strategic and specific policies, proposals, and development allocations. The Plan covers the area of Carmarthenshire excluding the Brecon Beacons National Park.

2.2.8 PSD11: Noise Pollution states:

"*Proposals that will lead to a detrimental impact from noise pollution will be permitted where it can be demonstrated that appropriate mitigation measures will be implemented, and incorporated into the development to minimise the adverse effects*."

2.2.9 Until the Revised LDP is adopted, the existing 2006-2021 LDP will remain in place for all planning decisions, in line with advice issued by the Welsh Government.

2.3 Standards

BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise

2.3.1 BS 5228-1:2009+A1:2014 gives recommendations for basic methods of noise control relating to construction sites, including sites where demolition, remediation, ground treatment or related civil engineering works are being carried out, and open sites, where work activities/operations generate significant noise levels, including industry-specific guidance.

2.3.2 Annexes C and D detail current and historical sound level data associated with different construction and demolition operations that can be used to calculate the impact of noise from construction sites.

2.3.3 Annex E (BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise) outlines example criteria for the assessment of the potential significance of noise effects and describes methods to identify the likely significance of noise levels from surface construction activity.

2.3.4 The ABC method provides the threshold of potential significant effect at dwellings when the site noise level, rounded to the nearest decibel, exceeds the threshold value. For the appropriate period (night, evening/weekends or day), the ambient noise level is determined and rounded to the nearest 5 dB to determine the threshold level. This is then compared with the site noise level. If the site noise level exceeds the appropriate category value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect.

2.3.5 **Table 2.1** describes the example threshold of potential significant effects of noise from construction and open sites at dwellings.

Table 2.1: Example Threshold of Potential Significant Effect at Dwellings

Assessment Category and Threshold Value Period	Threshold Value, in decibels (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23:00 – 07:00)	45	50	55
Evenings and weekends [D]	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.

NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise.

NOTE 3 Applied to residential receptors only.

A) Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.
B) Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as category A values.
C) Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than category A values.
D) 19.00–23.00 weekdays, 13.00–23.00 Saturdays and 07.00–23.00 Sundays.

2.4 Proposed Assessment Criteria

2.4.1 With reference to the requirements of Carmarthenshire County Council and applicable guidance documents, **Tables 2.2** details the proposed assessment criteria for construction noise.

Table 2.2: Construction Noise Impact Levels for Residential Buildings

Magnitude of Impact in Noise Terms	Construction Sound Level $L_{Aeq,T}$ (dB) at Residential Receptor
Substantial	Above or equal to the Threshold Level* + 10 dB
Major	Above or equal to the Threshold Level* + 5 dB and below the Threshold Level* + 10 dB
Moderate	Above or equal to the Threshold Level* and below the Threshold Level* + 5 dB
Minor	Above or equal to the Ambient Sound Level and below the Threshold Level*
Negligible	Below the Ambient Sound Level
*Threshold level determined as per BS 5228:1 Section E3.2 and Table E.1 (also replicated in Table 2.1 of this report)	

2.4.2 Construction noise shall constitute an impact where it is determined that a major or moderate magnitude of change will occur for a duration exceeding:

- 10 or more days or nights in any 15 consecutive days or nights.
- a total number of days exceeding 40 in any 6 consecutive months.

3 Environmental Sound Survey

3.1 Procedure

3.1.1 An unattended environmental sound survey was undertaken between approximately 12:30 hours on Tuesday 23 April 2024 and approximately 13:15 hours on Wednesday 1 May 2024 to determine the existing sound climate at locations considered representative of the nearest receptors.

3.1.2 Measurements were made of the L_{Aeq}, sound levels over 15-minute periods.

3.1.3 The sound level meters were located in environmental cases. The microphones were connected to the meters via an extension cable and fitted with the manufacturer's windshield.

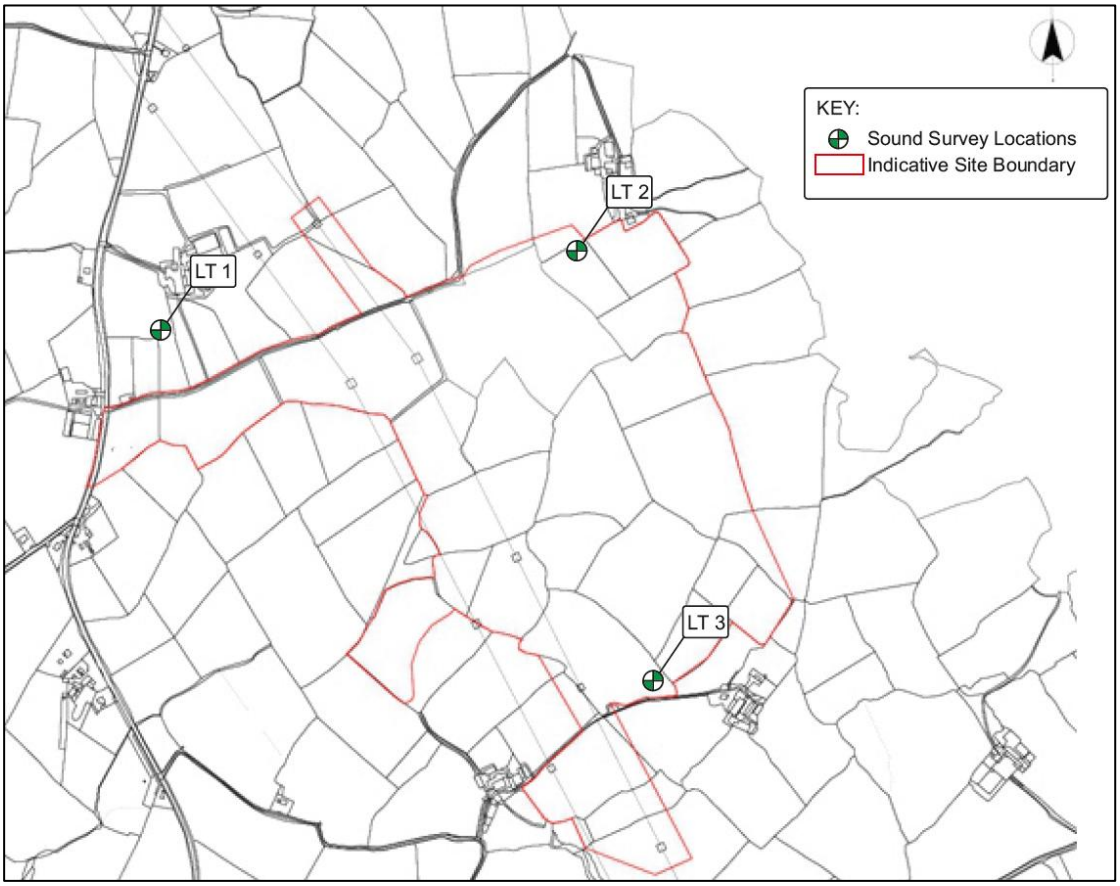
3.1.4 The instrumentation used in the survey (including calibration information) is listed in **Appendix B**.

3.1.5 Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

3.2 Measurement Locations

3.2.1 Sound measurements were undertaken at three locations at the site. The measurement positions are detailed in **Figure 2** and described in **Table 3.1**.

Figure 2: Environmental Sound Measurement Locations



(Courtesy of National Grid)

Table 3.1: Description of Measurement Locations

Position	Description
LT1	The microphone was located at a height of 1.5 m above local ground level in a free field location, north of the proposed development at a location representative of dwelling at Llwyngwcw.
LT2	The microphone was located at a height of 1.5 m above local ground level in a free field location, north-east of the proposed development at a location representative of dwelling at Bwlch Y Gwynt Farm.
LT3	The microphone was located at a height of 1.5 m above local ground level in a free field location, south of the proposed development at a location representative of Cwmafael and Crugan Fach.

3.3 Meteorological Conditions

3.3.1 A Lufft WS600 weather station was located within the proposed site to determine the weather conditions during the survey. The weather conditions are detailed in **Table 3.2**.

Table 3.2: Meteorological Conditions

Date	Average Temperature (°C)	Precipitation (mm)	Maximum Wind Speed (m/s)	Wind Direction
Tuesday 23 April 2024	13	0	2	NW
Wednesday 24 April 2024	12	0	2	NW
Thursday 25 April 2024	11	0	2	W
Friday 26 April 2024	10	0	1	SE
Saturday 27 April 2024	9	0.2	2	SE
Sunday 28 April 2024	12	0	4	W
Monday 29 April 2024	10	0	5	SW
Tuesday 30 April 2024	10	0.2	4	SE
Wednesday 1 May 2024	13	0	2	E

3.3.2 These conditions are generally considered suitable for obtaining representative sound level measurements. However, due to periods of rain and high winds, data collected on Monday 29th April and Tuesday 30th April has been excluded from the analysis.

3.4 Assumptions/Limitations

3.4.1 The engineer noticed nothing unusual in terms of the sound climate at the time of the survey. This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary. No warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.

3.5 Environmental Sound Climate

3.5.1 Due to the nature of the survey (i.e., unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events during the entire survey period. However, at the beginning and end of the survey period, it was noted that on-site sound levels were

dominated by distant vehicular movements on the surrounding road network as well as birdsong.

3.6 Environmental Sound Survey Results

3.6.1 The results of the survey are presented in the time history graphs in **Appendix C.** A summary of the survey results, during the proposed construction hours (08:00 – 18:00), is provided in **Table 3.3**.

Table 3.3: Summary of Environmental Sound Survey Results

Location	Date	Period, T	Measured Sound Level dB, $L_{Aeq,T}$
LT1	23/04/2024	Daytime (14:00 – 18:00 hours)	49
	24/04/2024	Daytime (08:00 – 18:00 hours)	54
	25/04/2024	Daytime (08:00 – 18:00 hours)	51
	26/04/2024	Daytime (08:00 – 18:00 hours)	51
	27/04/2024	Daytime (08:00 – 18:00 hours)	50
	28/04/2024	Daytime (08:00 – 18:00 hours)	49
	01/05/2024	Daytime (08:00 – 12:30 hours)	47
LT2	23/04/2024	Daytime (14:00 – 18:00 hours)	49
	24/04/2024	Daytime (08:00 – 18:00 hours)	57
	25/04/2024	Daytime (08:00 – 18:00 hours)	56
	26/04/2024	Daytime (08:00 – 18:00 hours)	53
	27/04/2024	Daytime (08:00 – 18:00 hours)	55
	28/04/2024	Daytime (08:00 – 18:00 hours)	58
	01/05/2024	Daytime (08:00 – 12:30 hours)	56
LT3	23/04/2024	Daytime (14:00 – 18:00 hours)	41
	24/04/2024	Daytime (08:00 – 18:00 hours)	49
	25/04/2024	Daytime (08:00 – 18:00 hours)	42
	26/04/2024	Daytime (08:00 – 18:00 hours)	38
	27/04/2024	Daytime (08:00 – 18:00 hours)	38
	28/04/2024	Daytime (08:00 – 18:00 hours)	40
	01/05/2024	Daytime (08:00 – 12:30 hours)	49

4 Construction Noise

4.1 Overview

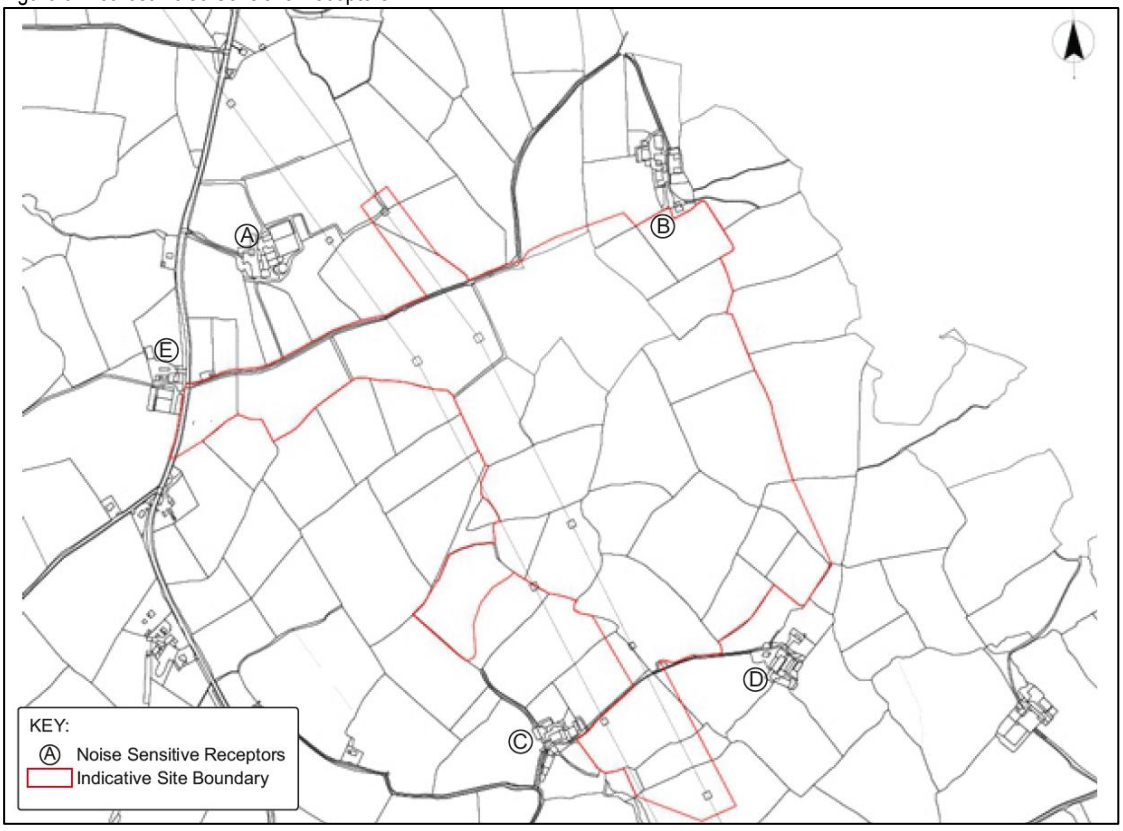
4.1.1 Noise associated with the construction phase could potentially increase the ambient noise levels at existing noise-sensitive receptors. An assessment has therefore been undertaken at the nearest noise sensitive receptors.

4.1.2 All construction works will be carried out during the hours of 0800 – 1800 Mon – Fri and 0800 – 1300 on Saturdays with no work on Sundays or bank holidays.

4.2 Noise Sensitive Receptors

4.2.1 **Table 4.1** provides details of noise sensitive receptors identified in the vicinity of the site. **Figure 3** details the approximate locations of the identified receptors.

Figure 3: Nearest Noise Sensitive Receptors



(Courtesy of National Grid)

Table 4.1: Noise Sensitive Receptors

Receptor	Description
A	Llwyngwcw (Existing residential dwelling) located off A484, north-west of the proposed development.
B	Bwlch Y Gwynt Farm (Existing residential dwelling) located north-east of the proposed development.
C	Cwmafael (Existing residential dwelling) located south-west of the proposed development
D	Crugan Fach (Existing residential dwelling) located south-east of the proposed development.
E	Llwyncelyn (Existing residential dwelling) located on A484, west of the proposed development.

4.3 Assessment Assumptions

4.3.1 The assessment considers construction activities during the principal stages outlined in **Table 4.2**.

Table 4.2: Construction Activities

Construction Task	Activity	Duration (months)
Site Preparation	Access road site clearance	3
	Site facility clearance	8
Ground Works	Site Earthworks	6
	Fill import, laying and compaction	4
Foundation Construction	Formwork/preparation Concreting	10
Site Road Construction	Sub base,Tarmacking	4
M&E	Cable laying/cable tower construction	15

4.4 Threshold Levels

4.4.1 Based on the sound survey data, **Table 4.3** presents the associated threshold level at each receptor determined in accordance BS 5228-1 Section E3.2 and Table E.1.

Table 4.3: Noise - Threshold Level for Receptors

Receptor	Ambient Noise Level (dB $L_{Aeq,10.5hrs}$)	Threshold Level (dB $L_{Aeq,10.5hrs}$)
A	51	65
B	56	65
C	43	65
D	43	65
E*	58	65
*Ambient level calculated based on a distance correction from Sound Survey Location 1		

4.5 Construction Noise Assessment

4.5.1 **Table 4.4** details the likely impact in noise terms associated with construction activities at the assessment receptors. The noise levels have been calculated as the dB $L_{Aeq,10h}$.

4.5.2 The assessment is based on worst-case noise levels with construction occurring on the parts of the site which are the closest distance to each of the noise receptors. Noise levels are likely to be below this level for the majority of the time as the works will not always be taking place at the closest part of the site, although these levels could be reached in some circumstances.

Table 4.4: Construction Noise Levels and Magnitude of Impact

Construction Activity	Calculated Construction Noise Level (dB $L_{Aeq,10h}$) at Noise Sensitive Receptor					Magnitude of Impact
	A	B	C	D	E	
Access road construction	51	44	37	37	64	Negligible/Minor
Site facility construction	44	51	46	47	40	Negligible/Minor
Site Earthworks	44	51	46	47	40	Negligible/Minor
Fill import, laying and compaction	44	51	46	47	40	Negligible/Minor
Formwork/preparation	44	51	46	47	40	Negligible/Minor
Concreting	43	51	46	47	40	Negligible/Minor
Sub base	51	44	37	37	64	Negligible/Minor
Tarmacking	51	44	37	37	64	Negligible/Minor
Cable laying/Cable tower construction	46	40	50	47	38	Negligible/Minor

4.5.3 Calculations indicate that the impacts are likely to be up to minor temporary short-term and are not considered to be significant.

4.5.4 Whilst further mitigation measures are not strictly required, best practice measures could be applied to reduce the noise impact further.

5 Mitigation

5.1 Construction Noise Mitigation

5.1.1 The following advice is based on the guidance provided in BS 5228-1:2009+A1:2014 and will be applied as appropriate to minimise the noise from the construction activities affecting noise sensitive receptors:

- Ensuring the use of quiet working methods, the most suitable plant and reasonable hours of working for noisy operations, where reasonably practicable;
- Locating noisy plant and equipment as far away from dwellings as reasonably possible, and where practical, carry out loading and unloading in these areas;
- Screening plant to reduce noise which cannot be reduced by increasing the distance between the source and the receiver (i.e. by installing noisy plant and equipment behind large site buildings);
- Shutting down any machines that work intermittently or throttling them back to a minimum;
- Orientating plant that is known to emit noise strongly in one direction so that the noise is directed away from houses, where possible;
- Closing acoustic covers to engines when they are in use or idling;
- Lowering materials slowly, whenever practicable, and not dropping them;
- Use of temporary acoustic barriers, where appropriate, and other noise containment measures, such as screens, sheeting and acoustic hoardings at the construction site boundary to minimise noise breakout and reduce noise levels at the potentially affected receptors.

5.1.2 The above range of environmental management controls represent measures that are regularly and successfully applied to large-scale construction projects in order to minimise noise effects on local communities. The application of similar control measures during the construction phases would likewise support that the works proceed with the minimum disturbance to local residents.

5.1.3 The above measures would be covered within the Construction Environmental Management Plan.

6 Conclusion

6.1.1 A noise assessment associated with the construction for the proposed Llandyfaelog substation has been undertaken.

6.1.2 Noise sensitive receptors have been identified close to the works, and calculations of likely noise levels arising from construction works have been carried out.

6.1.3 An environmental sound survey has been undertaken by Stantec, to establish the baseline environmental sound levels at existing receptors. The results of the environmental sound survey have been used to establish thresholds levels with regards to construction noise and forms the basis of the assessment.

6.1.4 The results of our calculations indicate that noise levels are likely to be below the threshold level for all receptors. Therefore, based on the results of the assessments undertaken herein, the site is considered suitable for the proposed development with respect to construction noise.

Appendix A Glossary of Acoustic Terminology

Table A.1: Glossary of Acoustic Terminology

Parameter	Description
Ambient Sound	Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Comprises of the residual sound and the specific sound when present.
Ambient Sound Level (La = $L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 µPa and for sound power is 1 ρW.
Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fats time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the LA90,1hour is the A-weighted sound level exceeded for 90% of 1 hour/
Sound Pressure	The difference between the pressure caused by a sound wave and the ambient pressure of the medium the sound wave is passing through. Measured in Pascals.
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p0). The reference value for sound pressure is 20 µPa. Defined as: $L_p = 20log\left(\frac{p}{p_0}\right)$

Appendix B Instrumentation

B.1.1 The instrumentation used in the survey is listed in **Table B.1.**

Table B.1: Instrumentation

Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
Sound Level Meter	RION	NL-52	54903	12/01/2023
½" Pre-polarised microphone		UC-59	6480	
Pre-amplifier		NH-25	42931	
Sound Level Meter	RION	NL-52	1010734	19/06/2023
½" Pre-polarised microphone		UC-59	23232	
Pre-amplifier		NH-25	11381	
Sound Level Meter	RION	NL-52	1043457	12/01/2023
½" Pre-polarised microphone		UC-59	07232	
Pre-amplifier		NH-25	43486	
Calibrator	B&K	4231	2619373	02/01/2024

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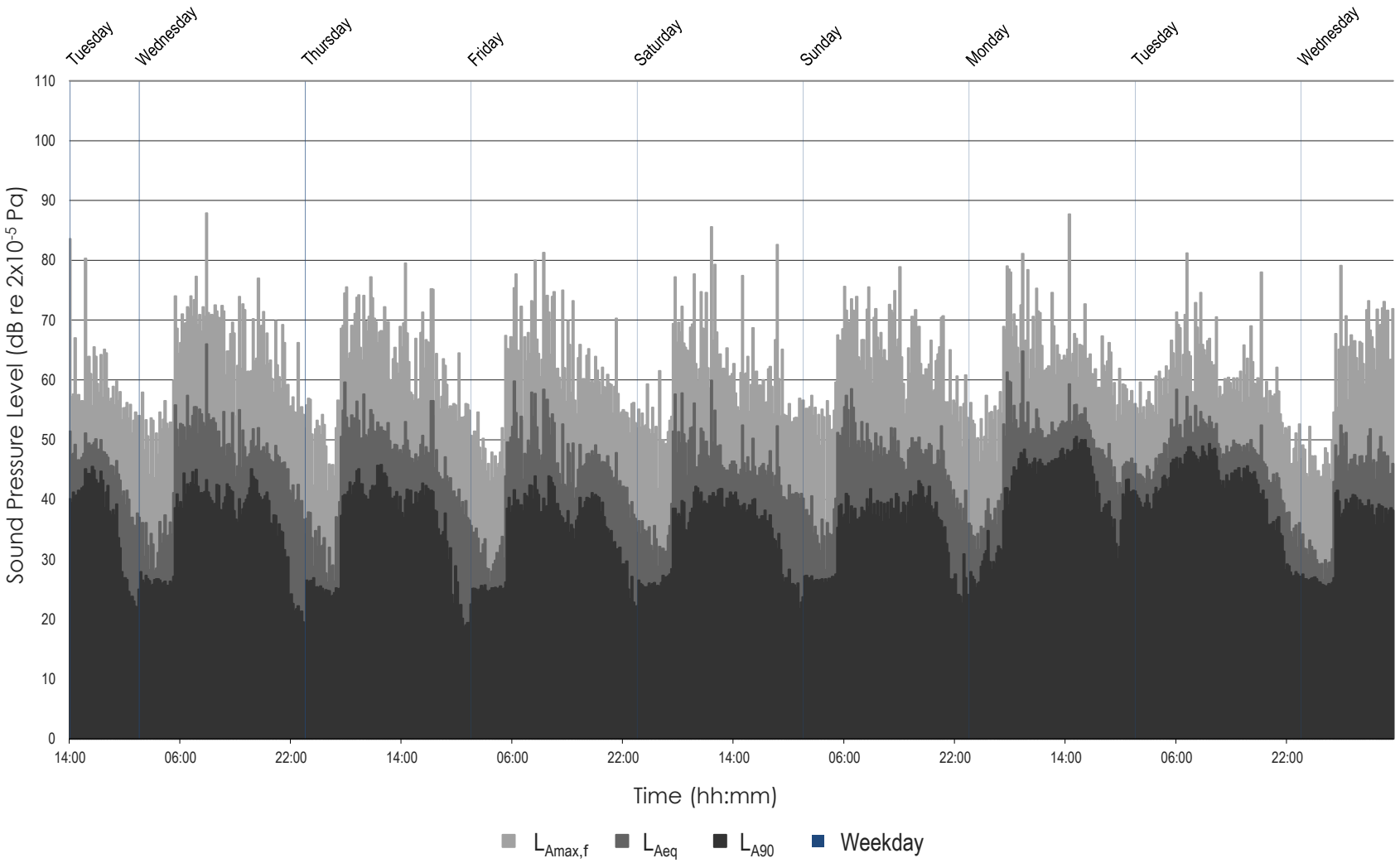
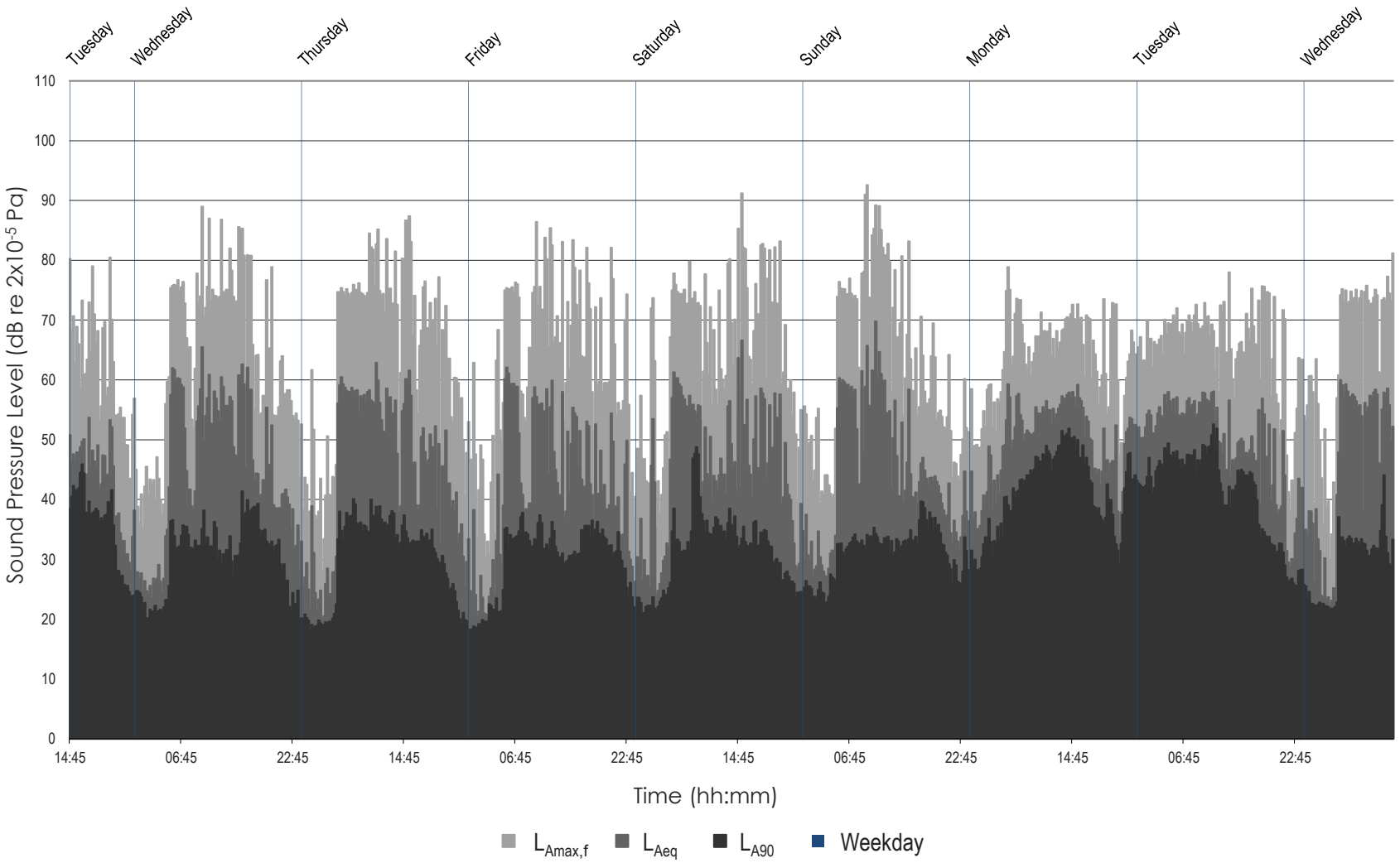
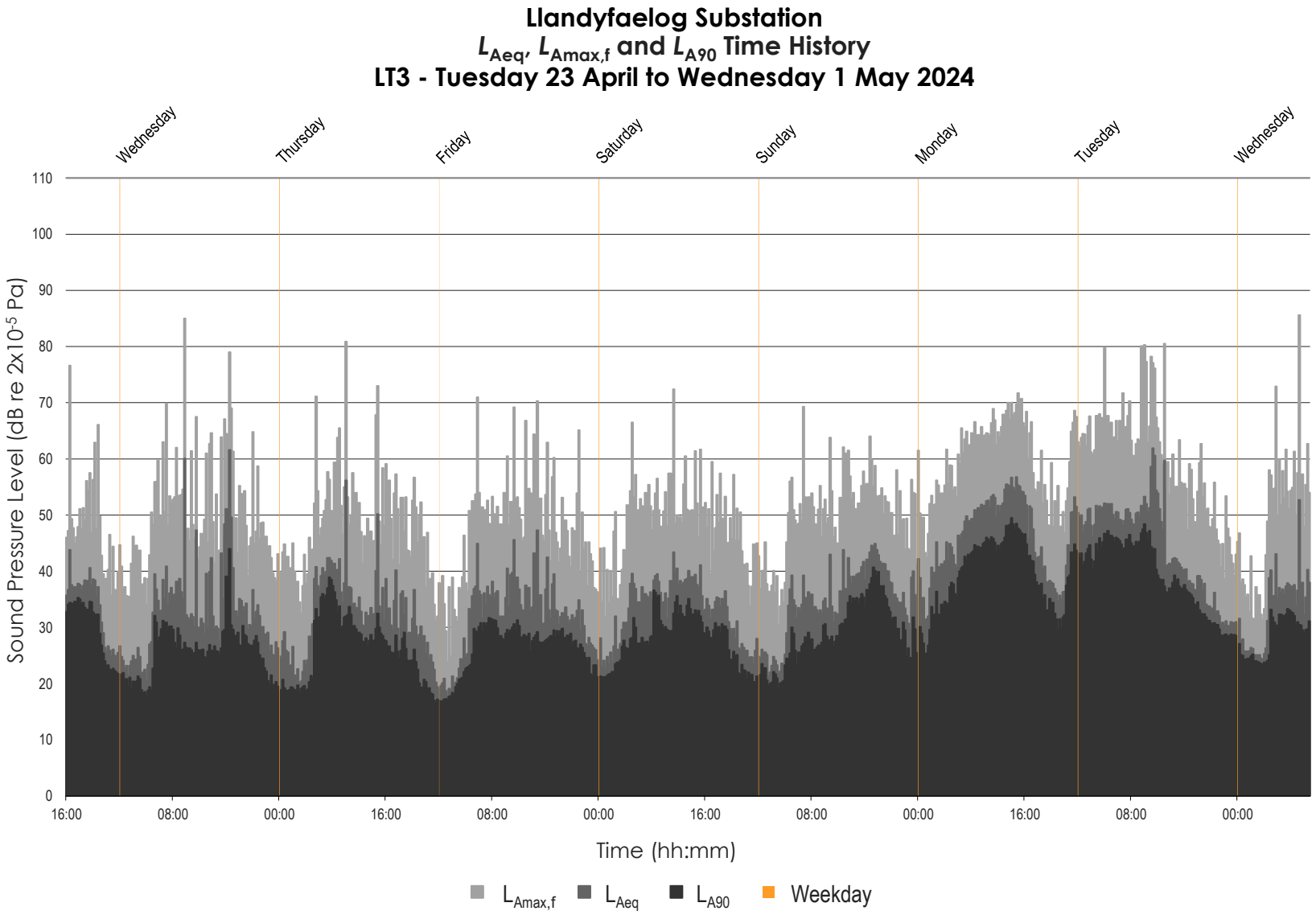
Appendix C Time History Graphs

Llandyfaelog Substation
L_{Aeq}, $L_{Amax,f}$ and L_{A90} Time History
LT1 - Tuesday 23 April to Wednesday 1 May 2024



Llandyfaelog Substation
L_{Aeq}, $L_{Amax,f}$ and L_{A90} Time History
LT2 - Tuesday 23 April to Wednesday 1 May 2024




Llandyfaelog Substation
L_{Aeq}, $L_{Amax,f}$ and L_{A90} Time History
LT3 - Tuesday 23 April to Wednesday 1 May 2024
Wednesday
Thursday
Friday
Saturday
Sunday
Monday
Tuesday
Wednesday
Sound Pressure Level (dB re 2x10-5 Pa)
110
100
90
80
70
60
50
40
30
20
10
0
16:00
08:00
00:00
Time (hh:mm)
LAmax,f
LAeq
LA90
Weekday