OPERATIONAL NOISE IMPACT ASSESSMENT

MARGAM SUBSTATION - EXTENSION

Laing O'Rourke

2062990-RSKA-RP-001-(04)

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General notes

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Author(s):	Kate Mann Senior Acoustic Consultant	Technical reviewer:	Daniel Clare Acoustics Director
Signature:		Signature:	
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1 Introduction

1.1 Instruction

RSK Acoustics Ltd. (RSKA) has been instructed by Laing O'Rourke to undertake an assessment of the potential noise impacts associated with the extension of the existing National Grid owned Margam Substation in Port Talbot, adjacent to the Tata Steel UK site (SA13 3NF).

An assessment has been undertaken to determine the potential noise impacts associated with the operation of the substation extension compared to the existing acoustic environment. The outcome of the assessment outlines any noise impacts and identifies noise control measures to limit disturbance in the surrounding community. The findings are presented in this report and will be used in support of a planning application for the development.

The assessment has been informed by baseline noise surveys carried out by RSKA in March 2025 and May 2024 comprising unattended measurements at locations representative of the nearest noise sensitive receptors and nearest ecological receptors respectively.

A glossary of acoustic terms used within this report is appended to this document.

1.2 Site Location and Description

The site is located off Grange Road in Port Talbot (278520E, 186356N). The site is an existing substation that includes a switchgear room, two transformers, two auxiliary transformers, a compressor and ancillary equipment. The proposed development comprises extending the substation site to include 1 no. back up diesel generator, a 275kV GIS Buildings with associated DX (air conditioning) units and Mechanically Switched Capacitor with Damping Network equipment. The extension is required by National Grid to facilitate the operation of the proposed Electric Arc Furnace (EAF) at the Tata Steel Site. This is discussed later in the document in relation to the noise survey.

The site is bounded by the Tata Steel UK site and railway line to the west, green space with the A4241 and residential properties to the north, bio energy facilities to the east and Grange substation and green space to the south.

Figure 1 shows the location of the substation in relation to the nearest noise sensitive receptors to the site. Figure 2 shows the layout of the proposed substation extension with the new equipment proposed highlighted in red[1].

[1] Margam 275kV GIS substation layout ref. 30004240-BHK-XX-XX-DR-HV-0012 – 9 February 2025

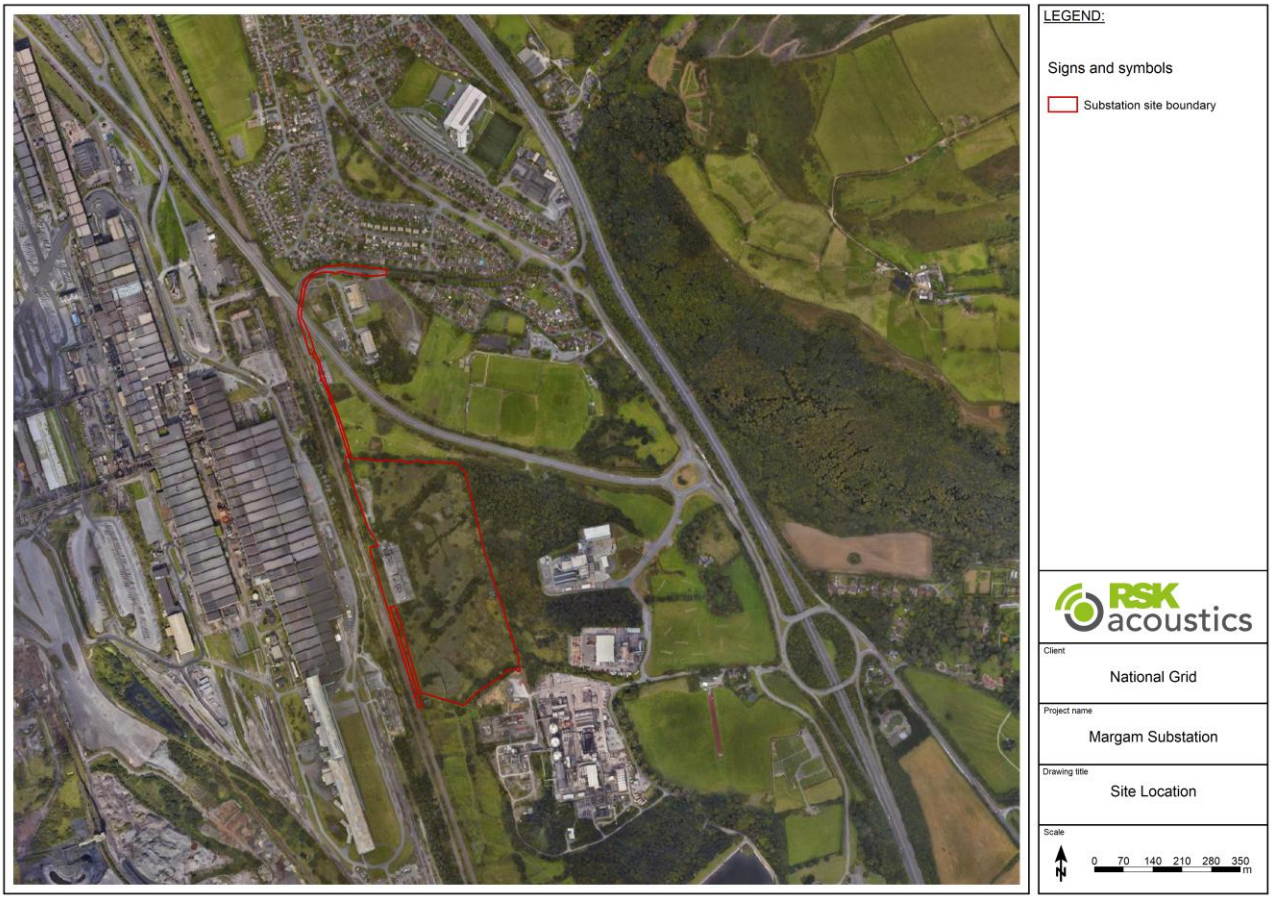

Figure 1 Site location

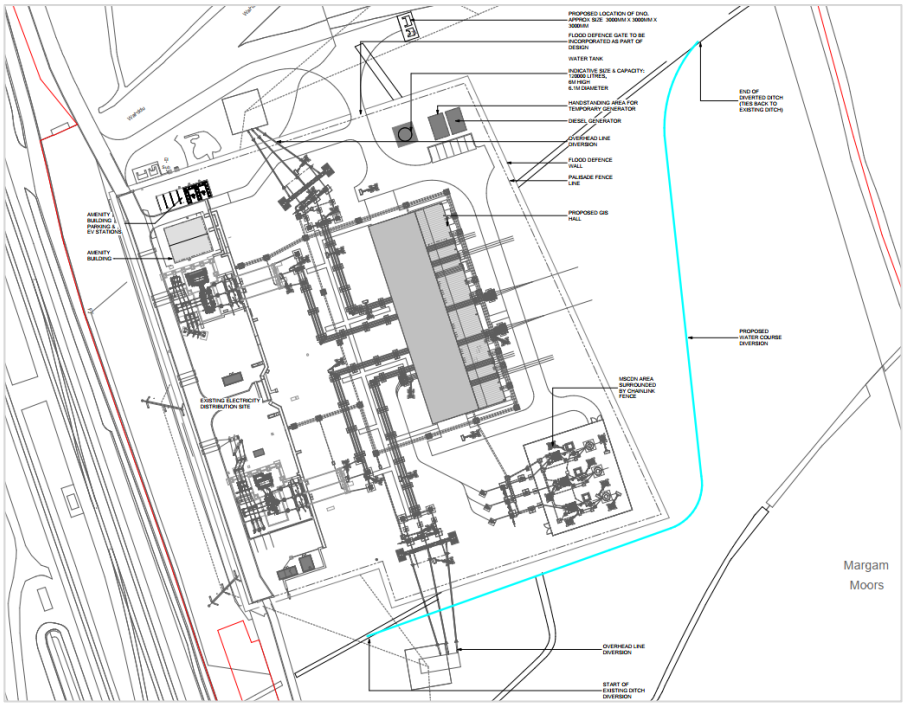

Figure 2 Site layout

2 Standards and Guidance

A summary of the relevant standards and guidance documents is provided in Table 1.

Document	Summary
BS 4142:2014+A1:2019 *'Methods for rating and assessing industrial and commercial sound'*	BS 4142 provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The method is applicable to fixed plant installations, sound from industrial and manufacturing process and other associated activities. The rating method takes into account specific source characteristics, such as tonality, impulsivity and intermittency. The impact assessment procedure described in BS 4142 is based on the comparison of the rating sound level with the background sound level prevailing at the assessment locations. BS 4142 excludes assessment of internal noise levels.
World Health Organisation (WHO) *'Guidelines for Community Noise'*, 1999	The WHO Guidelines for Community Noise sets out guidance on appropriate noise levels for different scenarios to ensure that communities are not subjected to unacceptable levels of noise. To minimise the likelihood of 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 levels may be annoying, depending on the nature of the noise source. If the noise includes a large proportion of low frequency components, lower guideline values should be applied.
WHO *'Night Noise Guidelines for Europe'* (NNG), 2009	The NNG aims to present the conclusions of the WHO working group responsible for preparing guidelines for exposure to noise during the night. This document forms an extension to the WHO Guidelines for Community Noise.
BS 8233:2014 *'Guidance on sound insulation and noise reduction for buildings'*	BS 8233 provides guidance on internal noise levels for dwellings when unoccupied. Guideline internal ambient noise level values are proposed which are considered desirable not to be exceeded when considering steady external noise sources, noting that occupants are usually more tolerant of noise without a specific character.
BS 7445-1:2003 *'Description and measurement of environmental noise'*	BS 7445 defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.
BS EN IEC 60942:2018 *'Electroacoustics – Sound calibrators'*	BS EN IEC 60942 specifies the performance requirements for sound calibrators.
BS EN 61672-1:2013 *'Electroacoustics – Sound level meters'*	BS EN 61672-1 provides electroacoustic performance specifications for sound measuring instruments.
The Environment (Air Quality and Soundscapes) (Wales) Act 2024	The Act makes provision for improving air quality in Wales; for a national strategy for assessing and managing soundscapes in Wales.
Noise and Soundscape Action Plan, 2023-2028, Welsh Government	Noise and soundscape action plan is the Welsh Government's central noise policy document. It outlines the Welsh public sector's strategic policy direction in relation to noise and soundscape management for the next 5 years.
Technical Advice Note (TAN) 11 Noise: October 1997. CL-01-15, Updates to TAN 11 Noise, Noise Action Plan (2013-18) Commitments	This document provides guidance on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development.

Document	Summary
	'CL-01-15 Updates to TAN 11 Noise - Noise Action Plan (2013-18) Commitments' includes clarifications on how the amendments/ revision of the supporting legislation and British Standards affect the content of TAN11. This update includes references to the publication of the revised BS 4142:2014 'Methods for rating and assessing industrial and commercial sound'.
Neath Port Talbot County Borough Council Local Development Plan (2011-2026) (Adopted January 2016)	Neath Port Talbot County Borough Council (NPTCDC) prepared a Local Development Plan (LDP) for the period 2011 to 2026, as required under the Planning and Compulsory Purchase Act 2004. This document *'(…) guides the future development of an area, providing a clear vision for the County Borough setting out where, when and how much new development can take place over the next 15 years (2011-2026). The aim is to provide developers and the public with certainty about the planning framework for Neath Port Talbot.'* Policy EN8 '*Pollution and Land Stability'* includes considerations on noise pollution as follows: '*In relation to noise, potentially noisy proposals should not be located close to sensitive uses (such as hospitals, schools and housing) and new noise-sensitive developments should not be located near to existing noisy uses (including industry and existing or proposed transport infrastructure) unless it can be shown that adverse effects can be dealt with through mitigation measures incorporated into the design. Where noise levels are likely to be a significant issue, developers may be required to provide information to show that no nuisance is likely to be caused through increased noise levels at sensitive locations if the development proceeds.'*

Table 1 Standards and guidance

3 Noise Survey

3.1 Methodology

Baseline noise monitoring has been undertaken to define the existing sound levels at the closest noise sensitive receptors to the site. The resulting measurement data set has been used to inform the assessment. Throughout the duration of the noise survey, it is understood that the substation was operating at normal duty.

Noise monitoring was undertaken in accordance with BS 7445-1 - 'Description and measurement of environmental noise. Guide to quantities and procedures'.

3.1.1 Survey duration

An unattended noise survey was carried out by RSKA between Friday 7 March and Wednesday 19 March 2025 at locations representative of the nearest residential receptors to the site.

Additionally, an unattended survey was undertaken at ecological receptors between Tuesday 7 May to Wednesday 22 May 2024 (UL4) and between Tuesday 7 May to Tuesday 28 May 2024 (UL3). Further details regarding the baseline survey (including full measurement results and equipment details) at these locations can be found in the noise impact assessment for Tata Steel UK (planning application ref. P2024/0711).

3.1.2 Measurement locations

The unattended noise monitoring locations are summarised in Table 2 and presented graphically in Figure 3. Photographs of the monitoring locations are presented in Appendix B.

Figure 3 Unattended monitoring locations

Ref.	Approx. Coordinates	Measurement Duration	Description
UL1	278782E, 186970N	07/03/25–17/03/25	Noise logger installed in free-field conditions approximately 1.5m above local ground level. Installed at this location to quantify noise levels at the residential receptors along Abbots Close. In absence of a monitoring location at Margam Road, UL1 is also taken to be representative of Margam Road. This receptor is located closer to the M4 than UL1, therefore it can be expected that the noise environment at UL1 is quieter and therefore represents a worst case assessment.
UL2	278357E, 187086N	07/03/25–19/03/25	Noise logger installed in free-field conditions approximately 1.5m above local ground level. Installed at this location to quantify noise levels at the residential receptors in the vicinity of Byass Street and Brynhyfryd Road.
UL3	278256E, 185312N	07/05/24–28/05/24	Noise logger installed in free-field conditions approximately 1.5m above local ground level. Installed at this location quantify noise levels at Margam Moors SSSI.
UL4	279769E, 185040N	07/05/24–22/05/25	Noise logger installed in free-field conditions approximately 1.5m above local ground level. Installed at this location quantify noise levels at Eglwys Nunydd reservoir SSSI.

Table 2 Unattended monitoring locations

3.1.3 Equipment

The equipment used in the March 2025 survey and calibration information is presented in Table 3. Calibration certificates for all equipment used can be provided on request

Equipment	Type	Serial Number	Calibration Date
Sound level meter	01dB Fusion	14023	28/06/2023
Sound level meter	01dB Fusion	15187	01/06/2023
Sound level meter	Svantek 971	77646	14/05/2023
Acoustic calibrator	Rion NC-74	34625616	16/07/2024

Table 3 Monitoring equipment

The calibration of the sound level meters was checked before and after the measurements, using the acoustic calibrator at 94 dB at 1 kHz; no significant calibration drift was noted i.e. within a +/- 0.5 dB tolerance.

The sound level meters used conformed to the Class 1 requirements of BS EN 61672-1: 2013 Electroacoustics. Sound level meter, Specifications. The calibrator used conformed to the Class 1 requirements of BS EN IEC 60942: 2018 Electroacoustics, Sound calibrators.

3.1.4 Weather conditions

Weather information has been obtained through a nearby third-party weather station (Wunderground ref. IPORTT16) to determine conditions throughout the unattended survey duration. The weather information has been summarised in Figure 4 below. Detailed hourly weather information can be provided upon request.

Throughout the measurement period, wind speeds were noted to be less than 5 m/s in a variable wind direction with minimal precipitation. Therefore, weather conditions were generally considered conducive to noise monitoring. Data from the weather station has been cross referenced with other weather stations in the local area and was consistent. The weather station is therefore considered acceptable and in line with other monitoring associated with the Tata Steel Project.

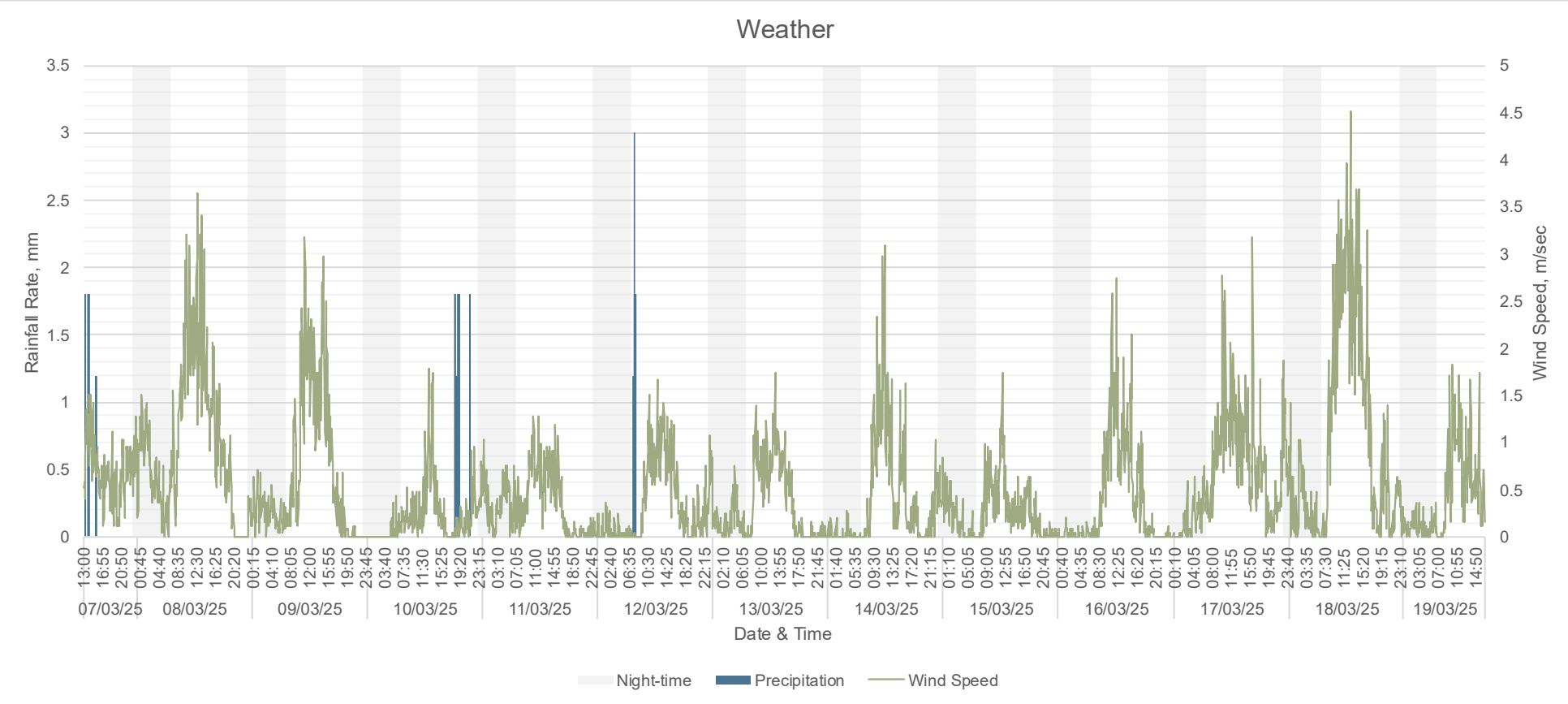

Figure 4 Weather data

3.2 Survey Observations

Observations of the existing environment at the monitoring locations are presented in Table 4.

Location	Type	Daytime Observations	Night-time Observations
UL1	Residential	Urban location dominated by sounds generated through human activity, specifically road traffic noise from the A48 and M4, and occasional car passbys on local roads. Sounds from nature included noise from foliage moving in the wind.	Urban location dominated by sounds generated through human activity, specifically road traffic noise from the A48 and M4. Sounds from nature included noise from foliage moving in the wind.
UL2	Residential	Urban location dominated by sounds generated through human activity, specifically noise from nearby industrial site and road traffic from the A4241 and A48. Sounds from nature include bird calls and some noise from foliage moving in the wind.	Urban location dominated by sounds generated by human activity, specifically noise from nearby industrial site. Occasional road traffic noise from A4241 and A48, however this is infrequent. Sounds from nature include some noise from foliage moving in the wind.
UL3	Ecological	Wilderness location adjacent to significant industrial site. Acoustic environment varies depending on adjacent industrial activities. Noise from motorised traffic on the local road network is audible. Sounds from nature included birdsong and insects.	Wilderness location adjacent to significant industrial site. Acoustic environment dominated by sounds generated by human activity, specifically from adjacent industrial activities. Occasional noise from the local road network (M4 motorway) and railway movements, however these were both infrequent. Sounds from nature included bird noise and insects.
UL4	Ecological	Wilderness location dominated by sounds generated by human activity, specifically noise from the local road network (M4 motorway) as well as nearby industrial activity. Natural sounds include bird calls and some noise from foliage moving in the wind.	Wilderness location dominated by sounds generated by human activity, specifically nearby industrial activity and occasional noise from the local road network (M4 motorway), however this was infrequent. Natural sounds include some noise from foliage moving in the wind.

Table 4 Survey observations

The RSKA surveyor confirmed that the existing Margam substation was not audible at the monitoring locations during any observed period. Therefore the measurements are considered to be true background levels.

4 Baseline Survey Results

4.1 Residential Receptor Survey Results (March 2025)

The noise monitoring results obtained are UL1 and UL2 are presented below. A tabulated summary is presented in Appendix C.

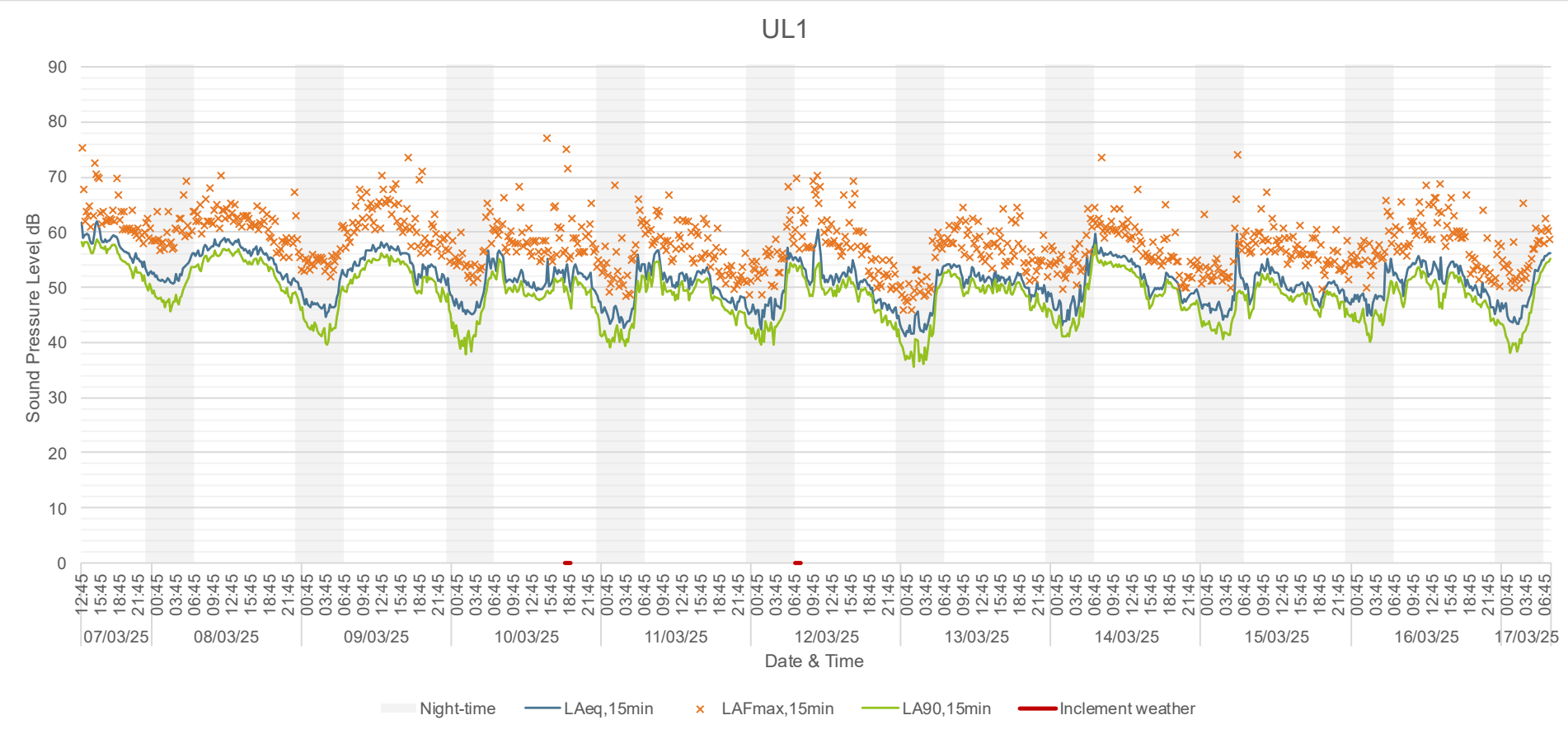

Figure 5 UL1 noise measurement results

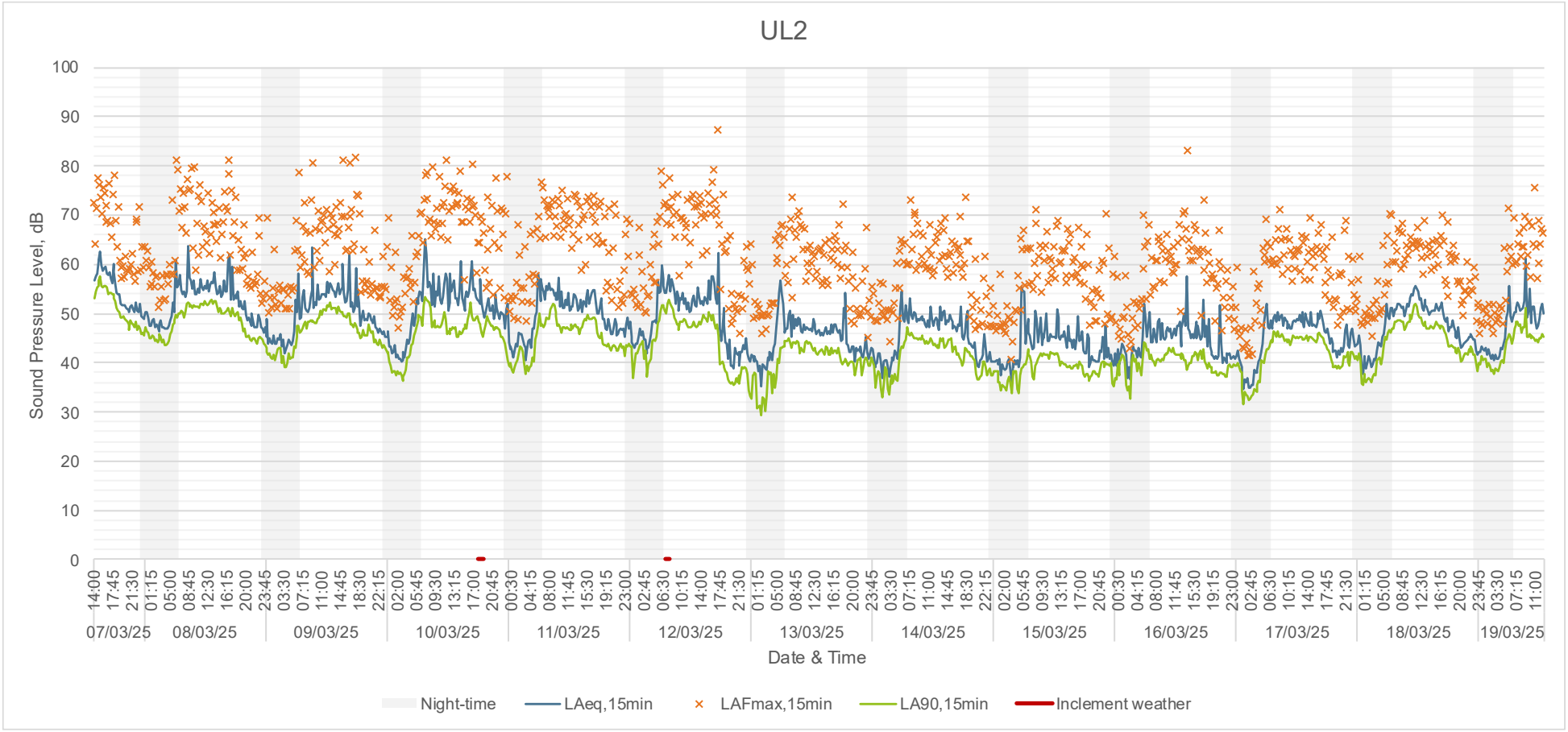

Figure 6 UL2 noise measurement results

4.2 SSSI Survey Results (May 2024)

A summary of the noise survey results for the SSSI monitoring locations across daytime and night-time are presented in Table 5 below:

Monitoring Location	Average Sound Level $L_{Aeq,T}$ (dB)		Representative Baseline $L_{A90,T}$ (dB)		Maximum Sound Level L_{AFmax} (dB)	
	Daytime	Night-time	Daytime	Daytime	Daytime	Night-time
UL3	49	50	41	46	83	85
UL4	60	57	52	46	82	78

Table 5 Ecological receptor baseline sound survey result summary

5 Assessment Methodology

5.1 Assessment Criteria

5.1.1 Residential receptors

The nearest noise sensitive receptors to the proposed substation extension are residential properties located along Abbots Close and Margam Road, and Brynhyfryd Road represented by UL1 and UL2 respectively. Although periods of rainfall (see Figure 4) did not elevate measured levels, noise measured during, and immediately after, have been excluded from the analysis.

The methodology detailed in BS 4142: 2014+A1: 2019 provides an example of statistical analysis to determine the typical background sound level ($L_{A90,15min}$). The following analysis adopts the methodologies applied within the aforementioned standard for both UL1 and UL2 respectively:

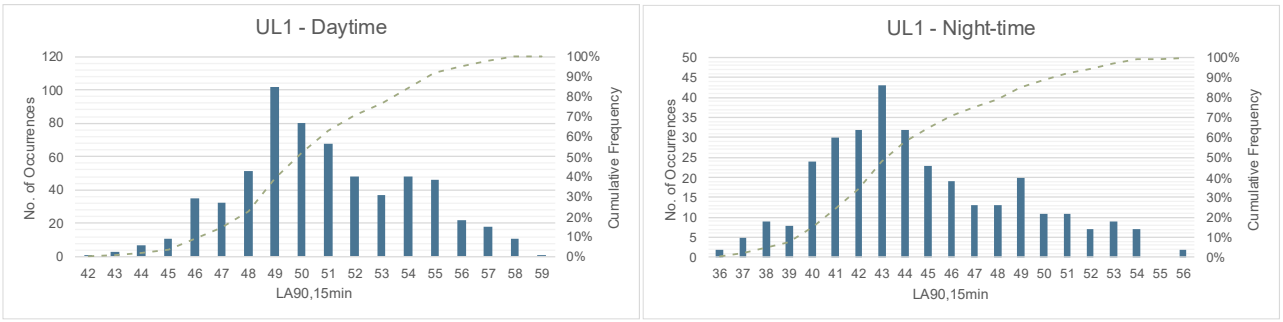

Figure 7 Statistical analysis of background sound levels – UL1

Based on Figure 7, 'BS 4142:2014+A1:2019 Technical Note (March 2020 Version 1.0) and professional judgment, an existing background sound level of 48 dB $L_{A90,1hr}$ during the daytime and 40 dB $L_{A90,15min}$ during the night-time has been derived. This is considered applicable to properties off Abbots Close and Margam Road.

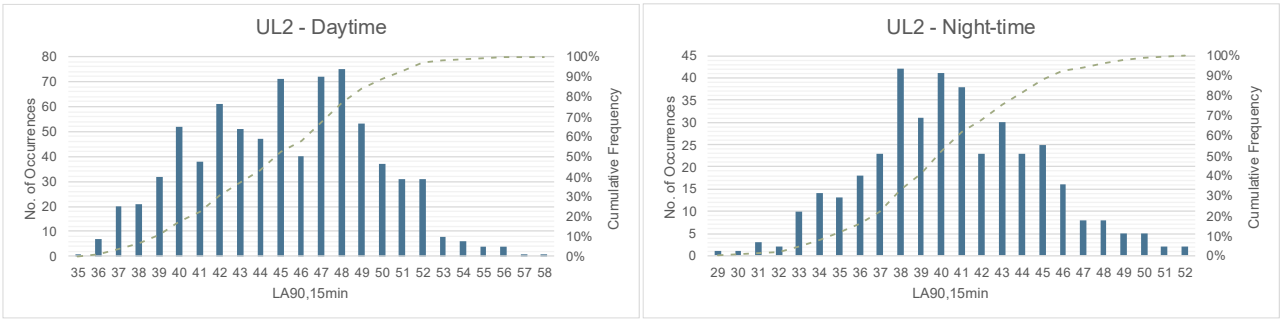

Figure 8 Statistical analysis of background sound levels – UL2

Based on Figure 8, 'BS 4142:2014+A1:2019 Technical Note (March 2020 Version 1.0) and professional judgment, an existing background sound level of 40 dB $L_{A90,1hr}$ during the daytime and 36 dB $L_{A90,15min}$ during the night-time has been derived. This is considered applicable to properties off Brynhyfryd Road.

5.1.2 SSSI receptors

Based on the guidance within the IECS 2009 report (Cutts et al., 2009)[2] and the review of thresholds provided in the Natural England 2018 document, it is considered that a noise threshold of 55 dB(A) is acceptable for the assessment of nesting and wintering birds within the SSSI. Such a noise level is an indication of low noise level effect in the Natural England, 'A Review of the Effects of Noise on Birds – Version 1' 2018 guidance[3].

[2] Cutts, N., Phelps, A. and Burdon, D. 2009. 'Construction and waterfowl: Defining Sensitivity, Response, Impacts and Guidance'. Report to Humber INCA, Institute of Estuarine and Coastal Studies, University of Hull.
[3] Drewitt, A., Hawthorne, E., Sauders, R. and Anthony, S. 2018. 'A Review of the Effects of Noise on Birds – Version 1'. Natural England

Although not specifically stated, the 55 dB (A) level has been assumed to relate to both average and maximum noise events e.g. 55 dB $L_{Aeq,\,T}$ and L_{AFMax}. In a similar way to the BS 4142:2014+A1 2019 assessment, context and existing noise levels are important to be accounted for when assessing impacts on fauna therefore the existing ambient noise levels are presented below for consideration in the assessment.

The character of the sound from the substation extension will generally be of low level and constant, with no impact noise and therefore an assessment of the L_{AFmax} events is not considered applicable as no increase in L_{AFmax} events is expected as a result of the substation at the SSSIs.

The existing ambient noise levels at UL3 and UL4 are presented in Table 6 for daytime and night-time respectively:

Receptor	Average Ambient Level $L_{Aeq,T}$ (dB)	
	Daytime	Night-time
UL3	49	50
UL4	60	57

Table 6 SSSI assessment criteria

It is noted that the survey location at UL4 was impacted by its proximity to the nearby motorway (within 150m of the M4). Although results are representative of areas of the reservoir a similar distance from the motorway, care should be taken in using the data as representative of the Eglwys Nunydd reservoir as a whole. On this basis, for the purpose of this assessment, noise levels measured at UL3 are considered applicable to both Margam Moors and Eglwys Nunydd reservoir.

5.2 Modelling Methodology

A number of proprietary and well proven software packages are available that can be programmed to conform to recognised source noise calculations and propagation calculations. Unless otherwise indicated all noise predictions presented in this report have been carried out using Soundplan v 9.1.

International Standard: ISO 9613-2: 2024: 'Acoustics - Attenuation of sound during propagation outdoors - Part 2: General method of calculation' enables the prediction of noise levels in the community from sources of known sound emission.

The noise prediction method described in this part of the standard is general and is suitable for a wide range of engineering applications where the noise level outdoors is of interest. The noise source(s) may be moving or stationary and the method considers the following major mechanisms of noise attenuation:

- Geometrical divergence (also known as distance loss or geometric damping);
- Atmospheric absorption;
- Ground effect;
- Reflection from surfaces; and
- Screening by obstructions, barriers and buildings.

The method predicts noise levels under metrological conditions favourable to noise propagation from the sound source to the receiver, such as downwind propagation, or equivalently, propagation under a moderate ground-based temperature inversion as commonly occurs at night.

An overview of the modelling parameters is given in Table 7.

Item	Setting
Algorithm	International Standard: ISO 9613-2: 2024

Item	Setting
Ground absorption	Ground absorption has been set based on local conditions as derived from aerial imagery and noise survey. Acoustically hard (assumed 0 coefficient) – roads, water, pavements and hard standing areas; Acoustically soft (assumed 1 coefficient) – grassed areas, vegetation
Meteorological conditions	10 degrees Celsius; 70% humidity; and Wind from source to receiver.
Receptor height	Ground Floor level set at 1.5m above external ground level. First Floor level set at 4m above external ground level.
Site layout	Site layout as per drawing ref. MARPT-BHK-01-ZZ-DG-A-130023_P05 and redline boundary as per MARPT-BHK-01-ZZ-DG-A-130020_P04. Outdoor heating and cooling units layout as per drawing ref. MARPT-BHK-01-00-DG-M-320004 – 27 March 2025.
Source modelling	Noise data for the substation extension has been provided by G&M Eurotex via Laing O'Rourke: ▪ 85 dBA at 1m (L_p) for the backup generator (spectral data for the proposed plant has been based on similar plant items) modelled at 4m A.G.L. ▪ 84.2 dBA (L_w) for the MSCDN reactors and spectral data as per datasheet provided by GE Vernova in email dated 14 May 2025, modelled at 2.5m A.G.L. ▪ 67 dBA (L_w) for the MSCDN capacitors as per GE Vernova in email dated 14 May 2025, modelled at 4m A.G.L. ▪ DX units as per document ref. MARPT-BHK-01-XX-SH-M-32001 and spectral data provided by Mitsubishi Electric and is presented in Appendix D, modelled at 0.3m A.G.L. It is not known at this stage how often the backup generator will be required therefore for assessment purposes, it is assumed all plant has the potential to be operational during both daytime and night-time hours to provide a worst-case scenario.
Terrain	Lidar data from DataMapWales with a 5m resolution has been imported into the model.

Table 7 Modelling parameters

6 Impact Assessment

6.1 Residential Receptors

6.1.1 Acoustic Correction

According to BS 4142:2014+A1: 2019, where certain features of the specific noise level can increase the significance of impact of a sound level, a character correction is applied to provide a rated noise level. The characteristics of a sound that are likely to cause an increase in the significance of impact are tonality, impulsivity, intermittency or other characteristic features such as an identifiable 'hiss'.

Based on the character and magnitude of the sound of the proposed plant items, and the predicted levels at the receptors, no correction for the acoustic characteristic features has been applied to the specific noise level at the surrounding sensitive receptors.

6.1.2 Operational Impact Assessment

The rating noise level predicted at the nearest noise sensitive receptors has been assessed against existing background noise levels in order to assess the likelihood for impact in accordance with BS 4142. The assessment uses the worst-case affected floor and façade for each receptor.

Table 8 presents the predicted specific and rated noise levels alongside, measured background and difference between background and rated levels. A noise contour plot depicting the propagation of noise from the substation is presented in Figure 9.

Results	Noise Sensitive Receptor Location					
	Abbots Close		Margam Road		Brynhyfryd Road	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
Predicted specific sound level, $L_{Aeq,15min}$ (dB)	26	26	28	28	28	28
Character corrections	+0	+0	+0	+0	+0	+0
Predicted rating sound level, $L_{Ar,15min}$ (dB)	26	26	28	28	28	28
Existing ambient sound level, $L_{Aeq,15min}$ (dB)	54	50	54	50	52	48
Existing background sound level, $L_{A90,15min}$ (dB)	48	40	48	40	40	36
Excess of rating over background level (dB)	**-22**	**-14**	**-20**	**-12**	**-12**	**-8**

Table 8 Operational phase assessment

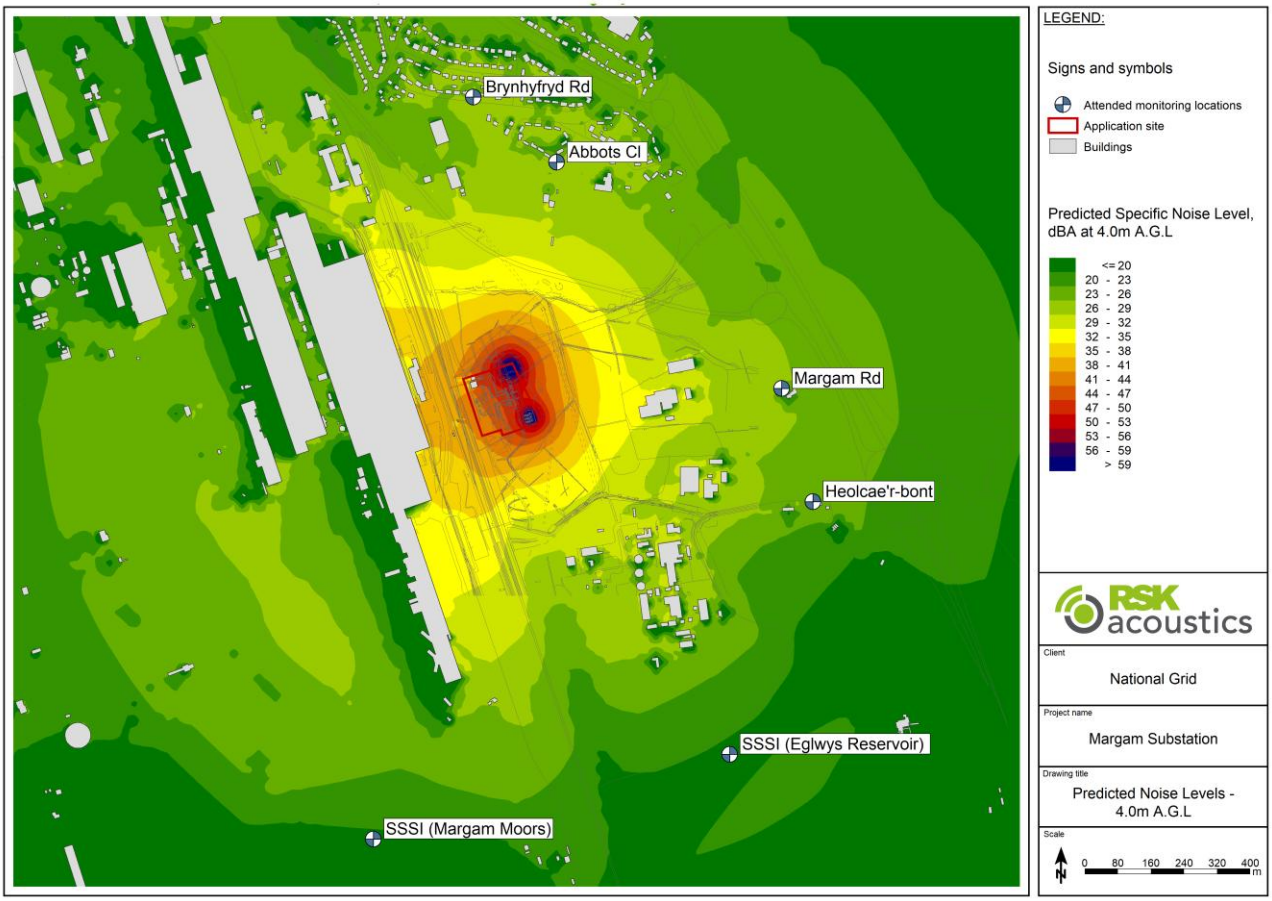

Figure 9 Predicted specific noise level at 4m A.G.L (first floor level)

Table 8 and Figure 9 indicate that the rating level is unlikely to exceed the background noise level at any of the surrounding noise sensitive receptors while all the proposed noise emitting plant associated with the extension is operational. Therefore, the likelihood for impact in accordance with BS4142 is low. In reality, the backup generator will only be used in emergency and is therefore unlikely to be operational 24/7. As a result of this, noise levels resulting from the substation extension experienced at the nearest receptors are likely to be lower when considering just noise levels from the MSCDN and DX units alone.

6.2 SSSI Receptors

Table 9 presents the predicted sound levels alongside the adopted SSSI criteria, measured ambient and background, and the difference between predicted levels and criteria.

Results	Noise Sensitive Receptor Location			
	Margam Moors		Eglwys Reservoir	
	Daytime	Night-time	Daytime	Night-time
Predicted sound level, $L_{Aeq,15min}$ (dB)	18	18	18	18
Existing ambient sound level, $L_{Aeq,15min}$ (dB)	49	50	49	50
Existing background sound level, $L_{A90,15min}$ (dB)	41	46	41	46
SSSI Criteria, $L_{Aeq,15min}$ (dB)	55		55	
Excess of predicted over ambient level (dB)	**-31**	**-32**	**-31**	**-32**
Excess of predicted over SSSI criteria (dB)	**-37**		**-37**	

Table 9 SSSI assessment results

Table 9 indicates that predicted noise levels are significantly below both the criteria and the existing ambient sound levels at both SSSIs while all the proposed noise emitting plant associated with the extension is operational, therefore it is expected that there will be no impact resulting from the substation extension.

Additionally, for both the residential receptors and SSSIs, as the substation is already existing and the wider soundscape is dominated by industrial and man-made noise sources, the noise sources that will be introduced as part of the extension are not considered to be out of character and unlikely to be distinguishable against the existing acoustic environment. A noise prediction of 10 dB below existing measurements is typically a sign of theoretical inaudibility.

6.3 Soundscape

The Welsh Government has published three documents since 2019 referring to Soundscape; Future Wales: the national plan 2040': 2019; updated in 2021 (See Section A7.4.1.1), Noise and Soundscape Action Plan, 2023-2028, and A7.4.1.3 Technical Advice Note 11: Air Quality, Noise and Soundscape (DRAFT) (see Section A7.4.2.1).

A 'soundscape' refers to the acoustic environment or the overall auditory experience of a particular location, taking into consideration the combination of sounds present in that environment. Unlike noise, which often has a negative connotation and is associated with unwanted or disruptive sounds, a soundscape is a broader and more inclusive concept that encompasses all sounds, including those that are considered pleasant or desirable.

Soundscape analysis involves examining the quality, characteristics, and patterns of sounds in a given area. It takes into account both natural and human-made sounds, considering how they interact and contribute to the overall sensory experience of a place. Soundscape assessments are often conducted in various contexts, including urban planning, environmental impact assessments, and studies focused on enhancing the well-being and 'liveability' of spaces. Soundscape design involves intentional efforts to shape and create environments with specific acoustic qualities, promoting positive experiences and minimizing potentially harmful noise

Given the very low noise levels (>10 dB below background) predicted at receptors as a result of the extension, no soundscape assessment has been undertaken. Therefore it is not considered proportionate to prepare a Noise and Soundscape Design Statement (NSDS) in accordance with the Governments' Technical Advice Note 11: Air Quality, Noise and Soundscape (DRAFT). In addition, the practical ability of being able to influence the soundscape of an existing environment, by an existing industrial operator, is limited for a number of reasons. This includes limited ability to undertake works beyond their red line boundary (i.e. make additions or changes to off site areas and at receptors themselves), but better placed to protect the existing soundscape and not have a detrimental impact on what is already present.

The area neighbouring the substation is primary industrial and commercial and any additional localised noise generated by the extension will be similar in nature. The closest sensitive receptors from a soundscape point of view would be those residences (north) identified in this report, and the Eglwys Nunydd Reservoir to the south. The noise from the extension is predicted to be theoretically inaudible at the residential receptors and therefore the soundscape there would not experience any change.

The SSSIs (Margam Moors and Eglwys Nunydd reservoir) are at a greater distance from the extension than the residential receptors and between lies a large industrial unit (BOC Gas), which generates noise itself. Therefore we do not anticipate the noise from the extension being audible at either SSSI, and therefore there will be no impact on the existing soundscape.

6.4 Uncertainty

BS 4142:2014+A1: 2019 requires that the assessment considers the level of uncertainty in the data and associated calculations. Consideration of the uncertainty can enable a more informed decision regarding the likely significance of impact, within the context of assessment. It is accepted that uncertainty may arise from all levels of measurement and assessment and reasonably practicable steps have been made at all stages with the aim of reducing uncertainty.

The frequency spectrum for the generator has been adopted from previous projects involving similar plant. This has been applied to the A weighted sound pressure value provided by Laing O'Rourke. The source height for the generator is based on a similar sized unit as provided by G&M Eurotex via Laing O'Rourke. The sound data (including spectral data) for the DX units has been provided directly from the supplier.

Specific sound level propagation has been calculated in accordance with the requirements of ISO 9613-2:2024 which is the widely accepted procedure for the calculation of sound propagation, including favorable wind conditions from source to receiver.

The following measures were also taken during the noise survey to limit uncertainty:

- Use of monitoring equipment in accordance with Section 5 of BS 4142: 2014+A1: 2019, using Class 1 instrumentation; and,
- Measurement procedures followed in general accordance with Section 6 of BS 4142: 2014+A1: 2019 with all precautions taken to minimize interference whilst maintaining the security of both personnel and monitoring equipment.

7 Conclusions

RSK Acoustics has undertaken an assessment of the potential noise impacts associated with the extension of the existing National Grid owned Margam Substation in Port Talbot, adjacent to the Tata Steel UK site (SA13 3NF).

An assessment has been undertaken to determine the potential noise impacts associated with the operation of the substation extension compared to the existing acoustic environment.

The noise assessment includes consideration of existing background levels and predicted noise emissions from the operation of the substation extension component, based on the methodology as described within BS 4142:2014+A1:2019. Predicted levels at the nearest noise sensitive residential receptors do not exceed the representative night-time background level, and likely to be inaudible at receptors under the current design. Therefore, the likelihood for adverse impact in accordance with BS 4142 is low.

Additionally, the predicted noise levels at the nearby SSSIs are significantly below both the adopted SSSI criteria and existing ambient noise levels, therefore the substation extension is likely to be inaudible at both the Margam Moors SSSI and Eglwys Nunydd reservoir SSSI.

The noise levels from the extension will be very low, and as such will have no impact on the existing soundscape.

At this stage no additional noise control measures are considered to be required. Any changes to the design, sound emission data or inclusion of additional noise emitting plant items may require additional acoustic design work.

Appendix A – Glossary

Term	Definition
Ambient sound	The total sound at a given place, usually a composite of sounds from many sources near and far.
Background sound, $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval.
dB	Decibel. Scale for expressing sound pressure level. It is defined as 20 times the logarithm of the ratio between the root mean square pressure of the sound field and a reference pressure i.e. $2x10^{-5}$ Pascal.
dB(A)	A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies. Example sound levels include: 140 dB(A) Threshold of pain 120 dB(A) Threshold of feeling 100 dB(A) Loud nightclub 80 dB(A) Traffic at busy roadside 60 dB(A) Normal speech level at 1m 40 dB(A) Quiet office 20 dB(A) Broadcasting studio 0 dB(A) Median hearing threshold (1000 Hz)
Frequency	The repetition rate of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted as kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20kHz.
$L_{Aeq,T}$	This is defined as the notional steady sound level over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
NR	Noise rating. A set of curves based on the sensitivity of the human ear. They are used to give a single-figure rating for a range of frequencies.
Rating level	Specific sound level of a source plus any adjustment for the characteristic features of the sound.
Residual sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Specific sound	Sound pressure level produced by the source being assessed at the assessment location.

Table A1 Glossary

Appendix B – Noise Survey Photographs

Figure B1 UL1 (March 2025)

Figure B2 UL2 (March 2025)

Figure B3 UL3 (May 2024)

Figure B4 UL4 (May 2024)

Appendix C – Noise Survey Results – March 2025

Date	Time	Measured noise levels (dB)			
		$L_{Aeq,T}$	$L_{AFmax,T}$	$L_{A90,T}$	$L_{A10,T}$
Friday 07/03/2025	13:00-23:00	58	75	54	60
	23:00-07:00	53	69	48	56
Saturday 08/03/2025	07:00-23:00	57	70	52	59
	23:00-07:00	49	63	43	51
Sunday 09/03/2025	07:00-23:00	55	74	51	58
	23:00-07:00	50	65	42	54
Monday 10/03/2025	07:00-23:00	52	77	49	55
	23:00-07:00	49	69	42	53
Tuesday 11/03/2025	07:00-23:00	52	67	47	54
	23:00-07:00	50	68	42	55
Wednesday 12/03/2025	07:00-23:00	53	70	46	55
	23:00-07:00	47	60	39	52
Thursday 13/03/2025	07:00-23:00	52	65	49	54
	23:00-07:00	51	64	43	55
Friday 14/03/2025	07:00-23:00	54	74	48	56
	23:00-07:00	50	74	43	51

Date	Time	Measured noise levels (dB)			
		$L_{Aeq,T}$	$L_{AFmax,T}$	$L_{A90,T}$	$L_{A10,T}$
Saturday 15/03/2025					
	07:00-23:00	51	68	47	53
	23:00-07:00	50	66	44	52
Sunday 16/03/2025	07:00-23:00	53	69	48	55
	23:00-07:00	49	65	42	54
Monday 17/03/2025	07:00-07:45	56	63	54	57

Table C1 Noise monitoring data

Date	Time	Measured noise levels (dB)			
		$L_{Aeq,T}$	$L_{AFmax,T}$	L_{A90T}	$L_{A10,T}$
Friday 07/03/2025	07:00-23:00	57	78	49	59
	23:00-07:00	51	81	45	52
Saturday 08/03/2025	07:00-23:00	55	81	47	56
	23:00-07:00	48	79	41	49
Sunday 09/03/2025	07:00-23:00	54	82	47	55
	23:00-07:00	48	71	39	51
Monday 10/03/2025	07:00-23:00	55	81	47	55
	23:00-07:00	50	78	40	52
Tuesday 11/03/2025	07:00-23:00	52	75	45	54
	23:00-07:00	51	79	41	53

Date	Time	Measured noise levels (dB)			
		$L_{Aeq,T}$	$L_{AFmax,T}$	L_{A90T}	$L_{A10,T}$
Wednesday 12/03/2025	07:00-23:00	53	87	39	54
	23:00-07:00	47	68	34	48
Thursday 13/03/2025	07:00-23:00	47	74	41	48
	23:00-07:00	46	65	36	48
Friday 14/03/2025	07:00-23:00	48	74	41	50
	23:00-07:00	46	67	36	45
Saturday 15/03/2025	07:00-23:00	45	71	39	46
	23:00-07:00	44	70	37	45
Sunday 16/03/2025	07:00-23:00	47	83	39	47
	23:00-07:00	44	69	34	46
Monday 17/03/2025	07:00-23:00	48	71	41	50
	23:00-07:00	46	70	37	48
Tuesday 18/03/2025	07:00-23:00	51	70	43	54
	23:00-07:00	46	71	40	48
Wednesday 18/03/2025	07:00-23:00	49	77	44	51

Table C2 Noise monitoring data – UL2

Appendix D – Mitsubishi Electric Sound Data

Item	Outdoor Unit Model	Octave band centre frequency (Hz)								Sound Pressure Level, dBA
		63	125	250	500	1k	2k	4k	8k	
OU - 1.1, 1.2, 4.1, 4.2, 4.3	PUZ-ZM200YKA2R1	71	61	61	61	56	53	49	42	62
OU - 2.1, 2.2	PUZ-ZM71VHA2	53	52	53	45	43	39	34	27	49
OU - 3.1, 3.2	PUZ-ZM140VKA2	63	55	53	50	47	42	38	30	52
OU- 5.1, 5.2	PUZ-ZM100VDA	51	54	49	47	42	37	32	29	48

Table D1 Octave band sound pressure level source data

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