Appendix D – Noise Impact Assessment Report

ALIVE ENVIRONMENTAL LTD

Noise Impact Assessment Report

Belmayne 110kV Substation

APRIL 2026

Contents

1. INTRODUCTION

This report has been prepared as supporting information for the application seeking full planning permission for a proposed 110kV substation at Belmayne on the north side of Dublin City. This report has been prepared by Stephen Cleary (BA[Mod] MSc MIOA MISEP CEnv) of Alive Environmental Ltd, who has over 20 years experience in the area of Noise Impact Assessment.

Section 2 of the report provides a description of the existing site and the proposed development to provide context of the site and its surroundings. Section 3 provides a summary of existing noise guidance documents relevant to this report. A description of the methodology and results from the noise monitoring survey are provided in Section 4 of the report. Sections 5 and 6 contain a detailed impact assessment for the proposed development during construction and operational phases, while Section 7 includes an outline of relevant mitigation measures.

The report should be read in conjunction with Appendix 1 which includes calibration certificates for the noise monitoring equipment used during the survey and Appendices 2-5 which provide specifications for the proposed plant.

2. SITE DESCRIPTION

The proposed development site is located adjacent to the R139 road between the M1 junction and the junction with the R107 at Clare Hall on the north side of Dublin. The indicative boundary of the application site is included in Figure 2.1.

The application site is adjacent to the Bewleys Tea and Head Office building. Residential properties are located to the south, east and north of the application site.

Figure 2.1: Indicative Boundary of Application Site

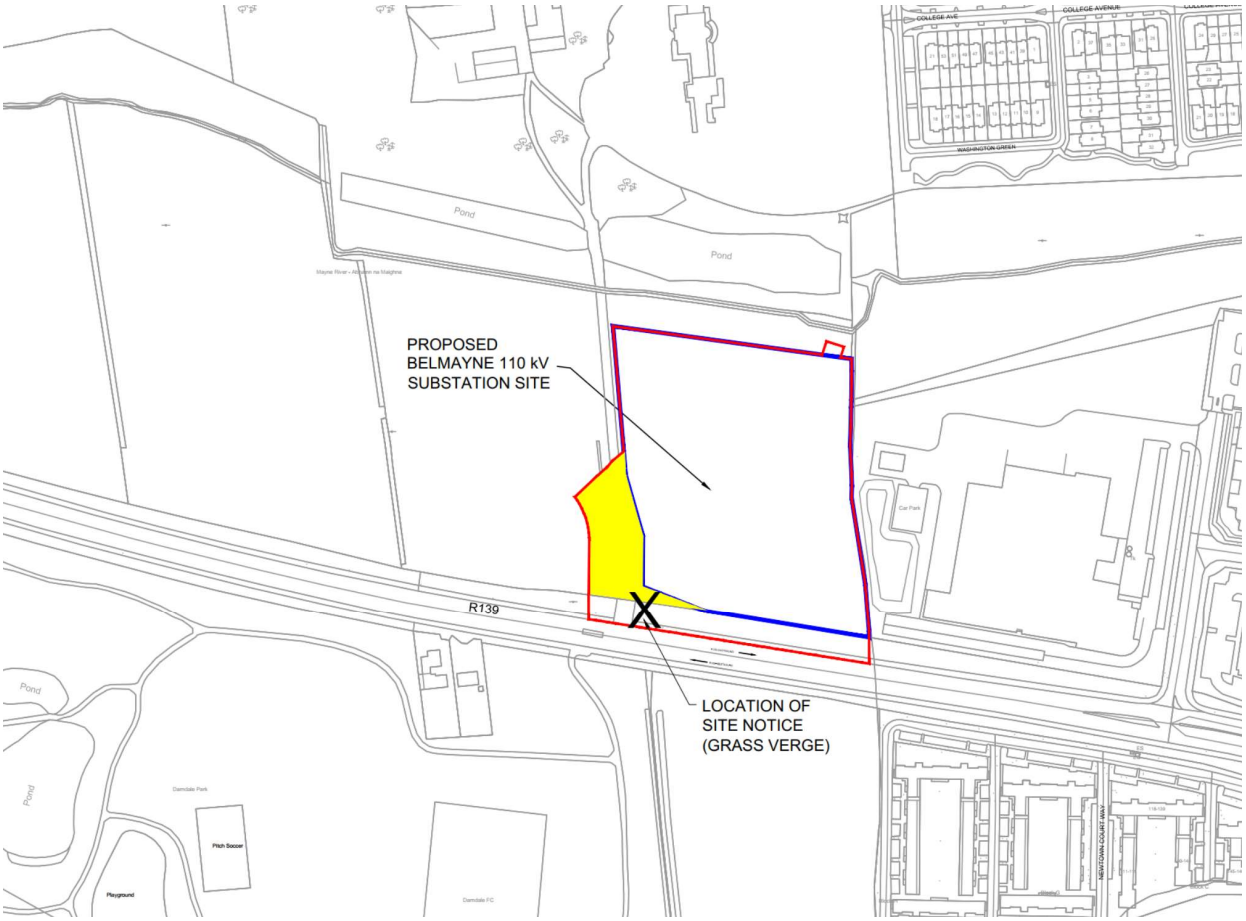
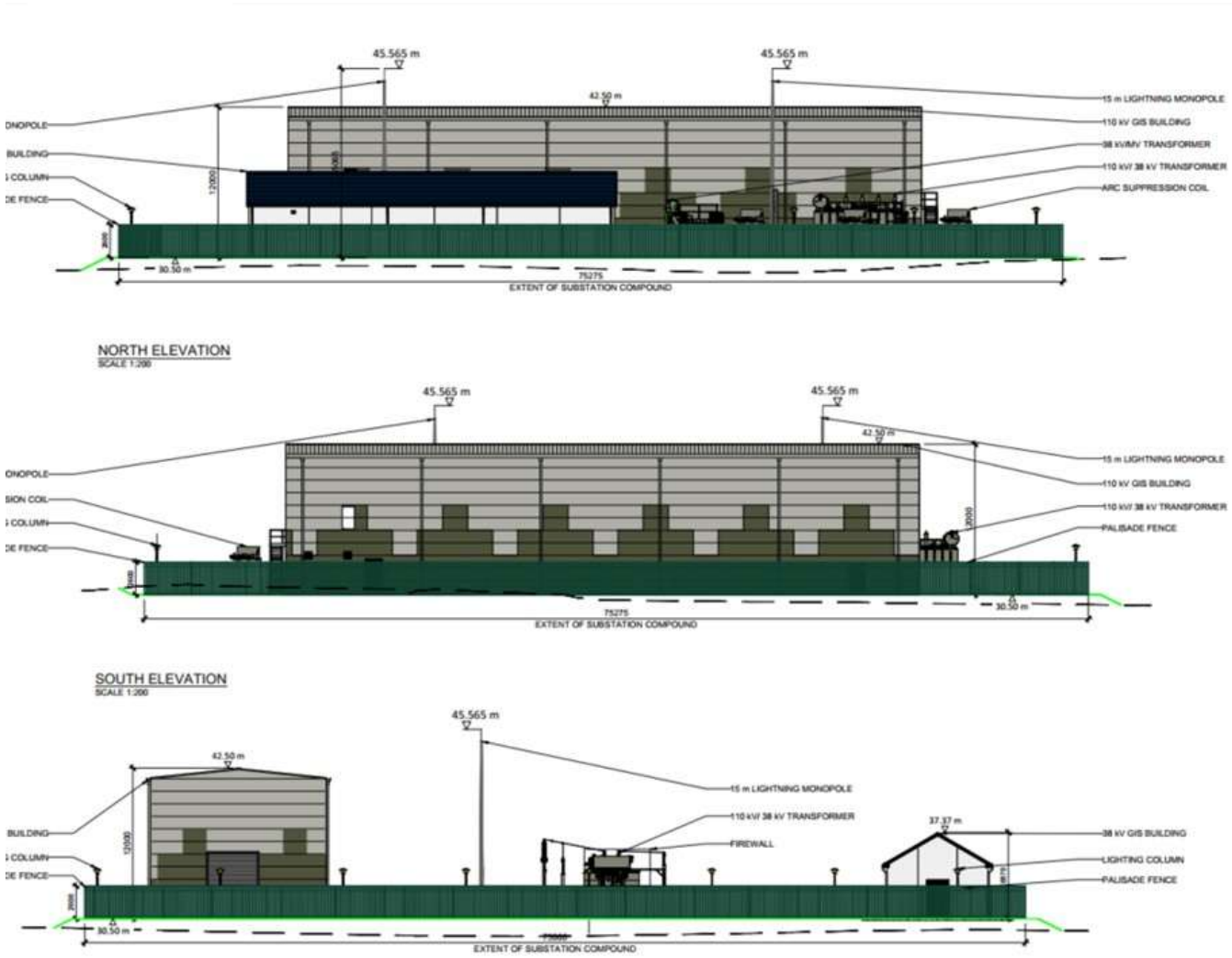


Figure 2.2 illustrates the layout of the proposed substation, while Figure 2.3 provides a view of the proposed substation elevations. The full size drawings for Figures 2.2 and 2.3 have been submitted as part of the application and these can be viewed separately in the application documents for greater legibility.

Figure 2.2: Layout of Proposed Substation

Figure 2.3: View of Proposed Substation Elevations



3. RELEVANT NOISE GUIDANCE DOCUMENTS

3.1 Environmental Protection Agency (EPA) Office of Environmental Enforcement (OEE) - Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

This document relates primarily to noise surveys and assessments for EPA licensed facilities but in the absence of any other directly applicable guidance documents, it provides useful reference material for the purposes of completing the noise assessment for the proposed development.

The EPA published two earlier documents in relation to the survey, assessment and management of noise emissions from licensed facilities, namely the *Environmental Noise Survey Guidance Document* (commonly referred to as NG1) and *Guidance Note for Noise in Relation to Scheduled Activities - 2nd Edition* (commonly referred to as NG2). These two documents have been withdrawn with the publication of NG4.

NG4 provides detailed consideration of a range of noise related issues including basic background to noise issues, various noise assessment criteria and procedures, noise reduction measures, Best Available Techniques (BAT) and the detailed requirements for noise surveys. NG4 provides typical limit values for noise from licensed sites, namely:

- Daytime (07:00 - 19:00) - 55dB $L_{Ar,T}$;
- Evening (19:00 - 23:00) - 50dB $L_{Ar,T}$:
- Night-time (23:00 - 07:00) - 45dB $L_{Aeq,T}$.

In the description of the limits above, the $L_{Aeq,T}$ is the equivalent continuous sound level over the measurement period and $L_{Ar,T}$ is equal to the L_{Aeq} but includes an additional penalty of 5dB(A) to account for any tonal or impulsive characteristics to the noise source.

The threshold limits presented above are used in the general context of the noise impact assessment included in this report.

Other EPA guidelines such as *Guidelines on the Information to be Contained in Environmental Impact Statements [2022]* and *Advice Notes on Current Practice (in the Preparation of Environmental Impact Statements) [2003]* have been considered also in the preparation of this Noise and Vibration Chapter.

3.2 World Health Organisation (WHO) Guidelines

In the World Health Organisation (WHO) Guidelines for Community Noise (1999), a LAeq threshold daytime noise limit of 55 dB is suggested for outdoor living areas to protect most people from being seriously annoyed. A second daytime limit of 50 dB is also given as a threshold limit for moderate annoyance.

The guidelines suggest that an internal LAeq not greater than 30 dB for continuous noise is needed to prevent negative effects on sleep. This is equivalent to a façade level of 45 dB LAeq, assuming open windows or a free-field level of about 42 dB LAeq. If the noise is not continuous, then the internal level

required to prevent negative effects on sleep is a LAmax,fast of 45 dB. Therefore, for sleep disturbance, the continuous level as well as the number of noisy events should be considered.

The WHO Night Noise Guidelines for Europe was published in 2009 on the back of extensive research completed by a WHO working group. Considering the scientific evidence on the threshold of night noise exposure indicated by Lnight,outside as defined in the Environmental Noise Directive [2002/49/EC], a Lnight,outside of 40dB should be the target of the night noise guideline (NNG) to protect public, including the most vulnerable groups such as children, the chronically ill and the elderly. An interim target of 55dB is recommended where the NNG cannot be achieved. These guidelines are applicable to Member States of the European Region and may be considered as an extension to the previous WHO Guidelines for Community Noise (1999).

In 2011, the WHO published the Methodological Guidance for Estimating the Burden of Disease from Environmental Noise. This document outlines the principles of quantitative assessment of the burden of disease from environmental noise, describes the status in terms of the implementation of the European Noise Directive and reviews evidence on exposure-response relationships between noise and cardiovascular diseases.

In 2018, the WHO Regional Office for Europe has developed guidelines, based on the growing understanding of health impacts of exposure to environmental noise. The main purpose of these guidelines is to provide recommendations for protecting human health from exposure to environmental noise originating from various sources: transportation (road traffic, railway, and aircraft) noise, wind turbine noise and leisure noise. Leisure noise in this context refers to all noise sources that people are exposed to due to leisure activities, such as attending nightclubs, pubs, fitness classes, live sporting events, concerts or live music venues and listening to loud music through personal listening devices.

The 2018 guidelines are published by the WHO Regional Office for Europe. In terms of their health implications, the recommended exposure levels can be considered applicable in other regions and suitable for a global audience.

3.3 British Standard BS8233:2014 – Guidance on sound insulation and noise reduction for buildings

BS8233:2014 provides guidance values for a range of ambient noise levels within residential properties as shown in Table 3.1 below.

Table 3.1: Internal Ambient Noise Levels

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living Room	35 dB $L_{Aeq16hr}$	
Dining	Dining Room/Area	40 dB $L_{Aeq16hr}$	
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq16hr}$	30 dB $L_{Aeq16hr}$

The standard allows for a further relaxation in standards of up to 5dB where "development is considered necessary or desirable". In relation to external amenity areas such as gardens and patios, the standard states that it is desirable that external noise does not exceed 50 dB LAeq,T with an upper guideline value of 55 dB LAeq,T.

3.4 British Standard BS 7445-1:2003 Description and measurement of environmental noise – Part 1: Guide to quantities and procedures (BS, 7445-1)

BS 7445 provides the framework within which environmental noise should be quantified. Part 1 of the standard provides guidance to quantities and procedures in relation to environmental noise monitoring. Meteorological conditions are not prescribed but it is recommended that wind speed should not exceed 5 m /s at height of 3-11m above ground, any temperature inversions near ground, or heavy precipitation.

3.5 British Standard BS4142:2014+A1:2019 – Method for rating and assessing industrial and commercial sound

BS4142:2014 describes methods for rating and assessing sound of an industrial and/or commercial nature, which includes:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

BS 4142 also provides procedures in determining if the noise in question is likely to give rise to complaints from residents in the vicinity.

BS 4142 states that one should 'obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level and consider the following:

a) Typically, the greater this difference, the greater the magnitude of the impact.
b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
c) A difference of around + 5 dB is likely to be an indication of an adverse impact, depending on the context.
d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

The rating level is based upon the specific noise level of the noise source in question. A correction should be applied to the specific noise level to obtain an increased rating level if 'a tone, impulse or other characteristic occurs, or is expected to be present, for new or modified sound sources.

To summarise, BS4142 section 9.2 advises the following regarding corrections for acoustic characteristics:

- Tonality – for sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.
- Impulsivity – A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.
- Other sound characteristics – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.
- Intermittency – When the specific sound has identifiable on/off conditions, if the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

3.6 British Standard BS5228:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites

This British standard consists of two parts and covers the need for protection against noise and vibration of persons living and working in the vicinity of construction and open sites. The standard recommends procedures for noise and vibration control in respect of construction operations and aims to assist architects, contractors and site operatives, designers, developers, engineers, local authority environmental health officers and planners.

Part 1 of the standard provides a method of calculating noise from construction plant, including:

- Tables of source noise levels;
- Methods for summing up contributions from intermittently operating plant;
- A procedure for calculating noise propagation;
- A method for calculating noise screening effects; and
- A way of predicting noise from mobile plant, such as haul roads.

The standard also provides guidance on legislative background, community relations, training, nuisance, project supervision and control of noise and vibration.

The ABC method outlined in Section E3.2 has been used for the purpose of determining whether the predicted noise levels from the construction activities will result in any significant noise impact at the nearest noise sensitive properties.

Table 3.2 below outlines the applicable noise threshold limits that apply at the nearest noise sensitive receptors. The determination of what category to apply is dependent on the existing baseline ambient (LAeq) noise level (rounded to the nearest 5dB) at the nearest noise sensitive property. For daytime, if the ambient noise level is less than the Category A threshold limit, the Category A threshold limit (i.e. 65dB) applies. If the ambient noise level is the same as the Category A threshold limit, the Category B threshold limit (i.e. 70dB) applies. If the ambient noise level is more than the Category A threshold limit, the Category C threshold limit (i.e. 75dB) applies. The applicable limits that apply to each of the sensitive receptors are presented in Section 7 of this report.

Table 3.2: Noise Threshold Limits at Nearest Sensitive Receptors

	Threshold Limits [dB(A)]		
	Category A	Category B	Category C
Night-time (23:00 - 07:00)	45	50	55
Evening and Weekends (19:00 - 23:00 Weekdays, 13:00-23:00 Saturdays, 07:00-23:00 Sundays)	55	60	65
Weekday daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75

3.7 Vibration Guidance Documents

Limits of transient vibration, above which cosmetic damage could occur, are given numerically in Table 3.3 (Ref: BS5228-2:2009+A1:2014). Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 3.3, and major damage to a building structure can occur at values greater than four times the tabulated values (definitions of the damage categories are presented in BS7385-1:1990, 9.9).

Table 3.3: Transient Vibration Guide Values for Cosmetic Damage (Ref BS5228-2:2009+A1:2014)

Type of Building	**Peak Particle Velocity (PPV) (mm/s) in Frequency Range of Predominant Pulse**	
	4 Hz to 15 Hz	**15 Hz and above**
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above	50 mm/s at 4 Hz and above
Unreinforced or light framed structures. Residential or light commercial buildings.	15 mm/s at 4 Hz increasing to 20 mm/S at 15 Hz	20 mm/s at 15 Hz increasing to 50 mm/s at 40 Hz and above.

4. NOISE SURVEY

4.1 Methodology

A baseline noise monitoring survey was completed between the 2nd and 12th December 2025 at the proposed site. The survey included separate day and night-time noise monitoring periods. The survey period was also selected to take place when there was no interference from weather conditions (i.e. no precipitation and wind speed of less than 3m/sec).

The following noise monitoring equipment was used (Calibration certificates for the equipment are contained in Appendix 1):

- Norsonic Nor140 Sound Level Meter (BS EN IEC 61672-1:2003 Class 1) [Serial No: 1402995]
- Norsonic Sound Calibrator 1251 [Serial No: 33739]

The microphone was placed at a height of 1.2 - 1.5m above ground level. The sound level meter was accurately calibrated before and after use with no drift observed.

The weather conditions during the noise monitoring survey were in accordance with the requirements of BS7445: Description and Measurement of Environmental Noise.

The following parameters were recorded during each monitoring period:

LAeq	The continuous equivalent A-weighted sound pressure level. This is an "average" of the sound pressure level.
LAmax	This is the maximum A-weighed sound level measured during the sample period.
LAmin	This is the minimum A-weighted sound level measured during the sample period.
LA10	This is the A-weighted sound level that is exceeded for noise for 10% of the sample period.
LA90	This is the A-weighted sound level that is exceeded for 90% of the sample period.

The noise monitoring location for the baseline survey is illustrated in Figure 4.1 and a view of the noise meter in-situ is included in Figures 4.2. The survey location was chosen to be approximately equidistant from the dominant noise source in the study area (i.e. road traffic noise from R139) as the nearest noise sensitive properties.

Figure 4.1: Noise Monitoring Location for Baseline Survey

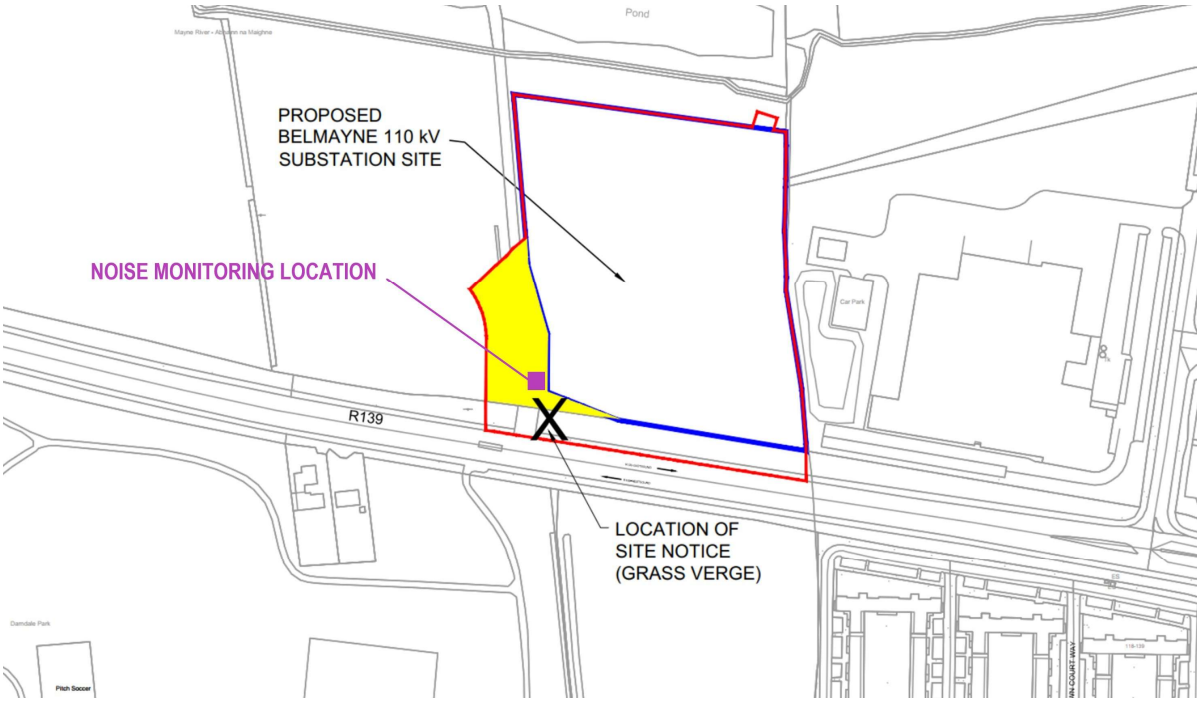


Figure 4.2: View of Noise Meter In-Situ During Baseline Survey

4.2 Noise Survey Results

Tables 4.1 and 4.2 present the noise monitoring data recorded during the noise monitoring survey.

Table 4.1: Daytime Noise Monitoring Survey Results (12th December 2025)

Measurement Number	Time	Measured Noise Levels dB(A)				
		L_{Aeq}	L_{AMax}	L_{AMin}	L_{A10}	L_{A90}
1	10:15 – 10:30	65.8	69.8	56.3	67.8	61.7
2	10:30 – 10:45	65.6	69.8	52.5	67.5	62.5
3	10:45 – 11:00	65.4	70.9	57.5	67.3	61.7
4	11:00 – 11:15	65.7	70.8	59.5	67.2	63.5
5	11:15 – 11:30	65.1	71.0	56.5	67.1	61.3
6	11:30 – 11:45	65.7	70.9	58.8	67.4	63.1
7	11:45 – 12:00	66.1	70.3	57.3	68.1	62.7
8	12:00 – 12:15	66.6	71.3	60.8	68.3	64.0
9	12:15 – 12:30	67.5	73.1	61.5	69.4	64.8
10	12:30 – 12:45	66.8	72.3	56.4	68.7	62.3
11	12:45 – 13:00	67.3	72.1	62.2	69.0	64.8
12	13:00 – 13:15	67.3	71.5	61.5	68.9	65.1
13	13:15 – 13:30	67.2	82.6	59.1	69.0	63.1
14	13:30 – 13:45	67.1	72.6	63.1	68.6	65.1
15	13:45 – 14:00	67.2	72.4	55.0	69.2	62.5
16	14:00 – 14:15	66.7	73.8	60.5	69.0	63.0
17	14:15 – 14:30	67.0	72.8	59.6	68.7	64.3
18	14:30 – 14:45	65.9	71.0	60.7	67.7	63.5
19	14:45 – 15:00	64.9	70.7	56.5	67.0	61.4
20	15:00 – 15:15	66.4	71.8	58.4	68.2	63.1
21	15:15 – 15:30	66.3	71.2	59.8	68.1	63.8
22	15:30 – 15:45	65.4	70.2	55.3	67.7	61.0

Table 4.2: Night-time Noise Monitoring Survey Results (2-3rd December 2025)

Measurement Number	Time	Measured Noise Levels dB(A)				
		L_{Aeq}	L_{AMax}	L_{AMin}	L_{A10}	L_{A90}
1	23:00 – 23:15	59.8	79.8	44.8	61.1	50.7
2	23:15 – 23:30	61.1	70.0	44.2	64.2	53.7
3	23:30 – 23:45	59.1	68.5	45.6	62.2	51.5
4	23:45 – 00:00	58.8	67.5	44.9	62.5	48.5
5	00:00 – 00:15	57.5	68.2	44.5	61.0	48.7
6	00:15 – 00:30	58.9	68.9	46.3	62.7	50.1
7	00:30 – 00:45	56.2	65.7	42.2	60.0	45.4
8	00:45 – 01:00	56.4	68.2	42.2	60.3	46.2
9	01:00 – 01:15	55.8	68.1	42.4	59.7	46.3
10	01:00 – 01:15	55.1	68.5	42.3	59.1	47.0
11	01:30 – 01:45	56.1	66.2	41.8	58.7	46.3
12	01:45 – 02:00	55.3	68.8	42.1	59.1	45.1

During both surveys, road traffic noise was the dominant noise source. During the daytime, the noise levels were contributed to from an array of additional noise sources such as airplane movements and bird noises. Some airplane movements were also present for the night-time period.

As presented in Table 4.1, ambient daytime noise levels (LAeq) remained within the range 65-67dB(A), while background sound levels (LA90) remained consistently within the range of 61-65dB(A).

As presented in Table 4.2, ambient night-time noise levels (LAeq) were within the range 55-61dB(A), while background sound levels (LA90) were within the range of 45-54dB(A).

5. IMPACT ASSESSMENT – CONSTRUCTION PHASE

5.1 Description of Construction Process

A Construction Methodology Report (November 2025) has been prepared which details the various aspects of the construction of the proposed development. This section has been prepared with reference to this document and in particular, the aspects that have the potential to generate construction noise. The construction phase will take place in three broad phases including the enabling works stage, the civil construction stage and the substation electrical installation stage.

Various aspects of the construction process for the proposed development with the most potential to generate significant noise levels are detailed in the bullet points below:

- Construction of site entrance;
- Earthworks, including site leveling and cut/fill works;
- Construction of temporary site drainage works;
- Trenching and ducting works;
- Construction of internal roads;
- Construction of site buildings, including foundation works and structural steelwork;
- Construction of transformer compounds;
- Construction of permanent foul and surface water drainage works;
- Construction of paving, fencing, landscaping and completion works.

Construction activities for the proposed development will take place on Monday to Fridays between 07:00 – 19:00 and on Saturdays between 08:00 – 16:00. It is not proposed that construction activities will take place outside of these hours.

Table 5.1 presents typical noise levels from various types of construction plant likely to be used during the construction process, while Table 5.2 shows typical combined construction noise levels for various construction phase activities at varying distances from the construction activities.

Table 5.1: Noise Levels for Construction Plant (Ref: BS 5228:2009+A1:2014)

Construction Phase	Plant (Reference from Annex C + D, BS5228:2009+A1:2014)	Reference from Annex C + D, BS5228	Plant Equivalent Continuous Sound Pressure Level L_{Aeq} at 10m (dB)
Site Preparation	Tracked excavator	C2.22	72
	Pneumatic breaker	D2.11	87
	Dump truck	C1.11	80
	Wheeled loader lorry	C2.26	79
	Dozer	C2.10	80
	Tracked excavator	C2.22	72
	Pneumatic breaker	D2.11	87

Foundations	Concrete pump	C3.25	78
	Compressor	C3.19	75
	Poker vibrator	C4.33	78
Steel Erection	Tower crane	C4.48	76
	Articulated lorry	C11.10	77
	Electric impact torque wrench		78
General Construction	Hand tools		81
	Pneumatic circular saw	D7.79	75
	Internal fit-out		70
	Power: Diesel Generator	C4.83	65
	Pumping Water: Water pump	C2.45	65
Earthworks / Landscaping	Dozer	C2.10	80
	Dump truck	C1.11	80
	Surfacing	D8.25	68

Table 5.2: Typical Combined Construction Noise Levels

Activity	**L_{Aeq} @ 10 m**	**L_{Aeq} @ 40 m**	**L_{Aeq} @ 80 m**	**L_{Aeq} @ 160 m**	**L_{Aeq} @ 320 m**
Site Preparation	89	77	71	65	59
Foundations	88	76	68	62	56
Steel Erection	82	70	64	58	52
General Construction	82	70	64	58	52
Landscaping	83	71	65	59	53

5.2 Worst-Case Predicted Noise Impacts from Construction Process

Section 5.1 provides details on typical construction plant likely to be used during the construction process, while Table 5.2 provides typically combined noise levels from various plant operating simultaneously for different activities. A number of the items of plant included in Table 5.1 (e.g. tracked excavator, dump track) will be the same item of plant that will be used for different activities (e.g. dump truck used for site preparation and landscaping). The typical combined construction noise levels included in Table 5.2 are worst-case as they assume all items of plant acting simultaneously and continuously, however in reality plant activity will be more sporadic in nature with regular gaps in activity. Nevertheless, these typical combined construction noise levels are useful for the purposes of assessing the potential for worst-case construction noise impacts.

Section 3.6 includes a summary of the BS5228:2009+A1:2014 methodology, which includes relevant construction noise threshold limits based on the existing ambient noise levels at the nearest noise sensitive properties. On the basis of the existing ambient noise levels included in Table 4.1 and the construction phase operating hours, the applicable BS5228 noise threshold limit at the nearest noise sensitive properties is the daytime Category B noise threshold limit of 70dB(A).

The nearest construction activities will take place approximately 70m from the nearest noise sensitive property at the nearest point. On the basis of the typical combined construction noise levels included in Table 5.2, worst-case construction noise levels from these activities may be in the low 70s dB(A) and over the relevant BS5228 noise threshold limit of 70dB(A).

It must be noted that these worst-case case construction noise predictions are an over-estimation of the likely construction noise levels that will actually be emitted from the proposed site as they assume every item of construction plant will be active simultaneously at the nearest portion of the proposed boundary to the respective sensitive receptor.

Nevertheless, these worst-case predicted construction noise levels serve as a useful tool in illustrating that there is potential for noise impacts during the construction phase at the nearest properties. On the basis of the predicted worst-case construction noise levels from the proposed development, there will be a requirement for mitigation measures to be put in place in order to ensure that construction noise levels are reduced as much as practicable and do not significantly impact on the nearest noise sensitive receptors. Noise mitigation measures for construction activities are outlined in Section 7.

5.3 Vibration

Section 3.6 provides details on vibration threshold limits, whereby there is potential for damage to buildings. On account of the distance between the construction works for the proposed development and the nearest sensitive receptors and on account of the nature of the construction activities, there is very limited opportunity for any significant vibration impact at these properties.

6. IMPACT ASSESSMENT – OPERATIONAL PHASE

This section contains a noise impact assessment of the operational phase of the proposed development. Section 2 provides details related to the proposed development including the site location and context, the proposed site layout and proposed site elevations.

6.1 Noise Source Data

The proposed 110 / 38 kV & MV GIS substation has several noise sources, which are constant under normal circumstances but can be short-term and intermittent when the substation is not functioning normally. Under normal conditions, transformer noise is dominant which is audible in the form of a steady hum from the transformer. The higher the voltage is, the higher the noise levels that are emitted. Hence, the 110kV transformers produce greater noise levels than the 38kV ones.

Arc Suppression Coils do not emit noise during continuous standard operation, but may do during an earth fault condition. Such an event would be temporary in nature until the fault is repaired. The worst-case noise from such an event would not exceed 75 dB(A) at 1m. The proposed layout has a standby diesel generator which is required to provide emergency standby / auxiliary power in the event of a failure or loss of the LV mains supply to ensure that the network control and protection systems remain operational. The diesel generator will not operate under normal circumstances outside of short and periodic maintenance checks.

Under normal substation operation, the combined noise sources will consist of two 110 / 38 kV – 63 MVA transformers and two 38 kV / MV – 15 MVA transformers. In the event of an earth fault, the combined noise sources will consist of three generators and the Arc Suppression Coil. When there is a LV mains supply failure, the combined noise sources will consist of the standby diesel generator and all four transformers. In such a scenario, the diesel generator would only be operational for a short period until the LV fault is restored.

Appendices 2 – 5 contain specification information for the 110 / 38 kV – 63 MVA transformer, the 38 kV / MV – 15 MVA transformer, the standby diesel generator and the arc suppression coil.

6.2 Predicted Noise Level from Proposed Substation

In order to predict plant noise levels from the proposed substation at the nearest noise sensitive properties, CadnaA noise modelling software was used to generate a detailed noise model of the proposed substation and its surrounding environment. The CadnaA noise modelling software package uses the ISO9613 prediction methodology along with a range of topographical and ordnance data collected on the surrounding area to build up a picture of the noise environment in the vicinity of sensitive receptors in the study area. The software was used to build a 3-dimensional model of all features which may affect the generation and propagation of noise in the study area.

Table 6.1 presents the predicted noise levels from the proposed Belmayne 110kV Substation at the nearest noise sensitive properties. Figures 6.1 and 6.2 illustrate the noise contour maps for the proposed substation under normal conditions and under worst-case assumptions of all combined noise sources

being active, including a reference number for each property included in Table 6.1. The properties have been modelled at first floor (4m) level.

Table 6.1: Predicted Noise Levels from Proposed Substation at Nearest Noise Sensitive Properties

Property Reference (See Figure 6.1 & 6.2)	Predicted Noise Level dB(A)	
	Normal Operations	Worst-Case (All Noise Sources Combined)
1	13.1	20.0
2	13.0	21.2
3	12.6	31.9
4	13.6	28.6

Figure 6.1: Noise Contour Drawing (Normal Operations)

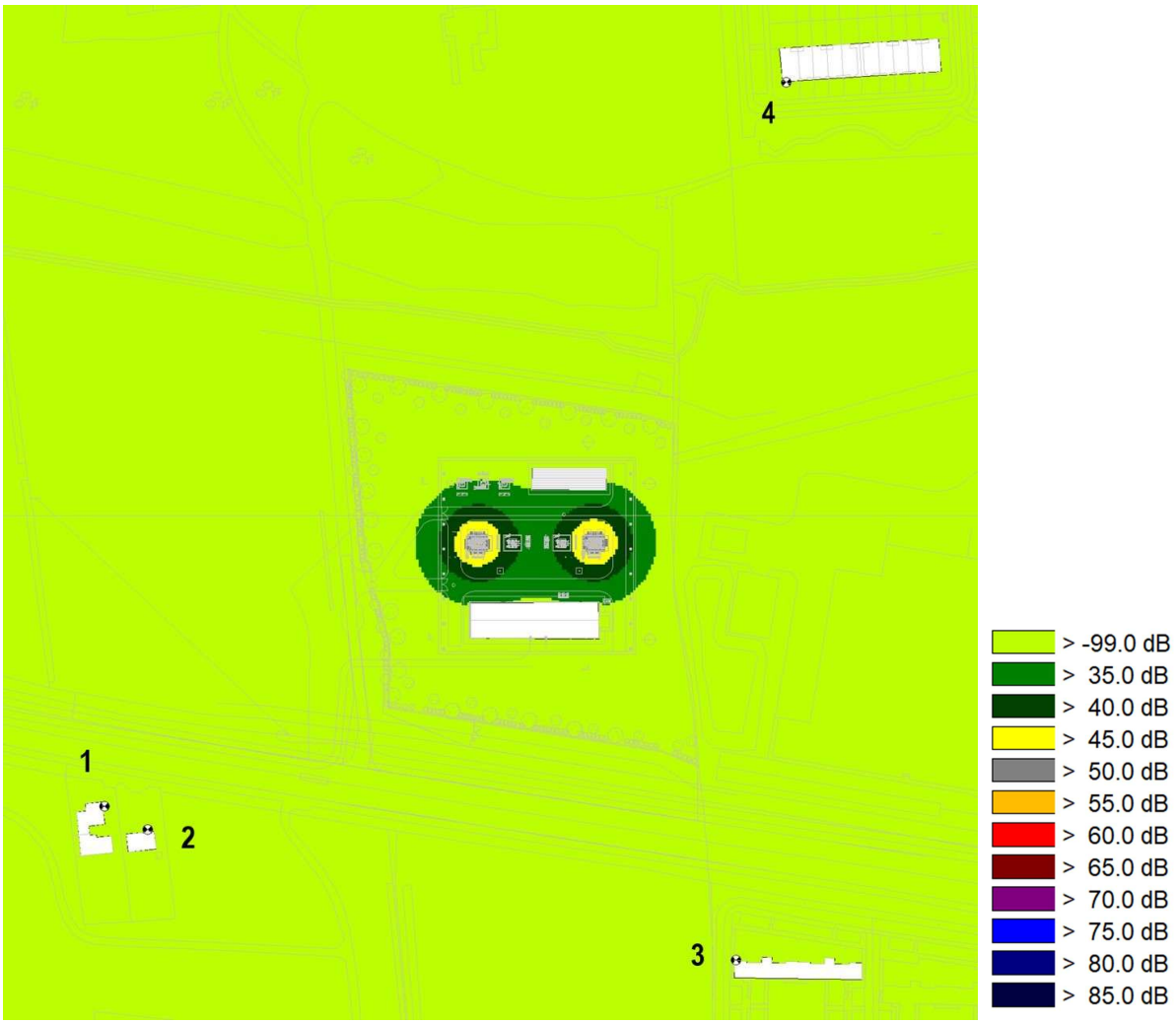
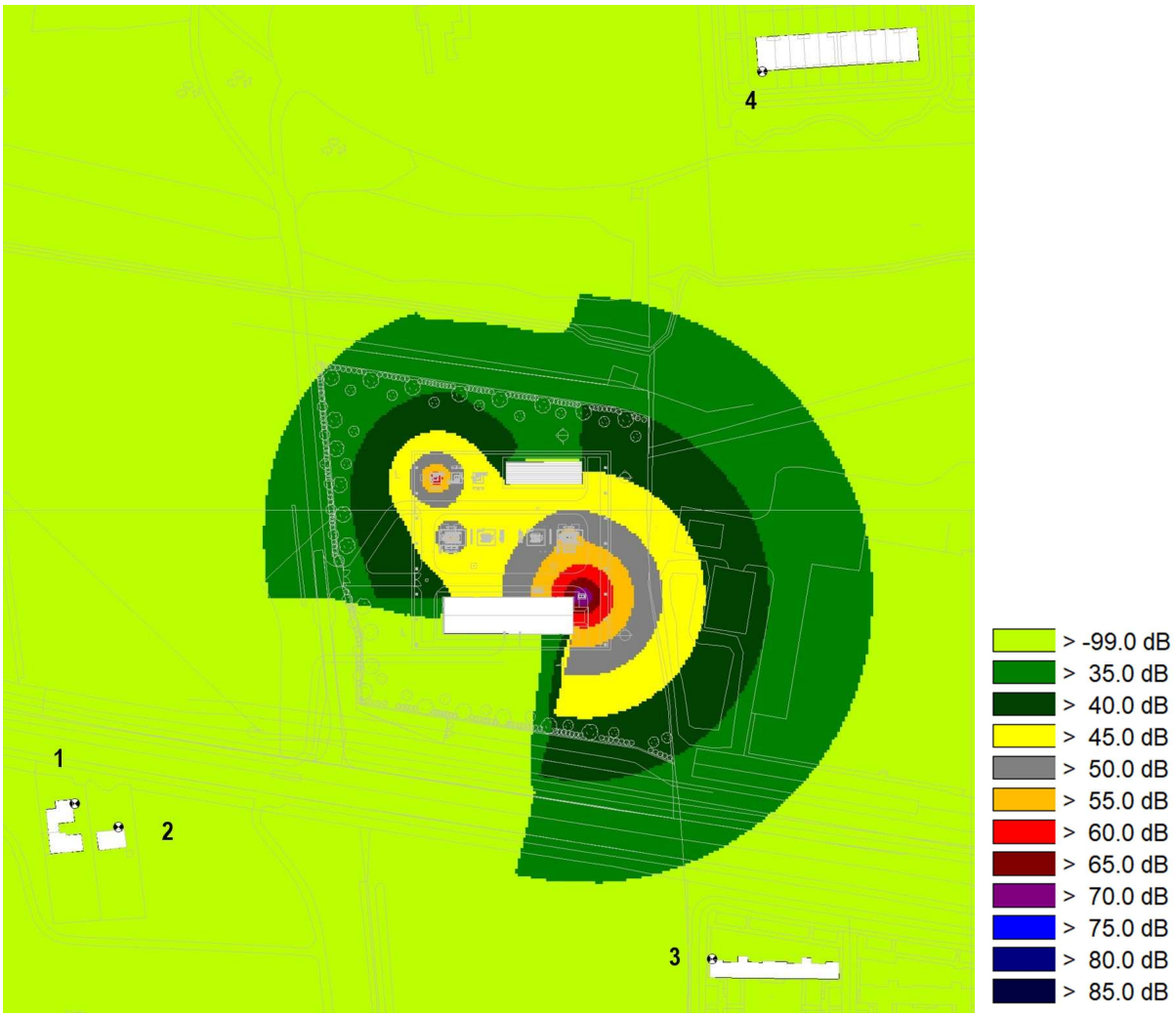


Figure 6.2: Noise Contour Drawing (Worst-Case: All Sources Combined)



Please note that the combination of all sources combined (i.e. 4 transformers, 1 arc suppression coil and 1 standby diesel generator) included in Figure 6.2 has been completed for the purposes of a conservative worst-case assessment. In actuality, all of these source could not be active at the same time. Also, the arc suppression coil and standby diesel generator would only be present for a short duration as they are indicative of a fault scenario, which would be resolved at short notice.

6.3 BS4142:2014 Assessment

Sections 6.1 and 6.2 provide details on the noise predictions and the noise source data included within the noise impact assessment. Noise level predictions were completed at the nearest noise sensitive properties to the proposed development. Figures 6.1 and 6.2 illustrate the nearest noise sensitive properties included within the noise model.

Table 6.1 presents the worst-case noise level predictions from the proposed substation at the nearest noise sensitive properties under normal conditions with only the four transformers operating and under worst-case assumptions including the four transformers, the arc suppression coil under fault conditions and the standby generator operating. The predicted noise levels included in Table 6.1 have been used for the purpose of completing a BS4142 assessment. A worst-case tonal correction of +6dB has been added under the BS4142 assessment methodology on the basis of a worst-case assumption of a prominently audible tonal noise from the substation.

Tables 6.2 and 6.3 include a BS4142 assessment for day and night-time periods at the nearest noise sensitive properties to the proposed substation. For the purposes of a worst-case assessment, no barrier attenuation has been assumed in this assessment.

BS4142 indicates that typical background sound level (LA90) should be used in a BS4142 assessment, however for the purposes of completing a worst-case assessment, the lowest background sound level for both day and night-time periods has been used in Tables 6.2 and 6.3 (see Tables 4.1 and 4.2).

Table 6.2: Daytime BS4142 Assessment

Prop. Ref.	Predicted Noise Level dB(A)	Tonal Correction dB	Barrier Attenuation dB	Rating Level L_{AR}	Background Sound Level [L_{A90}] dB(A)	Excess of L_{AR} Above L_{A90}
Normal Operations						
1	13.1	+6	0	19.1	61	-41.9
2	13.0	+6	0	19.0	61	-42.0
3	12.6	+6	0	18.6	61	-42.4
4	13.6	+6	0	19.6	61	-41.4
Worst-Case (All Sources Combined)						
1	20.0	+6	0	26.0	61	-35.0
2	20.2	+6	0	26.2	61	-34.8
3	31.9	+6	0	37.9	61	-23.1
4	28.6	+6	0	34.6	61	-26.4

Table 6.3: Night-time BS4142 Assessment

Prop. Ref.	Predicted Noise Level dB(A)	Tonal Correction dB	Barrier Attenuation dB	Rating Level L_{AR}	Background Sound Level [L_{A90}] dB(A)	Excess of L_{AR} Above L_{A90}
Normal Operations						
1	13.1	+6	0	19.1	45	-25.9
2	13.0	+6	0	19.0	45	-26.0
3	12.6	+6	0	18.6	45	-26.4
4	13.6	+6	0	19.6	45	-25.4
Worst-Case (All Sources Combined)						
1	20.0	+6	0	26.0	45	-19.0
2	20.2	+6	0	26.2	45	-18.8
3	31.9	+6	0	37.9	45	-7.1
4	28.6	+6	0	34.6	45	-10.4

Table 6.2 and 6.3 indicate that all predicted noise levels with tonal correction are significantly below existing background sound levels at the nearest noise sensitive receptors for the daytime and night-time periods. This assessment results indicate that there is no likelihood of adverse noise impact during both the day and night-time periods at the nearest noise sensitive properties.

Section 6.4 includes a further discussion on the predicted noise levels included in this section in the context of the surrounding site and other noise guidance documents.

6.4 Predicted Noise Levels and Other Noise Guidance Documents

As detailed in Section 3.1, the EPA NG4 guidance document relates primarily to noise surveys and assessments for EPA licensed facilities but provides useful reference material for the purposes of completing the noise assessment for the proposed development.

NG4 provides typical limit values for noise from licensed sites, namely:

- Daytime (07:00 - 19:00) - 55dB $L_{Ar,T}$;
- Evening (19:00 - 23:00) - 50dB $L_{Ar,T}$:
- Night-time (23:00 - 07:00) - 45dB $L_{Aeq,T}$.

The predicted noise levels from the proposed development are significantly below the worst-case night-time noise limit and will have no noise impact at these properties on the basis of the guidance provided in these documents.

As detailed in Section 3.2 and 3.3 of this report, both the WHO Guidelines and BS8233:2014 indicate a noise threshold limit of 30dB inside bedrooms for good sleeping conditions. This equates to an exterior façade noise level of 45dB(A), assuming an open window. The predicted noise levels included in Table 6.1 are significantly below the threshold for achieving good sleeping conditions in bedrooms, even assuming an open window.

As detailed in Sections 6.3 and 6.4, the predicted noise levels from the proposed substation are substantially below all relevant noise threshold limits presented in any relevant noise guidance documents. On this basis, there will be no requirement for mitigation measures during the operational phase.

7. NOISE MITIGATION

7.1 Construction Phase

Where construction activity takes place for a development in the vicinity of residential properties, it is standard practice that the activities would operate between the hours of 07:00 and 19:00 on Monday to Fridays, between 08:00 and 16:00 on Saturdays and there will be no activity on Sundays or Bank Holidays.

As outlined in Section 5, there is potential for short-term noise impacts at the nearest noise sensitive properties if worst-case construction noise levels occur. Section 5.2 outlines worst-case predicted noise levels at the nearest noise sensitive properties and this indicates that there is potential for noise impacts at the nearest noise sensitive properties from the construction activities.

It must be noted that these worst-case predicted noise levels are very much an overestimation of the likely construction phase noise levels as they assume that all plant will be active simultaneously at the nearest portion of the site boundary to the proposed development. Nevertheless there is a clear need for appropriate mitigation measures to be in place during the construction phase.

It is proposed that a noise barrier in the form of site hoarding is erected at the site boundary during the construction phase. Figure 7.1 provides an indicative indication of the location of this barrier (in yellow), which will be refined based on site requirements when a more detailed construction plan is in place. It is proposed that this is a minimum of 2m height with no gaps in it, which will provide noise attenuation of approximately 10dB(A) in the direction of the nearest noise sensitive properties.

Figure 7.1: Indicative Location of Proposed Construction Phase Noise Barrier

A detailed Construction Environmental Management Plan (CEMP) will be prepared and will include a range of measures aimed at reducing the potential construction noise impacts on the nearest receptors to the proposed development site. This plan will address the mode and timing of construction activity in close proximity to the site boundary with the nearest receptors, aiming to reduce the noisiest activities in the vicinity of the boundary of the proposed site. This should also include measures to communicate and coordinate construction phase activities at the nearest boundary to the most affected receptors so as to reduce these noise impacts to the lowest possible levels. The detailed CEMP will include the noise threshold limits included in Table 3.2 (BS5228:2009+A1:2014), which must be adhered to throughout the construction phase. On the basis of the noise monitoring survey completed, the lowest noise threshold limits included in this table (i.e. Category B) must be applied for all construction activities.

British Standard BS5228:2009+A1:2014 – Noise and vibration control on construction and open sites outlines a range of measures that can be used to reduce the impact of construction phase noise on the nearest noise sensitive receptors. These measures should be applied by the contractor where appropriate during the construction phase of the proposed development. Examples of some of the best practice measures included in BS5228 are listed below:

- ensuring that mechanical plant and equipment used for the purpose of the works are fitted with effective exhaust silencers and are maintained in good working order;
- careful selection of quiet plant and machinery to undertake the required work where available;
- all major compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use;
- any ancillary pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers;
- machines in intermittent use should be shut down in the intervening periods between work;
- ancillary plant such as generators, compressors and pumps should be placed behind existing physical barriers, and the direction of noise emissions from plant including exhausts or engines should be placed away from sensitive locations, in order to cause minimum noise disturbance. Where possible, in potentially sensitive areas, acoustic barriers of enclosures should be utilised around noisy plant and equipment.
- Handling of all materials should take place in a manner which minimises noise emissions;
- Audible warning systems should be switched to the minimum setting required.

A complaints procedure should be operated by the Contractor throughout the construction phase.

7.2 Operational Phase

As detailed in Section 6.4, there is no requirement for mitigation measures during the operational phase.

Although no mitigation measures are required for the operational phase, it must be noted that a Perimeter RC Wall with Stone Facing (2.6m high) is proposed along the west, north and south perimeters of the site. This will offer some additional attenuation of noise for receptors located in those directions.

8. CONCLUSION

This report contains a detailed assessment of construction and operational phase noise levels from the proposed 110kV substation at Belmayne. The assessment has been conducted on the basis of worst-case assumptions for construction and operational phase noise.

The assessment has also been completed against a baseline noise dataset measured during day and night-time periods to determine existing ambient (L_{Aeq}) and background sound levels (L_{A90}) in the study area.

Subject to the appropriate mitigation measures being in place as detailed in this report during the construction phase, the proposed development can be constructed without generating any significant noise impact at the nearest sensitive properties.

During the construction phase, a Construction Environmental Management Plan will be prepared in advance of the commencement of works and will detail all measures and monitoring to ensure that construction noise levels are maintained below the Category B BS5228 noise threshold limits.

Operational phase noise levels from the proposed substation will be substantially below existing background sound levels at the nearest noise sensitive properties and will not generate any significant noise impact at these properties.

APPENDIX 1 – CALIBRATION CERTIFICATES

Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

Certificate of Calibration and Conformance

Certificate number: **U52161**

Test Object: **Sound Level Meter, BS EN IEC 61672-1:2003 Class 1**

Producer: **Norsonic AS.**
Type: **140**
Serial number: **1402995**
Customer: **Alive Environmental Ltd**
Address: **52 Drumman Heights, Armagh, Northern Ireland. BT61 9SL.**
Contact Person: **Stephen Cleary**
Order No:

Introduction:
Calibration has been performed as set out in CA Technical Procedures which are based on the procedures for periodic verification of sound level meters as per the **Test Object** listed above. Results and conformance statement are overleaf and detailed results, where appropriate, are provided in the attached Measurement Report.

Tested:	*Producer*	*Type*	*Serial No*	*Certificate No*
Microphone	Norsonic	1225	504184	52160
Calibrator*	Norsonic	1251	30873	U49929
Preamplifier	Norsonic	1209	12541	Included

* The calibrator was complete with any required coupler for the microphone specified.

Additional items that have also been submitted for verification:

Wind shield	N/A
Attenuator	N/A
Extension cable	N/A

These items have been taken into account wherever appropriate.

Instruction Manual: Im140_1Ed8R0En Firmware Version: v2.1.670 The test object is a single channel instrument.

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.25 ±0	22.98 ±0.1	56.60 ±1.9

Calibration Dates:

Received date:	16/09/2025	Reviewed date:	18/09/2025
Calibration date:	18/09/2025	Issued date:	18/09/2025

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*

Reviewed by: *Lauren Chitty*

Doc ref: Slm-Cert-Master-V3-09

Page 1 of 2

Laboratory Location

Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

CALIBRATION

Certificate of Calibration

Certificate number: **52160**

Test Object: **Measurement Microphone**

Producer: **Norsonic AS.**
Type: **1225**
Serial number: **504184**
Customer: **Alive Environmental Ltd**
Address: **52 Drumman Heights, Armagh, Northern Ireland. BT61 9SL.**
Contact Person: **Stephen Cleary**
Order No:

Measurement Results	Sensitivity (dB re 1V/Pa)	Sensitivity (mV/Pa)	Capacitance (pF)
Measurement 1	*-26.59*	*46.84*	*23.96*
Measurement 2	*-26.59*	*46.83*	*24.04*
Measurement 3	*-26.59*	*46.83*	*24.05*
Result (Average):	***-26.59***	***46.83***	***24.02***
Expanded Uncertainty:	0.10		2.00
Degree of Freedom:	>100		>100
Coverage Factor:	2		2

The stated sensitivity is the pressure sensitivity at 250Hz, S_{250}, and is valid at reference conditions. The following correction factors have been applied during the measurement:
Pressure:uncertainty dB/kPa Temperature:-0.005 dB/°C Humidity:0 dB/%RH

Conditions	*Pressure kPa*	*Temperature °C*	*Humidty %RH*
Reference conditions	101.325	23	50
Measurement conditions	101.235 ± 0.042	22.9 ± 0.1	56.2 ± 2.6

The calibration test report shown on the next page gives details of the response at other frequencies relative to this 250 Hz reference sensitivity. Results ≥100 Hz are obtained using an electrostatic actuator as described in BS EN 61094-6 and those below 100 Hz are obtained in a reference pressure chamber. Detailed results are available from the calibration laboratory upon request.

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a coverage probability of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level.

Calibration Dates:

Received date:	16/09/2025	Reviewed date:	18/09/2025
Calibration date:	18/09/2025	Issued date:	18/09/2025

Technicians: (Electronic certificate)

Calibrated by: *Palanivel Marappan B.Eng (Hons), M.Sc*
Reviewed by: *Lauren Chitty*

This certificate is issued in accordance with the CA Quality Management system. It provides traceability of measurement to recognized national standards, and to the units of measurement realized at the National Physical Laboratory or other recognized national standards laboratories. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Doc ref: Mic-V6-Cert-Master-V3-08

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Laboratory Location
Campbell Associates Ltd
5b Chelmsford Road Industrial Estate
GREAT DUNMOW, Essex, GB-CM6 1HD
Phone 01371 871030

0789

Certificate of Calibration

Certificate number: **U49617**

Test Object: **Sound Calibrator**

Producer: **Norsonic AS.**
Type: **1251**
Serial number: **33739**
Customer: **Alive Environmental Ltd**
Address: **52 Drumman Heights, Armagh, BT61 9SL**
Contact Person: **Stephen Cleary**
Order No:

Measurement Results	Level dB	Level Stability dB	Frequency Hz	Distortion %
Measurement 1	113.96	0.04	1000.72	0.38
Measurement 2	113.97	0.03	1000.72	0.36
Measurement 3	113.96	0.04	1000.73	0.36
Result (Average):	**113.96**	**0.04**	**1000.72**	**0.37**
Expanded Uncertainty:	0.1	0.02	1	0.1
Degree of Freedom:	>100	>100	>100	>100
Coverage Factor:	2	2	2	2

The stated level is relative to 20µPa. The level is traceable to National Standards. The stated level is valid at reference conditions. The following correction factors have been applied during the measurement
Pres:0.0005 dB/kPa Temp:0.003 dB/°C Humi:0 dB/%RH Load volume: 0.0003 dB/mm3

Conditions	*Pressure kPa*	*Temperature °C*	*Humidity %RH*
Reference conditions	101.325	23	50
Measurement conditions	100.002 ±0.043	21.7 ±0.1	36.1 ±1.1

The reported expanded uncertainty of measurements is based on a standard uncertainty multiplied by the coverage factor of k=2, providing a level of confidence of approximately 95%. Where the degrees of freedom are insufficient to maintain this confidence level, the coverage factor is increased to maintain this confidence level. The uncertainty has been determined in accordance with UKAS requirements.

Records: K:\C A\Calibration\Nor-1504\Nor-1018 CalCal\Current Year\NOR1251_33739_M1.nmf

Preconditioning
The equipment was preconditioned for more than 4 hours in the specified calibration environment.

Method
Calibration has been performed as set out in the current version of CA Technical procedure TP01

Calibration Dates:

Received date:	08/01/2025	Reviewed date:	09/01/2025
Calibration date:	09/01/2025	Issued date:	09/01/2025

Technicians: (Electronic certificate)
Calibrated by: *Arjun Jaiya*
Reviewed by: *Lauren Chitty*

Doc ref: Calb-V6-Cert-Master-V3-08

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APPENDIX 2 – SPECIFICATION FOR 110 / 38 KV 63 MVA POWER TRANSFORMER

SIEMENS **TEST REPORT**

Measurement of no-load sound level (ONAF)	Test department Linz
Transformer	EQP-PB 660-10.18
Type: DOR 80000/110 **Ser.No.: N008690101**	

Determination of sound level according EN IEC 60076-10 - 2016 **Device: B&K 2270 Id.:71.008**

Test object has been excited with: **40,9 kV** **50,0Hz** **Tap pos: 6**

Measurement - forced cooling (2 m meas. distance) [LpAi] ONAF

Measurement at 1/3 tank height

Pos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LPAi	58,9	60,3	62,6	57,8	58,8	58,4	59,4	58,7	58,8	61,7	60,2	57,1	57,4	59,0	59,5

Pos.	16	17	18	19
LPAi	58,7	58,8	61,2	58,7

Pos.
LPAi

Pos.
LPAi

Measurement at 2/3 tank height

Pos.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LPAi	60,9	57,2	55,8	54,3	53,2	55,6	53,7	59,1	56,6	62,0	57,0	58,9	59,4	57,5	60,0

Pos.	16	17	18	19
LPAi	58,9	57,7	60,5	59,7

Pos.
LPAi

Pos.
LPAi

Note: point 1 is mid of LV-side, all other points clockwise in a distance of 1m

Determination of Sound Level - Evaluation

Background noise Lbg0 before test sequence: 30,0 dB
Background noise Lbg0 after test sequence: 30,0 dB
Length / width / height of test object: 6,63 m / 3,40 m / 3,39 m

Average of sound pressure level
ONAF L_{pA0} = 59,0 dB (energy average)

Correction K1 for background noise (Lbg0)
ONAF $K1 = LpA0 - 10\log(10^{0,1LpA0} - 10^{0,1Lbg0})$ K1= 0,0 dB

Environmental correction K due to reflection
ONAF K = 4,1 dB (K will be determined by the acoustic absorbtion coefficient of the test room and the volume of the test room)

ONAF measured sound pressure level corrected = LpA0 - K1 - K = 54,9 dB

ONAF coefficient for sound power calculation $Ls = 10\log\frac{S}{So}$ Ls= 22,5 dB

	Sound pressure level LpA:		Sound power level LwA:	
Sound level measured:	**55 dB**	**ONAF**	**77 dB**	**ONAF**
Sound level guaranteed:	**65 dB**	**ONAF**	**---**	**ONAF**

Date: 2019 05 03	Test eng: Anibas	Release: W.Schirl 2019-05-07

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APPENDIX 3 – SPECIFICATION FOR 38 KV / MV 15 MVA POWER TRANSFORMER

ABB S.p.A.
Power Products Division

DETERMINATION OF SOUND LEVEL
ONAN - Rated voltage

IEC 60076-10 05/2001

OBJECT: Transformer
SERIAL N.: 1LIT754470-01

Monselice: 22/03/11
page 40 / 43

Measuring Positions	Half tank height measurement: Noise	Backgr. before	Backgr. after	One-third tank height measurement: Noise	Backgr. before	Backgr. after	Two-third tank height measurement: Noise	Backgr. before	Backgr. after
1				44.8	33.9	33.9	44.9	33.8	33.8
2				44.1	33.9	33.9	44.4	33.8	33.8
3				45.2	32.6	32.6	46.7	32.8	32.8
4				48.3	32.6	32.6	45.2	32.8	32.8
5				49.2	32.9	32.9	50.1	31.4	31.4
6				47.4	32.9	32.9	51.4	31.4	31.4
7				44.0	31.6	31.6	43.8	31.4	31.4
8				46.4	31.6	31.6	46.2	31.4	31.4
9				48.7	30.5	30.5	49.0	30.0	30.0
10				49.4	30.5	30.5	51.0	30.0	30.0
11				42.8	32.0	32.0	45.5	31.6	31.6
12				45.9	32.0	32.0	45.8	31.6	31.6
13				48.1	32.0	32.0	50.1	31.8	31.8
14				49.9	32.0	32.0	48.9	31.8	31.8
15				46.9	31.6	31.6	46.4	31.8	31.8
16				42.4	31.6	31.6	47.7	31.8	31.8
17									
18									
19									
20									
21									
22									
23									
24									
25									
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27									
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39									
40									
41									

TRANSFORMERS DIMENSIONS

Height of the transformer tank		h =	3.00	m
Length of the prescribed surface		lm =	16	m
Area of measurement surface	S = 1,25 x h x lm	=	60.0	m^2
Measuring positions		N =	16	
Measurement distance		r =	0.3	m
Spacing between measuring positions		=	1	m

RESULT OF THE MEASUREMENTS

* Environmental correction (K)	=	2.0	dB(A)
<u>Surface sound pressure level not correct (LpA):</u>			
LpA0 = $10\log_{10}[1/N \times S_{i=1}^{N} 10^{0.1LpAi}]$	=	47.5	dB(A)
<u>Sound pressure levels of the background noise (before and after):</u>			
LbgAf = $10\log_{10}[1/N \times S_{i=1}^{N} 10^{0.1LpAi}]$	=	32.1	dB(A)
LbgAe = $10\log_{10}[1/N \times S_{i=1}^{N} 10^{0.1LpAi}]$	=	32.1	dB(A)
<u>Surface sound pressure level correct (LpA):</u>			
LpA = $10\log_{10}[10^{0.1LpA0} - 10^{0.1LbgA}]$-K	=	**45.4**	**dB(A)**

Guarantee value (sound pressure level)	52.0	dB(A)

* See cert. ISMES A9030971 of 12.12.2009

ABB

INSPECTOR

APPENDIX 4 – SPECIFICATION FOR STANDBY DIESEL GENERATOR

J110K

Engine ref.	4045HF120
Alternator ref.	AT00911T
Performance class	G3

GENERAL CHARACTERISTICS

Frequency (Hz)	50
Voltage (V)	400/230
Standard Control Panel	APM303
Optional control panel	TELYS

POWER

Voltage	ESP		PRP		Standby Amps
	kWe	kVA	kWe	kVA	
220 TRI	88	110	80	100	289
220/127	79	99	72	90	260
415/240	88	110	80	100	153
400/230	88	110	80	100	159
380/220	88	110	80	100	167
200/115	88	110	80	100	318
240 TRI	88	110	80	100	265
230 TRI	88	110	80	100	276

DESCRIPTIVE

- Mechanic governor
- Mechanically welded chassis with antivibration suspension
- Main line circuit breaker
- Radiator for wiring temperature of 48/50°C max with mechanical fan
- Protective grille for fan and rotating parts (CE option)
- 9 dB(A) silencer supplied separately
- Charger DC starting battery with electrolyte
- 12 V charge alternator and starter
- Delivered with oil and coolant -30°C
- Manual for use and installation

DIMENSIONS COMPACT VERSION

Length (mm)	1950
Width (mm)	1084
Height (mm)	1330
Dry weight (kg)	1187
Tank capacity (L)	190

DIMENSIONS SOUNDPROOFED VERSION

Commercial reference of the enclosure	M129
Length (mm)	2554
Width (mm)	1150
Height (mm)	1680
Dry weight (kg)	1587
Tank capacity (L)	190
Acoustic pressure level @1m in dB(A)	78
Sound power level guaranteed (Lwa)	95
Acoustic pressure level @7m in dB(A)	66

POWER DEFINITION

PRP : Prime Power is available for an unlimited number of annual operating hours in variable load applications, in accordance with ISO 8528-1. ESP : The standby power rating is applicable for supplying emergency power in variable load applications in accordance with ISO 8528-1. Overload is not allowed.

TERMS OF USE

According to the standard, the nominal power assigned by the genset is given for 25°C Air Intlet Temperature, of a barometric pressure of 100 kPA (100 m A.S.L), and 30 % relative humidity. For particular conditions in your installation, refer to the derating table.

ASSOCIATED UNCERTAINLY

For the generating sets used indoor, where the acoustic pressure levels depends on the installation conditions, it is not possible to specify the ambient noise level in the exploitation and maintenance instructions . You will also find in our exploitation and maintenance instructions a warning concerning the air noise dangers and the need to implement appropriated preventive measures.

APPENDIX 5 – SPECIFICATION FOR ARC SUPPRESSION COIL

THE PROVEN POWER. TRENCH

Order no.	Position	Date	Page
92210929	01	15.03.2022	2/3

Title	Document no.
TEST REPORT Routine Tests	TR-92210929-010000/A

3. Separate source a.c. withstand voltage test

Frequency of the test voltage :	50	Hz	Remark :
Duration of the test :	60	s	During the test no flashover
Test voltage - Main winding :	50	kV	or puncture occurred.
Test voltage - Secondary winding :	3	kV	
Test voltage - Auxiliary winding :	3	kV	
Test voltage - Current transformer :	3	kV	
Test voltage - Auxiliary wiring :	2	kV	

5. Operation test of core air-gap mechanism

8 complete cycles of operation were performed			Remark :
with reactor un-energized and rated auxiliary voltage.			During the test on the air-gap mechanism
Duration of one operation from min. to max. position:	166	s	no failure occurred.

6. Measurement of acoustic sound level

I_p in A	L_{pAeq} in 1 m in dB	L_S in dB	L_{WA} in dB
20	69	16	86
200	68	16	84

7. Leak testing with pressure

Top oil temperature :	23	° C	Remark :
Test pressure over the normal liquid pressure :	10	kPa	During the test no decrease in
Duration of the test :	8	h	pressure and no leakage occurred.