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Revision 02

Sizewell C
The power of good for Britain



# Sizewell C Project

# EPR/GP3226SQ/A001 Request for Information: Noise – BS 4142:2014 + A1:2019 Assessment

# DOCUMENT CONTROL

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# REVISION HISTORY

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# 1 INTRODUCTION

## 1.1 Purpose

Sizewell C Ltd (SZC) submitted a permit application for an installation activity environmental permit, EPR Schedule 1, Section 1.1A(1)(a): Burning of any fuel in an appliance with a rated thermal input of 50 MW or more for the installation of diesel generators within the Main Development Site (MDS) on 12th April 2024.

A request for further information was received from the Environment Agency (EA) on 10th May 2024. Within this, it was noted that the following was missing:

"*Noise – Screening Assessment*

1) *Where no BS 4142 assessment is being carried out, clearly state your screening methodology showing that sound emissions from the proposed generators are low risk. Include detailed supporting evidence such as detailed sound propagation calculations used to arrive at your conclusions.*

2) *Provide raw background sound level measurements (including time, date, LA90, LAeq, LAmax at each survey location) in an Excel spreadsheet format and any accompanying computer modelling files or calculation spreadsheets.*

*Reason: The submitted report assesses the overall sound emissions from the construction phase of the Sizewell C Nuclear Plan according to BS 5228. The Environment Agency is only permitting the sound emissions from the power generators; therefore, a separate assessment is required to evaluate the sound emissions from these power generators. The Environment Agency guidance clear states, "you must use 'BS 4142: Methods for rating and assessing industrial and commercial sound' to quantify the level of environmental noise impact from industrial processes". In addition to this the BS 4142 standard states within Section 1.1 b), detailing the scope of the standard, that "sound from fixed installations which comprise mechanical and electrical plant and equipment" should be assessed using the BS 4142 method.*

*Where no BS 4142 assessment is being carried out, you must undertake screening to show that sound emissions from the proposed generators are low risk. Where the possibility of impacts, due to sound emissions from the proposed generators, cannot be ruled out at any residential receptor, you must carry out a detailed BS 4142 assessment at these residential receptors. This would be required during determination of the permit application. The Environment Agency will scrutinise the screening methodology used. If we disagree with the screening outcomes in a location, then we will also require a full BS 4142 assessment at that location during determination."*

## 1.2 Scope

This report presents a BS 4142:2014 + A1:2019 [1] (BS 4142) assessment of the sound levels likely to be generated by the proposed generators at the nearest residential receptors.

An updated round of baseline monitoring has recently been conducted to feed into the Code of Construction Practice (CoCP) and Noise Monitoring and Management Plan (NMMP) control documents for the MDS, including the Ancillary Construction Area (ACA). The BS 4142 [1] assessment draws upon the results of this monitoring, with the raw data provided alongside the submission of this assessment.

This assessment has been conducted in accordance with BS 4142 [1], including the use of baseline background sound levels. It should be noted that it is not typical to implement BS 4142 [1] for construction noise, with Section 1.3 of the standard stating *'The standard is not intended to be applied to the rating and assessment of sound from: … d) construction and demolition;…"*, which the activities in this permit application would be expected to fall under. The proposed generators will be operating within a construction site, and it is therefore not considered to be in accordance with the scope of the standard to compare the operational sound levels of the generators to the existing baseline background levels at the nearby residential receptors in the absence of the construction activities. Notwithstanding this, SZC has completed a BS 4142 [1] assessment to respond to the EA's request for further information.

## 1.3 Definitions

| Term / Abbreviation | Definition |
|---|---|
| ACA | Ancillary Construction Area |
| AD | Associated Development |
| BMP | Bespoke Mitigation Plan |
| BPM | Best Practicable Means |
| BS 4142 | British Standard BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound |
| BS 5228 | British Standard BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise |
| CoCP | Code of Construction Practice |
| CoPA | Control of Pollution Act 1974 |
| dB | Decibel |
| DCO | Development Consent Order |
| EA | Environment Agency |
| EDRMS | Electronic Document and Records Management System |
| ES | Environmental Statement (Book 6, Volume 2) |
| ESC | East Suffolk Council |
| ISO 9613 | Internation Organization for Standardization ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors |

| Term / Abbreviation | Definition |
|---|---|
| $L_{A90,T}$ | The A-weighted sound level exceeded 90% of the time / background sound level |
| $L_{Aeq,T}$ | The A-weighted equivalent continuous sound level / ambient sound level |
| $L_{Amax,T}$ | The A-weighted maximum recorded sound level |
| $L_{Ar,Tr}$ | Rating level |
| $L_r$ | Residual sound |
| $L_s$ | Specific sound |
| MCA | Main Construction Area |
| MDS | Main Development Site |
| NMMP | Noise Monitoring and Management Plan |
| NSR | Noise Sensitive Receptor |
| SPL | Sound Pressure Level |
| SWL | Sound Power Level |
| SZC | Sizewell C |
| TCA | Temporary Construction Area |

## 1.4 References

| Ref | Title | Location | Document No. |
|---|---|---|---|
| 1 | British Standard Institution (2019). *BS 4142:2014 + A1:2019 Methods for rating and assessing industrial and commercial sound*. BSI, London. | N/A | N/A |
| 2 | Bies, D.A., Hansen, C.H., 2009. *Engineering Noise Control: Theory & Practice. 4th Edition*. Abingdon: Spon Press. | N/A | N/A |
| 3 | Book 6, Volume 2 Main Development Site Chapter 11 Noise and Vibration | Online | https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-001822-SZC_Bk6_ES_V2_Ch11_Noise_and_Vibration.pdf |

| Ref | Title | Location | Document No. |
|---|---|---|---|
| 4 | International Organization for Standardization (1996), *ISO 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors* | N/A | N/A |
| 5 | Appendix C: Air Emission Risk Assessment | EDRMS | 101254803 |
| 6 | Ordnance Survey OS open-source Data – OS Terrain 50 | Online | https://www.ordnancesurvey.co.uk/products/os-terrain-50 |
| 7 | Ordnance Survey OS open-source Data – OS OpenMap - Local | Online | https://osdatahub.os.uk/downloads/open/OpenMapLocal |
| 8 | British Standard Institution (2014). *BS 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*. BSI, London. | N/A | N/A |
| 9 | Code of Construction Practice (Revision 7) | Online | https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-008183-Carly%20Vince%20-%20Other-%20Code%20of%20Construction%20Practice%20(clean%20version).pdf |
| 10 | Noise Monitoring and Management Plan - Main Development Site (including Land East of Eastlands Industrial Site), Revision 4.0 | Online / EDRMS | DC/24/0363/DRR42 191254668 |
| 11 | UK Government (1974). *Control of Pollution Act 1974*. | N/A | N/A |

# 2 TERMINOLOGY

This section provides explanations and definitions for the terms used in this report.

## 2.1 The decibel scale, A-weighting & typical sound levels

The ratio between the quietest audible sound and the loudest tolerable sound is a million to one in terms of the change in sound pressure. Due to this wide range, a scale based on logarithms is used in noise level measurement. The scale used is the decibel (dB) scale which, in terms of human response to airborne sound, typically covers a range of 0 to 140dB, corresponding to the intensity of the Sound Pressure Level (SPL).

The human ear has the ability to recognise a particular sound depending on the pitch or frequencies found at the source. Microphones cannot differentiate noise in the same way as the ear; to counter this weakness the noise measuring instrument applies a correction to correspond more closely to the frequency response of the ear. The correction factor is called 'A-weighting', and the resulting measurements are written as dBA or dB(A). 'A-weighting' refers to the sound level that represents the human ear's response to sound. The frequency weighting may be included in the descriptor (see **Section 2.2**), in which case the unit is described only as dB.

The dB(A) unit is internationally accepted and has been found to correspond well with people's subjective reaction to sound. Typical dB(A) sound levels for familiar sounds are given in **Table 2.1**.

**Table 2.1 Typical sound levels [2]**

| Approximate noise level dB(A) | Example |
|---|---|
| 0 | Threshold for hearing for normal young people |
| 20 | Recording studio, ambient level |
| 40 | Quiet residential neighbourhood, ambient level |
| 60 | Department store, restaurant, speech levels |
| 80 | Next to busy highway, shouting |
| 100 | Textile mill; press room with presses running; punch press and wood planers, at operators' position |
| 120 | Ship's engine room, rock concert, in front and close to speakers |
| 140 | Moon launch at 100m; artillery fire, gunner's position. |

## 2.2 Sound power, sound level indices and other descriptors

The sound levels given in **Table 2.1** are sound pressure levels ($L_p$) and describe the sound level at a point in space. Sound power levels ($L_W$) are used to describe the sound output of a sound source. Sound levels vary over time depending on sound generating activities. The following indices are used to take account of these variations:

- $L_{Aeq,T}$ – the equivalent continuous sound level. This is the sound level of a steady sound having the same energy as a fluctuating sound over the same period. Ambient sound levels are described with this index. $L_{Aeq,T}$ is considered the best general-purpose index for

environmental sound, as it is the index which generally best represents how sound levels are perceived;

- $L_{A90,T}$ – this noise index represents the sound levels exceeded for 90% of the measurement period and is used to indicate quieter times during the measurement period. In BS 4142 [1] assessments it is usually referred to as the background sound level, and describes the quietest 10% of a measurement period; and
- $L_{Amax}$ – is the maximum recorded sound level during the measurement period.

In addition, the following descriptors are often used in noise assessments:

- **Ambient sound** is the totally encompassing sound in a given situation, at a given time, usually composed of sound from many sources near and far;
- **Residual sound** is the sound remaining at the assessment location where the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound. This is the case when a sound source/proposed development is yet to be installed and/or be operational. The residual sound level is the equivalent continuous A-weighted sound pressure level deemed to represent the residual sound ($L_r = L_{Aeq,T}$) at the assessment location over a given time interval *T*;
- **Specific sound level** is the equivalent continuous A-weighted sound pressure level produced by a specific sound source (i.e. the sound source under assessment in accordance with BS 4142 [1]) at the assessment location over a given reference time interval *T*;
- **Rating level** is the specific sound level with the addition and inclusion of any acoustic characteristic feature corrections of the sound. If no acoustic features are present, then the rating level is equal to the specific sound level;
- **Fast time weighting** is where a sound pressure level measurement using a 125 ms moving average time weighting period has been used;
- **Tonality** is an acoustic feature which represents the sound level of a source that has a dominant 'pitch' characteristic similar to a sine wave or musical note. Sounds with a perceptible tone are more easily noticeable and should therefore carry a character correction where deemed appropriate under the guidance in BS 4142 [1];
- **Impulsivity** is an acoustic feature where the sound level of a source is highly variable over time. Humans are more sensitive to impulsive sound when compared to a continuous sound of the same sound pressure level. Therefore, an acoustic character feature correction can be applied when deemed appropriate under the guidance in BS 4142 [1].
- **Intermittency** is an acoustic feature considered in BS 4142 [1]. Humans are more sensitive to sounds that are intermittent in nature when compared to a continuous sound of the same specific sound level. Therefore, a correction can be applied for the presence of such a characteristic.
- **Free field** signifies that a sound measurement has been undertaken in 'free field' conditions, i.e. away from any reflecting facades, other than the ground, e.g. building facades, close boarded fence work, etc.; and
- **Façade level:** A standard correction of +3dB may be added to a free field sound level to estimate the sound level 1m away from a façade to account for both the sound upon the façade and the reflected sound from the façade. When considering the break-in of external sound into a room, the sound level which is incident upon the façade, rather than the façade

level, is considered because only the incident sound will pass through the fabric of the building, whilst reflected sound travels away from the building. The standard +3dB façade correction is most applicable in situations where the façade has a relatively unobstructed angle of view of the source (i.e. an uninterrupted 180º angle of view of the source in the horizontal plane).

# 3 ASSESSMENT GUIDANCE

## 3.1 BS 4142:2014 + A1:2019 Methods of rating and assessing industrial and commercial sound [1]

Section 1.1 of BS 4142 [1] states that:

*"This British Standard 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 on or around an industrial and/or commercial site.*

*The methodology contained within BS 4142 uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which the sound is incident."*

Section 1.3 of BS 4142 [1] states that:

*"This standard is not intended to be applied to the rating and assessment of sound from:*

*a) recreational activities, including all forms of motorsport;*

*b) music and other entertainment;*

*c) shooting grounds;*

*d) construction and demolition;*

*e) domestic animals;*

*f) people;*

*g) public address systems for speech; and*

*h) other sources falling within the scopes of other standards or guidance."*

A summary of the approach set out within BS 4142 [1] is set out below:

- establish the specific sound level of the source(s);
- establish the representative background sound level, typically by measurement close to the receptor location;
- rate the specific sound level to account for any distinguishing characteristics (see below);
- estimate the impact by subtracting the background sound level from the rating level; and
- consider the initial estimate of the impact, as determined above, in the context of the noise and its environment.

The specific sound level is rated to account for distinguishing characteristics by using the following penalties:

- tonality up to 6dB[1]
- impulsivity up to 9dB[2]
- intermittency 3dB
- other sound characteristics 3dB

The corrections provided above could be applied in a linear fashion. However, this could result in some large penalties, and it is recommended that where two characteristics are present, and one is dominant, that the larger of the two is used.

An initial estimate of the impact of the specific sound is obtained by subtracting the background sound level from the rating level. Using this approach, BS 4142 [1] states:

*"Typically, the greater this difference, the greater the magnitude of impact*

- *a difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context*
- *a difference of around +5dB is likely to be an indication of an adverse impact, depending on the context*
- *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 results of the final assessment should be reached in light of all pertinent contextual factors, including:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound;
- the sensitivity of the receptor; and
- the overall context in which the application is being put forward.

[1] BS 4142 suggests that a penalty of *"2dB for tone which is just perceptible at the receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible"* could be applied.
[2] BS 4142 suggests that a penalty of *"3dB for impulsivity which is just perceptible at the receptor, 6dB where it is clearly perceptible and 9dB where it is highly perceptible"* could be applied.

# 4 ASSESSMENT METHODOLOGY

## 4.1 Baseline background sound levels

Baseline sound levels pertinent to this assessment were obtained between 2013 and 2019, with the methodology and results presented within the ES, Volume 2 Chapter 11 of the DCO [3]. An updated round of baseline sound monitoring has been undertaken between September 2023 and May 2024 to feed into the Code of Construction Practice (CoCP) and Noise Monitoring and Management Plan (NMMP) control documents for the MDS, including the Ancillary Construction Area (ACA). The background sound levels of the BS 4142 [1] assessment draw upon the recent data, and not the data presented within the DCO [3].

The baseline noise measurements have been derived without the presence of any associated construction activity. It should be noted that the activity proposed in the permit application (use of generators) would happen concurrently with construction activities on the MDS, including the TCA and ACA, and therefore the baseline background levels used in the assessment represent a worst-case assessment scenario and do not reflect the reality of the situation that will occur.

## 4.2 Calculations and assessment

The generators included within the permit application EPR/GP3226SQ will generate sound. Sound levels at the nearest residential receptors due to the proposed generators have been predicted using SoundPLAN 8.2 acoustic modelling software which implements ISO 9613-2:1996 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation* [4] prediction methodology.

The model consists of a detailed three-dimensional representation of the application site and the surroundings and has been employed to calculate the sound levels likely to be generated by the proposed generators at the nearest receptors.

The model has taken the following into consideration:

- the peak use of generators has been modelled, as described in Appendix C: Air Emission Risk Assessment [5] of the permit application;
- OS open-source Terrain data [6] has been incorporated into the model for the application site and surrounding area, extending to encompass the nearest receptors;
- OS open-source building data [7] has been incorporated into the model, set to include three no. order of reflections from solid structures. All buildings have been set to a height of 8m;
- the static generators included within Appendix C: Air Emission Risk Assessment of the permit application [5] have been incorporated into the model, at a height of 3m;
- the mobile generators included with Appendix C: Air Emission Risk Assessment of the permit application [5] have been incorporated and modelled as area sources, with the total sound power level spread across the area to represent a realistic worst case, at a height of 3m;
- the nearest residential receptors included within Appendix C: Air Emission Risk Assessment of the permit application [5] have been incorporated into the model, at a height of 1.5m for daytime representation;

- the percentage on times reported in the emission inventory (peak) spreadsheet (package substations tab) have been assumed within the model. Where a percentage on time was not included, it has been assumed the on time is 100%;
- ground absorption has been included, set to a value of 0.5 for a conservative assessment; and
- all eight barriers included within the ES of the DCO application [3] have been incorporated into the model.

The hours of operation for the proposed generators are 07:00 – 23:00, Monday - Friday. Therefore, no night-time assessment is required.

# 5 BASELINE SOUND MONITORING

Baseline sound monitoring was carried out at the locations in **Figure 5.1** between September 2023 and May 2024. **Table 5.1** presents a summary of the daytime background levels for each identified residential Noise Sensitive Receptor (NSR) in Appendix C: Air Emission Risk Assessment of the permit application [5]. The exception to this is R4 – Ash Wood Cottage which is now a vacant property, and therefore not considered as an NSR.

As stated in **Section 1.2**, this assessment draws upon a recent round of updated baseline noise monitoring. The raw data has been provided to the EA in the requested format (a spreadsheet including time, date, $L_{A90}$, $L_{Aeq}$ and $L_{Amax}$ at each survey location) alongside this report, which also includes commentary on the analysis of the baseline background levels.

**Table 5.1 Summary of background levels at each NSR**

| NSR Number | NSR Name | Measurement Reference | Location Rationale | Typical $L_{A90,T}$ (dB) daytime |
|---|---|---|---|---|
| 1 | Abbey Cottages | MS14 | Measurement location is within 100m of the NSR. | 44 |
| 2 | Abbey Farm | MS5 | Measurement location is within 100m of the NSR. | 31 |
| 3 | Abbey Road, Leiston | MS19 | Measurement location is within 100m of the NSR. | 40 |
| 5 | Barley Rise | MS42 / MS41 | Measurement location is approximately 200m east of the NSR. Measurement location is expected to have the same sound environment as the NSR and the location is therefore representative. | 39 |
| 6 | Common Cottages | MS26 | Measurement location is approximately 500m south of the NSR. The measurement location is expected to have the same sound environment as the NSR (similar distance from Lover's Lane and Sandy Lane) and the location is therefore representative. | 42 |
| 7 | Crown Lodge | MS30 | Measurement location is slightly set back from Lover's Lane and King George's Avenue compared to the NSR and is therefore considered conservatively representative of the sound environment at the NSR. | 39 |
| 8 | Eastbridge | MS1 | Measurement location is approximately 130m south of the NSR and is expected to have the same sound environment as the NSR. | 33 |

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| NSR Number | NSR Name | Measurement Reference | Location Rationale | Typical $L_{A90,T}$ (dB) daytime |
|---|---|---|---|---|
| 9 | Grimsey's Lane | MS42 / MS41 | Measurement location is approximately 300m north of NSR and is expected to have a similar sound environment as the NSR. Limited traffic movements on Sizewell Gap are not expected to influence the $L_{A90,T}$ levels. | 39 |
| 10 | Heath View | MS45a | Measurement location is approximately 100m north of NSR and is expected to have the same sound environment as the NSR. | 48 |
| 11 | Keepers Cottage | MS26 | Monitoring location is approximately 200m south of NSR and is expected to have the same sound environment as the NSR. | 42 |
| 12 | King George's Avenue | MS29 | Monitoring location is approximately the same distance from King George's Avenue as the NSR and is expected to have the same sound environment as the NSR. | 36 |
| 13 | Leiston Abbey | MS15 | Monitoring location is approximately 600m east of NSR, and approximately 350m from Abbey Road (NSR is approximately 250m from Abbey Road). Measurement location is considered conservatively representative of the sound environment at the NSR. | 39 |
| 14 | Lover's Lane / Sandy Lane Junction | MS25 | Monitoring location is within 100m of the NSR. | 42 |
| 15 | Old Abbey Farm / Care Home | MS15 | Monitoring location is approximately 170m south of the NSR and is expected to have the same sound environment as the NSR. | 39 |
| 16 | Plantation Cottages | MS5 | Monitoring location is approximately 200m east of the NSR and is expected to have the same sound environment as the NSR. | 31 |
| 17 | Potter's Farm | MS15 | The monitoring location is approximately the same distance from the B1122 as the NSR and is therefore expected to have a similar sound environment to the NSR and is considered representative. | 39 |
| 18 | Potter's Street | MS15 | The monitoring location is approximately the same distance from the B1122 as the NSR and is therefore expected to have a similar sound environment to the NSR and is considered representative. | 39 |
| 19 | Rosery Cottages | MS27 | Monitoring location is within 100m of the NSR. | 40 |

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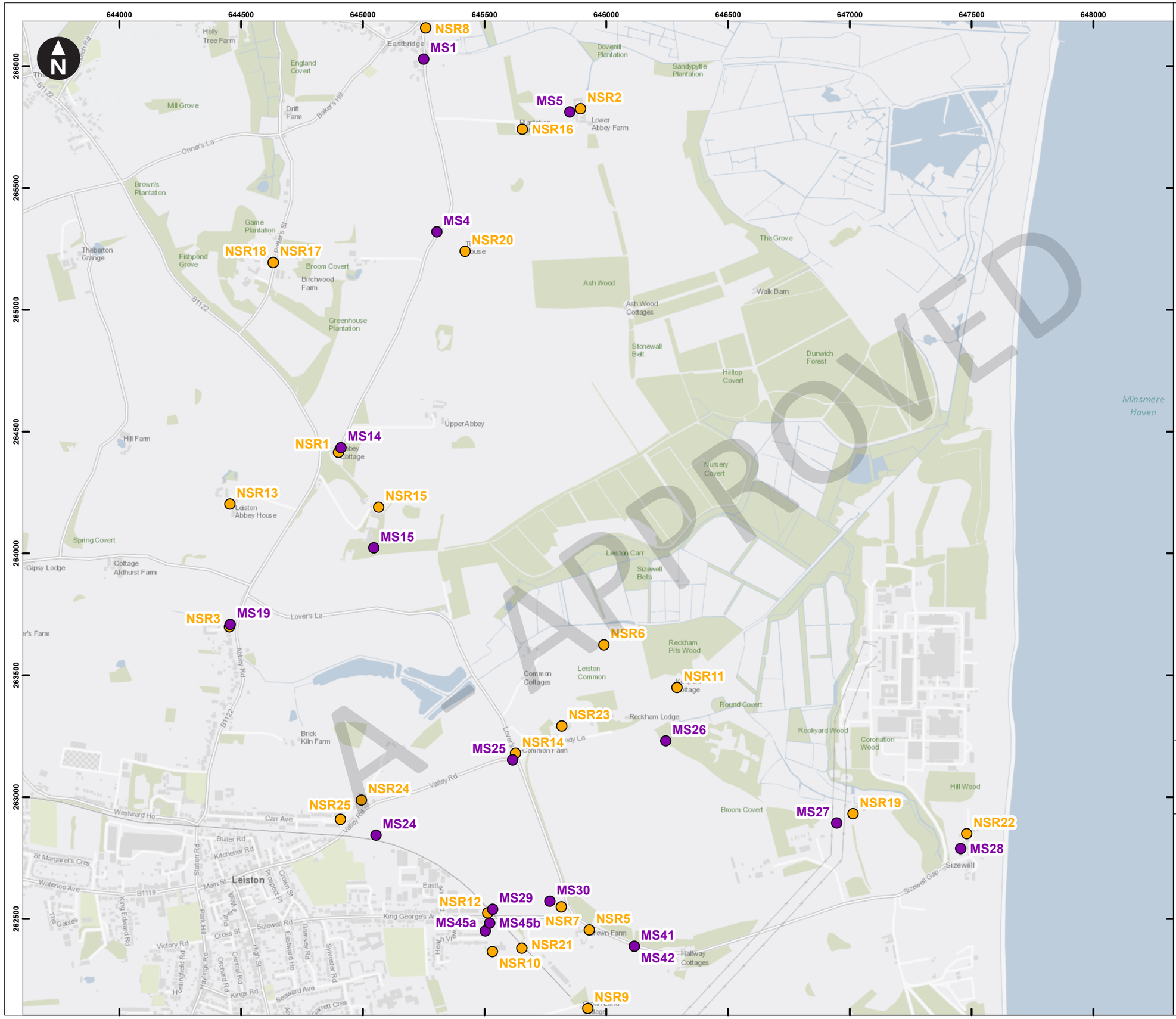
| NSR Number | NSR Name | Measurement Reference | Location Rationale | Typical $L_{A90,T}$ (dB) daytime |
|---|---|---|---|---|
| 20 | Roundhouse | MS4 | Monitoring location is approximately 150m west of the NSR and is expected to have the same sound environment as the NSR. | 33 |
| 21 | Sizewell Sports & Social Club | MS45b | Monitoring location is approximately 160m northwest of the NSR and is expected to have the same sound environment as the NSR. | 45 |
| 22 | Sizewell Village | MS28 | Monitoring location is within 100m of the NSR. | 41 |
| 23 | The Studio | MS26 | Monitoring location is approximately 400m east of the NSR. Given the greater distance between Lover's Lane and the monitoring location compared to the NSR, the monitoring location is considered conservatively representative of the sound environment at the NSR. | 42 |
| 24 | Valley Road North | MS24 | Monitoring location is approximately 150m southeast of the NSR and considered representative of the sound environment at the NSR. The nearby trainline is not in use and therefore does not contribute to the sound environment at the monitoring location. | 34 |
| 25 | Valley Road South | MS24 | Monitoring location is approximately 150m southeast of the NSR and considered representative of the sound environment at the NSR. The nearby trainline is not in use and therefore does not contribute to the sound environment at the monitoring location. | 34 |
| All comments on the equivalence of the acoustic climate between the measurement locations and the NSRs are based on existing conditions, before the SZC construction works commence, and do not reflect the acoustic climate that will be present when the proposed generators are in use. | | | | |



# 6 NOISE MODELLING

## 6.1 Model inputs

**Section 4.2** lists the considerations given to the noise modelling. This Section aims to provide clarity on the modelling inputs, including locations, assumptions, and sound power levels (SWLs).

### 6.1.1 Static generators

53no. static generators have been included within Appendix C: Air Emission Risk Assessment of the permit application [5] and have therefore been included within the noise model. The generators, locations and percentage on times are presented in **Table 6.1**.

To provide a conservative worst-case assessment, the loudest generator within Appendix C of BS 5228-1:2009 + A1:2014 [8] (BS 5228) has been assumed to be representative of all static generators. The details are provided in **Table 6.2** and **Table 6.3**.

**Table 6.1 Static generator locations and percentage on times**

| Reference | X | Y | % on time |
|---|---|---|---|
| MDS1 | 645574 | 263141 | 50 |
| MDS2 | 645249 | 262911 | 50 |
| MDS3 | 645708 | 262873 | 50 |
| MDS4 | 645618 | 262660 | 50 |
| MDS5 | 645619 | 262632 | 50 |
| MDS6 | 645619 | 262594 | 50 |
| MDS7 | 647157 | 263905 | Standby[3] |
| MDS8 | 647353 | 264175 | Standby[3] |
| MDS9 | 647353 | 264169 | Standby[3] |
| MDS10 | 647450 | 264123 | Standby[3] |
| MDS11 | 647430 | 264056 | Standby[3] |
| MDS12 | 645105 | 264502 | 50 |
| MDS13 | 645157 | 264421 | 100 |
| MDS14 | 645350 | 264395 | 100 |
| MDS15 | 645521 | 264427 | 100 |
| MDS16 | 645369 | 264222 | 100 |
| MDS17 | 645409 | 264074 | 100 |
| MDS18 | 646820 | 264623 | 100 |

[3] Where the generators are noted as standby, it is assumed the percentage on time is 0%.

| Reference | X | Y | % on time |
|---|---|---|---|
| MDS19 | 646759 | 264603 | 100 |
| MDS20 | 646650 | 264789 | 100 |
| MDS21 | 646444 | 264790 | 50 |
| MDS22 | 646540 | 264616 | 100 |
| MDS23 | 646125 | 264701 | 50 |
| MDS24 | 646169 | 264591 | 50 |
| MDS25 | 645980 | 264699 | 50 |
| MDS26 | 646309 | 264845 | 50 |
| MDS27 | 646827 | 264832 | 100 |
| MDS28 | 646760 | 264789 | 100 |
| MDS29 | 645832 | 264660 | 50 |
| MDS30 | 645806 | 264639 | 50 |
| MDS31 | 645718 | 264552 | 100 |
| MDS32 | 647212 | 264628 | 100 |
| MDS33 | 647191 | 264649 | 100 |
| MDS34 | 646983 | 264670 | 50 |
| MDS35 | 646948 | 264670 | 50 |
| MDS36 | 646915 | 264670 | 50 |
| MDS37 | 646956 | 264722 | 50 |
| MDS38 | 646760 | 264747 | 100 |
| MDS39 | 646760 | 264718 | 100 |
| MDS40 | 647456 | 264384 | 50 |
| MDS41 | 647593 | 263869 | 50 |
| MDS42 | 647593 | 263797 | 50 |
| MDS43 | 647112 | 264350 | 50 |
| MDS44 | 647215 | 264356 | 50 |
| MDS45 | 647257 | 264356 | 50 |
| AD4_4 | 643454 | 263123 | 100[4] |
| AD4_5 | 644988 | 262859 | 100[4] |

[4] Where no percentage on time was available, it has been assumed to be 100%.

| Reference | X | Y | % on time |
|---|---|---|---|
| AD4_6 | 644503 | 263825 | 100[4] |
| AD5_1 | 645251 | 262073 | 100[4] |
| AD6_1 | 644922 | 264589 | 100[4] |
| AD6_2 | 644657 | 263802 | 100[4] |
| AD6_3 | 645208 | 263798 | 100[4] |
| AD6_4 | 645492 | 263441 | 100[4] |

**Table 6.2 SWL assumptions for static generators**

| BS 5228 [8] Reference | Plant name | $L_{Aeq,T}$ at 10m (dB) | $L_{WA}$ (dB) |
|---|---|---|---|
| Table C.4 item 96 | Diesel generator (directional drill) | 77 | 105 |

**Table 6.3 Octave band SWL assumptions for static generators**

| Plant name | Octave band SWL (dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Diesel Generator (directional drill) | 95 | 108 | 102 | 100 | 100 | 100 | 96 | 89 |

### 6.1.2 Mobile generators

Due to the nature of mobile generators, the exact locations are unknown. However, the areas in which the mobile generators will be working are known, along with the number of generators within each working area.

The mobile generators will be used primarily for lighting and cranes, and therefore a reasonable worst-case assumption has been made, using the loudest lighting tower generator listed within Appendix C of BS 5228 [8]. **Table** 6.4 displays the areas used within Appendix C: Air Emission Risk Assessment of the permit application [5] and the generator assumptions, whilst **Table 6.5** shows the octave band SWL assumptions for each area. The total sound power from the generators for each area has been spread evenly across the area and modelled as an area source to consider a reasonable worst-case scenario.

It has been assumed the mobile generators will be operational 100% of the time.

**Table 6.4 Mobile generator areas and broadband plant assumptions**

| Area reference | BS 5228 [8] reference | Number of plant | $L_{Aeq,T}$ at 10m (dB) | $L_{WA}$ (dB) |
|---|---|---|---|---|
| Diesel Generator (lighting towers) | Table C.4 item 87 | 1 | 65 | 93 |
| MCA Deep Dig | Table C.4 item 87 | 25 | 79 | 107 |
| MCA Perimeter | Table C.4 item 87 | 7 | 73 | 101 |

| Area reference | BS 5228 [8] reference | Number of plant | $L_{Aeq,T}$ at 10m (dB) | $L_{WA}$ (dB) |
|---|---|---|---|---|
| TCA SE | Table C.4 item 87 | 21 | 78 | 106 |
| TCA SW | Table C.4 item 87 | 39 | 81 | 109 |
| TCA NE | Table C.4 item 87 | 17 | 77 | 105 |
| TCA Stockpiles | Table C.4 item 87 | 10 | 75 | 103 |
| TCA Rails | Table C.4 item 87 | 10 | 75 | 103 |
| ACA | Table C.4 item 87 | 30 | 80 | 108 |

**Table 6.5 Octave band SWL assumptions for mobile generators**

| Area reference | Octave band SWL (dB) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Diesel Generator (lighting towers) | 105 | 100 | 92 | 88 | 87 | 85 | 82 | 70 |
| MCA Deep Dig | 119 | 114 | 106 | 102 | 101 | 99 | 96 | 84 |
| MCA Perimeter | 113 | 108 | 100 | 96 | 95 | 93 | 90 | 78 |
| TCA SE | 118 | 113 | 105 | 101 | 100 | 98 | 95 | 83 |
| TCA SW | 121 | 116 | 108 | 104 | 103 | 101 | 98 | 86 |
| TCA NE | 117 | 112 | 104 | 100 | 99 | 97 | 94 | 82 |
| TCA Stockpiles | 115 | 110 | 102 | 98 | 97 | 95 | 92 | 80 |
| TCA Rails | 115 | 110 | 102 | 98 | 97 | 95 | 92 | 80 |
| ACA | 120 | 115 | 107 | 103 | 102 | 100 | 97 | 85 |

## 6.2 Model results

As stated in **Section 4.2**, the above was incorporated into a SoundPLAN model. The predicted $L_{Aeq,T}$ results are presented in **Table 6.6**.

**Table 6.6 Predicted $L_{Aeq,T}$ levels due to the operation of generators at NSRs**

| NSR No. | NSR Name | Contribution from static generators, $L_{Aeq,T}$ (dB) | Contribution from mobile generators, $L_{Aeq,T}$ (dB) | Resultant $L_{Aeq,T}$ (dB) |
|---|---|---|---|---|
| 1 | Abbey Cottages | 44 | 39 | 45 |
| 2 | Abbey Farm | 37 | 33 | 38 |
| 3 | Abbey Road, Leiston | 54 | 44 | 54 |
| 5 | Barley Rise | 43 | 39 | 45 |
| 6 | Common Cottages | 45 | 40 | 46 |
| 7 | Crown Lodge | 47 | 45 | 49 |

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| NSR No. | NSR Name | Contribution from static generators, $L_{Aeq,T}$ (dB) | Contribution from mobile generators, $L_{Aeq,T}$ (dB) | Resultant $L_{Aeq,T}$ (dB) |
|---|---|---|---|---|
| 8 | Eastbridge | 32 | 30 | 34 |
| 9 | Grimsey's Lane | 41 | 37 | 42 |
| 10 | Heath View | 42 | 38 | 43 |
| 11 | Keepers Cottage | 41 | 38 | 43 |
| 12 | King George's Avenue | 47 | 43 | 48 |
| 13 | Leiston Abbey | 42 | 36 | 43 |
| 14 | Lover's Lane / Sandy Lane Junction | 53 | 48 | 54 |
| 15 | Old Abbey Farm / Care Home | 50 | 47 | 51 |
| 16 | Plantation Cottages | 36 | 34 | 38 |
| 17 | Potter's Farm | 36 | 32 | 38 |
| 18 | Potter's Street | 36 | 32 | 38 |
| 19 | Rosery Cottages | 37 | 34 | 39 |
| 20 | Roundhouse | 40 | 39 | 43 |
| 21 | Sizewell Sports & Social Club | 49 | 43 | 50 |
| 22 | Sizewell Village | 35 | 32 | 37 |
| 23 | The Studio | 49 | 42 | 49 |
| 24 | Valley Road North | 53 | 48 | 54 |
| 25 | Valley Road South | 51 | 41 | 51 |

# 7 BS 4142 ASSESSMENT

## 7.1 Establishing rating level ($L_{Ar,Tr}$)

**Table 6.6** displays the ambient level results of the noise modelling from the operation of generators. This can also be described as the specific sound level ($L_s$) in the context of BS 4142 [1].

As described in **Section 3.1**, BS 4142 [1] requires consideration of tonality, impulsivity, intermittency and other characteristics of the specific source and where necessary, a penalty is applied to determine a rating level ($L_{Ar,Tr}$).

The generators are not expected to have a tonal element, but instead be a continuous, consistent broadband sound. It is therefore not appropriate to add any penalties to the specific sound levels, and the rating level equals the specific sound level ($L_{Ar,Tr} = L_s$).

## 7.2 Initial estimate of noise impact

**Table 7.1** compares the rating level ($L_{Ar,Tr}$) to the background sound level ($L_{A90}$) at each NSR and provides an initial estimate of noise impact in accordance with BS 4142 [1].

**Table 7.1 BS 4142 [1] initial estimate of noise impact at each NSR**

| NSR No. | NSR Name | $L_{A90}$ (dB) | $L_{Ar,Tr}$ (dB) | Difference | Initial impact estimate[5] |
|---|---|---|---|---|---|
| 1 | Abbey Cottages | 44 | 45 | +1 | Low impact |
| 2 | Abbey Farm | 31 | 38 | +7 | Adverse impact |
| 3 | Abbey Road, Leiston | 40 | 54 | +14 | Significant adverse impact |
| 5 | Barley Rise | 39 | 45 | +6 | Adverse impact |
| 6 | Common Cottages | 42 | 46 | +4 | Low impact |
| 7 | Crown Lodge | 39 | 49 | +10 | Significant adverse impact |
| 8 | Eastbridge | 33 | 34 | +1 | Low impact |
| 9 | Grimsey's Lane | 39 | 42 | +3 | Low impact |
| 10 | Heath View | 48 | 43 | -5 | Low impact |
| 11 | Keepers Cottage | 42 | 43 | +1 | Low impact |
| 12 | King George's Avenue | 36 | 48 | +12 | Significant adverse impact |
| 13 | Leiston Abbey | 39 | 43 | +4 | Low impact |
| 14 | Lover's Lane / Sandy Lane Junction | 42 | 54 | +12 | Significant adverse impact |

[5] As defined in Section 3.1

| NSR No. | NSR Name | $L_{A90}$ (dB) | $L_{Ar,Tr}$ (dB) | Difference | Initial impact estimate[5] |
|---|---|---|---|---|---|
| 15 | Old Abbey Farm / Care Home | 39 | 51 | +12 | Significant adverse impact |
| 16 | Plantation Cottages | 31 | 38 | +7 | Adverse impact |
| 17 | Potter's Farm | 39 | 38 | -1 | Low impact |
| 18 | Potter's Street | 39 | 38 | -1 | Low impact |
| 19 | Rosery Cottages | 40 | 39 | -1 | Low impact |
| 20 | Roundhouse | 33 | 43 | +10 | Significant adverse impact |
| 21 | Sizewell Sports & Social Club | 45 | 50 | +5 | Adverse impact |
| 22 | Sizewell Village | 41 | 37 | -4 | Low impact |
| 23 | The Studio | 42 | 49 | +7 | Adverse impact |
| 24 | Valley Road North | 34 | 54 | +20 | Significant adverse impact |
| 25 | Valley Road South | 34 | 51 | +17 | Significant adverse impact |

## 7.3 Context

In addition to the initial estimate of noise impact, which is simply based on the excess of the rating level over the background sound level, BS 4142 [1] requires the consideration of context, including the following factors:

- the absolute level of the sound;
- the character and level of the residual sound compared to the character and level of the specific sound; and
- the sensitivity of the receptor and whether they will already incorporate design measures that secure good internal and / or outdoor acoustic conditions.

### 7.3.1 Absolute level of the sound

The operation of the generators is to provide power for the construction activities on the MDS throughout the 2025 / 2026 period, until mains power is installed on site. As such, the noise emissions due to construction work were considered at the ES [3] stage, and submitted as part of the DCO application. The following hierarchy of controls must be applied to the construction works, secured by Requirement 2 of the DCO:

- Code of Construction Practice (CoCP) [9], which is the overarching mechanism for providing a clear and consistent approach to the control of SZC construction activities on the MDS, and the associated development (AD) sites, to minimise impacts on people and the environment;
- Noise Monitoring and Management Plans (NMMPs), which sit under the CoCP [9] and provide site-specific controls for each work site, i.e. separate NMMPs must be submitted to and approved by East Suffolk Council (ESC) for each separate work site (one for the MDS [10],

and one for each AD site). The NMMPs provide site-specific mitigation and monitoring requirements and restate the noise and vibration thresholds that SZC must use best practicable means to comply with. The NMMPs also provide for the Bespoke Mitigation Plan (BMP) process.

- BMPs sit under the NMMPs and provide activity specific controls and mitigations where controls and mitigations where construction activities are expected to exceed the noise and/or vibration thresholds stated in the NMMPs.

The CoCP [9] and MDS NMMP [10] (approved by ESC on 21st March 2024) set out the noise thresholds for construction works, replicated in **Table 7.2**.

**Table 7.2 Noise thresholds for construction works**

| Period | Threshold | Parameter |
|---|---|---|
| Any day 07:00 to 23:00 | 60 | $L_{Aeq,16\ hours}$, dB, free field |
| Night 23:00 to 07:00 | 45 | $L_{Aeq,8\ hours}$, dB, free field |
| Night 23:00 to 07:00 | 65 | $L_{Amax,}$ dB, façade |

Where it is anticipated that, despite the use of best practicable means (as defined by Section 72 of the Control of Pollution Act 1974 (CoPA) [11]), the construction works will exceed the free-field noise levels set out in the below paragraph, a BMP must be submitted to ESC for approval.

The free-field noise levels that, when exceeded, would trigger the need for a BMP at the MDS are:

- 55dB $L_{Aeq,16hrs}$ (daytime between 07:00 and 23:00);
- 50dB $L_{Aeq,4hrs}$ (evening between 19:00 and 23:00)[6]; or
- 45dB $L_{Aeq,8hrs}$ (night-time between 23:00 and 07:00).

In the context of the requirements set out by the DCO, and the absolute levels reported in **Table 7.1**, the predicted sound levels at the majority of the NSRs are at least 10dB below the threshold for construction works. It is therefore reasonable to assume that the levels at receptors that would not trigger the need for a BMP could be considered to have a low impact, given the context of the DCO requirements based on absolute noise levels.

The following receptors would trigger the need for a BMP based solely on generator use during the evening period:

- R3 – Abbey Road, Leiston
- R14 – Lover's Lane / Sandy Lane Junction
- R15 – Old Abbey Farm / Care Home
- R24 – Valley Road North
- R25 – Valley Road South

[6] The overlap between the 16-hour daytime period and the 4-hour evening period is immaterial in the context of noise assessments carried out in advance of the works to determine the need for a BMP. The calculations will consider both periods, and predicted exceedance of either period (or the other stated levels) will trigger the need for a BMP.

In these instances, a BMP will be required in respect of the generator noise alone, prior to the consideration of other construction plant, and specific mitigation will be required to reduce generator noise levels to a practicable minimum and will be subject to the approval of ESC. Through the application of the project construction controls in this manner, the generator noise levels are highly likely to be lower than the values set out in **Table 7.1**, however, the nature of the mitigation and the exact reduction likely to be achieved cannot be determined at this stage.

### 7.3.2 Character and level of the residual sound compared to the character and level of the specific sound

#### DCO construction noise data

Whilst the initial estimate assessment presented in **Section 7.2** uses existing background levels (i.e. as a greenfield site, with no construction works), the generators are proposed to be used as part of the construction works being undertaken in 2025 / 2026.

Calculations of likely construction noise levels were undertaken as part of the DCO submissions, contained within the ES [3], with additional background detail in Appendix 11B. The calculations were undertaken for five phases of work on the Temporary Construction Area (TCA) / Main Construction Area (MCA), with the ACA assessed separately due to slightly different phasing and being geographically distinct. Where appropriate, the cumulative effect of noise from the TCA / MCA and ACA was assessed.

The period covered by the permit for the generators coincides with Phase 1 and the start of Phase 2 of the Project. **Table 7.3** and **Table 7.4** show the predicted construction noise levels for the daytime TCA / MCA activities and ACA activities, taken from Table 11.19 and Table 11.21 of the ES [3] respectively.

**Table 7.3 Predicted construction noise levels, daytime period where TCA / MCA dominate (in isolation or in combination with ACA), free field $L_{Aeq,16hrs}$ dB**

| NSR No. | NSR Name | Phase 1a | Phase 1b/2 |
|---|---|---|---|
| 1 | Abbey Cottage | 70 | 58 |
| 2 | Abbey Farm | 62 | 48 |
| 3 | Abbey Road, Leiston | 67 | 50 |
| 6 | Common Cottages | 53 | 54 |
| 8 | Eastbridge | 54 | 46 |
| 11 | Keepers Cottage | 70 | 54 |
| 13 | Leiston Abbey | 60 | 53 |
| 14 | Lover's Lane / Sandy Lane Junction | 70 | 54 |
| 15 | Old Abbey Farm / Care Home | 70 | 64 |
| 16 | Plantation Cottages | 64 | 48 |
| 17 | Potter's Farm | 61 | 54 |
| 18 | Potter's Street | 58 | 50 |

| NSR No. | NSR Name | Phase 1a | Phase 1b/2 |
|---|---|---|---|
| 19 | Rosery Cottages | 50 | 48 |
| 20 | Roundhouse | 69 | 60 |
| 22 | Sizewell Village | 46 | 44 |
| 23 | The Studio | 66 | 53 |

**Table 7.4 Predicted construction noise levels, daytime period where ACA dominates, free field $L_{Aeq,16hrs}$ dB**

| NSR No. | NSR Name | Initial site strip / level | Preparation | Early Years Operations |
|---|---|---|---|---|
| 5 | Barley Rise | 60 | 47 | 42 |
| 7 | Crown Lodge | 65 | 51 | 50 |
| 9 | Grimsey's Lane | 53 | 46 | 42 |
| 10 | Heath View | 62 | 56 | 50 |
| 12 | King George's Avenue | 67 | 61 | 53 |
| 21 | Sizewell Sports & Social Club | 63 | 56 | 51 |
| 24 | Valley Road North | 62 | 51 | 42 |
| 25 | Valley Road South | 60 | 51 | 43 |

A number of the modelled activities included noise contributions from generators that were expected to be associated with the works; the activities where generators were expected were listed in Appendix 11B of the ES [3].

During recent discussions with the EA, it is understood that if it were possible to demonstrate that the proposed generators were not materially contributing to the overall construction noise levels at a receptor, for example by showing that generator noise is at least 10dB below the total level of noise from the rest of the works, notwithstanding that there is nothing in the DCO that requires the generators to be a non-material source, then the EA may accept that the generators do not require any further detailed assessment.

To achieve this, it is necessary to remove the generators included in the calculated ES [3] construction noise levels, so that their noise level can be compared against noise from the non-generator construction noise.

Due to the size of the site, the complexity of the construction phase and the extended duration of the works, the construction noise calculations in the ES [3] considered specific activities, which were made up of groups of individual plant items. Also, the exact locations for the plant were not known in detail or were understood to be so variable so as to make any assumption about a specific plant location redundant or unrepresentative, the groups of plant items were therefore replicated in the model to represent every possible location. As a result, it is not possible to reliably remove the contribution from generators from the original ES [3] calculations.

However, the nature of that assumption, i.e. every plant item appeared at every possible source location means that the calculated levels at the receptors are dependent on the plant assumed to make up the whole activity, and not the specific location of one of the plant items that formed part of the activity. It is therefore possible to infer from their contribution to the overall source level for a particular activity, whether the generators would have been a material contributor to the overall construction noise levels at the receptors, as shown in **Table 7.3** or **Table 7.4**.

The sound power levels for each group of plant for each activity, as summarised in Appendix 11B of the ES [3], have been analysed to determine whether the contribution from the generators were within 10dB of the rest of the plant. The outcomes are shown in **Table 7.5**. Only the grouped activities where generators were included are shown.

**Table 7.5 Generator sound levels in ES calculations, $L_{WA}$ dB**

| Works Reference | Activity | $L_{WA}$ dB | | | Generator difference |
|---|---|---|---|---|---|
| | | With generators | Without generators | Generator | |
| P1_01C | Water Management Zone | 108.7 | 108.6 | 93.4 | -15.2 |
| P1_02A | Borrow Pit - excavation | 109.5 | 109.0 | 99.4 | -9.6 |
| P1_04B | Piling | 114.1 | 113.5 | 105.1 | -8.4 |
| P1_05C | Culvert & Embankment construction | 117.8 | 117.7 | 99.4 | -18.3 |
| P1_06A | Haul Road Construction | 120.0 | 119.9 | 102.4 | -17.5 |
| P1_07A | Main Site Office | 114.2 | 114.0 | 101.2 | -12.8 |
| P1_07B | Entrance Plaza | 120.2 | 120.1 | 102.4 | -17.7 |
| P1_08B | Concrete Batching Plant construction | 112.2 | 111.7 | 102.3 | -9.4 |
| P1_10A | Sea Defences - Remove existing | 115.3 | 115.2 | 99.4 | -15.8 |
| P1_10Ci | Sea Defences - Ground Improvement | 113.3 | 113.1 | 99.4 | -13.7 |
| P1_10Cii | Sea Defences - Peat Treatment under | 113.6 | 113.2 | 102.9 | -10.3 |
| P1_10D | Sea Defences - Construction | 117.6 | 117.5 | 99.4 | -18.1 |
| P1_11A | Cut off Wall - Platform | 117.6 | 117.5 | 99.4 | -18.1 |
| P1_11B | Cut off Wall - Construction | 115.2 | 114.2 | 108.4 | -5.8 |
| P1_12B | Marine infrastructure- Superstructure | 110.8 | 109.6 | 104.8 | -4.8 |
| P1_25 | Desalination plant operation - Phase 1 | 105.9 | 105.7 | 92.5 | -13.2 |
| P2_02A | Borrow Pit - excavation | 108.8 | 108.3 | 99.4 | -8.9 |

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| Works Reference | Activity | $L_{WA}$ dB | | | Generator difference |
|---|---|---|---|---|---|
| | | With generators | Without generators | Generator | |
| P2_06B | Main Access Road | 120.9 | 120.8 | 102.4 | -18.4 |
| P2_07C | Main Site Office - Superstructure | 113.5 | 113.0 | 103.8 | -9.2 |
| P2_12B | Marine infrastructure - Superstructure | 110.4 | 109.8 | 101.5 | -8.3 |
| P2_13A | Contractor's Compounds - Hardstanding | 120.1 | 120.0 | 102.4 | -17.6 |
| P2_14Ai | Accommodation campus - Groundworks | 113.8 | 113.5 | 102.4 | -11.1 |
| P2_14Bi | Accommodation campus - Car Parks | 119.1 | 119.0 | 102.4 | -16.6 |
| P2_14Ci | Accommodation campus - Buildings | 113.5 | 113.0 | 103.8 | -9.2 |
| P2_15A | Within Cut-off Wall - Excavation | 118.8 | 118.4 | 107.5 | -10.9 |
| P2_25 | Desal operation Phase 1 | 105.9 | 105.7 | 92.5 | -13.2 |
| P2_30 | Main Works Yard | 110.7 | 110.3 | 99.4 | -10.9 |
| P3_30 | Main Works Yard | 113.7 | 113.2 | 104.2 | -9.0 |
| P3_31 | CRF Pipes | 114.8 | 114.3 | 104.9 | -9.4 |
| P3_32 | Galleries | 116.7 | 116.6 | 91.9 | -24.7 |
| P3_33 | CRF Backfill | 111.1 | 110.6 | 101.2 | -9.4 |
| P3_34 | CRF Secondary Backfill | 115.1 | 114.9 | 101.2 | -13.7 |
| P3_35 | 1.0 Base slab & substructure | 114.5 | 114.3 | 101.2 | -13.1 |
| P3_36 | Nuclear Island 1 | 119.6 | 119.5 | 103.4 | -16.1 |
| P3_37 | Nuclear Island 2 | 117.2 | 117.1 | 101.2 | -15.9 |
| P3_38 | Nuclear Island 3 | 116.3 | 116.1 | 101.2 | -14.9 |
| P3_40 | Turbine Hall | 116.5 | 116.4 | 101.2 | -15.2 |
| P3_41 | SWBP Walls | 115.5 | 115.3 | 101.2 | -14.1 |
| P3_42 | Forebay Base | 114.8 | 114.6 | 101.2 | -13.4 |
| P3_45 | Stockpile Main | 116.5 | 116.4 | 99.4 | -17.0 |
| P5_14Ai | Reinstatement Accommodation Campus | 115.6 | 115.5 | 99.4 | -16.1 |

| Works Reference | Activity | $L_{WA}$ dB | | | Generator difference |
|---|---|---|---|---|---|
| | | With generators | Without generators | Generator | |
| P5_14Bi | Reinstatement Accommodation Campus - Car Parks | 118.0 | 117.9 | 99.4 | -18.5 |

The activities where the assessed generators may be considered to have contributed to the overall sound level for that particular activity are Works Ref P1_12B *Marine infrastructure – Superstructure* and P1-11B *Cut off wall construction* where the generator sound levels were 4.8dB and 5.8dB lower than the rest of the plant for that activity, respectively. However, both activities will be located on the eastern side of the TCA, away from any residential receptor, and therefore would not have been the cause of the predicted construction noise levels in the ES [3].

For every other activity, the generators modelled are calculated to be at least 8 to 9dB lower than everything else within that group of plant items, and therefore the generators were not a material contributor to the predicted overall construction sound levels at the receptors set out in the ES [3].

On this basis, the predicted construction noise levels shown in **Table 7.3** and **Table 7.4** can be considered to represent the likely noise levels from the construction works, without any material contribution from the generators.

### Screening of generator noise model results vs DCO predicted construction noise levels

An initial estimate of the noise impact of the proposed generators has been made by comparing the predicted sound levels generated by the proposed generators with the DCO predicted construction noise levels. Where the generators are around 9dB or more below the other construction plant, it is considered that the generators are not contributing to the overall noise level and therefore receptors where this is the case should be screened out of further assessment.

As mentioned above, **Table 7.3** and **Table 7.4** represent the DCO predicted construction noise levels without generators, whilst **Table 6.6** shows the predicted noise levels at receptors due to generator use. These tables are collated below into **Table 7.6**, showing the difference between the two levels.

**Table 7.6 Predicted generator $L_{Aeq,T}$ levels vs DCO predicted construction $L_{Aeq,T}$ levels**

| NSR No. | NSR name | Predicted generator $L_{Aeq,T}$ dB | Lowest DCO predicted construction $L_{Aeq,T}$ dB | Difference (predicted generator – lowest DCO) dB |
|---|---|---|---|---|
| 1 | Abbey Cottages | 45 | 58 | -13 |
| 2 | Abbey Farm | 38 | 48 | -10 |
| 3 | Abbey Road, Leiston | 54 | 50 | +4 |
| 5 | Barley Rise | 45 | 42 | +3 |
| 6 | Common Cottages | 46 | 53 | -7 |
| 7 | Crown Lodge | 49 | 50 | -1 |
| 8 | Eastbridge | 34 | 46 | -12 |
| 9 | Grimsey's Lane | 42 | 42 | 0 |
| 10 | Heath View | 43 | 50 | -7 |

| NSR No. | NSR name | Predicted generator $L_{Aeq,T}$ dB | Lowest DCO predicted construction $L_{Aeq,T}$ dB | Difference (predicted generator – lowest DCO) dB |
|---|---|---|---|---|
| 11 | Keepers Cottage | 43 | 54 | -11 |
| 12 | King George's Avenue | 48 | 53 | -5 |
| 13 | Leiston Abbey | 43 | 53 | -10 |
| 14 | Lover's Lane / Sandy Lane Junction | 54 | 54 | 0 |
| 15 | Old Abbey Farm / Care Home | 51 | 64 | -13 |
| 16 | Plantation Cottages | 38 | 48 | -10 |
| 17 | Potter's Farm | 38 | 54 | -16 |
| 18 | Potter's Street | 38 | 50 | -12 |
| 19 | Rosery Cottages | 39 | 48 | -9 |
| 20 | Roundhouse | 43 | 60 | -17 |
| 21 | Sizewell Sports & Social Club | 50 | 51 | -1 |
| 22 | Sizewell Village | 37 | 44 | -7 |
| 23 | The Studio | 49 | 53 | -4 |
| 24 | Valley Road North | 54 | 42 | +12 |
| 25 | Valley Road South | 51 | 43 | +8 |

Based on the above, the generators do not materially contribute to the overall lowest predicted DCO construction $L_{Aeq,T}$ at the following receptors:

- R1 – Abbey Cottages
- R2 – Abbey Farm
- R8 – Eastbridge
- R11 – Keepers Cottage
- R13 – Leiston Abbey
- R15 – Old Abbey Farm / Care Home
- R16 – Plantation Cottages
- R17 – Potter's Farm
- R18 – Potter's Street
- R19 – Rosery Cottages
- R20 – Roundhouse

These receptors should therefore be screened out of any further assessment, and the impacts on these properties disregarded in the context of BS 4142 [1]. It should also be noted that it is likely that the other construction plant is likely to have more prominent characteristics compared to generators. As described in **Section 7.1**, the generators are not expected to have a tonal element, but instead be a continuous, consistent broadband sound while other construction plant is likely to include tonal or intermittent elements such as alarms, or impulsive characteristics such as hammers, and therefore more likely to be noticeable.

### 7.3.3 The sensitivity of the receptor and incorporated design measures

#### Sensitivity of receptors

All receptors listed within **Table 5.1** are residential receptors and should all be classed as the same sensitivity.

However, it is understood that Roundhouse (R20) will become vacant in the coming months (during the determination period of this permit application).

Receptor R20 should therefore be screened out of further assessment, and the impacts on these properties disregarded in the context of BS 4142 [1].

#### Incorporated design measures

The noise model described in **Section 4.2** and **Section 6** incorporates all eight noise barriers described within the ES [3], shown in Figure 11.4, of the DCO application, as follows:

- Barrier #1 – 5m above ground;
- Barrier #2 – 3m above ground;
- Barrier #3 – 3m above ground;
- Barrier #4 – 5m high acoustic fence;
- Barrier #5 – 3m above ground;
- Barrier #6 – 3m high earth bund;
- Barrier #7 – 3m high earth bund with a 2m high acoustic fence on top of the ridge (5m total height); and
- Barrier #8 – 5m above ground.

The incorporated design measures have therefore already been included in the initial estimate of impact.

## 7.4 Uncertainty

As described in **Section 4.2** and **Section 6**, a noise model has been created to simulate and assess the predicted sound levels of the operational generators at the nearby NSRs.

Uncertainty is inevitable at this stage, however, the model has been created based on a realistic worst-case scenario by modelling downwind at all receptors, using area sources to model mobile generators, assuming 100% on time where this is not known, and using the loudest generator listed within Appendix C of BS 5228 [8] for the different generator uses in the absence of manufacturer noise specification data. It is likely that on site levels will be lower at the NSRs than those displayed in this report.

## 7.5 Summary

### 7.5.1 Establishing rating level

After considering tonality, impulsivity, intermittency, and other characteristics of the specific source, it is not considered appropriate to apply any penalties to the specific source, due to the consistent broadband nature of the source. Therefore, the rating level equals the specific level ($L_{Ar,Tr} = L_s$).

### 7.5.2 Initial estimate of noise impact

The initial estimate of noise impact showed that out of 24no. NSRs, 5no. NSRs are likely to experience adverse effects and 8no. NSRs are likely to experience significant adverse effects based on the operation of the proposed generators in accordance with BS 4142 [1], before considering context.

### 7.5.3 Context – absolute level of the sound

When considering the context in terms of absolute level of the sound and the DCO requirement to work in accordance with the CoCP [9] and produce NMMPs and BMPs where necessary, it is assumed that receptors that would not trigger the need for a BMP can be screened out of further assessment. This would mean receptors R1, R2, R5, R6, R7, R8, R9, R10, R11, R12, R13, R16, R17, R18, R19, R20, R21, R22 and R23 would not require further assessment.

For those receptors where the current predictions suggest that the generator noise levels would trigger the need for a BMP, specific mitigation will be required to reduce generator noise levels to a practicable minimum, as part of the project's construction controls, secured under Requirement 2 of the DCO.

### 7.5.4 Context – character and level of the residual sound compared to the character and level of the specific sound

When considering the character and level of the residual sound compared to the character and level of the specific sound, it is noted that the generators will not be in use on a greenfield site, but instead will be used during the construction on the MDS. To be able to consider this properly, an investigation into the DCO construction predictions has been conducted. This investigation found that whilst some generators had been included in the DCO modelling, these generators were not contributing materially to the overall predicted construction noise levels.

This then allowed a comparison to the predicted generator levels in **Section 6.2** to the DCO predicted construction levels to determine whether the updated generator modelling would mean that generators contribute to the overall DCO predicted construction level at receptors during 2025 / 2026. As the proposed generator period covered a few phases, the lowest DCO predicted construction level has been compared to the generator level. Where the generator level is 9dB or more below the DCO predicted construction level, it is unlikely that the generators have a material influence on the overall construction noise level and receptors where this is the case can be screened out of further assessment.

This would mean receptors R1, R2, R8, R11, R13, R15, R16, R17, R18, R19 and R20 would not require further assessment.

It should also be noted that the residual sound is likely to have more prominent characteristics than the specific sound and therefore the impact may not be as great as that stated in the initial estimate of noise impact.

### 7.5.5 Context – sensitivity of receptors and incorporated design measures

All NSRs considered in the assessment are residential receptors and therefore should all be classed as the same sensitivity. However, it is understood that R20 will become vacant in the coming months (during the determination period of this application). Receptor R20 should therefore be screened out of further assessment.

The noise model described in **Section 4.2** and **Section 6** already incorporates all eight noise barriers described within the ES [3] of the DCO application, and therefore the incorporated design measures have already been included within the initial estimate of impact.

### 7.5.6 Uncertainty

The model has been created based on a realistic worst-case scenario, by:

- modelling downwind at all receptors;
- using area sources for mobile generators;
- considering percentage on times; and
- using conservative values for the sound power levels.

It is likely that the on-site levels will be lower at NSRs than those displayed in this report.

### 7.5.7 Estimate of noise impact

21no. NSRs have been screened out of further assessment, as explained in **Section 7.5.3** to **Section 7.5.5**. Four NSRs have not been screened out from assessment after considering context, a summary of the findings for these receptors can be seen in **Table 7.7**.

**Table 7.7 Summary of findings for scoped in receptors**

| NSR No. | NSR name | Rating level $L_{Ar,Tr}$ dB | Background level $L_{A90,T}$ dB | Lowest DCO predicted construction level $L_{Aeq,T}$ dB | Initial estimate of impact |
|---|---|---|---|---|---|
| 3 | Abbey Road, Leiston | 54 | 40 | 50 | Significant adverse impact |
| 14 | Lover's Lane / Sandy Lane Junction | 54 | 42 | 54 | Significant adverse impact |
| 24 | Valley Road North | 54 | 34 | 42 | Significant adverse impact |
| 25 | Valley Road South | 51 | 34 | 43 | Significant adverse impact |

Whilst representative background sound levels are not available for the construction period, it is likely that, at the time of construction, the predicted sound levels from the proposed generators will have a low impact at R3 and R14, due to the similarity in the absolute sound levels when compared with the predicted construction noise levels. The background noise level during the construction phase is likely to rise from the baseline background level, and whilst the generators will contribute to the overall predicted construction level, it is likely that the proposed generators would result in a lower impact than that currently predicted when assessed in isolation and in accordance with BS 4142 [1], particularly when considering context.

The results of the noise modelling described in **Section 6** show that all receptors listed in **Table 7.7** are predicted to be dominated by the mobile generators in the ACA area, with all other modelled generators contributing a value more than 10dB below this dominant source. As the mobile generator locations are determined, it is likely that the noise modelling can be refined and the rating level $L_{Ar,Tr}$ reduced, reducing the impact to these receptors.

All proposed activities will follow the hierarchy dictated by Requirement 2 of the DCO, as described in **Section 7.3.1**. As more details become available, all activities will go through a screening process to determine whether a BMP is required, and, where one is required, specific mitigation must be put forward for approval by ESC. Requirement 2 and the use of BMPs is to ensure the impact on nearby human NSRs is as low as practicably possible.

# 8 CONCLUSIONS

A noise impact assessment has been completed to respond to a request for information from the EA following the submission of a permit application for an installation activity environmental permit, EPR Schedule 1, Section 1.1A(1)(a): Burning of any fuel in an appliance with a rated thermal input of 50 MW or more for the installation of diesel generators within the MDS on 12th April 2024.

This assessment has considered the existing background levels measured during a recent round of baseline noise monitoring, and in the context of the operation of the generators during the MDS construction, the DCO predicted construction levels. It has conducted an initial estimate of impact in accordance with BS 4142 [1], showing that out of 24no. NSRs, 5no. NSRs are likely to experience adverse effects and 8no. NSRs are likely to experience significant adverse effects based on the operation of the proposed generators, before considering context.

When considering the context of the absolute level of the sound, it was found that the predicted resultant level at 18no. of the NSRs would not trigger the need for a BMP, and therefore should be screened out of further assessment.

When considering the context of the character and level of the residual sound to the character and level of the specific sound, an investigation has been conducted into the DCO predicted construction noise levels and the impact of the proposed generators on these levels. It was determined that the generators assessed at DCO did not influence the predicted construction levels at receptors, and therefore a comparison of the predicted sound levels likely to be generated by the proposed generators and the DCO construction levels has been conducted. This has found that the predicted construction levels at 11no. NSRs will not be influenced by generators and should be screened out of further assessment. It should also be noted that the character of the residual noise is expected to be more prominent than the character of the specific sound due to its continuous broadband nature, as the residual noise will consist of other construction plant, and therefore the impact is likely to be lower than is set out in this report.

When considering the context of the sensitivity of receptors and incorporated design measures, one NSR will become unoccupied in the coming months and should be discounted from further assessment. The noise model already considered the eight barriers included in the ES [3], and therefore incorporated design measures had already been considered.

The noise model presents a realistic worst-case scenario for the operation of generators, and of the 4no. NSRs not screened out of further assessment, the modelling results show that the predictions are dominated by noise from the mobile generators within the ACA or TCA Rail areas, where exact locations are not yet known, nor are the percentage on times. It is likely that as more details become available, the model can be refined and the rating level $L_{Ar,Tr}$ can be reduced at these receptors.

When considering the context of the site and proposals, it is considered that the proposed generators would result in a lower impact than that currently predicted when assessed in isolation and in accordance with BS 4142 [1]. In addition, the site must comply with Requirement 2 of the DCO, complying with the CoCP [9] and producing NMMPs and BMPs where required. The NMMPs and BMPs both require sign off from ESC, with the aim to ensure that the impact on nearby human NSRs is as low as practicably possible.