7 NOISE

7.1 INTRODUCTION

7.1.1 This chapter assesses the likely significant effects of the Proposed Development with respect to noise. In particular, it considers the potential construction and operational noise impacts upon the occupants of surrounding noise-sensitive receptors, which surround the Application Site.

7.1.2 The chapter describes the methods used to assess the effects and determines the baseline conditions currently existing at the Application Site. The potentially affected noise sensitive receptors surrounding the Application Site are identified, together with the potential effects arising from the Proposed Development. Mitigation measures are identified, where required, to prevent, reduce or offset the effects and the residual effects are also described.

7.1.3 This assessment comprises the following elements:

- identification of sensitive receptors;
- establishment of baseline conditions;
- establishment of criteria to be adopted for the operation;
- outline assessment of noise generated during the construction phase;
- assessment of noise levels in the operational phase of the Proposed Development (with reference to the NPPF, BS 4142, BS 8233 and World Health Organisation guidelines); and
- where appropriate, proposals for mitigation.

7.1.4 This approach is standard practice for conducting an assessment of noise relating to this type of development.

7.2 ASSESSMENT APPROACH

Methodology and Assessment of Significance

7.2.1 A description of the noise units referred to is provided in **Appendix 7.1**.

Principal Standards and Guidance

Construction

7.2.2 BS 5228 Parts 1 and 2 [Ref 7.1, 7.2] provides guidance for assessing noise and vibration during the construction of the development. The standard describes procedures for estimating noise levels from construction activities and vibration attributable to piling activities. It also provides guidance on minimising potential impacts through the use of mitigation and the adoption of Best Practicable Means (BPM) or Best Available Techniques Not Entailing Excessive Cost (BATNEEC).

7.2.3 BPM or BATNEEC both seek to ensure that the contractors adopt best practice measures to reduce noise and vibration from site activities. The use of BPM to control emissions constitutes a ground of defence against charges that a nuisance is being caused under Part III of the Environmental Protection Act.

7.2.4 Whilst BS 5228 does not provide specific guidance with regards acceptable noise levels associated with construction activities, it provides guidance on limits

adopted for a number of previous schemes, which were considered to provide satisfactory levels of noise for construction projects.

7.2.5 Based on this guidance, it is often appropriate to set noise Action Levels to provide an indication of the noise levels that can be generated from construction activities, which should minimise the potential for complaints. A level of 10 dB(A) above the existing ambient (L_{Aeq}) noise level is often specified, subject to a minimum level of 65 dB $L_{Aeq,T}$ for rural areas for daytime works. By adopting noise limits of this order of magnitude, contractors are generally seen to be adopting best practice to reducing construction noise levels to an acceptable standard.

7.2.6 With regards acceptable levels of vibration, BS 5228 advises that at a Peak Particle Velocity (PPV) level of 0.3 mm/s vibration might just be perceptible within residential environments, with levels of 1.0 mm/s having the potential to cause complaint but can be tolerated if prior warning is given to residents. At levels of 10 mm/s, the activity would be intolerable for any more than a brief exposure.

7.2.7 BS 7385 [7.3] defines criteria for two different types of building structure, brick-built residential and more heavily-built industrial. The standard advises that there is a minimal risk of cosmetic damage (i.e. the formation of hairline cracks on drywalls, plaster or in mortar joints) at the specific guidance levels.

7.2.8 For residential buildings the limit for cosmetic damage varies with frequency and a conservative level of 12.5 mm/s PPV, as defined in BS 7385, has been adopted.

Operation of the Completed Development

British Standard BS 4142

7.2.9 BS 4142 [Ref 7.4] is the British Standard for rating and assessing noise of a commercial or industrial nature and is relevant to the noise associated with the operation of the proposed plant and equipment.

7.2.10 BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative / typical background noise level from existing uses.

7.2.11 BS 4142 relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level.

7.2.12 The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15 minute duration.

7.2.13 The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. The extent of the correction is dependent upon the degree of tonality or character in the noise and is determined either by professional judgement, where the plant is not operational at present, or by measurement.

7.2.14 Where the noise is tonal in nature, the standard imposes the following penalties when assessing the rating level:

- 2 dB for a tone which is just perceptible;
- 4 dB where the tone is clearly perceptible; and

- 6 dB where the tone is highly perceptible.

7.2.15 Where noise exhibits other sound characteristics, the Standard advises a penalty of 3 dB should be applied.

7.2.16 During the daytime, the specified noise levels are determined over a reference time interval of 1 hour, with a 15 minute reference period adopted when assessing night-time noise.

7.2.17 If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

7.2.18 The assessment method outlined above is intended for the assessment of external noise levels and is not intended to assess the extent of impact at internal locations.

7.2.19 Where the initial assessment of impact, based upon and assessment of the external noise levels, needs to be modified due to the context, all pertinent factors should be taken into account, including:

- The absolute level of sound;
- Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night; and
- The sensitivity of the receptor and whether the premises will already incorporate measures to ensure good internal and/or external acoustic conditions.

7.2.20 The current revision of BS 4142 does not define low background or rating levels. The previous 1997 revision of the Standard described very low background sounds as being less than 30 dB L_{A90} and low rating levels as being less than 35 dB $L_{Aeq,T}$. The Association of Noise Consultants have prepared a technical note to accompany the current revision of BS 4142 [Ref 7.5]. The document advises that it would not be unreasonable to adopt similar lower limits when assessing noise levels against the current revision of the Standard.

British Standard BS 8233

7.2.21 British Standard BS 8233 [Ref 7.6] principally provides design guidance for new buildings. For residential premises, the guidance advises for steady external noise sources, levels of noise internally not exceeding 30 dB $L_{Aeq,\ 8\ hour}$ within bedrooms at night are desirable, with a level of 35 dB $L_{Aeq,\ 16\ hour}$ representing a desirable standard of noise within living rooms and bedrooms for resting purposes during daytime periods.

7.2.22 Externally within gardens and amenity spaces, the guidance recommends a general limit of 50 dB $L_{Aeq,\ T}$.

World Health Organisation Guidelines

7.2.23 The World Health Organisation guidance [Ref 7.7] provides additional guidance upon potential effects in relation to noise.

7.2.24 The guidance advises few people are moderately annoyed by noise levels of below 50 dB L_{Aeq} during the daytime, with noise levels within bedrooms overnight should not exceed 30 dB L_{Aeq}, with individual noise events not regularly exceeding 45 dB L_{Amax}.

7.2.25 Assuming an open window provides a reduction in noise levels of between 10 – 15 dB(A), during the night-time the WHO guidance indicates that external noise levels should remain below 40 – 45 dB L_{Aeq} to maintain the restorative processes of sleep.

7.2.26 The WHO produced additional noise guidance in relation specifically to night-time noise in 2009 [Ref 7.8], which is generally considered to be the most noise sensitive period. This report provides a description of the no observed adverse effect level (which is equivalent to a No Observed Effects Level, NOEL) and advises for night-time noise (which is considered to be the most sensitive period of the day) that this concept is less useful, as the adversity of effects are less clear. Instead, it advises the use of the observed effects thresholds, above which an effect starts to occur or shows itself to be dependent upon the exposure level.

7.2.27 The guidance is presented in terms of external and internal recommendations to minimise any potential adverse effects. Externally, the guidance advises that an average night-time noise level L_{night} (the $L_{Aeq, 8\ hour}$) of 40 dB is equivalent to the Lowest Observed Adverse Effect Level (LOAEL) and advises this guideline value is recommended for the protection of public health from night-noise. However, below this level there was no change in the small number of awakenings identified and hence a reason for considering that the NOEL was not an appropriate descriptor in noise terms for identifying adverse effects and hence recommend the use of the observed effects threshold as an appropriate descriptor to identify the potential for the onset of adverse effects.

7.2.28 The guidance, however, advises that an external night-time noise level of 30 $L_{Aeq, 8\ hour}$ would be equivalent to the NOEL, as their research indicated that there were no detectable effects on sleep observed below this level.

7.2.29 The potential for Significant Observed Adverse Effects (SOAEL) were identified to occur at levels considerably above 40 dB $L_{Aeq, 8\ hour}$.

Policy Framework

National Planning Policy Framework

7.2.30 The National Planning Policy Framework (NPPF) provides the principal planning guidance and in relation to noise, advises that planning policies and decisions should aim to:

- Ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health and living conditions;
- Avoid noise from giving rise to significant adverse impacts on health and quality of life from new development;
- Mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development;
- Ensure that new development can be effectively integrated with existing businesses and community facilities.

7.2.31 The accompanying planning policy guidance to the NPPF, published in July 2019, provides a description of a significant observed adverse effect, as follows:

> **"The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities**

during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area."

7.3 BASELINE CONDITIONS

7.3.1 The proposed development is located directly to south of the A52, with noise levels in the surrounding area principally influenced by traffic travelling along the road. The A52 is a major cross country route, carrying around 18,000 vehicles per day.

7.3.2 There are a number of residential properties surrounding the Proposed Development, principally to the north in Easthorpe and to the east in Muston.

7.3.3 The majority of the properties are located some distance from the noise generating equipment within the solar farm, which has been positioned to maximise separation distances. The closest properties identified are within Muston to the east and along Castle View Road to the west. The location of the properties identified to be potentially affected by the construction and operation are indicated on **Figure 7.1**.

7.3.4 Noise levels at the properties located away from the main A52 are likely to be low, with background noise levels anticipated to be of the order of 35 dB L_{A90} during the daytime period and 30 dB L_{A90} during the early morning / evening periods, when the solar farm would be operational.

7.3.5 Section 11 of BS 4142 provides useful information in relation to areas where background noise levels are low. In these areas, the Standard advises that an assessment of the absolute levels of noise might be as, or more, relevant than the margin by which the rating level exceeds the background, which is especially true at night.

7.3.6 Taking this guidance into account and given the rural location, it has been considered appropriate to assess the noise level attributable to the operation of the plant against other appropriate absolute noise standards, principally WHO guidelines, as described in Section 7.22, to determine the potential adverse impacts associated with the operation of the solar farm. Adopting this approach will ensure that the operation of the solar farm would not result in any adverse noise impacts and achieve a standard below that which would represent the Lowest Observed Effects Level [LOAEL] during the most sensitive early morning and evening periods

7.4 ASSESSMENT OF LIKELY SIGNIFICANT EFFECTS

Construction

7.4.1 The construction of the solar farm would take between 6 – 9 months to complete.

7.4.2 Minimal plant will be required for the construction. With regards the installation of the solar panels, the main plant would include an excavator to level ground, as required, and a small arm mounted piling rig (typically attached to an excavator) which would be used to install the foundations for the panels. Installation of the panels would require the use of small HIAB forklifts and battery tools.

7.4.3 There would be a number of deliveries made to the site, which would include deliveries of solar panels, equipment and concrete to form the foundation slabs for the substation, battery stations and inverters.

7.4.4 The highest noise levels would be associated with the piling operations. Whilst the final piling requirements are still to be determined, a small vibratory rig, would provide worst case conditions, and would typically generate noise levels of up to 85 dB L_{Aeq} at a distance of 10 metres. The type of rig used for the installation would also generate low levels of vibration, with no vibration impacts anticipated at the surrounding properties. Given the nature of the piling, the rig would only be operational in one area for a period of up to a few days.

7.4.5 Typical operations carried out on the site would generate a considerably lower level of noise, typically between 70 – 75 dB $L_{Aeq,T}$ at a distance of 10 metres.

7.4.6 The closest properties to the solar panels (properties within Muston and along Castle View Road to the west) would be at least 150 metres from the plant whilst it was operating at the closest point. On this basis, noise levels attributable to the piling operations could potentially be of the order of 50 dB $L_{Aeq,T}$ and thus unlikely to result in any adverse noise impacts.

7.4.7 Appropriate control measures would be adopted whilst plant is operating close to the properties, to ensure any potential adverse impacts are minimised, based upon achieving Best Practicable Means and the requirements of BS 5228.

7.4.8 Noise levels during the remainder of the construction operations at these properties and other surrounding properties would be considerably lower, with noise levels not anticipated to exceed 50 dB $L_{Aeq,T}$. Construction noise levels of this order of magnitude would not result in adverse noise impacts.

Operation

Proposed Plant and Equipment

7.4.9 The solar panels would be connected to a number of centralised inverters, located around the site, at positions where appropriate connections could be made to the solar arrays. The equipment would be located at positions maximising separation from neighbouring properties, whilst allowing appropriate connections to be made. The inverters would be connected to a substation, located within the southern area of the site.

7.4.10 The central inverters connected to the solar panels would only operate during hours of daylight.

7.4.11 The locations of the inverters and substation are indicated on **Figure 1.4**.

7.4.12 Source term noise levels for the proposed plant have been obtained from manufacturers specifications and are provided in **Table 7.1** below.

Table 7.1 Source Term Noise Levels

Plant	Sound Pressure Level [dB(A)]	Sound Power Level SWL [dB(A)]	Octave Band Sound Power Level SWL [dB]							
			63	125	250	500	1k	2k	4k	8k
Central Inverter	64.3	97	80	86	93	86	83	86	93	90

	@10m									
Substation Transformer	-	83	81	77	96	89	80	55	52	47

7.5 CALCULATION OF NOISE LEVELS

7.5.1 As indicated above, the main noise generating element of the proposed development would be attributable to the operation of the solar inverters.

7.5.2 Calculations have been made using SoundPlan, which implements the calculation methodology from ISO 9613-2. The calculations have taken account of the land formation around the site based upon Lidar mapping.

7.5.3 Calculations have been prepared on the basis of all plant fully operational, which represents the likely worst case conditions during the peak daytime periods. This approach will provide an overestimate of the noise levels during the early morning and evening periods whilst the solar inverters would be operating at a lower power.

7.5.4 The operation of the cooling fans within the solar inverters are temperature controlled. During the early morning periods, when temperatures are lower and solar energy low, it is far less likely that the fans would need to operate and if so, they would only operate at low speed, thus generating lower levels of noise. The fans would be most likely to operate at full speed during the mid part of the day when the sun is at its highest level and thus generating the maximum energy (note that the specifications provided are based upon external temperatures of 30^{0}C, when the fans would operate at full speed to provide worst case conditions). During the evening periods, the output from the solar panels would reduce as the sun sets and thus the requirement for the cooling fans to operate would gradually reduce later into the evening. As indicated previously, the inverters would not operate overnight during hours of darkness.

7.5.5 Noise levels have been calculated on the basis of the site layout indicated on **Figure 1.4**.

7.5.6 **Figure 7.2** presents the calculated peak daytime operational noise levels in graphical format and additionally provides the calculated façade noise levels in numerical form at the properties potentially most likely to be affected by the operation of the site. The calculated noise levels at the potentially most affected properties are additionally summarised in **Table 7.2** below.

Table 7.2 Noise Levels Generated by Operation of Proposed Solar Farm

Location	Distance to Site Boundary / Closest Inverter Station [m]	Calculated Façade Peak Daytime Noise Level at First Floor Level [dB $L_{Aeq.T}$]
Muston	150 / 700	28
Easthorpe	150 / 490	28
Dwelling to West Along Castle View Road	165 / 450	29
Properties to South	420 / 880	21

Assessment Criteria

7.5.7 As indicated previously, background noise levels in the vicinity of the site are likely to be low, particularly during the evening and early morning periods, when traffic volumes on the A52 are lower.

7.5.8 The solar panels and separate central inverters would only be operational during daylight hours, typically between 06:00 – 21:00 hours during summer months, when the days are longest.

7.5.9 To provide a worst case assessment therefore, the noise levels attributable to the peak summer daytime operation have been assessed for daytime and the early morning (night-time) periods.

7.5.10 Given the low assumed background noise levels during the early morning periods, it has been considered appropriate to assess the noise levels attributable to the operation of the site against absolute noise criteria in accordance with the guidance contained in BS 4142. The assessment has been based upon adopting limits which seek to ensure the operation would not result in adverse noise impacts at surrounding properties and thus comply with the requirements of the NPPF.

7.5.11 To provide an initial assessment against background noise levels, noise levels have been assessed against background noise levels during the night-time and early morning period of 30 dB L_{A90}, with daytime levels of the order of 35 dB L_{A90}, for the properties remote from the main road, with background levels at the properties to the north of the Proposed Development, closest to the A52, higher.

7.5.12 However, the main consideration has been given to criteria contained within BS 8233 and within the WHO night noise guidance, which provides guidance on absolute noise levels to ensure potential adverse impacts are minimised.

7.5.13 BS 8233 advises for steady state external noise sources, such as that associated with the operation of the solar farm, it is desirable that the internal ambient noise level does not exceed a level of 35 dB $L_{Aeq,16\ hour}$ during the daytime period within living rooms and bedrooms and 30 dB $L_{Aeq,\ 8\ hour}$ within bedrooms at night. On the basis of an open window typically providing a sound reduction of between 10 – 15 dB(A), equivalent external levels below 45 dB $L_{Aeq,\ 16\ hour}$ daytime and 40 dB $L_{Aeq,\ 8\ hour}$ night-time, would ensure an acceptable noise environment was maintained within the surrounding properties and seek to minimise any potential adverse noise impacts.

7.5.14 Additionally, for steady state noise as associated with the operation of the proposed equipment, the WHO night-noise guidance advises that an external level of 40 dB $L_{Aeq,\ 8\ hour}$ represents the Lowest Observed Adverse Effect Level (LOAEL) overnight, which is equivalent to the BS 8233 guidance for night noise, assuming an open window, with a level of 30 dB $L_{Aeq,8\ hour}$ externally representing a No Observed Effects Level (NOEL).

7.5.15 Given that the plant would potentially operate during the early morning periods before 07:00, it is appropriate to base the assessment upon night-time periods to ensure that the operation did not result in adverse impacts. Meeting these criteria would ensure that the operation during the daytime periods, when background noise levels would be higher, would ensure that the daytime operation did not result in adverse impacts.

Assessment

7.5.16 As indicated previously, noise would only be generated from the operation of the central inverters associated with the solar panels during daylight hours, when the panels are producing electricity.

7.5.17 The highest noise levels, which have been calculated and presented in Table 7.2, would only occur during the mid daytime summer periods whilst the solar panels were operating at full capacity and ambient temperatures were high and an assessment

made on this basis therefore represents worst case conditions for early morning / evening periods.

7.5.18 With the exception of areas very close to the inverter cabins (typically, within 25 metres), where high frequency noise from the operation of the inverters is likely to be clearly audible, the noise generated by the inverters would be principally associated with the operation of the cooling fans, which generates broadband noise. At the large distances between the inverters and neighbouring properties, any high frequency components of the noise would be effectively mitigated, as the higher frequencies attenuate at a higher rate over distance compared to lower frequencies. On this basis and the fact that the plant would generate low levels of noise no corrections have therefore been considered when assessing the noise levels against the BS 4142 methodology to determine the rating level of noise.

7.5.19 Uncertainties in the calculations have been considered. Given that the assessment has been based upon all plant and equipment fully operational, which is considered unlikely, particularly during the most sensitive early morning periods, the calculations are likely to have overestimated the noise levels at the dwellings and thus cover any uncertainty in the noise levels attributable to the operation of the plant or within the calculation methodology. It is additionally noted that the source data used represents the maximum design level for the plant.

7.5.20 The calculations indicate noise levels at the surrounding properties, would be very low. The highest noise levels calculated would be at the property to the west along Castle View Road and within Easthorpe where levels of 29 dB $L_{Aeq,T}$ and 28 dB $L_{Aeq,T}$ have been calculated respectively at the façades of the properties. This level of noise is very low, even during the early morning periods and would be substantially lower than the level of noise attributable to the road traffic passing along the A52.

7.5.21 Whist the calculated noise levels have not been fully assessed against the prevailing background noise levels at the surrounding properties, it is unlikely that the noise levels associated with the operation at these properties, would result in an assessment which would indicate the potential for adverse impacts.

7.5.22 Noise levels of this order of magnitude would remain below the proposed noise limit of 35 dB $L_{Aeq,T}$, which seeks to ensure that noise levels remained below the WHO night-time criteria of 40 dB $L_{Aeq,T}$ representing the Lowest Observed Effects Level (NOEL) and thus ensuring noise from the operation of the proposed plant and equipment remained acceptable.

7.5.23 The noise levels would additionally remain below the WHO night-noise value of 30 dB $L_{Aeq,T}$, which represents a No Observed Effect Level, providing a positive indication that the operation of the solar farm would not result in adverse noise impacts.

7.5.24 Noise levels attributable to the operation of the plant would generate internal noise levels within the property of less than 20 dB $L_{Aeq,T}$ assuming windows open (on the basis of a 10 dB(A) reduction for an open window), which is at least 10 dB(A) below the criteria representing a good standard of noise for bedrooms, specified within BS 8233.

7.5.25 The calculated noise levels indicated on **Figure 7.2**, indicate that the noise levels at other properties surrounding the site would be lower than at the properties assessed above.

7.5.26 Given that the assessment at those properties indicated that the operation would not result in any adverse noise impacts, an assessment at other surrounding properties, where noise levels were lower, would also indicate that the operation would result in no observed effects.

7.6 MITIGATION AND ENHANCEMENT

7.6.1 No additional noise mitigation measures have been identified within the assessment.

7.7 CUMULATIVE AND IN-COMBINATION EFFECTS

7.7.1 No other developments have been identified within this assessment which would affect noise levels at the surrounding properties, thus no cumulative effects have been identified.

7.8 SUMMARY

Introduction

7.8.1 A noise assessment has been undertaken to identify potential impacts associated with the operation of the Proposed Development. The assessment has considered the proposed layout and equipment to be installed and operated on the site.

Assessment Approach

7.8.2 The assessment has been based upon ensuring potential adverse noise impacts are minimised, based upon the requirements of the requirements of the relevant British Standards and World Health Organisation guidance.

Baseline Conditions

7.8.3 The Proposed Development is within a rural location, with noise levels in the surrounding area principally influenced by traffic travelling along the A52. Existing baseline noise levels at the surrounding noise-sensitive receptors have therefore been assumed to be low and influenced by local road traffic and noise from the surrounding environment.

Assessment of Likely Significant Effects

7.8.4 No adverse noise impacts have been identified during the construction of the Proposed Development. Appropriate control measures would be adopted during the construction to ensure noise levels associated with the construction operations are minimised.

7.8.5 Noise levels associated with the operation of the Proposed Development have been calculated and assessed on the basis of the proposed equipment. The calculations and assessment concluded that there would be no adverse noise impacts at surrounding noise-sensitive receptors.

Mitigation and Enhancement

7.8.6 No additional noise mitigation measures have been identified.

Cumulative and In-combination Effects

7.8.7 No cumulative noise impacts have been identified as a result of the operation of the Proposed Development.

Conclusion

7.8.8 In summary, with appropriate control measures adopted during the construction, potential noise impacts and effects would be minimised and would ensure that no adverse noise impacts at the surrounding noise sensitive receptors.

Table 6.4: Summary of Effects, Mitigation and Residual Effects.

Receptor / Receiving Environment	Description of Effect	Nature of Effect *	Sensitivity Value **	Magnitude of Effect **	Geographical Importance ***	Significance of Effects ****	Mitigation / Enhancement Measures	Residual Effects ****
Construction								
Residential receptors	Noise and vibration associated with construction	Temporary	Not Applicable	Not Applicable	Local	Negligible	Appropriate control measures	Negligible
Operation								
Residential receptors	Noise associated with the operation of the plant and equipment	Permanent	Not Applicable	Not Applicable	Local	Negligible	Appropriate mitigation measures incorporated into the design	Negligible
Cumulative and In-combination								
None identified								

Notes:

* Enter either: Permanent or Temporary / Direct or Indirect

** Only enter a value where a sensitivity v magnitude effects has been used – otherwise 'Not Applicable'

*** Enter either: International, European, United Kingdom, Regional, County, Borough/District or Local

**** Enter either: Major / Moderate / Minor / Negligible AND state whether Beneficial or Adverse (unless negligible)

References

7.1 British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise. BS 5228+A1: 2014.

7.2 British Standards Institute. Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration. BS 5228+A1: 2014.

7.3 British Standards Institute. Evaluation and Measurement for Vibration in Buildings. Part 2. Guide to Damage Levels from Groundborne Vibration. BS 7385: Part 2. 1993.

7.4 British Standards Institute. Methods for Rating and Assessing Industrial and Commercial Sound. BS 4142: 2014 + A1:2019.

7.5 Acoustics & Noise Consultants. BS 4142:2014+A1:2019. Technical Note. Version 1.0. March 2020.

7.6 British Standards Institute. Guidance on Sound Insulation and Noise Reduction in Buildings – Code of Practice. BS 8233: 2014.

7.7 World Health Organisation. Guidelines for Community Noise. 1999. WHO Geneva.

7.8 World Health Organisation. Night Noise Guidelines for Europe. 2009.