



Appeal Against refusal of planning permission by Hertfordshire County Council

Appendix To Proof of Evidence of Michelle Dawson (Noise)

APP/M1900/W/24/3346607

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SLR Project No.: CD 1.2F

22 October 2024

Revision: 0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
0	22 October 2024	Michelle Dawson	Benedict Sarton	Michelle Dawson
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Table of Contents

Appendices

Appendix A	Glossary of Terminology
Appendix B	Phase F Predicted Noise Levels
Appendix C	MAS Environmental Comments
Appendix D	Paragraphs 19 to 22 of the MPG





Appendix A Glossary of Terminology

Glossary of Terminology

- 1.1 The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

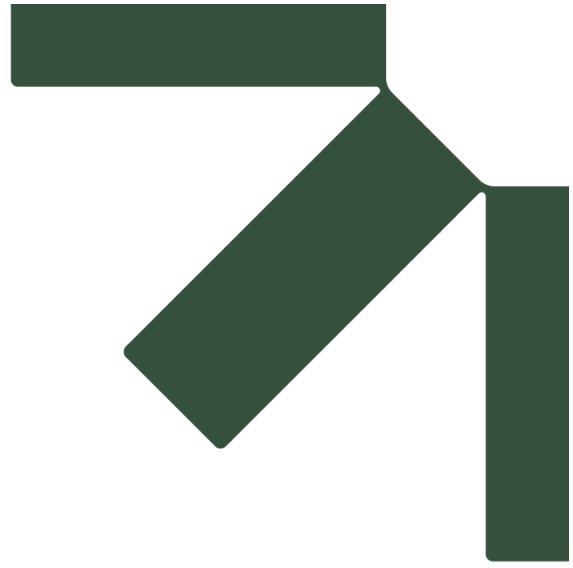
Table A-1: Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

Acoustic Terminology

- dB (decibel): The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 μ Pa).
- dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
- $L_{Aeq, T}$: $L_{Aeq, T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
- $L_{A10, T}$ & L_{A90} : If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence LA10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, LA90 is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the LA10 index to describe traffic noise.
- $L_{Amax(F)}$: $L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise

level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.



Appendix B Phase F Predicted Noise Levels

- 1.2 The 2021 ES Chapter1 replicated the sound level data used in the 2016 Report. The noise data used was single value data, i.e. the sound level value entered into the noise model was a single whole number.
- 1.3 Following the Inspector's comments regarding low frequency noise, to further inform the assessment, a visit was made to George Green Quarry so that noise levels in each octave band could be obtained.
- 1.4 A comparison between the data used in the 2016 and 2021 Assessments, and the 2022 Updated Assessment², can be seen in Table B-1. The overall Phase F LAeq, 1hr dB value at Popefield Farm is also provided.

¹ Core Doc. 2.3.

² Core Doc. 2.4.

Table B-1: Phase F & Access Rd Sound Power Data³

Plant	2016 / 2021 Assessments Sound Power dB(A)	2022 Assessment Sound Power dB(A)	2022 Notes
Excavator	105.0	105.9	George Green octave band input to model. Total resultant sound level = 105.9dB(A)
Dozer	106.0	106.0	In the absence of plant to measure the 2016/2021 single band data was used. The 2022 Assessment also used this single band data.
Articulated Dumper Truck (ADT)	108.0	92.7 109.0	The measured spectral data at George Green resulted in a sound power level of 92.7dB(A). This was considered unrepresentative, so the octave data in BS5228 Table C4 Item 1 ⁴ was used ⁵ for an ADT was used.
HGV	111.0	104.5	George Green octave band input to model. Total resultant sound level = 104.5dB(A)
Phase F Overall $L_{Aeq, 1hr}$ dB			
Receptor	2016 / 2021 Assessments	2022 Assessment	-
Popefield Farm	54.0	51.6	-

- 1.5 It can be seen from Table B-1 that the data used in the 2022 Noise Assessment was either the same as that used in the earlier Assessments, or higher, with the exception for the HGV data.
- 1.6 The lower HGV value however did not affect the overall $L_{Aeq,T}$ value as whilst the 2022 HGV level was lower at the Farm than the earlier Assessments, the Excavator, ADT, and Dozer sources are located closer to the Farm, than the HGVs, these noise sources are therefore the main contributor to the total $L_{Aeq,T}$ at the Farm. Sound from HGVs on the Access Road is too low to elevate the $L_{Aeq,T}$ at Popefield Farm.

³ The Processing Plant data remained the same.

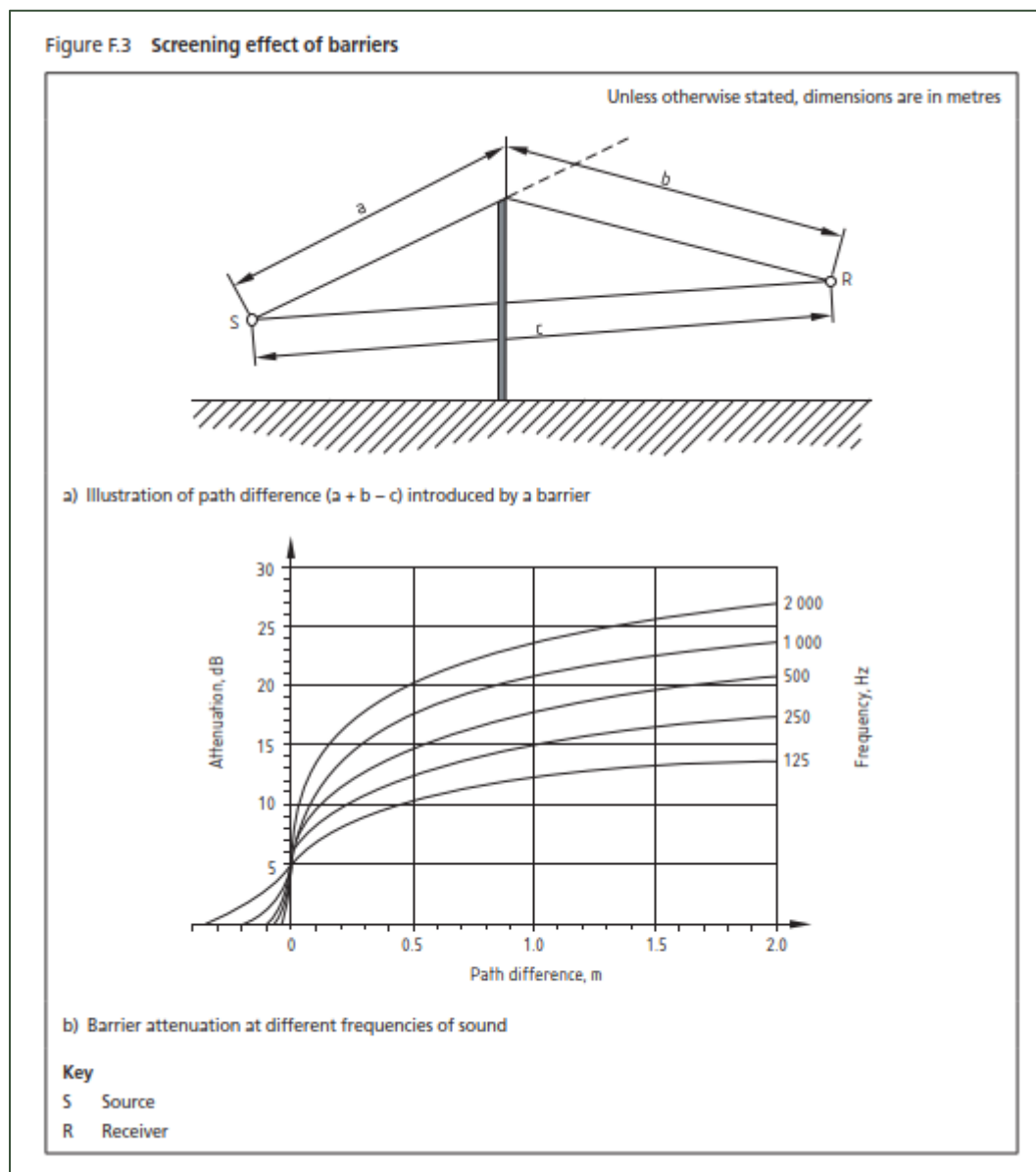
⁴ Core Doc. 7.5.

⁵ This is explained in Footnote 3 of the Noise Assessment in Appendix 5 of Core. Doc. CD2.4

- 1.7 The predicted $L_{Aeq,1\text{ hr}}$ Phase F noise level at Popefield Farm is lower in 2022 owing to the use of octave band noise data in the 2022 Assessment. In the absence of octave band data (as with the 2016 and 2021 Assessments), the noise calculation assumes the following:
- A topographical/barrier attenuation of 5dB(A) when the top of the plant is just visible to the receiver.
 - A topographical/barrier attenuation of 10dB(A) when the noise is completely screened from the receiver.
- 1.8 The topography attenuation subsequently applied to each noise source at the receiver is therefore 0dB(A), 5dB(A) or 10dB(A). When octave band data is used in the model the calculation makes use of Figure F.3 in BS52286. This Figure is copied below. With reference to Figure B-1 the resultant screening effect can be much higher than 10dB(A) depending on the frequency and path difference.

⁶ Core Doc. 7.5.

Figure B-1: Screening Effect of Barriers

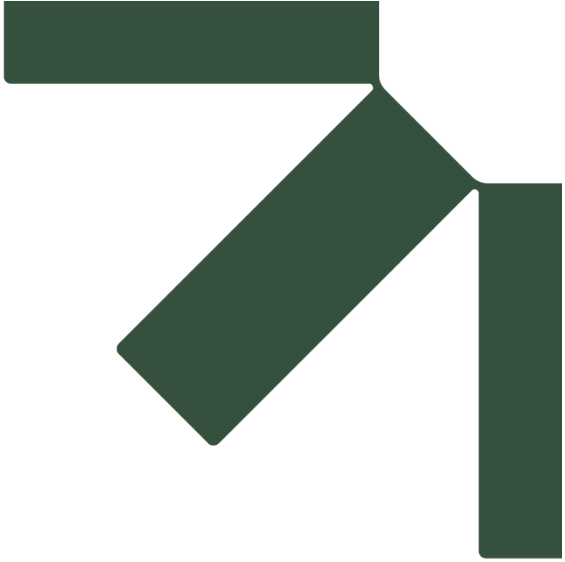


1.9 As an example of how this has affected the resultant over $L_{Aeq,1 \text{ hr}}$ level at Popefield Farm, the noisiest item of plant at Popefield Farm is an excavator. Overall A weighted sound pressure level of the excavator at the Farm, and the attenuation afforded by the topography in each Assessment is listed below:

- 2016 and 2021 Assessment: Excavator sound pressure level = 49.8dB(A). Attenuation of 5dB(A) as the top of the plant is just visible to the receiver.
- 2022 Assessment: Excavator sound pressure level = 48.3dB(A). Attenuation of between 5dB(A) at 32Hz increasing to 15.5 at 8000Hz.

1.10 As the Site is not flat, the use of octave band data, some of which was obtained from George Green Quarry (see Table B-1), and the subsequent use of Figure F.3

in the BS5228 calculations, means that the 2022 Assessment has refined the noise calculations at Popefield Farm.



Appendix C MAS Environmental Comments

- 1.11 *The noise impact assessment (NIA) is not reliable and should not be given weight. A detailed and transparent assessment is required that can be appropriately evaluated and checked. Some of the primary concerns are as follows:*
- 1.12 *A significant number of the requirements of the Minerals Planning Guidance are simply ignored and excluded. There is cherry picking from the guidance and ignoring of key elements of the guidance such as assessing and controlling noise characteristics. This is a key element of the MPG that is not addressed in the NIA.*
- 1.13 *There is rejection of highly relevant guidance (BS4142:2014) which provides detailed assessment methods to evaluate the issues set out in the Minerals Planning Guidance such as “adverse” and “significant adverse” effects, background sound / noise levels and the evaluation of tonal and impulse sources. This is rejected in the NIA and there is a failure to assess such factors despite detailed discussion in the MPG on the need to evaluate these factors. In contrast there is reliance on guidance that is wholly irrelevant as found in BS5228:2019 that relates to temporary construction and demolition site noise criteria. Whilst aspects of the sources of noise and prediction methods contained within BS5228:2019 can be used, its guidance on noise acceptability is inappropriate due to the circumstances and context of that guidance compared to a long-term quarrying operation.*
- 1.14 *There is grossly inadequate information to provide any weight to the determination of the background noise levels provided. Very short midday time periods of assessment only were made in 2021 on only two summertime days under northerly winds only and which disregard most periods of the day, weekend days, different seasonal effects on noise transmission and effects at all floor levels. The level of information provided on the exercise and the extremely limited recordings are simply inadequate.*
- 1.15 *Inadequate information is provided to determine how the measurement locations chosen are in relation to dwelling rooms and amenity areas. There are no photographs or plans showing the sound meter locations or descriptions other than stating “free field”. Absent such information weight should not be given to them. Furthermore, the levels recorded appear high indicating nearness to local sources that may not reflect actual amenity and dwelling sound levels. The time of year for measurements reflects high bird activity noise and winds were sufficient for foliage rustling. Location information in relation to roads, hedges, foliage and other sources of noise is critical and should have been provided. As presented it is not considered reliable and warrants further investigation. No weight should be given to the levels in any event as the short snapshots relied upon are simply insufficient.*
- 1.16 *There is a failure to qualify, quantify, describe or address noise character within the sources and its potential impact that is disproportionate to its decibel level. The MPG considers specific and separate controls relevant for such issues which*

operate in tandem with the overall sound energy level controls, but this is omitted from the NIA.

- 1.17 *Modelling using CadaA is relied upon but grossly inadequate information is provided on this exercise. The actual files used (*.cna) should be provided to enable their examination and interpretation as to appropriateness of the inputs and parameters used as well as the results".*

Some detailed considerations in brief.

NIA Para 10.5

- 1.18 *The use of BS4142:2014 in the NIA is rejected as an assessment method. This is incorrect and as a result leads to erroneous assessment. The standard provides a number of procedures including for the assessment of background noise levels which for all intensive purposes are the same as background sound levels.*
- 1.19 *Whilst the BS4142:2014 guidance is not applied to "other sources falling within the scopes of other standards or guidance" this is not an "other" source. The planning guidance does not exclude the use of BS4142:2014 the latter of which was produced after the planning guidance was updated in 2014.*
- 1.20 *BS4142:2014 provides a number of objective assessment methods to rate and evaluate tonal and impulse sources of noise and the minerals planning guidance specifically seeks this is evaluated and where necessary controlled. It proposes different means of controlling them and their control using a different means of decibel limit than 'A' weighted criteria but nevertheless envisages their control and prevention.*
- 1.21 *Before considering evaluation of the quarry noise against the guidance it is important to set out what that Minerals Planning Guidance (MPG) actually requires or seeks to be done. This is summarised below.*

Summary of MPG requirements

- 1.22 *The minerals guidance requires account is taken of:*

- 1) All sources*
- 2) Source characteristics*
- 3) Location of sources*
- 4) Procedures*
- 5) Duration of sources of noise*
- 6) Likely impact*
- 7) The background noise level*

- 8) *An estimate of likely future noise*
 - 9) *The need to minimise, mitigate or remove noise sources.*
 - 10) *To evaluate any “significant adverse” and “adverse” noise.*
 - 11) *To enable a good standard of residential amenity.*
 - 12) *Not to exceed the background noise level during any hour by more than 10dBA and also not produce more than 55dB LAeq(1hr).*
 - 13) *To minimise noise at night (22:00-07:00) and in any case not to exceed 42dB LAeq(1 hour).*
 - 14) *The imposition of separate limits for tonal and impulse noise including through the use of Lmax limits in 1/3rd octave bands plus not to impact regularly at night.*
 - 15) *Consider a relaxation for certain noisy operations up to 70dB LAeq(1hr) for operations which cannot be easily noise controlled such as soil stripping and constructing noise attenuating mounds.*
 - 16) *Not to impose an unreasonable burden on the minerals operator.*
- 1.23 *It is instructive that the MPG specifically seeks assessment of “adverse” and “significant adverse” impact from the sources of noise. Neither the average decibel noise limits proposed in the MPG nor the discussion within it provide a process or means of determining these factors. In contrast BS4142:2014 provides detailed methods for assessing these elements. It is inappropriate therefore to ignore this guidance.*
- 1.24 *The fundamental difference between BS4142:2014 and the MPG is not in terms of evaluating and assessing noise impact but the methods of control to be applied. The MPG seeks to use separate decibel related mechanisms to control the characteristics of the noise with no upper or lower limits identified but based on an objective of minimising impact and avoiding adverse and significant adverse impacts. It sets upper limits for overall ‘A’ weighted noise levels with possible exceptions but does not promote these as acceptable limits; they are upper limits.*
- 1.25 *At paragraph 10:17 of the NIA the analysis misses the critical element of wind direction and atmospheric states such as atmospheric stability which strongly influences sound propagation.*

Erroneous reliance on BS5228:2019 criteria

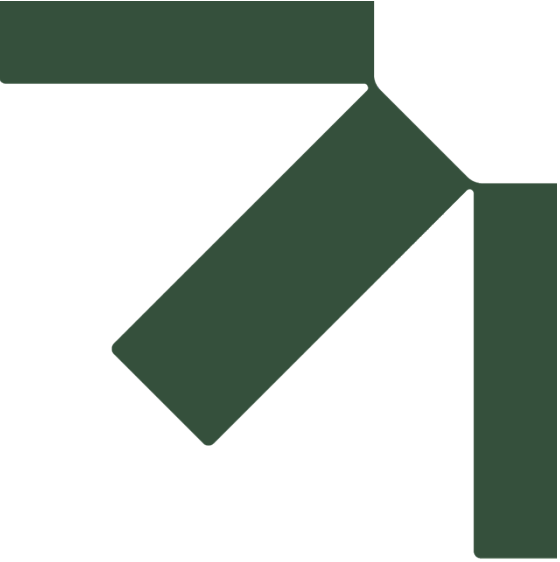
- 1.26 *This standard is directed at temporary sources of noise relating to construction and demolition and not minerals noise. Whilst the standard usefully provides some sources of noise and a method of predicting noise levels its guidance and observations on noise levels are inappropriate for the assessment of noise acceptability in this case and the NIA misleads in this regard.*

Objectives of controls

- 1.27 *This is assessed at paragraph 10.27 of the NIA and entirely misses a large range of the issues identified in the guidance including controls over tonal and impulse sources of noise. This is misleading and little weight can be given to the analysis as a result.*

Further detailed analysis.

- 1.28 *There is a need for much further and detailed consideration of analysis and claims made in the NIA but this is considered an inappropriate use of this resource until a detailed analysis of noise sources, noise character and representative background sound level data is provided along with the predicted levels all in a transparent form.*
- 1.29 *In essence there is insufficient reliable evidence to determine the application on noise or formulate suitable controls. These could not in any event be evaluated as there is no basis to determine whether they would impose unreasonable constraint upon any quarrying activities”.*



Appendix D Paragraphs 19 to 22 of the MPG

Paragraph 19: How should minerals operators seek to control noise emissions?

- *“Those making mineral development proposals, including those for related similar processes such as aggregates recycling and disposal of construction waste, should carry out a noise impact assessment, which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations, procedures, schedules and duration of work for the life of the operation, and its likely impact on the surrounding neighbourhood.*
- *Proposals for the control or mitigation of noise emissions should:*
- *consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites;*
- *assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties;*
- *estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations;*
- *identify proposals to minimise, mitigate or remove noise emissions at source;*
- *monitor the resulting noise to check compliance with any proposed or imposed conditions”.*

Paragraph 20: How should mineral planning authorities determine the impact of noise?

“Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:

- *give rise to a significant adverse effect;*
- *give rise to an adverse effect; and*
- *enable a good standard of amenity to be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy”.

Paragraph 21: What are the appropriate noise standards for mineral operators for normal operations?

“Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level (LA90,1h) by more than 10dB(A) during normal working

hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level (LA90,1h) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 – 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property.

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control this aspect. Peak or impulsive noise, which may include some reversing beepers, may also require separate limits that are independent of background noise (eg Lmax in specific octave or third-octave frequency bands – and that should not be allowed to occur regularly at night.)

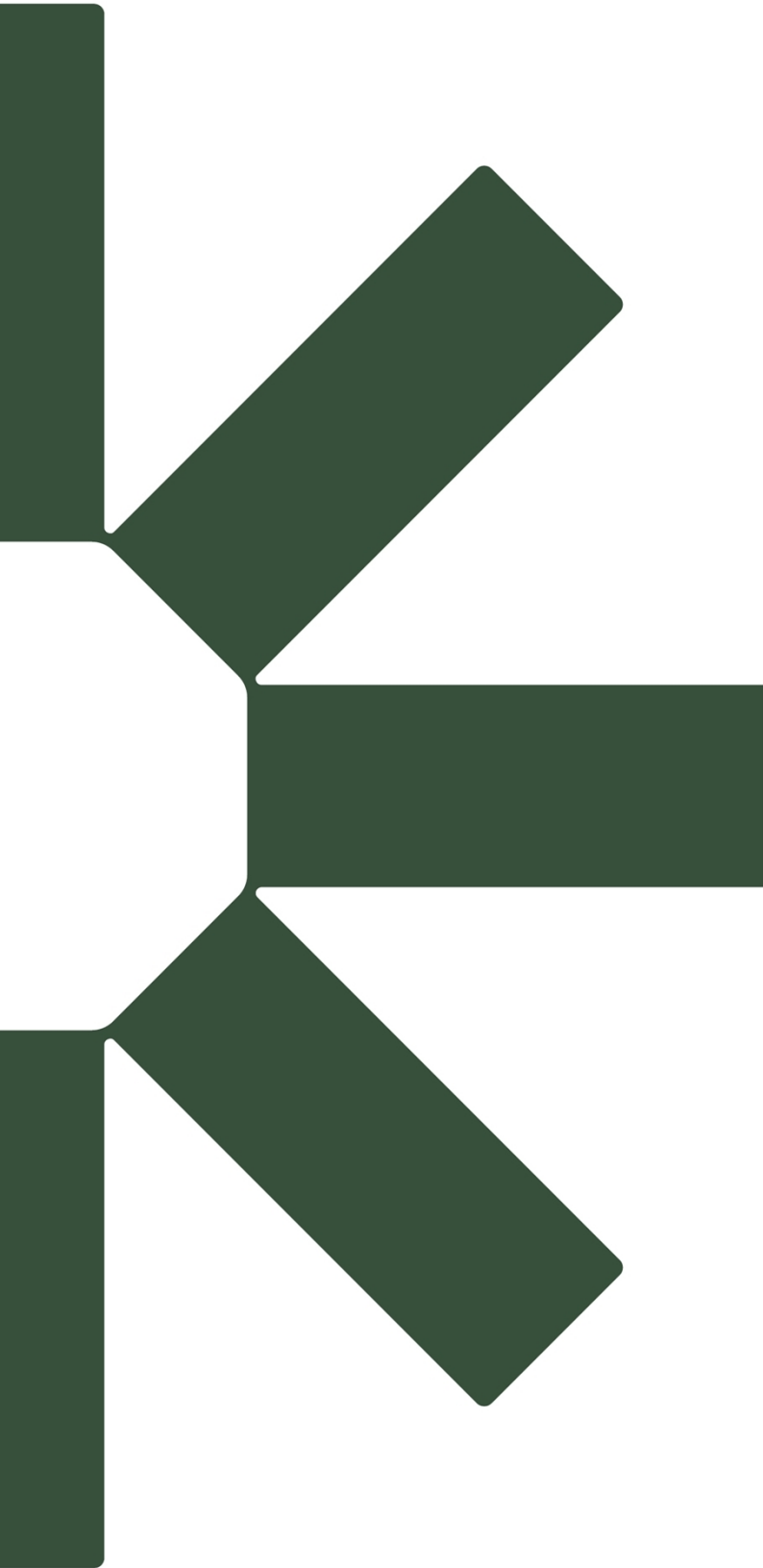
Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed”.

Paragraph 22: What type of operations may give rise to particularly noisy short-term activities and what noise limits may be appropriate?

“Activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to 8 weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than 8 weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum”.



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