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Wienerberger Kingsbury Quarry and Brickworks

Application for Proposed Eastern Extension

Noise Assessment Report

Author Dr Robert Storey

The Author

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WBM

WBM (the trading name of The Walker Beak Mason Partnership) is an established independent acoustic consultancy specialising in architectural & building acoustics, environmental noise, planning issues and expert work. WBM is a member of the Association of Noise Consultants and is also a corporate member of the Institute of Environmental Management & Assessment. The Consultants are Members or Fellows of the Institute of Acoustics.

ACOUSTIC CONSULTANTS

Contents

1 Introduction

Wienerberger currently operate a brickworks site at Kingsbury in Warwickshire. The brickworks is supplied by clay extracted from the associated quarry.

Wienerberger is applying for planning permission for an extension to the quarry located to the east of the Kingsbury brickworks site with the proposed extension area worked in phases following on from the existing extraction area.

As is the case with the current extraction area, the extraction of clay is to be undertaken on a campaign basis with the clay stockpiled at the brickworks site.

This report sets out the findings of baseline noise surveys conducted in March and June 2016 and March 2018 at positions representative of the closest noise sensitive premises to the site and reviews the existing site noise conditions and suggests noise criteria in relation to the background noise levels observed in March and June 2016 and March 2018 at the chosen locations.

It sets out the calculated noise levels arising from the proposed workings and compares those calculated noise levels with suggested site noise limits at the nearest noise sensitive premises to the site.

The noise criteria are based on current advice from the government contained in the web document Planning Practice Guidance for Minerals, first published in March 2014.

To aid comprehension, a glossary of acoustic terms is presented in Appendix A.

2 Assessment Methodology

The various relevant noise guidance documents used in this assessment are detailed below.

2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) July 2018 sets out the Government's planning policies for England. At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development.

Section 15 of the NPPF (Conserving and enhancing the natural environment) refers specifically to noise in the following paragraphs:

"*170. Planning policies and decisions should contribute to and enhance the natural and local environment by…*

(e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability..."

"*180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…"

Paragraph 182 refers to the integration of new development with existing businesses and facilities:

"*182. Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*"

Mineral sites are considered in Section 17 "*Facilitating the sustainable use of minerals*" of the NPPF 2018.

"*204. Planning policies should …*

(e) safeguard existing, planned and potential sites for: the bulk transport, handling and processing of minerals; the manufacture of concrete and concrete products; and the handling, processing and distribution of substitute, recycled and secondary aggregate material;

f) set out criteria or requirements to ensure that permitted and proposed operations do not have unacceptable adverse impacts on the natural and historic environment or human health, taking into account the cumulative effects of multiple impacts from individual sites and/or a number of sites in a locality;

(g) when developing noise limits, recognise that some noisy short-term activities, which may otherwise be regarded as unacceptable, are unavoidable to facilitate minerals extraction..."

"*205. When determining planning applications, great weight should be given to the benefits of mineral extraction, including to the economy . In considering proposals for mineral extraction, minerals planning authorities should…*

(c) ensure that any unavoidable noise, dust and particle emissions and any blasting vibrations are controlled, mitigated or removed at source, and establish appropriate noise limits for extraction in proximity to noise sensitive properties..."

The term *"sites for: the bulk transport, handling and processing of minerals"* is a general term which WBM considers to include rail heads, rail links to quarries and related sites, wharfage and associated storage.

Paragraph 205 (c) advises that the national planning guidance on minerals sets out how these policies should be implemented, see Section 2.2 below.

2.2 Planning Practice Guidance

Technical guidance on noise was provided in more detail in March 2014 by the Planning Practice Guidance.

Planning Practice Guidance Minerals (PPGM)

Paragraphs 19 to 22 inclusive of the "*Minerals*" chapter of the Planning Practice Guidance, also dated March 2014, are under the heading "*Noise emissions*" within the section "*Assessing environmental impacts from mineral extraction*".

Paragraph 019 Reference ID: 27-019-20140306 states:

"***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 020 Reference ID: 27-020-20140306 states:

"*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 021 Reference ID: 27-021-20140306 states:

"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 bleepers, may also require separate limits that are independent of background noise (e.g. 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 022 Reference ID: 27-022-20140306 states:

"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 eight 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 eight 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.

2.3 Local Authority

Kingsbury Quarry and Brickworks falls under the planning jurisdiction of Warwickshire County Council.

The latest planning permission for the site dated September 1998 Ref NW378/97CM014 includes the following conditions relating to noise:

"31. Machinery and vehicles used on the site shall be maintained and silenced so as to comply with the best practicable standard.

32. Reversing alarms shall not be used on site machinery unless they are of the bell tone type or are of the directional type, capable of adjusting their noise level automatically to 5dB(A) above the ambient noise level.

33. The rating level of the noise emitted from the site shall not exceed the existing background noise levels (L90), as set out on page 4 of the background noise survey received on 03/07/97, at the noise sensitive properties shown on the plan accompanying the survey by more than 5 dB(A) at any time, other than for a period not exceeding eight weeks in total in any calendar year during which the rating level of noise emitted from the site shall not exceed the existing background noise levels (L90) by more than 10 dB(A). The measurements and assessment shall be made according to BS 4142:1990."

Condition 33 does not specify the locations at which the site noise should be assessed and rather refers to a separate document. The condition also refers to BS4142: 1990 (since superseded by BS 4142: 2014) and Rating Levels (as defined in that document).

This application relates to mineral extraction and as such, the use of BS4142: 2014 is not appropriate. The development has therefore been considered with regard to the current Government guidance provided in Planning Practice Guidance for Minerals.

Updated background noise levels in the vicinity of the site were established by means of noise surveys including attended sample measurements and the installation of a data logging sound level meter in March and June 2016 and March 2018.

The approach to the baseline noise surveys was discussed between WBM and Dean Walters, Environmental Health Officer at North Warwickshire Council during telephone conversations regarding the site in June 2016.

3 Site Description

The Kingsbury Brickworks site is located to the south-east of Dosthill in Warwickshire. The proposed extraction area is to the north-east and east of the brickworks site. The M42 motorway lies to the east and south of the site. The main rail line lies to the immediate west and the A51 Tamworth Road further to the west.

The permitted working hours of the site as detailed in Condition 16 of the latest planning permission dated September 1998 Ref NW378/97CM014 are:

Mineral Extraction Operations (except soil stripping and overburden removal)
06:00 to 20:00 hours Monday to Sunday
Soil Stripping and Overburden Removal
07:00 to 18:00 hours Monday to Friday
07:00 to 13:00 hours on Saturdays
Landfilling Operations

Landfill deliveries:
07:00 to 18:00 hours Monday to Friday
07:00 to 13:00 hours on Saturdays
Landfill site operations:
07:00 to 18:30 hours Monday to Friday
07:00 to 13:30 hours on Saturdays
with no landfilling, soil stripping or overburden removal operations on Sundays, Bank or Public Holidays.

Notwithstanding the above, on Saturdays falling immediately before a Bank Holiday Monday landfilling operations (deliveries and site operations) shall be permitted between 07:00 and 16:00 hours.

The nearest noise sensitive premises to the site include those on Ascot Drive in Dosthill, Holt Hall Farm, Slateley Hall Farm and properties in and around Whateley village and properties at Stonehill Farm and Cliff on Tamworth Road.

The proposed extraction operations will be undertaken in phases as outlined in detail in the document "*Kingsbury Extension Planning EIA*" prepared by GWP Consultants in October 2018.

Due to the volume of soils, overburden and sandstone to be relocated within the site, the duration of activities such as the removal of the soils and overburden to the proposed soil storage bunds and the sandstone tips means that these cannot be considered as temporary operations (as defined in PPGM).

All activity in the proposed development area has therefore been considered in terms of suggested site noise limits for routine operations.

A site location plan showing the application boundary and including the baseline noise survey measurement locations is included in this report as Appendix B.

4 Measurement Methodology

4.1 Measurement Description

The locations at which baseline measurements have been made were chosen as being representative of the nearest noise sensitive premises to the site.

Baseline noise surveys were conducted on four days at eight locations representative of the nearest noise sensitive properties to the site. Forty-two sample measurements were made over the four visits which took place on Monday 07 March 2016, Tuesday 22 March 2016, Monday 27 June 2016 and Tuesday 13 March 2018.

The measurements were undertaken between about 12:00 and 16:30 on Monday 07 March 2016, between about 10:00 and 13:30 on Tuesday 22 March 2016, between about 14:30 and 16:30 on Monday 27 June 2016 and between about 10:35 and 15:55 on Tuesday 13 March 2018.

A sound level meter was installed at Holt Hall Farm (Position 1) between 12:00 and 16:30 hours on Monday 07 March 2016 to obtain more extensive noise survey data.

The measurements were taken at a microphone height of approximately 1.4 metres above local ground level away from reflecting surfaces other than the ground, with a wind shield used throughout each measurement. The sample measurements were of 15 minute duration.

The parameters reported are the statistical indices $L_{A10,T}$ and the Background Noise Level, $L_{A90,T}$ as well as the Equivalent Continuous Noise Level, $L_{Aeq,T}$ and the Maximum Noise Level $L_{Amax,f}$. An explanation of the noise units presented is given in Appendix A.

The instrumentation and calibration details used for the sample measurements and the installed meter are shown in Appendix C.

4.2 Results

The detailed results of the sample measurements are set out in Appendix D.

A summary of the sample measurement results and the data from the installed sound level meter is presented below.

Position	Average dB $L_{Aeq,15min}$	Average dB $L_{A90,15min}$	Range dB $L_{A90,15min}$
1. Holt Hall Farm	52	42	40 to 44
1. Holt Hall Farm (Installed Meter)	50	42	39 to 43
2. Slateley Hall Farm	62	58	55 to 63
3. Cliff Farm/The Croft	56	50	48 to 52
4. Ascot Drive	49	40	39 to 43
5. Stonehill Farm	58	41	37 to 45
6. Whateley Hall Farm	47	39	35 to 42
7. Hockley Hall	48	36	33 to 39
8. Rathmore House, Whateley	50	40	38 to 42

Noise levels were generally controlled by distant and local road traffic noise, local activity, birdsong and aircraft movements.

The full data from the installed sound level meter is presented in Appendix E in tabular and chart form.

5 Evaluation and Analysis of Noise Data

The latest planning permission for the site granted by Warwickshire County Council dated September 1998 Ref NW378/97CM014 includes Condition 33 relating to noise as reproduced in Section 2.3 of this report.

Site noise limits at specific residential properties in the vicinity of the site are suggested based on the latest Government guidance provided in PPGM and the background noise levels measured in March and June 2016 and March 2018.

Position	**Average Measured dB $L_{A90,15\ minute}$**	**Suggested Site Noise Limit dB $L_{Aeq,\ 1\ hour,\ free\ field}$**
1. Holt Hall Farm	42	52
2. Slateley Hall Farm	58	55
3. Cliff Farm/The Croft	50	55
4. Ascot Drive	40	50
5. Stonehill Farm	41	51
6. Whateley Hall Farm	39	49
7. Hockley Hall	36	46
8. Rathmore House, Whateley	40	50

6 SoundPLAN Noise Modelling of Redevelopment Proposals

The Equivalent Continuous Noise Level, $L_{Aeq,\ T}$, is the preferred unit for assessing noise sources. It is the value of a continuous level that would have equivalent energy to the continuously varying noise over the specified period "T". This unit is recommended internationally for the description of environmental noise and is in general use. It is the chosen unit of Planning Practice Guidance for Minerals and BS 7445 for the Description and Measurement of Environmental noise.

The noise levels likely to arise at dwellings depend on the method of working and the sound power levels of the plant chosen to work a site as much as on the distance to the properties and the effects of intervening ground. Proper allowance can be made for these variables in order to calculate site noise levels.

6.1 Noise Calculation Methodology

The Planning Practice Guidance for the NPPF in paragraph 19 states those making development proposals should "*estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations*".

The Planning Practice Guidance for Minerals does not contain details of noise prediction methods and in the absence of detailed guidance in the NPPF, the calculations in this report are based on the methods contained in ISO 9613-2 (1996) "*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*".

In order to assess the noise levels for the proposed site operations, the contribution from each significant specific noise source has been evaluated separately and then combined to give the overall noise level.

6.2 SoundPLAN Noise Model

Noise modelling of the Wienerberger site at Kingsbury was undertaken using SoundPLAN noise mapping software, version 8.0 updated 09 November 2018.

The base for the noise model was a DXF of the site and surrounding area supplied by the operator. The ground height data was used to produce a Digital Ground Model (DGM) of the site and surrounding area.

The operations taking place on the site during normal working hours (detailed in Section 3) that are included in the application are:

- The normal ongoing operations at the brickworks;
- Movement and stockpiling of soils and overburden;
- Movement and stockpiling of yellow and blue sandstone (some of which will be used in the brickmaking process);
- Extraction of clay on a campaign basis;
- Dump Trucks movements;
- Grading of haul routes using a grader;

- Management of waste and sandstone tips including grading by dozer; and
- Management of the clay stockpile by the brickworks.

The noise model includes two teams of plant working simultaneously. However, this is only scheduled to occur periodically during 4-5 years of the 30 year lifespan of the project.

Each phase has been modelled by placing the various mobile noise sources in a position that would be considered to be a representative location for that plant item during the phase in question.

During Phase 1A two soil storage stockpiles will be formed within the current extraction void. This is expected to take no more than two weeks to complete and will be undertaken using the same equipment as the main sandstone/clay extraction and stockpiling operations. The stockpiles will remain in place until the final phases of the development.

Due to the short term nature of this activity and the location within the existing void, this has not been included in the model for Phase 1A.

6.3 Sound Power Level Data

Noise sources were input for the various operations on the site as follows:

Plant Item	dB L_{WA}
From Manufacturer Brochure	
Volvo EC480 Excavator (1)	106
Komatsu D155 Bulldozer (2)	113
Volvo A30G Dumper Truck (4)	109
Caterpillar 140G Grader (1)	107
Volvo EC700 Excavator (2)	107
Volvo A40 Dumper Truck (4)	110
From WBM Plant Noise Survey	
Brick Making Factory (N)	110
Brick Making Factory (E)	95
Brick Making Factory (S)	110
Brick Making Factory (W)	97
Forklifts (2)	85
HGV Movements	
HGVs on access road	104

Directivity was not built in to the mobile noise sources as the sound power level data input into the model were generally based on the highest measured levels in any direction.

6.4 Noise Modelling Assumptions

Various assumptions have been made with regard to the input of Sound Power Level data and construction of the SoundPLAN noise model as follows:

- Sound Power Level data for the various items/processes at the brickworks site has been taken from the plant noise survey on 22 March 2016. Details of the plant noise survey and the instrumentation are provided in Appendix C with the results tabulated in Appendix F;
- Apart from the brickworks building itself and haul routes, noise sources have been input as point sources at the location and height of the main noise source for each item;
- Noise sources have been input at positions to be most representative of the activities taking place during each phase of the development;
- Activity during the final phase continues in a similar manner to that in Phase 5 and has not been modelled separately;
- The Digital Ground Model includes the existing and proposed topographic profile;
- The ground has been assumed to be 80% soft across the calculation area.

The assumption that the majority of the site activities are taking place for 100% of a given hour is unlikely to be truly representative of the normal operation of the site, even when considering a reasonable worst case scenario. This is particularly the case with regard to plant such as loading shovels and excavators for which the Sound Power Level has been input as representative of those items being under load.

The calculated specific sound levels at the assessment locations due to site activity are therefore likely to be higher than the sound levels normally generated by the site operations.

A full list of the assumptions used in creating the SoundPLAN noise model is presented in Appendix G to this report.

7 Calculated Site Noise Levels

The calculated site noise levels are summarised in the following table and are presented in graphical format (noise contour maps) in Appendix H.

Assessment Location	Calculated Sound Level dB $L_{Aeq, T\ free\ field}$							
	Phases							
	1A	1B	2A	2B	3A	3B	4	5
1. Holt Hall Farm	48	46	48	48	42	45	47	47
2. Slateley Hall Farm	43	41	39	39	36	40	42	42
3. Cliff Farm/The Croft	35	34	34	34	34	35	35	35
4. Ascot Drive	48	48	48	48	49	49	48	48
5. Stonehill Farm	41	40	39	39	41	41	40	40
6. Whateley Hall Farm	45	43	43	43	42	44	44	44
7. Hockley Hall	42	40	40	40	39	41	41	41
8. Rathmore House, Whateley	48	45	47	47	42	48	46	46

7.1 Effects on Assessment Locations

Site noise limits have been suggested, in line with the advice contained in the web document “Planning Practice Guidance” to the National Planning Policy Framework, based on the average background noise level plus 10 dB(A) and not to exceed 55 dB $L_{Aeq, 1\ hour, free\ field}$ at the nearest noise sensitive premises. Site noise calculations have been undertaken for eight receiver locations corresponding to where baseline noise measurements were made.

A comparison of the calculated site noise levels at the receiver locations for each phase of the development and the suggested site noise limits is shown in the following table. The calculated site noise levels and the suggested site noise limits in the tables below are all in terms of dB $L_{Aeq, 1\ hour, free\ field}$.

The highest calculated phase noise levels for each receiver location are presented for comparison with the suggested site noise limits in the following table.

Assessment Location	Highest Calculated Site Noise Level dB $L_{Aeq, T\ free\ field}$	Suggested Site Noise Limit dB $L_{Aeq, 1\ hour, free\ field}$
1. Holt Hall Farm	48	52
2. Slateley Hall Farm	43	55
3. Cliff Farm/The Croft	35	55
4. Ascot Drive	49	50
5. Stonehill Farm	41	51
6. Whateley Hall Farm	45	49
7. Hockley Hall	42	46
8. Rathmore House, Whateley	48	50

The calculated site noise levels comply with the suggested site noise limits at all of the eight chosen assessment locations.

In August 2017, an application was submitted for a major mixed use development on the land between Rush Lane and the A51 Tamworth Road. The application is yet to be determined, but should acknowledge the existence and continued operation of the brickworks and therefore should be required to provide suitable mitigation before the development has been completed.

Examination of the noise contour maps for Phases 1A to 5 of the Kingsbury Brickworks development indicates that site noise levels would be less than 52 dB $L_{Aeq, 1\ hour\ free\ field}$ in the vicinity of the nearest part of the proposed residential area and will be less than 50 dB $L_{Aeq, 1\ hour\ free\ field}$ at the majority of the houses (the suggested site noise limit for Ascot Drive, the nearest assessment location).

8 Assessment of Residual Impacts

The calculated overall site noise levels for routine operations on site are below the suggested site noise limits at all receiver locations considered.

At a distance, noise from machinery used at mineral workings does not usually contain a distinguishable tone nor does it tend to be impulsive. The use of reversing bleepers on site plant is a separate matter. Where reversing sirens or bleepers are used on mobile site plant and give rise to noise problems, the use of quieter or silent types of alarm or warning devices that are more environmentally acceptable should be explored.

9 Uncertainty

The site noise calculations use noise levels based on manufacturers' data and/or measured on site and all noise sources are input with a 100% on time.

The locations for each plant item on each phase in the model have been assumed based on the information provided. The various mobile plant items were placed at locations that are representative of the most likely location of that item of plant during each phase of the development.

These assumptions will affect the calculated site noise levels, but the intention is to present calculated site noise levels based on a reasonable worst case scenario for each phase.

The largest level of uncertainty is whether the noise levels calculated at the residences are generated at the dwellings once the site is operational.

10 Summary and Conclusions

This report sets out the findings of a noise assessment for an application for an eastern extension to Kingsbury Quarry in Warwickshire.

Current guidelines on noise are contained in the Planning Practice Guidance for Minerals, first published in March 2014.

The existing site noise limits are reviewed and specific site noise limits for the nearest dwellings are suggested in line with guidance contained within the Planning Practice Guidance (Minerals) and having regard to the measured background noise levels at locations taken to be representative of the nearest noise sensitive premises to the site.

Site noise calculations have been undertaken for eight locations, taken to be representative of the nearest noise sensitive premises to the proposed site development. The calculated site noise levels are presented for inspection and comparison with the suggested site noise limits at those locations.

The calculated site noise levels for routine operations on site comply with the suggested site noise limits at all the assessment locations.

Since the proposed operations on site complies with the suggested site noise limits based on measured background noise levels and the advice set out in the Planning Practice Guidance for Minerals with regard to routine operations, it is considered that the site can be worked while keeping noise emissions to within environmentally acceptable limits.

Dr Robert Storey PhD BEng MIOA
Consultant

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Appendix A – Glossary of Acoustic Terms

The following section describes some of the parameters that are used to quantify noise.

Decibels dB

Noise levels are measured in decibels. The decibel is the logarithmic ratio of the sound pressure to a reference pressure ($2x10^{-5}$ Pascals). The decibel scale gives a reasonable approximation to the human perception of relative loudness. In terms of human hearing, audible sounds range from the threshold of hearing (0 Db) to the threshold of pain (140 Db).

A-weighted Decibels dB(A)

The 'A'-weighting filter emulates human hearing response for low levels of sound. The filter network is incorporated electronically into sound level meters. Sound pressure levels measured using an 'A'-weighting filter have units of dB(A) which is a single figure value to represent the overall noise level for the entire frequency range.

A change of 3 dB(A) is the smallest change in noise level that is perceptible under normal listening conditions. A change of 10 dB(A) corresponds to a doubling or halving of loudness of the sound. The background noise level in a quiet bedroom may be around 20 –30 dB(A); normal speech conversation around 60 dB(A) at 1 m; noise from a very busy road around 70-80 dB(A) at 10m; the level near a pneumatic drill around 100 dB(A).

Façade Noise Level

Façade noise measurements are those undertaken near to reflective surfaces such as walls, usually at a distance of 1m from the surface. Façade noise levels at 1m from a reflective surface are normally around 3 dB greater than those obtained under freefield conditions.

Freefield Noise Level

Freefield noise measurements are those undertaken away from any reflective surfaces other than the ground

Frequency Hz

The frequency of a noise is the number of pressure variations per second, and relates to the "pitch" of the sound. Hertz (Hz) is the unit of frequency and is the same as cycles per second. Normal, healthy human hearing can detect sounds from around 20 Hz to 20 kHz.

Octave and Third-Octave Bands

Two frequencies are said to be an octave apart if the frequency of one is twice the frequency of the other. The octave bandwidth increases as the centre frequency increases. Each bandwidth is 70% of the band centre frequency.

Two frequencies are said to be a third-octave apart if the frequency of one is 1.26 times the other. The third octave bandwidth is 23% of the band centre frequency.

There are 21ecognized octave band and third octave band centre frequencies. The octave or third-octave band sound pressure level is determined from the energy of the sound which falls within the boundaries of that particular octave of third octave band.

Appendix A (continued)

Equivalent Continuous Sound Pressure Level $L_{Aeq,T}$

The 'A'-weighted equivalent continuous sound pressure level $L_{Aeq,T}$, is a notional steady level which has the same acoustic energy as the actual fluctuating noise over the same time period T. The $L_{Aeq,T}$ unit is dominated by higher noise levels, for example, the $L_{Aeq,T}$ average of two equal time periods at, for example, 70 dB(A) and 50 dB (A) is not 60 dB(A) but 67 dB(A).

The $L_{Aeq,}$ is the chosen unit of BS 7445-1:2003 "Description and Measurement of Environmental noise".

Maximum Sound Pressure Level L_{Amax}

The L_{Amax} value describes the overall maximum 'A'-weighted sound pressure level over the measurement interval. Maximum levels are measured with either a fast or slow time weighted, denoted as $L_{Amax,f}$ or $L_{Amax,s}$ respectively.

Sound Exposure Level L_{AE} or SEL

The sound exposure level is a notional level which contains the same acoustic energy in 1 second as a varying 'A'-weighted noise level over a given period of time. It is normally used to quantify short duration noise events such as aircraft flyover or train passes.

Statistical Parameters L_N

In order to cover the time variability aspects, noise can be analysed into various statistical parameters, i.e. the sound level which is exceeded for N% of the time. The most commonly used are the $L_{A01,T}$, $L_{A10,T}$ and the $L_{A90,T}$.

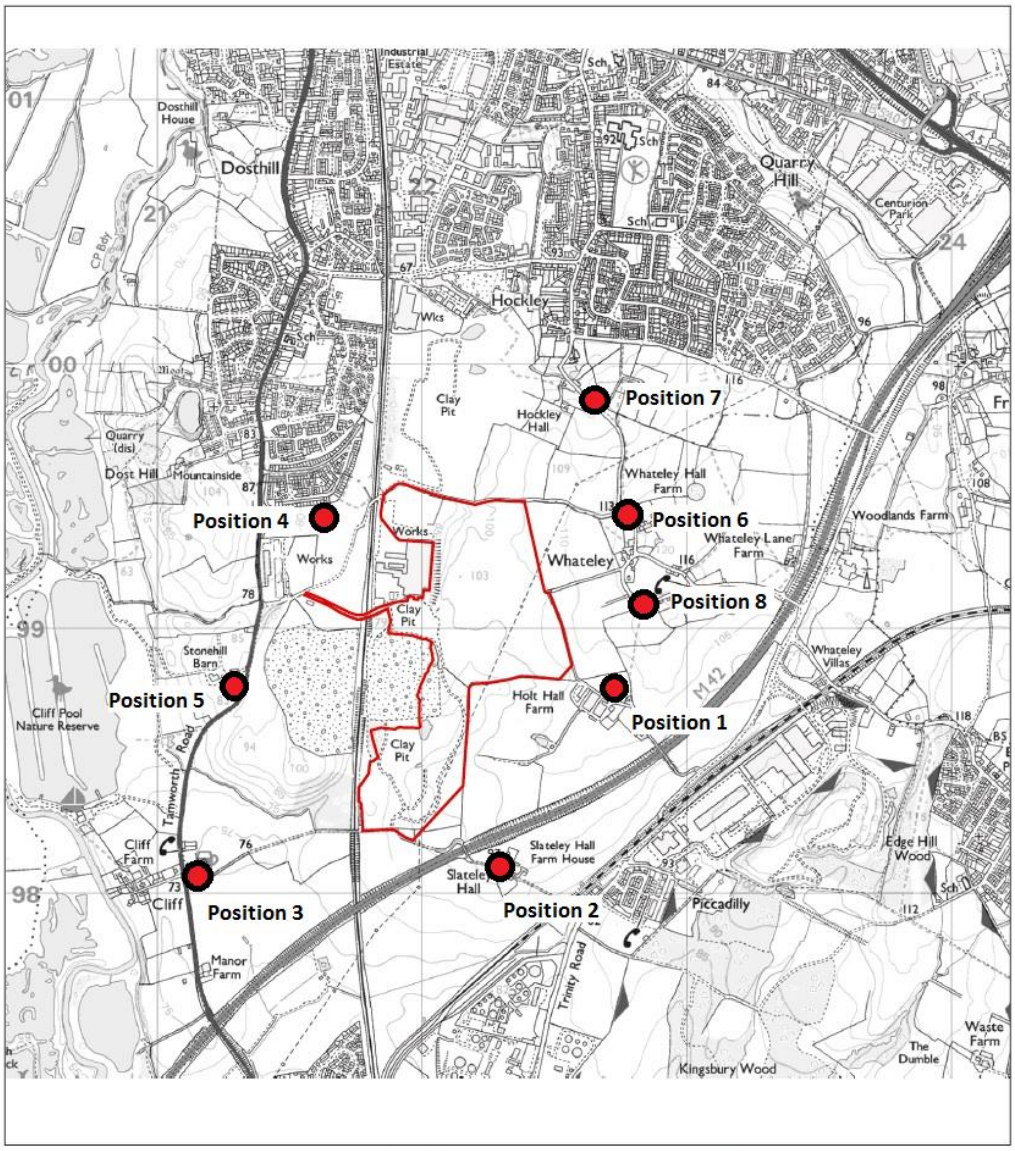
$L_{A01,T}$ is the 'A'-weighted level exceeded for 1% of the time interval T and is often used to gives an indication of the upper maximum level of a fluctuating noise signal.

$L_{A10,T}$ is the 'A'-weighted level exceeded for 10% of the time interval T and is often used to describe road traffic noise. It gives an indication of the upper level of a fluctuating noise signal. For high volumes of continuous traffic, the $L_{A10,T}$ unit is typically 2–3 dB(A) above the $L_{Aeq,T}$ value over the same period.

$L_{A90,T}$ is the 'A'-weighted level exceeded for 90% of the time interval T, and is often used to describe the underlying background noise level.

Appendix B – Baseline Noise Survey Locations

Location	Description
1. Holt Hall Farm	North of house on grassed area by granary
2. Slateley Hall Farm	On bridleway to west of properties at end of garden
3. Cliff Farm/The Croft	By bridleway sign just past gate
4. Ascot Drive	At rear of properties on footpath, just past hole in fence
5. Stonehill Farm	By tree on driveway to The Folly
6. Whateley Hall Farm	By iron gates by junction between Whateley Lane & Rush Lane
7. Hockley Hall	At side of Whateley Lane to south of properties
8. Rathmore House, Whateley	In field entrance to north-west of property



Appendix C – Instrumentation and Calibration Details

Date and Location of Survey

Monday 07 March 2016

In vicinity of Kingsbury Quarry and Brickworks, Warwickshire

Survey carried out by

Dr Robert Storey

Weather Conditions

Dry, clear, sunny, some light cloud, 8-11^{o}C, NW breeze 0-3 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1404819)

Norsonic 1251 Calibrator (33321)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Monday 07 March 2016 (Between 12:00 and 16:30)	113.8 dB(A)	114.0 dB(A)

The meter and calibrator are tested monthly against a Bruel and Kjaer Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Attended sample measurements of 15 minute duration were taken at each of the chosen locations. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout.

The start times of each sample are tabulated with the results in Appendix D.

Appendix C – Instrumentation and Calibration Details (continued)

Date and Location of Installation Survey

Monday 07 March 2016

In the grounds of Holt Hill Farm

Meter Installed & Collected by

Dr Robert Storey

Instrumentation used (Serial Number)

Norsonic 116 Sound Level Meter (21628)

Bruel & Kjaer 4230 Calibrator (1558653)

Calibration

The sensitivity of the meter was verified on site immediately before and after the measurements with readings as follows:

Times	Start Calibration	End Calibration
07/03/2016 12:00 to 16:20	93.9 dB(A)	93.6 dB(A)

The meter and calibrator are tested monthly against a Brüel and Kjær Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Continuous measurements of 15 minutes duration were taken at the chosen location over the specified period. The microphone was fitted with a Norsonic 1212 weather protection system which was used throughout the measurements.

Appendix C – Instrumentation and Calibration Details (continued)

Date and Location of Survey

Tuesday 22 March 2016

In vicinity of Kingsbury Quarry and Brickworks, Warwickshire

Survey carried out by

Dr Robert Storey

Weather Conditions

Dry, cloudy, 9-13^{o}C, light NW breeze 0-2 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1404819)

Norsonic 1251 Calibrator (33321)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Tuesday 22 March 2016 (Between 10:00 and 13:30)	114.0 dB(A)	113.7 dB(A)

The meter and calibrator are tested monthly against a Bruel and Kjaer Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Attended sample measurements of 15 minute duration were taken at each of the chosen locations. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout.

The start times of each sample are tabulated with the results in Appendix D.

Appendix C – Instrumentation and Calibration Details (continued)

Date and Location of Plant Noise Survey

Tuesday 22 March 2016

In vicinity of Kingsbury Quarry and Brickworks, Warwickshire

Survey carried out by

Dr Robert Storey

Weather Conditions

Dry, cloudy, 9-13^{o}C, light NW breeze 0-2 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1404819)

Norsonic 1251 Calibrator (33321)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Tuesday 22 March 2016 (Between 13:55 and 14:45)	114.0 dB(A)	113.7 dB(A)

The meter and calibrator are tested monthly against a Bruel and Kjaer Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Attended sample measurements of up to 1 minute duration were taken around the brickworks building. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout.

The results of the plant noise survey are tabulated in Appendix F.

Appendix C – Instrumentation and Calibration Details (continued)

Date and Location of Survey

Monday 27 June 2016

In vicinity of Kingsbury Quarry and Brickworks, Warwickshire

Survey carried out by

Dr Robert Storey

Weather Conditions

Dry, sunny, some cloud, ~19^{o}C, WNW breeze 1-4 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1404819)

Norsonic 1251 Calibrator (33321)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Monday 27 June 2016 (Between 14:30 and 16:15)	113.7 dB(A)	113.7 dB(A)

The meter and calibrator are tested monthly against a Bruel and Kjaer Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Attended sample measurements of 15 minute duration were taken at each of the chosen locations. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout.

The start times of each sample are tabulated with the results in Appendix D.

Appendix C – Instrumentation and Calibration Details (continued)

Date and Location of Survey

Tuesday 13 March 2018

In vicinity of Kingsbury Quarry and Brickworks, Warwickshire

Survey carried out by

Dr Robert Storey

Weather Conditions

Dry, overcast clearing intermittently, some sun, 9-11^{o}C, W breeze 0-2 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1404819)

Norsonic 1251 Calibrator (33321)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Tuesday 13 March 2018 (Between 10:35 and 15:55)	113.7 dB(A)	113.7 dB(A)

The meter and calibrator are tested monthly against a Bruel and Kjaer Pistonphone, type 4220 (serial number 375806) and a Norsonic Calibrator, type 1253 (serial number 22906) with UKAS approved laboratory certificate of calibration.

Survey Details

Attended sample measurements of 15 minute duration were taken at each of the chosen locations. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout.

The start times of each sample are tabulated with the results in Appendix D.

Appendix D - Baseline Survey Results (Samples)

Results and Observations

Monday 07 March 2016, 12:00 to 16:30

Dry, clear, sunny, some light cloud, 8-11°C, NW breeze 0-3 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
1. Holt Hall Farm	12:11	50	47	43	Distant road traffic, birdsong, aircraft, breeze in trees, cockerel, distant farm activity and cows, distant dog barking, distant train, distant reversing bleeper, activity and vehicle movement on farm
2. Slateley Hall Farm	12:40	61	64	57	M42 road traffic, birdsong, breeze in trees, aircraft, clanking excavator, horns and engine noise from quarry extraction area only just audible at times, activity at properties, car horn on M42
3. Cliff Farm/The Croft	13:13	53	56	48	Distant and local road traffic, aircraft, birdsong, breeze in trees, extractor fan at public house, distant hammering, distant dog barking, dog barking and fowl at properties
4. Ascot Drive	13:36	45	48	39	Distant and local road traffic, birdsong, breeze in trees, aircraft, voices of walkers, dog barking on Ascot Drive, trains, forklift reversing bleepers and hammering activity at Hunnebeck site, reversing bleepers and vehicle movements at brickworks site only just audible at times
5. Stonehill Farm	14:10	57	61	45	Road traffic, birdsong, breeze in trees, aircraft, hammering to north, voice of resident, distant reversing bleeper only just audible

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Monday 07 March 2016, 12:00 to 16:30

Dry, clear, sunny, some light cloud, 8-11°C, NW breeze 0-3 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
2. Slateley Hall Farm	14:36	61	63	57	M42 road traffic, birdsong, aircraft, breeze in trees, voice at properties, engine startup at properties
3. Cliff Farm/The Croft	15:00	55	59	50	Distant and local road traffic, extractor fan at public house, birdsong, breeze in trees, aircraft, dog barking and fowl at property, distant dog barking
5. Stonehill Farm	15:18	55	60	41	Road traffic, birdsong, breeze in trees, aircraft, radio at property just audible, distant hammering
4. Ascot Drive	15:38	49	51	41	Distant and some local road traffic, birdsong, trains, forklift reversing bleepers, cutting tool land impact noises at Hunnebeck site just audible, voices of walkers, distant dog barking, vehicles and reversing bleepers at brickworks just audible at times
1. Holt Hall Farm	16:04	51	50	44	Distant road traffic, birdsong, cockerel, activity at property, aircraft, distant trains, distant hammering, goats, distant train horn, breeze in trees

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Tuesday 22 March 2016, 10:00 to 13:30

Dry, cloudy, 9-13°C, light NW breeze 0-2 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
1. Holt Hall Farm	10:01	48	50	41	Distant road traffic, birdsong, activity at house, distant dog barking, aircraft, car movements at farm, distant train horn, distant bell
2. Slateley Hall Farm	10:23	61	64	57	M42 road traffic, birdsong, aircraft
3. Cliff Farm/The Croft	10:48	54	57	50	Distant and some local road traffic, extractor fan at public house, birdsong
5. Stonehill Farm	11:06	58	62	39	Distant and local road traffic, birdsong, distant hammering to north, temporary works at brickworks site audible at times, aircraft, vehicle movements at farm, mini excavator at farm just audible
4. Ascot Drive	11:25	48	53	39	Distant road traffic, aircraft, birdsong, trains, distant train horn, voices and activity on Ascot Drive, hammering/cutting and engine noise at Hunnebeck site, intermittent temporary works at brickworks site audible

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Tuesday 22 March 2016, 10:00 to 13:30

Dry, cloudy, 9-13°C, light NW breeze 0-2 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
1. Holt Hall Farm	11:52	56	52	40	Distant road traffic, birdsong, aircraft, activity at house, cockerel, sheep, motor startup at farm, van arriving at house
2. Slateley Hall Farm	12:15	59	62	55	M42 road traffic, birdsong, aircraft
3. Cliff Farm/The Croft	12:40	54	57	50	Distant and some local road traffic, birdsong, dog barking, extractor fan and voices at public house, aircraft
5. Stonehill Farm	12:58	60	63	43	Distant and local road traffic, birdsong, aircraft, activity including mini-excavator at farm just audible at times, intermittent temporary works at brickworks site audible, breeze in trees, tanker delivery to farm
4. Ascot Drive	13:16	45	49	39	Distant and some local road traffic, birdsong, hammering/cutting tool at Hunnebeck site, clatter and activity at brickworks just audible, distant reversing bleeper, aircraft, activity on Ascot Drive, trains

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Monday 27 June 2016, 14:30 to 16:30

Dry, sunny, some cloud, ~19°C, WNW breeze 1-4 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
6. Whateley Hall Farm	14:33	46	49	42	Distant road traffic, breeze in trees, birdsong, distant plant noise, distant ice cream van, distant hammering, two cars on lane.
7. Hockley Hall	14:54	45	48	39	Distant road traffic, birdsong, breeze in trees, vehicle movement up lane, distant clanking/engine noise, distant trains to north, distant dog barking.
8. Rathmore House, Whateley	15:12	48	50	42	Distant road traffic, birdsong, breeze in trees, sheep, aircraft, distant reversing bleepers/clanking/impact noise, train horn/whistle, car on lane, distant hammering.
6. Whateley Hall Farm	15:31	47	48	40	Distant road traffic, breeze in trees, birdsong, train whistle, distant reversing bleeper/impact noise, aircraft, van on Rush Lane, two passing cars.
7. Hockley Hall	15:51	49	48	37	Distant road traffic, breeze in trees, birdsong, distant trains to north, distant clatter/white noise reversing alarm/reversing bleepers/engine noise, four passing cars, aircraft, train whistle, distant hammering, distant car horn, distant ice cream van.
8. Rathmore House, Whateley	16:14	54	49	40	Distant road traffic, breeze in trees, aircraft, birdsong, voices and car door on lane, distant ice cream van, sheep, distant dog barking/yelping, distant train, car and trailer startup and pass, distant hammering, voice of walker, brief clanking in distance, car starting at Cottage Farm.

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Tuesday 13 March 2018, 10:35 to 15:55

Dry, overcast clearing intermittently, some sun, 9-11°C, W breeze 0-2 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
1. Holt Hall Farm	10:37	51	69	42	Distant road traffic, birdsong, barking dogs at neighbouring properties, tractor and van on drive and at farm, aircraft, voice of dog walker, distant cows
2. Slateley Hall Farm	10:59	65	72	63	Road traffic (M42), birdsong, aircraft
3. Cliff Farm/The Croft	11:22	58	76	48	Distant and local road traffic, birdsong, vent at pub, dog growling/barking, voices, scraping and activity at house, aircraft, helicopter, distant bird scarers
5. Stonehill Farm	11:42	58	72	37	Road traffic, birdsong, activity including gardening tools and motor at farm (at start), distant train horns, aircraft, distant dog barking
4. Ascot Drive	12:02	52	66	43	Distant road traffic, activity including sweeping at houses, brickworks just audible at times including vehicles and reversing bleepers, Hunnebeck site (vents, tools, voices, reversing bleepers, impact noises), mower in adjacent garden, train, distant train horn, distant dog yelping/barking
7. Hockley Hall	12:25	48	67	34	Distant road traffic, birdsong, aircraft, passing van and car, distant train horns, distant two tone alarm (level crossing?), distant trains

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Tuesday 13 March 2018, 10:35 to 15:55

Dry, overcast clearing intermittently, some sun, 9-11°C, W breeze 0-2 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
6. Whateley Hall Farm	12:42	44	45	35	Distant road traffic, birdsong, aircraft, distant hammering (Hunnebeck site), distant clanks, distant dog barking/howling, passing van and car, distant shouting, distant train, distant bird scarer
8. Rathmore House, Whateley	12:59	48	51	38	Distant road traffic, low light aircraft, birdsong, vehicle movement to north, distant dog howling, distant reversing bleeper, van and car on lane to north,m distant train and train horn, distant impact noises, distant shouting, distant rattle of machinery to north, breeze in trees
1. Holt Hall Farm	13:19	49	49	41	Distant road traffic, birdsong, aircraft, activity at neighbouring house/animal stalls, distant dog barking, car & trailer on drive and at farm, distant bird scarer
2. Slateley Hall Farm	13:41	62	64	59	Road traffic (M42), birdsong, aircraft, distant bird scarer
3. Cliff Farm/The Croft	14:04	59	60	52	Road traffic, birdsong, distant bird scarers, JCB working at front of house at start and end plus intermittent voices and scraping, aircraft, dogs barking, vent at pub
5. Stonehill Farm	14:22	58	63	38	Distant and local road traffic, birdsong, aircraft, gates at farm and house, car entering farm, voice of resident

Appendix D – Baseline Survey Results (Samples) continued

Results and Observations

Tuesday 13 March 2018, 10:35 to 15:55

Dry, overcast clearing intermittently, some sun, 9-11°C, W breeze 0-2 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
4. Ascot Drive	14:40	46	49	41	Distant road traffic, birdsong, trains, occasional clangs from brickworks, plant noise from Hunnebeck site as well as loud impact noise, lesser impact noises, music and reversing bleepers
7. Hockley Hall	15:04	48	41	33	Distant road traffic, birdsong, passing cars and van, distant trains, aircraft, distant dog barking, distant hammering, distant reversing bleepers and rattle of machinery
6. Whateley Hall Farm	15:21	49	45	39	Distant road traffic, birdsong, distant bird scarer, low light aircraft, distant clang to west, distant trains, Passing cars and van, distant power tool, distant rattle of machinery to north-west, tractor on Rush Lane and in field (clanking and reversing bleeper), distant white noise reversing alarm, distant reversing bleeper
8. Rathmore House, Whateley	15:39	43	45	41	Distant road traffic, birdsong, aircraft, distant hammering to west, breeze in trees, distant reversing bleeper, van and car on lane to north

Appendix E – Baseline Survey Results (Installed Meter)

Results

Monday 07 March 2016, 12:00 to 16:21

Dry, clear, sunny, some light cloud, 8-11°C, NW breeze 0-3 m/s

Position	Start Time	Results dB (T = 15 minutes)		
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$
1. Holt Hall Farm	12:00	51	49	42
	12:15	46	46	42
	12:30	48	48	42
	12:45	55	59	43
	13:00	49	52	42
	13:15	49	52	43
	13:30	48	51	43
	13:45	45	46	42
	14:00	44	46	42
	14:15	50	54	43
	14:30	45	47	42
	14:45	45	47	41
	15:00	53	47	42
	15:15	49	47	39
	15:30	53	50	43
	15:45	49	47	42
	16:00	49	49	43
	16:15	49	47	42

Appendix F – Plant Noise Survey

Tuesday 22 March 2016, 10:00 to 13:30

Dry, cloudy, 9-13oC, light NW breeze 0-2 m/s

Description of Activity	Distance to Plant Item(s)	Noise Level $L_{Aeq,T}$ dB	Noise Level $L_{A90,T}$ dB
By western doors (2 open, 1 closed)	13.4	57	55
Side vent (northern side)	11.7	73	72
Side vent (northern side)	11.7	73	73
Side vent (northern side shielded)	12	56	56
Side vent (northern side shielded)	12	57	56
Side door (northern side closed)	7.9	59	58
Side door (northern side closed)	7.9	58	57
Side door (northern side closed)	4.1	60	59
Side door (northern side closed)	4.1	60	59
In front of vents (northern side)	4	63	62
In front of vents (northern side)	4	63	62
In front of vents (northern side)	7.9	59	58
In front of vents (northern side)	7.9	58	57
In front of closed door (northern side)	7.1	52	50
In front of closed door (northern side)	7.1	51	50
In front of closed door (eastern side)	2.6	54	53
In front of closed door (eastern side)	2.6	54	53
In front of closed door (eastern side)	8.5	49	48
In front of closed door (eastern side)	8.5	49	48
In front of vents (eastern side)	2.9	60	59
In front of vents (eastern side)	2.9	60	59
In front of holes in wall (eastern side)	2.6	64	63
In front of holes in wall (eastern side)	2.6	64	63
In front of holes in wall (eastern side)	8.8	59	58
In front of holes in wall (eastern side)	8.8	58	58
Forklift driveby	3	67	62
Forklift driveby	3	67	55
Forklift picking up/reversing alarm	3	65	61

Note: T ≤1 minute

Appendix G - SoundPLAN Noise Mapping Assumptions

Calculations were undertaken using SoundPLAN 8.0 (updated 09 November 2018)

Noise calculations were made on a 5 metre grid at a calculation height of 1.5 metres above local ground level

The calculations assume 80% soft ground across the calculation area

No barrier attenuation is included in the calculations apart from that afforded by the brickworks buildings and the topography of the area

Sound Power Level data has been included based on product datasheets and/or measured on site

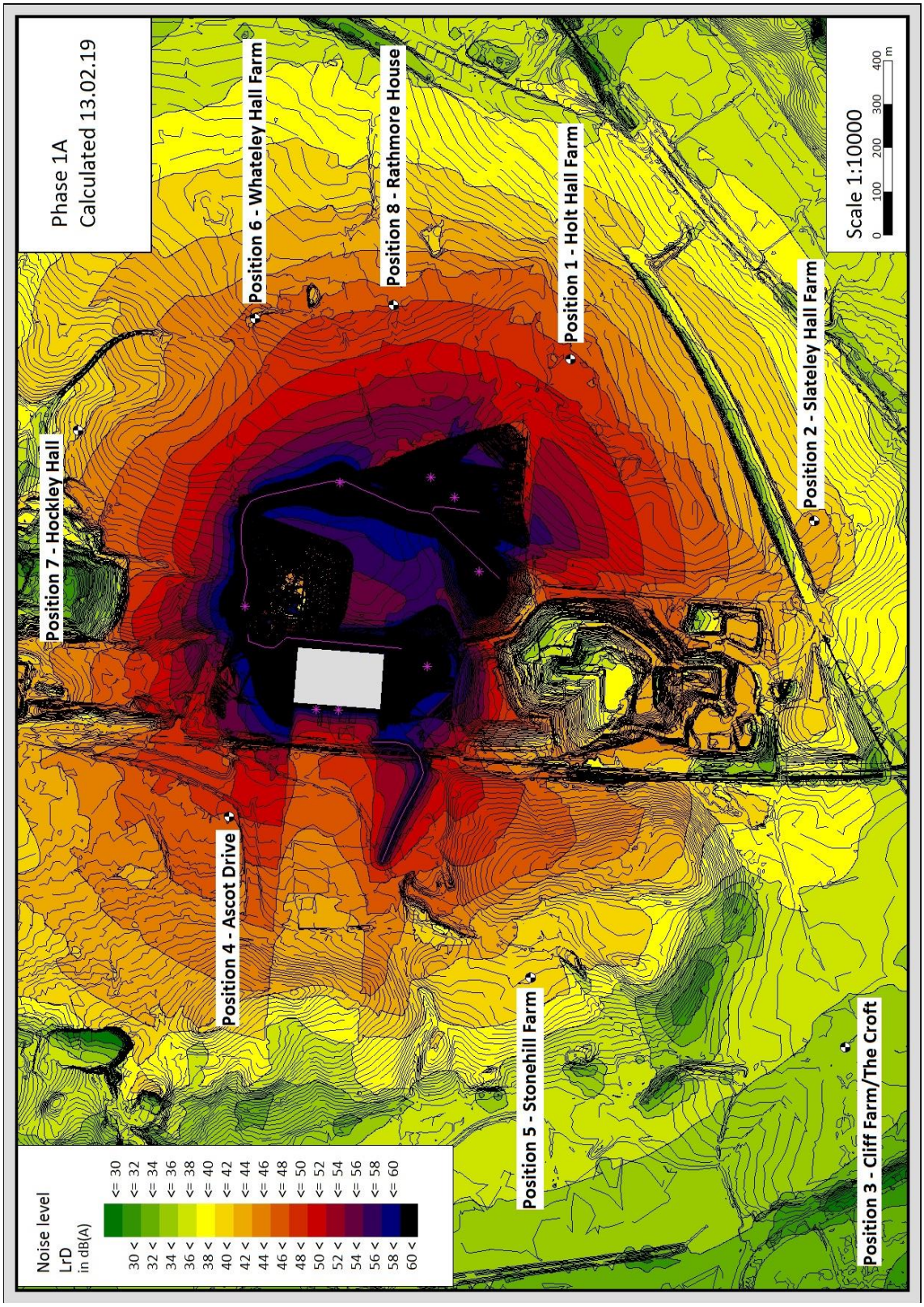
The brickworks has been modelled to generate noise levels as measured around the building during the plant noise survey in March 2016

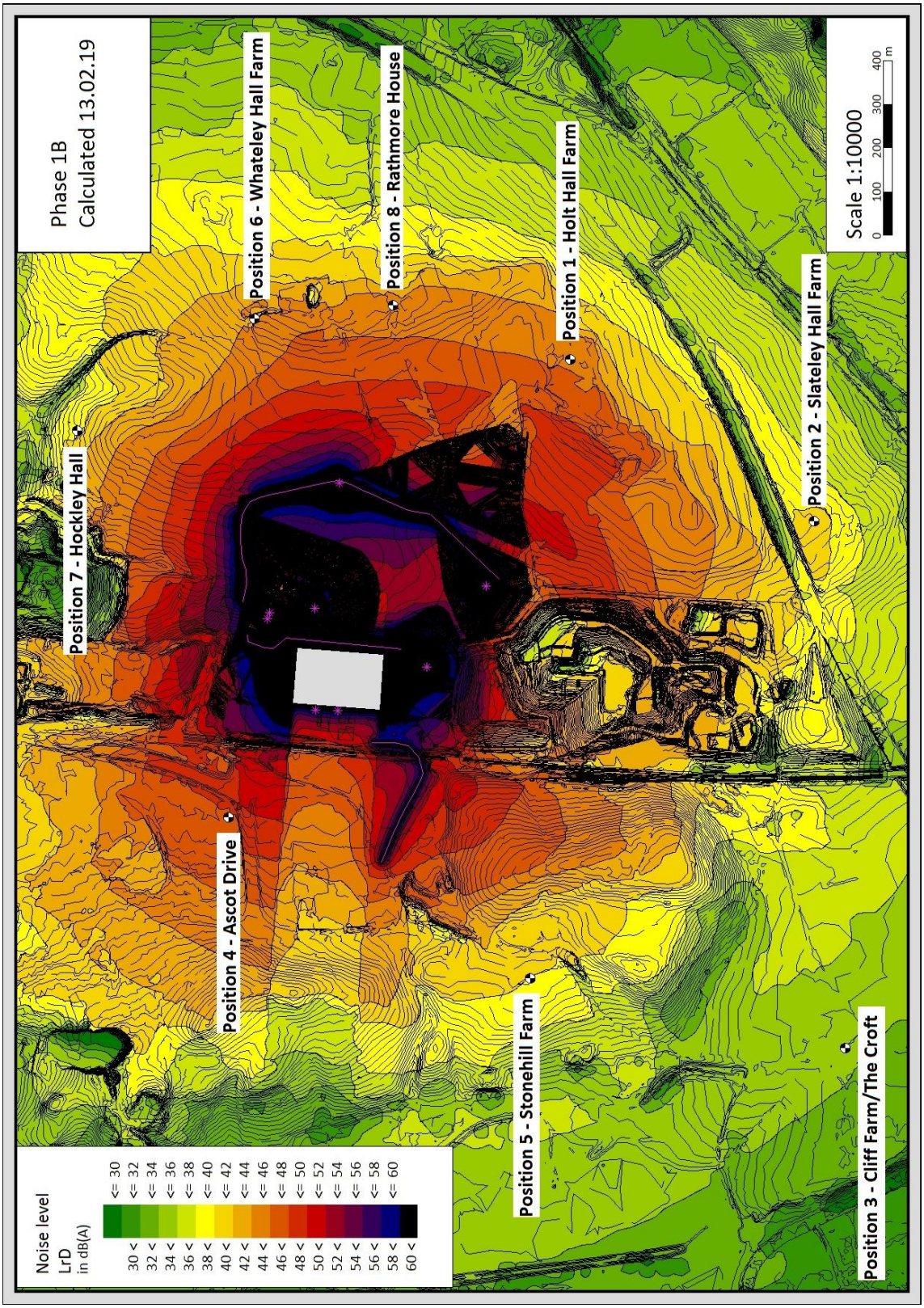
All plant items and operations have been input with a 100% on time

Dump Truck have been input as 24 movements per hour on each route at 15 kilometres per hour

HGV movements on the site access road have been input assuming 10 movements per hour at 15 kilometres per hour

Appendix H - SoundPLAN Noise Mapping Output

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Calculated 13.02.19
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Noise level
LrD
in dB(A)
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32 < <= 34
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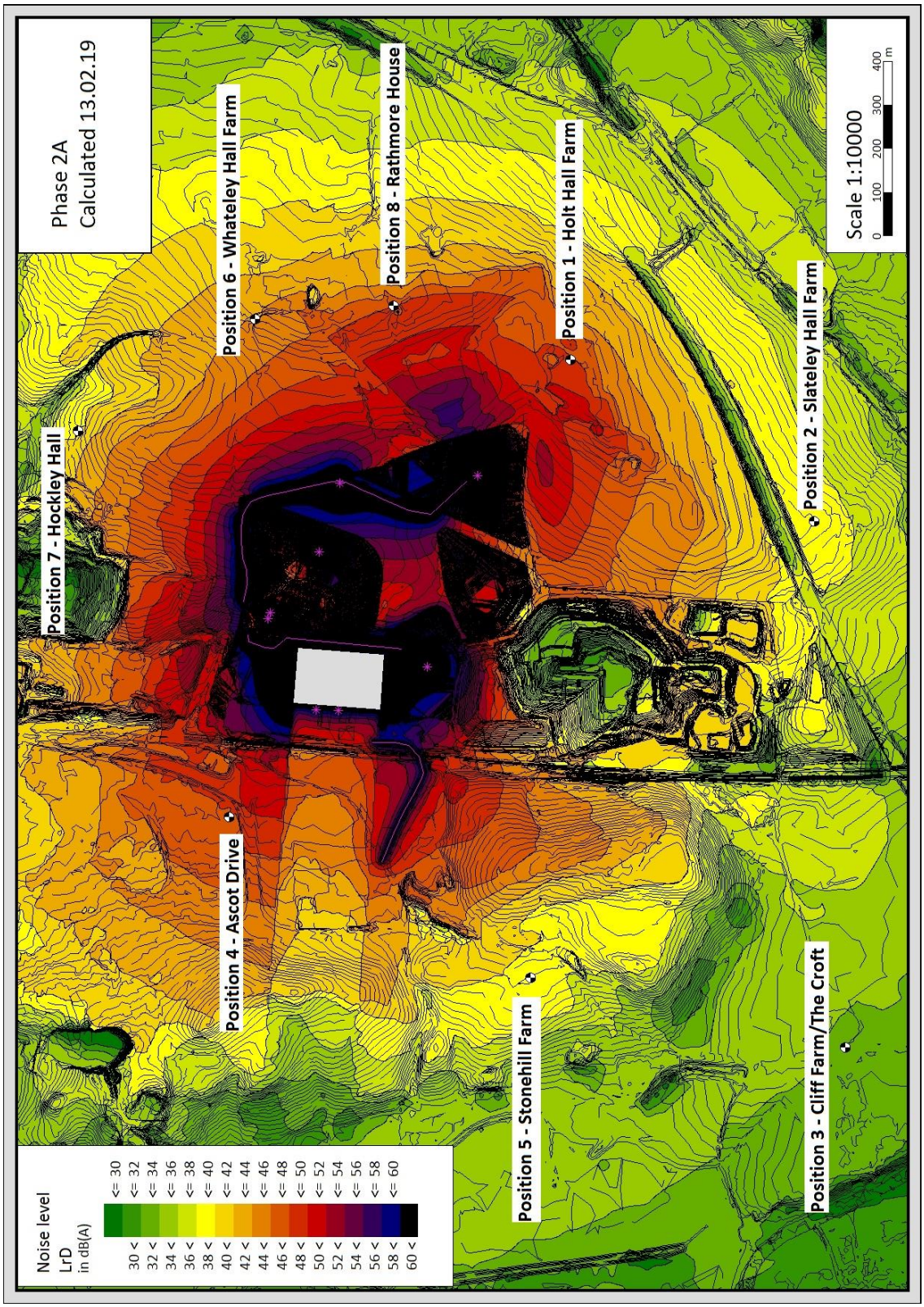
44 < <= 46
46 < <= 48
48 < <= 50
50 < <= 52
52 < <= 54
54 < <= 56
56 < <= 58
58 < <= 60
60 <
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 3 - Cliff Farm/The Croft
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 6 - Whateley Hall Farm
Position 7 - Hockley Hall
Position 8 - Rathmore House


Phase 2A
Calculated 13.02.19
Scale 1:10000
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Noise level
LrD
in dB(A)
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<= 32
<= 34
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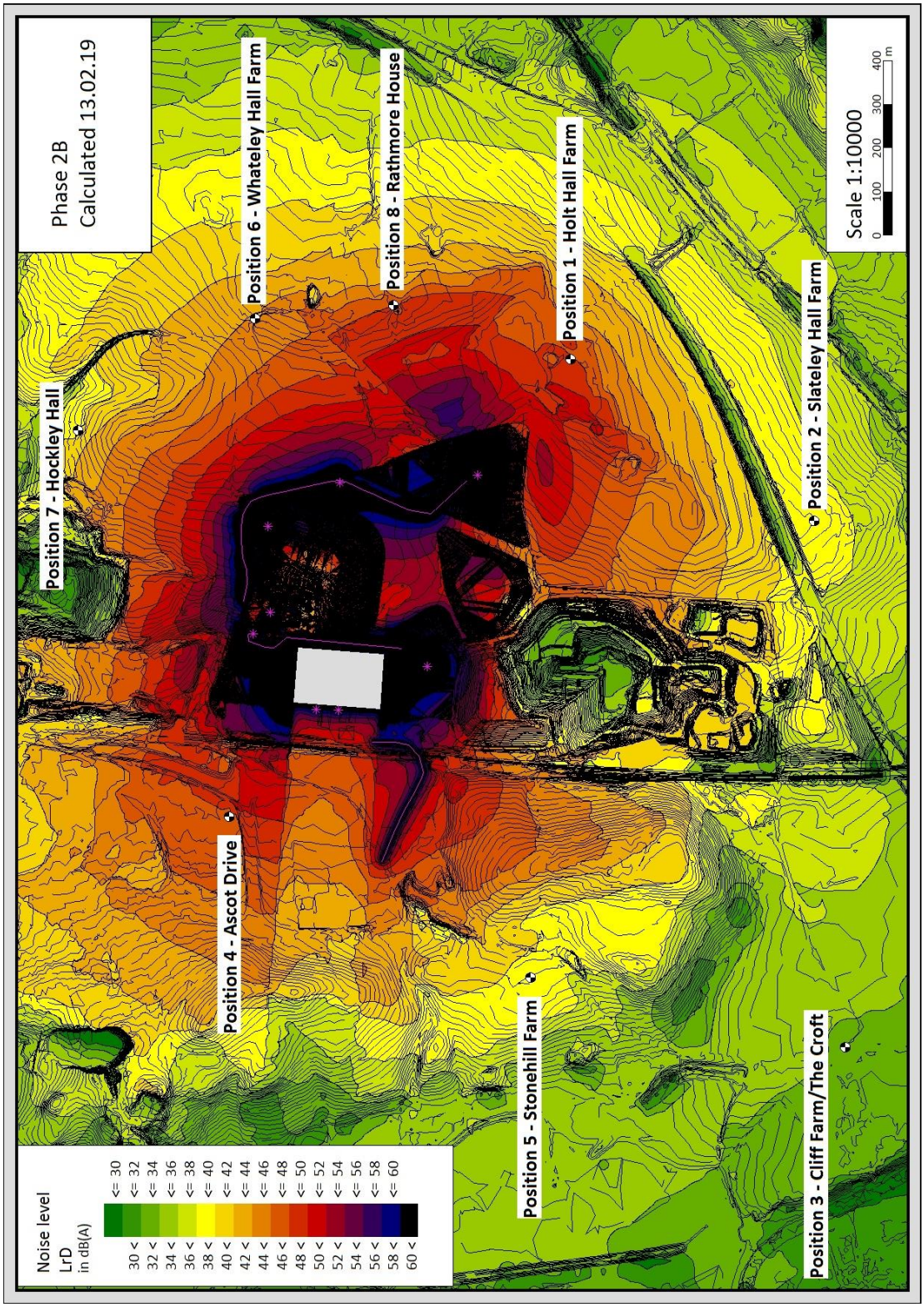
34 <
36 <
38 <
40 <
42 <
44 <
46 <
48 <
50 <
52 <
54 <
56 <
58 <
60 <
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 3 - Cliff Farm/The Croft
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 6 - Whateley Hall Farm
Position 7 - Hockley Hall
Position 8 - Rathmore House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Calculated 13.02.19
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Noise level
LrD
in dB(A)
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30 < <= 32
32 < <= 34
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38 < <= 40
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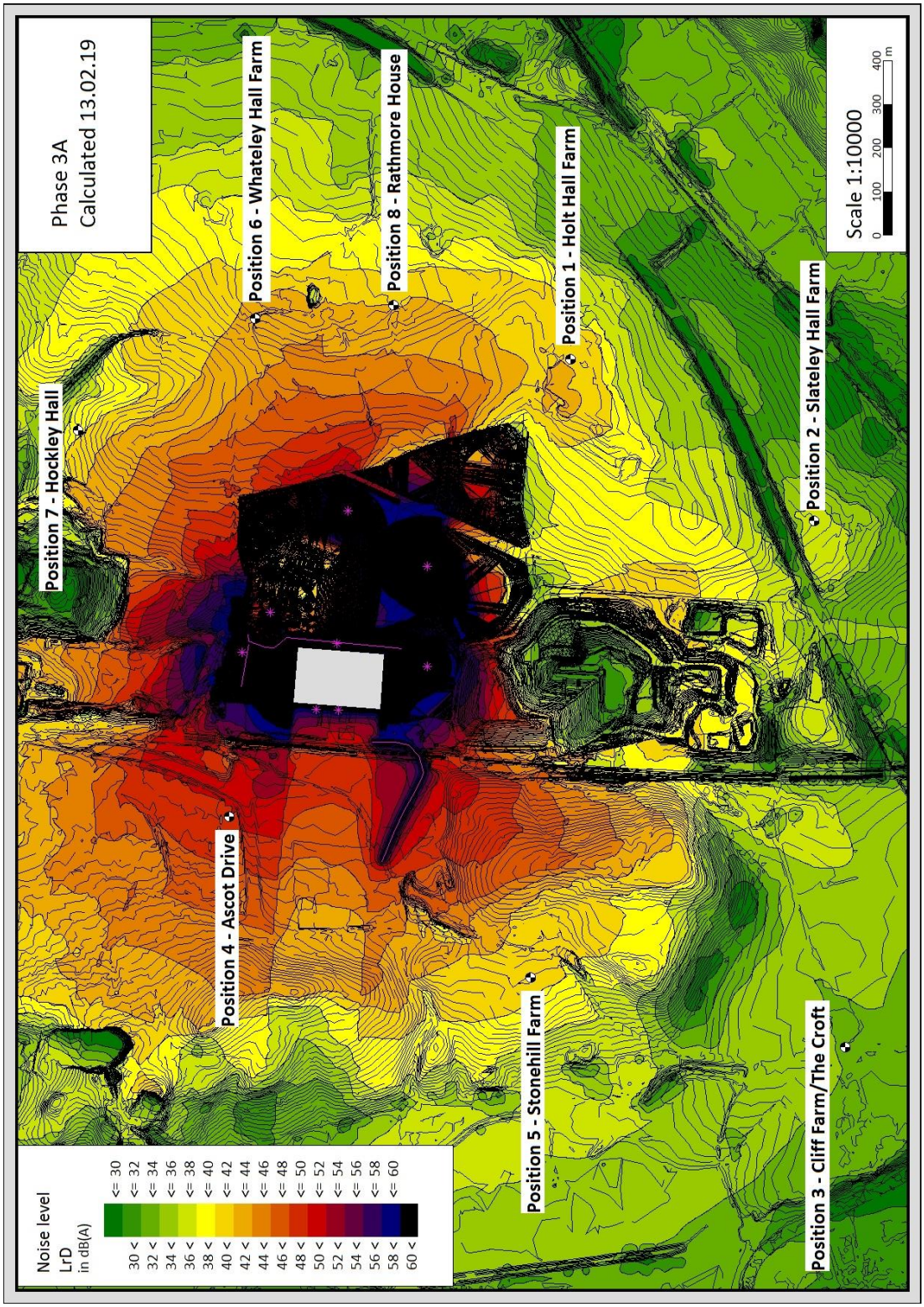
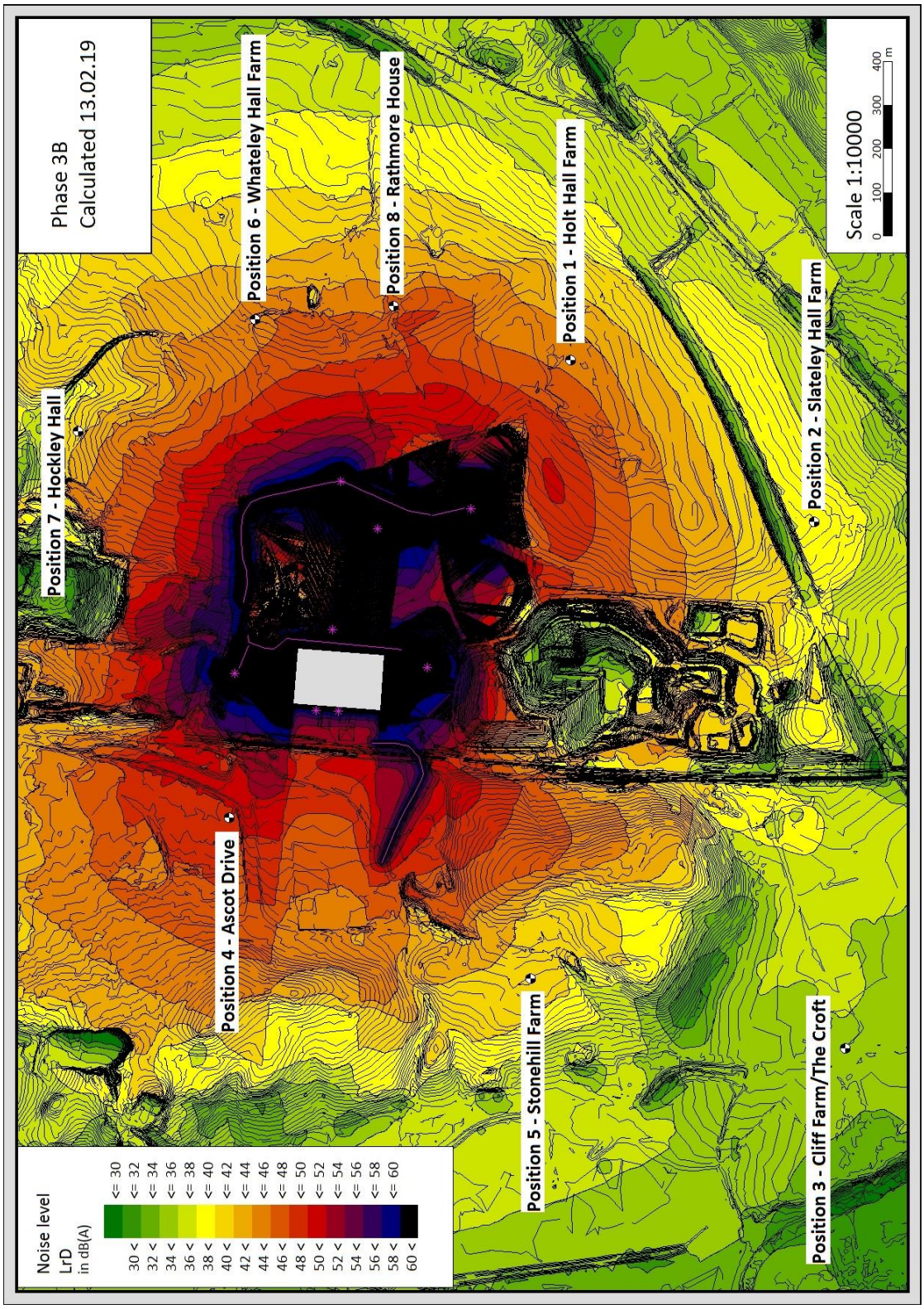
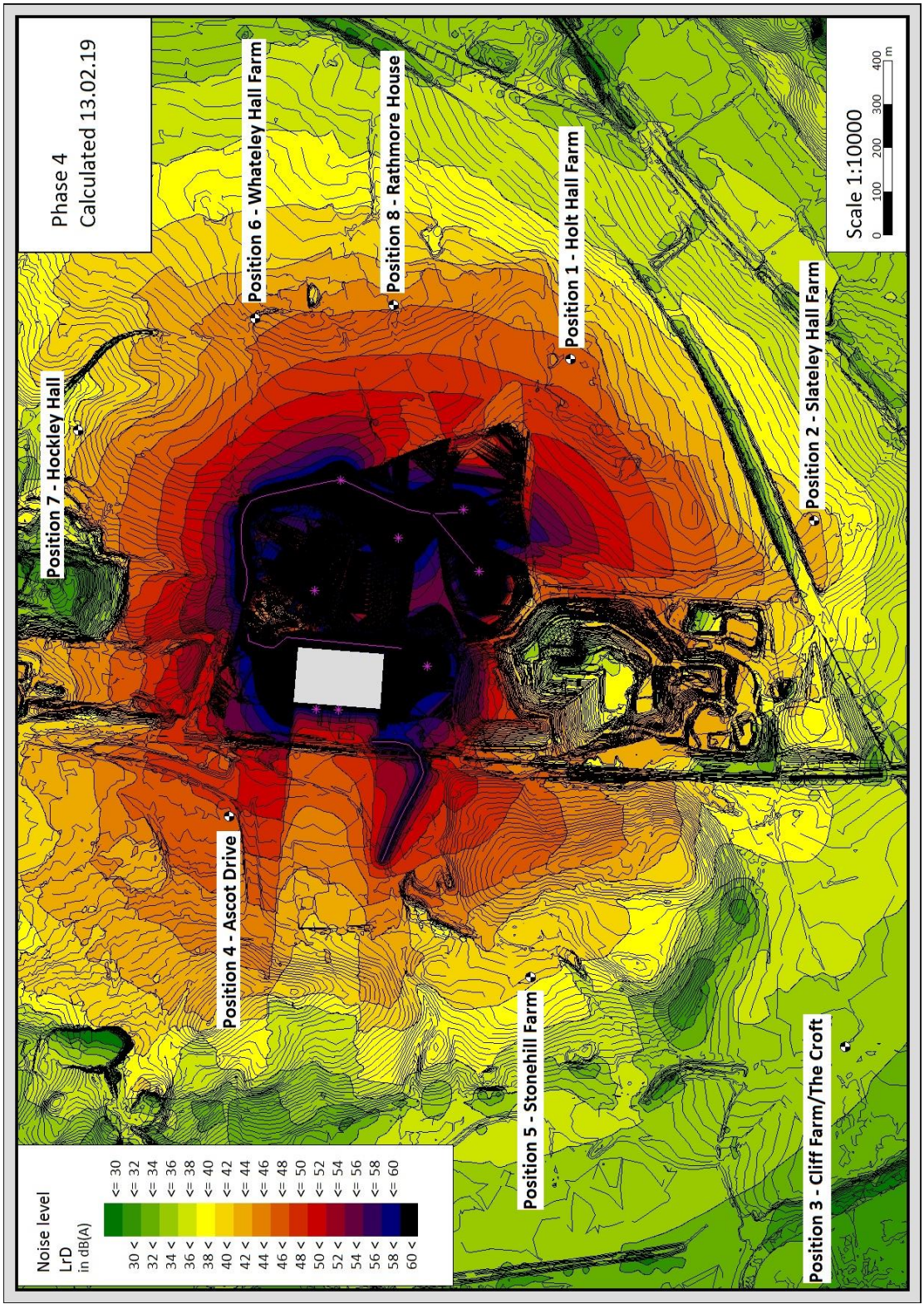
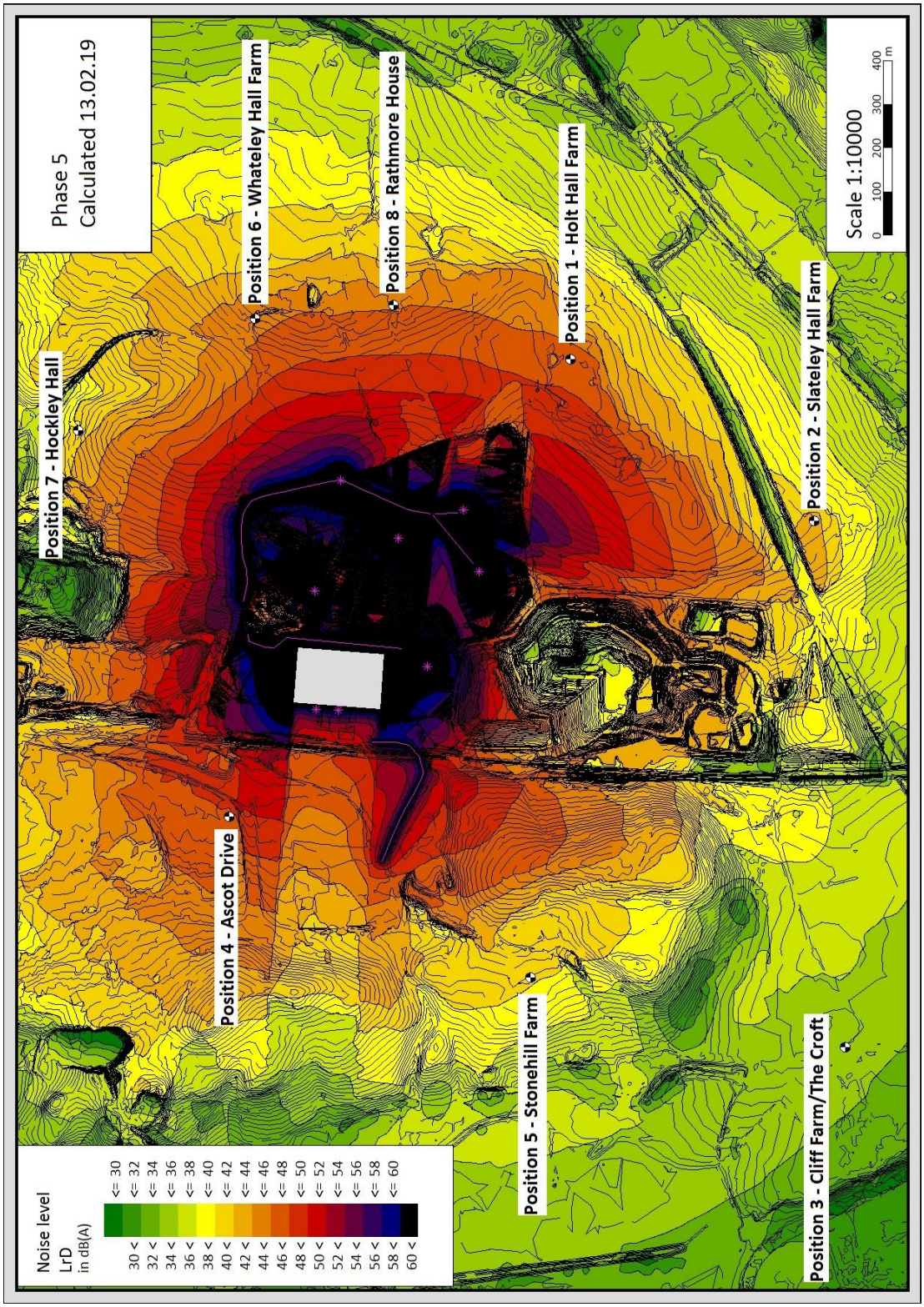
42 < <= 44
44 < <= 46
46 < <= 48
48 < <= 50
50 < <= 52
52 < <= 54
54 < <= 56
56 < <= 58
58 < <= 60
60 <
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 3 - Cliff Farm/The Croft
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 6 - Whateley Hall Farm
Position 7 - Hockley Hall
Position 8 - Rathmore House


Phase 3A
Calculated 13.02.19
Scale 1:10000
0 100 200 300 400 m
Noise level
LrD
in dB(A)
<= 30
30 < <= 32
32 < <= 34
34 < <= 36
36 < <= 38
38 < <= 40
40 < <= 42
42 < <= 44
44 < <= 46
46 < <= 48
48 < <= 50
50 < <= 52
52 < <= 54
54 < <= 56
56 < <= 58
58 < <= 60
60 <
Position 7 - Hockley Hall
Position 6 - Whateley Hall Farm
Position 8 - Rathmore House
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 3 - Cliff Farm/The Croft


Phase 3B
Calculated 13.02.19
Scale 1:10000
0 100 200 300 400 m
Noise level
LrD
in dB(A)
<= 30
<= 32
<= 34
<= 36
<= 38
<= 40
<= 42
<= 44
<= 46
<= 48
<= 50
<= 52
<= 54
<= 56
<= 58
<= 60
30 <
32 <
34 <
36 <
38 <
40 <
42 <
44 <
46 <
48 <
50 <
52 <
54 <
56 <
58 <
60 <
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 3 - Cliff Farm/The Croft
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 6 - Whateley Hall Farm
Position 7 - Hockley Hall
Position 8 - Rathmore House


Phase 4
Calculated 13.02.19
Noise level
LrD
in dB(A)
<= 30
<= 32
<= 34
<= 36
<= 38
<= 40
<= 42
<= 44
<= 46
<= 48
<= 50
<= 52
<= 54
<= 56
<= 58
<= 60
30 <
32 <
34 <
36 <
38 <
40 <
42 <
44 <
46 <
48 <
50 <
52 <
54 <
56 <
58 <
60 <
Position 7 - Hockley Hall
Position 6 - Whateley Hall Farm
Position 8 - Rathmore House
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 3 - Cliff Farm/The Croft
Scale 1:10000
0
100
200
300
400
m


Phase 5
Calculated 13.02.19
Scale 1:10000
0
100
200
300
400
m
Noise level
LrD
in dB(A)
<= 30
<= 32
<= 34
<= 36
<= 38
<= 40
<= 42
<= 44
<= 46
<= 48
<= 50
<= 52
<= 54
<= 56
<= 58
<= 60
30 <
32 <
34 <
36 <
38 <
40 <
42 <
44 <
46 <
48 <
50 <
52 <
54 <
56 <
58 <
60 <
Position 7 - Hockley Hall
Position 6 - Whateley Hall Farm
Position 8 - Rathmore House
Position 1 - Holt Hall Farm
Position 2 - Slateley Hall Farm
Position 4 - Ascot Drive
Position 5 - Stonehill Farm
Position 3 - Cliff Farm/The Croft