Technical Appendix F

Noise Assessment

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ADVANCE
ENVIRONMENTAL

ASSESSMENT OF THE POTENTIAL ENVIRONMENTAL NOISE IMPACT FROM DEEPENING OF WORKINGS AND TIME EXTENSION AT AGGREGATE INDUSTRIES UK LIMITED BACK LANE QUARRY CARNFORTH LANCASHIRE

Assessment of the Potential Environmental Noise Impact

from

deepening of workings and time extension

at

Aggregate Industries UK Limited

Back Lane Quarry

Carnforth

Lancashire

Report submitted to:-

Heatons

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Date:

26 January 2024

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EXECUTIVE SUMMARY

Aggregate Industries UK Limited proposes deepening the workings at their Back Lane Quarry near Carnforth in Lancashire below the currently permitted floor of 38 metres AOD in the extraction void and extending the life of the site to allow for quarrying operations to continue until 31 December 2077 with restoration of the site to be completed by 31 December 2078. The operations will not expand the already permitted working footprint of the site.

The application is for permission to extract the limestone reserves to a depth of minus 37 metres AOD (i.e. an additional depth of 75 metres). The application also allows for the joint working of the boundary between Back Lane Quarry and Leapers Wood Quarry

The intention of this assessment is to establish that the ongoing mineral extraction operations on the site with increasing depth of workings would not be expected to generate noise levels that would exceed the existing site noise limits at the nearest residential properties to the site.

The intention of the application is to seek permission to continue the already permitted operations on the site within the existing operational boundaries, but to a greater depth than the currently permitted 38 metres AOD.

The routine noise monitoring of the site has been reviewed to establish that the site noise levels have been shown to comply with the site noise limits stipulated in the latest ROMP for the site in 2006 (ref: 1/03/1186).

The noise criteria in place for the site are in line with current advice from the government contained in the web document *'Planning Practice Guidance'*, dated March 2014 and the *'Minerals'* and *'Noise emissions'* elements of the guidance.

The review of the site noise monitoring has confirmed that the site noise levels have not been shown to have exceeded the site noise limits in around twenty years of monitoring. Records also indicate that there have been not complaints received by the site regarding noise relating to the site.

Consideration of the site plans provided by the operator and the topography of the site in relation to the nearest noise sensitive receptors have been used to demonstrate that site noise levels at the receptors will be no higher than the current levels and the proposals will therefore have no increased impact on the amenity of the area.

The consistent compliance with site noise limits that are in line with current government guidance regarding noise from minerals site and the increasing depth/barrier attenuation afforded by the existing topography demonstrates that the site can continue to be worked within environmentally acceptable noise levels.

1. INTRODUCTION

1.1 Aggregate Industries UK Limited (AIUK) is submitting an application for the deepening of existing quarry operations and an extension of time for the quarrying operations to continue until 31 December 2077, with restoration being completed a year later, by 31 December 2078.

1.2 The application boundary is not to increase from the area already permitted under the Review of Mineral Permission (ROMP) granted in 2006 (ref: 1/03/1186) and the extant planning permission for the site (ref: 01/09/0360) and therefore the workings will be no closer to the nearest dwellings.

1.3 As the operations are to continue in the existing extraction area to a greater depth (a further 75 metres to minus 37 metres AOD from the currently permitted floor of 38 metres AOD), there will be no requirement for soil stripping or bund formation operations that are considered temporary operations (with a higher site noise limit) in Planning Practice Guidance (Minerals).

1.4 The mineral extraction operations, processing operations and use of the asphalt plant and concrete block works will not change from the current situation.

1.5 The access arrangements will remain as for the current operations on site.

1.6 It is not proposed to vary the operating hours of the site from those permitted in the current planning permission for the site (ref: 01/09/0360).

1.7 Following completion of the mineral extraction works, the void will be restored in accordance with the restoration scheme.

1.8 The intention of this assessment is to establish that the noise impact of the continuation of the existing site operations with mineral extraction to a greater depth, would not be expected to generate noise levels at the nearest noise sensitive properties that would exceed the existing site noise limits as required by extant planning permission conditions.

1.9 Site noise monitoring data at the nearest residential locations where monitoring has been undertaken has been reviewed to establish the ongoing compliance of site noise with those limits.

1.10 Consideration of the site plans and the topography to explain why there is a potential increase in noise attenuation due to the greater depth of workings has been included in the assessment to demonstrate that site noise levels will not increase.

1.11 A glossary of acoustic terms is included as Appendix A. Plans showing the application boundary and the phasing (as well as the nearest noise sensitive receptors/dwellings) are included as Appendix B.

2. SITE DESCRIPTION

2.1 Back Lane Quarry is in the jurisdiction of Lancaster City Council and Lancashire County Council being situated to the south-east of Carnforth in Lancashire.

2.2 The site is bounded to the north by the adjoining Leapers Wood Quarry operated by Tarmac Trading Limited, to the east by woodland, to the south by agricultural land and to the west by woodland, with the M6 beyond.

2.3 Leapers Wood quarry is operated by Tarmac Trading Limited and is immediately adjacent to the site with a common nominal boundary separating the two sites. A concurrent application is being submitted on behalf of Tarmac for the deepening of the workings at Leapers Wood Quarry to the same depth to allow for joint working of the boundary between the two quarries. This application is considered in the section of this assessment relating to cumulative impact.

2.4 Carnforth is the located to the west of the site and is the nearest substantial residential area with the nearest dwellings on the edge of the town being around 400 metres to the north-west of the extraction area beyond the M6 motorway.

2.5 There are a isolated residential properties located within 1 kilometre of the site.

2.6 Hawthorns Caravan Park is located approximately 90 metres to the south-west of the southern-most part of the site (southern site entrance) and approximately 280 metres from the mineral extraction area.

2.7 Newlands Farm lies approximately 280 metres south-west of the southern site entrance and approximately 500 metres south of the extraction area.

2.8 Wayside lies approximately 210 metres to the south-east of the southern site entrance and 350 metres south-east of the extraction area.

2.9 Other properties including Kit Bill Lodge, The Helks and an adjacent residential property lie between 280 metres and 340 metres east of the extraction area.

2.10 The site access is from the west on Back Lane.

2.11 The site includes processing operations (crushing and screening) and an asphalt plant on the plant site on the western side of the application area. There is also a concrete block works in the south-east part of the site.

2.12 The nearest Listed Building to the site is the Grade II listed Birkland Barrow Farmhouse, located around 600 metres to the east.

2.13 There are two Sites of Special Scientific Interest (SSSI) within 2 kilometres of the site.

2.14 Crag Bank SSSI is a 3.7 hectare biological designation located around 1.5 kilometres to the west of the site. Thwaite House Moss SSSI is a 7.25 hectare biological designation approximately 1 kilometre to the south-west of the site.

2.15 The Forest of Bowland Area of Outstanding Natural Beauty (AONB) and the Arnside and Silverdale AONB lie around 1.7 kilometres to the east and 1.8 kilometres to the west respectively.

2.16 There are no points of public access into the site at Back Lane Quarry. A Public Footpath (PROW ref: 1-24-FP 7) runs north to south along the eastern side of Kit Bill Wood, east of Back Lane Quarry reaching Main Road. Here it runs parallel with Main Road before heading east to west (PROW ref: 1-22-FP 5) across the agricultural fields to the south of Back Lane Quarry.

2.17 A plan showing the application boundary including the plant site, the extraction area and the nearest residential receptors at which site noise is routinely monitored is included as Appendix B.

3. EXISTING SITE NOISE LIMITS

3.1 The site falls within the jurisdiction of Lancashire County Council and is currently operated under various planning permission for the different elements of the site.

3.2 The mineral operations on site are covered by an Environment Act 1995 Review of Mineral Permission (ROMP) granted in 2006 (ref: 1/03/1186) which permits quarrying operations until 29 April 2048 (with restoration to be completed within a year).

3.3 The ROMP was varied by planning permission reference 1/09/360 in July 2009 which allowed the controls on stockpile heights to be amended.

3.4 The extant planning permission contains the following conditions relating to noise including Condition 22 stipulating site noise limits and Condition 26 requiring the site noise monitoring scheme that is the basis for the ongoing site noise monitoring:-

"Noise

21. All plant, equipment and machinery used in connection with the operation and maintenance of the site shall be equipped with effective silencing equipment or sound proofing equipment to the standard of design set out in the manufacturer's specification and shall be maintained in accordance with that specification throughout the development.

22. Noise emitted from the site shall not exceed 55dB LAeq (1 hour) (free field) when measured from any of the following properties at the point closest to the noise source.

a) Wayside NGR 518 686
b) Helks Wood Farm NGR 521 691
c) Hawthorns Caravan Park NGR 514 684
d) 94 Windermere Road NGR 504 697

23. Notwithstanding condition 22, outside of the hours of 0700 to 2100 hours Monday to Friday, 0700 to 1300 on Saturdays and at any time on Sundays and Public Holidays, noise emitted from the site shall not exceed 42 dB LAeq (1 hour) (free field) as defined in this permission when measured from any of the properties listed in condition 22.

24. The noise limits set out in condition 22 above shall not apply during the stripping of soils or overburden on the site, the construction of storage mounds for these materials and their respreading during restoration of the site or the construction of landscape or baffle mounds. Noise from any of these activities shall not exceed 70dB LAeq (1 hour) (free field), as defined in this permission as measured from any of the properties identified in condition 22 at a point closest to the noise source. This condition shall only apply for not more than 20 days in one calendar year unless otherwise agreed in writing by the County Planning Authority. A Written record shall be made of the dates that these activities are taking place and shall be made available to the County Planning Authority on request.

25. The reversing warning systems contained in the scheme and programme approved by the County Planning Authority on 20 August 2007 shall be installed and used on all existing mobile plant and equipment used on the site and to all new plant and equipment before it is used on the site.

26. Within six months of the date of this schedule of conditions, a scheme and programme of noise monitoring for the site shall be submitted to the County Planning Authority for approval in writing. The scheme and programme shall provide for the following:

a) A programme of noise monitoring at the properties listed in condition 22 above or any other property from which a noise complaint is received.

b) The equipment to be used and the information to be recorded including weather conditions, activities taking place at the site and the plant equipment being used during the monitoring period.

c) The frequency of monitoring.

d) Details for the reporting of results to the County Planning Authority.

e) Procedures to be adopted if noise levels are recorded above the levels identified in conditions 22 and 23 above.

f) A timescale for the implementation of the monitoring scheme."

3.5 It is not proposed to alter the existing site noise limits and this assessment considers those limits to remain valid and consequently the noise impact of the proposals is assessed in the context of those limits.

3.4 The following noise monitoring locations representative of the nearest dwellings are used for site noise monitoring on an annual basis:-

- The Hawthorns Caravan Park; and
- Helks Wood Farm.

4. REVIEW OF SITE NOISE MONITORING

4.1 Site noise monitoring at the nearest noise sensitive receptors to Back Lane Quarry has been undertaken by Advance Environmental Limited on behalf of the operator for around twenty years.

4.2 The aims of the monitoring are to:

- Determine the noise impact of the current site operations at the potentially noise sensitive receptors stated in the approved Environmental Scheme (ES); and
- Compare measured noise impact levels against the permissible noise levels, stated in Planning Permission Ref. 1/86/636 and reproduced in the approved ES.

4.3 The measurements were undertaken at the monitoring locations in the presence of a suitably trained technician whilst the quarry was fully operational and were made in accordance with the methods outlined in BS 4142: 2014, 'Method for rating industrial and commercial sound' (British Standards Institution) and BS5228-1:2009 + A1:2014, Code of practice for noise and vibration control on construction and open sites. Annex G (British Standards Institution)..

4.4 The data from the last three years of noise monitoring data has been summarised in the following table for comparison with the site noise limits.

Location	**Measured Noise Level** dB $L_{Aeq,\ 15\ minutes\ free\ field}$			**Site Noise Limit** dB $L_{Aeq,\ 1\ hour\ free\ field}$
	August 2020	**August 2021**	**July 2022**	
Hawthorns Caravan Park	46	41	49	55
	44	40	45	
Helks Wood Farm	44	42	47	55
	41	44	44	

4.5 As can be seen from the table the overall measured noise levels including extraneous noise (L_{Aeq}) are well below the site noise limits during all the measurement periods examined.

4.6 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 BS 5228 for Construction and Open site noise; Planning Practice Guidance for Minerals and BS 7445 for the Description and Measurement of Environmental noise.

4.7 Observations made by the technician during the surveys indicated that site noise was inaudible at both locations in 2020, just audible at Helks Wood Farm and inaudible at Hawthorns Caravan Park in 2021 and audible at Helks Wood Farm and generally inaudible at Hawthorns Caravan Park in 2022.

4.8 Based on the ongoing site noise monitoring data, site noise is generally inaudible and is demonstrated to be well below the site noise limits stipulated in the latest planning permission for the site (which is in line with current government guidance).

5. CONSIDERATION OF INCREASED DEPTH/BARRIER ATTENUATION

5.1 The proposed deepening of the mineral extraction area and amended end date of the site operations do not alter the working area of the site. The site operations will not change and those operations will be no nearer to the nearest noise sensitive receptors than is currently the case.

5.2 With the only change from the current scenario being the ground height for the mineral extraction operations, the distance from the ongoing operations to the nearest receptors will only increase.

5.3 As well as a small increase in working distance, there is the potential for greater noise attenuation at the receptors due to the working face of the quarry/topography because of the increased path difference.

5.4 The calculation of barrier attenuation is mainly based on the path difference between the direct path from source to receptor and the altered path over the barrier. As the depth of working increases, this difference will also increase resulting in greater attenuation.

5.5 The calculation method for external noise propagation in BS5228-1:2009+A1:2014 *'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise'* calculates the adjustment for screening/barrier attenuation as follows:

$10\log_{10}(3+20*\text{PATH DIFFERENCE}*2*\text{OCTAVE BAND DATA}/340)$
or the upper limit as defined in Figure 3 in BS5228 Annex F.

5.6 Based on calculations for Hawthorn Caravan Park, the barrier attenuation afforded by the working face of the quarry at Back Lane using the current ground heights is close to the limit that allowed for by the calculation method and therefore this would not be the best means of demonstrating the change due to increasing depth.

5.7 However, one can examine the influence of an increase in path difference in more general terms.

5.8 The path difference is calculated based on Figure 3 in BS5228 Annex F (i.e. the sum of the two slanted distances over the barrier minus the single non-slanted distance without the barrier in place).

5.9 The octave band data is that input for the plant item in each band and this is conducted for all bands considered and then summed logarithmically.

5.10 Any increase in the depth of working will increase the path difference and result in potentially greater noise attenuation. An increase of up to 75 metres in depth from the permitted floor of the quarry (not the current working level) would result in highly significant barrier attenuation as well as a substantial increase in distance between source and receiver.

5.11 As site noise monitoring over the last twenty years has indicated that site noise (even at the top of the mineral) has complied with the site noise limits throughout the life of the site and working at greater depth will result in potentially greater barrier attenuation for the nearest dwellings to the site, the proposed deepening and continued mineral extraction operations should not constitute an increase in site noise levels or an adverse impact on the dwellings.

6. CUMULATIVE NOISE IMPACT

6.1 The Back Lane Quarry site is located immediately adjacent to the Leapers Wood Quarry that is operated by Tarmac Trading Limited sharing a common boundary to the north of Back Lane Quarry.

6.2 The two sites are separated by a nominal boundary that is proposed to be worked as part of this application and the similar concurrent application by Tarmac for deepening of the workings (and a time extension) at Leapers Wood Quarry.

6.3 Both sites are subject to the same site noise limit of 55 dB $L_{Aeq,\ 1\ hour\ free\ field}$ and the permissions on noise for the two sites share three common receptors.

6.4 Site noise monitoring at Back Lane Quarry demonstrates that those site noise limits have been consistently complied with over the past twenty years.

6.5 Site noise monitoring at Leapers Wood Quarry has not been required over this period as there have been no complaints regarding noise at the site.

6.6 The site noise monitoring for Back Lane Quarry has shown that the overall measured noise levels (including both sites and extraneous noise such as M6 road traffic noise) are significantly below the site noise limits for both sites.

6.7 The applications for both sites do not involve any increase in site operations, no changes to the processing plant site and associated plant items, no changes to the access to either site and no alteration to the operating hours.

6.8 As such, the only change in the workings will be the depth of working, with an increase in depth only resulting in lower site noise levels at the nearest dwellings to either site.

6.9 As both sites are satisfying the noise conditions in the permissions that are in place until 2048 with regard to cumulative noise levels and the deeper workings would increase the barrier attenuation and therefore reduce the site noise levels at the nearest dwellings due to mineral extraction, there is expected to be no adverse impact on the nearest noise sensitive receptors to the site from the proposed deepening of both quarries.

7. SUMMARY AND CONCLUSIONS

7.1 Aggregate Industries UK Limited (AIUK) is submitting an application for the deepening of existing quarry operations and an extension of time for the quarrying operations to continue until 31 December 2077, with restoration being completed a year later, by 31 December 2078.

7.2 The application boundary is not to increase from the area already permitted under the latest ROMP for the site in 2006 (ref: 1/03/1186) and the extant planning permission from 2009 (ref: 01/09/0360) and therefore the workings will be no closer to the nearest dwellings to the site.

7.3 As the operations are to continue in the existing extraction area to a greater depth, there will be no requirement for soil stripping or bund formation operations that are considered temporary operations (with a higher site noise limit) in Planning Practice Guidance (Minerals).

7.4 The mineral extraction operations, processing operations and use of the asphalt plant and concrete block works will not change from the current situation.

7.5 Following completion of the mineral extraction works, the void will be restored in accordance with the restoration scheme.

7.6 The intention of this assessment is to establish that the noise impact of the continuation of the existing site operations with mineral extraction to a greater depth, would not be expected to generate noise levels at the nearest noise sensitive properties that would exceed the existing site noise limits as required by extant planning permission conditions or increase the site noise levels at the dwellings from the current levels.

7.7 Site noise monitoring data at the nearest residential locations where monitoring has been undertaken has been reviewed to establish the ongoing compliance of site noise with those limits.

7.8 Consideration of the site plans and the topography to explain why there is a potential increase in noise attenuation due to the greater depth of workings has been included in the assessment to demonstrate that site noise levels will not increase.

7.9 Site noise monitoring over the last twenty years has indicated that site noise (even at the top of the mineral) has complied with the site noise limits throughout the life of the site. Allied to this, working at greater depth will result in potentially greater barrier attenuation for the nearest dwellings to the site and therefore the proposed deepening and continued mineral extraction operations should not constitute an increase in site noise levels or an adverse impact on the dwellings.

7.10 The site can therefore continue to be worked within environmentally acceptable noise levels.

7.11 The cumulative impact of the continuing operations at Back Lane Quarry with the operations at the adjacent Tarmac Leapers Wood Quarry has also been examined and shown to be of low impact.

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APPENDICES

Appendix A
Glossary of Acoustic Terms

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. Two frequencies are said to be a third-octave apart if the frequency of one is 1.26 times the other.

There are recognised 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 that particular octave or third octave band.

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 $L_{Aeq,T}$ unit was commended by the Noise Advisory Council and is the chosen unit of BS5228 for Construction and Open site noise, BS 7445 for the 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.

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 bypasses.

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.

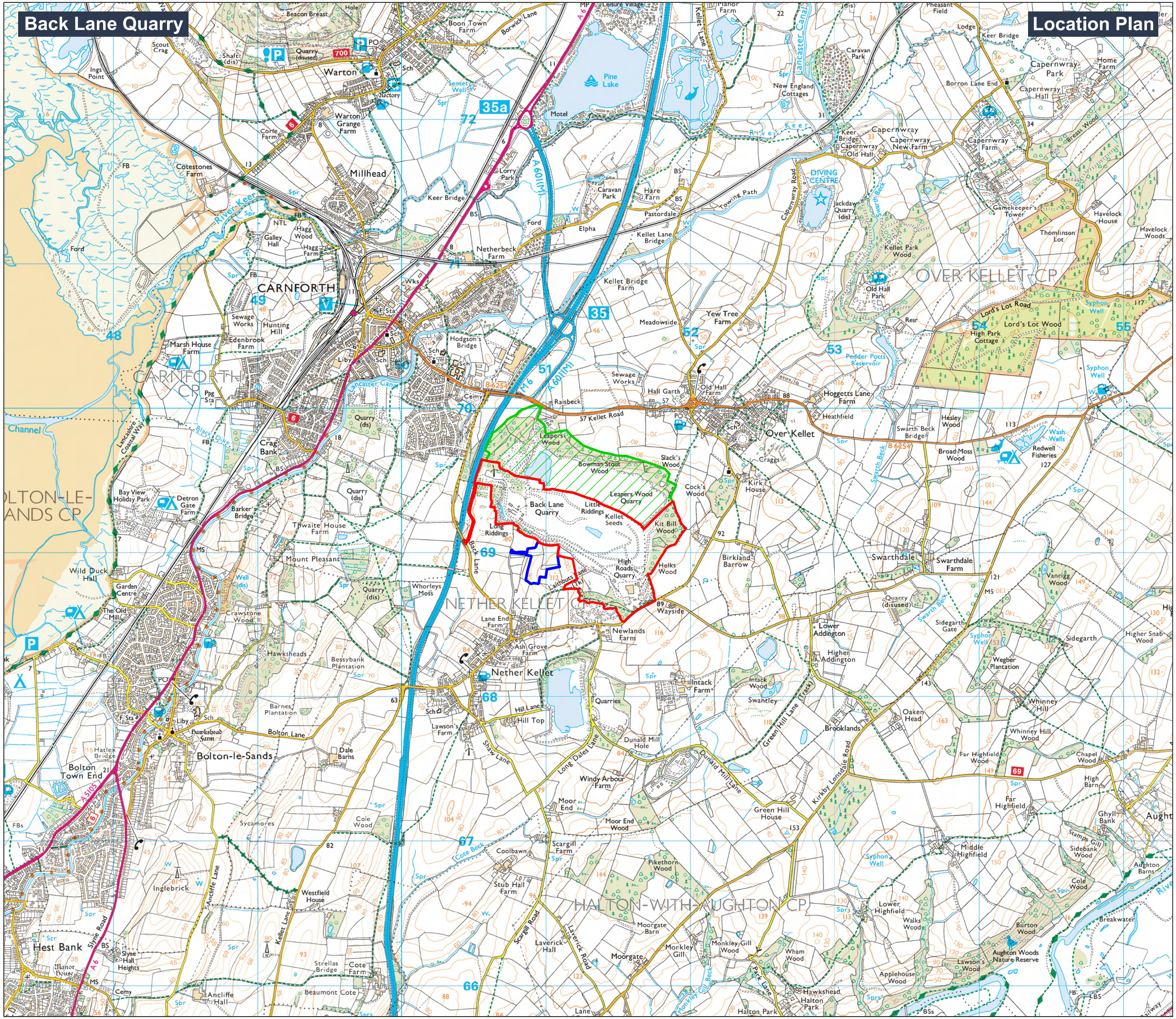
$L_{A90,T}$ is the 'A'-weighted level exceeded for 90% of the time interval T, and is often used to describe the underlying background noise level.

Appendix B

Site Plans Showing Application Boundary, Phases and Nearest Receptors

Back Lane Quarry

Location Plan



LEGEND

- Application Boundary
- Other Land Under the Ownership of the Applicant
- Leapers Wood Quarry

KEDD Limited

PROJECT:
Back Lane Quarry

TITLE:
Location Plan

REF NO:
KD.BKLN.1.D.006

DATE:
December 2023

SCALE:
1:25,000 @ A3

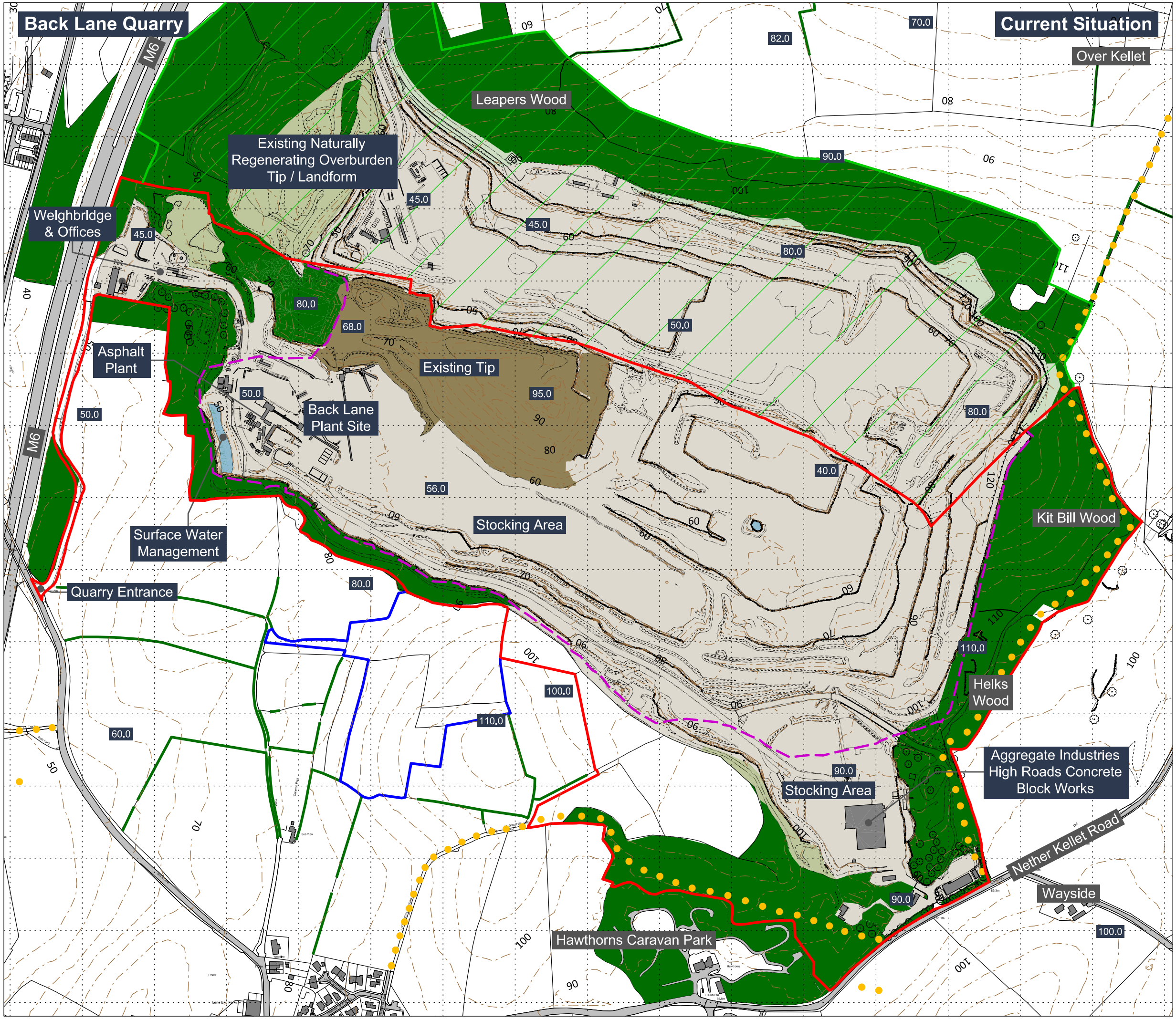
STATUS:
FINAL

N

Fox Studio, Much Wenlock, Shropshire TF13 6BL

Back Lane Quarry

Current Situation



LEGEND

- Application Boundary
- Other Land Under the Ownership of the Applicant
- Leapers Wood Quarry
- Surrounding Woodland / Vegetation Structure
- Buildings & Roads
- Disturbed Land - Leapers Wood & Back Lane Quarries
- Existing Overburden Tip / Landform
- 70.0 Contours (5m Intervals) & Spot Heights (m AOD)
- Limit of Permitted Extraction
- Public Rights of Way (PROW)

AGGREGATE INDUSTRIES

KEDD Limited

PROJECT:
Back Lane Quarry

TITLE:
Current Situation

REF NO:
KD.BKLN.D.1.010

DATE:
December 2023

SCALE:
1:5,000 @ A3

STATUS:
FINAL

N

Fox Studio, Much Wenlock, Shropshire TF13 6BL