



Noise Assessment

**Proposed Processing and
Storage of Road Planings,
Borras Quarry, Clwyd**

**BREEDON SOUTHERN
LIMITED**

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REPORT DETAILS

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QUALITY ASSURANCE

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			J Mape Consultant	A Pickford MIOA Consultant	D B Johnson MIQ Director
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1.0 INTRODUCTION

1.1 Overview

- 1.1.1 Vibrock Limited has been commissioned to undertake a noise impact assessment to accompany a planning application for the proposed processing and storage of road planings (herein referred to as the development) at Borras Quarry, Wrexham.
- 1.1.2 This study benefits from a site inspection and sound level monitoring of plant and activities associated with current operations at Borras Quarry in December 2019.
- 1.1.3 An assessment of the potential impact of the proposed development at the nearest noise sensitive receptor has been made using the internationally recognised noise modelling software CadnaA to predict the likely future noise levels should the development be permitted. The development is then assessed via comparison of the potential noise levels against the limits stipulated within the site's current planning permission.
- 1.1.4 Further explanation of the terminology used within this report is provided in Appendix 1.

1.2 Proposals

- 1.2.1 A location plan and proposed site layout for the proposed development is provided in Figures 1 and 2 respectively. The development comprises the following plant and storage facilities:
 - Four Pre-coated Chippings Processing Bays
 - Storage Shed (dimensions 40m x 20m x 20m)
 - Caterpillar 950H wheeled Loading Shovel
 - Rotopack 963 Impact Crusher
 - Single deck screen
 - 20,000 tonne stock area
- 1.2.2 It has been assumed that there will be approximately 8 HGV movements per hour associated with the new facility.
- 1.2.3 Current processing hours at Borras Quarry are as follows:

06:30 – 16:30 (with permission to operate until 22:00)	Monday to Friday
06:30 – 12:00	Saturdays
- 1.2.4 The current operations at Borras Quarry and the proposed development including all of the above plant and associated infrastructure have been considered within this assessment.

1.3 Existing Noise Controls

- 1.3.1 Noise levels from operations at the site are currently controlled via the following condition of Planning Permission ref. HOL P/2003/0579.

28. Except with the prior written agreement of the Minerals Planning Authority, noise emissions from operations carried out at the Site (excluding soil stripping and replacement, baffle mound construction, removal of soil heaps, the construction of the Borras Road crossing and other similar operations) shall not exceed the following noise levels in dBL_{aeq} (1 hour) at the specified monitoring location, when measured at a height of 1.5 metres above the ground and in free-field conditions:

Monitoring locations	Free-field L _{aeq} 1 hour Noise Limits (dB)			
	Monday to Saturday 0630 – 0730 hours (excluding Bank Holidays)	Monday to Friday 0730-1800 hours and Saturday 0730-1300 (excluding Bank Holidays)	Monday to Saturday 1800 – 2200 hours (excluding Bank Holidays)	Any other time
1. Sandrosa	52	55	45	42
2. Canister Cottages	47	48		
3. Woodlands Farm	48	50		
4. Borras Head Cottages	46	48		
5. Mosshall Cottage	45	45		
6. Borras hall	50	55		
7. The Cottage, Borras Hall Lane	47	48		
8. Llanypwll Farm	55	55		
9. Samida	52	55		

All measurements shall be determined at the facade of the location facing the quarry and the associated noise source. The applicant shall submit, every two months, to the Minerals Planning Authority a noise report detailing noise levels as determined at each of the nine monitoring locations. The measurements shall be carried out at times representative of the operations carried out at the quarry and representative of the times detailed in the noise condition.

- 1.3.2 Location 6 Borras Hall has been identified as the nearest sensitive receptor located approximately 150 metres to the north-east of the proposed development site.
- 1.3.3 The baseline acoustic environment has previously been established via the measurement of the background noise level at noise-sensitive locations in the vicinity of the site. The planning condition noise limits detailed above have been set relative to these background noise levels and with reference to national planning guidance for mineral sites as detailed in Section 2 of this report.

2.0 NOISE POLICY AND GUIDANCE

2.1 Planning Policy Wales (PPW)

- 2.1.1 Planning Policy Wales sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.
- 2.1.2 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

Minerals

- 2.1.3 The role of the planning authority in relation to mineral extraction is to balance the fundamental requirement to ensure the adequate supply of minerals with the protection of amenity and the environment. The key principles are to:
- provide positively for the safeguarding and working of mineral resources to meet society's needs now and in the future, encouraging the efficient and appropriate use of high quality materials;
 - protect environmental and cultural characteristic of places, including those highly cherished for their intrinsic qualities, such as wildlife, landscapes, ancient woodlands and historic features, and to protect human health and safety and general well-being;
 - reduce the impact of mineral extraction and related operations during the period of working by ensuring that impacts on relevant environmental qualities caused by mineral extraction and transportation, for example air quality and soundscape, are within acceptable limits; and
 - achieving, without compromise, a high standard of restoration and aftercare so as to avoid dereliction and to bring discernible benefits to communities, heritage and/or wildlife, including beneficial after uses or opportunities for enhancement of biodiversity and the historic environment.

Noise

- 2.1.4 Mineral workings should not cause unacceptable adverse environmental or amenity impact. Where this is not possible working needs to be carefully controlled and monitored so that any adverse effects on local communities and the environment are mitigated to acceptable limits. Any effects on local communities and the environment must be minimised to an acceptable standard.

- 2.1.5 Development plans should set out clearly the criteria that will be applied to minerals proposals to ensure that they do not have an unacceptably adverse impact on the environment and the amenity of nearby residents. Issues that must be addressed include noise, in terms of limits, type and locations.

Extensions

- 2.1.6 Extensions to existing mineral working, whether they be time, lateral or depth extensions should be considered in the same manner as applications for new sites. Each application will need to consider the impact on the site as a whole and the wider surroundings and will need to be considered on its own merits.
- 2.1.7 The presence of an existing quarry should be a material consideration when considering a proposal for an extension. There may be benefits to extending a site in terms of shared infrastructure, for instance, as opposed to working a new greenfield site.

2.2 Minerals Planning Guidance Note 11: The Control of Noise at Surface Mineral Workings

- 2.2.1 This guidance, published in April 1993, provides advice to mineral planning authorities and the industry on how the environmental performance of the industry can be improved by the control of noise from operations.
- 2.2.2 The advice contained within this document regarding the monitoring and assessment of noise levels is still largely applicable, however, paragraphs 31 to 42 have been superseded by Mineral Technical Advice Note 1.

2.3 Minerals Technical Advice Note (Wales) 1: Aggregates

- 2.3.1 This guidance sets out detailed advice on the mechanisms for delivering policy for aggregates extraction by mineral planning authorities and the aggregates industry.
- 2.3.2 In terms of noise, the guidance states that where aggregates extraction and related operations occur close to areas that are sensitive to noise, particularly residential areas, noise impact must be minimised to acceptable levels.
- 2.3.3 Mineral planning authorities should have regard to the background noise levels and the threshold at which significant effects are likely at noise sensitive properties when considering the acceptability of proposals or setting noise limits in a planning condition.
- 2.3.4 In relation to noise limits, MTAN1 offers the following specific advice.

“Noise limits should relate to the background noise levels ($L_{A90,T}$), subject to a maximum daytime noise limit of 55 dB(A) where background noise levels exceed 45 dB(A). 55 dB(A) is the lower limit of the daytime noise levels where serious annoyance is caused.

Where background noise is less than 45 dB(A), noise limits should be defined as background noise levels plus 10 dB(A).

Night-time working limits should not exceed 42 dB(A) at noise sensitive properties.

Daytime working is defined as 07:00 – 19:00 hours and night-time as 19:00 – 07:00 hours.

Noise limits should be set in terms of $L_{Aeq,T}$ over a 1-hour measuring period. L_{Aeq} is the noise index used to describe the "average" level of noise that varies with time (T) and should be measured "free-field" that is, at least 3.5 metres away from a façade to prevent reflection of noise by any façade that faces the noise source.

During temporary and short-term operations higher levels may be reasonable but should not exceed 67dB(A) for periods of up to 8 weeks in a year at specified noise sensitive properties."

3.0 PLANT NOISE SURVEY

3.1 Survey Methodology

3.1.1 In order to obtain noise emission data regarding existing site operations, noise monitoring was conducted across Borrás Quarry during normal operating conditions on Tuesday 10 December 2019.

3.2 Instrumentation

3.2.1 Monitoring was undertaken using the following equipment.

Manufacturer	Type	Serial No.
Casella	Class 1 Integrating Sound Level Meter CEL-6X0	2391770
	Acoustic Calibrator	CEL-110/2

3.2.2 During all measurements the microphone was protected with a suitable windshield.

3.2.3 The sound level meter was positioned five metres from all plant and at a height of between 1.2 – 1.5 metres above ground level.

3.2.4 The following set-up parameters were used:

- Time Weighting: Fast
- Frequency Weighting: A
- Averaging-Integrating Period: Various according to activity

3.2.5 With the equipment set up in the configuration used during measurement, field calibration checks were performed on site immediately before and after the survey period using a sound calibrator. No significant drift (i.e. no greater than ± 0.5 dB) in the calibration value was observed between the initial and final checks.

3.3 Observations

3.3.1 During the survey period weather conditions were dry with average wind speeds considered to be less than 5 ms^{-1} and predominantly from a south-west direction. Cloud cover was in the region of 80% and temperatures approximately 5°C .

3.4 Results

3.4.1 The noise level data obtained during the survey has been used as part of the noise modelling exercise detailed in Section 4.

4.0 SITE NOISE EMISSIONS

4.1 Introduction

4.1.1 The level of noise in the local environs that arises from a site will depend on a number of factors. The more significant of which are:

- (a) the sound level output of the plant or equipment used on site;
- (b) the periods of operation of the plant on site;
- (c) the distance between the source noise and the receiving position;
- (d) the presence of screening due to barriers;
- (e) the reflection of sound;
- (f) soft ground attenuation.

4.1.2 The parameter that is in general use and is recommended internationally for the description of environmental noise at a receptor position is the equivalent continuous sound pressure level, L_{eq} (expressed in dB).

4.1.3 The L_{eq} describes the total amount of acoustic energy measured but does not take any account of the ear's ability to hear certain frequencies more readily than others. Instead an A-weighting is applied to form the L_{Aeq} (expressed in dB(A)) as this is found to relate better to the loudness of the sound heard.

4.1.4 Noise levels associated with the proposed operation of the development have been calculated at the nearby noise-sensitive location based on the following methodology and assumptions.

4.2 Prediction Methodology

4.2.1 In order to assist in the calculation of noise levels associated with the proposed development, CadnaA noise modelling software has been used. The noise prediction software has been configured to undertake the noise calculations in accordance British Standard BS 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*. This guidance details methods to estimate noise from 'open sites' which can include quarries, waste disposal sites and long-term construction projects.

4.2.2 The most important elements of this standard used to estimate site noise within this assessment include the sound level of plant/activities, distance attenuation, activity on-time, screening effects, ground absorption and angle of view corrections.

- 4.2.3 Within the noise model, point sources have been used to represent processing plant along with stationary or quasi-stationary activities such as tipping and loading of material. HGV, loading shovel and dump truck movements have been modelled as moving point sources. Line sources have been used to model the existing conveyor system.
- 4.2.4 Detailed digital topography data has been included within the noise model based on survey data from June 2019. The noise prediction software has been configured to undertake screening calculations in accordance with Figure F.3 of BS 5228-1. This method allows for the attenuation of the barrier or topographical feature to be calculated in octave bands by examining the path difference created by the screen as well as the frequency of the sound.
- 4.2.5 For all noise prediction calculations, the ground absorption coefficient on the proposed development site has been set to '0.0' representing hard ground conditions. For all other areas, the ground absorption coefficient has been set to '1.0' representing soft ground. 'Soft' ground is taken to refer to surfaces which are absorbent to sound, e.g. grassland, cultivated land or plantations as opposed to 'hard' ground surfaces which reflect sound such as paved areas, rolled asphalt and surface water.
- 4.2.6 In accordance with BS 5228 methodology, the attenuation from screening and soft ground attenuation have not been combined (where applicable). Instead, either the attenuation from screening and hard ground propagation, or the attenuation provided by soft ground alone has been included in the calculation, whichever is the greater of the two.
- 4.2.7 Site noise levels have been predicted within private garden areas at a height of 1.5 metres above ground level. The predictions made by the modelling software are for 'free-field' $L_{Aeq,1h}$ sound levels.

4.3 Plant Complement

- 4.3.1 Information regarding the working of Borrás Quarry is based on recent observations and discussions with the operator.
- 4.3.2 A list of plant and activities from which the noise predictions have been made are presented in Table 1 along with a number of assumptions regarding activity 'on-times' and vehicle movements.
- 4.3.3 The sound power levels adopted for use within this assessment are based on measurements of current plant and activities at the existing Borrás Quarry along with Vibrock's database of measurements at similar sites, manufacturer data and information contained within Annex C of BS 5228, which presents current sound level data on specific items of site equipment and site activities.

5.0 NOISE ASSESSMENT

- 5.1 The table below presents the results of the noise modelling exercise assessing the potential cumulative noise at the nearest sensitive receptor against the limits stipulated within planning condition 28.

Predicted Worst-Case Site Noise Level at Borras Hall $L_{Aeq,1h}$ free-field dB	Free-field $L_{Aeq,1\text{ hour}}$ Noise Limits (dB)			
	Monday to Saturday 0630 – 0730 hours (excluding Bank Holidays)	Monday to Friday 0730 – 1800 hours and Saturday 0730 – 1300(excluding Bank Holidays)	Monday to Saturday 1800 - 2200 hours (excluding Bank Holidays)	Any other time
50	50	55	45	42

- 5.2 The results of the assessment demonstrate that the operation of the site including the proposed development is not expected to exceed the specified noise limits between the hours of 0630 – 1800 Monday to Friday and 0630 – 1300 on Saturdays.
- 5.3 The proposed development has the potential to generate levels above the 45 dB(A) and 42 dB(A) noise limits detailed in the table above and it is therefore recommended that the crushing and screening of road planings is not undertaken during the evening and night-time periods or on Saturdays from 1300 – 1800 and not at all on Sundays and Bank Holidays.

6.0 SUMMARY

- 6.1 Vibrock Limited has been commissioned to undertake a noise assessment to accompany a planning application for the proposed processing and storage of road planings at Borras Quarry, Wrexham.
- 6.2 A visual survey of the site has been made and current operational plant noise levels have been measured across Borras Quarry.
- 6.3 Predicted noise levels from existing operations combined with those associated with the proposed development have been made at the nearest sensitive receptor of Borras Hall.
- 6.4 These predictions have been assessed against the noise limits outlined within planning condition 28 which were set in accordance with national planning guidance for mineral sites.
- 6.5 The results of the assessment demonstrate that site noise levels at the nearest sensitive receptor are not expected to exceed the specified noise limits between the following hours:
- | | |
|------------------|-------------|
| Monday to Friday | 0630 – 1800 |
| Saturday | 0630 – 1300 |
- 6.6 Outside of the above hours, the proposed development has the potential to result in an exceedance of the noise limits and it is therefore recommended that the crushing and screening of road planings is not undertaken during these periods.

7.0 REFERENCES

1. ANC Guidelines: *Environmental Noise Measurement Guide*. 2013.
2. British Standard 5228-1:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites. Part 1: Noise*. British Standards Institution 2014.
3. British Standard 7445-1:2003 *Description and measurement of environmental noise – Part 1 Guide to quantities and procedures*. British Standards Institution 2003.
4. Planning Policy Wales (PPW) Welsh Government, 10th Edition, December 2018.
5. Mineral Planning Guidance 11: noise at surface mineral workings, Department of Environment, Welsh Office, April 1993
6. Minerals Technical Advice Note (MTAN) Wales 1: aggregates, Welsh Assembly Government, March 2004

FIGURE 1

Location Plan



FIGURE 2

Proposed Site Layout Plan

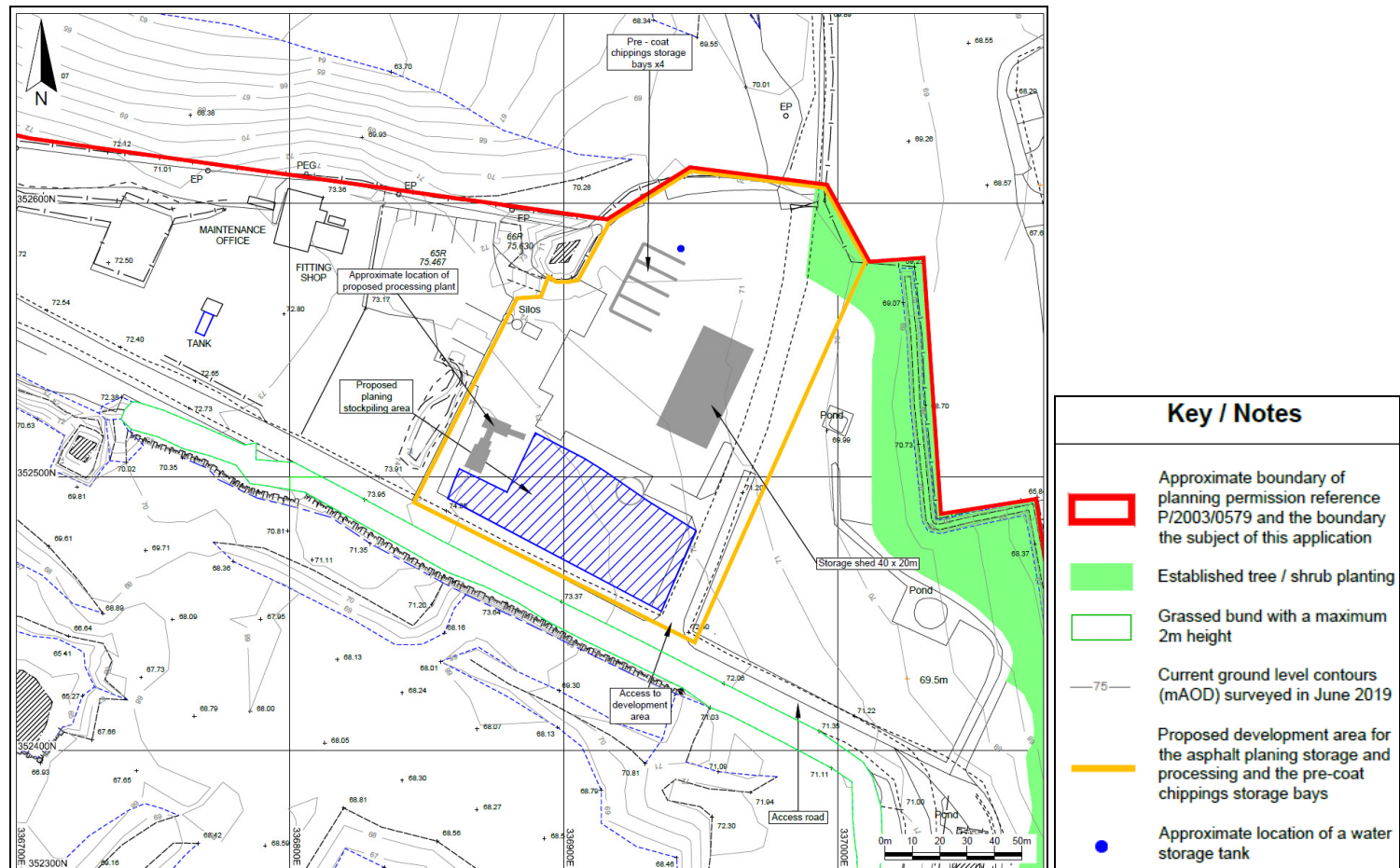


TABLE 1

List of Plant, Assumptions and Sound Levels

Plant/Activity	Sound Power Level L _{WA} dB	Assumptions	Source
Proposed Plant			
HGV Movements	101	8 movements per hour	L _{WA} calculated from sound pressure level measured at existing quarry site.
HGV (Tipping Into Stockpile)	103	10% on-time	
Wheeled Loader Movements	101	20 movements per hour	
Loading Shovel (Storage Bays)	105	10% on-time	Annex C of BS 5228-1
Loading Shovel (Loading)	105	10% on-time	Annex C of BS 5228-1
Dump Truck Movements	103	4 movements per hour	Measured at similar site
Crusher	110	100% on-time	Manufacturer Data
Screen	106	100% on-time	Measured at similar site
Current Plant			
JIG Lignite Removal Process	96	100% on-time	L _{WA} calculated from sound pressure level measured at existing quarry site.
Sand Crusher	102	100% on-time	
Gravel Crusher	103	100% on-time	
Finley Screen	106	100% on-time	
HC2	112	100% on-time	
Lagoon 8 Pump	94	100% on-time	
Telehandler (with reverse beep)	98	10% on-time	
Dozer in JIG area	99	10% on-time	
Finley Screen Loader	106	50% on-time	
Dozer	99	10% on-time	
Tractor (with reverse beep)	104	50% on-time	
HGV movements	101	16 movements per hour	
Dump Truck	98	10% on-time	
HC2 Conveyer	78 at 5m*	100% on-time	
HC1 Conveyer	87 at 5m*	100% on-time	

* sound pressure level

APPENDIX 1

Acoustic Terminology and Definitions

Acoustic Environment

Sound from all sound sources as modified by the environment.

Sound Power Level (L_{WA})

The total amount of sound energy per unit of time generated by a particular sound source independent of the acoustic environment that it is in.

Equivalent Continuous A-weighted Sound Pressure Level ($L_{Aeq,T}$)

Value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval T , has the same mean square sound pressure as a sound under consideration whose level varies with time.

A-weighting

A-weighting is used to replicate this sensitivity by modifying the electrical response of a sound level meter with frequency in approximately the same way as the sensitivity of the human hearing system. Measurements in dB(A) broadly agree with people's assessment of loudness.

Ambient Sound Level

Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far. Normally expressed as the equivalent continuous A-weighted sound pressure level ($L_{Aeq,T}$).

Specific Sound Level (also referred to as 'site noise')

Sound in the neighbourhood that originates from the site i.e. the sound being assessed.

Background Sound Level ($L_{A90,T}$)

A-weighted sound pressure level of the residual sound at the assessment position with no operation occurring at the proposed site. Defined in terms of the $L_{A90,T}$ which is the "A weighted" noise level exceeded for 90 per cent of the specified measurement period (T).

Free-field

External sound field in which no significant sound reflections occur (apart from the ground).

NOTE Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field.

Noise-Sensitive Receptor

Any occupied premises outside a site used as a dwelling (including gardens), place of worship, educational establishment, hospital or similar institution, or any other property likely to be adversely affected by an increase in noise level.