BLASTING & VIBRATION

INTRODUCTION

The first operation in the mineral extraction works is drilling and blasting, to fragment the strata such that it can be fed into the processing equipment, to be made into quarry products. Even the most well designed and executed of blasts will generate a certain amount of energy in the form of both ground vibration and airborne vibration.

FREQUENCY OF BLASTING

Blasting is undertaken at Balmullo Quarry approximately every 6 to 8 weeks. The frequency of blasting is dictated by the demand for quarry products. Each blast is designed to create a blast pile which contains between 10,000 to 20,000 tonnes of rock, which is then crushed and screened into a variety of quarry products.

TIMING OF BLASTING

The quarry is permitted to carry out blasting between the following hours;

Mondays to Fridays: 10:00-12.00 and 14.00-16:00 hours

No change to the permitted timing of blasts are proposed by Breedon.

VIBRATION LIMITS

Ground vibration generated by blasting at the quarry is currently limited at residential properties by planning condition.

The planning conditions state that blasting operations shall not exceed a peak particle velocity of 6 mms^{-1} in 95% of any consecutive block of 20 blasts and no individual blast shall exceed a peak particle velocity of 12 mms^{-1} as measured at vibration sensitive buildings.

No change to the permitted blast limits are proposed by Breedon.

BLASTING WARNING SIREN

A warning siren is sounded at the quarry approximately 5 minutes & 2 minutes prior to a blast taking place.

This warning siren is a health and safety precaution to ensure all staff are clear of the blasting danger zone. The siren is not intended as a warning for members of the public, residing outwith the quarry, and Breedon is not obliged to ensure the siren is audible outwith the quarry boundary.

VIBRATION MITIGATION

Each blast undertaken at the quarry is designed in order to maximise the production (tonnage) of the blast whilst ensuring it complies with the vibration limits stipulated within the planning conditions.

Blasting may incorporate a number of mitigation measures within the blast design to manage blast induced vibration, including reducing the ‘maximum instantaneous charge’ (MIC), ‘double decking’, using electronic detonators, bore hole spacing etc.

VIBRATION MONITORING

Breedon employ specialist consultants to monitor blast vibration. This monitoring is generally undertaken at the closest residential properties to the location of the blast.

Vibration levels reduce as the separation distance from the blast location increases. Vibration levels at the closest residential properties therefore represent the highest vibration levels which will be experienced at residential properties within the local area.

BREEDON

NOISE

INTRODUCTION

The use of large plant and machinery within the quarry has the potential to generate noise levels at sensitive locations close to the mineral extraction operations. The quarry contains a variety of noise sources, including crushing and processing plant, on-site mobile plant and equipment such as tractors, excavators, loading shovels, and road going HGV lorries.

PLANNING ADVICE NOTE 50 – ANNEX A

Planning Advice Note (PAN) 50, Annex A, provides the most relevant planning policy advice applicable the control of noise from surface mineral workings in Scotland. PAN 50 recommends the setting of absolute values for noise limits, linked to day-time and night-time working periods, defined as 07:00 - 19:00 hours and 19:00 - 07:00 hours respectively.

PAN 50 introduces the concept of a maximum fixed acceptable noise level of 55 dB $L_{Aeq,1h}$ for daytime operations during the working week. It also introduces a nominal night time limit of 42 dB $L_{Aeq,1h}$.

The document also states that in some circumstances, e.g. in quieter rural areas, the setting of nominal limits lower than 55 dB $L_{Aeq,1h}$ may be considered. This may be considered, for example, where the nominal 55 dB $L_{Aeq,1h}$ level is more than 10 dB above the measured background level. In these circumstances, PAN 50 recommends the use of a condition limiting mineral operators to a noise level which is 10 decibel excess over the existing background noise level, albeit, PAN 50 notes that it would not normally be appropriate to require a daytime limit below 45 dB $L_{Aeq,1h}$.

EXISTING NOISE LIMITS

That with respect to the control of noise resulting from the operations during the permitted hours of operation(07.00-17.00 Monday to Friday & 08.00-12.00 Saturday, the nominal noise limit from site operations shall not exceed:

- 45dB (LAeq) or
- 10dB (A) above the measured background level (whichever is the greater) at any noise sensitive receptor.

Additional noise limits are provided for temporary operations such as drilling and soil movements.

Breedon undertake noise monitoring annually at locations close to the quarry operations with results used to calculate the likely quarry attributable noise level at a number of noise sensitive receptors. The monitoring demonstrates on-going compliance with the noise limits noted above.

NOISE MITIGATION

The most effective noise mitigation is the use of barriers to minimise direct line of sight between quarry operations and noise sensitive receptors. This is generally achieved by operating within the quarry void or creating noise attenuation bunding around the periphery of the site. Other forms of mitigation include the use of low level reversing alarms, minimizing drop heights and enclosures around noise generating plant such as crushing equipment.

NOISE ASSESSMENT

Breedon's planning application will be supported by an Environmental Impact Assessment (EIA) Report which will incorporate a Noise Impact Assessment (NIA) prepared by professional acoustic consultants. The NIA will utilize specialist environmental noise prediction software (Cadna 'A'), incorporating the local topographical environment and maximum noise power level of the onsite plant. This modelling has been found to be highly accurate in predicting noise levels from quarrying activities. The NIA will be presented in the EIA Report which accompanies the planning application.

BREEDON

DUST & AIR QUALITY

INTRODUCTION

Dust from quarrying operations is generally created by firstly the extraction or breaking of strata and secondly the handling of previously broken materials. Potential sources of dust include the stripping and handling of soil and overburden, and the blasting, loading, processing, transportation and storage of mineral.

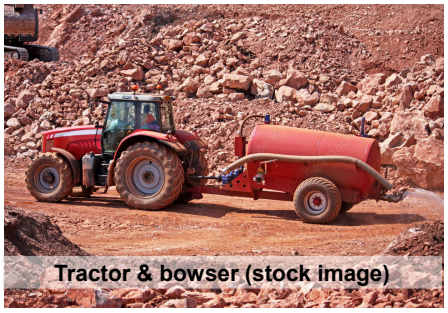
WEATHER CONDITIONS

Weather conditions have a significant impact on the likelihood of dust being generated. During dry windy weather, the potential for dust generation is much greater than during calm wet weather. Wind direction also influences where dust may be deposited.

DUST CONTROL MEASURES

Breedon employ a range of measures on site to minimise and mitigate emissions of dust and fine particulates. These measures include;

- Water sprays and a tractor and bowser on roadways and hardstandings
- Filtration systems on drill rigs
- Water sprays on crushers and transfer points
- Conveyors enclosed
- Transfer points being enclosed
- Minimise free fall drop heights
- Using belts of suitable capacity
- Avoiding overfilling conveyors
- Belt cleaning equipment on conveyors
- Cleaning up spillages promptly
- Vehicle exhausts directed above the horizontal
- Location of stockpiles to benefit from available screening
- Profiling stockpiles to minimise wind whipping



Tractor & bowser (stock image)

POLLUTION PREVENTION AND CONTROL REGULATIONS

Breedon operate plant and equipment within Balmullo Quarry which is licensed under the *Pollution Prevention and Control (Scotland) Regulations* 2012 (PPC Regs). The PPC Regs are administered by SEPA, who set's permit conditions with the aim of achieving a high level of protection for the environment.

The primary focus of a PPC 'Part B' permit, under which all of the licensed equipment at Balmullo Quarry operates, is in relation to emissions to air – i.e. the emission of dust and particulates. The PPC Permit conditions are closely monitored by SEPA.

DUST MONITORING

Breedon's site management visually monitor dust emissions during operations to ensure dust generation is minimised. Where necessary, dust generating activities will be suspended until appropriate weather conditions prevail or mitigation is implemented.

In addition, Breedon undertake dust monitoring using dust monitoring gauges which can monitor the quantity and direction of dust deposition. Breedon has recently installed two permanent gauges along the northeastern boundary of the site in order to .

Dust monitoring gauge

DUST ASSESSMENT

Breedon's planning application will be supported by an Environmental Impact Assessment (EIA) Report which will incorporate a Dust and Air Quality Assessment. The EIA Report will be publicly available once the planning application is submitted to The City of Edinburgh Council.