# HURN QUARRY WASHING PLANT PERMIT

NOISE ASSESSMENT FOR ENVIRONMENTAL PERMIT APPLICATION

Acoustics Report A1678 R02

15th February 2022

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| Report for: | New Milton Sand & Ballast |
| | Attention: Darren Hazell |
| Issued to: | Land and Mineral Management |
| | Attention: Lesley Loane |
| Prepared by:<br>Mark Harrison BSc(Hons) PGDip MIOA | Checked by:<br>Gavin Irvine BSc(Hons) MIOA |
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Ion Acoustics Ltd
Georges House
9 – 10 Bath Street
BRISTOL
BS1 6HL

www.ionacoustics.co.uk

0117 911 3765
mail@ionacoustics.co.uk

Consultants in Acoustics Noise & Vibration
Registered in England & Wales No. 5920418

# Contents

# 1 Introduction

Ion Acoustics is appointed by New Milton Sand and Ballast (NMSB) to provide an assessment of noise impacts associated with the existing washing plant for processing of waste materials at the consented quarry off Hurn Court Lane, Hurn, near Bournemouth. The activities considered within this assessment pertain only to the washing plant in the main quarry site and not activities in the other parts of the quarry. The assessment is to be included as part of an environmental permit application to the Environment Agency (EA) required for the processing of waste materials.

The assessment has been informed by a baseline noise survey undertaken on the 25th January 2022 and by Ion Acoustics library data for an operational washing plant.

Calculations and computer modelling software have been used to predict noise levels from the washing plant at receptor locations in the vicinity of the facility. The results have been compared with the measured background sound levels to assess the noise impact in accordance with British Standard BS 4142: 2014[1] as required by the Environment Agency.

# 2 Scheme Details

## 2.1 Site Location

The consented quarry is located on land off Hurn Court Lane to the south of Bournemouth Airport. The quarry was originally granted planning consent in March 2001. Part of the existing operation at the site is the processing of primary minerals which, in this instance includes running the aggregates through a washing plant. This operation is consented under planning reference 8/2001/0192 dated March 2001.

The site is relatively removed from the nearest noise sensitive receptors, with the closest being Parkfield School which is approximately 130m to the north-west of the site boundary. The receptor locations and their proximity to the permit application boundary are detailed in Table 1 below.

**Table 1: Assessment Locations**

| Assessment Location | Ordnance Survey Grid Co-ordinates | | Distance to site boundary (m) |
|---|---|---|---|
| | Easting | Northing | |
| AL01 – Parkfield School | 411889 | 097285 | 130 |
| AL 02 – 1 and 2 Dales House | 411459 | 097041 | 390 |
| AL03 – 1 Wallis Cottage | 411657 | 096902 | 230 |
| AL04 – Heronshaw House | 411817 | 096732 | 280 |
| AL05 – North Lodge | 412132 | 096353 | 610 |
| AL06 – Park Cottages | 412608 | 096415 | 750 |
| AL07 – Bridles | 412591 | 096801 | 530 |
| AL08 – New Cottages | 412571 | 096936 | 490 |

The above receptor locations, the site boundary and noise monitoring locations shown on an aerial photograph in Figure 1 below.

1 British Standard BS 4142: 2014 +A1:2019 Method for rating and assessing industrial and commercial sound

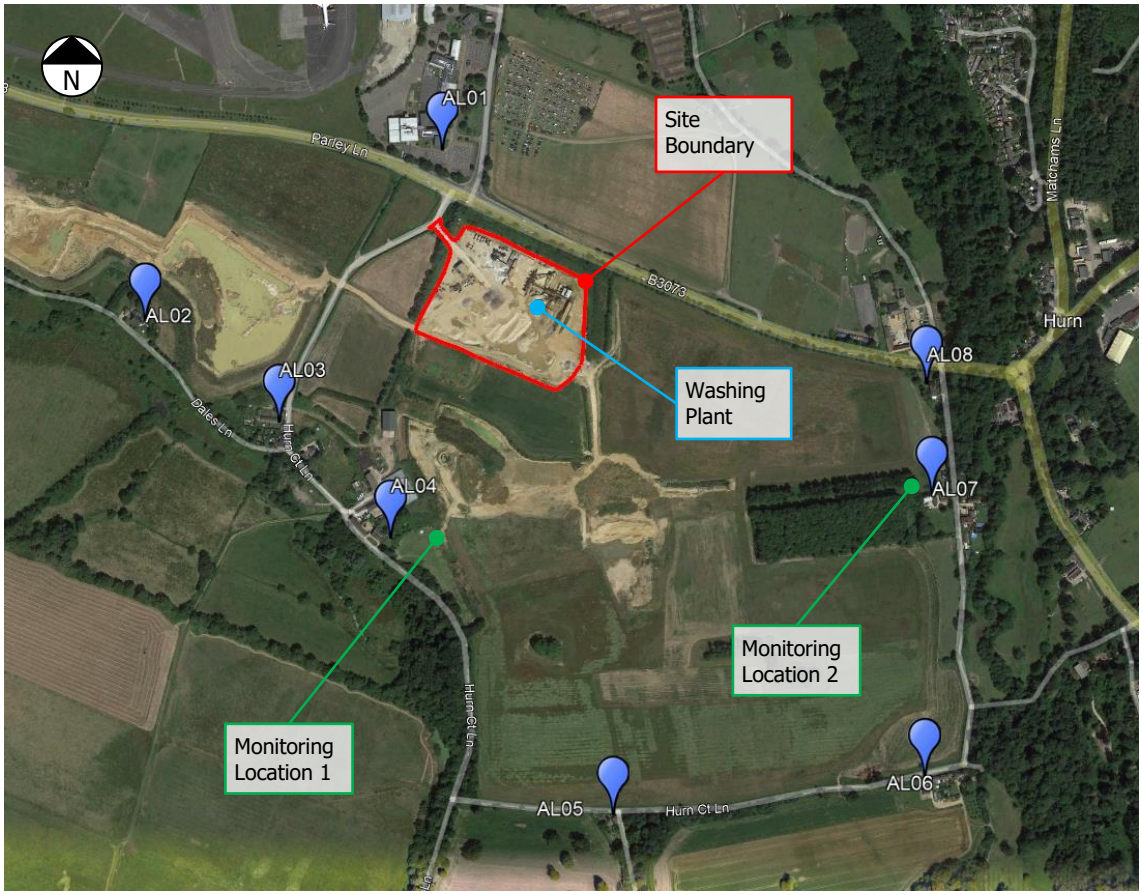



*Figure 1 – Site plan showing site, noise monitoring and receptor locations*

## 2.2 Proposed Operation

The proposed operation is to use the existing washing plant to process inert waste materials in a manner largely similar to that used for primary aggregates. The washing plant will remain at the site, in the same location and will not change as a function of the proposed use. No change in noise level is anticipated.

Materials will be brought to, and removed from the washing plant by means of shovel loaders which are already in use at the site. The processing of waste materials will not result in any significant change in vehicle numbers at the site.

Activities would take place during the existing operational hours:

- 07:00 to 18:00 Monday to Friday;
- 07:00 to 13:00 Saturday;
- No activities on Sundays or Bank Holidays.

The operational hours are the same for the consented operations at the site.

# 3 Standards and Guidance on Noise

Environmental permits for the processing and handling of waste materials are issued by the Environment Agency. In this regard, the EA have their own requirements which are separate from planning obligations. The appropriate guidance is discussed below.

## 3.1 Noise and Vibration Management: Environmental Permits

Previous guidance on the management of noise and vibration as it pertains to environmental permitting was contained in the Environment Agency Horizontal Guidance for Noise (H3) parts 1 and 2. These have been withdrawn and replaced by an online guidance document[2] to assist in the assessment of noise and vibration impacts (dated 31st January 2022).

The guidance indicates that operators must 'prevent significant pollution' and must use BS4142 in terms of reporting requirements and impact assessment ratings.

The guidance indicates that 'unacceptable level of audible or detectable noise' would equate to 'significant pollution' at the receptor location. The guidance equates this level with the 'significant adverse impact' level detailed in BS4142 which, as indicated below, is 10dB or more above the typical background sound level. Lower noise impact ratings are appropriate though at levels equating to an 'adverse impact' ($L_{A90}$ +5dB) must rigorously demonstrate that appropriate measures are being taken to control noise.

## 3.2 BS4142: 2014 +A1:2019 – Assessment Principles

The standard method for assessing noise of an industrial nature affecting housing, is British Standard BS 4142 "Method for rating and assessing industrial and commercial sound". A BS 4142 assessment is typically made by determining the difference between the industrial noise under consideration and the background sound level as represented by the $L_{A90}$ parameter, determined in the absence of the industrial noise. The $L_{A90}$ parameter is defined as the level exceeded for 90% of the measurement time, representing the underlying noise in the absence of short duration noise events such as dog barks or individual cars passing.

The industrial noise under consideration is assessed in terms of the ambient noise level, $L_{Aeq}$, but a character correction penalty can be applied where the noise exhibits certain characteristics such as distinguishable tones, impulsiveness or, if the noise is distinctively intermittent. The ambient noise level, $L_{Aeq}$ is defined as the steady-state noise level with the same energy as the actual fluctuating sound over the same time period. It is effectively the average noise level during the period. The industrial noise level ($L_{Aeq}$) with the character correction (if necessary) is known as rating level, $L_{Ar}$, and the difference between the background noise and the rating level is determined to make the BS 4142 assessment. The standard then states:

- *"Typically, the greater the difference, the greater the magnitude of the impact.*
- *A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context."*

[2] https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits

The standard outlines a number of methods for defining appropriate 'character corrections' to determine the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency.

The standard also highlights the importance of considering the context in which a sound occurs. The standard indicates that factors including the absolute sound level, the character of the sound, the sensitivity of the receptor and the existing acoustic character of the area should be considered when assessing the noise impact.

# 4 Noise Survey

A baseline noise survey was carried out on the 25th January 2022 at two locations in the vicinity of the site. The initial intention of the survey was to include some operational noise from the washing plant and derive the specific noise level in accordance with BS4142 however, on arrival at the site the washing plant had broken down and it was not possible to measure noise from the washing plant.

Nevertheless, it is possible to measure the background sound levels at the receptors and an assessment is made using library data for a similar washing plant.

The baseline survey at the measurement locations was undertaken using two Rion NL52 sound level meter, fitted with WS-15 windshields. The equipment was set to measure various noise indices in 15-minute periods and record sample audio recordings throughout the survey. The microphones and windshields were mounted on tripods at approximately 1.5m above local ground level. The meters were calibrated at the start and end of the survey using a Brüel & Kjær Type 4231 sound level calibrator with no drift observed. The equipment was all within its third-party calibration period and calibration certificates are available on request.

The noise survey was entirely unattended apart from at set up and collection. The noise monitoring locations are described in more detail below.

## 4.1 Noise Monitoring Location 1

The first noise monitoring location was sited to the south of the site, in the vicinity of Heronshaw House (AL04). The monitoring location was approximately 75m from the dwelling, in a location which is understood to be used as a camping ground for the B&B which operates at the property. The monitoring location was in a free-field location (that is away from reflective surfaces other than the ground) as presented in the images below:

Monitoring location looking towards washing plant

Monitoring location looking towards Heronshaw House

*Figure 2: Noise Monitoring Location 1 Detail*

The noise climate at the monitoring location was relatively tranquil during the survey. Distant road traffic noise was audible from Parley Lane (B3073) to the north, though the sources were distant and well screened by the intervening landform. Sporadic activities at the main quarry site were audible as vehicle movements and occasional 'bangs and clangs' associated with materials handling. The only other noise source of note was general environmental noise i.e. bird song, low level wind noise etc.

## 4.2 Noise Monitoring Location 2

Monitoring location 2 was to the east of the site, towards Mill Lane and a small wooded copse. The meter was set up in a free field location, approximately 170m from Parley Lane and approximately 30m from the nearest dwelling (Bridles AL07).

Monitoring location looking towards Parley Lane

Monitoring location looking towards dwelling.

*Figure 3: Noise Monitoring Location 2 Detail*

Traffic noise at location 2 was more evident, given the relative proximity to Parley Lane. Visually the road was almost entirely screened from view by the intervening trees and undergrowth. No noise from the existing quarry operation was evident at this location though the site was known to be operational.

## 4.3 Weather

The weather during the monitoring survey was cold, with an ambient air temperature of 5°C. Winds were considered to be low / still at the start of the survey though did pick up slightly after 14:00 with a northerly direction. Ground conditions were dry and the cloud cover was 100%.

## 4.4 Baseline Survey Data

The ambient sound level, the logarithmic average of the $L_{Aeq,\ 15min}$ values is shown. For the background sound level, $L_{A90}$, the minimum, mean (average) and mode (most common) values are presented to facilitate the derivation of the "typical" value in line with BS 4142:2014 guidance. The full measured data is presented in Appendix A of this report, including tabulated data and time history charts showing the variation in noise levels across each day.

**Table 2: Summary of Noise Survey Data**

| Monitoring Location | Duration hh:mm | $L_{Aeq}$, dB | Background Sound Level, $L_{A90}$, dB | | |
|---|---|---|---|---|---|
| | | | Minimum | Arithmetic mean | Mode (Most common) |
| Location 1 | 03:15 | 50.1 | 41 | 42 | 42 |
| Location 2 | 03:00 | 53.0 | 48 | 49 | 49 |

The background sound level at location 1 is markedly lower than that at location 2 due to the distance from the B3073. The time history charts for the monitoring period indicates that noise levels, particularly the background sound level ($L_{A90}$) were stable at both locations, only varying by 1dB to 2dB at most.

## 4.5 Noise Targets

Given the background sound levels detailed above and the context of the setting, noise targets are proposed which would avoid generating adverse noise impacts. As indicated in section 3.2, BS4142 states: *'+5dB is likely to be an indication of an adverse noise impact depending on the context'*. At this level, the Environment Agency guidance would consider the noise source to be 'audible or detectable' at the receptor. Furthermore, the operator would be required to 'rigorously demonstrate' appropriate measures are being used. Therefore, noise from the washing plant should be no more than 5 dB above the typical background noise.

Table 3 below summarises the appropriate rating level noise targets at the identified assessment locations. The targets apply throughout the operational hours of the quarry.

**Table 3: Appropriate Noise Target**

| Monitoring Location | Relevant Assessment Location | Typical Background Sound Level, $L_{A90}$, dB | Rating Level Noise Targets, $L_{Ar}$, dB |
|---|---|---|---|
| Location 1 | AL02 to AL06 | 42 | 47 |
| Location 2 | AL01, AL07 & 8 | 49 | 54 |

The rating level will apply to the noise level plus any specific character corrections which need to be applied in line with BS4142:2014 subject to context.

# 5 Noise Modelling Assessment

In the absence of any measured noise levels from the existing washing plant, a noise modelling assessment has been undertaken to predict noise levels to the nearest noise sensitive assessment locations. For this, a noise model was constructed using IMMI[3] noise modelling software and the propagation of noise has been calculated in accordance with ISO 9613-2[4] with the following input parameters:

- Downwind propagation (noise levels under crosswind and upwind conditions will be lower);
- Mixed ground between the noise source and the receiver locations (G = 1.0);
- Ambient air temperature of 10°C and 70% Relative Humidity; and,
- Barriers and screening influence calculated in accordance with ISO 9613-2.

The land to the south and west of the washing plant site, between the application boundary and the nearest receptors is part of the former and existing quarry works which includes numerous bunds and stock piles of material / overburden which are not accurately replicated in the available terrain mapping. To that end, these features have been omitted from the modelling assessment resulting in a more conservative assessment as the ground attenuation is likely to be higher than modelled.

## 5.1 Washing Plant Noise Levels

As indicated above, it was not possible to directly measure noise from the existing washing plant in situ due to a technical fault during the site visit. As such, library data for a comparable washing plant has been used to inform a noise modelling assessment. The library data used was measured by Ion Acoustics at a similar washing plant at another NMSB facility.

The washing plant is a large, multi-operation machine which performs a number of actions concurrently. Materials are loaded in to the process via a large hopper and transported to the various processing stages by conveyor. The wider process includes various operations including vibrating screens, washing / separation and sorting of materials. The main stages of the process are common to both the existing washing plant at Hurn Quarry and the source of the noise data presented in Table 4 below.

The sound power data derived from Ion Acoustics' measurements of the most significant noise generating operations are summarised in Table 4 below.

**Table 4: Washing Plant Sound Power Level**

| Noise Source | $L_{WA}$ (dB) in Octave Frequency Bands, Hz | Overall |
|---|---|---|

3 https://www.immi.eu/en/noise-mapping-with-immi.html
4 ISO 9613-2: Acoustics – Attenuation of sound during propagation outdoors: Part 2: General method of calculation

| | 63 | 125 | 250 | 500 | 1000 | 200 | 4000 | $L_{WA}$, dB |
|---|---|---|---|---|---|---|---|---|
| Vibrating Hopper* | 123.4 | 108.3 | 101.5 | 93.8 | 91.0 | 87.9 | 86.0 | 101.0 |
| Washing Barrel | 95.3 | 84.2 | 82.3 | 81.7 | 80.2 | 77.0 | 77.3 | 85.4 |
| Vibrating Screen | 91.6 | 90.1 | 86.6 | 84.4 | 86.7 | 86.5 | 87.4 | 92.9 |
| Findor Screen | 87.4 | 87.1 | 90.0 | 93.2 | 95.5 | 100.5 | 92.3 | 103.3 |
| Dewater Screen | 99.8 | 90.4 | 86.1 | 83.2 | 82.4 | 81.6 | 83.5 | 89.3 |
| * Assumed to be operating for 50% of the assessment period | | | | | | | | |

Each operational stage is modelled as a point source at various heights above ground level, ranging between 2m and 6m. All noise sources are considered to operate concurrently though the loading hopper is assumed to operate for 50% of the assessment period.

For the purposes of this assessment the noise sources are assumed to radiate equally in all direction. This again results in a conservative assessment as the sound power values tend to be derived from a measurement at a distance from the noisiest side.

## 6 Noise Impact Assessment

The predictions of noise from the facility are presented, in the first instance, as noise contours in Figure 4 below.


*Figure 4 – Indicative Noise Contour Plot*

The figure above indicates that noise propagates relatively freely from the site given the elevated noise sources and the absence of any screening bunds or barriers from the noise model. The

closest receptor (Parkfield School AL01) falls between the 45dB(A) to 50dB(A) contours. All residential locations fall well below 45dB(A).

In addition to the noise contours, the model has been used to predict specific noise levels to the receptor locations identified in Table 1 above. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142.

The site will still process primary minerals and will still include vehicle movements etc as it has since 2001. In terms of context, the noise associated with processing waste materials is entirely in keeping with the current and future noise climate of the area. To that end, no additional character corrections have been applied in the derivation of the rating noise level.

**Table 5: Noise Impact Assessment**

| Assessment Location | Specific Noise Level, dB | BS4142:2014 Correction | Rating Noise Level, $L_{Ar}$, dB | Noise Limit, dB | Difference, dB |
|---|---|---|---|---|---|
| AL01 | 46.9 | 0 | 47 | 54 | -7 |
| AL02 | 39.1 | 0 | 39 | 47 | -8 |
| AL03 | 42.3 | 0 | 42 | 47 | -5 |
| AL04 | 42.6 | 0 | 43 | 47 | -4 |
| AL05 | 37.0 | 0 | 37 | 47 | -10 |
| AL06 | 35.2 | 0 | 35 | 47 | -12 |
| AL07 | 38.9 | 0 | 39 | 54 | -15 |
| AL08 | 40.0 | 0 | 40 | 54 | -14 |

The assessment presented above indicates that the predicted rating noise level from the operational washing plant would not exceed the noise limit at any of the receptor locations. That is to say, the rating level would not exceed $L_{A90}$ +5dB at any noise sensitive location. Further analysis indicates that the predicted noise level would only exceed the measured background sound level at one location (AL04) and only by 1dB.

The predicted rating levels are below those at which BS4142 would consider an adverse noise impact and below typical minerals planning noise limits which typically permit levels 10dB above the background noise (subject to a maximum of 55 dB $L_{Aeq}$).

## 6.1 Context and Uncertainty

BS 4142 requires an assessment of context and uncertainty.

The context in this instance is that the site is a consented and operational quarry which has demonstrated through planning and through operations since 2001 that noise from activities including materials handling and vehicle movements are of a low impact in accordance with all the relevant and appropriate guidance. To that end noise associated with the use of inert waste in the washing plant would not be out of character.

The uncertainty in the survey has been minimised by measuring over a typical daytime period, between the peaks in road traffic noise i.e. rush hour periods. The noise climate of the area is relatively stable, comprising road traffic noise from Parley Lane, some noise from the existing quarry and noise from the airport. It is noted that the airport is operating at a lower capacity than in pre-pandemic times due to lower demand on international travel etc. To that end, it is likely that the measured background sound level is marginally lower than when the airport is fully operational. This would result in conservative noise limits.

Other factors such as measurement locations, weather conditions and the measurement intervals used are all beneficial in reducing uncertainty in the measured noise data.

Additional uncertainty may factor in the calculations undertaken within the assessment. The ISO 9613-2 standard states that noise levels are predicted to ±3dB.

To further minimise uncertainties in the calculation, conservative assumptions have been made. These include the following:

- The assessment further assumes that the majority of plant will be operational for 100% of the assessment period;
- The vibrating hopper is operating for 50% of the operational period; and,
- The noise levels used in the modelling assessment have been measured from a comparable, operational washing plant at an alternative NMSB facility.

Given the above, it is likely that noise levels will be less than predicted and uncertainly it not likely to have an adverse effect on the assessment.

# 7 Summary

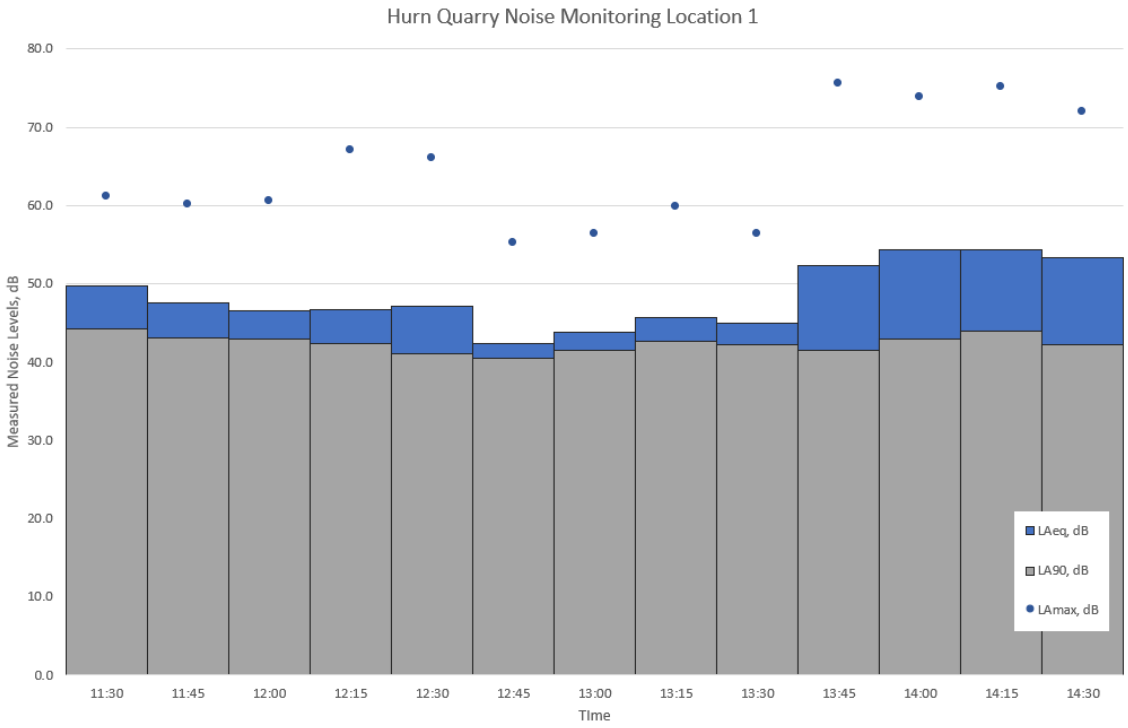
A noise assessment has been carried out to quantify the noise impact associated with the use of inert waste material in the existing washing plant at the quarry at Hurn Court Lane, Hurn, Bournemouth.

The assessments summarised in this document indicate that the use of the washing plant would not result in any adverse noise impacts in accordance with BS4142: 2014.

Given the above, it is considered that there are no noise-related issues associated with facility which would prevent the granting the appropriate Environmental Permit.

**Location M01**

| Period Start | Measured Noise Level | | |
|---|---|---|---|
| | $L_{Aeq}$, dB | $L_{Amax}$, dB | $L_{A90}$, dB |
| 11:30 | 49.7 | 61.1 | 44.2 |
| 11:45 | 47.6 | 60.1 | 43.1 |
| 12:00 | 46.6 | 60.5 | 43.0 |
| 12:15 | 46.7 | 67.1 | 42.3 |
| 12:30 | 47.2 | 66.0 | 41.0 |
| 12:45 | 42.3 | 55.2 | 40.5 |
| 13:00 | 43.8 | 56.4 | 41.5 |
| 13:15 | 45.7 | 59.8 | 42.6 |
| 13:30 | 45.0 | 56.3 | 42.2 |
| 13:45 | 52.3 | 75.6 | 41.5 |
| 14:00 | 54.4 | 73.9 | 43.0 |
| 14:15 | 54.4 | 75.2 | 43.9 |
| 14:30 | 53.4 | 71.9 | 42.2 |



## Location M02

| Period Start | Measured Noise Level | | |
|---|---|---|---|
| | $LA_{eq}$, dB | $L_{Amax}$, dB | $L_{A90}$, dB |
| 12:00 | 53.5 | 70.8 | 49.9 |
| 12:15 | 51.7 | 68.8 | 49.1 |
| 12:30 | 51.8 | 66.4 | 48.7 |
| 12:45 | 50.6 | 68.9 | 48.4 |
| 13:00 | 51.0 | 60.1 | 49.0 |
| 13:15 | 51.2 | 61.9 | 48.8 |
| 13:30 | 51.6 | 65.5 | 49.0 |
| 13:45 | 54.4 | 74.2 | 48.2 |
| 14:00 | 54.7 | 73.4 | 49.2 |
| 14:15 | 53.9 | 72.2 | 49.4 |
| 14:30 | 54.9 | 73.7 | 50.2 |
| 14:45 | 53.3 | 60.2 | 50.7 |