


**NOISE ASSESSMENT ASSOCIATED WITH
THE IMPORTATION OF INERT MATERIAL
TO IMPROVE THE RESTORED LANDFORM**

**WAKERLEY QUARRY, WAKERLEY,
NORTHAMPTONSHIRE**

MICK GEORGE LTD

DECEMBER 2019



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Status	Prepared By	Date
1.0	L Jephson BEng (Hons) MIOA	05/12/19

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1. Introduction

- 1.1. LF Acoustics Limited have been appointed by Mick George Ltd (MGL) to carry out a noise assessment associated with the proposed working of Wakerley Quarry, Wakerley Northamptonshire.
- 1.2. Planning permission to operate and restore the quarry was granted 11 December 2015 (Application Ref. 08/0026/MIN), subject to a number of conditions, including conditions limiting noise emissions from the working of the quarry consistent with central government advice.
- 1.3. Operations within the quarry commenced in 2017, with extraction presently progressing within Phase A at the western end of the quarry. MGL are now seeking an environmental permit to allow the importation of inert materials to assist in the restoration of the quarry close to original ground levels.
- 1.4. This report presents an assessment of the noise levels associated with the operation of the quarry and plant to be utilised for the purposes of the infill / restoration, which would be covered by the permit.
- 1.5. This report has been prepared by Les Jephson BEng(Hons) MIOA, Director of LF Acoustics Ltd. Les has 25 years experience in acoustic consultancy, and extensive knowledge of minerals and associated operations, undertaking assessments for in excess of 100 applications for new and extended quarries during this time.

2. Applicable Standards and Guidance

A description of the noise units referred to within this report is provided in Appendix A.

2.1. National Planning Policy Framework

2.1.1. The principal planning guidance considered when assessing noise from the proposed operations is contained within the National Planning Policy Framework [1]. At the heart of the NPPF is a presumption in favour of sustainable development, although environmental criteria should be set out to ensure that the permitted operations do not have unacceptable adverse impacts, with appropriate noise limits adopted to control noise.

2.1.2. The current minerals planning practice guidance attached to the NPPF relating to noise was published in March 2014 [2] and covers mineral extraction and related processes, including aggregate recycling, restoration and the disposal of construction waste.

2.1.3. The guidance seeks to ensure that the operations carried out within the quarry do not result in significant adverse effects. For normal daytime operations the guidance advises that the following limits should not exceed:

- 10 dB above the background (L_{A90}) noise level; subject to
- a maximum value of 55 dB $L_{Aeq, 1 \text{ hour}}$ (free field).

2.1.4. Where background noise levels are low, the guidance accepts that it may be very difficult to achieve a limit based upon background + 10 dB(A) without imposing unreasonable burdens on the mineral operator. In such cases, the limit set should be as near that level as practicable during normal working hours and should not exceed 55 dB $L_{Aeq, 1 \text{ hour}}$ (free field).

2.1.5. The guidance suggests that in the evening (19:00 – 22:00) $L_{Aeq, 1 \text{ hour}}$ noise levels should not exceed the background (L_{A90}) noise level by more than 10 dB and during the night-time a limit of 42 dB $L_{Aeq, 1 \text{ hour}}$ should be adopted.

2.1.6. In addition to the general daytime works, the guidance advises that all mineral extraction and associated operations will have some particularly noisy short-term activities that cannot meet the limits set for normal operations. These include the removal of bunding or spoil heaps and construction of new permanent landforms. A level of 70 dB $L_{Aeq, 1 \text{ hour}}$ is suggested as a limit for these activities for periods of up to eight weeks in any one year. Where the duration of temporary works may exceed eight weeks it can be appropriate to apply a lower limit for a longer period. The guidance also recognises that, in wholly exceptional cases, where there is no viable alternative, a limit of more than 70 dB $L_{Aeq, 1 \text{ hour}}$ may be appropriate in order to obtain other environmental benefits.

2.2. World Health Organisation Guidelines

The World Health Organisation [3] provides guidance upon the potential health effects in relation to noise. During the daytime periods, the guidance advises that few people are highly annoyed at noise levels below 55 dB $L_{Aeq,T}$ and few people moderately annoyed at noise levels below 50 dB $L_{Aeq,T}$.

2.3. British Standard BS 4142

- 2.3.1. The Environment Agency have advised that an assessment of the noise levels attributable to the importation of materials in relation to the infilling and restoration operations should be made against the requirements of BS 4142 [4].
- 2.3.2. BS 4142 is intended for the assessment of noise from commercial and industrial operations and is not intended to be applied to the assessment of noise from minerals operations, including aggregate recycling and restoration operations and construction and demolition, as advised in Section 1.3 of the Standard. It is clear from the Standard that the most appropriate guidance to adopt should be that contained within the PPG described above.
- 2.3.3. However, consideration to this Standard has been given within this report to address the requirements of the EA.
- 2.3.4. BS 4142 is a comparative standard in which the estimated noise levels from the proposed development are compared to the representative background noise level from existing uses.
- 2.3.5. BS 4142 relates the likelihood of complaint to the difference between the Rating Level of the noise being assessed and the background noise level.
- 2.3.6. The background noise level is the L_{A90} noise level, usually measured in the absence of noise from the source being assessed, but may include other existing industrial or commercial sounds. The background noise levels should generally be obtained from a series of measurements each of not less than 15 minute duration.
- 2.3.7. The Rating Level of the noise being assessed is defined as its L_{Aeq} noise level (the 'specific noise level'), with the addition of appropriate corrections should the noise exhibit a marked impulsive and/or tonal component or should the noise be irregular enough in character to attract attention. Given that the noise attributable to the operation of a sand and gravel quarry is principally associated with diesel engines, it has not been considered appropriate to apply any corrections when determining the Rating Levels of noise from the operation of the site.
- 2.3.8. During the daytime, the specified noise levels are determined over a reference time interval of 1 hour.
- 2.4. If the Rating Level of the noise being assessed exceeds the background level by 10 dB or more BS 4142 advises that there is likely to be an indication of a significant adverse impact, depending upon context. A difference between background level and Rating Level of around 5 dB is likely to be an indication of an adverse impact, depending upon context. The lower the Rating Level is, relative to the background noise level, the less likely the specific source will have an adverse or significant adverse impact. Where the Rating Level does not exceed the background noise level is an indication of a low impact, depending upon context.

2.5. Environment Agency Guidelines

In addition to the requirements above, the Environment Agency have published internal guidance [5], which has also been considered when assessing noise in relation to current permit application.

The document provides guidance in relation to the assessment and control of noise levels from noise generating operations and refers to the principal standards and guidance applicable at the time of publication.

With regards mineral related operations, which would include the importation of inert waste, the guidance considers MPG 11 (now replaced by the minerals PPG), which states the following in relation to waste disposal within operational minerals sites:

“where the waste disposal is an integral part of a mineral operation, MPG11 states that it is expected that its guidance will be followed... However, when setting limits and/or conditions for such facilities, Regulators should be guided by requirements of the appropriate internal noise guidance and the sector-specific guidance”.

Reference is also made within the document to Agency Internal Guidance for the Regulation of Noise at Waste Management Facilities [6] when considering waste infilling operations.

The guidance advises that there is overlap and joint responsibility of competent authorities to consider noise when dealing with the recovery or disposal of waste. It is considered that this might lead to conflict and unnecessary duplication between the Local Planning Authority and the Environment Agency. In view of this, it is considered that the following chain of actions should satisfy both the legislation and guidance .

- 1) If no planning permission exists or the site is operating under a certificate of established use then the licence should fully consider noise issues to determine whether the relevant objectives of WML94 will be satisfied.
- 2) If the planning permission has not considered noise for one reason or another or the Local Planning Authority has in fact asked the Agency to consider noise then the licence should fully consider noise issues as in 1) above.
- 3) If planning has considered noise, particularly if it has done so in the light of the relevant objectives – as it should have done if planning was granted after 30th April 1994, additional licensing controls should be unnecessary.

Section 4.4.6 of this document makes reference to the use of BS 4142:1997 to set numerical limits for landfill operations, subject to a lower limit of 50 dB $L_{Aeq, 1 hr}$. The section further states:

MPG11 considers that waste disposal operations share many common features with surface minerals workings. It states that much of the advice contained in MPG11 apply equally to landfill operations and concludes that “where waste disposal operations form an integral part of a mineral site, it is expected that they should be covered by these [MPG11] guidelines. It should be noted that MPG11 is in the process of being revised and the advice may change.

For this site, planning permission has been granted (requirement 3 above), which has considered noise from both quarrying and infill / restoration operations, with appropriate noise limits imposed to ensure satisfactory noise levels at the surrounding noise sensitive receptors. On this basis, the noise limits, which were derived in accordance with the requirements of the minerals PPG are therefore considered to be the most appropriate to adopt when considering noise from the infill operations.

3. Planning Conditions

- 3.1. The principal planning conditions relevant to noise within the current planning permission to operate the quarry are reproduced below, for information.

Noise and Dust

31. No vehicles and mobile plant used exclusively on site shall be operated unless they have been fitted with and use white noise alarms.

32. No vehicle, plant, equipment or machinery used exclusively on site shall be operated at the site unless it has been fitted with and uses an effective silencer. All vehicles, plant, equipment and machinery shall be maintained in accordance with the manufacturer's specification.

33. Traffic management operations at the site shall be controlled to ensure that all Heavy Goods Vehicles are routed to minimise reversing manoeuvres.

34. The site shall be worked in accordance with the measures set out in Part 1 (Noise), Section 8 of British Standard 5228: 2009 "Noise and Vibration Control on Construction and Open Sites or subsequent edition thereof. The equivalent sound level (L_{Aeq}), measured over any 1 hour time period, attributable to the normal operations on site, as measured free field shall not exceed the following limits at the potentially noise sensitive locations listed:

1)	Oak Farm, Wakerley Village	49 dBA (1hr L_{Aeq})
2)	Wakerley Church	45 dBA (1hr L_{Aeq})
3)	Laxton Hall	45 dBA (1hr L_{Aeq})
4)	Town Wood Farm	45 dBA (1hr L_{Aeq})
5)	The Bungalows, Shotley	45 dBA (1hr L_{Aeq})

35. Monitoring of noise from the mineral extraction operations shall be undertaken at the sites listed in condition 34 at intervals to be agreed in writing with the Mineral Planning Authority prior to the commencement of mineral extraction. The monitoring shall be undertaken for a period of 1 hour during operational phases.

36. The results of the noise monitoring shall be submitted to the Mineral Planning Authority within 2 weeks of monitoring taking place and shall include the following information:

- a) The measured L_{Aeq} (free field) level in dB(A)
- b) Date and time of measurement
- c) Description of site activity
- d) Details of measuring equipment
- e) Weather conditions, including wind speed and direction

37. Notwithstanding details of soil storage mounds on the submitted plans showing phasing of working as listed in condition 2, no development within any individual phase of working as shown on Plans 2C, 3, 4, 5, 6 and 7 shall take place until a scheme for the location of soil storage mounds to secure noise and dust screening mitigation at the boundaries of the working area has been submitted in writing and approved by the Mineral Planning Authority. The scheme as approved shall be implemented thereafter.

4. Baseline Noise Assessment

4.1. Noise Monitoring

- 4.1.1. The noise limits specified within Condition 34 of the planning permission were derived from baseline noise monitoring carried out as part of the planning application process, prior to the quarry becoming operational. The limits were based upon the requirements of the minerals PPG, subject to a lower limit of 45 dB $L_{Aeq, 1 \text{ hour}}$ for normal operations, thus seeking to ensure that the operations did not result in adverse noise impacts.
- 4.1.2. Whilst the quarry is now operational, the present operations are being carried out in Phase A, furthest from Wakerley village, with noise associated with the operation of the quarry having minimal influence on the noise environment at the surrounding properties at the present time.
- 4.1.3. It was therefore considered appropriate to update the baseline noise information, to ensure that the limits imposed as part of the planning permission were appropriate.
- 4.1.4. A noise monitoring exercise was therefore carried out during the morning of Friday 29 November 2019. Weather conditions for the survey were good, fine and dry with calm conditions throughout.
- 4.1.5. Measurements were obtained at the five locations identified within Condition 34 of the planning position, which are considered representative of the properties potentially most likely to be affected by noise from the operation of the quarry. The monitoring locations are indicated on Figure 1.
- 4.1.6. Five Rion NL-52 Class 1 Sound Level Meters were used for the exercise, which were field calibrated before and after the exercise using a Rion NC-74 Class 1 Acoustic calibrator, with the instruments reading 94.0 dB on each occasion. Each meter had been laboratory calibrated within the previous 12/24 months, as specified below (the calibration certificates can be provided upon request).

Instrument	Serial No.	Calibration Date	Laboratory / Certificate No.
Rion NL-52 Class 1 SLM (Wakerley Village)	00231657	30/4/19	ANV – TRCT19/1346
Rion NL-52 Class 1 SLM (Wakerley Church)	00231656	12/3/19	ANV – TRCT19/1172
Rion NL-52 Class 1 SLM (Laxton Hall)	01021287	12/3/19	ANV – TRCT19/1174
Rion NL-52 Class 1 SLM (Town Wood Farm)	00231655	30/4/19	ANV – TRCT19/1345
Rion NL-52 Class 1 SLM (The Bungalows)	00610177	10/9/18	ANV – TRCT18/1755
Rion NC-74 Class 1 Acoustic Calibrator	35125830	12/3/19	ANV – UCRT19/1310

- 4.1.7. At each monitoring location, the microphone was set at a height of 1.2 metres above the ground and free-field, i.e. at least 3.5 metres from any building or other reflecting surface other than the ground.
- 4.1.8. A series of measurements, each over a duration of 15 minutes was made at each location, over a period of at least 1 hour, which was considered sufficient to check the present background noise levels against those used to determine the present noise limits.

4.2. Results of Noise Monitoring at Wakerley Village

- 4.2.1. The noise monitoring at this location was carried out along the lane to the rear of the properties.
- 4.2.2. Measurements at this location were obtained between 09:35 – 11:50 hours. The results obtained are provided below.

Start Period	Measured Noise Levels [dB]		
	L _{Aeq, 15 min}	L _{Amax,F}	L _{A90}
09:35	48.1	68.2	40.7
09:50	41.1	58.8	38.5
10:05	47.4	65.5	39.2
10:20	45.7	60.7	40.1
10:35	42.9	56.7	38.4
10:50	46.9	72.0	38.0
11:05	43.9	64.7	39.2
11:20	41.0	57.0	38.1
11:35	50.2	74.1	39.4
Typical L_{A90}			39

- 4.2.3. Noise levels monitored at this location were principally influenced by a mix of distant road traffic and occasional birdsong. The operation of the quarry was not audible at this location throughout the survey period.
- 4.2.4. The results indicate a typical background noise level of 39 dB L_{A90} at this location, consistent with the noise levels monitored previously upon which the normal working limit was based. On this basis, the present limit is considered appropriate to ensure that the operations do not result in significant adverse noise impacts, when considered against either the minerals PPG guidance or the requirements of BS 4142.

4.3. Results of Noise Monitoring at Wakerley Church

- 4.3.1. The noise monitoring at this location was carried out along the public footpath, which runs to the rear of the church.
- 4.3.2. Measurements at this location were obtained between 09:20 – 11:50 hours. The results obtained are provided below.

Start Period	Measured Noise Levels [dB]		
	L _{Aeq, 15 min}	L _{Amax,F}	L _{A90}
09:20	51.9	69.4	43.0
09:35	46.4	68.2	43.3
09:50	48.1	76.5	41.2
10:05	47.6	64.8	40.3
10:20	47.5	67.7	42.8
10:35	47.9	74.0	40.8
10:50	44.6	60.0	41.0
11:05	47.0	73.5	40.4
11:20	42.6	55.3	38.8
11:35	45.8	75.8	38.6
Typical L_{A90}			41

4.3.3. Noise levels monitored at this location were principally influenced by a mix of distant road traffic and occasional vehicles passing along the lane. The operation of the quarry was not audible at this location throughout the survey period.

4.3.4. The results indicate a typical background noise level of 41 dB L_{A90} at this location, higher than the noise levels monitored previously upon which the normal working limit was based. On this basis, the present limit is considered appropriate to ensure that the operations do not result in significant adverse noise impacts, when considered against either the minerals PPG guidance or the requirements of BS 4142.

4.4. Results of Noise Monitoring at Laxton Hall

4.4.1. The noise monitoring at this location was carried out along the rear boundary of the property, which is marginally closer to the quarry.

4.4.2. Attended noise measurements at this location were obtained between 10:00 – 11:00 hours. The results obtained are provided below.

Start Period	Measured Noise Levels [dB]		
	L _{Aeq, 15 min}	L _{Amax,F}	L _{A90}
10:00	40.1	52.5	37.8
10:15	42.7	54.8	37.7
10:30	42.0	55.3	37.7
10:45	41.1	58.5	36.9
Typical L_{A90}			38

4.4.3. Observations made at this location indicated that the noise levels monitored were principally influenced by distant road traffic from the main roads to the east.

4.4.4. The general quarry operations were not audible at this location, although it was possible to hear stone being tipped either into the processing plant or vehicles on occasion. Whilst these activities were audible, they were of very short duration and had no influence on the background noise levels.

4.4.5. The results indicate a typical background noise level of 38 dB L_{A90} at this location, higher than noise levels monitored previously upon which the normal working limit was based. On this basis, the present limit is considered appropriate to ensure that the operations do not result in significant adverse noise impacts, when considered against either the minerals PPG guidance or the requirements of BS 4142.

4.5. Results of Noise Monitoring at Town Wood Farm

4.5.1. The noise monitoring at this location was carried out on the land to the side of the properties.

4.5.2. Measurements at this location were obtained between 09:05 – 11:20 hours. The results obtained are provided below.

Start Period	Measured Noise Levels [dB]		
	$L_{Aeq, 15 \text{ min}}$	$L_{Amax,F}$	L_{A90}
09:05	48.9	72.7	38.2
09:20	48.9	68.3	37.0
09:35	55.0	79.3	37.7
09:50	42.4	62.4	37.1
10:05	47.4	75.6	36.0
10:20	41.9	61.3	36.3
10:35	57.5	79.1	36.1
10:50	43.2	64.7	35.2
11:05	44.5	65.8	35.0
Typical L_{A90}			36

4.5.3. Noise levels monitored at this location were principally influenced by a mix of distant road traffic and occasional birdsong. There was also occasional shooting clearly audible at this location, which influenced ambient and maximum noise levels periodically.

4.5.4. Observations made at the start and end of the survey period indicated that the operations within the quarry were just audible although having minimal influence on the measured noise levels.

4.5.5. The results indicate a typical background noise level of 36 dB L_{A90} at this location, marginally higher than monitored previously and likely to have been influenced to a small amount by the operation of the processing plant. On this basis, the present limit is considered appropriate to ensure that the operations do not result in significant adverse noise impacts, when considered against either the minerals PPG guidance or the requirements of BS 4142.

4.6. Results of Noise Monitoring at The Bungalows

4.6.1. The noise monitoring at this location was carried out within the field adjacent to the property and with the microphone positioned at an equivalent distance back from the lane.

4.6.2. Measurements at this location were obtained between 08:50 – 11:35 hours. The results obtained are provided in the following table.

Start Period	Measured Noise Levels [dB]		
	L _{Aeq, 15 min}	L _{Amax,F}	L _{A90}
08:50	49.0	74.2	37.6
09:05	46.5	63.2	38.9
09:20	51.6	68.2	38.5
09:35	49.4	63.1	38.4
09:50	50.3	65.0	38.0
10:05	52.0	71.2	45.4
10:20	47.2	64.6	39.4
10:35	51.5	71.2	40.0
10:50	47.5	64.7	39.1
11:05	48.8	71.9	37.0
11:20	47.0	65.5	35.3
Typical L_{A90}			38

- 4.6.3. Noise levels monitored at this location were influenced by a mix of sources, including regular vehicles movements along the lane and more distant road traffic associated with vehicles travelling along the main road to the north.
- 4.6.4. The operation of the quarry was just audible at this location, principally associated with the operation of the processing plant, which may have had a small influence on the background noise levels monitored.
- 4.6.5. The results, however, indicate a typical background noise level of 38 dB L_{A90} at this location, higher than obtained previously at this location and noted to have been principally attributable to the distant road traffic noise. On this basis, the present limit of 45 dB L_{Aeq, 1 hour} at this location is appropriate to ensure that the operations do not result in adverse noise impacts, when considered against either the minerals PPG guidance or the requirements of BS 4142.

5. Calculations and Assessment

5.1. Proposed Operations

- 5.1.1. The quarry is being worked as per the working scheme permitted under the current planning permission, with the operations being carried out in a phased manner as indicated on Figure 2.
- 5.1.2. To mitigate noise levels at the surrounding properties, bunding has been constructed, or will be constructed to operations within the relevant phase, around the perimeter of the quarry as indicated on the figure, which would be retained during extraction within the associated phase, infilling and restoration. The soils stored within the bunds would be spread as part of the final restoration of each phase, once infilling operations have been completed.
- 5.1.3. Extraction and processing operations are presently being carried Phase A. Once this area has been worked, infill operations would commence and would then follow the quarrying operations on a phased basis as the quarry is worked.
- 5.1.4. Inert material will be required to be imported in order to restore the quarry fully. Whilst there would be no requirement for any additional plant on site to that which presently operates, it is anticipated that there would be up to an additional 5 vehicles per hour accessing the site (i.e. up to an additional 10 movements per hour), although these would be minimised wherever possible, using back hauls.

5.2. Source Term Information

- 5.2.1. The source term noise information for plant to be used on the site have been obtained from plant operating presently within Wakerley Quarry and other existing MGL quarries.
- 5.2.2. To provide a worst case assessment, it has been assumed that the plant would be operational 100% of the time.
- 5.2.3. The noise source terms which have been assumed for this assessment are provided below.

Source	SWL [dB(A)]	L _{Aeq} at 10m [dB]	Number	% On-Time
Excavator	-	75.0	2	100
Articulated Dump Truck	110	-	12 – 30 movements / hr	-
Dozer	-	79.0	1	100
Loading Shovel	-	75.0	2	100
Processing Plant	-	86.8	1	100
HGV Movements	106	-	15 / hr (quarry) / 15 / hr (landfill)	-

Table 5.1 Source Term Noise Levels

- 5.2.4. The inert waste landfill operations, which require the permit, would utilise the dozer to spread the deposited material periodically across the working area. The calculations have assumed that the plant would operate 100% of the time, although generally, its usage would be typically around 50% of the time, with the plant powered down whilst not working.

- 5.2.5. As indicated above, there would be a small number of additional vehicle movements associated with the importation of materials, with the aim of bringing the majority of the material as a back hall, to reduce both vehicle movements and noise levels. To provide a worst case assessment, it has, however, been assumed that there would be up to 30 movements per hour associated with the quarry and infilling operations.
- 5.2.6. The plant would be screened from the surrounding properties by the perimeter bunding. The calculations have, however, assumed the plant operating close to the final ground levels and close to the neighbouring properties and not generally taken account of the bunding to provide a worst case assessment.

5.3. Criteria to be Adopted for the Assessment

- 5.3.1. Based upon the requirements of Condition 34 of the current planning consent, the following freefield normal daytime working limits have been adopted for this assessment, which are in accordance with the requirements of the current planning guidance. These limits would also ensure that the noise associated with the operation of the quarry, including permitted landfill operations do not result in significant adverse impacts when assessed against the requirements of BS 4142.

Location	Proposed Freefield Normal Working Limit [dB L _{Aeq, 1 hour}]
Oak Farm, Wakerley Village	49
Wakerley Church	45
Laxton Hall	45
Town Wood Farm	45
The Bungalows, Shotley	45

Table 5.2 Proposed Normal Working Limits

- 5.3.2. For any temporary operations, which may include the removal of temporary soils storage mounds, carried out over a duration of not more than 8 weeks per year, a temporary noise working limit of 70 dB L_{Aeq, 1 hour} would be adopted in accordance with the current planning guidance. Given the large distances to the surrounding properties, it is, however, be unlikely that noise levels would exceed the normal working limits, even during temporary works.

5.4. Calculation Methodology

- 5.4.1. The calculations of the noise levels from site operations have been made using the methodology contained within BS 5228-1 [7]. Where barrier corrections have been calculated, the algorithm used within a Calculation of Road Traffic Noise [8] has been used.
- 5.4.2. Calculations have been made at positions representative of the likely closest operations to the properties. For the purposes of the calculations, it has been generally assumed that all plant would be working at the same distance from the properties.
- 5.4.3. The calculations associated with the infilling and restoration have assumed that the plant would be operational close to the final restoration level. This assumption does not account for any attenuation afforded by the sides of the quarry during the initial stages of the restoration when the plant would be working at the base of the quarry and thus effectively screened. The calculations are therefore a worst case at each position.
- 5.4.4. The details of the calculations are provided in Appendix B.

5.5. Assessment of Noise Levels at Wakerley Village

- 5.5.1. Wakerley village is located to the north of the quarry. The initial phases (Phases A and B) would be over 1 kilometre from the dwellings in the village, with the latter phases closer to the village, although the working areas would remain in excess of 500 metres from any property. The haul road leading into the quarry utilises an existing track along the northern boundary of Long Wood to carry the HGV traffic to and from the site. Bunding has been constructed alongside the haul road to screen the vehicles as they travel along it.
- 5.5.2. Noise levels at the dwellings within the village during Phases A and B would be of the order of 33 – 35 dB $L_{Aeq,1 hr}$. This figure includes noise from the infilling operations, which are anticipated to be around 10 dB(A) lower than the overall site noise levels.
- 5.5.3. Noise levels would increase as works progress into Phases D and E, with site noise levels during these latter phases would of between 37 - 38 dB $L_{Aeq, 1 hr}$ predicted within the village. Noise levels attributable to the permitted operations during the working of these phases are anticipated to be between 30 – 32 dB $L_{Aeq, 1 hour}$.
- 5.5.4. The calculations have accounted for HGVs accessing the quarry along the proposed haul route. To provide a worst case assessment, the calculations have been based upon 15 in and 15 out per hour. The calculations indicated that the noise associated with the vehicle movements on the access would be of the order of 21 dB $L_{Aeq, 1 hr}$ at the dwellings within the village. Whilst individual vehicle movements along the access may be audible within the village, noise levels associated with the passbys would have no influence on the ambient (L_{Aeq}) noise levels at the dwellings in the village.
- 5.5.5. Whilst no further specific noise mitigation measures have been proposed for the haul route, the surface of the haul route is maintained in good condition and repairs made quickly, should any deformations in the surface occur.
- 5.5.6. The calculations indicate that noise levels will remain substantially below the criterion for normal operations of 49 dB $L_{Aeq, 1 hr}$ within the village.
- 5.5.7. Furthermore, the noise levels are not anticipated to generally exceed the prevailing background noise levels at this location, with noise from infilling operations remaining below the background noise levels. On this basis, an assessment against BS 4142 would conclude that the operations would result in the potential for a low impact.

5.6. Assessment of Noise Levels at Wakerley Church

- 5.6.1. Wakerley Church is situated to the south east of the village and is elevated above the properties within the village. During the initial three phases, activities within the quarry would be over one kilometre from the church, with noise levels of between 34 – 39 dB $L_{Aeq, 1 hr}$ calculated during this period.
- 5.6.2. Noise levels would increase during work in Phases D and E and to minimise noise levels, the boundary bund would be constructed prior to the commencement of working in these phases. With the bunding in place, noise levels are anticipated to be between 38 – 41 dB $L_{Aeq, 1 hr}$, whilst working and restoring these phases.
- 5.6.3. Noise levels attributable to the infilling operations would be at a maximum during infilling of Phase E, closest to the church. Noise levels during this period attributable to the permitted operations would be 31 dB $L_{Aeq, 1 hour}$, thus remaining below the background noise levels.

- 5.6.4. Noise levels attributable to the overall operation of the quarry are would rain at least 4 dB(A) below the presently permitted noise limit at the church.
- 5.6.5. Noise levels attributable to the infilling operations, which include the HGV movements and use of the dozer would remain below the prevailing background noise levels at this location and when assessed against the requirements of BS 4142 would ensure that the operations result in low impact.
- 5.7. Assessment of Noise Levels at Laxton Hall
- 5.7.1. This property is situated to the south east of the quarry, approximately 1200 metres from the closest working during Phase B.
- 5.7.2. Noise levels at this property will be at a maximum the working of Phases A and B. Noise levels during this period have been calculated to be between 37 - 38 dB $L_{Aeq, 1 hr}$ on the basis of solely distance attenuation, substantially below the normal working limit of 45 dB $L_{Aeq, 1 hr}$ at this property and remaining generally below the prevailing background noise levels at this location.
- 5.7.3. Noise levels attributable to the permitted infill operations would be substantially lower than those associated with the main quarry operations, with the highest noise levels of 30 dB $L_{Aeq, 1 hour}$ associated with these operations. Noise from these operations would remain below background noise levels and when assessed against the requirements of BS 4142 would ensure the potential for a low impact.
- 5.8. Assessment of Noise Levels at Town Wood Farm
- 5.8.1. The properties at this location are located approximately 800 metres from the southern boundary of the quarry.
- 5.8.2. A bund has been constructed along the southern boundary of the site, which would remain in place until the final restoration of these phases has been completed.
- 5.8.3. With the bunding in place, worst case noise levels during the operation of the quarry in Phases A and B are anticipated to be between 38 – 41 dB $L_{Aeq, 1 hr}$, thus remaining substantially below the imposed working limit of 45 dB $L_{Aeq, 1 hr}$ at this property for normal operations.
- 5.8.4. Noise levels attributable to the permitted operations during working in these phases are anticipated to be up to 34 dB $L_{Aeq, 1 hour}$ and not anticipated to exceed the background noise levels.
- 5.8.5. Noise levels will generally decrease as the extraction progressed into the later phases and site noise levels remaining below 40 dB $L_{Aeq, 1 hr}$ during the working of Phases C to E, thus at least 5 dB(A) below the current noise limit and result in a low impact when assessed against the requirements of BS 4142.
- 5.8.6. With the provision of the boundary bunding during Phases A and B, noise levels at this location would be acceptable throughout the working life of the quarry including the activities associated with the importation of material.

5.9. Assessment of Noise Levels at The Bungalows

- 5.9.1. These properties are located to the west of the quarry, approximately 1300 metres from the closest working area during Phase A.
- 5.9.2. The calculations indicated that, at worst, site noise levels during the working of this Phase, are not anticipated to exceed 40 dB $L_{Aeq, 1 \text{ hr}}$ at these dwellings, thus remaining substantially below the 45 dB $L_{Aeq, 1 \text{ hr}}$ working limit proposed at this location.
- 5.9.3. Noise levels attributable to the infill operations are not anticipated to exceed 30 dB $L_{Aeq, 1 \text{ hour}}$ at this location, thus remaining at least 10 dB(A) below the background noise levels at this location. When assessed against BS 4142, noise levels attributable to the permitted operations would result in a low impact.

6. Requirement for Noise Monitoring, Additional Mitigation and Control Measures

- 6.1. The assessment within Section 4 indicates that noise levels associated with working of Wakerley Quarry including the proposal to import restoration materials would be acceptable with appropriate working methods adopted.
- 6.2. In addition to any mitigation measures incorporated into the design and working method, in accordance with Conditions 31 – 33 of the current consent, appropriate noise control measures would be adopted to ensure noise associated with the operation of the quarry was minimised and would include:
- Ensuring all plant is kept well maintained;
 - Ensuring silencers on plant are effective;
 - Ensuring loads are tipped carefully to minimise tailgates banging as the tippers are lowered;
 - Turning off plant when not in use;
 - Using alternative non tonal reversing signals on mobile plant; and
 - Minimise the requirements for HGVs to reverse whilst on site.
- 6.3. Vehicles travelling on the access have potential to cause disturbance even at low noise levels. To ensure potential disturbance is minimised, the access roads should be inspected at regular intervals (at least once every week) to ensure that the surface remains in good condition. Where defects are identified, these should be rectified immediately. This action seeks to ensure that empty vehicles travelling on the haul roads and passing over the defect do not give rise to body slap, which is potentially disturbing. Furthermore, the speed limit on the access road should be well enforced, this measure also seeks to minimise the likelihood of body slap from empty vehicles.
- 6.4. Condition 35 and current planning guidance advises that noise monitoring should be carried out periodically to ensure that noise levels associated with site operations remain within acceptable limits.
- 6.5. Given the large distances between the site and surrounding properties and the fact that the calculated noise levels are substantially below the appropriate normal working limits and existing ambient noise levels, regular noise monitoring is not considered to be required to demonstrate compliance. Monitoring has therefore only been proposed at the commencement of each main phase of work, when the plant is working closest to the surface or following receipt of any justified complaints.
- 6.6. For any measurements made, a meter conforming to at least Class 2 standards should be used, which should be calibrated before and after the exercise. The meter should be positioned at a height of 1.2 metres above the ground and at a free-field location (i.e. at least 3.5 metres from a building facade or other reflecting surface other than the ground).
- 6.7. Measurements should be taken over a minimum duration of 15 minutes at each location whilst the quarry is fully operational. A 15 minute monitoring period is normally sufficient to provide a good indication of the 1 hour noise levels. Any extraneous noise sources, such as aircraft flying overhead, should be paused out of the measurements, to ensure the levels recorded are representative of the current noise environment. Where noise levels are above the limits, but not attributable to quarry operations, a second measurement should be obtained during a break period for comparative purposes.

- 6.8. The results of the monitoring exercise should be compared to the proposed operating limits presented in Section 4.3. Should the results indicate that the limits are being exceeded, further mitigation measures, such as temporary storage mounds, should be considered and implemented, where appropriate.

7. Summary

- 7.1. LFAcoustics Limited have been appointed by Mick George Ltd to carry out a noise assessment at Wakerley Quarry associated with the main quarrying operations and proposed importation of inert materials to enable the quarry to be restored.
- 7.2. Planning permission for the working and extension to the quarry was granted in December 2015, subject to conditions.
- 7.3. Noise levels associated with the operation of the quarry, including proposed permitted operations have been calculated and assessed against the noise limits specified within current governmental advice documents, which additionally seek to ensure acceptable noise levels when assessed against the requirements of BS 4142.
- 7.4. The assessment concluded that the noise levels attributable to the operation of the quarry, including infilling operations would remain low and substantially below the presently permitted noise levels. When assessed against the requirements of BS 4142, the permitted quarrying and landfill operations would result in a low impact and thus acceptable.

References

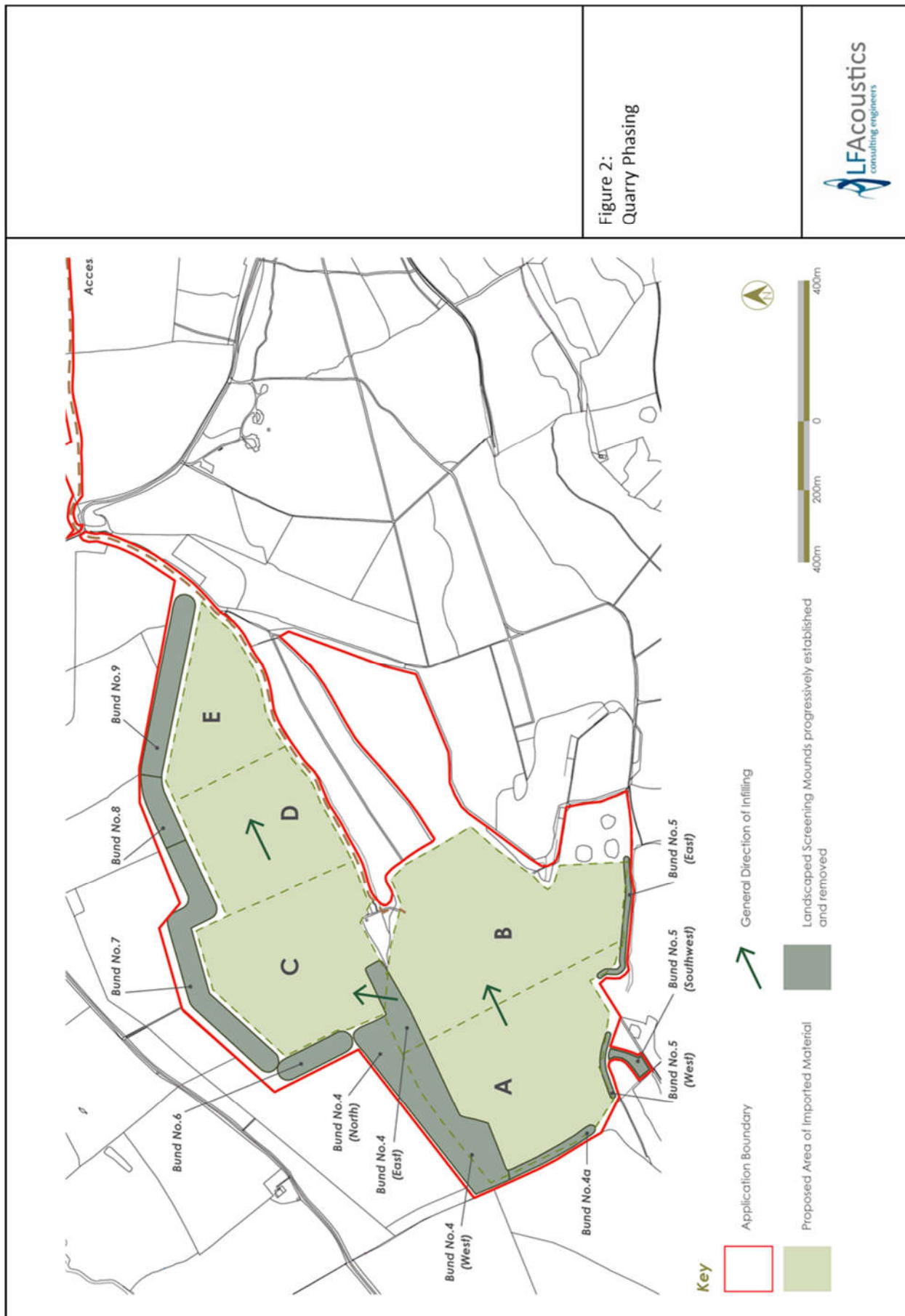
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Figures



Figure 1:
Noise Measurement and
Calculation Positions

Figure 2:
Quarry Phasing



Appendix A Noise Units

Decibels (dB)

Noise can be considered as 'unwanted sound'. Sound in air can be considered as the propagation of energy through the air in the form of oscillatory changes in pressure. The size of the pressure changes in acoustic waves is quantified on a logarithmic decibel (dB) scale firstly because the range of audible sound pressures is very great, and secondly because the loudness function of the human auditory system is approximately logarithmic.

The dynamic range of the auditory system is generally taken to be 0 dB to 140 dB. Generally, the addition of noise from two sources producing the same sound pressure level will lead to an increase in sound pressure level of 3 dB. A 3 dB noise change is generally considered to be just noticeable, a 5 dB change is generally considered to be clearly discernible and a 10 dB change is generally accepted as leading to the subjective impression of a doubling or halving of loudness.

A-Weighting

The bandwidth of the frequency response of the ear is usually taken to be from about 18 Hz to 18,000 Hz. The auditory system is not equally sensitive throughout this frequency range. This is taken into account when making acoustic measurements by the use of A-weighting, a filter circuit that has a frequency response similar to the human auditory system. All the measurement results referred to in this report are A-weighted.

Units Used to Describe Time-Varying Noise Sources (L_{Aeq} , L_{Amax} , L_{A10} , and L_{A90})

Instantaneous A-weighted sound pressure level is not generally considered as an adequate indicator of subjective response to noise because levels of noise usually vary with time.

For many types of noise the Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$) is used as the basis of determining community response. The $L_{Aeq,T}$ is defined as the A-weighted sound pressure level of the steady sound which contains the same acoustic energy as the noise being assessed over a specific time period, T.

The L_{Amax} is the maximum value that the A-weighted sound pressure level reaches during a measurement period. $L_{Amax,F}$, or Fast, is averaged over 0.125 of a second and $L_{Amax,S}$, or Slow, is averaged over 1 second. All L_{Amax} values referred to in this report are Fast.

The L_{A90} is the noise level exceeded for 90% of the measurement period. It is generally used to quantify the background noise level, the underlying level of noise that is present even during the quieter parts of measurement period.

Appendix B
Calculation Details

Mick George Limited
Wakerley Quarry, Northamptonshire
Calculated Noise Levels

05-Dec-2019

Receptor: 1 - Dwellings in Wakerley Village Uses 855228
 Height 50 m
 Grid Ref: 495012 X 299460 Y

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference X	Grid Reference Y	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Operation LAeq [dB]	Overall LAeq [dB]		
										Hard	Soft							
Extraction - Phase A																		
Excavator	75.0	1	100	494318	297977	95	1300	87	750	-42.3	-50.9	-13.2	-55.5	19.5				Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494318	297977	95	1300	87	750	-42.3	-50.9	-13.2	-55.5	19.5				
Articulated Dump Truck	34.9	12	-	494318	297977	95	1300	87	750	-42.3	-50.9	-13.2	-55.5	13.1				
Loading Shovel (Stockpiles)	75.0	2	100	494318	297977	95	1300	87	750	-42.3	-50.9	-13.2	-55.5	22.5				
Processing Plant	86.8	1	100	494318	297977	97	1300	87	750	-42.3	-50.9	-12.9	-55.2	31.6				
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	33.0			
Extraction Phase B & Infilling / Restoration Phase A																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	494802	298076	100	1300	87	600	-42.3	-50.9	-10.2	-52.5	22.5				Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494802	298076	100	1300	87	600	-42.3	-50.9	-10.2	-52.5	22.5				
Articulated Dump Truck	34.9	12	-	494802	298076	95	1300	87	600	-42.3	-50.9	-11.3	-53.6	18.0				
Processing Plant	86.8	1	100	494802	298076	97	1300	87	600	-42.3	-50.9	-10.9	-53.2	33.6				
Loading Shovel (Stockpiles)	75.0	2	100	494802	298076	95	1300	87	600	-42.3	-50.9	-11.3	-53.6	24.4				
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	34.9			
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494318	297977	95	1300	87	750	-42.3	-50.9	-13.2	-55.5	23.5				35.4
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	25.8			
Extraction Phase C & Infilling / Restoration Phase B																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	494646	298647	85	800	87	50	-38.1	-45.6	-10.6	-48.7	26.3				Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494646	298647	85	800	87	50	-38.1	-45.6	-10.6	-48.7	26.3				
Articulated Dump Truck	37.0	12	-	494646	298647	85	800	87	50	-38.1	-45.6	-10.6	-48.7	18.9				
Processing Plant	86.8	1	100	494520	298551	85	1000	87	150	-40.0	-48.0	-10.8	-50.8	36.0				
Loading Shovel (Stockpiles)	75.0	2	100	494520	298551	83	1000	87	150	-40.0	-48.0	-11.9	-51.9	26.1				
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	37.4			
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494802	298076	100	850	87	650	-38.6	-46.3	-18.3	-56.9	22.1				37.6
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	25.0			
Extraction Phase D & Infilling / Restoration Phase C																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	495018	298693	80	700	87	50	-36.9	-44.1	-15.0	-51.9	23.1				Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	495018	298693	80	700	87	50	-36.9	-44.1	-15.0	-51.9	23.1				
Articulated Dump Truck	37.6	12	-	495018	298693	80	700	87	50	-36.9	-44.1	-15.0	-51.9	15.4				
Processing Plant	86.8	1	100	495020	298594	82	800	87	150	-38.1	-45.6	-13.1	-51.2	35.6				
Loading Shovel (Stockpiles)	75.0	2	100	495020	298594	80	800	87	150	-38.1	-45.6	-14.0	-52.0	26.0				
HGV Movements	38.5	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.4	36.6			
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494646	298647	83	800	87	50	-38.1	-45.6	-12.4	-50.5	28.5				37.4
HGV Movements	38.9	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.8	29.3			
Extraction Phase E & Infilling / Restoration Phase D																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	495293	298688	80	750	87	50	-37.5	-44.9	-14.9	-52.4	22.6				Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	495293	298688	80	750	87	50	-37.5	-44.9	-14.9	-52.4	22.6				
Articulated Dump Truck	37.3	12	-	495293	298688	80	750	87	50	-37.5	-44.9	-14.9	-52.4	15.0				
Processing Plant	86.8	1	100	495248	298634	82	800	87	150	-38.1	-45.6	-13.1	-51.2	35.6				
Loading Shovel (Stockpiles)	75.0	2	100	495248	298634	80	800	87	150	-38.1	-45.6	-14.0	-52.0	26.0				
HGV Movements	38.0	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	20.9	36.6			
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	495018	298693	85	700	87	50	-36.9	-44.1	-11.0	-47.9	31.1				37.8
HGV Movements	38.5	15	-	495293	298485	95	950	87	300	-39.6	-47.5	-9.2	-48.8	21.4	31.6			
Final Restoration Phase E																		
Dozer	79.0	1	100			85	750			-37.5	-44.9	0.0	-44.9	34.1				35.6
HGV Movements	38.0	15	-	495293	298485	95	950			-39.6	-47.5	0.0	-47.5	30.1				

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
ADT Movement (Phase A)	110	12	25	1300	30	34.9
ADT Movement (Phase B)	110	12	25	1300	30	34.9
ADT Movement (Phase C)	110	12	25	800	30	37.0
ADT Movement (Phase D)	110	12	25	700	30	37.6
ADT Movement (Phase E)	110	12	25	750	30	37.3
HGV Movements (Phase A)	106	15	25	950	110	38.9
HGV Movements (Phase B)	106	15	25	950	110	38.9
HGV Movements (Phase C)	106	15	25	950	110	38.9
HGV Movements (Phase D)	106	15	25	950	100	38.5
HGV Movements (Phase E)	106	15	25	950	90	38.0

Mick George Limited
Wakerley Quarry, Northamptonshire
Calculated Noise Levels

05-Dec-2019

Receptor: 2 - Wakerley Church Uses 855228
 Height 65 m
 Grid Ref: 495653 X 299217 Y

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference X	Grid Reference Y	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation Hard	Distance Attenuation Soft	CRTN Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Operation LAeq [dB]	Overall LAeq [dB]	
Extraction - Phase A																	
Excavator	75.0	1	100	494318	297977	95	1700	87	1150	-44.6	-53.8	-10.8	-55.4	19.6			Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494318	297977	95	1700	87	1150	-44.6	-53.8	-10.8	-55.4	19.6			
Articulated Dump Truck	33.7	12	-	494318	297977	95	1700	87	1150	-44.6	-53.8	-10.8	-55.4	13.7			
Loading Shovel (Stockpiles)	75.0	2	100	494318	297977	95	1700	87	1150	-44.6	-53.8	-10.8	-55.4	22.6			
Processing Plant	86.8	1	100	494318	297977	97	1700	87	1150	-44.6	-53.8	-10.6	-55.2	31.6			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	33.8		
Extraction Phase B & Infilling / Restoration Phase A																	
<i>Extraction / Processing</i>																	
Excavator	75.0	1	100	494802	298076	100	1300	87	800	-42.3	-50.9	-9.7	-51.9	23.1			Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494802	298076	100	1300	87	800	-42.3	-50.9	-9.7	-51.9	23.1			
Articulated Dump Truck	34.9	12	-	494802	298076	95	1300	87	800	-42.3	-50.9	-10.5	-52.8	18.8			
Processing Plant	86.8	1	100	494802	298076	97	1300	87	800	-42.3	-50.9	-10.2	-52.5	34.3			
Loading Shovel (Stockpiles)	75.0	2	100	494802	298076	95	1300	87	800	-42.3	-50.9	-10.5	-52.8	25.2			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	36.1		
<i>Infilling / Restoration</i>																	
Dozer	79.0	1	100	494318	297977	95	1300	87	800	-42.3	-50.9	-10.5	-52.8	26.2			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	29.8	37.0	
Extraction Phase C & Infilling / Restoration Phase B																	
<i>Extraction / Processing</i>																	
Excavator	75.0	1	100	494646	298647	85	1050	87	100	-40.4	-48.5	-9.0	-49.5	25.5			Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	494646	298647	85	1050	87	100	-40.4	-48.5	-9.0	-49.5	25.5			
Articulated Dump Truck	35.8	12	-	494646	298647	85	1050	87	100	-40.4	-48.5	-9.0	-49.5	18.7			
Processing Plant	86.8	1	100	494520	298551	85	1150	87	250	-41.2	-49.5	-9.4	-50.6	36.2			
Loading Shovel (Stockpiles)	75.0	2	100	494520	298551	83	1150	87	250	-41.2	-49.5	-10.3	-51.5	26.5			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	37.7		
<i>Infilling / Restoration</i>																	
Dozer	79.0	1	100	494802	298076	100	1300	87	800	-42.3	-50.9	-9.7	-51.9	27.1			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	30.2	38.4	
Extraction Phase D & Infilling / Restoration Phase C																	
<i>Extraction / Processing</i>																	
Excavator	75.0	1	100	495018	298693	80	750	87	150	-37.5	-44.9	-12.6	-50.1	24.9			Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	495018	298693	80	750	87	150	-37.5	-44.9	-12.6	-50.1	24.9			
Articulated Dump Truck	37.3	12	-	495018	298693	80	750	87	150	-37.5	-44.9	-12.6	-50.1	17.3			
Processing Plant	86.8	1	100	495020	298594	82	825	87	300	-38.3	-45.9	-12.0	-50.3	36.5			
Loading Shovel (Stockpiles)	75.0	2	100	495020	298594	80	825	87	300	-38.3	-45.9	-12.6	-50.9	27.1			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	37.9		
<i>Infilling / Restoration</i>																	
Dozer	79.0	1	100	494646	298647	85	1050	87	100	-40.4	-48.5	-9.0	-49.5	29.5			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	31.6	38.8	
Extraction Phase E & Infilling / Restoration Phase D																	
<i>Extraction / Processing</i>																	
Excavator	75.0	1	100	495293	298688	80	600	87	100	-35.6	-42.5	-13.4	-48.9	26.1			Mitigation Provided by Bunds 7 - 9
Excavator (Face)	75.0	1	100	495293	298688	80	600	87	100	-35.6	-42.5	-13.4	-48.9	26.1			
Articulated Dump Truck	38.2	12	-	495293	298688	80	600	87	100	-35.6	-42.5	-13.4	-48.9	17.9			
Processing Plant	86.8	1	100	495248	298634	82	650	87	150	-36.3	-43.3	-12.1	-48.4	38.4			
Loading Shovel (Stockpiles)	75.0	2	100	495248	298634	80	650	87	150	-36.3	-43.3	-13.0	-49.2	28.8			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	39.6		
<i>Infilling / Restoration</i>																	
Dozer	79.0	1	100	495018	298693	80	750	87	150	-37.5	-44.9	-12.6	-50.1	28.9			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	31.2	40.2	
Final Restoration Phase E																	
Dozer	79.0	1	100	495293	298688	80	600			-35.6	-42.5	0.0	-42.5	36.5			
HGV Movements	44.6	15	-	495763	298891	80	300	82	10	-29.6	-34.9	-11.9	-41.5	27.3	37.0	37.0	

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
ADT Movement (Phase A)	110	12	25	1700	30	33.7
ADT Movement (Phase B)	110	12	25	1300	30	34.9
ADT Movement (Phase C)	110	12	25	1050	30	35.8
ADT Movement (Phase D)	110	12	25	750	30	37.3
ADT Movement (Phase E)	110	12	25	600	30	38.2
HGV Movements (Phase A)	106	15	25	300	130	44.6
HGV Movements (Phase B)	106	15	25	300	130	44.6
HGV Movements (Phase C)	106	15	25	300	130	44.6
HGV Movements (Phase D)	106	15	25	300	130	44.6
HGV Movements (Phase E)	106	15	25	300	130	44.6

Mick George Limited
Wakerley Quarry, Northamptonshire
Calculated Noise Levels

05-Dec-2019

Receptor: 3 - Laxton Hall Uses 855228
 Height 65 m
 Grid Ref: 495929 X 297038 Y

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference X	Grid Reference Y	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Operation LAeq [dB]	Overall LAeq [dB]
										Hard	Soft					
Extraction - Phase A																
Excavator	75.0	1	100	494372	297518	95	1500			-43.5	-52.4	0.0	-52.4	22.6		
Excavator (Face)	75.0	1	100	494372	297518	95	1500			-43.5	-52.4	0.0	-52.4	22.6		
Articulated Dump Truck	34.3	12	-	494372	297518	95	1500			-43.5	-52.4	0.0	-52.4	25.4		
Loading Shovel (Stockpiles)	75.0	2	100	494372	297518	95	1500			-43.5	-52.4	0.0	-52.4	25.6		
Processing Plant	86.8	1	100	494372	297518	97	1500			-43.5	-52.4	0.0	-52.4	34.4		
HGV Movements	34.5	15	-	494521	298165	95	1650			-44.4	-53.4	0.0	-53.4	25.4	36.2	
Extraction Phase B & Infilling / Restoration Phase A																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	494674	297443	100	1200			-41.6	-50.0	0.0	-50.0	25.0		
Excavator (Face)	75.0	1	100	494674	297443	100	1200			-41.6	-50.0	0.0	-50.0	25.0		
Articulated Dump Truck	35.2	12	-	494674	297443	95	1200			-41.6	-50.0	0.0	-50.0	26.8		
Processing Plant	86.8	1	100	494674	297443	97	1200			-41.6	-50.0	0.0	-50.0	36.8		
Loading Shovel (Stockpiles)	75.0	2	100	494674	297443	95	1200			-41.6	-50.0	0.0	-50.0	28.0		
HGV Movements	33.8	15	-	494521	298165	95	1650			-44.4	-53.4	0.0	-53.4	24.7	38.4	
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	494372	297518	95	1500			-43.5	-52.4	0.0	-52.4	26.6		
HGV Movements	34.5	15	-	494521	298165	95	1650			-44.4	-53.4	0.0	-53.4	25.4	29.1	38.8
Extraction Phase C & Infilling / Restoration Phase B																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	494643	298237	85	1600			-44.1	-53.1	0.0	-53.1	21.9		
Excavator (Face)	75.0	1	100	494643	298237	85	1600			-44.1	-53.1	0.0	-53.1	21.9		
Articulated Dump Truck	34.0	12	-	494643	298237	85	1600			-44.1	-53.1	0.0	-53.1	25.0		
Processing Plant	86.8	1	100	494643	298237	87	1600			-44.1	-53.1	0.0	-53.1	33.7		
Loading Shovel (Stockpiles)	75.0	2	100	494643	298237	85	1600			-44.1	-53.1	0.0	-53.1	24.9		
HGV Movements	33.3	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	24.3	35.5	
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	494674	297443	100	1200			-41.6	-50.0	0.0	-50.0	29.0		
HGV Movements	33.8	15	-	494521	298165	90	1650			-44.4	-53.4	0.0	-53.4	24.7	30.4	36.7
Extraction Phase D & Infilling / Restoration Phase C																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	494869	298390	85	1500			-43.5	-52.4	0.0	-52.4	22.6		
Excavator (Face)	75.0	1	100	494869	298390	85	1500			-43.5	-52.4	0.0	-52.4	22.6		
Articulated Dump Truck	34.3	12	-	494869	298390	85	1500			-43.5	-52.4	0.0	-52.4	25.4		
Processing Plant	86.8	1	100	494869	298390	87	1500			-43.5	-52.4	0.0	-52.4	34.4		
Loading Shovel (Stockpiles)	75.0	2	100	494869	298390	85	1500			-43.5	-52.4	0.0	-52.4	25.6		
HGV Movements	32.9	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	23.9	36.1	
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	494643	298237	85	1600			-44.1	-53.1	0.0	-53.1	25.9		
HGV Movements	33.3	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	24.3	28.2	36.8
Extraction Phase E & Infilling / Restoration Phase D																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	495225	298588	85	1500			-43.5	-52.4	0.0	-52.4	22.6		
Excavator (Face)	75.0	1	100	495225	298588	85	1500			-43.5	-52.4	0.0	-52.4	22.6		
Articulated Dump Truck	34.3	12	-	495225	298588	85	1500			-43.5	-52.4	0.0	-52.4	25.4		
Processing Plant	86.8	1	100	495225	298588	87	1500			-43.5	-52.4	0.0	-52.4	34.4		
Loading Shovel (Stockpiles)	75.0	2	100	495225	298588	85	1500			-43.5	-52.4	0.0	-52.4	25.6		
HGV Movements	32.3	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	23.3	36.1	
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	494869	298390	85	1500			-43.5	-52.4	0.0	-52.4	26.6		
HGV Movements	32.9	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	23.9	28.5	36.8
Final Restoration Phase E																
Dozer	79.0	1	100	495225	298588	85	1500			-43.5	-52.4	0.0	-52.4	26.6		
HGV Movements	32.3	15	-	495250	298585	85	1550			-43.8	-52.8	0.0	-52.8	23.3	28.3	28.3

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
ADT Movement (Phase A)	110	12	25	1500	30	34.3
ADT Movement (Phase B)	110	12	25	1200	30	35.2
ADT Movement (Phase C)	110	12	25	1600	30	34.0
ADT Movement (Phase D)	110	12	25	1500	30	34.3
ADT Movement (Phase E)	110	12	25	1500	30	34.3
HGV Movements (Phase A)	106	15	25	1650	70	34.5
HGV Movements (Phase B)	106	15	25	1650	60	33.8
HGV Movements (Phase C)	106	15	25	1550	50	33.3
HGV Movements (Phase D)	106	15	25	1550	45	32.9
HGV Movements (Phase E)	106	15	25	1550	40	32.3

Mick George Limited
Wakerley Quarry, Northamptonshire
Calculated Noise Levels

05-Dec-2019

Receptor: 4 - Town Wood Farm Uses 855228
 Height 100 m
 Grid Ref: 494502 X 296568 Y

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference X	Grid Reference Y	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Operation LAeq [dB]	Overall LAeq [dB]		
										Hard	Soft							
Extraction - Phase A																		
Excavator	75.0	1	100	494252	297496	95	900	102	50	-39.1	-46.9	-13.0	-52.1	22.9				Screening by land formation and Bund 5
Excavator (Face)	75.0	1	100	494252	297496	95	900	102	50	-39.1	-46.9	-13.0	-52.1	22.9				
Articulated Dump Truck	36.3	12	-	494252	297496	95	950	102	100	-39.6	-47.4	-11.1	-50.7	17.3				
Loading Shovel (Stockpiles)	75.0	2	100	494222	297548	95	950	102	100	-39.6	-47.4	-11.1	-50.7	27.3				
Processing Plant	86.8	1	100	494222	297548	97	950	102	100	-39.6	-47.4	-9.7	-49.3	37.5				
HGV Movements	36.0	15	-	494160	297604	95	1000	102	200	-40.0	-48.0	-9.6	-49.6	18.4	38.3			
Extraction Phase B & Infilling / Restoration Phase A																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	494585	297472	100	850	102	50	-38.6	-46.2	-8.0	-46.6	28.4				Screening by Bund 5
Excavator (Face)	75.0	1	100	494585	297472	100	850	102	50	-38.6	-46.2	-8.0	-46.6	28.4				
Articulated Dump Truck	36.3	12	-	494585	297529	95	950	100	100	-39.6	-47.4	-9.6	-49.1	18.9				
Processing Plant	86.8	1	100	494585	297529	97	950	100	100	-39.6	-47.4	-7.9	-47.5	39.3				
Loading Shovel (Stockpiles)	75.0	2	100	494585	297529	95	950	100	100	-39.6	-47.4	-9.6	-49.1	28.9				
HGV Movements	34.2	15	-	494400	297916	95	1250	100	500	-41.9	-50.4	-6.8	-50.4	18.9	40.4			
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494252	297496	95	900	102	50	-39.1	-46.9	-13.0	-52.1	26.9				Screening by land formation and Bund 5
HGV Movements	36.0	15	-	494160	297604	95	1000	102	200	-40.0	-48.0	-9.6	-49.6	18.4	27.5	40.6		
Extraction Phase C & Infilling / Restoration Phase B																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	22.6				36.1
Excavator (Face)	75.0	1	100	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	22.6				
Articulated Dump Truck	34.3	12	-	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	25.4				
Processing Plant	86.8	1	100	494303	298168	87	1500			-43.5	-52.4	0.0	-52.4	34.4				
Loading Shovel (Stockpiles)	75.0	2	100	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	25.6				
HGV Movements	32.5	15	-	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	23.6				
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494585	297472	100	850			-38.6	-46.2	0.0	-46.2	32.8				
HGV Movements	34.2	15	-	494400	297916	90	1250			-41.9	-50.4	0.0	-50.4	25.7	33.5	38.0		
Extraction Phase D & Infilling / Restoration Phase C																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	21.9				35.4
Excavator (Face)	75.0	1	100	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	21.9				
Articulated Dump Truck	34.0	12	-	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	25.0				
Processing Plant	86.8	1	100	494686	298289	87	1600			-44.1	-53.1	0.0	-53.1	33.7				
Loading Shovel (Stockpiles)	75.0	2	100	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	24.9				
HGV Movements	31.0	15	-	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	22.0				
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494303	298168	85	1500			-43.5	-52.4	0.0	-52.4	26.6				
HGV Movements	32.5	15	-	494303	298168	90	1500			-43.5	-52.4	0.0	-52.4	23.6	28.4	36.1		
Extraction Phase E & Infilling / Restoration Phase D																		
<i>Extraction / Processing</i>																		
Excavator	75.0	1	100	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	20.0				33.5
Excavator (Face)	75.0	1	100	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	20.0				
Articulated Dump Truck	33.2	12	-	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	23.8				
Processing Plant	86.8	1	100	495037	298553	87	1900			-45.6	-55.0	0.0	-55.0	31.8				
Loading Shovel (Stockpiles)	75.0	2	100	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	23.0				
HGV Movements	28.5	15	-	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	19.1				
<i>Infilling / Restoration</i>																		
Dozer	79.0	1	100	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	25.9				
HGV Movements	31.0	15	-	494686	298289	85	1600			-44.1	-53.1	0.0	-53.1	22.0	27.4	34.5		
Final Restoration Phase E																		
Dozer	79.0	1	100	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	24.0				25.2
HGV Movements	28.5	15	-	495037	298553	85	1900			-45.6	-55.0	0.0	-55.0	19.1	25.2	25.2		

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
ADT Movement (Phase A)	110	12	25	950	30	36.3
ADT Movement (Phase B)	110	12	25	950	30	36.3
ADT Movement (Phase C)	110	12	25	1500	30	34.3
ADT Movement (Phase D)	110	12	25	1600	30	34.0
ADT Movement (Phase E)	110	12	25	1900	30	33.2
HGV Movements (Phase A)	106	15	25	1000	60	36.0
HGV Movements (Phase B)	106	15	25	1250	50	34.2
HGV Movements (Phase C)	106	15	25	1500	40	32.5
HGV Movements (Phase D)	106	15	25	1600	30	31.0
HGV Movements (Phase E)	106	15	25	1900	20	28.5

Mick George Limited
Wakerley Quarry, Northamptonshire
Calculated Noise Levels

05-Dec-2019

Receptor: 5 - The Bungalows Uses 855228
 Height 85 m
 Grid Ref: 492377 X 297367 Y

Predicted Freefield Noise Levels

	Ref Level @10m	No.	% On Time	Grid Reference X	Grid Reference Y	Source Ht	Dist S-R	Barrier Ht	Dist S-B	Distance Attenuation		CRTN Barrier Attenuation	Max Attenuation	Activity LAeq [dB]	Operation LAeq [dB]	Overall LAeq [dB]
										Hard	Soft					
Extraction - Phase A																
Excavator	75.0	1	100	493750	297704	95	1300			-42.3	-50.8	0.0	-50.8	24.2		
Excavator (Face)	75.0	1	100	493750	297704	95	1300			-42.3	-50.8	0.0	-50.8	24.2		
Articulated Dump Truck	33.1	12	-	493750	297704	95	1300			-42.3	-50.8	0.0	-50.8	24.5		
Loading Shovel (Stockpiles)	75.0	2	100	493813	297721	95	1350			-42.6	-51.3	0.0	-51.3	26.8		
Processing Plant	86.8	1	100	493813	297721	97	1350			-42.6	-51.3	0.0	-51.3	35.5		
HGV Movements	29.9	15	-	493813	297721	95	1350			-42.6	-51.3	0.0	-51.3	21.2		37.0
Extraction Phase B & Infilling / Restoration Phase A																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	494268	297837	100	1800			-45.1	-54.4	0.0	-54.4	20.6		
Excavator (Face)	75.0	1	100	494268	297837	100	1800			-45.1	-54.4	0.0	-54.4	20.6		
Articulated Dump Truck	31.7	12	-	494268	297837	95	1800			-45.1	-54.4	0.0	-54.4	22.4		
Processing Plant	86.8	1	100	494268	297837	97	1850			-45.3	-54.7	0.0	-54.7	32.1		
Loading Shovel (Stockpiles)	75.0	2	100	494320	297850	95	1850			-45.3	-54.7	0.0	-54.7	23.3		
HGV Movements	28.6	15	-	494320	297850	95	1850			-45.3	-54.7	0.0	-54.7	19.3		33.7
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	493750	297704	95	1300			-42.3	-50.8	0.0	-50.8	28.2		
HGV Movements	29.9	15	-	493813	297721	95	1350			-42.6	-51.3	0.0	-51.3	21.2		34.9
Extraction Phase C & Infilling / Restoration Phase B																
<i>Extraction / Processing</i>																
Excavator	75.0	1	100	494155	298237	85	1800			-45.1	-54.4	0.0	-54.4	20.6		
Excavator (Face)	75.0	1	100	494155	298237	85	1800			-45.1	-54.4	0.0	-54.4	20.6		
Articulated Dump Truck	31.7	12	-	494155	298237	85	1800			-45.1	-54.4	0.0	-54.4	22.4		
Processing Plant	86.8	1	100	494155	298237	87	1800			-45.1	-54.4	0.0	-54.4	32.4		
Loading Shovel (Stockpiles)	75.0	2	100	494155	298237	85	1800			-45.1	-54.4	0.0	-54.4	23.6		
HGV Movements	28.7	15	-	494155	298237	85	1800			-45.1	-54.4	0.0	-54.4	19.4		33.9
<i>Infilling / Restoration</i>																
Dozer	79.0	1	100	494320	297850	95	1850			-45.3	-54.7	0.0	-54.7	24.3		
HGV Movements	28.6	15	-	494320	297850	95	1850			-45.3	-54.7	0.0	-54.7	19.3		34.5

Extraction Phase D and E

Extraction Areas Over 2 Kilometres from Dwellings - No Calculations Made

Moving Point Sources

	Ref SWL	No. Veh per hour	Speed [km/h]	Dist to Centre of Haul Road	AOV	LAeq [dB]
ADT Movement (Phase A)	110	12	25	1300	20	33.1
ADT Movement (Phase B)	110	12	25	1800	20	31.7
ADT Movement (Phase C)	110	12	25	1800	20	31.7
HGV Movements (Phase A)	106	15	25	1350	20	29.9
HGV Movements (Phase B)	106	15	25	1850	20	28.6
HGV Movements (Phase C)	106	15	25	1800	20	28.7