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INTRODUCTION

10.1 This chapter of the ES considers the potential for the proposed development of the quarry at Hatfield Aerodrome to to impact upon the noise environment in the vicinity of the application site. The chapter describes the scope, relevant legislation, assessment methodology and the baseline conditions that exist around the application site.

10.2 The chapter assesses the potential environmental effects the proposals, which have been described in Chapter 3 of this Volume, would have on the baseline noise environment. It then considers the mitigation measures required to prevent, reduce or offset any significant adverse effects (should they be identified) and the likely residual effects after these measures have been employed.

10.3 Technical terms or references are occasionally used in this Chapter. To assist the reader, a Glossary of Terminology, including a table of example noise levels that may be found in general life, are included in Appendix 10/1.

METHODOLOGY

Government Advice, Standards & Good Practice

10.4 A summary of all the standards and guidance documents employed in this assessment are given below.

Web-based Planning Practice Guidance for Minerals

10.5 The web-based Planning Practice Guidance (PPG) provides the latest advice on planning controls and good practice methods to keep noise emissions from minerals sites to acceptable levels including advice on noise limits for various operational stages of developments and times of day.

10.6 The PPG states, in paragraph 019, that mineral development proposals should carry out a noise impact assessment which should identify all sources of noise and, for each source, take account of the noise emission, its characteristics, the proposed operating locations, procedures, schedules and duration of the work with respect to the life of the operation, and its likely impact on the surrounding neighbourhood.

10.7 Paragraph 19 also states that proposals for the control, or mitigation, of noise emissions should:

- Consider the main characteristics of the production process and its environs, including the location of noise-sensitive properties and sensitive environmental sites.
- Assess the existing acoustic environment around the site of the proposed operations, including background noise levels at nearby noise-sensitive properties.

- Estimate the likely future noise from the development and its impact on the neighbourhood of the proposed operations.
- Identify proposals to minimise, mitigate or remove noise emissions at the source.
- Monitor the resulting noise to check compliance with any proposed or imposed conditions.

10.8 Paragraph 20 of the PPG outlines how mineral planning authorities should determine the impact of noise stating that:

"*Mineral planning authorities should take account of the prevailing acoustic environment and in doing so consider whether or not noise from the proposed operations would:*

- *give rise to a significant adverse effect;*
- *give rise to an adverse effect; and*
- *enable a good standard of amenity to be achieved.*

In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure would be above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation. As noise is a complex technical issue, it may be appropriate to seek experienced specialist assistance when applying this policy."

10.9 With respect to noise limits, the PPG states in paragraph 021 that:

"*Mineral planning authorities should aim to establish a noise limit, through a planning condition, at the noise-sensitive property that does not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) during normal working hours (0700-1900). Where it will be difficult not to exceed the background level by more than 10dB(A) without imposing unreasonable burdens on the mineral operator, the limit set should be as near that level as practicable. In any event, the total noise from the operations should not exceed 55dB(A) LAeq, 1h (free field). For operations during the evening (1900-2200) the noise limits should not exceed the background noise level ($L_{A90,1h}$) by more than 10dB(A) and should not exceed 55dB(A) LAeq, 1h (free field). For any operations during the period 22.00 - 07.00 noise limits should be set to reduce to a minimum any adverse impacts, without imposing unreasonable burdens on the mineral operator. In any event the noise limit should not exceed 42dB(A) LAeq,1h (free field) at a noise sensitive property.*

Where the site noise has a significant tonal element, it may be appropriate to set specific limits to control the aspect. Peak or impulsive noise, which may include some reversing bleepers, may also require separate limits that are independent of background noise (e.g. Lmax in specific octave or third-octave frequency bands - and that should not be allowed to occur regularly at night.)

Care should be taken, however, to avoid any of these suggested values being implemented as fixed thresholds as specific circumstances may justify some small variation being allowed."

10.10 Paragraph 022 of the PPG sets out limits for operations which may give rise to particularly noisy short term activities stating:

"*Activities such as soil-stripping, the construction and removal of baffle mounds, soil storage mounds and spoil heaps, construction of new permanent landforms and aspects of site road construction and maintenance.*

Increased temporary daytime noise limits of up to 70dB(A) LAeq 1h (free field) for periods of up to eight weeks in a year at specified noise-sensitive properties should be considered to facilitate essential site preparation and restoration work and construction of baffle mounds where it is clear that this will bring longer-term environmental benefits to the site or its environs.

Where work is likely to take longer than eight weeks, a lower limit over a longer period should be considered. In some wholly exceptional cases, where there is no viable alternative, a higher limit for a very limited period may be appropriate in order to attain the environmental benefits. Within this framework, the 70 dB(A) LAeq 1h (free field) limit referred to above should be regarded as the normal maximum."

Guidelines for Environmental Noise Impact Assessment

10.11 The *Guidelines for Environmental Noise Impact Assessment* produced by the Institute of Environmental Management and Assessment was published in October 2014.

10.12 The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- How to scope a noise assessment;
- Issues to be considered when defining the baseline noise environment;
- Prediction of changes in noise levels as a result of implementing development proposals; and
- Definition and evaluation of the significance of the effect of changes in noise levels.

10.13 Section 7 of the document refers to a noise assessment which was undertaken to determine the overall noise impact. The magnitude and sensitivity criteria are combined into a Degree of Effect matrix as shown in Table 4-1 below and the definitions of the effects in decibel (dB) terms are shown in Table 4-2.

Table 10-1
Degree of Effect Matrix

		Importance/Sensitivity of Receptor			
		High	Medium	Low	Neg
Relative Change in Sound Level	Large	Very Substantial	Sub	Moderate	None
	Medium	Sub	Sub	Moderate	None
	Small	Moderate	Moderate	Slight	None
	Negligible	None	None	None	None

Table 10-2
Effect Descriptions

Relative Change in Sound Level	Description
Very Substantial	Greater than 10dB L_{Aeq} change in sound level perceived at a receptor of great sensitivity to noise.
Substantial	Greater than 5dB L_{Aeq} change in sound level at a noise-sensitive receptor, or a 5 to 9.9dB L_{Aeq} change in sound level at a receptor of great sensitivity to noise.
Moderate	A 3 to 4.9dB L_{Aeq} change in sound level at a sensitive or highly sensitive noise receptor or a greater than 5dB L_{Aeq} change in sound level at a receptor of some sensitivity.
Slight	A 3 to 4.9dB L_{Aeq} change in sound level at a receptor of some sensitivity.
None/Not Significant	Less than 2.9 dB L_{Aeq} change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals.

10.14 It is considered that the above criteria reflect the key benchmarks that relate to human perception of sound. A change of 3dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear. A 10dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level.

British Standard 5228-1:2009+A1:2014

10.15 British Standard 5228:2009+A1:2014 *Code of practice for noise and vibration control on construction and open sites, Part 1: Noise* sets out a methodology for predicting noise levels arising from a wide variety of construction and related activities which are shared with mineral extraction sites. As such, the calculation methodologies it contains can be used to predict noise levels arising from the construction and operational phases for this development.

10.16 BS5228-1:2009+A1:2014 also contains tables of a wide variety of plant equipment, and their respective sound power levels, which can be found at mineral extraction sites.

Noise levels generated by construction or related operations and experienced at local receptors will depend on a number of variables, the most significant of which are:

- the sound power emissions of processes and/or plant;
- the periods of operation of processes and/or plant;
- the distance between the sources and the receptors;
- the presence of screening mounds, buildings or barriers;
- the potential reflection of sound; and
- soft ground attenuation.

10.17 Predicted noise levels in this chapter have been determined using proprietary noise modelling software, CadnaA, and the calculation methodologies contained in BS5228-1:2009+A1:2014. The sound power levels used as input data for the noise model are those contained in the standard, specified in the plant manufacturers' data sheets, from sound emission badges on plant or from field measurements of similar plant.

10.18 Due to the location of the proposed development relative to the nearby properties, the predictions have been based on 90% soft ground between the sources and receptor locations under weather conditions considered favourable for noise propagation leading to a conservative result.

10.19 The Standard also describes examples of acceptable limits for noise generated by construction operations at nearby sensitive receptor locations. The most simplistic being based upon the breach of fixed noise limits. The Standard states in paragraph E.2:

"*Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.*"

10.20 The paragraph goes on to state:

"*Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:*

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas.*

These limits are for daytime working outside living rooms and offices."

Approach to the Assessment

10.21 The assessment considers the likely noise impacts, generated by operations associated with the development and operation of the proposed development, with reference to measured background noise levels at locations representative of the nearest noise-sensitive properties.

10.22 An assessment has been made of the baseline noise environment and the potential impact of the proposed development. Environmental advantages and disadvantages have been identified and, where appropriate, mitigation measures and/or scheme changes to offset potentially adverse impacts have been suggested.

10.23 Operational noise levels generated by the plant/equipment have been predicted to the façade to the nearby noise-sensitive receptors facing the site. The results have been assessed against criteria derived in accordance with the Planning Practice Guidance.

Baseline Conditions

10.24 Environmental baseline noise surveys were undertaken on 23rd September 2015 to capture the prevailing noise climate at the nearby noise-sensitive receptor locations agreed with the local authority.

10.25 Access to Popefield Farm and The Lodge could not be gained therefore alternative, nearby, representative locations were chosen.

10.26 The noise monitoring locations were chosen as being representative of the nearest noise-sensitive receptors identified and are shown on Drawing HQ 10/1, namely:

- Popefield Farm, Hatfield Road, to the south;
- The Lodge, St Albans Road West, to the south;
- No.616 Hatfield Road, to the southwest;
- Pasture View, to the west;
- Walker Grove, to the east.

10.27 At each monitoring location the following parameters were measured:

- $L_{Aeq,T}$ The A-Weighted equivalent continuous noise level over the measurement period.
- L_{A90} The A-weighted background noise level, i.e. the noise level exceeded for 90% of the measurement period thereby excluding short duration noise events.
- L_{A10} The A-weighted noise level exceeded for 10% of the measurement period, usually used to describe road traffic noise.
- L_{Amax} The maximum A-weighted noise level during the measurement period.

10.28 The noise monitoring equipment used during the surveys is detailed in Table 10-3. The sound level meter was field calibrated before and after the surveys and no significant drift in calibration was found to have occurred. The calibration chain is traceable via the United Kingdom Accreditation Service (UKAS) to National Standards held at the National Physical Laboratory (NPL). The equipment had been calibrated within the 24-months preceding the surveys.

Table 10-3
Noise Monitoring Equipment

Location	Description of Equipment	Serial Number
1. Popefield Farm	Cirrus CR171B Type 1 sound level meter	G061094
	Cirrus CR515 Acoustic calibrator	72210
2. No.403 St. Albans Road West	Cirrus CR171B Type 1 sound level meter	G061094
	Cirrus CR515 Acoustic calibrator	72210
3. No.616 Hatfield Road	Cirrus CR171B Type 1 sound level meter	G061094
	Cirrus CR515 Acoustic calibrator	72210
4. Pasture View	Cirrus CR171B Type 1 sound level meter	G071350
	Cirrus CR515 Acoustic calibrator	74579
5. Walker Grove	Cirrus CR171C Type 1 sound level meter	G061911
	Cirrus CR515 Acoustic calibrator	72848

10.29 Weather conditions during the surveys were within the parameters suitable for baseline monitoring, being dry with 80% cloud cover. The temperature was around 18°C and wind speeds were below $5ms^{-1}$ throughout the survey period.

10.30 The results of the baseline surveys are presented in full in Appendix 10/2 and are summarised in Table 10-4.

10.31 The noise climate in the area consisted of close and distant road traffic noise dependant on the receptor location, occasional aircraft overhead and natural sounds, such as birdsong, wind in nearby trees, etc.

Table 10-4
Summary of Measured Noise Levels, free-field, dB

Location	$L_{Aeq,T}$	L_{A90}	L_{A10}	L_{Amax}
1. Popefield Farm	58.2	50.9	58.2	86.4
2. No.403 St. Albans Road West & The Lodge	69.3	53.0	73.4	82.4
3. No.616 Hatfield Road	66.9	54.5	70.2	88.7
4. Pasture View & Radio Nursery	51.4	46.9	52.5	80.2
5. Walker Grove & Nimrod Drive	56.5	40.8	50.9	88.0

Environmental Design Measures

10.32 The operational layout, location of the processing plant, route of internal haul roads and location of screening bunds and fences have been designed to offer maximum protection from potential impacts, and to protect the amenity at nearby residential receptors.

10.33 Operational hours have also been limited to the following periods to protect the amenity of nearby residents during the most sensitive periods:

- Monday to Friday 07:00 to 18:00 hours
- Saturday 07:00 to 13:00 hours

10.34 There would be no operations at the proposed development on Sundays and/or Public/Bank Holidays.

Potential Impacts

10.35 As set out in Chapter 3 above, the development proposals would involve the winning and working, including processing, of 8Mt of sand and gravel over a period of approximately 30 years based on an annual output of 250,000tpa.

10.36 The quarry would be worked on a phased basis allowing for the stripping, extraction (with associated processing) and progressive restoration of the application site.

10.37 The initial construction phase would involve:

- establishment of a new site access road and internal road to the processing plant site.
- soil stripping from the plant site, freshwater and silt lagoons, haul roads and initial extraction area.
- establishment of perimeter screening mounds.
- initial landscaping works.
- erection of processing and concrete batching plants.
- excavation of freshwater and silt lagoons.

10.38 The processing plant would be located within the northern part of the application site, to the west of Home Covert and to the north of the extraction area as shown on the drawings in Chapter 3 of this Volume. The processing plant would be static in nature and comprise of primary and secondary screens, washing plant, sand classifier/hydra-sander, crushing plant and associated conveyors; the plant would be housed in steel clad buildings. There would also be a concrete batching plant close to the processing plant.

10.39 The plant site would include the site office, welfare facilities, workshops, weighbridge, fuel tank and containerised diesel power generation plant.

10.40 The web-based Planning Practice Guidance contains the current Government advice on noise emissions from minerals extraction sites in England and is directly applicable to assessing the potential noise impacts from the operational phases of the proposed development.

10.41 Since the baseline monitoring was undertaken SLR has learned that a new residential development located on land adjacent to the garden centre/nursery to the west of the development site has been granted planning permission on appeal. It is assumed that the baseline noise levels at this location would be similar to those measured at Pasture View.

10.42 The absolute limit of 70dB $L_{Aeq,1hr}$ for temporary operations and noise limits for normal operations derived from the measured background noise levels in accordance with the current guidance, i.e. background +10dB, and detailed in Table 10-5 are considered appropriate for this assessment. The noise levels have been rounded to the nearest whole number.

Table 10-5
Derived Noise Limits for Normal Operations, free-field, dB

Location	Derived Background Noise Level, L_{A90}	Derived Noise Limit, $L_{Aeq,1hr}$
1. Popefield Farm	51	55
2a. No.403 St. Albans Road West	53	55
2b. The Lodge	53	55
3. No.616 Hatfield Road	55	55
4a. Pasture View	47	55
4b. Radio Nursery	47	55
5a. Walker Grove	41	51
5b. Nimrod Drive	41	51
6. New Development to West	47	55

10.43 Operational plant and equipment details have been provided by the applicant and are set out in Table 10-6 together with the adopted sound power levels or internal reverberant noise levels for plant buildings. The sound power levels are taken from manufacturers' datasheets, machine noise emission badges where available or the tables contained in BS5228-1:2009+A1:2014.

10.44 Plant buildings, i.e. the primary screen building, secondary screen building and crusher building, would be constructed as steel portal frame buildings which would be clad in 0.7mm plastic coated sheet steel which has a Weighted Sound Reduction Index of 24dB R_W. The internal reverberant noise levels within these buildings have been calculated within the CadnaA noise modelling software and take into account the noise generating sources within the building, the surface area of the buildings and an absorption co-efficient, alpha low, of 0.2.

Table 10-6
Plant & Equipment

Operation	Plant/Equipment Item (or similar)	Sound Power Level, L_{WA}, dB each
Construction, including Site Preparation & Plant Site Establishment	Caterpillar CAT336D 40t Hydraulic Excavator	105
	Volvo A30G Articulated Dumper	108
	Komatsu D51EX-22 Bulldozer	106
	CAT16M Motor-grader	108
	Komatsu WA380-7 Wheeled Loading Shovel (x2)	106
	Crane (x2)	107
	Telehandler	99
	Various Hand Tools (total)	104
	Delivery Trucks	111*
Extraction	Caterpillar CAT325D 30t Hydraulic Excavator	104
	Volvo A30G Articulated Dumper - S&G to plant site (x6)	108
	Caterpillar CAT336D 40t Hydraulic Excavator - Inter-burden removal	105
	Volvo A30G Articulated Dumper - Inter-burden removal (x4)	108
	Komatsu D51EX-22 Bulldozer - Inter-burden placement	106
Processing	Feed Hopper	97
	Primary Screening House - internal reverberant noise level	98
	Washing & Screening House - internal reverberant noise level	94
	Crusher House - internal reverberant noise level	100
	Linatex 630 Sand Separator	95
	Stockpiler Conveyors (x8)	81
	Komatsu WA380-7 Wheeled Loading Shovel (x2)	106
	Concrete Batching Plant (based on 27m^3/hr)	106
Transport	HGV - 32t Rigid Bodied Tipper Wagons (Sand & Gravel)	111*
	HGV - 32t Rigid Bodied Tipper Wagons (Inert Fill)	111*
	HGV - Mixer Trucks	111*

*maximum (L_{Afmax}) measured drive by noise level from BS5228-1:2009+A1:2014.

Construction Phase Assessment

10.45 The construction phase of the proposed development is estimated to take between 12 and 18 months to complete and has been assessed in accordance with the noise limits set out in British Standard 5228-1:2009+A1:2014 using the *Potential significance based on fixed noise limits* methodology. For the purpose of this assessment, the lower noise limit of 70dB(A) has been adopted.

10.46 Construction operations include the establishment of the site access road, stripping of soils in the processing plant area, lagoon areas and initial

working phase, erection of the processing plant and construction of the perimeter screening bunds.

10.47 The predictions are based on the worst-case scenario when all activities are being undertaken simultaneously and when screening mound construction is taking place at its closest approach to the receptor being considered. For example, the predictions at Popefield Farm have been made during the construction of the screening bund directly adjacent to the property whilst construction operations within the plant site area are also being undertaken.

10.48 The results of the assessment are shown in Table 10-7. The predicted noise levels have been rounded to the nearest whole number.

Table 10-7
Predicted Noise Levels Generated by Construction Operations, free-field, dB

Location	Predicted Noise Level, $L_{Aeq,1hr}$	Derived Noise Limit, $L_{Aeq,1hr}$	Difference
1. Popefield Farm	58		-12
2a. No.403 St. Albans Road West	57		-13
2b. The Lodge	58		-12
3. No.616 Hatfield Road	52		-18
4a. Pasture View	48	70	-22
4b. Radio Nursery	50		-20
5a. Walker Grove	44		-26
5b. Nimrod Close	47		-23
6. New Development to West	43		-36

10.49 Table 10-5 shows that the worst-case predicted noise levels generated by construction operations would remain below the 70dB(A) noise limit adopted for the assessment.

10.50 It should also be noted that noise levels generated by construction operations would remain below the 55dB noise limits for day to day operations except when bund construction operations are taking place close to locations 1, 2a and 2b (Popefield Farm, St. Albans Road and The Lodge). Therefore the predicted noise levels would only occur for a limited duration of the construction phase.

10.51 Based on the results of the construction noise assessment, mitigation measures to reduce potential impacts at the nearby receptors are considered unnecessary. However, good site management practices would be followed at all times.

Mineral Extraction & Processing Operational Assessment

10.52 Sand and gravel would be extracted using hydraulic excavators and transported to the plant site using a fleet of articulated dump trucks where it would be processed into a range of graded aggregates and sands which would be dispatched from the site typically using 32t rigid bodied tippers or 38-44t articulated HGVs. Aggregates would be loaded using wheeled loading shovels. Concrete would be exported in mixer trucks.

10.53 Site restoration would take place on a phased basis following behind the working face. Overburden and inter-burden stripped from operational phases would be placed within the base of the previously worked phase, with imported inert infill materials placed on top of the site derived wastes and shaped to create the designed landscape features. Restoration is currently intended to be a combination of nature conservation, including grassland and small waterbodies, as well as amenity after-uses.

10.54 Based on an annual output of 250,000tpa with the majority exported by 32t rigid bodied trucks having a payload of around 20t, there would be five 32t trucks per hour visiting the site, i.e. 10 movements (five in and five out). In addition, it is assumed that there would also be one mixer truck (2 movements) exporting from the concrete batching plant. There would also be 3 trucks (6 movements) delivering inert waste for restoration purposes.

10.55 Therefore, in total there would be 18 HGV movements along the site access road in a worst-case 1-hour period. The site speed limit along the access road will be 25kph (15mph).

10.56 Noise predictions represent a worst-case scenario in terms of plant and equipment locations where mobile equipment is operating at its closest approach to the nearby receptors or in locations where attenuation provided by the screening bunds is at a minimum, i.e. plant working away from the perimeter bund. For the extraction phase, predictions include extraction of the UMH and LMH materials, inter-burden removal and progressive restoration operations.

10.57 All predictions are based on plant operating at full power and 100% on-time. No allowance has been made for breaks and/or temporary shutdowns of the plant and equipment.

10.58 The results of the predictions for worst-case operational noise levels in Phases A, B, F and G, i.e. the closest phases to noise-sensitive receptor locations, are shown in Table 10-8. The predicted noise levels have been rounded to the nearest whole number. The worst-case phase prediction is shown in bold.

Table 10-8
Predicted Operational Noise Levels

Location	Prediction Worst-case Noise Levels, dB				
	Phase A	Phase B	Phase F	Phase G South	Phase G North
1. Popefield Farm	53	50	**54**	52	49
2a. No.403 St. Albans Road West	**54**	48	48	45	45
2b. The Lodge	**55**	49	48	46	45
3. No.616 Hatfield Road	50	50	51	**53**	52
4a. Pasture View	48	48	48	49	**50**
4b. Radio Nursery	50	50	51	**52**	**52**
5a. Walker Grove	**42**	**42**	**42**	40	40
5b. Nimrod Close	**43**	**43**	42	40	41
6. New Development to West	52	52	52	**54**	**54**

10.59 Table 10-9 shows the worst-case results assessed against the derived noise limits.

Table 10-9
Predicted Noise Levels Generated Operations, free-field, dB

Location	Predicted Noise Level, $L_{Aeq,1hr}$	Derived Noise Limit, $L_{Aeq,1hr}$	Difference
1. Popefield Farm	54	55	-1
2a. No.403 St. Albans Road West	54	55	-1
2b. The Lodge	55	55	0
3. No.616 Hatfield Road	53	55	-2
4a. Pasture View	50	55	-5
4b. Radio Nursery	52	55	-3
5a. Walker Grove	42	51	-9
5b. Nimrod Close	43	51	-8
6. New Development to West	54	55	-1

10.60 Table 10-9 shows that the worst-case predicted noise levels generated by day to day operations would be at or below the derived noise limit adopted for the assessment.

10.61 It should also be noted that these are worst-case operational noise levels when all operations are taking place simultaneously and at their most exposed elevation or closest approach. For the majority of the life of the development operations would be undertaken at greater distances and/or lower elevations within the void and therefore noise levels are likely to be lower than those shown.

10.62 Based on the results of the operational noise assessment, mitigation measures to reduce potential impacts at the nearby receptors, other than those included within the design of the site, are considered unnecessary. However, good site management practices would be followed at all times.

CUMULATIVE IMPACTS

10.63 The cumulative effect of worst-case operational noise levels at the proposed development and existing noise levels in the area have been assessed to determine any changes in the prevailing ambient noise levels at the nearby receptors.

10.64 Table 10-10 summaries the cumulative effect. The significance of change is assessed against the values contained in Table 10-2.

Table 10-10
Cumulative Impacts, free-field, dB

Location	Ambient Noise Levels			
	Existing Measured	Predicted Future	Difference	Significance of Change
1. Popefield Farm	58.2	59.6	+1.4	Not Significant
2a. No.403 St. Albans Road West	69.3	69.4	+0.1	Not Significant
2b. The Lodge	69.3	69.5	+0.2	Not Significant
3. No.616 Hatfield Road	66.9	67.1	+0.2	Not Significant
4a. Pasture View	51.4	53.8	+2.4	Not Significant
4b. Radio Nursery	51.4	54.7	+3.3	Slight
5a. Walker Grove	56.5	56.7	+0.2	Not Significant
5b. Nimrod Close	56.5	56.7	+0.2	Not Significant
6. New Development to West	51.4	55.6	+4.2	Slight

10.65 Table 10-10 shows that the potential increase in ambient levels due to worst-case operational noise would be slight at worst at two receptors but generally not significant at the remainder of the nearby noise-sensitive receptors.

10.66 It should be noted that, at Radio Nursery and the proposed new development to the west of the site, the existing measured noise levels were measured away from the working nursery and therefore are considered to be conservative.

MITIGATION MEASURES

Good Site Practice

10.67 Surface minerals extraction sites, by their nature, generate noise due to the use of heavy machinery. During the proposed development the potential risk of noise impacting on the nearby noise-sensitive receptors

would vary depending on the type of activities being undertaken at the time and the effectiveness of any noise control measures that are in place. The site design incorporates several features that provide mitigation against potential noise impacts; these features include, but are not limited to:

- the construction of perimeter screening mounds/bunds between operations and noise-sensitive receptors.
- acoustic fencing.
- enclosing the processing plant with buildings.
- the use of broadband reverse warning systems on all mobile machinery.

10.68 In addition to the noise mitigation measures incorporated into the site design, good site management practices and other specific measures would also provide additional noise mitigation. These measures would include:

- activities within the review site would be undertaken in locations where noise attenuation from existing landforms would maximise the benefit to the noise-sensitive properties;
- internal haul routes would, wherever possible, be routed such that separation distances to the noise sensitive properties is maximised;
- all haul roads would be kept clean and maintained in a good state of repair to avoid unwanted rattle and “body slap” from vehicles;
- all mobile plant used at the proposed extension would have noise emission levels that comply with the limiting levels defined in EC Directive 86/662/EEC and any subsequent amendments;
- all mobile plant and heavy goods vehicles entering the site will move in a circular pattern to minimise, as far as is practical and safe, noise from reverse warning systems;
- plant would be operated in a proper manner with respect to minimising noise emissions, for example, minimisation of drop heights and no un-necessary engine revving;
- plant would be subject to regular maintenance. All plant at the site would be fitted with effective exhaust silencers and would be maintained in good working order to meet manufacturers’ noise rating levels. Defective silencers would be replaced immediately;
- plant that is used intermittently, would be shut down when not in use; and,
- pumps, generators and compressors would be located behind existing screening mounds or landform, would be electrically powered and fitted with an acoustic covers where necessary. Diesel powered pumps, generators and compressors, if used, will be installed within acoustic enclosures.

CONCLUSIONS

10.69 This noise assessment has considered the potential for noise generated by the proposed development to give rise to noise impacts at the nearest noise-sensitive receptors to the application site. The assessment has

been made against noise limits derived in accordance with the relevant guidance based on the results of baseline noise measurements made over a typical working daytime period. The assessment has found that:

- worst-case noise levels generated by construction operations would remain below the 70dB(A) noise limit adopted for the assessment. It should also be noted that construction noise levels would also remain below the 55dB(A) noise limit derived in accordance with the relevant guidance for day to day operations except during construction of the perimeter screening mounds to the south;
- worst-case noise levels generated by operational activities, including all truck movements on the access road, would be at or below the noise limits derived in accordance with the relevant guidance at all locations;
- the cumulative effects would result in changes in the ambient noise level that are not considered significant.

10.70 Based on the results of the assessment, it is considered that all practical means have been employed in the design of the site to protect the amenity of the nearby noise-sensitive receptors. A number of good site practice measures have been suggested to further reduce the risk of any potential adverse noise impacts.

10.71 It is concluded that noise should not pose a material constraint for proposed development.