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ACOUSTIC CONSULTANTS

Technical Note

Prepared by:	**Dr Robert Storey**	Date:	**28 July 2022**
Project:	**Proposed Quarry at Former Hamble Airfield Site**	Ref:	**5173**
For:	**Emma Pearman at CEMEX**	Page:	**1 of 12**
Subject:	**Updated Baseline Noise Survey Following Regulation 25 Letter**		

Introduction

Following the receipt by CEMEX of a Regulation 25 letter dated 04 April 2022 from Hampshire County Council requesting further information to supplement the noise assessment for the proposed quarry at the former Hamble Airfield site, WBM reviewed the letter and also the comments from the Environmental Health Officer at Eastleigh Borough Council and prepared a response dated 19 May 2022.

The Regulation 25 letter required an updated baseline noise assessment and this Technical Note has been prepared to address that requirement.

To aid comprehension, a glossary of acoustic terms is presented in Appendix 1.

Hampshire County Council Regulation 25 Letter

The Regulation 25 letter included the following text relating to noise:

"*The Environmental Health Officer (EHO) notes that background noise monitoring was undertaken in 2018, some four years ago and which may not be reflective of the current position. It is requested that a revised background noise monitoring exercise be undertaken to better reflect current noise levels within an updated NIA.*"

The WBM response dated 19 May 2022 responded to this request as follows:

"*WBM normally consider that unless there has been significant changes in the vicinity of a site that background noise levels measured within the last 4 years would still be valid. It is noted that at the time of the assessment, the data was just over 3 years old and at that time the country was under at least partial lockdown conditions resulting in any further baseline noise survey data collected being unrepresentative.*

Nonetheless, whilst reserving and without prejudice to the applicant's position on that subject, in the interests of progressing the application and as CEMEX are willing to commission the additional work, further baseline noise survey data will be acquired."

As part of the Regulation 25 letter, the Environmental Health Officer at Eastleigh Borough Council asked:

"*How can it be concluded that from 0700 in the morning residents will be going to work as the EIA says they will less likely impacted by the works?*"

WBM responded to this point in the note dated 19 May 2022 as follows:

"*This was mentioned in the assessment as it is established in this country that the period 07:00 to 09:00 hours (and the corresponding period in the afternoon when the school and work day finishes) are generally noisier in terms of background noise levels as this is when the rush hour starts. WS Atkins have stated that the would only accept background noise levels at a similar location during the period 10:00 to 14:00 hours as this represents the quietest part of the day and is therefore a worst case scenario with no rush hours movements*."

In order to address this point, an updated baseline noise survey was arranged to cover the period 07:00 to 08:00 hours at the most relevant of the receivers (Hamble School should not be considered a sensitive receiver prior to 08:00).

Previous Baseline Noise Survey Data (2018)

The data obtained in 2018 is summarised in the following table

Location	Monitoring Date and Times	Average L_{Aeq} (dB)	Average L_{A90} (dB)	Range L_{A90} (dB)
1 Astral Gardens/Tutor Close	12/02/18 13:13 24/04/18 14:03 15/05/18 12:55 & 15:02	46	40	38 to 43
2 The Close, Satchell Lane	12/02/18 13:37 24/04/18 13:39 15/05/18 12:33 & 14:40	44	39	37 to 42
3 Satchell Lane	12/02/18 14:00 24/04/18 13:16 15/05/18 12:13 & 14:18	45	40	39 to 41
4 Wessex Manor	12/02/18 14:33 24/04/18 12:51 15/05/18 11:51 & 13:56	53	45	41 to 48
5 Hamble School	12/02/18 14:53 24/04/18 12:31 15/05/18 11:32 & 13:36	52	45	43 to 46
6 Hamble Lane (rear)	24/04/18 12:08 15/05/18 11:11, 13:14 & 15:21	49	44	43 to 45

This data was used to suggest the following site noise limits based on the advice in Planning Practice Guidance (Minerals):

Location	Average L_{A90} (dB)	Suggested Site Noise Limit (dB $L_{Aeq, 1 hour free field}$)
Routine Operations (07:00 – 17:00)		
1. Astral Gardens	40	50
2. The Close	39	49
3. Satchell Lane	40	50
4. Wessex Manor	45	55
5, Hamble School	45	55
6. Hamble Lane	44	54
Temporary Operations		
All Locations	N/A	70

Updated Baseline Noise Survey Data (2022)

More baseline noise survey data was obtained in July 2022 to check the validity of the 2018 data and assess the need for more extensive new baseline noise surveys. The survey data was also collected with the intention of looking at the period 07:00 to 08:00 hours.

The survey/assessment locations are indicated on the site plan in Appendix 2

The details of the instrumentation and calibration as well as weather conditions is presented in Appendix 3 to this note.

The detailed results and the consultant's comments/observations are presented in Appendix 4.

The data from the baseline noise surveys in July 2022 is summarised in the following table:

Location	Monitoring Date and Times	Average L_{Aeq} (dB)	Average L_{A90} (dB)	Range L_{A90} (dB)	07:00-08:00 L_{A90} (dB)
1 Astral Gardens/Tutor Close	01/07/22 07:25, 11:07, 14:00 & 16:00	49	43	39 to 46	40
2 The Close, Satchell Lane	01/07/22 07:52, 11:58, 14:27 & 16:24	45	42	41 to 43	41
3 Satchell Lane	01/07/22 09:15, 11:40 & 14:46	46	42	39 to 45	N/A
4 Wessex Manor	01/07/22 08:20, 12:47, 15:26 & 16:51	55	47	43 to 50	N/A
5 Hamble School	01/07/22 08:45 & 13:08	49	43	41 to 45	N/A
6 Hamble Lane (rear)	01/07/22 07:00, 10:42 & 13:36	47	43	42 to 45	42

Based on the updated baseline noise survey data, site noise limits based on the advice in Planning Practice Guidance (Minerals) would be as follows:

Location	2022 Average L_{A90} (dB)	PPGM 2022 Suggested Site Noise Limit (dB $L_{Aeq, 1\ hour\ free\ field}$)	ES Noise Chapter Suggested Site Noise Limit (dB $L_{Aeq, 1\ hour\ free\ field}$)
Routine Operations (07:00 – 17:00)			
1. Astral Gardens	43	53	50
2. The Close	42	52	49
3. Satchell Lane	42	52	50
4. Wessex Manor	47	55	55
5, Hamble School	43	53	55
6. Hamble Lane	43	53	54
Temporary Operations			
All Locations	N/A	70	70

As can be seen from the table, the site noise limits following PPGM guidance based on the recent updated baseline noise measurements are within +/- 3dB of the site noise limits suggested in the ES chapter.

The previously suggested limits in the ES chapter are lower than the updated survey suggests at three locations (Astral Gardens, The Close and Satchell Lane), the same at one location (Wessex Manor) and higher at the remaining two locations (Hamble School and Hamble Lane).

As one of the locations at which a lower limit might be suggested is a school, this would not be considered as a residential location. At the residential location at Hamble Lane, the difference is only 1 dB. At both of these locations, the calculated site noise levels presented in the ES Noise Chapter would comply with a reduced site noise limit based on the updated average background noise level.

This would suggest that the limits used in the previous assessment are still appropriate.

The background noise data from 07:00-08:00 is not notably dissimilar to the measured background noise levels in the middle of the day at the three locations that could be visited in that one hour period. If a noise limit was used based on the background noise levels during that time, the limit at Astral Gardens would remain the same as in the ES Noise Chapter, the limit at The Close would increase and the limit at Hamble Lane would decrease by 2 dB, but the calculated site noise levels would still comply with that limit.

This indicates that the noise limits are appropriate for all the working hours of the site and no changes should be required to the assessment in this regard.

Summary and Conclusions

Following a Regulation 25 letter issued by Hampshire County Council regarding the proposed quarry at the former Hamble Airfield site, WBM prepared a response dated 19 May 2022, which stated that updated baseline noise surveys would be undertaken to check the validity of the 2018 data used in the ES Noise Chapter. The surveys would also examine the 07:00 to 08:00 period highlighted by the Environmental Health Officer at Eastleigh Borough Council.

An updated baseline noise survey was undertaken in July 2022 at the locations used in the ES Noise Chapter.

The data from the surveys indicates that the background noise levels are similar to those obtained in 2018. The 2022 additional survey data indicates noise limits would be higher at three of the five residential assessment locations than suggested previously. At the one residential location where the 2022 background noise level data indicated that the site noise limit could be reduced by 1 dB(A), the calculated site noise levels presented in the ES Noise Chapter still safely comply with a reduced site noise limit.

The 2022 survey suggests that the data and site noise limits suggested in the ES Noise Chapter are still appropriate and changes to the submitted ES Noise Chapter are not necessary.

The data from the period 07:00 to 08:00 indicates similar background noise levels to those measured during the middle of the working day and therefore the suggested site noise limits are still appropriate for this period and the working hours of the site should remain as proposed.

Dr Robert Storey
Senior Consultant

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Appendix 1 – Glossary of Acoustic Terms

The following section describes some of the parameters that are used to quantify noise.

Decibels dB

Noise levels are measured in decibels. The decibel is the logarithmic ratio of the sound pressure to a reference pressure ($2x10^{-5}$ Pascals). The decibel scale gives a reasonable approximation to the human perception of relative loudness. In terms of human hearing, audible sounds range from the threshold of hearing (0 dB) to the threshold of pain (140 dB).

A-weighted Decibels dB(A)

The 'A'-weighting filter emulates human hearing response for low levels of sound. The filter network is incorporated electronically into sound level meters. Sound pressure levels measured using an 'A'-weighting filter have units of dB(A) which is a single figure value to represent the overall noise level for the entire frequency range.

A change of 3 dB(A) is the smallest change in noise level that is perceptible under normal listening conditions. A change of 10 dB(A) corresponds to a doubling or halving of loudness of the sound. The background noise level in a quiet bedroom may be around 20 –30 dB(A); normal speech conversation around 60 dB(A) at 1 m; noise from a very busy road around 70-80 dB(A) at 10m; the level near a pneumatic drill around 100 dB(A).

Façade Noise Level

Façade noise measurements are those undertaken near to reflective surfaces such as walls, usually at a distance of 1m from the surface. Façade noise levels at 1m from a reflective surface are normally around 3 dB greater than those obtained under freefield conditions.

Freefield Noise Level

Freefield noise measurements are those undertaken away from any reflective surfaces other than the ground

Frequency Hz

The frequency of a noise is the number of pressure variations per second, and relates to the "pitch" of the sound. Hertz (Hz) is the unit of frequency and is the same as cycles per second. Normal, healthy human hearing can detect sounds from around 20 Hz to 20 kHz.

Octave and Third-Octave Bands

Two frequencies are said to be an octave apart if the frequency of one is twice the frequency of the other. The octave bandwidth increases as the centre frequency increases. Each bandwidth is 70% of the band centre frequency.

Two frequencies are said to be a third-octave apart if the frequency of one is 1.26 times the other. The third octave bandwidth is 23% of the band centre frequency.

There are recognised octave band and third octave band centre frequencies. The octave or third-octave band sound pressure level is determined from the energy of the sound which falls within the boundaries of that particular octave of third octave band.

Appendix 1 (continued)

Equivalent Continuous Sound Pressure Level $L_{Aeq,T}$

The 'A'-weighted equivalent continuous sound pressure level $L_{Aeq,T}$, is a notional steady level which has the same acoustic energy as the actual fluctuating noise over the same time period T. The $L_{Aeq,T}$ unit is dominated by higher noise levels, for example, the $L_{Aeq,T}$ average of two equal time periods at, for example, 70 dB(A) and 50 dB(A) is not 60 dB(A) but 67 dB(A).

The $L_{Aeq,}$ is the chosen unit of BS 7445-1:2003 "Description and Measurement of Environmental noise".

Maximum Sound Pressure Level L_{Amax}

The L_{Amax} value describes the overall maximum 'A'-weighted sound pressure level over the measurement interval. Maximum levels are measured with either a fast or slow time weighted, denoted as $L_{Amax,f}$ or $L_{Amax,s}$ respectively.

Sound Exposure Level L_{AE} or SEL

The sound exposure level is a notional level which contains the same acoustic energy in 1 second as a varying 'A'-weighted noise level over a given period of time. It is normally used to quantify short duration noise events such as aircraft flyover or train passes.

Statistical Parameters L_N

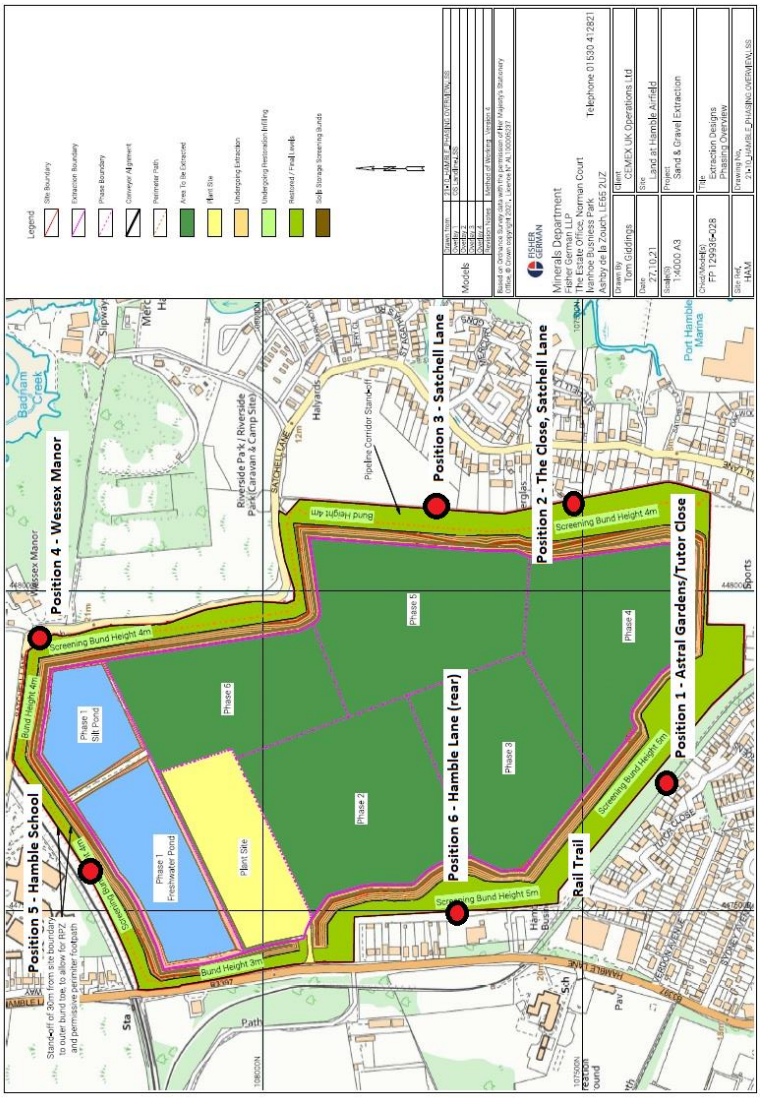
In order to cover the time variability aspects, noise can be analysed into various statistical parameters, i.e. the sound level which is exceeded for N% of the time. The most commonly used are the $L_{A01,T}$, $L_{A10,T}$ and the $L_{A90,T}$.

$L_{A01,T}$ is the 'A'-weighted level exceeded for 1% of the time interval T and is often used to gives an indication of the upper maximum level of a fluctuating noise signal.

$L_{A10,T}$ is the 'A'-weighted level exceeded for 10% of the time interval T and is often used to describe road traffic noise. It gives an indication of the upper level of a fluctuating noise signal. For high volumes of continuous traffic, the $L_{A10,T}$ unit is typically 2–3 dB(A) above the $L_{Aeq,T}$ value over the same period.

$L_{A90,T}$ is the 'A'-weighted level exceeded for 90% of the time interval T, and is often used to describe the underlying background noise level.

Appendix 2 – Baseline Survey and Assessment Locations



Approximate positions of baseline noise survey locations

Location	Description
1. Astral Gardens/Tutor Close	On footpath at rear of properties leading to Rail Trail
2. The Close, Satchell Lane	On site at rear of properties
3. Satchell Lane	On site at rear of properties
4. Wessex Manor	At start of footpath on site opposite entrance to property
5. Hamble School	On site to south of main school buildings
6. Hamble Lane (Rear)	On site at rear of properties

Appendix 3 – Instrumentation and Calibration Details

Date and Location of Survey

Friday 01 July 2022

In vicinity of former Hamble Airfield site, Hamble-Le-Rice

Surveys carried out by

Jack Semple

Weather Conditions

Friday 01 July 2022: Dry, 60% cloud cover, sunny, 13°C, WSW wind 1-3 m/s

Instrumentation used (Serial Number)

Norsonic 140 Sound Level Meter (1403137)

Norsonic 1251 Calibrator (31993)

Calibration

The sensitivity of the meter was verified on site immediately before and after the survey. The measured calibration levels were as follows:

Survey Date	Start Cal	End Cal
Friday 01 July 2022	113.8 dB(A)	113.7 dB(A)

The meter and calibrator are tested monthly against Norsonic Calibrators, type 1253 (serial number 22906) and type 1256 (serial number 125626100) both with UKAS approved laboratory certificate of calibration. In addition, the meter and calibrator undergo traceable calibration at an external laboratory every two years.

Survey Details

Attended sample measurements of 15 minute duration were taken at each of the chosen locations. The microphone was at a height of approximately 1.4 metres above local ground level, with a windshield used throughout. The start times of each sample are tabulated with the results in Appendix 4.

Appendix 4 – Updated Baseline Noise Survey Results

Results and Observations

Friday 01 July 2022

Dry, 60% cloud cover, sunny, 13°C, WSW wind 1-3 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
6. Hamble Lane (rear)	07:00	46	48	42	Birdsong, wind in trees, intermittent low rumble from south east, passing traffic on Hamble Lane, distant large aircraft movements and motorbikes on Hamble Lane.
1. Astral Gardens/Tutor Close	07:25	46	49	40	Birdsong, wind in trees, distant large aircraft movements, wind in trees, people jogging past meter, dog walkers walk past meter, barely audible whine from north-west and distant dog barks.
2. The Close, Satchell Lane	07:52	45	46	41	Birdsong, wind in trees, distant dog barks, distant large aircraft movements, chatter from nearby dwelling, very distant horn beep, loud dog bark at nearby dwelling, people walking past meter, high frequency impact noise at nearby dwelling.
4. Wessex Manor	08:20	52	56	43	Birdsong, wind in trees, distant road traffic on Hamble Lane, passing traffic on Satchell Lane, distant large aircraft movements and overhead small aircraft.
5. Hamble School	08:45	45	46	41	Birdsong, wind in trees, road traffic on Hamble Lane, clatters from HGVs, distant large aircraft movements, distant dog barks and distant motorbikes.
3. Satchell Lane	09:15	44	45	39	Birdsong, wind in trees, distant reversing alarms, distant material movements from south and south-east, impact noise and clatters from north.

Appendix 4 – Baseline Noise Survey Results (continued)

Results and Observations

Friday 01 July 2022

Dry, 60% cloud cover, sunny, 13°C, WSW wind 1-3 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
6. Hamble Lane (rear)	10:42	46	48	43	Birdsong, wind in trees, distant dog barks to north, road traffic on Satchell Lane, children playing at the school, barely audible impact noise from north-west and south-west, and intermittent popping noise from warehouse.
1. Astral Gardens/Tutor Close	11:07	46	49	39	Birdsong, wind in trees, material movement from distant north-west, distant large aircraft movements, impact noise/clacks from distant dwelling, person walking past talking on phone, dog walkers walking past meter, cyclists passing meter, road traffic on Hamble Lane.
3. Satchell Lane	11:40	45	46	41	Birdsong, wind in trees, distant police siren, distant motorbikes, very distant 2 stroke engine, to south-east, large aircraft movements and material movements at nearby dwelling.
2. The Close, Satchell Lane	11:58	45	47	41	Birdsong, wind in trees, distant road traffic on Hamble Lane, distant motorbikes, clanks to west, dog barking at dwelling, distant large aircraft movement, nearby dog barking in field, people talking nearby.
4. Wessex Manor	12:47	56	58	49	Birdsong, wind in trees, distant and overhead aircraft movements, HGV idling nearby at 1:30 - 3:00 into measurement, road traffic on Satchell Lane and distant road traffic on Hamble Lane.
5. Hamble School	13:08	50	52	45	Birdsong, wind in trees, distant road traffic on Hamble Lane, distant large aircraft movements, trains passing 7:00 and 13:40 into measurement.

Appendix 4 – Baseline Noise Survey Results (continued)

Results and Observations

Friday 01 July 2022

Dry, 60% cloud cover, sunny, 13°C, WSW wind 1-3 m/s

Position	Start Time	Results dB (T = 15 minutes)			Comments
		$L_{Aeq,T}$	$L_{A10,T}$	$L_{A90,T}$	
6. Hamble Lane (rear)	13:36	48	50	45	Birdsong, wind in trees, reversing alarms at warehouse, forklift driving in and out of warehouse, road traffic on Hamble Lane, distant large aircraft movements.
1. Astral Gardens/Tutor Close	14:00	51	54	46	Birdsong, wind in trees, people walking past meter at start of sample, distant large aircraft movements and distant road traffic on Hamble Lane.
2. The Close, Satchell Lane	14:27	46	49	43	Birdsong, wind in trees, distant large aircraft movements, distant car horn, distant lawn mower at dwelling, women calling dog in distance.
3. Satchell Lane	14:46	49	51	45	Birdsong, wind in trees, dog walker talking briefly , tapping from distant south-west, distant horn beep to south-west.
4. Wessex Manor	15:26	56	59	50	Birdsong, wind in trees, road traffic on Satchell Lane, distant large aircraft movements, door closing on vehicle nearby,
1. Astral Gardens/Tutor Close	16:00	52	55	45	Birdsong, wind in trees, cyclists ride up and down pathway frequently, people walking past talking at 13:25 into measurement and impact noise from dwellings.
2. The Close, Satchell Lane	16:24	45	47	42	Birdsong, wind in trees, people talking at dwellings, distant aircraft movements, impact noise at nearby dwelling 4:45 into measurement , distant dog barking, nearby voices, children playing football in distance, distant road traffic on Hamble Road, dog walkers walking past (dog wearing a bell on its collar).
4. Wessex Manor	16:51	56	59	46	Birdsong, wind in trees, road traffic on Satchell Lane, distant large aircraft movements.