enzygo
environmental consultants

HGV Movement Change Assessment – EA Permit

Baileys Skip Hire, Heritage Way, Corby, NN17 5XW

Baileys Skip Hire & Recycling Ltd

SHF.799.001.NO.R.002

'Experience and expertise working in union'

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HGV Movement Change Assessment

Project:	Baileys Skip Hire, Heritage Way, Corby, Northamptonshire, NN17 5XW
For:	Baileys Skip Hire & Recycling Ltd
Status:	Draft
Date:	October 2024
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1 Introduction

1.1 Project Introduction

1.1.1 Enzygo Limited (Enzygo) has been commissioned by Baileys Skip Hire & Recycling Ltd to undertake an a brief noise assessment to support the EA permit application to increase the HGV haulage serving the site from 117,500tpa to 200,000tpa.

1.1.2 Previously, permission has been granted for an extension of operating hours, increasing the throughput from 75,000tpa to 117,500tpa. A further increase to 200,000tpa has now been proposed.

1.1.3 The assessment has been undertaken to assess impact of the increase in throughput and its compliance with the relevant standards at the nearest noise-sensitive receptors.

1.1.4 Details of the assessment methodology employed, together with the results of the baseline survey, assessment and conclusions are presented within this report.

1.2 Site Description

1.2.1 The site is located to the northeast of Corby between Heritage Way and the A6086 Phoenix Parkway and between Earlstree and Willowbrook East Industrial Estates. The site and the nearest noise sensitive receptor, No.73 Pen Green Lane, are shown in Figure 1-1.

Figure 1-1: Site and Receptor Location

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1.2.2 To the north of the site is Phoenix Parkway which runs north to south past the eastern site boundary with commercial and/or industrial premises on either side of the road. Further north is Corby Power Station and Breedon's Corby Asphalt, Concrete & Ready-mixed Concrete Plant.

1.2.3 To the east, beyond Phoenix Parkway, BCA Automotives vehicle storage area and other commercial/industrial premises at the northern part of Willowbrook East Industrial Estate. To the south is open land to Willowbrook East Industrial Estate. To the west is the Kettering North Junction and Melton Mowbray Line railway, which runs north to south, beyond which is Earlstree Industrial Estate and open land.

1.2.4 The Pen Green Lane receptor is located 197m to the southwest of the site.

1.3 Description of the Proposals

1.3.1 Currently the site is permitted to operate between 07:00 and 18:00 hours Monday to Friday, between 07:00 and 13:00 on Saturday, and limited operation between 09:00 and 17:00 hours on Sundays and Bank Holidays.

1.3.2 The application proposes an uplift of allowed haulage movements during these operational hours, from 117,500tpa to 200,000tpa.

1.4 Noise Assessment Methodology

1.4.1 The noise assessment has been conducted in accordance with the guidance contained within British Standard 4142:2014+A1:2019 '*Method for rating and assessing industrial and commercial sound*' (BS4142).

1.4.2 Noise levels generated by the proposed development have been predicted to the nearest noise-sensitive receptors, using the calculation methodology outlined in ISO9613:1996 '*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*' (ISO9613) using the proprietary noise modelling software CadnaA.

2 Standards and Guidance

2.1 Planning Practice Guidance: Noise

2.1.1 The Planning Practice Guidance: Noise is the Government's online guidance on managing potential noise impacts from new developments.

2.1.2 The guidance includes a noise exposure hierarchy table which relates response to noise and example outcomes to effect levels. The hierarchy table also identifies actions required for each effect level.

2.1.3 Particularly relevant to this assessment are the No Observed Effect Level and the No Observed Adverse Effect Level (NOAEL) to which the guidance states:

Table 2-1: Noise Hierarchy Table Excerpt

Response	Example of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude, or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life	No Observed Adverse Effect	No specific measures required

2.2 British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound*

2.2.1 BS4142 provides a methodology for rating and assessing sound associated with both industrial and commercial premises. The purpose of the Standard is clearly outlined in the opening section where it states that the method is appropriate for the consideration of:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

2.2.2 The Standard is based around the premise that the significance of the noise impact of an industrial/commercial facility can be derived from the numerical subtraction of the background noise level (not necessarily the lowest background level measured, but the typical background of the receptor) from the measured/calculated rating level of the specific sound

under consideration. This comparison will enable the impact of the specific sound to be concluded based upon the premise that typically "*the greater this difference, the greater the magnitude of the impact*". This difference is then considered as follows:

- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of around +5dB is likely to be an indication of an adverse impact, depending upon context; and
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

2.2.3 BS4142 further states that "*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact*" again depending upon the specific context of the site. The Standard further qualifies the assessment protocol by outlining conditions to the comparative assessment and stating that "*not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact*", thus implying that all sites should be assessed on their own merits and specifics.

2.2.4 The Standard quantifies the typical reference periods to be used in the assessment of noise, namely:

Typical Daytime	07:00 – 23:00	1-hr assessment period
Typical Night-time	23:00 – 07:00	15-min assessment period

2.2.5 The Standard outlines methods for defining appropriate "*character corrections*" within the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. These are a) the Subjective Method, b) the Objective Methods for tonality and c) the Reference Method. It is noted by the Standard that where multiple features are present the corrections should be added in a linear fashion to the specific level.

2.2.6 The Subjective Method is based on the following corrections:

Table 2-2: BS4142 Subjective Method Rating Corrections

Level of Perceptibility	Tonal Correction	Impulsivity Correction	Correction for "Other sound characteristics"	Intermittency Correction
No Perceptibility	+0 dB	+0 dB	Where neither tonal nor Impulsive but clearly identifiable +3 dB	If intermittency is readily identifiable +3 dB
Just Perceptible	+2 dB	+3 dB		
Clearly Perceptible	+4 dB	+6 dB		
Highly Perceptible	+6 dB	+9 dB		

2.3 ISO9613 *Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*

2.3.1 The noise levels generated by the operation of the proposed development have been predicted using the calculation methodology set out in ISO9613-2. The methodology considers

the distance between the sources and the receptors and applies the amount of attenuation due to atmospheric absorption and other site-specific characteristics.

2.3.2 The methodology assumes downwind propagation, i.e., a wind direction that assists the propagation of noise from the source to all receptors.

3 Noise Monitoring Surveys

3.1.1 Baseline noise surveys were undertaken on Thursday 2nd, Friday 3rd, Sunday 5th and Wednesday 22nd February 2023 to gather background and ambient noise levels at a location representative of the nearest noise-sensitive receptor to the site.

3.1.2 The monitoring location used for the survey is detailed in Table 3-1 and shown in Figure 1-1. The microphone was mounted on a tripod with a windshield approximately 1.5m above the ground in free-field conditions.

Table 3-1: Noise Monitoring Location

Location/Receptor	Approximate Distance from Site Boundary	Reflecting Surfaces between Source & Receptor(1)	Topography of Intervening Ground	Justification for Choice of Measurement Location
No.73 Pen Green Lane	200m	None	Open grassland, ponds and a railway	Nearest residential receptor to the site

Note (1) – Reflecting surfaces other than the ground.

3.1.3 The noise monitoring equipment used during the survey is shown in Table 3-2, and was set to record a number of parameters, including the $L_{Aeq,T}$, L_{A90}, L_{A10} and L_{AFmax}.

Table 3-2: Survey Equipment

Equip. Make & Model	Class	Calibration Level, dB	Serial No.	Calibration Date Prior to Survey
RION NL-52 Sound Level Meter	1	94.0	0052099	August 2022
RION NC-75 Acoustic Calibrator	-	-	34724233	August 2022

3.1.4 The sound level meter was field calibrated, using an electronic calibrator, prior to and upon completion of the overall survey. No drift in calibration was noted. The external calibration documentation for the equipment used is available upon request.

3.2 Weather

3.2.1 The weather conditions during the survey period are detailed in Table 3-3 below.

Table 3-3: Weather Conditions

Date	Period	Precipitation	Cloud Cover	Max. wind-speed	Wind Direction	Temperature
Thursday 2nd February	Day	None	60%	<5.0m/s	SW	9°C
Friday 3rd February	Night	None	100%	<5.0m/s	W	6°C
Sunday 5th February	Night	None	30%	<5.0m/s	W	3°C
	Day	None	0%	<5.0m/s	NW	6°C

3.3 Survey Results

3.3.1 The 15-minute L_{Aeq}, L_{A90}, L_{A10} and L_{AFmax} results the measurement position are summarised in Table 3-4.

Table 3-4: Summary of Baseline Survey Results, dB

Location	Period	Average[1] $L_{Aeq,T}$	L_{Afmax}[2]	L_{A90}[3]	L_{A10}[3]
No.73 Pen Green Lane	Midweek Daytime (07:00-18:00)	46.7	75.6	41.5	47.4
	Midweek Night-time (23:00-07:00)	36.5	58.9	33.8	37.9
	Sunday Daytime (07:00-18:00)	45.7	83.4	40.3	46.8
	Sunday Night-time (23:00-07:00)	43.2	75.0	38.9	44.8

Note:
1) Logarithmic average of the L_{Aeq} parameter reported.
2) Maximum recorded L_{Afmax} value reported.
3) Arithmetic average value reported.

3.4 Subjective Field Monitoring Notes

Thursday 2nd February 2023 - Daytime

3.4.1 The daytime noise climate at No.73 Pen Green Lane comprised background road traffic noise, a continuous ringing sound from the industrial estate to the north and birdsong. Site operations were only just audible, engines and glass bottles (possibly) being dropped although these were difficult to distinguish from the ambient noise climate.

Friday 3rd February 2023 – Night-time

3.4.2 The night-time noise climate at the receptor comprised background road traffic noise and continuous humming from the industrial estate to the north. The site being assessed was not operational.

Sunday 5th February 2023 – Night-time

3.4.3 The night-time noise climate at the receptor during the early hours of Sunday morning comprised background road traffic noise and a continuous humming from the industrial estate to the north. The site being assessed was not operational.

Sunday 5th February 2023 – Daytime

3.4.4 The daytime noise climate at the receptor on Sunday comprised background road traffic noise, a continuous humming from the industrial estate to the north, but less noticeable than at night, birdsong, and occasional overhead aircraft. The site being assessed was not operational.

3.5 Measurement of On-site Operations

3.5.1 On-site measurements of typical operations at the site were undertaken on Thursday 2nd February 2023. The results are shown in Table 3-5.

Table 3-5: Summary of On-site Measurements

Activity	Measured dB $L_{Aeq,T}$	Distance m
Doosan Excavator loading hopper to sorting line	75.5	10
Case Loading Shovel moving waste and reversing away	72.6	varies
HGV unloading waste	81.7	10
Mobile Screen Operations after sorting line	81.7	4.5
Doosan Excavator loading mobile shredder	79.8	9.5
Doosan Excavator loading trommel screen (in building)	82.0	10

4 Noise Assessment

4.1 Introduction

4.1.1 Specific sound levels generated by site operations at haulage throughputs of 117,500tpa and 200,000tpa have been predicted to the outdoor amenity space of the nearest noise-sensitive receptor identified using the calculation methodology outlined in ISO9613.

4.1.2 The resulting predicted specific sound levels have then been assessed in accordance with the guidance contained in BS4142.

4.2 Noise Modelling

4.2.1 The noise model was constructed using the proprietary noise modelling software package CadnaA. The noise model was constructed using Google Maps geo-referenced 1:1 scaled aerial photography. The following assumptions have been made during the modelling process:

- The ground absorption has been set to 1.0 to represent soft ground between the site and the nearest property and 0 to represent hard ground within the site.
- All equipment has 100% on time when in operation.
- Worst case throughput has been assumed

4.2.1 The on-site measured operational noise data shown in Table 3-5 has been used to verify the noise levels within the site. Noise levels during operations have been predicted to the garden space of No.73 Pen Green Lane, the nearest receptor.

4.3 Predicted Sound Levels

4.3.1 Noise levels generated by on-site operations, including HGV movements, have been predicted to a height of 1.5m to represent an individual within the outdoor amenity space during the day and evening.

4.3.2 Table 4-1 details the resulting predicted noise levels.

Table 4-1: Predicted Specific Sound Levels at the Noise-Sensitive Receptors

Receptor	Haulage Throughput, tpa	Location	Assessment Height above local ground level, m	Specific Sound Level, dB
No.73 Pen Green Lane	117,500	Back Garden	1.5	33
	200,000	Back Garden	1.5	34

4.4 Subjective Impressions at the Receptors

4.4.1 During the visit to undertake on-site measurements, a visit was also made to the receptor to determine the subjective operational noise from the site. It was noted that site operations could not be easily distinguished from other sources in the area.

4.5 Sound Rating Levels

Existing Context – Site not operational

4.5.1 The receptor is currently subject to noise levels generated by road traffic using the A6116 Phoenix Parkway, A6086 and local roads, and industrial noise from businesses on Earlstrees Industrial Estate during the evening and on Sundays.

Derived Sound Rating Levels

4.5.2 The proposed increase in haulage movements would not generate any noise which would have a tonal, intermittent feature which would be perceptible over those that already exist at the receptor, i.e., vehicle movements, noise from Earlstrees Industrial Estate, etc. However, it is possible that an impulsive feature may just be perceptible, therefore, a +3dB corrections has been made to the specific sound source for this characteristic.

4.6 BS4142 Assessment

4.6.1 BS4142 states:

"*The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs.*"

4.6.2 A comparative assessment has been undertaken to determine the potential impact of the predicted sound rating levels of each haulage total. The average measured background sound levels are considered typical and have been used in the assessment. Table 4-2 summarises the results of the assessment.

4.6.3 The assessment reflects a worst-case situation when all operations at site are being undertaken simultaneously throughout the assessment period, and maximum allowed haulage throughput is carried out hourly.

Table 4-2: BS4142 Assessment – Worst-case

Location	Haulage Throughput, tpa	Period	Rating Level dB $L_{Aeq,T}$	Background Noise Level, dB L_{A90}	Difference, dB
No.73 Pen Green Lane	117,500	Weekday Daytime	36	42	-6
		Sunday/Bank Holiday Daytime		40	-4
		Sunday/Bank Holiday Night-time		39	-3
	200,000	Weekday Daytime	37	42	-5
		Sunday/Bank Holiday Daytime		40	-3
		Sunday/Bank Holiday Night-time		39	-2

4.6.4 Table 4-2 shows that the predicted sound rating level at both existing and proposed haulage throughput levels are below the measured background noise level. This would indicate that the specific sound level would have a low impact depending on the context.

4.6.5 As the predicted noise levels are below the measured background noise levels it is considered that local amenity protection has been maintained as required by the reason for Condition 5 and Policy 18 of the Northamptonshire MWLP.

4.7 Context

4.7.1 BS4142 states that where the initial estimate of impact needs to be modified due to the context, all pertinent factors should be taken into consideration.

Sensitivity of the Receptors

4.7.2 The receptor is located relatively close to major transport infrastructure (Phoenix Parkway and the Kettering North Junction and Melton Mowbray Line railway) and industrial noise sources (Earlstrees and Willowbrook East Industrial Estates) which generate noise throughout the day, evening and overnight.

The Absolute Level of Sound

4.7.3 The worst-case specific sound levels generated during the proposed varied operating hours are predicted to be below the prevailing average ambient $L_{Aeq,1hr}$ noise levels on Sundays/Bank Holidays and in the evening.

The Character and Level of the Residual Sound

4.7.4 The specific sound levels are predicted to be below the measured ambient noise level at the receptor and as such the character and level of the sound are likely to be indistinguishable against the residual noise climate.

Summary of Context

4.7.5 The context should not affect the initial estimate of impact as predicted noise levels would be equal to or below the prevailing background noise levels.

4.7.6 Based on the findings and context of the assessment, mitigation measures above those incorporated into the design of the site are considered unnecessary.

5 Conclusion

5.1 Background

5.1.1 Enzygo Limited (Enzygo) has been commissioned by Baileys Skip Hire & Recycling Ltd to undertake an a brief noise assessment to support the EA permit application to increase the HGV haulage serving the site from 117,500tpa to 200,000tpa.

5.1.2 The assessment has been undertaken to assess compliance with the relevant standards at the nearest noise-sensitive receptors during the proposed operational hours.

5.1.3 The assessment is based on the results of a series of noise predictions undertaken in accordance with the calculation methodology contained in ISO9613 '*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation*' and the results of baseline noise surveys undertaken at locations representative of the nearest noise-sensitive receptors.

5.2 Noise Assessment

5.2.1 Sound levels generated by the site have been predicted using the proprietary noise modelling software CadnaA. An assessment has been made in accordance with the guidance contained in BS4142. Reference has also been made to the noise exposure hierarchy described in the planning practice guidance.

5.2.2 The BS4142 assessment has shown that noise levels from the site with increased HGV throughput would be equal to or below the prevailing background noise levels and should have a low impact at the nearby residential receptors.

5.2.3 Furthermore, based on the noise exposure hierarchy described in the planning practice guidance, noise from the facility should fall into the No Observed Effect Level (NOEL) threshold of impact.

5.2.4 As the predicted noise levels are below the measured background noise levels it is considered that local amenity protection has been maintained as required by the reason for Condition 5 and Policy 18 of the Northamptonshire MWLP.

5.2.5 Therefore, there are no reasons on noise grounds why an EA permit should not be granted for an increase of HGV movements servicing the site.

Glossary of Terminology

Noise is defined as unwanted sound. The range of audible sound is known to be from 0dB (threshold of hearing) to 140dB (threshold of pain). Examples of typical noise levels relating to 'everyday' occurrences are given in Table G-1 below.

Table G-1: Typical Noise Levels

Source	Sound Pressure Level in dB(A)	Subjective Level
Gun shot	160	Perforation of eardrum
Military Jet take-off	140	Threshold of pain
Jet Aircraft at 100m	120	Very Loud
Rock Concert, front seats	110	Threshold of Sensation
Pneumatic Drill at 5m	100	Very Loud
Heavy goods vehicle from pavement	90	
Traffic at kerb edge	70 – 85	Loud
Vacuum Cleaner, Hair Dryer	70	
Normal conversation at 1m	60	Moderate
Typical Office	50 – 60	
Residential area at night	40	Quiet
Rural area at night, still air	30	
Leaves Rustling	20	
Rubbing together of fingertips	10	
	0	Threshold of hearing

The frequency response of the human ear to noise is usually taken to be around 18Hz (number of oscillations per second) to 18,000Hz. However, the human ear does not respond equally to different frequencies at the same level; it is more sensitive in the mid-frequency range than lower and higher frequencies and, because of this, when undertaking the measurement of noise the low and high frequency components of any given sound are reduced in importance by applying a filtering (weighting) circuit to the noise measuring instrument. The weighting which is widely accepted to correlate best with the subjective nature of human response to noise and is most widely used to quantify this is the A-weighted filter set. This is an internationally accepted standard for noise measurement.

For variable noise sources within an area an increase of 3dB(A) would be the minimum perceptible to the human ear under normal conditions. It is generally accepted that an increase/decrease of 10dB(A) corresponds to a doubling or halving in perceived loudness. The 'loudness' of a noise is a purely subjective parameter, dependant not only upon the sound pressure of the event but also on the dynamics of the listener's ear, the time of the day and the general mood of the person.

With regard to environmental noise levels (in the open air), these are rarely steady but rise and fall according to the activities being undertaken within the surrounding area at any given time. In an attempt to produce a figure that relates this variable nature of noise to human subjective response, a number of statistical noise metrics have been developed. These and other useful terminology and descriptors are presented in Table G-2 below.

Table G-2: Terminology

Term	Definition
Sound	Pressure fluctuations in a fluid medium within the audible range of amplitudes and frequencies which stimulate the organs of hearing.
Noise	Unwanted sound emitted from a source and received by the sensitive receptor.
Decibel (dB)	Unit most often used to describe the sound pressure level. A logarithmic number, it correlates closely to the way in which humans perceive sound. Its wide range of values helps quantify sound pressures from a large variety of magnitudes.
A-Weighting (dB(A))	Human perception of sound is frequency dependant. A-weighting applies a range of corrections at each frequency to provide a 'human-averaged'. Can be frequency band or broadband values.
Frequency (Hz)	The number of cycles per second, for sound this is closely related (and often mistaken for) pitch.
Frequency Spectrum	A more detailed analysis of the frequency components that comprise a sound source.
$L_{A10,T}$	The 10th statistical percentile of a measurement period, i.e. the level that is exceeded for 10% of the measurement duration. Closely correlates with traffic sources, A-weighted.
$L_{A90,T}$	The 90th statistical percentile of a measurement period, i.e. the level that is exceeded for 90% of the measurement duration. Used to describe background sound levels, as this value is affected less by short, transient sound sources, A-weighted.
L_{Amax}	The root mean square (RMS) maximum sound pressure level within a measurement period, A-weighted.
Ambient Sound	The total sound climate of all sources incident at one location, both in the near- and far-field (*The ambient sound comprises the residual sound and the specific sound when present)*.
Ambient Sound Level $L_a = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
Background Sound Level $L_{A90,T}$	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.
Equivalent Continuous A-weighted Sound Pressure Level $L_{Aeq,T}$	Value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, $T = t_2 - t_1$, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

Term	Definition
	$$L_{Aeq,T} = 10lg_{10}\left\{\left(\frac{1}{T}\right)\int_{t1}^{t2}\left[p_A\frac{(t)^2}{{p_0}^2}\right]dt\right\}$$ Where p_0 is the reference sound pressure (20µPA); and $P_A(t)$ is the instantaneous A-weighted sound pressure level at time t.
Measurement Time Interval T_m	Total time over which measurements are taken (*This may consist of the sum of a number of non-contiguous, short-term measurement time intervals)*
Rating level $L_{Ar,Tr}$	Specific sound level plus any adjustment for the characteristic features of the sound, over a period of time, T.
Reference Time Interval, T_r	Specified interval over which the specific sound level is determined (This is 1hr during the day from 07:00 to 23:00 hours and a shorter period of 15-min at night from 23:00 to 07:00 hours).
Residual Sound	Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.
Residual sound level $L_r = L_{Aeq,T}$	Equivalent continuous A-weighted sound pressure level of the residual sound in a given situation at the assessment location over a given time interval, T.
Sound Pressure Level	The level of fluctuation in air pressure, caused by airborne sound sources. Measured in Pascals (Pa).
Sound Power Level	The rate at which sound is radiated by a source. This parameter is useful as it describes sound energy before environmental or decay factors. Quantified in dB and notated usually as L_w or SWL.
Specific sound level $L_s = L_{Aeq,Tr}$	Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T.
Specific Sound Source	Sound source being assessed.

Statement of Uncertainty

This report is based upon a range of measurements, a system of calculations and noise predictions. As such, this report attempts to quantify fluctuations in air pressure and is subject to the effects of meteorology, physical and perceived anomalies, tolerances within the measuring and monitoring equipment and accuracy margins within the noise modelling software. In the interests of repeatability, this report must be considered as being affected by common factors involved in the measurement and calculation of noise propagation.

All measurement values, outcomes and assumptions are subject to a margin of uncertainty. This has been quantified and assessed as follows:

- Rounding errors – systemic tolerance of ±1dB;
- Type 1 sound level meter – operational tolerance of ±1.1dB;
- Meteorology – allowance of ±1.9dB; and
- CadnaA noise propagation modelling software – operational accuracy of ±2.1dB

The most influential uncertainty factors for the assessment of noise are deemed to be equipment tolerances, meteorology and software accuracy. A root-sum-square statistical average has been used to provide an overall margin of uncertainty of ±3dB.

Statement of Competency

Darren Lafon-Anthony MSc MIOA FIQ

The assessment has been undertaken by, or under the supervision of, Mr. Darren Lafon-Anthony who is the Director of Acoustics at Enzygo Limited. Mr. Lafon-Anthony holds a Master of Science Degree in Applied Acoustics and has been a Corporate Member of the Institute of Acoustics since July 2004 having previously been an Associate Member of the institute since October 2001. Mr. Lafon-Anthony is also a Fellow of the Institute of Quarrying based on his contribution to the assessment of noise and the application of mitigation for minerals and mining sites, a qualification he has held since September 2014.

Mr. Lafon-Anthony has worked in acoustics since January 1981. Initially as an engineer designing and overseeing manufacture of noise control equipment for the water industry, standby power diesel generator and power generation markets for several noise control equipment manufacturers and, since February 2004, as an environmental noise consultant in various sectors, including mineral and mining sites, waste disposal and recycling sites, large industrial developments, energy supply projects (EfW, STOR and Battery Energy Storage and Solar Farm sites) and residential developments in the UK, Europe and sub-Saharan Africa.

APPENDIX A – Baseline Noise Data

Table B-1: Baseline Noise Data - No.73 Pen Green Lane - Midweek Daytime

Time	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{A90} (dB)	L_{A10} (dB)
02/02/2023 10:15	43.8	64.1	40.9	44.5
02/02/2023 10:30	46.7	65.0	41.5	49.7
02/02/2023 10:45	45.4	71.2	41.9	46.3
02/02/2023 11:00	46.1	63.8	41.6	48.8
02/02/2023 11:15	43.8	61.0	41.3	45.2
02/02/2023 11:30	46.4	61.2	42.0	48.8
02/02/2023 11:45	43.0	57.2	41.0	44.6
02/02/2023 12:00	45.5	67.1	40.7	46.2
02/02/2023 12:15	46.3	68.9	40.7	45.2
02/02/2023 12:30	46.3	71.8	40.0	48.6
02/02/2023 12:45	47.5	65.2	42.7	48.4
02/02/2023 13:00	45.6	62.0	41.7	47.7
02/02/2023 13:15	51.0	62.6	43.1	52.9
02/02/2023 13:30	49.7	75.6	42.7	48.9
02/02/2023 13:45	46.0	72.4	41.3	45.2
Overall	46.7	75.6	41.5	47.4

Table B-2: Baseline Noise Data – No.73 Pen Green Lane - Midweek Night-time

Time	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{A90} (dB)	L_{A10} (dB)
03/02/2023 02:15	35.1	45.8	32.7	36.5
03/02/2023 02:30	34.2	50.7	32.5	35.7
03/02/2023 02:45	36.6	56.2	34.0	38.1
03/02/2023 03:00	37.3	54.8	34.9	38.8
03/02/2023 03:15	35.9	51.1	33.4	37.7
03/02/2023 03:30	36.5	52.0	34.1	38.6
03/02/2023 03:45	38.5	58.9	34.7	39.6
Overall	36.5	58.9	33.8	37.9

Table B-3: Baseline Noise Data – No.73 Pen Green Lane - Weekend Daytime

Time	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{A90} (dB)	L_{A10} (dB)
05/02/2023 07:00	44.5	64.1	40.6	46.8
05/02/2023 07:15	49.5	61.9	42.0	53.5
05/02/2023 07:30	44.5	61.6	40.6	46.8
05/02/2023 07:45	43.9	58.5	40.6	46.0
05/02/2023 08:00	43.8	56.9	40.9	46.0
05/02/2023 08:15	43.1	58.3	40.8	44.6
05/02/2023 08:30	44.0	67.6	40.5	45.8

05/02/2023 08:45	43.5	62.3	40.4	45.7
05/02/2023 09:00	46.4	67.7	40.8	45.8
05/02/2023 09:15	44.6	63.2	41.6	46.0
05/02/2023 09:30	45.6	62.1	40.8	47.4
05/02/2023 09:45	43.8	66.9	40.9	45.2
05/02/2023 10:00	44.8	66.9	40.0	47.3
05/02/2023 10:15	44.3	60.9	39.6	47.1
05/02/2023 10:30	43.8	59.9	40.1	45.3
05/02/2023 10:45	44.8	61.1	40.9	46.9
05/02/2023 11:00	47.1	69.6	38.4	45.3
05/02/2023 11:15	44.0	69.5	38.8	45.0
05/02/2023 11:30	47.6	61.1	41.6	50.4
05/02/2023 11:45	49.0	83.4	41.3	47.5
05/02/2023 12:00	45.9	66.8	41.2	46.6
05/02/2023 12:15	44.3	68.6	39.7	45.3
05/02/2023 12:30	47.1	72.6	39.0	47.4
05/02/2023 12:45	47.4	62.5	40.2	49.6
05/02/2023 13:00	45.2	69.1	40.2	46.3
05/02/2023 13:15	44.0	69.2	38.4	44.1
05/02/2023 13:30	46.4	69.5	39.8	48.6
05/02/2023 13:45	46.4	72.4	38.8	46.8
Overall	45.7	83.4	40.3	46.8

Table B-4: Baseline Noise Data – No.73 Pen Green Lane - Weekend Night-time

Time	L_{Aeq} (dB)	L_{AFMax} (dB)	L_{A90} (dB)	L_{A10} (dB)
05/02/2023 02:15	40.9	52.8	37.7	43.4
05/02/2023 02:30	46.7	75.0	39.5	46.2
05/02/2023 02:45	42.2	50.7	39.1	44.3
05/02/2023 03:00	42.3	51.0	38.7	44.7
05/02/2023 03:15	42.7	50.5	39.2	45.2
05/02/2023 03:30	42.7	50.7	39.1	45.4
05/02/2023 03:45	42.0	48.8	38.9	44.2
Overall	43.2	75.0	38.9	44.8

APPENDIX B – Noise Contour Plot

Figure B-1: Noise Contour Plot – 117,500tpa

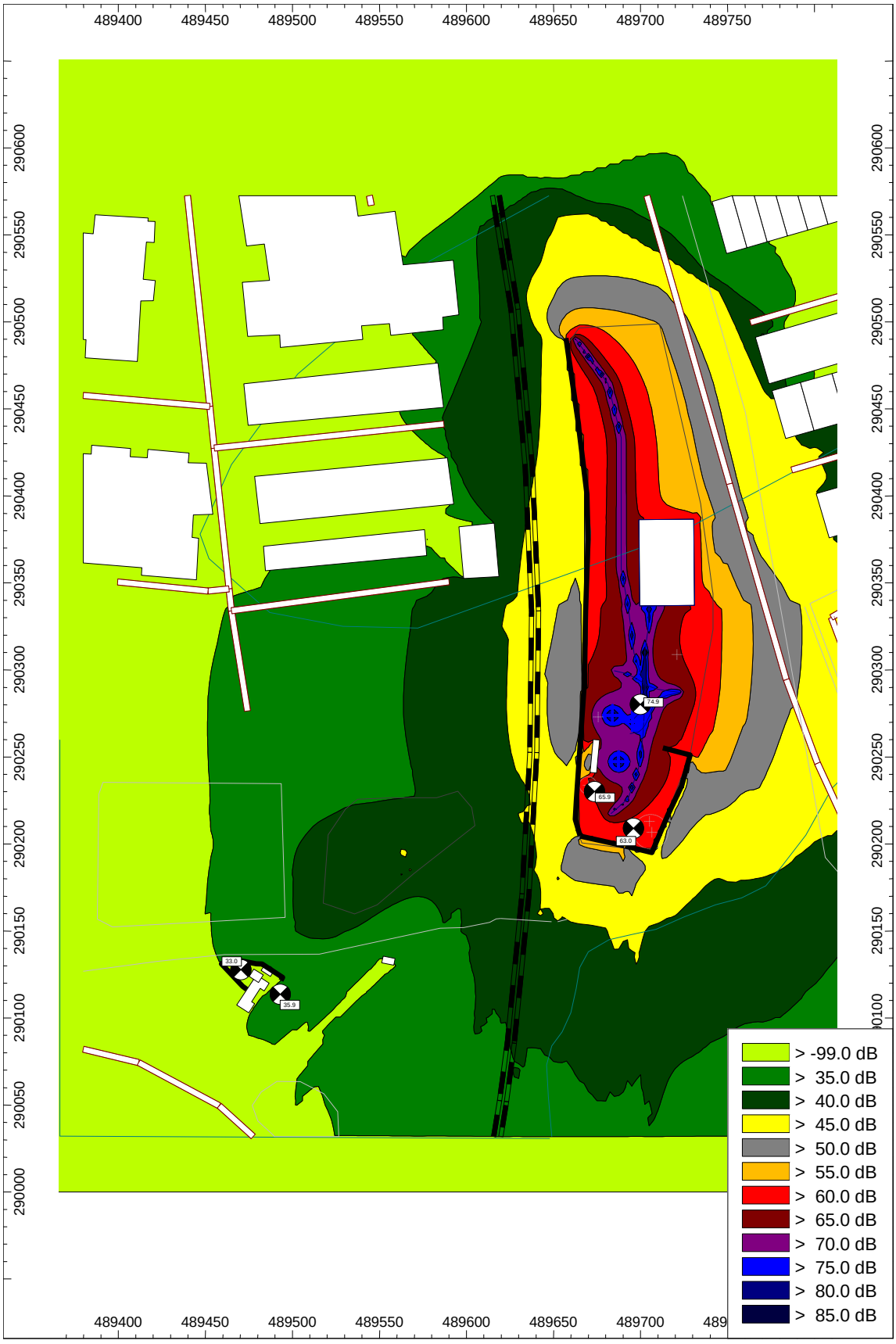

Figure B-2: Noise Contour Plot – 200,000tpa

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