



REPORT REFERENCE:

IMP4872-3

INDUSTRIAL NOISE IMPACT ASSESSMENT

British Standard 4142:2014

CLIENT:

Lambeth Smith Hampton

SITE:

Kenwood Business Park, Havant
(Longitude: 50.51'21.27°, Latitude: 0.58'14.14°)

SURVEY DATES:

3rd – 6th October 2016

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1 EXECUTIVE SUMMARY

1.1 Instruction

Impact Acoustics have been instructed by Lambert Hampton Smith to undertake a background noise survey at the premises at Units 3, 7 & 8 Kenwood Business Park, New Lane, Havant to understand the level of impact the existing site will have on this new site.

1.2 Scope of Report

The measurements have been undertaken in accordance with British Standard 4142:2014 and ISO 1996 – Part 2: 2007 to establish if the proposed site has a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. This report aims to establish the following:

- Existing background noise levels at the closest residential façade to the proposed site.
- Monitor existing noise levels of all plant scheduled to be moved to the new site
- Assessment of the impact of the site operation on nearby residential properties.
- Make remedial acoustic recommendations and assessments if required.

1.3 Summary of Report

1.3.1 Measured Background Noise Levels

Continuous background noise measurements were undertaken between 3rd – 6th October 2016 at the Assessment Position 1. The modal 1-hour day time background noise levels between 07:00 and 23:00 was found to be L_{A90} 46dB at the assessment position and L_{A90} 35 dB during night time hours 23:00 – 07:00

Assessment Position	LA90 (Modal)	LA90 (Modal)
	Day	Night
	(07:00 – 23:00)	(23:00 – 07:00)
1	46 dB	35 dB

1.4 Conclusions

The operation of the proposed plant to be relocated on the new site has been assessed to establish if the development will have a demonstrable adverse effect in terms of noise that outweigh the benefits of the development. Measurements have been undertaken in accordance with British Standard 4142:2014 and ISO 1996 – Part 2: 2007. This report has established the existing background noise levels at the closest residential façade to the proposed site and the assessment of the impact of the site operation on nearby residential properties. The resulting emissions from the site running on a worst case scenario show no conflict with 'low impact' criteria and give a strong indication that complaint and impact on the local amenity is unlikely, provided the recommendations contained within this report are implemented accordingly. It will be necessary to operate with the doors closed at all times and to install new fans complete with attenuators.

2 INTRODUCTION

2.1 Instruction

Impact Acoustics have been instructed by Lambert Hampton Smith to undertake a background noise survey at the premises at Units 3, 7 & 8 Kenwood Business Park, New Lane, Havant to understand the level of impact the existing site will have on this new site.

The purpose of this assessment is to ensure the acoustic protection of noise sensitive premises closest to the proposed new site at New Lane. Noise sensitive premises are not restricted to residential dwellings as offices can be affected by unwanted external noise. However, the residential properties to the East of the development have been identified as the nearest noise sensitive and therefore all assessments are to be made to this position.

This report should be read in conjunction with our initial background noise assessment dated October 2016, Report reference IMP4872. A summary of the background noise levels acquired are detailed within this report. For full details, please refer to original report.

2.2 Ambient and Background Measurements

External noise levels are to be recorded over, what has been considered for the site, an average / typical time period in order to assess the daytime and night time noise levels. Levels have been recorded over more than one night in order to ensure the uncertainty of measurement aspects of BS 4142: 2014 have been satisfied and that the data recorded is representative for the purpose of a robust assessment.

2.3 BS 4142: 2014

British Standard 4142: 2014 is to be adopted for the basis of this background noise level assessment. A BS 4142: 2014 noise assessment will be carried out in order to demonstrate the existing acoustic impact the external plant currently has on the nearest affected residential and make suitable recommendations in order to demonstrate that these units will not have a significant and demonstrable adverse impact on the nearest noise sensitive premises in accordance with the National Planning Policy Framework, once remedial works are completed. BS 4142: 2014 supersedes the 1997 version and has been developed to move more in-line with the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

2.4 National Planning Policy Framework & Noise Policy Statement for England 2010

References and evaluations are to be made to the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise.

Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

“Significant adverse” and “adverse”

There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

NOEL – No Observed Effect Level *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

LOAEL – Lowest Observed Adverse Effect Level *This is the level above which adverse effects on health and quality of life can be detected.*

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.

SOAEL – Significant Observed Adverse Effect Level *This is the level above which significant adverse effects on health and quality of life occur.*

It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.

2.5 Council Requirements

Havant Borough Council has made the following comments regarding this application and therefore this noise assessment will be undertaken in order to satisfy these concerns.

The applicant or tenant will need to provide an acoustic assessment following BS4142-2014 discussing the noise produced within and outside of the proposed location.

Having visited Colt factory, the noise from the internal equipment should not cause undue concern. However we note that the roll former, guillotine and the press are located near the good entry door on the new application. The acoustician needs to put into context the noise created by the equipment, the fabric of the building (for reflection of the noise) and ways that the noise may escape and how this may affect the local ambient noise levels. Some inexpensive mitigation measures could be implemented by the company which could include;

- *Revisiting the lay out of the noisy equipment of the proposed set up to minimise noise escape,*
- *Increasing distance to nearest residential property and as discussed during the visit,*
- *Simple processes can be put into place to reduce the impact noise (Guillotine). However, this will need to be assessed and reported upon.*

Mark and my concerns mainly rests with the external equipment, including the Testing station, Metal Scrap Bins, the compactor and to some extent the use of forklift to load and offload the raw material (including reversing beep and fork

rattle). Whilst on site, and when the Testing Station equipment was switched on, it became apparent that this will be of concern. Mitigation measures should be possible to control the noise at source therefore reducing noise at the nearest residential receptors. It may be done by purchasing newer units, fitting silencers to the fans or designing a purpose-built mitigation structure/partial enclosure (however, the height may be of concern to yourselves).

When the noise assessment is carried out, it may be worth stating the time and days of operation and the assessment can look at those time/day only. They should be no need to night time assessment as the company will not be operating. However, for flexibility to the company, the assessment may show that operating outside of the hours, may not negatively impact on the local environment as long as it only takes place within a closed door environment. Therefore, production/packaging may take place without any impact.

The acoustician should aim to achieve, 0dB increase (NOEL), however, due to the location and the class use, +5dB (LOAEL), may be allowable, however, +3dB max would be preferred

3 SITE LOCATION

3.1 Position of Site in Wider Area

The site is located on the Kenwood Business Park with residential properties to the East of the site.



TEMPORARY BUILDINGS NO LONGER IN PLACE



TEMPORARY BUILDINGS NO LONGER IN PLACE

3.2 Assessment Position and Background Position

Continuous measurement was undertaken at the assessment position between 3rd – 6th October 2016. Measurement was undertaken at roof level at the nearest noise sensitive premises / receptor in accordance with ISO1996 part 2: 2007 in free field conditions.



4 CALCULATIONS

Nearfield sound pressure levels have been recorded of all internal and external plant that is to be moved to the new location. This includes the following and is tabulated accordingly.

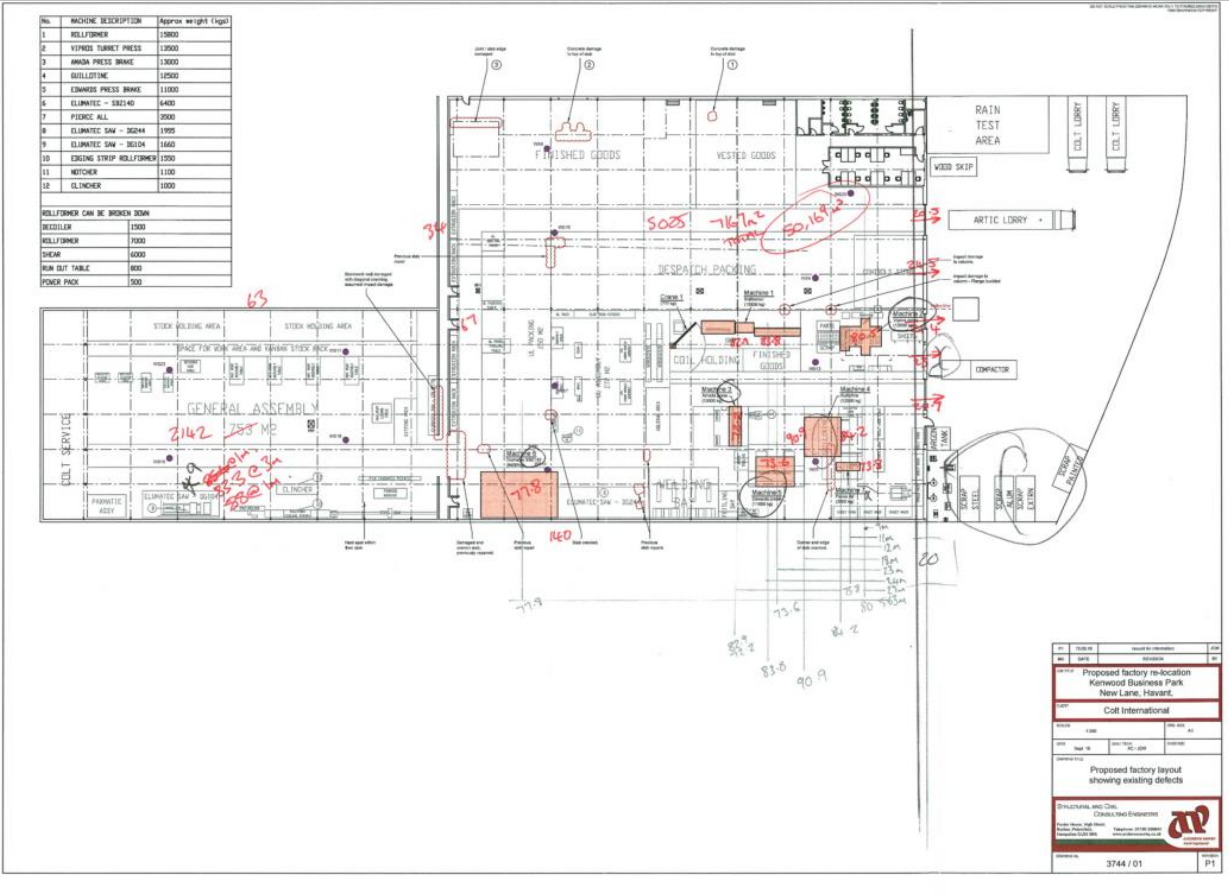
4.1 Internal Noise Sources.

Source	Noise Level	Lw dB
Machine 2 Vipros Press	80.5	91.5
Machine 7	73.8	84.8
Machine 4 Guillotine front	84.2	95.2
Machine 4 Guillotine rear	90.9	101.9
Machine 5 Edwards Press	83.6	94.6
Machine 1 Rollformer Dispatch	83.8	94.8
Machine 1 & 3 Rollformer Operative & Amada Press	82.9	93.9
Machine 6 Elumatic SBZ140	88.8	99.8

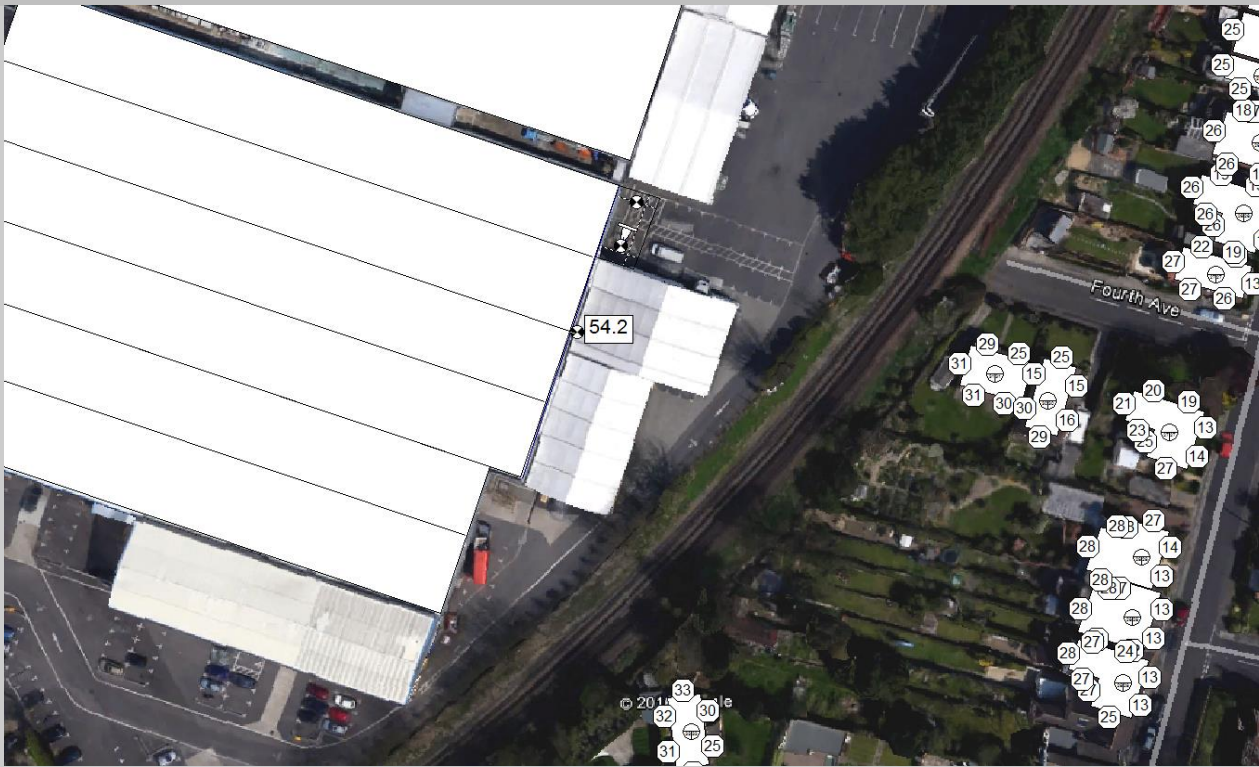
The following calculations have been carried out to demonstrate the resultant external noise level from all machinery operating at the same time. This is worst case scenario. Sound Insulation tests carried out across the new structure from inside to outside with all the shutters closed has indicated a minimum transmission loss of 20 dB(A).

These calculations ascertain the resultant noise levels of all plant based on the existing structure and their positioning within the proposed factory floor layout.

Source	Distance to 1.0m from Shutter	Noise Level	Lw dB	Q	$4 \text{ pie } \times r^2$	4/RC	$Q/4 \text{ pie } r^2$	$(4/RC) + (Q/4 \text{ pie } r^2)$	10*Log	@1.0m from shutters	Transmissi on Loss	Sound Pressure level
Machine 2 Vipros Press	9	80.5	91.5	2	1017.8	0.0002	0.00196	0.0022	-26.55	65.0	20	45
Machine 7	11	73.8	84.8	2	1520.5	0.0002	0.00132	0.0016	-28.06	56.7	20	36.7
Machine 4 Guillotine front	12	84.2	95.2	2	1809.5	0.0002	0.00111	0.0014	-28.68	66.5	20	46.5
Machine 4 Guillotine rear	18	90.9	101.9	2	4071.4	0.0002	0.00049	0.0007	-31.31	70.6	20	50.6
Machine 5 Edwards Press	23	83.6	94.6	2	6647.4	0.0002	0.00030	0.0005	-32.6	62.0	20	42
Machine 1 Rollformer Dispatch	24	83.8	94.8	2	7238.0	0.0002	0.00028	0.0005	-32.8	62.0	20	42
Machine 1 & 3 Rollformer Operative & Amada Press	29	82.9	93.9	2	10568.0	0.0002	0.00019	0.0004	-33.58	60.3	20	40.3
Machine 6 Elumatic SBZ140	63	88.8	99.8	2	49874.5	0.0002	0.00004	0.0003	-35.39	64.4	20	44.4
Calculated Sound Pressure Level 1.0m from Factory Façade Externally.												54.2



PROPOSED FACTORY FLOOR LAYOUT & DISTANCES



CALCULATED LEVELS EMANATING FROM INTERNAL SOUND SOURCES

4.2 External Noise Sources

Source	Noise Level	Lw dB
Front of Fan	95	106
Rear of Fan	99	110
Rear of Small Fan	82	93
Rear of Small Fan All On	83	94
Metal Bin*	84	95
Compactor*	80	91

*Both the Metal Bin and compactor operations are subject to time corrections as these are not in continuous use.

4.2.1 Metal Bin

The 4 proposed metal bins to be located within the external yard include Aluminium, Steel, Painted and Extrusion.

Bin Type	Emptying Cycle	Time of Operation
Aluminium	Once a Day	2 minutes Maximum
Steel	Every 2 – 3 Days	2 minutes Maximum
Painted	Every 2 – 3 Days	2 minutes Maximum
Extrusion	Every 2 – 3 Days	2 minutes Maximum

Therefore, the following time corrections have been calculated.

Total Operational Time 2 min = 120 seconds

Time = 120 seconds x 4 bins = 480 seconds out of a 16 hour day 07:00 - 23:00 (57600 seconds)

$10 \times \log_{10} (480/57,600) = -20.8 \text{ dB}$ $= 84 - 20.8 = 63.2 \text{ dB}$

Alternative Calculation

$L_{Aeq,T} = 10 \times \log_{10} \left[\frac{480 \times 10^{(84/10)}}{57,600} \right] = 63.2 \text{ dB}$

The CADNA A calculation demonstrates a resultant noise level at 1.0m from the Bins of **63.2 dB(A)**.

The above external noise levels have been created on the following CADNA A 3D model in order to generate calculated noise levels at the nearest affected noise sensitive premises.



4.2.2 Compactor

The proposed compactor is to be located within the external yard.

Name of Plant	Emptying Cycle	Time of Operation
Compactor	Once a Day	10 minutes Maximum

Therefore, the following time corrections have been calculated.

Total Operational Time 10 min = 600 seconds

Time = 600 seconds out of a 16 hour day 07:00 - 23:00 (57600 seconds)

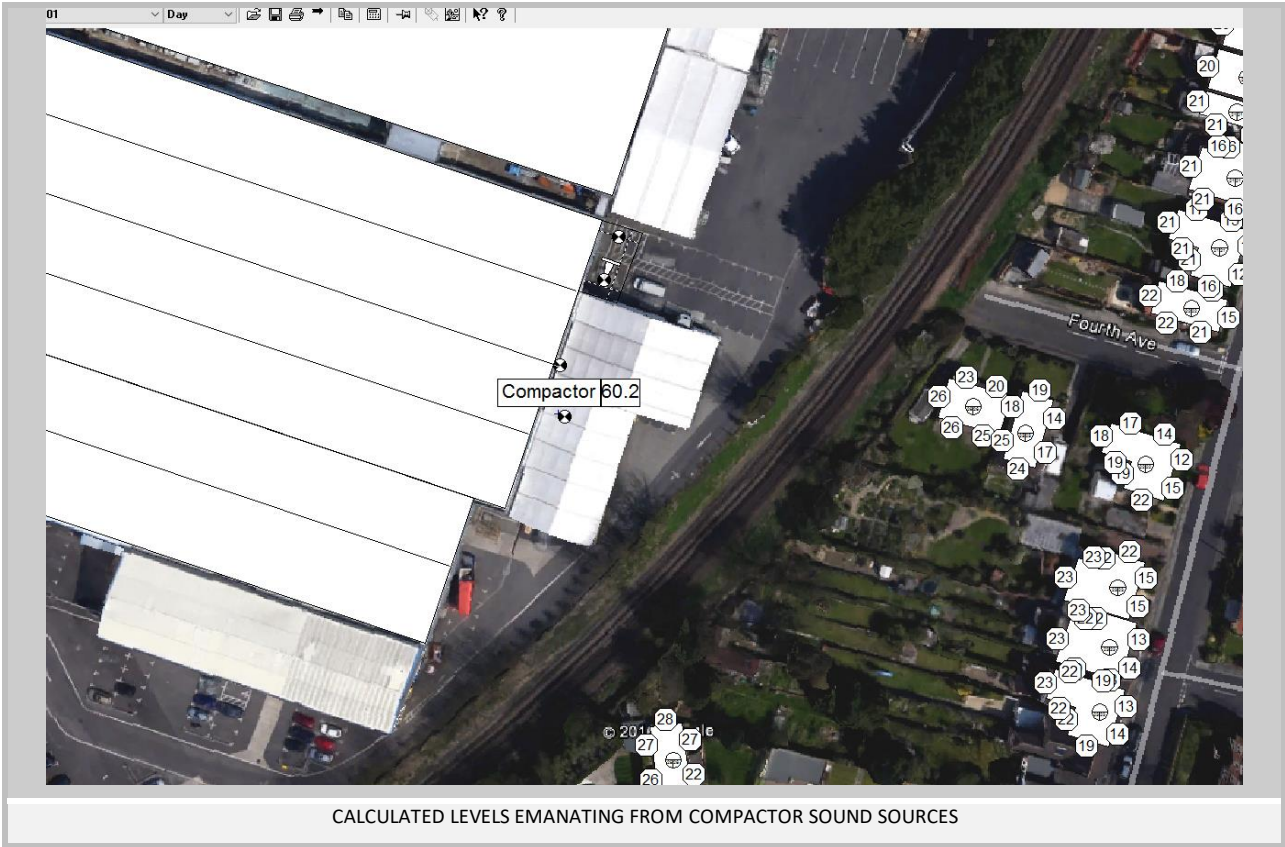
$10 \times \text{Log}_{10} (600/57,600) = -19.8 \text{ dB}$ = $80 - 19.8 = 60.2 \text{ dB}$

Alternative Calculation

$\text{LAeq,T} = 10 \times \text{Log}_{10} \left[\frac{600 \times 10^{(80/10)}}{57,600} \right] = 60.2 \text{ dB}$

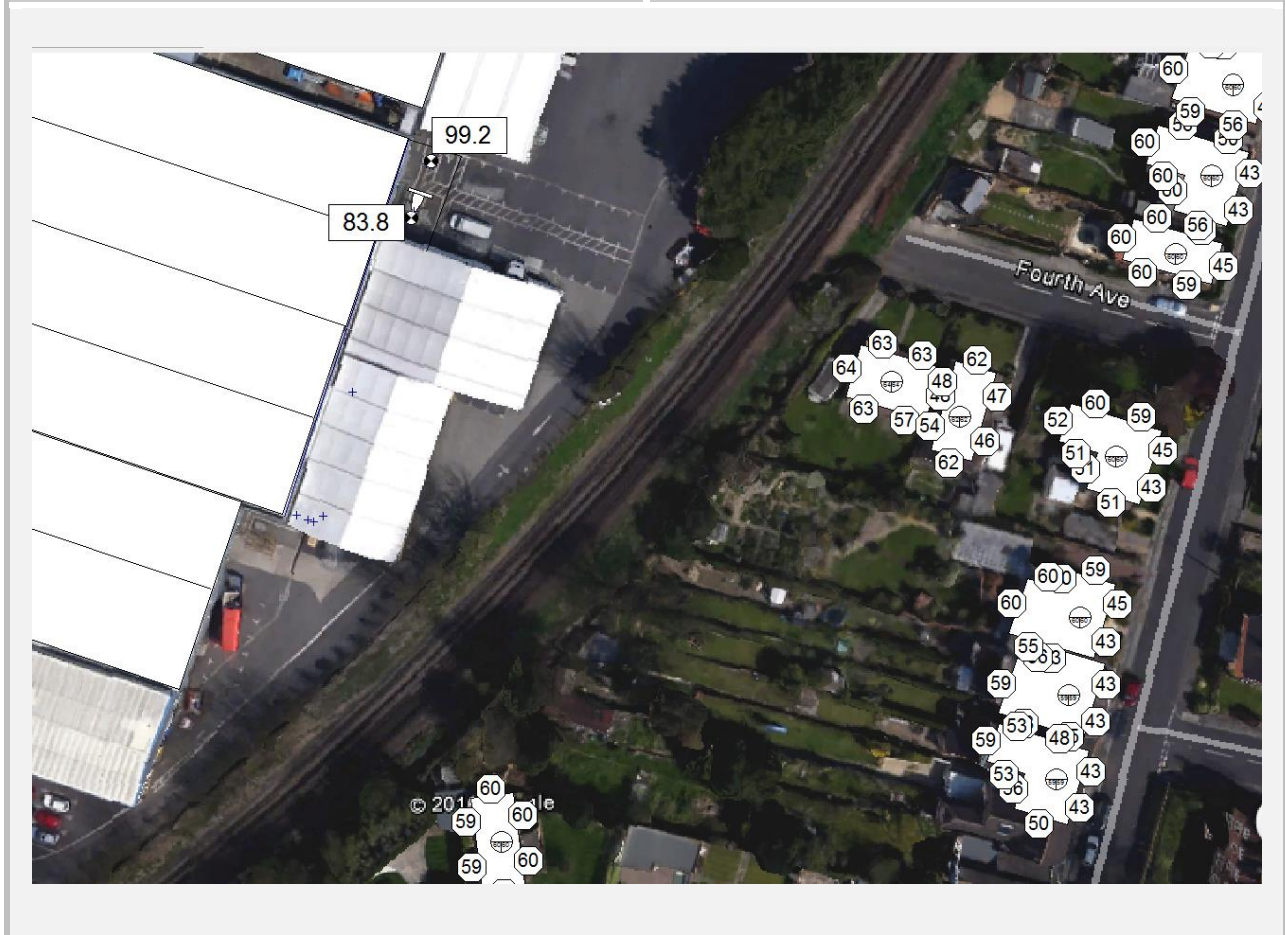
The CADNA A calculation demonstrates a resultant noise level at 1.0m from the Bins of **60.2 dB(A)**.

The above external noise levels have been created on the following CADNA A 3D model in order to generate calculated noise levels at the nearest affected noise sensitive premises.



4.3 Combined Noise Sources at Residential

Source	dB(A) @ Nearest Residential
Internal Noise Sources	33
Metal Bin	34
Compactor	28
External Noise Sources (Untreated Acoustically)	64



The above demonstrates that further remedial acoustic works are required.

5 BS4142:2014 NOISE ASSESSMENT

5.1 Scope of British Standard 4142:2014

In the assessment of the existing surrounding commercial premises, consideration has been given to the scope of British Standard 4142:2014, which in section 1, details applicability of this standard to rating assessing sound of an industrial and/or commercial nature. It is considered appropriate that both the background noise levels and the rating noise levels obtained fall within the scope of British Standard 4142:2014 by using outdoor sound levels to assess the effect of sound on local residents.

5.2 Terms and Definitions

Symbol	Term	Definition
AP	Assessment Position	Position externally at the façade property under investigation at which the assessment is undertaken which is usually 1m from the 1 st floor bedroom window.
EP	Equivalent Position	Position at which the background noise levels are measured if there is no access to the assessment position or if source under investigation is audible.
$L_s = L_{Aeq, T}$	Specific Level	The average continuous equivalent sound pressure level of the source at the assessment position.
$L_{Ar, Tr}$	Rating Level	The average continuous equivalent sound pressure level of the source at the assessment position with a correction to account for the characteristic features.
$L_r = L_{Aeq, T}$	Residual Level	The average continuous equivalent sound pressure level at the assessment position without the source operating.
$L_{A90, T}$	Background Level	The sound pressure level that is not exceeded 90% of the time at the assessment position.
$L_a = L_{Aeq, T}$	Ambient Level	The totally encompassing sound at the assessment position including the residual and specific noise.

5.3 Assessment Position

The assessment position was established as the residential properties to the south and east of the site.

5.4 Calculations

The specific noise levels are calculated at the assessment position located at the residential property above the site using the calculations detailed within ISO 9613 Part 1 and 2: 1996. These calculations take the manufacturers sound power levels into account for a variety of factors including source directivity, distance, atmospheric absorption, ground absorption and the effects of any barriers and determine the resultant noise levels at the assessment position.

5.5 Rating Levels (Character Correction)

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142:2014. There are 3 methods for approaching this.

- a) Subjective method
- b) Objective method (for tonality)
- c) Reference method

5.6 Subjective Method

The subjective method establishes a rating penalty that is added to the specific noise level if any of the following is present at the assessment position. If a tone is expected to be present a character correction of 0 dB to 6 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6

If the source is expected to be impulsive a character correction of 0 dB to 9 dB is added depending on how perceptible it is at noise sensitive locations.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just perceptible	+3
	Clearly perceptible	+6
	Highly perceptible	+9

When the sound features are neither tonal nor impulsive, a character correction of +3 is added for the readily distinctive quality against the acoustic environment or for the intermittency of the source.

BS4142:2014 – Section 9.2 Subjective Method	Perceptibility to noise sensitive facades	Correction
Readily Distinctive	Is not present	+0
	Is present	+3
Intermittency	Is not present	+0
	Is present	+3

5.7 Assessment Criterion

The significance of the resulting noise on the residential property depends on the margin by which it exceeds the background noise levels. British Standard 4142: 2014 provides the following guidance within section 11.

Difference	Assessment of Impact
+10 dB	Indication of a significant adverse impact
+5 dB	Indication of an adverse impact
+0 dB	Indication of low impact

5.8 Noise Meter Floor

BS 4142: 2014 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

5.9 BS 4142: 2014 Penalties

Whilst BS 4142: 2014 allows receptor assessments to made to achieve levels equal to prevailing background noise levels, it also ensures that appropriate and more stringent penalties are applied to the specific noise level to ensure the correct level of protection for the local residents.

5.10 Assessments

5.10.1 Daytime (07:00 – 23:00) INTERNAL OPERATIONS – DOORS CLOSED

Rating Industrial Noise affecting Mixed Industrial and Residential Areas			
Source	Operating Times		Source Position
	07:00 to 23:00		See Plans
	7 days per week		
	Worst case scenario		
Assessment Position	Kenwood Business Park, New Lane		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	33 dB	7	Calculated using ISO 9613:1996 ^[3] .
Readily Distinctive	+0 dB	8.1	Readily Distinctive Characteristic
Intermittency	+3 dB	8.1	Intermittency Characteristic
Rating Level	36 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	46 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	- 10 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 ^[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	- 10 dB		
Conclusion	The assessment level is below ‘Low Impact’		
Council Criteria	+3 dB		

The above demonstrates that internal noise level operations at worst case scenario, with the doors closed, of -10 dB below background noise and therefore daytime operations are acceptable.

5.10.2 Night Time (23:00 – 07:00) INTERNAL OPERATIONS – DOORS CLOSED

Rating Industrial Noise affecting Mixed Industrial and Residential Areas			
Source	Operating Times		Source Position
	23:00 to 07:00		See Plans
	7 days per week		
	Worst case scenario		
Assessment Position	Kenwood Business Park, New Lane		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	33 dB	7	Calculated using ISO 9613:1996 _[3] .
Readily Distinctive	+0 dB	8.1	Readily Distinctive Characteristic
Intermittency	+3 dB	8.1	Intermittency Characteristic
Rating Level	36 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	35 dB	8.1	Modal Background Noise Level (2300 – 0700)
Assessment Level	+ 1 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 _[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	+ 1 dB		
Conclusion	The assessment level is below ‘Low Impact’		
Council Criteria	+3 dB		

The above demonstrates that internal noise level operations at worst case scenario, with the doors closed, of +1 dB above background noise and therefore night time operations are acceptable.

5.10.3 Daytime (07:00 – 23:00) INTERNAL & EXTERNAL OPERATIONS

Rating Industrial Noise affecting Mixed Industrial and Residential Areas			
Source	Operating Times		Source Position
	07:00 to 23:00		See Plans
	7 days per week		
	Worst case scenario		
Assessment Position	Kenwood Business Park, New Lane		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	64 dB	7	Calculated using ISO 9613:1996 _[3] .
Readily Distinctive	+ 3dB	8.1	Readily Distinctive Characteristic
Tonality	+4 dB	8.1	Clearly Perceivable
Intermittency	+6 dB	8.1	Clearly Perceivable
Rating Level	77 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	46 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	+ 31 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 _[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	+ 31 dB		
Conclusion	The assessment level is below ‘Significant Adverse Impact’		
Council Criteria	+3 dB		

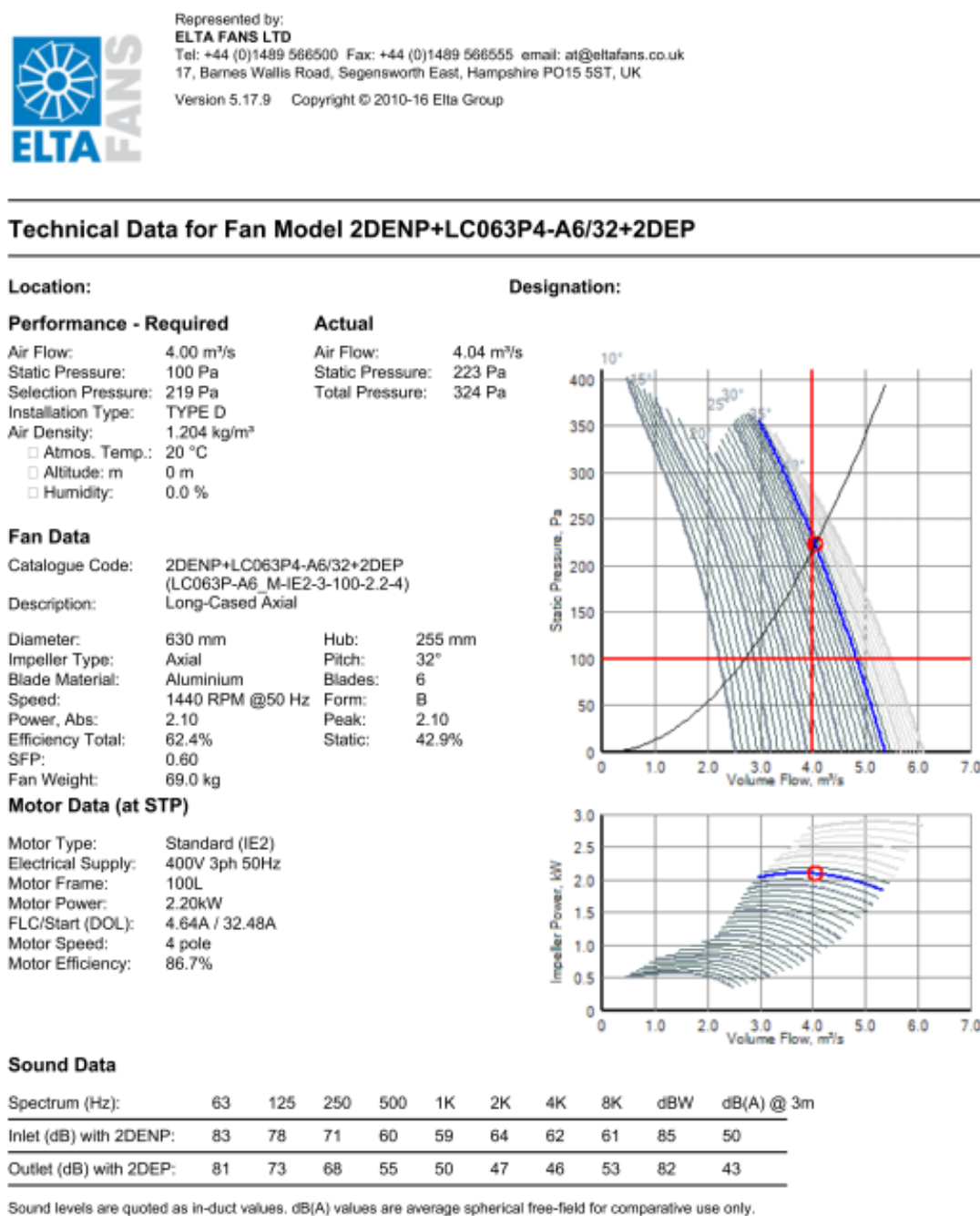
The above demonstrates that internal and external noise level operations at worst case scenario, with the doors closed, of +31 dB above background noise and therefore daytime operations would not be acceptable without mitigation measures in place.

Therefore, the following recommendations are made in order to mitigate against these values.

6 RECOMMENDATIONS

6.1 Proposed New Fans

A proposal has been made to replace the existing 4 no. fans with 6 no. smaller fans capable of delivering the same velocity to the test rig. Details of these fans are as follows.



PROPOSED FAN UNITS

The above unit therefore equates to an inlet sound power level of 70.3 dB(A) and an extract level of 62.6 dB(A) at the attenuator. However, the casing breakout must also be considered and is included within the following calculations.

In addition, the casing breakout has been confirmed as:-

Standard 3mm Steel Casing									
Octave Band Centre Frequency (Hz)									
63	125	250	500	1.0k	2.0k	4.0k	8.0k	dB(w)	dB(A) @ 3m
84	75	67	61	57	50	41	40	64	44

However, if required this can be upgraded to a 5mm casing with the following breakout values:-

Standard 5mm Steel Casing									
Octave Band Centre Frequency (Hz)									
63	125	250	500	1.0k	2.0k	4.0k	8.0k	dB(w)	dB(A) @ 3m
76	67	58	53	52	46	35	38	57	37

Therefore, based on the information provided by Elta, the following calculations have been carried out:-

6.1.1 3mm Casing Fan

Inlet Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Inlet Fan	78.0	71.0	60.0	59.0	64.0	62.0	61.0	70.3
Attenuator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
End Reflection Loss	-6.0	-2.0	0.0	0.0	0.0	0.0	0.0	
Lw to Lp Conversion	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	
Calculated Discharge Levels	61.0	58.0	49.0	48.0	53.0	51.0	50.0	58.5
Calculated Level at Residential	61.0	58.0	49.0	48.0	53.0	51.0	50.0	58.5
Extract Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Extract Fan	73.0	68.0	55.0	50.0	47.0	46.0	53.0	62.6
Attenuator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
End Reflection Loss	-6.0	-2.0	0.0	0.0	0.0	0.0	0.0	
Lw to Lp Conversion	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	
Calculated Discharge Levels	56.0	55.0	44.0	39.0	36.0	35.0	42.0	49.6
Calculated Level at Residential	56.0	55.0	44.0	39.0	36.0	35.0	42.0	24.9
3m Case Breakout	125	250	500	1.0k	2.0k	4.0k	8.0k	Lp dB
Fan Outlet Measured SPL	75.0	67.0	61.0	57.0	50.0	41.0	40.0	64.3
Panel Attenuation	-24.0	-26.0	-31.0	-35.0	-39.0	-42.0	-37.0	
Calculated Discharge Levels	51.0	41.0	30.0	22.0	11.0	-1.0	3.0	37.3
Calculated Level at Residential	51.0	41.0	30.0	22.0	11.0	-1.0	3.0	37.3
	125	250	500	1.0k	2.0k	4.0k	8.0k	Lp dB
Total Noise Level for 1 x fan	62.5	59.8	50.2	48.5	53.1	51.1	50.6	58.5
Total Noise Level for 6 x fans	70.3	67.6	58.0	56.3	60.9	58.9	58.4	66.3

6.1.2 5mm Casing Fan

Inlet Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Inlet Fan	78.0	71.0	60.0	59.0	64.0	62.0	61.0	70.3
Attenuator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
End Reflection Loss	-6.0	-2.0	0.0	0.0	0.0	0.0	0.0	
Lw to Lp Conversion	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	
Calculated Discharge Levels	61.0	58.0	49.0	48.0	53.0	51.0	50.0	58.5
Calculated Level at Residential	61.0	58.0	49.0	48.0	53.0	51.0	50.0	58.5
Extract Side	125	250	500	1.0k	2.0k	4.0k	8.0k	Lw dB
Extract Fan	73.0	68.0	55.0	50.0	47.0	46.0	53.0	62.6
Attenuator	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
End Reflection Loss	-6.0	-2.0	0.0	0.0	0.0	0.0	0.0	
Lw to Lp Conversion	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0	
Calculated Discharge Levels	56.0	55.0	44.0	39.0	36.0	35.0	42.0	49.6
Calculated Level at Residential	56.0	55.0	44.0	39.0	36.0	35.0	42.0	24.9
3m Case Breakout	125	250	500	1.0k	2.0k	4.0k	8.0k	Lp dB
Fan Outlet Measured SPL	67.0	58.0	53.0	52.0	46.0	35.0	38.0	57.2
Panel Attenuation	-24.0	-26.0	-31.0	-35.0	-39.0	-42.0	-37.0	
Calculated Discharge Levels	43.0	32.0	22.0	17.0	7.0	-7.0	1.0	29.2
Calculated Level at Residential	43.0	32.0	22.0	17.0	7.0	-7.0	1.0	29.2
	125	250	500	1.0k	2.0k	4.0k	8.0k	Lp dB
Total Noise Level for 1 x fan	62.2	59.8	50.2	48.5	53.1	51.1	50.6	58.5
Total Noise Level for 6 x fans	70.0	67.6	58.0	56.3	60.9	58.9	58.4	66.3

The above demonstrates that the increase in fan casing thickness will have no effect on the outcome of these calculations and therefore the standard 3mm casing should be adopted.

With the above recommended attenuators fitted to the new proposed fans, the following values could be expected:-



The above model demonstrates that the proposed new fan units would be acceptable provided the manufacturers attenuators were fitted and a standard 3mm casing applied to the fan unit itself.

6.2 Other Noise Sources

With regards to staff arriving and departing, deliveries and folk lift movement it is advised that the proposed user operated battery powered folk lift trucks. With regards to these additional noise sources it should be noted that the site units were operational before and have been permitted for this type of commercial use. The neighbouring commercial premises operate a large number of lorries and movements throughout the day. The Calculation of Road Traffic Noise (CRTN) suggests that in order to influence a noticeable change in noise levels a 20% increase in vehicular movement would be required. Given the number of commercial units already in operation at this site and the fact that the one-way system is in place for all units in this park, the probability of Colt International creating a 20% is unrealistic and therefore the traffic noise increase in noise levels and chance of complaint as a direct result is 'Low'.

6.3 Other Recommendations

It is suggested that automatic door closers are fitted to all roller shutter doors in order to ensure that noise breakout from the production plant is kept to a minimum

It is also suggested that the existing folk lift trucks be fitted with quiet reversing alarms which change from the normal 'Beeping' to a more acceptable 'Hissing' sound.

6.3.1 Daytime (07:00 – 23:00) INTERNAL & EXTERNAL OPERATIONS WITH NEW FANS

Rating Industrial Noise affecting Mixed Industrial and Residential Areas			
Source	Operating Times		Source Position
	07:00 to 23:00		See Plans
	7 days per week		
	Worst case scenario		
Assessment Position	Kenwood Business Park, New Lane		
Background Position	At the assessment position		
Item	Calculation	Clause	Commentary
Specific Noise Level $L_{Aeq,1\text{ hour}}$	38 dB	7	Calculated using ISO 9613:1996 _[3] .
Tonality	+2 dB	8.1	Clearly Perceivable
Intermittency	+3 dB	8.1	Clearly Perceivable
Rating Level	43 dB	9.1	The acoustic feature correction is added to the specific noise level
Background Noise Level $L_{A90,1\text{ hour}}$	46 dB	8.1	Modal Background Noise Level (0700 – 2300)
Assessment Level	-3 dB	11	The background level is subtracted from the rating level.
Conclusion BS 4142:2014 _[1]	+10 dB Significant Adverse Effects, +5 dB Adverse Effects, +0 dB Low Impact		
Assessment	-3 dB		
Conclusion	The assessment level is below ‘Significant Adverse Impact’		
Council Criteria	+3 dB		

The replacement fan with attenuators would be the most effective from an acoustic, aesthetic and cost perspective.

7 NPPF & NPSE

The National Planning Policy Framework 2012 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraph 123 of the National Planning Policy Framework (NPPF) states the following:

Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With the proposed fans installed with attenuators, and taking into account all internal and external source sources, as detailed within this report, the development can be operated within the guidelines of the aforementioned documents and ensure a development conclusion of **NOEL – No Observed Effect Level**. This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

8 CONCLUSIONS

8.1 Summary of Report

8.1.1 Measured Background Noise Levels

Continuous background noise measurements were undertaken between 3rd – 6th October 2016 at the Assessment Position 1. The modal 1-hour day time background noise levels between 07:00 and 23:00 was found to be $L_{A90,1 \text{ hour}}$ 46dB at the assessment position and $L_{A90,1 \text{ hour}}$ 35 dB during night time hours 23:00 – 07:00

Assessment Position	LA90 (Modal)	LA90 (Modal)
	Day	Night
	(07:00 – 23:00)	(23:00 – 07:00)
1	46 dB	35 dB

Calculations and assessments made within this report have identified that it will be necessary to introduce new fans to the external test rig as well as automatic closers on the roller shutter doors facing the residential as well as quiet reversing beepers which give a hiss rather than a beep.

The replacement fan with attenuators would be the most effective from an acoustic, aesthetic and cost perspective.

Assessments have concluded that the internal operations can operate during both daytime and night time periods and that external operations should be limited to daytime periods.

With the above recommendations in place the proposed development can operate within the requirements of BS 4142: 2014 and local council's requirement of +3 dB and therefore planning permission can be granted.