

Our Ref: 26-16285 - Unit 7, Langstone Technology Park, Langstone Road, Havant,
Hampshire, PO9 1SA - Technical Note - Mitigation Calculations of Extraction Fans

Subject: Mitigation Calculations of Extraction Fans

Introduction

This Technical Note has been prepared to summarise the acoustic assessment undertaken for the proposed mitigation strategy serving **Unit 7, Langstone Technology Park, Langstone Road, Havant, Hampshire, PO9 1SA**.

The proposal (Planning Application Reference APP/25/01040) comprises the fit-out of an existing industrial unit incorporating three extraction fans. In addition, seven external air conditioning units are proposed at the ground floor level. The mechanical plant is intended to operate between 0900 and 1700 hours, Monday to Friday.

This Technical Note considers the noise emissions from the three extraction fans once mitigated.

Plant Noise Level

The sound power levels of the extraction fans have been obtained from the manufacturer's technical data supplied by the client. The available data provides overall A-weighted sound power levels only, as summarised in *Table 1*.

Plant Reference	Quoted Sound Power Level L_{WA} (dB)	Additional Information
TES AL-750	84	5.5kW, 3 phase, 2 pole extraction fan.
TES AL-550	81	4kW, 3 phase, 2 pole extraction fan.

Table 1: Manufacturers' Fan Noise Levels

The manufacturer has not provided octave-band sound power data for the extraction fans. Accordingly, representative octave-band spectra have been derived based on the type, size and power rating of each fan, whilst maintaining the manufacturer's quoted overall A-weighted sound power levels. The derived spectra are considered representative of centrifugal extraction fans of this size and duty and are therefore suitable for the purposes of this acoustic assessment.

Plant Reference	Octave Band Plant Noise Levels (HZ)							
	65	125	250	500	1k	2k	4k	8k
TES AL-750	65	70	76	81	82	79	73	67
TES AL-550	62	67	73	78	79	76	70	64

Table 2: Derived Octave Band Sound Power Levels

Insertion Loss of Selected Silencer

To mitigate noise emissions from the extraction system, the client has selected an in-line attenuator described by the manufacturer as a 400 mm/500 mm diameter × 900 mm long silencer with 100 mm acoustic infill.

The manufacturer's published insertion loss values are presented in *Table 3*.

Insertion Loss (dB) for Centre Frequency (HZ)							
65	125	250	500	1k	2k	4k	8k
3	7	12	20	35	34	27	20

Table 3: Manufacturers' Insertion Loss Values

Plant Noise Level

The mitigated sound power levels have been converted to free-field sound pressure levels at a reference distance of 1 metre from the discharge point.

For the two AL-750 extraction fans, a +3 dB correction has been applied to account for the simultaneous operation of two identical units.

Distance attenuation has subsequently been applied to predict noise levels at the nearest identified noise-sensitive receptors.

A further attenuation of 23 dB has been applied to account for losses associated with the ductwork and silencer arrangement.

The combined total noise level includes the calculated noise levels of all other units from the original assessment.

The resulting predicted external plant noise levels are presented in *Table 4*.

	Noise-Sensitive Receptors	
	NSR 1	NSR 2
	Ocean Scientific International Ltd	11 Brookmead Way
AL-750		
Sound Pressure Level at 1m from the end of the duct (L_{Aeq} dB)	76	
Correction for additional unit (dB)	+ 3	
Distance to Nearest Habitable Room Window (approx.)	30 m	100 m
Distance Correction (dB)	- 30	- 40
Loss from Ducting (dB)	- 23	
Predicted Noise Level at Receptor (L_{Aeq} dB)	26	16
AL-550		
Sound Pressure Level at 1m from the end of the duct (L_{Aeq} dB)	73	
Distance to Nearest Habitable Room Window (approx.)	30 m	100 m
Distance Correction (dB)	- 30	- 40
Loss from Ducting (dB)	- 23	
Predicted Noise Level at Receptor (L_{Aeq} dB)	20	10
Combined Total Noise Level		
Predicted Total Noise Level at Receptor (L_{Aeq} dB)	41	42

Table 4: Predicted Mitigated Plant Noise Levels

BS4142 Assessment

Table 5 below summarises the BS 4142 assessment procedure carried out for the site. The aim is to meet the requirements of the Local Authority, which is to be equal to the background noise level.

The EHO made comments regarding the Acoustic Correction Features. In the original assessment, the corrections were applied on a precautionary basis to represent a robust worst-case scenario.

Given the separation distance between the plant and the nearest noise-sensitive receptor, together with the screening and propagation losses present, it is considered unlikely that any impulsive, tonal or low-frequency characteristics would be readily perceptible at the receptor location.

As such, the applied penalties are considered conservative and are likely to overestimate, rather than underestimate, the potential impact.

In the interest of a worst-case assessment, we have used the same correction features applied in our original assessment.

Results	Nearest Noise Sensitive Receptor (NSR1)	Nearest Noise Sensitive Receptor (NSR2)	Relevant Clauses of BS 4142:2014	Commentary
Measured Ambient Sound Level	52		7.3.2	Refer to Table 5.1
Residual Sound Level	52		7.3.3	<i>The ambient noise level without the plant operating.</i> Refer to Table 5.1
Typical Background Sound Level L _{A90} (dB)	48		8.1, 8.2	Refer to Table 5.1
Specific Sound Level	41	42	9.1, 9.2	Refer to Table 6.2
Acoustic Feature Correction	+ 6		9.2	Refer to Section 6.1.1
Rating Level L _{Ar} (dB)	47	48	9.1	Specific Sound Level + Acoustic Feature Correction
Excess of Rating over Background Sound Level	- 1	0	11	
	Assessment indicates a likelihood of adverse impact	Assessment indicates a likelihood of adverse impact	11	
Achievement of Local Authority Criteria	Yes	Yes	n/a	Equal to L _{A90}

Table 5: BS 4142 Assessment (with mitigation)

Conclusion

Based on the manufacturer's published sound power data and the proposed silencer performance, the predicted noise levels from the extraction system are low at both identified receptors.

The assessment demonstrates that the proposed silencer provides significant attenuation of the extraction fan noise and is expected to reduce plant noise emissions to levels that are unlikely to adversely affect nearby noise-sensitive receptors during the proposed daytime operating period.

Written & approved by:

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Stephen Hale is a full member of the Institute of Acoustics (MIOA) and holds a Bachelor of Science degree in Sound Engineering with honours, backed by a decade of experience in the field of acoustics.

Specialising in environmental noise measurement, Stephen excels in providing expert acoustic consultancy services for residential and mixed-use planning applications, managing plant noise for large-scale industrial projects, and contributing to the innovative design of music studios.

Additionally, Stephen offers valuable expertise in sound insulation testing and design advisory.