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Dear Suzanne

MOUNTIES CARPARK PLANT ROOMS MECHANICAL PLANT EXTERNAL NOISE EMISSION

1 INTRODUCTION

Acoustic Dynamics is engaged by Paynter Dixon on behalf of Mounties Group to prepare an assessment of mechanical noise emission associated with the use and operation of the proposed car park supply and exhaust plant rooms located within the Mount Pritchard & District Community Club ("Mounties") located at 101 Meadows Road, Mount Pritchard in NSW.

This document provides a technical assessment of external mechanical noise emissions and provides recommendations for attenuation measures to achieve the relevant acoustic requirements of Fairfield City Council, the NSW Environment Protection Authority, and relevant Australian Standards.

2 **RELEVANT ACOUSTIC CRITERIA AND STANDARDS**

Responsibility for the control of commercial noise emission at the subject development site is vested in the Local Council. Guidelines for the assessment of environmental noise are contained within the EPA's Industrial Noise Policy (INP). In addition to these guidelines, some Councils have specific noise criteria, against which, certain noise sources must be assessed.

In section 2 of this document, we explain acoustic terms and symbols used to describe noise. The origin and applicability of each acoustic criterion is set out. Detail of the relevant applicable noise criteria is also provided.

2.1 **Noise Descriptors and Definitions**

Noise is a variation in sound pressure at audible frequencies. In addition to such rapid frequency variations, the overall level of noise almost always varies with time. To



describe a noise environment, more than one descriptor is necessary to show both a level and how the noise ranges about that level.

By sampling sound levels at a measurement location eight times per second, a great deal of data is generated. To reduce that data to useful information, the levels exceeded for different percentages of the total period are calculated. The statistical descriptor L_{A10} measures the A-weighted noise level exceeded for 10% of the sample time. The statistical values measured for this noise survey are the L_{A10} and L_{A90} noise levels. Also measured and assessed are L_{Aeq} noise levels.

The "A-weighting" refers to a prescribed amplitude versus frequency curve used to "weight" noise measurements, to represent the frequency response of the human ear. Put more simply, the human ear is less sensitive to noise at some frequencies than it is to noise at other frequencies. The A-weighting is an attempt to measure a result with a single overall number to represent how we subjectively hear different frequencies at different levels.

2.2 Audibility, Identification and Annoyance

It is important to realise that the acceptability of a given noise depends on both its character and the character of the background sound. The **many parameters** that **influence noise character** also influence how identifiable, audible and of course, annoying is the noise under investigation. It is often unstated that the number marking the marginal difference at the acceptable/unacceptable boundary depends a great deal on noise character (as well as which descriptors are used, as described in section 3.1).

In this assessment, Acoustic Dynamics considers the character of the noise under investigation which is compared against the character of the background noise. A trained professional's judgement is required to assess audibility, identifiability and the potential for annoyance. Assessment is made using the measured objective noise descriptors together with descriptions of both the noise under investigation and the background noise character.

2.3 Relevant Fairfield Council Noise Criteria & Requirements

A review of the Fairfield City Council Local Environment Plan (LEP) 2013 and Development Control Plan (DCP) 2013 was conducted. No relevant acoustic requirements and relevant noise criteria were presented within the LEP or DCP. Acoustic Dynamics understands Fairfield City Council adopts the various acoustic criteria outlined within the EPA's INP for the assessment of noise emission from such premises, detailed in section 2.4 below.

2.4 NSW EPA's Environmental Noise Criteria

2.4.1 The EPA's INP

The EPA, in its Industrial Noise Policy (INP) document published in January 2000, outlines and establishes noise criteria for industrial or other noise sources in various zoning areas.



Following the general procedures outlined in the EPA's INP, the following noise criteria have been previously established for potentially affected residences surrounding the subject development (refer to Acoustic Dynamics report 3080L001.AB.120605).

Location	Time of Day	IntrusiveAmenityLAeq(15minute)SoundLAeq(period)Criterion [dB]Level [dB]		Applicable Noise Criterion [dB]	
Boundary of nearest residential receivers	Day (7am to 6pm) ¹	44	51	44	
	Evening (6pm to 10pm)	47	45	45	
	Night (10pm to 7am)	44	42	42	

Table 2.4.1 Summary of Applicable Noise Criteria

Note: 1) 8am to 6pm on Sundays and public holidays

3 MECHANICAL NOISE EMISSION AT RESIDENCES

Acoustic Dynamics has been provided with the acoustic specifications of the proposed supply and exhaust fans to be installed within each level plant room to service the proposed multi-level car park. The octave band sound power levels of the proposed supply and exhaust fans are presented in **Table 3.1** below.

Table 3.1 Summary of Noise Emission Sources

Description	Measurement Description	Measured L _{Aeq} Noise Emission Spectrum [dB] (Octave Band Centre Frequencies in Hz)								
		63	125	250	500	1K	2K	4K	8K	O/A
Supply Fans										
Basement 1 Supply Fan – Fantech 33LDW		86	89	89	89	87	79	75	68	95
Basement 2 Supply Fan – Fantech 40LDW	In-duct Sound Power Level	88	91	91	91	89	81	77	70	97
Basement 3 Supply Fan – Fantech 36LDW		86	89	89	89	87	79	75	68	95
Exhaust Fans										
Basement 1 Exhaust Fan – Fantech 49LDW		91	94	93	93	91	83	80	72	100
Basement 2 Exhaust Fan – Fantech 49LDW	In-duct Sound Power Level	86	89	89	89	87	79	75	68	95
Basement 3 Exhaust Fan – Fantech 44LDW		84	87	87	87	85	77	73	66	93



Based on operation of the information provided by the client regarding the make and models of the car park supply and exhaust fans, Acoustic Dynamics has calculated the resulting mechanical noise emission at nearby residences as shown below in **Table 3.2**.

Acoustic Dynamics understands that the location of each item of mechanical plant is as follows:

- Supply Fan Plant Rooms (Northern corner of car park):
 - Basement Level 1 Supply Fantech 33LDW;
 - Basement Level 2 Supply Fantech 40LDW; and
 - Basement Level 3 Supply Fantech 36LDW.
- Exhaust Fan Plant Rooms (Western corner of car park):
 - Basement Level 1 Exhaust Fantech 49LDW;
 - Basement Level 2 Exhaust Fantech 49LDW; and
 - Basement Level 3 Exhaust Fantech 44LDW.

Each supply and exhaust fan has an individual duct which connects the fan located on each level to the ground level plant room. The north-western facade of each ground level plant room will consist of a louvre to allow air flow to the fans.

The above locations are shown in **Appendix A** attached. The noise emission results in **Table 3.2** below take into account the location of each item, acoustic benefits gained from the plant room, ductwork and distance loss and the recommendations in section 4 below.

Plant Room	Location	EPA Night-time L _{Aeq} Noise Criterion [dB]	Calculated L _{Aeq} Noise Emission [dB]	Achieves EPA Criterion?
Northern Plant Room – Supply Fans	Boundary of nearest	40	<35	Yes
Western Plant Room – Exhaust Fans	residential receivers	42	<35	Yes

Table 3.2 Predicted Mechanical Noise Emission at Residences

Acoustic Dynamics understands the car park supply and exhaust fans may operate, as required, 24 hours a day, 7 days a week.

Acoustic Dynamics advises that compliance with the more stringent night-time criteria will ensure compliance with the less stringent daytime and evening criteria.

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4 **RECOMMENDATIONS**

Further to the above, Acoustic Dynamics recommends the following noise mitigation treatment be incorporated in the design of the various items of mechanical plant to ensure compliance with the various noise emission criteria.

Supply Fans – Fantech 33LDW, Fantech 40LDW and Fantech 36LDW

The intake ductwork servicing the three supply fans must incorporate the following:

 Minimum 2 metres of rectangular duct lined with 50mm thick **polyester** acoustic insulation (Tontine TSB2 or equivalent);

<u>AND</u>

• Two 90 degree elbows lined with 50mm thick **polyester** acoustic insulation (Tontine TSB2 or equivalent).

Exhaust Fans – Fantech 49LDW, Fantech 49LDW and Fantech 44LDW

The exhaust ductwork servicing the three exhaust fans must incorporate the following:

 Minimum 2 metres of rectangular duct lined with 50mm thick **polyester** acoustic insulation (Tontine TSB2 or equivalent);

<u>AND</u>

• Two 90 degree elbows lined with 50mm thick **polyester** acoustic insulation (Tontine TSB2 or equivalent).

Ground Level Supply and Exhaust Plant Rooms

Louvres

- The louvres are to be located on the following facades:
 - Supply Fan Plant Room South-eastern or south-western facade facing the car park;
 - Exhaust Fan Plant Room North-eastern facade facing the car park;
- Calculations are indicative that weather louvres will be sufficient to reduce noise emission from the plant room to complying levels. If required, acoustic louvres can be incorporated at a later date.

AND



 All other walls and ceilings are to be constructed of masonry or concrete block work with no gaps or penetrations which could reduce the acoustic performance of the structure.

5 CONCLUSION

Acoustic Dynamics has conducted an acoustic assessment of noise emission associated with the use and operation of the mechanical plant located within the car park plant rooms at the Mount Pritchard & District Community Club located at 101 Meadows Road, Mount Pritchard, NSW.

Acoustic Opinion

Acoustic Dynamics' measurements and calculations indicate noise emission associated with the use and operation of all mechanical plant will achieve compliance with the requirements of Fairfield City Council and the NSW Environment Protection Authority when assessed at the boundary of the nearest residential receiver locations, following incorporation of the recommendations detailed in section 4.

We trust that the above information meets with your requirements and expectations. Please do not hesitate to contact us on 02 9908 1270 should you require more information.

Kind Regards ACOUSTIC DYNAMICS

CHRIS GORDON

Document	Revision	Date	Prepared	Checked	Approved
3107L005.CG.141013	Revision 0	16 October 2014	CG	RH	ll



APPENDIX A – LOCATION MAPS & DRAWINGS

A.1 LOCATION MAP



A.2 AERIAL PHOTO



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A.3 PLANS





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Site Plan

Ground Floor Plan

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Car Park Level 2 Plan

Car Park Sections 1 and 2

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Entry Foyer Section & Detail