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## Memo

**Date** 20 December 2013  
**To** Andy Pittlik  
**Copy** Paul GreenHalgh  
**From** Aaron McKenzie  
**Ref** 2162434B-ENV-MEM-001 RevA  
**Subject** Wellington Power Project - C-weighting noise analysis of Siemens 4000F units

### 1. Introduction

Parsons Brinckerhoff Australia Pty Ltd (Parsons Brinckerhoff) has been engaged by ERM power to provide a comparative assessment of A and C-weighted noise impacts predicted for operation of Siemens 4000F Gas Turbine Units at the proposed Wellington open-cycle gas-fired power station (the power station).

This memo has been prepared with reference to the Environmental Assessment; *Wellington Gas-fired Peaking Power Station: Environmental Assessment*, (EA, Parsons Brinckerhoff document reference PR\_7345, May 2008), and supplementary noise assessment technical letter; *Wellington power project – noise assessment of Siemens 4000F units*, (Parsons Brinckerhoff document reference LT\_1716, March 2010).

### 2. Low frequency noise criteria

NSW EPA's *Industrial Noise Policy* (NSW INP, 2000) aims to apply correction factors to source noise levels at the receiver to account for additional noise characteristics such as tonality, impulsiveness, intermittency, irregularity and dominant low frequency content anticipated to cause greater annoyance to residential receivers.

Following INP guidance, a 5 dB correction factor is to be applied where predicted C- and A- weighted levels over the same time period differ by 15 dB or greater.

### 3. Assessment of operational noise impacts

Predicted noise impacts from the operation of the 255 MW Siemens 4000F gas-fired turbines modelled for the supplementary noise assessment (LT\_1716, March 2010) are presented in Table 1 below. Noise impacts were determined utilising the SoundPLAN (version 6.5) noise modelling software. Following NSW INP guidance, a correction of +5 dB(A) was added to the exhaust stack and fin fan noise source contributions to account for the low-frequency noise components.

**Table 1 Predicted A-weighted noise impacts for revised two Siemens 4000F gas-fired turbine operations including +5 dB low frequency noise penalty**

Location	Received noise level (dB(A), $L_{Aeq,15min}$ )			
	Neutral conditions	Adverse conditions	Allowable noise contribution	Compliance
1. Mount Nanim	29.5	32	39	Yes
2. Cadonia Subdivision	26	29	35	Yes
3. Keston Rose Garden Cafe	28	31	37	Yes
4. Nanim House	<b>36</b>	<b>37.5</b>	35	<b>No</b>

Source: Table 4-2, Page 3, document: LT\_1716

Note: Noise levels shown to the nearest 0.5 dB(A)

#### 4. A and C weighting model results

To predict the A and C weighted noise levels Parsons Brinckerhoff re-ran the noise model utilising the March 2010 SoundPLAN model files for adverse meteorological conditions. No penalties were applied to any of the sources. The receiver noise impacts were predicted for both the A and C scale noise weightings. A and C weighted results were then compared to determine whether low frequency corrections are to be applied.

Results are presented in Table 2 below. The difference in A and C weighted noise predictions was greater than 15 dB at each of the receivers.

**Table 2 Predicted A- and C-weighted noise impacts for two Siemens 4000F gas-fired turbine operations without +5 dB low frequency noise penalty**

Location	Received noise level (dB(A), $L_{Aeq,15min}$ )	Received noise level (dB(C), $L_{Ceq,15min}$ )	Difference (dB)
	Adverse conditions	Adverse conditions	
1. Mount Nanim	30	46	<b>16</b>
2. Cadonia Subdivision	26.5	42	<b>15.5</b>
3. Keston Rose Garden Cafe	28	44	<b>16</b>
4. Nanim House	34.5	50.5	<b>16</b>

Note: Noise levels shown to the nearest 0.5 dB

## 5. Discussion

Following the approach described in the NSW INP, a +5 dB penalty would be applied to the predicted noise levels at each of the nearest residential receivers as the difference between the A- and C- weighted noise levels were 15 dB or greater.

Yours sincerely



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