Appendix D

Noise comparison study for
Munmorah alternative internal site

Report No 05231-GT-1
Version A

MUNMORAH GAS TURBINE FACILITY

HELIPAD SITE

ADDENDUM NOISE ASSESSMENT

April 2006

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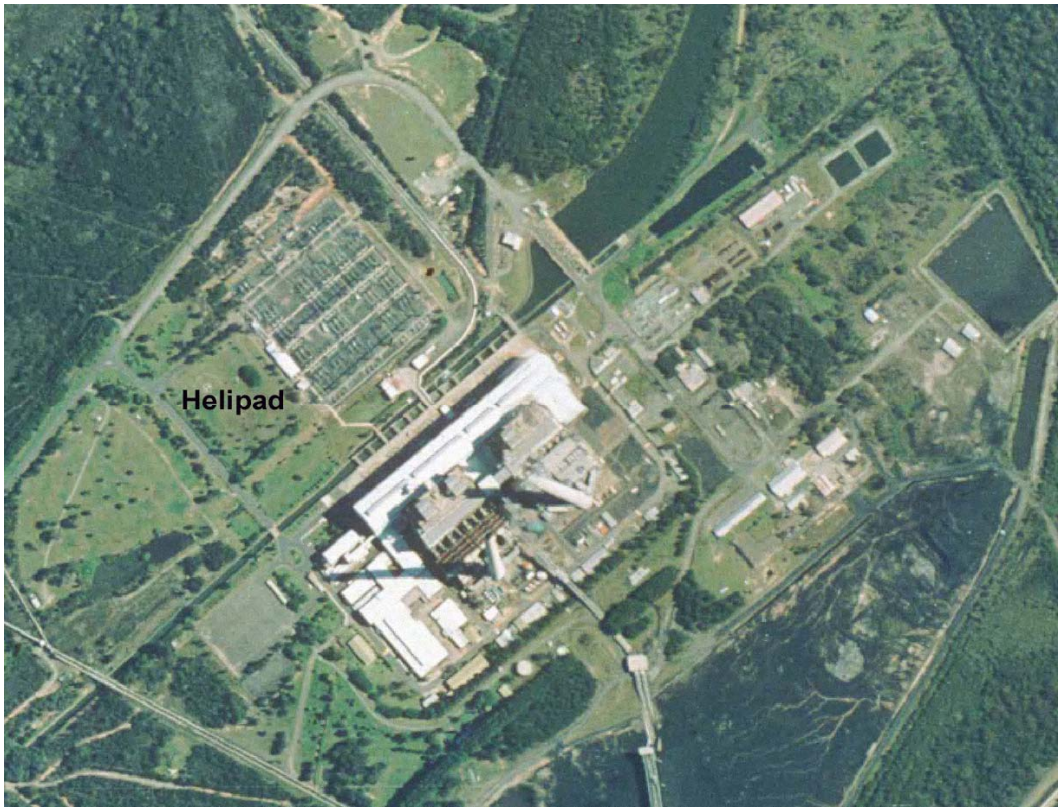
1 INTRODUCTION

Wilkinson Murray was requested to provide an addendum noise assessment of a proposed gas turbine facility to be located on part of the Munmorah Power Station site known as the helipad, north of the existing turbine hall. The assessment procedure is identical to Wilkinson Murray *Report No. 05231-GT Version A, September 2005* which should be referred to in relation to all background data, establishment of criteria and information regarding proposed operations and equipment noise levels. The helipad site is shown in Figure 1-1.

Figure 1-1 Helipad Site for the proposed Gas Turbine Facility



The assessment has been conducted in accordance with the requirements of the *NSW Industrial Noise Policy (INP)* and considered both intrusiveness and amenity. This is necessary as it is proposed that the gas turbines are located on a lot that may be operated independently from the existing facility in the future. For this reason, the noise criteria have needed to address the existing noise levels from the current operations on the site as an existing industrial noise source.

2 ASSESSMENT OF OPERATIONAL NOISE LEVELS

Noise levels were predicted using the software Environmental Noise Model (ENM). This model takes into account geometric spreading, ground effects and shielding provided by topography. It is also capable of predicting noise under differing meteorological conditions.

2.1 Predicted Noise Levels

Table 2-1 summarises the predicted noise levels under neutral and typical adverse (temperature inversion of 3º per 100m) meteorological conditions. Noise level contours showing the $L_{Aeq,15min}$ level are shown in Figure 2-1 (Neutral) and Figure 2-2 (Adverse). This would replace Table 4-1 in the original report.

Table 2-1 Predicted Noise Levels

Noise Catchment Area	Residential Areas	Noise Level Criterion (dBA)	Predicted $L_{Aeq,15min}$ Noise Level (dBA)			
			Neutral		Typical Adverse	
			Heli	Site E	Heli	Site E
A	Lakeside Village	40	23	21	26	23
	Kamillaroo Drive	40	20	19	23	22
B	Sunnylake Caravan Park	37	19	27	21	29
	Macleay Street	37	21	35	24	38
C	Woolana Road	37	33	34	37	37
	Ulana Road	37	35	32	39	35
D	Barega Close	38	32	28	36	31
E	Baker Street (south)	38	29	18	33	21
	Baker Street (north)	38	35	30	41	32
F	Denman Street	38	31	24	34	29

The predicted noise levels in Table 2-1 indicate that under neutral conditions, noise levels for the Helipad site will comply with the criterion.

Under typical adverse metrological conditions, noise levels typically increase by 2-4dBA, however for the Helipad site still achieve the criteria at all Noise Catchment Areas with the exception of the closest residences in Noise Catchment Areas C and E located on Ulana Road and Baker Street (north) respectively.

Noise levels contours for these scenarios are shown in Figure 2-1 and Figure 2-2 respectively. A comparison with the Site E predicted noise levels for neutral conditions show increases at catchments A, D, E and F of 1-11dBA and decreases at Catchment B of 8-14dBA as a function of distance to receivers and possibly the orientation of the intake louvres.

Figure 2-1 Neutral Metrological Conditions

Figure 2-2 Adverse Metrological Conditions

2.2 Statistical Analysis of Potential Noise Impacts Due to Meteorological Effects

More detailed analysis of the worst case adverse meteorological conditions indicate with temperature inversions of 5º per 100m and a wind speed from source to receiver of 3m/s, noise levels a further 2-3dBA higher than shown in Table 2-1 are possible although infrequent.

Since noise levels under worst case adverse meteorological conditions are predicted to exceed the night time intrusiveness criteria at four of the residential receiver areas to the south and west in Noise Catchment Areas C, D and E, it is important to quantify the proportion of time that this may occur to better understand the potential noise impacts.

Generally, the likelihood of concurrent wind speed and wind direction leading to noise levels significantly above the criteria is low. However, this higher degree of affectation can result if prevalent wind conditions dominate in certain directions.

Records of wind speed and direction were obtained for the meteorological station at the site for three years. This data has been processed to determine the likelihood of either wind or temperature inversions affecting the propagation of noise. Taking into account prevalent wind conditions or temperature inversions, statistical modelling was undertaken to determine the proportion of time that exceedances of the relevant criteria could occur in any one season.

A total of 110 separate meteorological condition combinations were considered – wind speeds of 1-3m/s in each of eight directions, and zero wind speed (representing both zero wind and wind speeds above 3m/s) with associated temperature inversions. Noise levels were calculated under each of these conditions, and the probability of occurrence of each wind condition was taken into account to determine the percent of time that noise levels could exceed the relevant criterion.

The results are separated into seasons and tabulated in Table 2-2. Results are provided in percentile bands. The table also shows the proportions of time that meteorological conditions are predicted to give rise to noise levels in excess of the daytime criteria for Scenario 1.

Table 2-2 Proportion of Operating Hours Resulting in Noise Level Exceedance

Receiver	Night $L_{Aeq,15min}$ Criterion (dBA)	Proportion of Time if Turbine Continuous (%)			
		Summer	Autumn	Winter	Spring
C – Woolana Road	37	4	5	11	6
C – Ulana Road	37	15	20	41	26
D – Barega Close	38	1	1	1	1
E – Baker Street (north)	38	31	11	6	21

These proportions assume the Gas Turbine Facility would be operating continuously throughout the night time. However the total time of operation in a year is estimated at 500 hours, with most of these during daytime. The proportion of time of actual use would reduce by a factor of approximately 10, when considering the likely use at night time during the winter season and much higher factors for the other months.

On this basis the percentage of time, exceedances may occur is generally less than 2% and at worst only 4% in winter.

3 CONCLUSION

A simple comparison of data indicated noise levels are higher at most of the residential receiver locations for the Helipad rather than Site E option. The proportion of time exceedances are predicted to occur also increases.

However, the proportion of times is relatively small, even when based on fairly conservative assumptions about the hours of operation of the turbines at the most sensitive night time period.

Although some changes in noise levels at individual receivers are quite significant, overall the difference in potential noise impact for the two options would be considered relatively small with Site E resulting in lower potential noise impacts than the Helipad site.

Version	Status	Date	Prepared by	Checked by
A	Final	10 April 2006	Jimi Ang	Neil Gross