

**VCAT Proceeding Nos P1829/2011 and  
P1846/2011**

**Expert Evidence for Dual Gas Pty Pty  
Ltd**

- Final
- 25<sup>th</sup> September, 2011



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## Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
Draft	23/9/11	P Walsh	P Walsh	23/9/11	Practice Review

## Distribution of copies

Revision	Copy no	Quantity	Issued to

<b>Printed:</b>	26 September 2011
<b>Last saved:</b>	26 September 2011 12:28 AM
<b>File name:</b>	Document2
<b>Author:</b>	Norm Broner
<b>Project manager:</b>	Seiko Toki
<b>Name of organisation:</b>	Dual Gas Pty Ltd
<b>Name of project:</b>	VCAT Evidence for Dual Gas
<b>Name of document:</b>	Statement of Evidence
<b>Document version:</b>	Final
<b>Project number:</b>	VW06468.400



## 1. INTRODUCTION

This report details the Statement of Evidence for VCAT Proceeding Nos P1829/2011 and P1846/2011 on behalf of Dual Gas Pty Pty Ltd

### 1.1. NAME and ADDRESS

Dr Norm Broner

SKM, 452 Flinders Street, Melbourne, 3000

### 1.2. QUALIFICATIONS:

Bachelor of Engineering (Hons.),

Masters of Engineering Science, Monash University 1977

PhD (Psychoacoustics), University of London 1979

### 1.3. AREA of EXPERTISE:

I have over 30 years of consulting experience in Acoustics, Noise and Vibration. I am Immediate Past President and currently Vice President of the Australian Acoustical Society. I have published peer reviewed papers in various acoustic journals.

### 1.4. EXPERTISE TO MAKE THE REPORT:

Through my consulting experience, I have been heavily involved in the preparation of Environmental Impact Statements and with the preparation of Environmental Management plans. I have experience with designating the appropriate criteria and assessing predicted noise emissions (based on SoundPlan noise level predictions) against these criteria, and with assessing the potential impact and intrusiveness. Where necessary, optimum cost-effective noise controls have been recommended and designed to reduce excessive noise emissions to within statutory and regulatory limits. I have been involved with various community/public consultation processes/meetings and have also presented technical



information at public/community meetings. I have also given expert witness at various Tribunals/Panel hearings and in court.

I have also been involved with the prediction, assessment and control of vibration. I have measured and assessed ground vibration with respect to human perception, and annoyance and also with respect to potential building damage. I have also been involved with construction noise and vibration mitigation and with the assessment of vibration due to aircraft flyovers.

I have applied my expertise to the assessment of power stations and process plants, transport noise impact (road/rail/air/shipping). Some larger projects include , a major power station development in Victoria, a large brown-coal liquefaction plant in the La Trobe Valley, Alinta Newman Power Station, Alinta Tamar Valley power station, a large newsprint paper mill near Albury, a gold mining development and the Altona Petrochemical Complex. Transport projects include the acoustic and vibration assessment of: the Albury-Wodonga freight rail bypass, the assessment of vibration impact and damage to housing due to construction of the Western Link, the impact of aircraft noise for the then proposed Third Runway for Sydney Airport.

#### **1.5. RECENT RELEVANT PROJECT EXPERIENCE INCLUDES:**

- » Peer Review of Olympic Dam Environmental Noise Impact Assessment
- » Peer Review of Acoustic Prediction Modelling for BHP's Port Hedland operations – Strategic Review.
- » Albury Wodonga rail bypass – measurement and prediction of noise and vibration impact due to proposed rail bypass. Presentation of technical evidence to a Panel Hearing.
- » Alcoa Angelsea Mine Expansion Noise Impact Assessment – Project Director role for acoustics assessment
- » Alinta Tamar Valley Power Station Noise Impact Assessment \_Project Director for acoustics and vibration assessment
- » Snowy Hydro Laverton – Review of noise levels at neighbouring locations and advice with respect to compliance with developed noise criteria
- » Alinta Tamar Valley Power Station Noise Impact Assessment \_Project Director for acoustics and vibration assessment
- » RIO Yurralyi Maya Power station – prediction of noise levels and assessment of impact for Approval
- » Snowy Hydro Siting Study – Prediction of noise levels and advice with respect to compliance with EPA SEPP No N-1 Noise Policy
- » Alinta Power Station Newman – Prediction of noise levels and assessment of impact
- » Alcoa Angelsea Mine Expansion Noise Impact Assessment – Project Director role for acoustics assessment
- » Toora Wind Farm – Tonality assessment and compliance with Standard
- » Waterloo Wind Farm (Roaring 40's) – Prediction of noise level and assessment of compliance with Standard



- » Northern Sewer Project, Melbourne Water – provision of noise impact assessment for shaft construction and trucking. Assessment of vibration and regenerated noise due to tunnelling activities below residential areas. Presentation of findings to hostile community meetings
- » University of Melbourne Bio 21 Noise Annoyance – use of co-spectral comparison to determine source of noise. Meetings with residents. Noise measurements in resident's houses. Assessment and recommendations.
- » Alcoa Angelsea Mine Expansion Noise Impact Assessment – Prediction of noise due to three scenarios of operation and assessment of impact
- » Ballarat Goldfields Noise Impact Assessment and Control – Assessment of impact and advice re control of noise emission,
- » BHP Quantum Noise Impact Assessment and Control – design and optimisation of noise control and costing of various scenarios
- » Port Hedland Port Authority Noise Assessment of Utah Point Expansion – Prediction of noise levels and assessment against Assigned Noise Level criterion
- » Aurox Balla Balla Noise Impact Assessment - Prediction of noise levels and assessment against Assigned Noise Level criterion
- » Centrex Mine Transport Noise and Mine Noise and Vibration Assessment – Prediction and assessment of noise level due to plant operation and due to train and trucking movements
- » Kwinana Bulk Terminal Expansion –Prediction and noise impact assessment for proposed additional capacity at KBT.
- » Port Hedland Utah Point Noise Impact – Prediction and assessment of noise impact due to proposed additional capacity throughput.

## 1.6. INSTRUCTIONS

SKM were originally engaged by Dual Gas Pty Ltd to determine the acoustic impact of the proposed Dual Gas Demonstration Project at Commercial Road, Morwell.

I was involved in the planning of the study and in the review of the noise survey results and report.

The scope of work included:

1. Noise logging at residential locations in Morwell and derivation of the appropriate Noise Limits.
2. Collection of noise source data
3. Prediction of noise levels due to the proposed plant.
4. Assessment of impact based on the criteria
5. Recommendation of noise mitigation treatments in principle if required to achieve compliance.

I was later instructed by Maddocks Lawyers to conduct additional noise level monitoring at McMillan Street, Morwell.

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I was further instructed in writing on 13<sup>th</sup> September 2011, by Maddocks Lawyers on behalf of Dual Gas Pty Ltd, to prepare expert evidence in relation to acoustic matters in these proceedings.

**1.7. ASSUMPTIONS**

1. Noise source data is valid for the equipment proposed for the development.
2. We relied on weather data provided by HRL for met conditions in the area.



## 2. EVIDENCE

1. Dual Gas Pty Ltd is proposing to develop a demonstration power station using Integrated Drying and Gasification Combined Cycle (IDGCC) technology, which will generate approximately 600MW of power for sale in the National Electricity Market. SKM was commissioned by Dual Gas Pty Ltd to conduct an assessment to determine the acoustic impact of the proposed Dual Gas Demonstration Project in the Latrobe Valley, south of Morwell. The assessment formed part of the EPA Works Approval application submitted by Dual Gas Pty Ltd.
2. The assessment comprised of an environmental noise survey to determine existing background noise levels in the vicinity of the site and computer prediction modelling of the proposed site and equipment to predict the noise levels.
3. Noise Limits were developed based on the EPA Interim Noise Guideline N3/89 titled 'Interim Guidelines for Control of Noise from industry in Country Victoria'. These Guidelines apply to industries outside Metropolitan Melbourne. In accordance with Clause (2) of the Guidelines, "Noise Limits in provincial cities and rural areas where background sound levels are comparable to Metropolitan Melbourne shall be determined using the procedures of the State Environment Protection Policy N-1" unless the background sound levels are very low (Section 3 defines these as less than 25 dBA at night and 30 dBA during the day or evening period). The Guidelines also state in Note 1 that when planning, "new industries should be encouraged to design for the lowest levels of noise achievable with commonly available technology. Where possible designers should aim to meet octave band levels of Lbg plus 5 – 10 dB."
4. Assumptions were made regarding the Sound Power Level of the various noise sources in the plant. This data was used in the noise prediction modelling and showed that with various feasible noise mitigation measures applied, the Noise Limits could be met at all sensitive receptor locations.
5. For the Works Approval application, SKM prepared a report entitled "Noise Level Prediction Modelling for the Dual Gas Demonstration Project – Environmental Noise Modelling" dated 19<sup>th</sup> July 2010 and entitled "Dual Gas Demonstration Project – Environmental Noise Modelling" dated 24<sup>th</sup> February 2011.
6. In this report, Note 2 of Table 9-3 is missing. This note explained that for the purpose of determining a Noise Limit at McMillan Street, Morwell, we subtracted 5 dBA from the measured minimum night time period average background noise level of 46 dBA after the EPA advised that they believed that this measured level was too high based on their experience. The background noise level at McMillan Street, Morwell, was remeasured in August –September, 2011..



7. I have reviewed this report and I adopt the content and findings in my evidence.
8. The derived Noise Limits for night time were as follows: 46 McLean Street 39 dBA, 46 Wallace Street 42 dBA and 22 McMillan Street 44 dBA.
9. During the noise surveys prior to the Works Application, we did not hear any audible plant at McMillan Street, Morwell.
10. After the Works Application, Maddocks engaged SKM to conduct a further noise survey at McMillan Street, Morwell. SKM conducted an unattended noise level survey from 30<sup>th</sup> August – 6<sup>th</sup> September 2011. SKM report entitled “HRL Pty Ltd. Dual Gas Demonstration Project – Ambient Noise Levels at McMillan Street” dated 23 September 2011 details the results of the unattended and attended surveys in September 2011 (MCSEPT2011). I have reviewed this report and I adopt the content and findings in my evidence. A copy of this report is appended as Attachment 1.
11. In the September 2011 report, the lowest average night time period background noise level based on hourly values was 37.5 dBA while the average across all night time periods was 40.3 dBA. The resultant night time period Noise Limits would be 41 dBA using the lowest average hourly background level and 43 dBA if the average value was used to characterise the area. Note that the State Environment Protection Policy No N-1 (SEPP N-1) does not specify explicitly which background noise level should be used in calculating the Noise Limit. Neither does it specify a measurement across seven days but SKM uses seven days to obtain a reasonable average.
12. An attended noise level measurement at McMillan Street was also conducted on 15<sup>th</sup> September, 2011 and described in MCSEPT2011. The average ambient night time period noise level was 43.5 dBA. During this survey, plant noise from the direction of Hazelwood Power Station was audible. Noise from Energy Brix was not audible. The Hazelwood Power Station [HPS] is approximately 4 km from McMillan Street, Morwell and I cannot be sure that the noise was emanating from HPS although this is the most likely scenario. I believe that noise was audible on this occasion due to the presence of a temperature inversion.
13. Based on the above updated results, I conclude that that the night time period Noise Limit for McMillan Street should be either 41 dBA or 43 dBA as explained in (9) above.
14. I also conclude that as some plant noise was audible at 22 McMillan Street, consideration for the presence of another plant which is contributing to the total effective noise level should be given. This conclusion is, however, dependent on whether temperature inversions occur for a majority of the year in this area and on whether Hazelwood Power Station is the noise source and will continue to operate



- in the future. If temperature inversions are a feature of the area, then audible noise would result in a consideration of the contribution for other premises. If it is not, then no consideration for other premises should be made.
15. We also note that the annual wind rose shows the dominant wind is a westerly and that easterly winds are also prominent. Further, the annual wind rose shows that winds are relatively infrequent from the south or southeast which is the direction from the proposed plant to the residential area.
  16. I note that Clause 18 of Part IV of SEPP N-1 states as follows "Where two or more premises contribute to the effective noise level in a noise sensitive area, each shall be controlled so that the contribution from each of the premises, when combined, will meet the noise limit at the noise sensitive area". This Clause requires that only premises that contribute to the effective noise level be considered but does not describe how each of the premises contributing should be controlled. It further does not define what a contribution is. In the case of McMillan Street, if only one other premises is contributing eg the HPS, then there are two contributors and assuming that the 'load' is shared equally, then each should contribute equally. The practical impact of this is a penalty of 3 dBA. If three industries are contributing, then the penalty would be 5 dBA.
  17. It is yet to be proven whether temperature inversions are a feature of the area surrounding the proposed site
  18. In the event that Hazelwood Power Station closes down and that then no plant was audible at McMillan Street, the consequence would be that no penalty should be applied if there is to be no other plant development in the area.
  19. In April, 2011, George Hessler was asked to verify that various levels of noise control are feasible and that HRL could in principle achieve the noise limits based on his experience. He did this in a memo dated April 4, 2011.
  20. I note that the Works Approval was for a 300 MW station while all noise predictions in the SKM report were for a 600 MW station. This will have the effect of a reduction of a nominal 3 dBA in total noise level at the residential locations.
  21. For the purpose of noise level prediction, the EPA indicated that SKM should use the 80% worst case weather condition rather than the absolute worst case weather.

I have relied on noise level measurements and noise level predictions conducted by Matthieu Nelson, a Junior Acoustics Engineer at SKM with three years experience.

I have relied on noise level measurements and noise analysis and mitigation expertise presented by Paul Walsh, Senior Acoustics Consultant at SKM. Paul has



over 30 years experience with noise level measurement, prediction, control and assessment.

In summary, my opinion is as follows:

1. The night time period Noise Limits for McLean Street, Wallace Street and McMillan Streets are 39 (41) dBA, 42 (42) dBA and 41 (43) dBA respectively depending on whether the lowest night time period average background noise level is used or whether the average of the average is used.
2. Plant noise was audible at McMillan Street, possibly due to the presence of a temperature inversion and possibly due to Hazelwood Power Station. If temperature inversions are a common occurrence in this area, then we would agree that a consideration for the presence of other plants be made. We would recommend a 3 dBA penalty in this instance. Note that the existing Energy Brix plant was not audible at this location and based on calculation, does not contribute to the effective noise level at McMillan Street.
3. The plant can be designed to comply with the Noise Limits and with a Design Noise Target 3 dB lower than the Noise Limit. This design can only be implemented when the actual plant and equipment is known and validated.

I have made all the inquiries that I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld from the Tribunal.



## **ATTACHMENT 1**

SKM report entitled “HRL Pty Ltd. Dual Gas Demonstration  
Project

– Ambient Noise Levels at McMillan Street” dated 23  
September 2011



# **HRL Pty Ltd**

## **Dual Gas Demonstration Project**

### **AMBIENT NOISE LEVELS AT MCMILLAN STREET**

- Final
- 23 September 2011



# HRL Pty Ltd

## Dual Gas Demonstration Project

### AMBIENT NOISE LEVELS AT MCMILLAN STREET

- Final
- 23 September 2011

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## Glossary

Term	Description
dB	Decibel – Sound Pressure Level expressed in decibels is 20 log of the ratio between the measured sound pressure level and the reference pressure. The reference pressure is 0.000002 Pascal (Newtons per square meter), the threshold of hearing.
NATA	National Association of Testing Authorities
dB(A)	A Sound Pressure Level where the sound is filtered in accordance with the A-weighting scale. The A weighting scale is a weighting scale which generally corresponds to the inverse of the 40 dB (at 1 kHz) equal-loudness curve. The A weighting parallels the sensitivity of the human ear when it is exposed to normal levels.
$L_{A10}$	The A weighted sound pressure level that is exceeded for 10% of the measurement period (approximately the average maximum noise level)
$L_{A90}$	The A weighted sound pressure level that is exceeded for 90% of the measurement period (represents the background noise level)
$L_{Aeq}$	The equivalent continuous sound level. The steady dB(A) level which would produce the same A weighted sound energy over a stated period of time as the specified time – varying sound.
Day Period	The time between 0700 and 1800 hours
Evening Period	The time between 1800 and 2200 hours
Night Period	The time between 2200 and 0700 hours



## Executive Summary

An ambient noise level survey was performed at No. 26 McMillan Street in Morwell in August / September, 2011. This location was chosen to verify the night time background noise level in this area.

The lowest average hourly night time background noise level obtained was 37.5 dBA and the average was 40.3 dBA. This result is consistent with the result of an attended noise survey conducted in January 2011, but there is a significant difference compared to the result from an unattended noise level survey conducted at 22 McMillan Street in November 2010. We cannot be sure of the reason for this difference but it could be due to the presence or absence of a temperature inversion.

Based on this most recent data, the night time Noise Limit for this area is either 41 or 43 dB(A).

It was noted that during the most recent attended noise level survey, some plant noise was audible from the direction of the Hazelwood Power Station and that EBAC was not audible.



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## Document history and status

Revision	Date issued	Reviewed by	Approved by	Date approved	Revision type
A	9/9/11	N Broner	N Broner	13/9/11	Practice Review
B	13/9/11	P Walsh	P Walsh	13/9/11	Practice Review
C	21/9/11	P Walsh	P Walsh	21/9/11	Update
C	22/9/11	N Broner	N Broner	22/9/11	Practice Review

## Distribution of copies

Revision	Copy no	Quantity	Issued to
DRAFT	1	1	Client/Maddock

<b>Printed:</b>	23 September 2011
<b>Last saved:</b>	23 September 2011 12:23 PM
<b>File name:</b>	Ambient Noise Survey in McMillan Street, Morwell
<b>Author:</b>	Paul Walsh
<b>Project manager:</b>	Seiko Toki
<b>Name of organisation:</b>	Dual Gas Pty Ltd
<b>Name of project:</b>	Dual Gas Demonstration IDGCC Technology Power Station
<b>Name of document:</b>	Ambient Noise Level at McMillan Street
<b>Document version:</b>	Draft
<b>Project number:</b>	VW04684.400



## **1. Introduction**

Dual Gas Pty Ltd is proposing the development of a new power station approximately 2km south-east of the township of Morwell in Victoria. The proposed power station is intended to generate base load power whilst demonstrating new power generation technology at a commercial scale.

In order to confirm the background noise level in the area of McMillan Street, Morwell, an ambient noise level survey was first conducted in November 2010. Further surveys have been conducted and this report presents the results of the latest noise survey.

## 2. Background

A number of unattended and attended noise surveys have been performed in McMillan Street, Morwell, to determine the typical background noise level in the residential community. This was for the purpose of determining an appropriate Noise Limit for the residential area at Mc Millan St.

### 2.1 Unattended Noise Level Survey (3 / 11 / - 10 / 11 / 2010)

An **unattended** ambient noise level survey was conducted by SKM at No. 22 McMillan Street between the 3<sup>rd</sup> and 10<sup>th</sup> of November, 2010. The noise logger was located in the backyard and overlooked the highway and industrial area to the south. The location was approximately 3 to 4 m from any fences or facades. Acoustic shielding by the fence would have been minimal and traffic noise could be heard quite clearly (middle of the day) from the highway.

The resultant average background noise levels were: Day: 48dBA, Evening: 49dBA and Night: 46dBA.

The results of this noise survey were presented in the SKM report titled ‘Noise Level Prediction Modelling for the Dual Gas Demonstration Project’ dated 22<sup>nd</sup> February, 2011.

It was noted at the time of placement and retrieval of the noise logger that no other industrial plants were audible. Rather, traffic noise seemed to be the dominant noise source.

The EPA, in a meeting in November 2010, however, suggested that their experience was that a lower background noise level occurred in that area. The EPA also claimed that other plant was audible in that vicinity. The EPA therefore also wanted to apply a 5 dB penalty to the calculated Noise Limits (further to Clause 18 of Part IV of the State Environment Protection Policy No N-1) to account for these existing noise sources and to derive the Design Noise Targets that are specified in the Works Approval.

### 2.2 Attended Noise Level Survey (19 / 1 / 2011)

As a result of the claim made by the EPA, SKM conducted an **attended** noise level survey on the night of the 19<sup>th</sup> of January 2011 at the corner of McMillan Street and Satelberg Street between the hours of 10:52pm - 11:18pm and 2:17am – 2:38am.

An attempt was made to conduct this survey at No.22 McMillan St. but the noise levels at that time were severely impacted by dogs barking as the attended noise survey was being attempted. This was causing a disturbance in the residential neighbourhood.

The noise survey was therefore conducted further along McMillan St.

The results of this noise survey were presented in SKM report titled ‘Attended Noise Survey at McMillan & McLean Streets, Morwell’ dated 20<sup>nd</sup> February, 2011.



On this occasion, an average noise level of 39 dB (A) during the night time period was recorded.

Once again, during this attended noise survey, no plant noise from industry was audible. It was also noted that road traffic noise was the dominant noise source impacting the background noise levels.

### **2.3 Unattended Noise Level Survey (30 / 8 – 6 / 9 / 2011)**

A second unattended noise level survey was conducted at No. 26 McMillan St. over a 7 day measurement period between the 30<sup>th</sup> August and 6<sup>th</sup> September, 2011. This survey was performed to verify the typical background noise levels in the residential community in that area.

The noise survey was performed at No. 26 McMillan St. due to not being able to obtain access to No.22 McMillan St. at the time of the noise survey.

The results of this unattended noise survey are presented below in Section 6.1.

### **2.4 Attended Noise Level Measurement (15 / 9 / 2011)**

SKM conducted a second **attended** noise level survey on the night of the 15<sup>th</sup> September, 2011, at the front property boundary at No. 8 of McMillan Street between 12.32pm - 12:42 pm.

The results of this attended noise survey are presented below in Section 6.2.



### **3. Instrumentation**

#### **3.1 Unattended Noise Survey (30/8 – 6/9/2011)**

The unattended noise monitoring was performed using the following data logger:

- Bruel & Kjaer 2238 Mediator Integrating Sound Level Meter calibrated in a NATA accredited laboratory.

The data logger was checked for calibration before and after the noise surveys using a Bruel & Kjaer NATA accredited Acoustic Calibrator, type 4231.

#### **3.2 Attended Noise Survey (15/9/2011)**

The attended noise level monitoring was performed using a Bruel & Kjaer 2250 Hand Held Analyser. This instrument was calibrated in a NATA accredited laboratory and is a Type 1 meter.

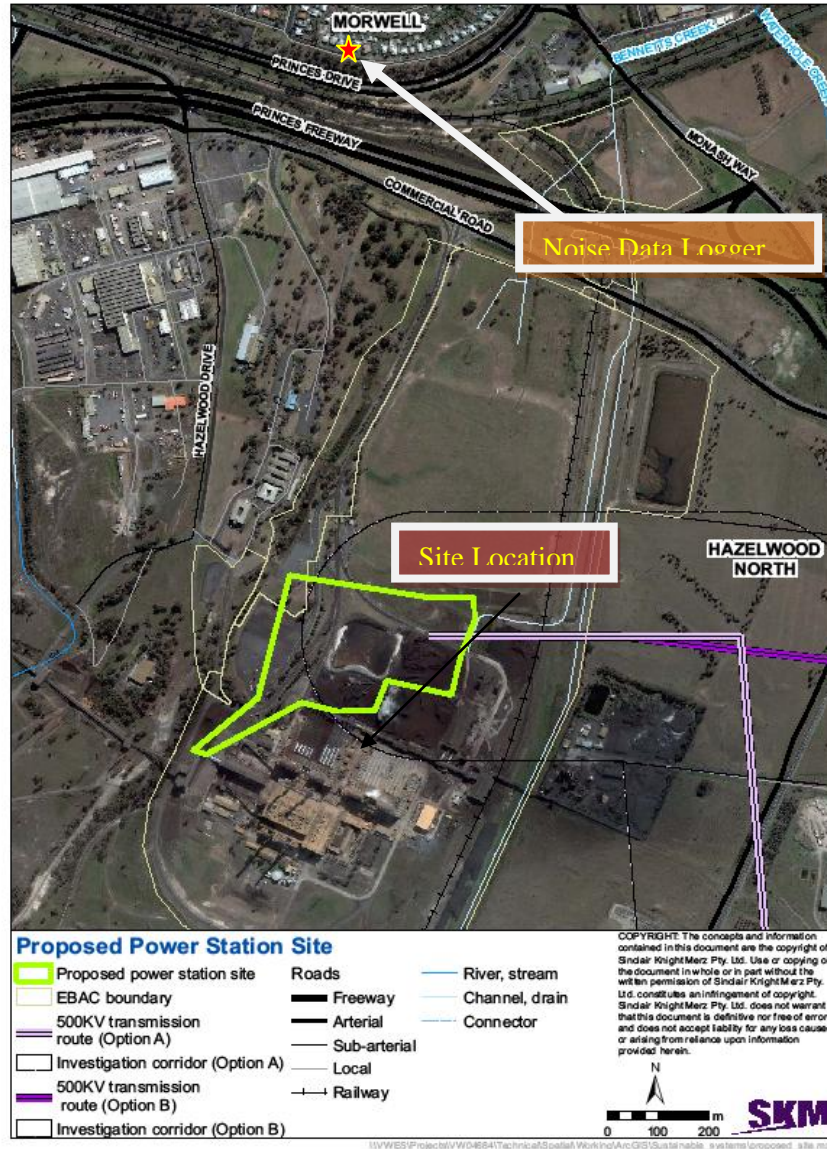
Statistical software calculates and stores the Ln percentile noise levels for each measurement period.

The meter was checked for calibration before and after the noise level measurements using a Bruel & Kjaer NATA accredited Acoustic Calibrator, type 4231.



## 4. Logger Location

Figure 4-1 below is an aerial image of the local area and shows the general location of the unattended noise logger and the attended measurement position in relation to the proposed site.



■ Figure 4-1: Location of noise logger relative to power station site



#### **4.1 Unattended Noise Survey**

The noise logger was located in the backyard of No. 26 McMillan Street and away from reflecting surfaces. The noise logger collected hourly noise level data from the 30<sup>th</sup> August to the 6<sup>th</sup> September, 2011.

#### **4.2 Attended Noise Survey**

The attended noise survey was performed at the front property boundary of No. 8 McMillan St. There were no reflecting surfaces (except for the ground) to influence the noise levels.

## 5. Weather Conditions

### 5.1 Unattended Noise Level Survey

The weather conditions during the unattended noise level survey were taken from the Bureau of Meteorology data collected at the Latrobe Valley Weather Station.

Table 1 and Table 2 below present the nominal weather conditions during the noise survey.

#### ■ Table 1: Nominal Weather Conditions During the Noise Level Measurements, August

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9:00 AM					3:00 PM						
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	g <sup>th</sup>		km/h	hPa	°C	%	g <sup>th</sup>		km/h	hPa
30	Tu	0.2	14.4	0.6		10.5	WNNW	39	22:47	7.6	90	7	W	7	1025	12.7	58	7	WNNW	24	1022.8
31	We	7.6	15.6	0	5.8	8.2	W	39	13:01	11.4	86	7	WNNW	19	1024.5	13.2	69	7	W	22	1023.4

#### ■ Table 2: Nominal Weather Conditions During the Noise Level Measurements, September

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9:00 AM					3:00 PM						
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C	mm	mm	hours		km/h	local	°C	%	g <sup>th</sup>		km/h	hPa	°C	%	g <sup>th</sup>		km/h	hPa
1	Th	6.1	18	0	0.2	10.6	NE	28	22:26	11.9	83	6	W	13	1026.9	17.6	56	3	SW	15	1025
2	Fr	6.8	17	0	3.2	11.1	ENE	31	10:57	10.7	86	0	E	13	1028.7	16.4	52	1	NE	20	1025.5
3	Sa	0.4	22.8	0		8.5	N	46	14:50	7.4	97	0	N	2	1024.5	21.6	38	8	NNE	26	1019.9
4	Su	6.9	23	0		1.8	NNW	46	6:03	18	55	7	W	9	1018.1	20.7	50	5	SW	22	1017.5
5	Mo	4.9	20.2	0	10.8	8.8	NE	26	16:48	12.6	84	6	NE	7	1023.7	19.6	58	3	E	11	1018
6	Tu	6.8	20.1	0	2.6	4.6	W	63	11:56	11.3	97	6		Calm	1009.4	8.9	87	7	W	26	1011.5

### 5.2 Attended Noise Level Survey

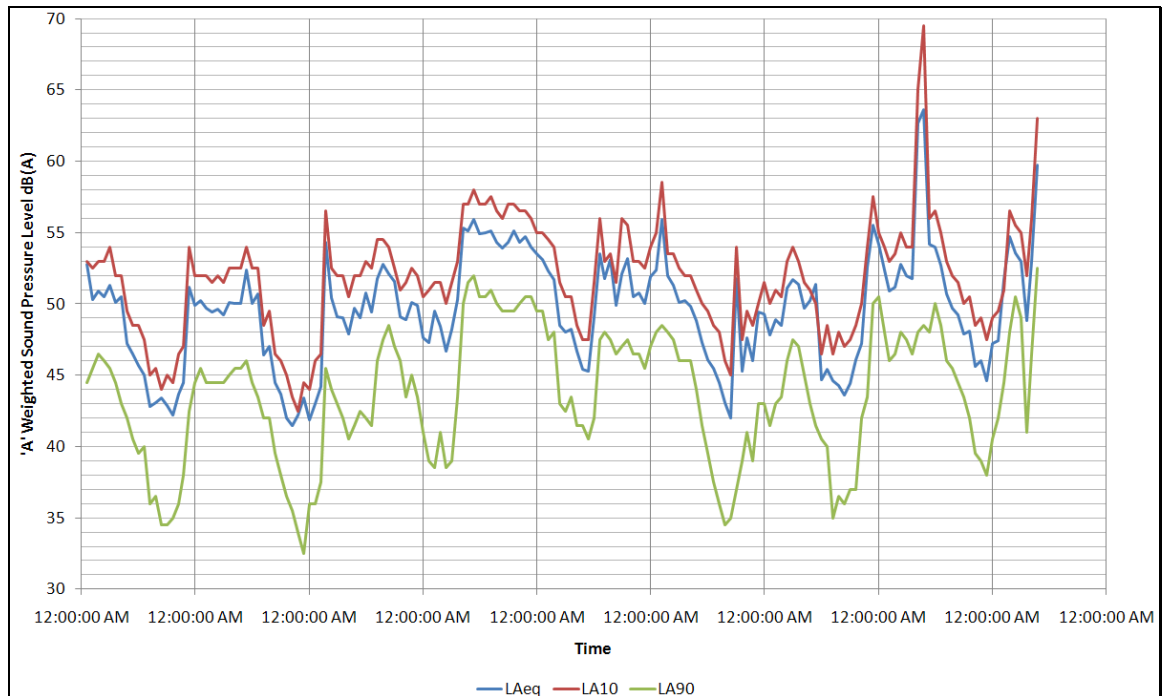
The weather conditions during the attended noise level survey were taken from the Bureau of Meteorology data collected at the Latrobe Valley Weather Station.

Date	Day	Temps		Rain	Evap	Sun	Max wind gust			9 am					3 pm						
		Min	Max				Dir	Spd	Time	Temp	RH	Cld	Dir	Spd	MSLP	Temp	RH	Cld	Dir	Spd	MSLP
		°C	°C				mm	mm	hours	km/h	local	°C	%	g <sup>th</sup>	km/h	hPa	°C	%	g <sup>th</sup>	km/h	hPa
14	We	7.4	17.1	0	6.4	9.4	W	59	10:07	15.3	53	6	W	31	1016.6	14.4	61	7	WSW	30	1018.3
15	Th	3.0	17.1	0	3.6	8.1	SW	43	14:52	10.6	78	2	WSW	9	1022.5	15.1	49	6	WSW	31	1018.5

## 6. Results

### 6.1 Unattended Noise Survey

Figure 6-1 below shows the  $L_{Aeq}$ ,  $L_{A10}$  and  $L_{A90}$  noise level versus time trace for the measurement location over the seven day measurement period from the 30/08/11 – 06/09/2011.



■ **Figure 6-1: Hourly  $L_{Aeq}$ ,  $L_{A10}$  and  $L_{A90}$  Sound Pressure Levels**

A review of the background noise level data allowed the determination of which data had been affected by wind noise.

The day, evening and night time period background ( $L_{A90}$ ) noise levels were calculated by adding the individual hourly time intervals and finding the arithmetic average of the hourly values for each time period (as per the SEPP No. N-1).

Table 3 below presents the arithmetic average of the hourly measurements for the background ( $L_{A90}$ ) noise levels at the measurement location for the day time, evening and night time periods. It can be seen that the lowest night time average hourly background was 37.5 dBA while the mean value was 40.3 dBA.

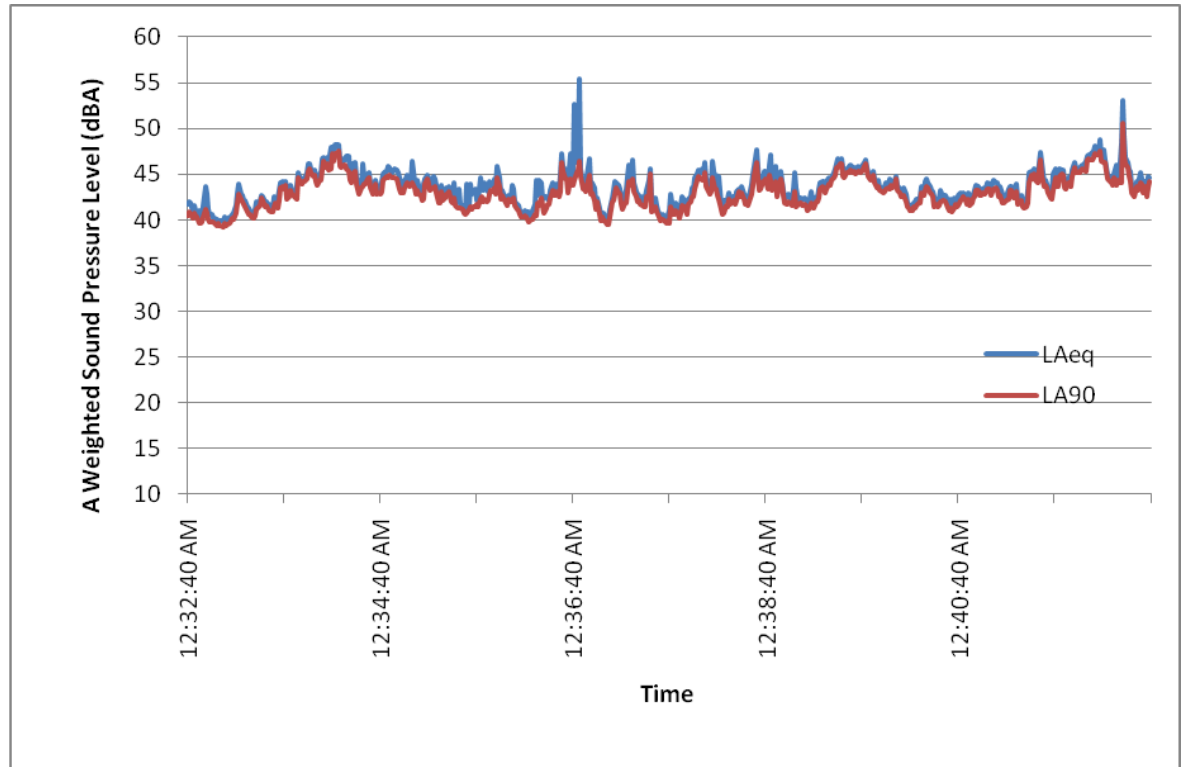
■ **Table 3: Noise Level Data at the Nearest Residential Receivers**

Date	Hourly $L_{A90}$ Sound Pressure Level ( dBA)		
	Day 0700 - 1800 hours	Evening 1800 - 2200 hours	Night 2200 - 0700 hours
<b>Tuesday 30 /8</b>	45.1	40.5	37.5
<b>Wednesday 31/8</b>	44.9	<b><u>40.4</u></b>	<b><u>37.5</u></b>
<b>Thursday 1/9</b>	43.8	44.5	42.4
<b>Friday 2/9</b>	50.3	48.6	43.3
<b>Saturday 3/9</b>	47.1	46.4	38.2
<b>Sunday 4/9</b>	<b><u>43.6</u></b>	41.3	40.8
<b>Monday 5/9</b>	47.8	44.9	42.7

***Bold, italic& underlined – lowest value for the day, evening and night time periods***

## 6.2 Attended Noise Survey

Figure 6-2 below shows the  $L_{Aeq}$ , and  $L_{A90}$  noise level versus time trace for the 10 minute measurement period on the 15 /9 starting at 12:32 am.



- **Figure 6-22:  $L_{Aeq}$ , and  $L_{A90}$  Sound Pressure Levels taken at 1 second intervals over the ten minute measurement period**

The background noise level ( $L_{A90}$ ) over the 10 minute measurement period was determined to be 43.5 dBA.

However, when traffic noise along the Princes Highway was not audible, a noise emanating from the direction of the Hazelwood Power Station was audible. Thus this “background noise level” is being somewhat influenced by noise from the direction of Hazelwood Power Station which is located approximately 3.9 Kms to the south –West of the residential measurement position. Noise from the EBAC/IE (briquette) was not audible at this time.



## 7. Noise Limit Criteria

Based on the lowest background noise level result from the unattended noise survey, the resultant Noise Limit criteria are as shown in Table 4 below.

- **Table 4: Noise Limits at McMillan Street in Accordance with EPA SEPP No. N-1**

	A' Weighted Sound Pressure Level dB(A)		
	Day	Evening	Night
<b>Noise Limits</b>	<b>51</b>	<b>45</b>	<b>41</b>

If the average background noise level result is use, the night time Noise Limit would be 43 dBA.



## 8. Discussion

Ambient noise levels were recently measured at No. 26 McMillan Street. The noise measurements were performed over a 7 day measurement period and it was found that the lowest night time average background noise level was 37.5 dB (A) on both Tuesday (30/8) and Wednesday (31/8) nights.

The current average ambient noise level result for the night time is consistent with the short duration attended background noise level results from the attended noise survey conducted in January 2011.

Although the noise level measurements taken for the attended noise survey on the 15<sup>th</sup> September, 2011, was performed for only a 10 minute period, it does provide an indication of the ambient noise level in the residential community of McMillan Street. On this occasion, the ambient noise level was of the order of 5 dBA higher than the results taken during the August/ September 2011 unattended noise survey.

However, we noted that when traffic noise from the Princes Highway was not audible, noise from the direction of the Hazelwood Power Station was clearly audible even though the power station is some 3.9 kilometres away from the residential measurement site. On the other hand, noise from the EBAC/IE(briquette) was not audible at this time. It is believed that during the latest attended noise survey, a temperature inversion was present in the area and this could explain the higher ambient noise level though we cannot be 100% sure, without further noise level measurements, that Hazelwood is the source.

The presence of a temperature inversion could also explain why the noise levels taken in the unattended noise survey on the 3/11 – 10/11/2011 were higher than the noise levels measured during the 2<sup>nd</sup> unattended noise survey at No. 22 McMillan Street in November 2010.

There was no audible noise emanating from the direction of the EBAC plant. To determine more definitively the acoustic contribution of the EBAC complex at McMillan Street, a noise level measurement was performed at the western boundary of the plant. The measured  $L_{Aeq\ 10\ \text{minute}}$  noise level was 57 dBA. Taking into account the attenuation due to the 1500 metres from the plant site to the residential properties in McMillan St. the predicted noise level at the residential properties due to the noise emissions from the EBAC plant would be in the order of 0 – 5 dBA.



## 9. Summary

An unattended ambient noise level survey was conducted at No. 26 McMillan Street, Morwell, between 30/08/11 – 06/09/2011. The lowest average hourly night time background noise level obtained was 37.5 dB and the average was 40.3 dBA. This result is consistent with the result of an attended noise level survey conducted in January, 2011. The latter result is significantly different to the result of an unattended noise level survey conducted at No. 22 McMillan Street in November 2010. A possible explanation for the difference might be the presence or absence of a temperature inversion.

During the second attended noise survey performed on the 15<sup>th</sup> September at 12:32 am, it was noted that plant noise from the direction of the Hazelwood Power Station was audible when traffic on the Princes Highway was not audible. Noise from the EBAC plant was not, however, audible.

Based on the lowest average hourly background noise level data, the night time Noise Limit for the Mc Millan Street area is 41 dB(A). Based on the average hourly background noise level data, the night time Noise Limit for the Mc Millan Street area is 43 dB(A).