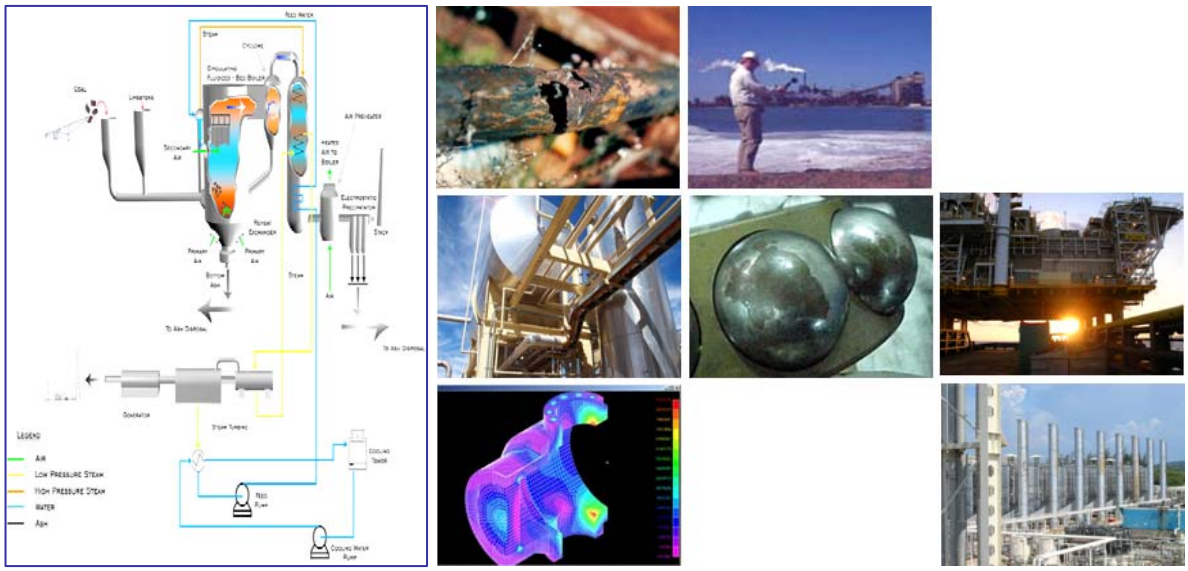
SVT ENGINEERING CONSULTANTS

ENVIRONMENTAL NOISE IMPACT ASSESSMENT OF THE PROPOSED COOLIMBA POWER STATION



AVIVA CORPORATION LTD

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www.svt.com.au

Head Office: Perth, Western Australia
Kuala Lumpur, Malaysia
Melbourne, Australia

DOCUMENT CONTROL & REVIEW INFORMATION

Client: **Aviva Corporation Ltd**

Client Contact: **Robert Griffiths**

SVT Contact: **Jim McLoughlin**

SVT Office: **Perth**

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SVT Engineering Consultants

ABN: 18 122 767 944

SVT Perth (HEAD OFFICE)	SVT Kuala Lumpur Office	SVT Melbourne Office
112 Cambridge Street West Leederville WA 6007 Australia Tel: (61) 8 9489 2000 Fax: (61) 8 9489 2088 Email: mailbox@svt.com.au	SVT-Engineering Malaysia Sdn Bhd (Malaysian Office) 62A, Jalan Badminton 13/29, Tadisma Business Centre, 40100 Shah Alam, Selangor, Malaysia Tel: +60 3 5513 6487 (h/p 012 330 1071) Fax: +60 3 5513 6486 Email: mailbox@svt.com.au	Suite 1 , 20 Cato Street Hawthorn East VIC 3123 Australia Tel: +61 3 9832 4406 Fax: +61 3 03 9917 2204 Email: mailbox@svt.com.au

EXECUTIVE SUMMARY

An environmental noise impact assessment has been undertaken of the potential noise emissions associated with the proposed Coolimba Power Station near Eneabba in Western Australia. The assessment addresses noise from normal operations of the power station under worst-case night-time meteorological conditions for sound propagation.

The nearest noise sensitive receiver, R6, is approximately 2 km to the south-south-west of the proposed development site.

Ambient noise levels were recorded in the vicinity of the nearest noise sensitive receiving premises to the proposed power station. The recorded noise data demonstrates that underlying background noise levels are very low and will not provide any significant masking to noise emitted from the power station under worst-case conditions for sound propagation. It is likely, therefore, that the power station will be audible above background noise at the nearest noise sensitive receivers (R5 and R6) under calm to light down-wind conditions.

Noise modelling of the power station plant demonstrates that noise limits imposed under the Environmental Protection (Noise) Regulations 1997 may be exceeded at location R6 at night-time under worst-case weather conditions for sound propagation. The predicted exceedance increases when considering cumulative impacts of the power station and noise emissions associated with the central west coal mining operations. Compliance with regulatory noise limits is demonstrated at all other locations considered.

The power station plant which contributes most significantly to noise received at location R6 includes the gas turbine generator packages, the boilers and the cooling towers. Noise reductions will be required from these items in order to achieve compliance with the regulatory noise limits.

It is likely that some or all of the following noise reduction measures will be required:

- Installation of high performance acoustic enclosures (or buildings) over the gas turbine generator packages.
- Installation of high performance air inlet, exhaust and ventilation silencers to the gas turbine generator packages.
- Acoustic cladding of the boilers.
- Low noise specifications for auxiliary equipment associated with the boilers, or location of this equipment within acoustic enclosures or buildings.
- Utilisation of low noise fans for the cooling towers and/or the use of variable speed drives to allow lower running speeds at night when noise limits are most stringent.

However, these suggestions should be reviewed during future design stages to ensure that the most effective noise mitigation solutions are identified and implemented.

TABLE OF CONTENTS

1. INTRODUCTION

SVT was commissioned by Aviva Corporation to develop an acoustic noise model of the proposed Coolimba Power Station development, and compare predicted noise levels against the assigned noise levels under the Environmental Protection (Noise) Regulations 1997.

1.1 Description of Facility

The proposed Coolimba Power Station will be located near Eneabba, approximately 250 km north of Perth and will be connected to the South West Interconnected System. The Power Station will provide a 450 MW base load electrical capacity using coal as fuel, and will also provide a 358 MW peak load capacity from two gas-fired turbines (2 x 179 MW).

The coal will arrive at the plant via a conveyor linking the coal product stockpiles on the adjoining Central West coal site to the coal handling area at the power station. The coal will fuel three boilers which, in turn, will power three 150 MW steam turbine generators.

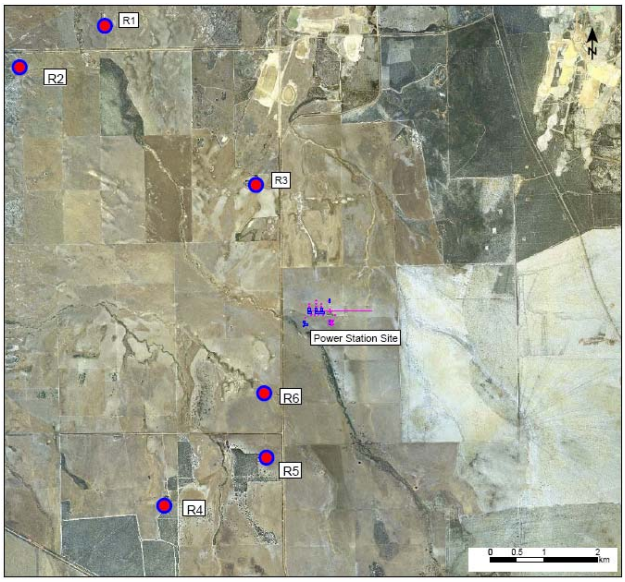
Auxiliary cooling for the coal fired units provided by three banks of low profile cooling towers.

Natural gas will fire the gas turbines and will be sourced via an underground pipeline placed within the easement to link the power station to the nearby Parmelia Natural Gas Pipeline or the Dampier to Bunbury Natural Gas Pipeline. The open cycle gas turbines will be air cooled and the gaseous emissions will be expelled to atmosphere through a 35-40 m high exhaust stack.

The proposed plant layout is provided in Appendix A.

1.2 Receiving Premises

A list of the nearest noise sensitive premises to the proposed power station was provided for the study and these locations are shown below. Locations R1, R2, and R4 to R6 have been considered as part of this assessment. (Location R3 has been demolished). Other receiving premises (not shown) are sufficiently distant from the proposed power station that no noise impacts are anticipated.



1.3 Work Undertaken

SVT Engineering Consultants have used in-house data to compile a noise model of the proposed power station based on preliminary project information provided by Aviva Corporation. Predicted noise levels have been calculated at the nearest noise sensitive receivers under worst case meteorological conditions for sound propagation (refer section 4.3.4), and contours showing the noise levels expected from site emissions have been generated.

Existing background noise levels have also been measured in the vicinity of the proposed power station, at a location representative of the nearest noise sensitive receivers. The monitoring was undertaken as per the requirements of EPA Guidance No.8[1] using a Bruel & Kjaer Model 2238, Class 1 logging sound level meter.

Predicted noise levels have been compared with environmental noise limits imposed under the Environmental Protection (Noise) Regulations 1997 and with existing background noise levels. The cumulative impacts of noise from the power station and coal mining operations have also been assessed.

[1] EPA draft guidance no 8, May 2007 "*Guidance for the assessment of environmental factors (in accordance with the Environmental Protection Act 1986) – Environmental Noise*"

2. NOISE LIMIT CRITERIA

The *Environmental Protection (Noise) Regulations 1997* govern the maximum permissible noise level at noise sensitive premises. These maximum levels are given in Table 2-1.

Table 2-1: Assigned levels at noise sensitive premises

Type of premises receiving noise	Time of day	Assigned Level – dB(A)		
		L_{A10}	L_{A1}	L_{Amax}
Noise Sensitive premises at locations within 15 metres of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sundays and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + influencing factor	45 + influencing factor	55 + influencing factor

In this table, L_{A10} represents the noise level exceeded for 10% of the time, L_{A1} represents the noise level exceeded for 1% of the time, and L_{Amax} represents the maximum noise level.

Influencing Factor is related to the land zoning and proximity of major roads in the vicinity of the receiving premises. Industrial or commercial zoned land and major and secondary roads within 450 metres of the noise sensitive receiver are taken into account when calculating the influencing factor. As all receivers considered are more than 450 metres from any such zoning or roads, the influencing factors are zero.

As both day and night-time the operation of the plant is expected to produce continuous noise emissions, the L_{A10} assigned level is used to compare predicted levels against assigned levels.

3. AMBIENT NOISE ASSESSMENT

A noise monitor was deployed at location (R3)[2], approximately 2 km to the north-north-west of the proposed power station. This location is considered representative of other noise sensitive receivers in the vicinity of the power station.

The noise monitoring equipment was set to continuously record L_{A1}, L_{A10} and L_{A90} noise levels at 15 minute intervals, where:

- L_{A1} is the noise level exceeded for 1 % of the time;
- L_{A10} is the noise level exceeded for 10 % of the time; and
- L_{A90} is the noise level exceeded for 90 % of the time.

The logging was undertaken from 10 March to 25 March 2008.

The following section provides the results of the ambient noise monitoring. A summary table is provided which includes the average L_{A10} and L_{A90} values collected over the monitoring period during daytime hours, evening hours and night time hours, and for all periods combined. The standard deviations in the measurement results are also provided, and the assigned noise levels (noise limit criteria) are included for comparison. The data has also been analysed to determine the L_{90} of the L_{A90} noise levels for the various time periods. This data provides a good indication of the lowest ambient noise levels. Charts showing the monitored noise data are also presented.

3.1 Noise Monitoring at R3

Table 3-1 : Summary of Ambient Noise Data at R3

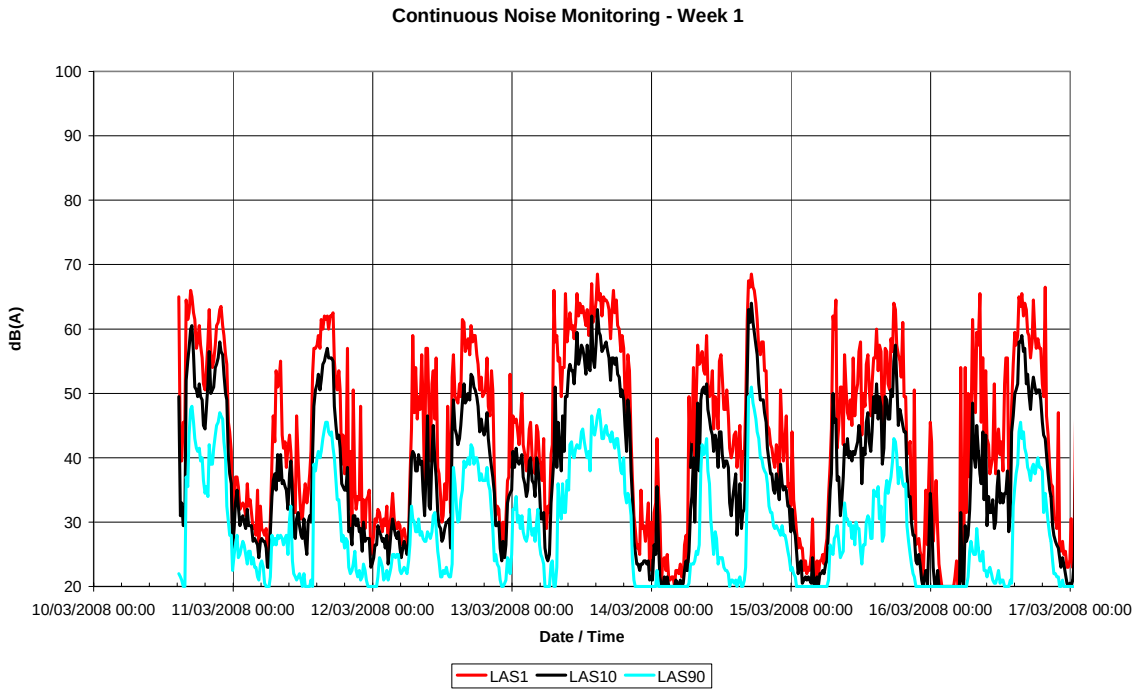
Period	Assigned Level – dB(A)	Average L_{A10} dB(A)	Standard Deviation in L_{A10} dB	Average L_{A90} dB(A)	Standard Deviation in L_{A90} dB	L_{90} of L_{A90} dB(A)
Day (07:00 to 19:00 hrs)	45	49.9	10.7	38.5	11.6	22.5
Evening (19:00 to 22:00 hrs)	40	44.8	10.8	35.1	9.4	21.5
Night (22:00 to 07:00 hrs)	35	40.4	16.2	33.6	13.6	<20
All data	n/a	45.3	13.8	36.0	12.3	<20

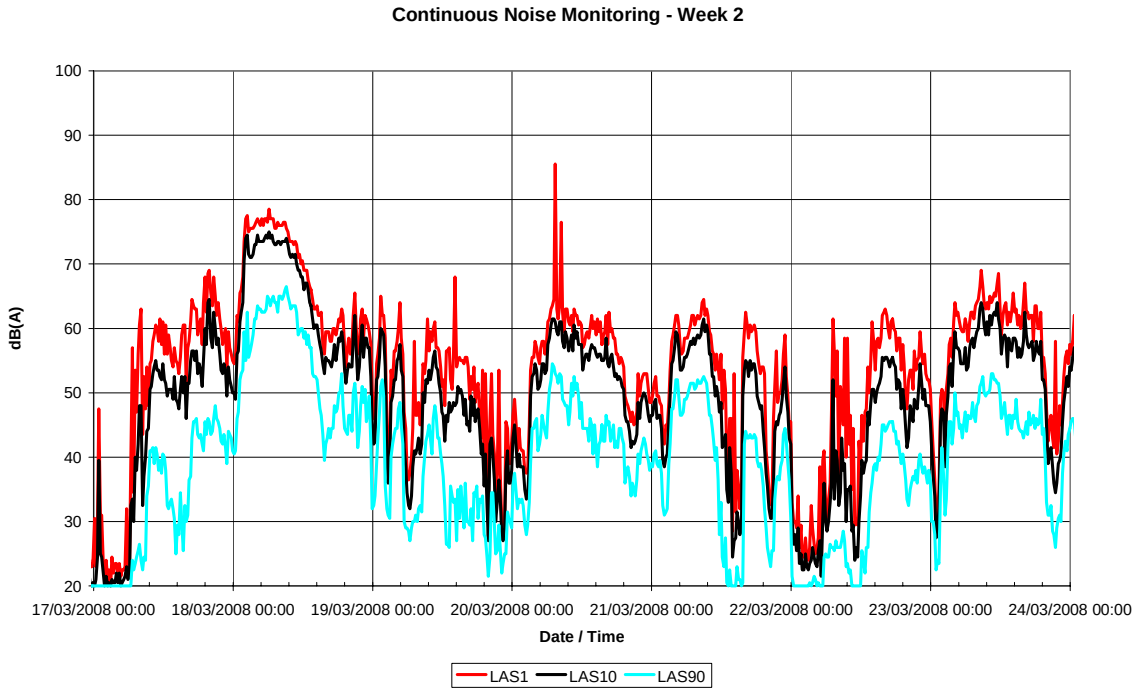
During the first week of monitoring, wind speeds were generally calm to light. However, during the second week wind speeds were generally much higher and had a significant effect on measured

[2] The property at this location has been demolished. However, the data collected is representative of other receptors in the vicinity of the proposed power station.

noise levels. This is clearly demonstrated in the figures overleaf. A daily cycle in noise levels can be seen in the results obtained during the first week of monitoring but this is masked by wind noise during the second week.

The results demonstrate that underlying background noise levels are very low. The large standard deviations in the measured results can be attributed to the effects of wind generated noise.





4. ACOUSTIC MODELLING

4.1 Methodology for Noise Modelling

An acoustic model has been developed using the SoundPLAN noise modelling software developed by Braunstein + Berndt GmbH. The SoundPLAN noise modelling program is approved by the Environmental Protection Authority (EPA) for the purposes of environmental noise modelling. The SoundPLAN program calculates the sound pressure levels at nominated receiver locations or produces noise contours over a defined area of interest around the noise sources. The inputs required are the noise source data, ground topographical data, meteorological data, noise barriers or buildings, and receiver locations.

The model has been used to generate noise contours for the area surrounding the power station and also predict noise levels at specific residential locations.

The model does not include noise emissions from any sources other than the proposed Coolimba Power Station. Therefore, noise emissions from road traffic, rail, domestic sources, entertainment, other industrial sources, etc. are not accounted for.

The acoustic model produces noise contours or noise levels at specified receiver locations for specific meteorological conditions. Therefore, a range of noise levels can be predicted for any given location.

4.2 Modelling Scenarios

The proposed power station operates continuously 24 hours per day and therefore a single noise modelling scenario has been considered representing typical operating conditions[3,4].

4.3 Input Data

4.3.1 Noise Sources and Sound Power Levels

The sound power level of all significant noise sources at the power station is required so that an acoustic model can be developed.

Noise sources were identified, and their locations determined, from site drawings provided for the study (reproduced in Appendix A). As this is a proposed project, no precise noise data is available for the equipment that will be used in the power station. Therefore, noise emissions were estimated based on SVT internal data for similar projects.

Table 4-1 summarises the noise sources included in the model. The table also shows the assumptions made in determining the sound power level of each source. The full spectrum of each source can be found in Table B 1 of Appendix B.

[3] Noise emissions may vary during steam venting (eg during start-up). However, the design of the power station is not sufficiently advanced to assess noise from this activity. It is likely that vent silencers will be required to ensure that noise emissions do not exceed those during normal operations.

[4] Noise emissions from the diesel generator which operates infrequently have also been included.

Table 4-1: A Weighted sound power levels for individual noise sources

Item	Estimated Sound Power Level dB(A)	Assumptions
Boilers (3 off)	116 / unit	Sound pressure level of 80 dB(A) at 1m external to the structures
Cooling towers (3 banks)	104 / bank	Estimate based on SVT in-house data for similar equipment
Boiler ID Fans	103 / fan	Estimate based on SVT in-house data for similar equipment
Large Turbine Hall	103	Sound pressure level of 60 dB(A) at 1m external to the structure
Small Turbine Hall	100	Sound pressure level of 60 dB(A) at 1m external to the structure
Gas Turbine Generators packages (2 off)	115 / unit	Using SVT in-house data for similar equipment
Compressor House	103	Sound pressure level of 85 dB(A) at 1m from the machine enclosure
Transformers (3 off)	100 / unit	Using SVT in-house data for similar equipment
Water Processing	102	Using SVT in-house data for similar equipment
Particulate Control - bag house filter (3 off)	98 / unit	Using SVT in-house data for similar equipment
Plant Coal Conveyors (enclosed)	99	Sound pressure level of 60 dB(A) at 1m radius
Stack	93	Estimate based on SVT in-house data for similar equipment
Diesel Generator	105	Using SVT in-house data for similar equipment
Cumulative Total	123	Combined sound power level for all sources

4.3.2 Topography and Barriers

Topographic information was imported into the noise model from data provided in electronic format. The barrier effects of buildings at the power station are also included. No other barriers, except those associated with the surrounding topography, have been assumed. An absorptive ground type has been used for the model.

4.3.3 Receiver Locations

The model was set to calculate the sound pressure level at a number of residential locations surrounding the proposed site location. These locations have been labelled R1 through R6 as

shown in the noise contours presented in Appendix C. Note that predictions are not provided for location R3 as this residence no longer exists.

4.3.4 Meteorological Conditions

Certain meteorological conditions can increase noise levels at a receiving location by a process known as refraction. Refraction occurs during temperature inversions and where there is a wind gradient. These meteorological effects typically increase noise levels by 5 to 10 dB.

The model developed for this study has been configured to calculate sound noise levels at the receiver under the worst-case, night-time meteorological conditions as defined in EPA's draft guidance note no. 8[5]. Table 4-2 shows these conditions. (Night-time conditions have been selected because noise limits are most stringent at night.)

Table 4-2: Worst case meteorological conditions

EPA Guidance No. 8 Default Conditions	SoundPLAN Meteorological Parameters		
	Wind Speed (m/s)	Stability Class	Temperature (°C)
Day	4	E	20
Night	3	F	15

[5] EPA draft guidance no 8, May 2007 "*Guidance for the assessment of environmental factors (in accordance with the Environmental Protection Act 1986) – Environmental Noise*"

5. NOISE MODELLING RESULTS

5.1 Overall Levels

Sound pressure levels were calculated at nearby noise sensitive receivers, and contours showing the overall sound pressure levels in the area surrounding the power station were developed. The predicted noise levels at the noise sensitive receivers are shown in Table 5-1, and the noise contours for worst-case meteorological conditions are presented in Figure C1 of Appendix C.

Table 5-1: Predicted noise levels for worst-case meteorological conditions

Receiver	Noise Limit – L_{A10} dB(A)	Predicted Night-time Sound Pressure Level – dB(A)
R1	35	12.1
R2	35	10.6
R4	35	23.4
R5	35	30.7
R6	35	38.8

Location R6 receives the highest noise levels.

5.2 Individual Plant contribution

Table 5-2 presents a ranking of noise emission sources in terms of their contribution to night-time levels at receiver R6 (where overall predicted noise levels are highest). From Table 5-2, it is clear that the gas turbine generators and boilers dominate noise received at location R6.

Table 5-2: Noise source contributions at R6 for worst-case meteorological conditions

Plant	Noise Level Contribution – dB(A)
Gas Turbine Generators	36.7
Boilers	32.5
Cooling Towers	26.3
Transformers	22.9
Diesel Generator	22.4
Boiler ID Fans	21.2
Turbine Halls	20.5
All other plant	20.2
Overall Noise Level at R6	38.8

6. COMPLIANCE ASSESMENT

6.1 Comparison to Predicted Levels

Table 5-1 show the predicted and assigned noise levels at nearby noise sensitive locations. It can be seen from this table that predicted noise levels for worst-case meteorological conditions exceed the night-time assigned noise level of 35 dB(A) at location R6.

6.2 Cumulative Noise Impacts

The Environmental Protection (Noise) Regulations require that noise emissions do not exceed, **or significantly contribute** to exceedances of the assigned noise levels.

The nearest receiving locations to the proposed power station will also be impacted by noise emissions from the proposed coal mining operations. SVT report No. Rpt01-075040-Rev 0[6] provides a review of noise impacts from the proposed coal mining operations. Noise levels are predicted at the same receiving locations for early, mid and late life mining operations. Table 6-1 to Table 6-3 present the cumulative noise levels predicted for the power station and each modelled mining scenario for worst-case meteorological conditions.

Table 6-1: Cumulative noise levels for power station and early mine life mining operations

Receiver	Predicted Sound Pressure Level – dB(A)			Night-time Assigned Level – dB(A)
	Power Station	Early Life Mining Operations	Cumulative	
R1	12.1	16.2	17.6	35
R2	10.6	14.6	16.1	35
R4	23.4	22.9	26.2	35
R5	30.7	31.8	34.3	35
R6	38.8	36.0	40.6	35

Table 6-2: Cumulative noise levels for power station and mid mine life mining operations

Receiver	Predicted Sound Pressure Level – dB(A)			Night-time Assigned Level – dB(A)
	Power Station	Mid Life Mining Operations	Cumulative	
R1	12.1	22.4	22.8	35
R2	10.6	18.8	19.4	35

[6] SVT Report Rpt01-075040-Rev 0-5 Nov 08 "*Environmental Noise Impact Assessment – Proposed Central West Coal Project*"

Receiver	Predicted Sound Pressure Level – dB(A)			Night-time Assigned Level – dB(A)
	Power Station	Mid Life Mining Operations	Cumulative	
R4	23.4	21.4	25.5	35
R5	30.7	30.0	33.4	35
R6	38.8	34.5	40.2	35

Table 6-3: Cumulative noise levels for power station and late mine life mining operations

Receiver	Predicted Sound Pressure Level – dB(A)			Night-time Assigned Level – dB(A)
	Power Station	Late Life Mining Operations	Cumulative	
R1	12.1	26.2	26.4	35
R2	10.6	20.0	20.5	35
R4	23.4	20.3	25.1	35
R5	30.7	29.7	33.2	35
R6	38.8	34.2	40.1	35

It can be seen that predicted cumulative noise levels exceed the night-time assigned noise levels at location R6 only. Predicted noise levels at this location also marginally exceed (by up to 0.6 dB) the 40 dB(A) assigned noise level which applies between 0900 to 1900 hours on Sundays and public holidays and 1900 to 2200 hours for all days.

7. CONSTRUCTION NOISE

Construction activities will include:

- Minor alterations to the public highway network to accommodate heavy vehicle access to the site.
- Preparation of an infrastructure corridor for the power transmission lines and gas pipeline.
- Ground preparation for the power station and evaporation ponds.
- Commissioning activities including steam blows.

The design of the project is not sufficiently advanced for construction schedules and equipment details to be available and, therefore, noise predictions have not been undertaken. However, for construction work at the project site, it is not anticipated that noise emissions will significantly exceed those associated with normal plant operation. Furthermore, it is proposed that construction activities will be limited to day time hours.

The proposed construction camp is to be located more than 20 km to the west of the proposed project site and will, therefore, not be impacted by construction noise.

7.1 Daytime Construction Activities

The Environmental Protection Noise Regulations 1997 state that for construction work carried out between 7am and 7pm on any day, which is not a Sunday or public holiday the assigned noise levels do not apply provided that:

- The construction work is carried out in accordance with control of noise practices set out in Section 6 of Australian Standard 2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”; and
- The equipment used for the construction is the quietest reasonably available.

The local government Chief Executive Officer (CEO) of may request that a noise management plan be submitted for the construction work at any time.

7.2 Night-time Construction Activities

In the event that construction work is required outside daytime hours then:

- The construction work must be carried out in accordance with control of noise practices set out in Section 6 of Australian Standard 2436-1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”; and
- The equipment used for the construction must be the quietest reasonably available.

Furthermore, if noise emissions are likely to exceed the assigned noise levels then:

- The contractor must advise all nearby occupants or other sensitive receptors who are likely to receive noise levels which fail to comply with the standard under Regulation 7, of the work to be done at least 24 hours before it commences;
- The contractor must show that it was reasonably necessary for the work to be done out of hours; and

- The contractor must submit to the CEO a Noise Management Plan at least seven days before the work starts, and the plan must be approved by the CEO. The plan must include details of:
    - Need for the work to be done out of hours;
    - Types of activities which could be noisy;
    - Predictions of the noise levels;
    - Control measures for noise and vibration;
    - Procedures to be adopted for monitoring noise emissions; and
    - Complaint response procedures to be adopted.

8. DISCUSSION & RECOMMENDATIONS

The assessment of ambient noise levels provided in Section 3 demonstrates that underlying background noise levels (i.e. the 90th percentile of the recorded LA90 noise levels) in the vicinity of the power station are very low and will not provide any significant masking to noise emitted from the power station under worst-case conditions for sound propagation. It is likely, therefore, that the power station will be audible above background noise at some of the nearest noise sensitive receivers (R5 and R6) under calm to light down-wind conditions.

Predicted noise levels from the power station, when considered in isolation, are shown to exceed the night-time assigned noise level of 35 dB(A) at location R6 under worst-case meteorological conditions for sound propagation. The main contributors to this exceedance are the gas turbine generators followed by the boilers. Noise levels can be reduced to below 35 dB(A) by limiting noise emissions from these sources. The next most significant sources of noise are the cooling towers.

Cumulative predicted noise levels for the power station and coal mining operations also exceed the 40 dB(A) assigned noise level at R6 which applies between 0900 to 1900 hours on Sundays and public holidays and 1900 to 2200 hours for all days. Achieving full compliance at R6 will require noise reductions from both the power station and coal mining operations. For the power station, this will require noise reductions as outlined below:

- Gas turbine generator packages will need to be specified with a total sound power level of 105 dB(A) – i.e. a 10 dB reduction from the sound power level assumed for the noise model.
- Boilers will need to be specified with a total sound power level of 106 dB(A) – i.e. a 10 dB reduction from the sound power level assumed for the noise model.
- Each bank of cooling towers will need to be specified with a total sound power level of 101 dB(A) – i.e. a 3 dB reduction from the sound power level assumed for the noise model.

Until further design details are available it is not possible to confidently specify the noise control measures required to achieve these reductions. However, it is likely that some or all of the following measures will be required:

- Installation of high performance acoustic enclosures (or buildings) over the gas turbine generator packages.
- Installation of high performance air inlet, exhaust and ventilation silencers to the gas turbine generator packages.
- Acoustic cladding of the boilers.
- Low noise specifications for auxiliary equipment associated with the boilers, or location of this equipment within acoustic enclosures or buildings.
- Utilisation of low noise fans for the cooling towers and/or the use of variable speed drives to allow lower running speeds at night when noise limits are most stringent.

It should be noted, that the modelling undertaken for this assessment is based on estimates of noise emissions for the equipment at the power station. Considering that noise data is not yet available from equipment suppliers and that noise emissions from the coal mining operations significantly contribute to exceedances of noise limits, these recommendations should be reviewed during future design stages to ensure that the most effective noise mitigation solutions are identified and implemented.

Noise emissions may vary during steam venting (eg during start-up). However, the design of the power station is not sufficiently advanced to assess noise from this activity. It is likely that vent silencers will be required to ensure that noise emissions do not exceed those during normal operations.

APPENDIX A : PLANT LAYOUT

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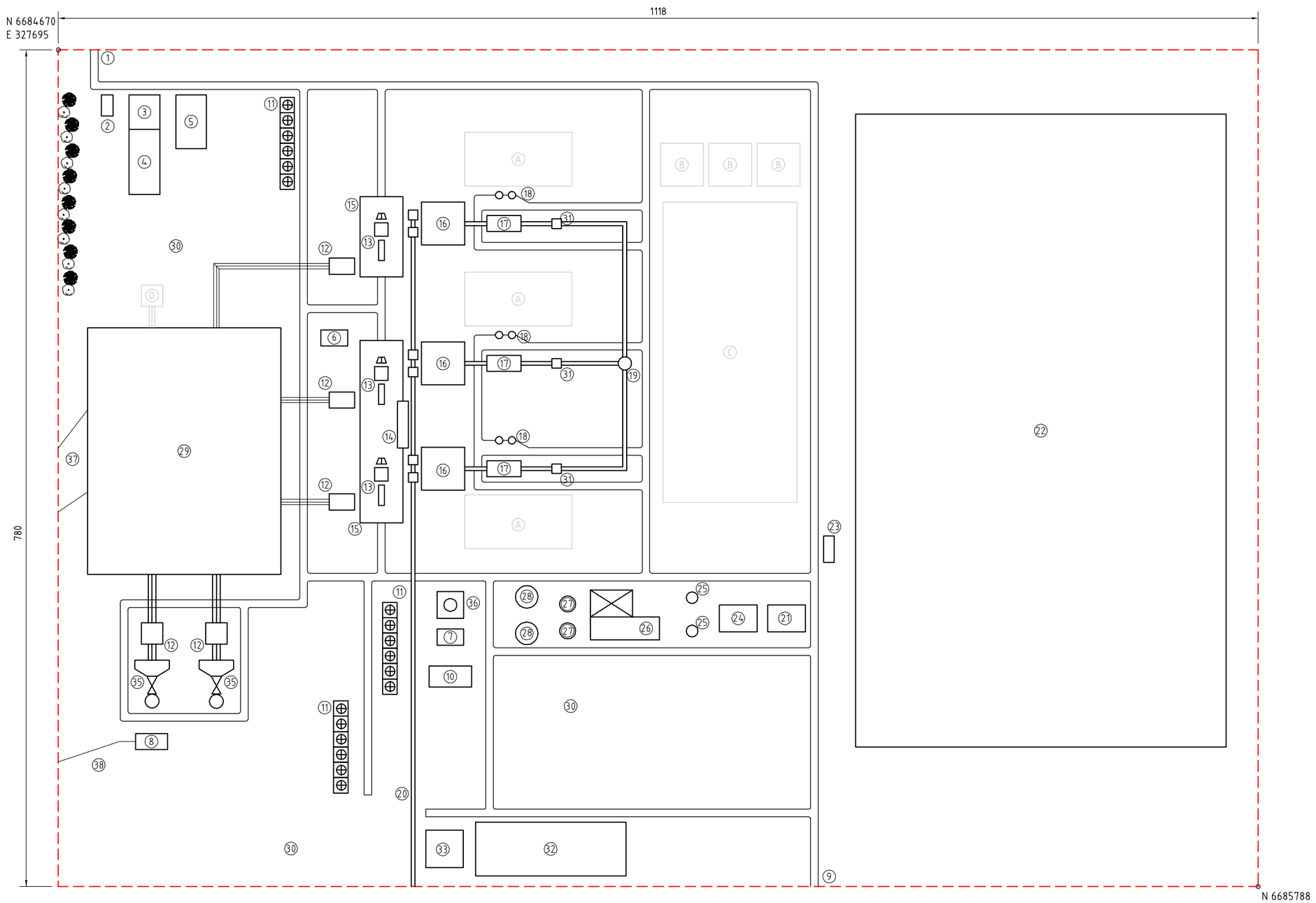
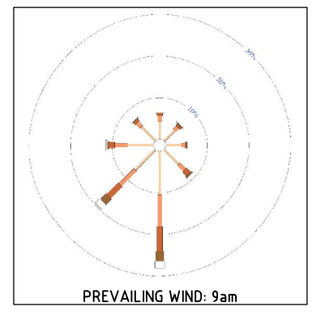


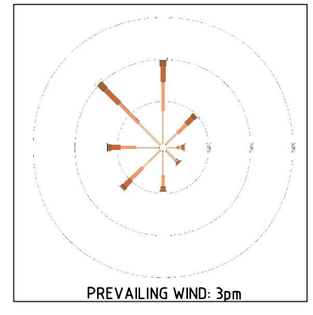
1. Plant Main Gate
2. Plant Security Office
3. Parking
4. Administration and Canteen Building
5. Warehouse / Laboratory / Workshop
6. Diesel Generator House
7. Compressor House
8. Fuel Gas Conditioning Area
9. Side Gate for Ash / Trucks
10. Effluent Treatment Plant
11. Cooling Towers
12. Transformer Area
13. Steam Turbine Generator (STG)
14. Main Control Room
15. Turbine Hall
16. Boiler
17. Particulate Control
18. Ash Silos
19. Chimney
20. Plant Coal Conveyor
21. Raw Water Aerator and Clarifier
22. Raw Water Reservoir
23. Fire Fighting Pump House
24. Reverse Osmosis Plant
25. RO Permeate Storage
26. D.M. Water Plant
27. D.M. Water Storage
28. Cooling Tower Make-up Storage
29. Switchyard
30. Contractor's Laydown Area
31. I.D Fans
32. Limestone Stockpile
33. Limestone Mill
34. Wastewater Evaporation Pond
35. Gas Turbine Generator (Open Cycle)
36. Fuel Oil Storage
37. Transmission Line
38. Fuel/Gas Line

SPACE ALLOWANCES FOR FUTURE EXPANSION

A. Air Separation Unit
B. Carbon Dioxide Pressurization
C. Carbon Capture Plant
D. Transformer Bay

FUTURE EXPANSION





PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECK	DESIGN	VERIFY
H	22.10.08	COORDINATES CORRECTED	MAH	SW	SW	MF
G	21.10.08	EVAPORATION POND LOCATION CHANGED	MAH	SW	SW	MF
F	13.10.08	GENERAL REVISION	MAH	SW	SW	MF
E	09.10.08	CONFIGURATION CHANGED TO 3x150 UNITS	MAH	SW	SW	MF
D	12.08.08	CCGT CHANGED TO OCGT	MAH	SW	SW	MF
C	06.05.08	PLANT LAYOUT REVISED		SW	MF	MF
B	09.01.08	GENERATING UNITS MOVED CLOSER TOGETHER	TA	SW	MF	MF

DRAWING CHECK PRINT

DATE RAISED 22 / 10 / 08	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION		

SCALES

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Full Size 1:2000 ; Half Reduction 1:4000
SCALE (m)

A1 ORIGINAL
DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY
VERIFY ALL DIMENSIONS ON SITE

APPROVED FOR AND ON BEHALF OF
PARSONS BRINCKERHOFF AUSTRALIA PTY LIMITED

SIGNED

DATE RPEQ No.

PB PARSONS BRINCKERHOFF
Adelaide, Bendigo, Brisbane, Melbourne, Newcastle, Perth, Singleton, Sunshine Coast and Sydney
12th Floor IBM Centre
348 Edward Street
Brisbane QLD 4000
GPO BOX 2907
Brisbane QLD 4000
Australia
ABN 80 078 004 798
Telephone +61 7 3218 2222
Facsimile +61 7 3831 4223
Email: brisbane@pbcom.au

CLIENT
AVIVA CORPORATION LTD

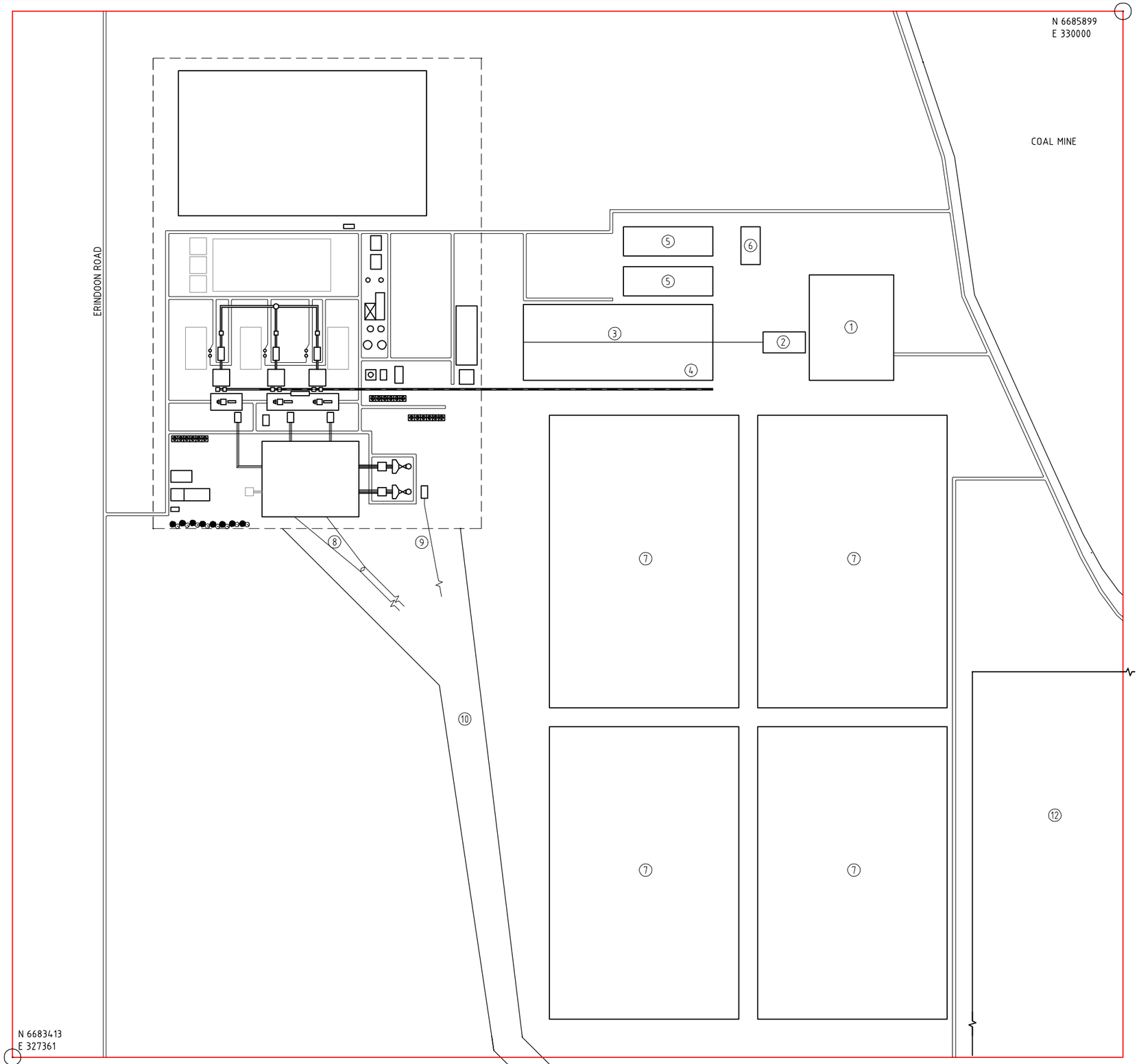
PROJECT
COOLIMBA POWER STATION
PLANT LAYOUT

PROJECT No.	DISCIPLINE	NUMBER	REV.
2158523A	- LYT -	0001	H

100mm AT FULL SIZE

Plotted By: HamillM Plot Date: 22/10/08 - 15:29 Cad File: T:\BNE - PBP - P - Projects\2158523 Aviva Coolimba\5.0 Technical\Drawings\2158523A-LYT-0001 REV H.dwg

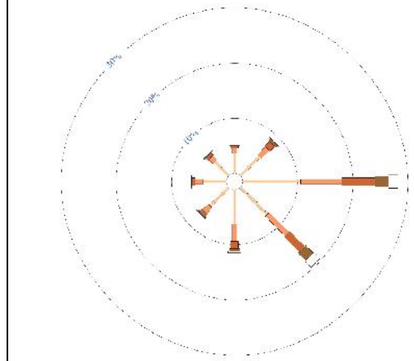
2158523A-LYT-0002 REV G



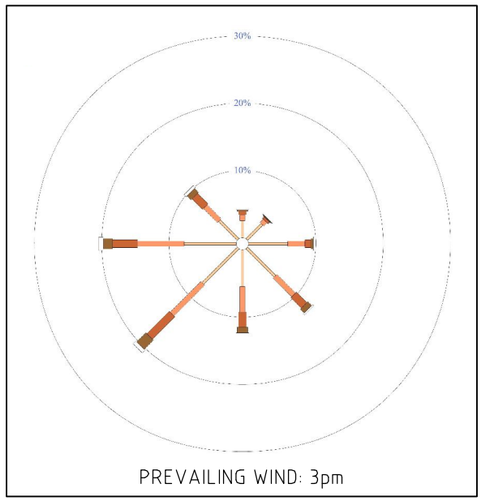
LEGEND

1. EMERGENCY ROM STOCKPILE
2. SCREEN / SIZE
3. SKYLINER STACKER
4. COAL STOCKPILE (500,000T)
5. STORM WATER RUNOFF SETTLING POND
6. WORKSHOP
7. WASTEWATER EVAPORATION PONDS
8. POWER LINE
9. GAS PIPELINE
10. POWER AND GAS EASEMENT
11. INITIAL DEWATERING STORAGE DAM (NOT SHOWN)
12. WASTE DUMP

REFER DRG. 2158523A-LYT-0001



PREVAILING WIND: 9am



PREVAILING WIND: 3pm

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

REV	DATE	DESCRIPTION	DRAWN	CHECK	DESIGN	VERIFY
G	22.10.08	COORDINATES CORRECTED	MAH	SW	SW	MF
F	21.10.08	EVAPORATION POND LOCATION CHANGED	MAH	SW	SW	MF
E	13.10.08	GENERAL REVISION	MAH	SW	SW	MF
D	09.10.08	CONFIGURATION CHANGED TO 3x150 MW UNITS	MAH	SW	SW	MF
C	12.08.08	CCGT CHANGED TO OCGT	MAH	SW	SW	MF
B	02.07.08	EVAPORATION PONDS REVISED	RH	SW	SW	
A	06.05.08	PRELIMINARY ISSUE	MAH	SW	SW	MF

DRAWING CHECK PRINT		
DATE RAISED 22 / 10 / 08	BY	DATE
DRAFTING CHECK		
ENGINEERING CHECK		
BACK-DRAFTING CHECK		
NEXT ACTION		

SCALES

0 50 100 200 300
Full Size 1:5000 : Half Reduction 1:10000
SCALE (m)

A1 ORIGINAL
DO NOT SCALE THIS DRAWING - USE FIGURED DIMENSIONS ONLY
VERIFY ALL DIMENSIONS ON SITE

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12th Floor IBM Centre
348 Edward Street
Brisbane QLD 4000
GPO BOX 2907
Brisbane QLD 4000
Australia
ABN 80 078 004 798
Telephone +61 7 3218 2222
Facsimile +61 7 3831 4223
Email: brisbane@pbcom.au

CLIENT
AVIVA CORPORATION LTD

PROJECT
COOLIMBA POWER STATION
PLANT LAYOUT

PROJECT No.	DISCIPLINE	NUMBER	REV.
2158523A	- LYT -	0002	G

100mm AT FULL SIZE

Plotted By: HamillM Plot Date: 22/10/08 - 15:34 Cad File: T:\BNE - PBP - P - Projects\2158523 Aviva Coolimba\5.0 Technical\Drawings\2158523A-LYT-0002 REV G.dwg

APPENDIX B : SOUND POWER SPECTRA

Table B 1: Individual equipment sound power spectra

Plant Area	Source	Spectrum – dB(lin)									Overall	
		31.5	63	125	250	500	1k	2k	4k	8k	dB(lin)	dB(A)
Cooling Towers	Cooling Tower Bank 1 (West)		112.2	109.1	104.6	100.2	98.0	93.8	91.0	88.1	114.7	103.6
Cooling Towers	Cooling Tower Ban 2 (Mid)		112.2	109.1	104.6	100.2	98.0	93.8	91.0	88.1	114.7	103.6
Cooling Towers	Cooling Tower Bank 3 (East)		112.2	109.1	104.6	100.2	98.0	93.8	91.0	88.1	114.7	103.6
Boiler	Boiler ID Fan 1 (West)	113.0	107.4	105.1	105.7	102.1	95.2	91.7	89.1	78.4	115.4	103.0
Boiler	Boiler ID Fan 2 (Mid)	113.0	107.4	105.1	105.7	102.1	95.2	91.7	89.1	78.4	115.4	103.0
Boiler	Boiler ID Fan 3 (East)	113.0	107.4	105.1	105.7	102.1	95.2	91.7	89.1	78.4	115.4	103.0
Boiler	Boiler 1 (West)	120.9	115.3	110.1	109.2	109.2	108.5	109.9	108.5	107.1	123.3	115.8
Boiler	Boiler 2 (Mid)	120.9	115.3	110.1	109.2	109.2	108.5	109.9	108.5	107.1	123.3	115.8
Boiler	Boiler 3 (East)	120.9	115.3	110.1	109.2	109.2	108.5	109.9	108.5	107.1	123.3	115.8
Boiler	Particulate Control 1 (West)	102.5	96.9	91.7	90.8	90.8	90.1	91.5	90.1	88.7	104.9	97.4
Boiler	Particulate Control 2 (Mid)	102.5	96.9	91.7	90.8	90.8	90.1	91.5	90.1	88.7	104.9	95.4
Boiler	Particulate Control 1 (East)	102.5	96.9	91.7	90.8	90.8	90.1	91.5	90.1	88.7	104.9	
Conveyors	Conveyors (stockpile to boilers)	110.9	99.0	98.6	97.4	97.3	93.2	89.1	85.8	78.3	111.8	98.6
Stack	Stack	110.0	109.0	100.0	98.0	91.0	81.0	70.0	67.0	67.0	112.9	93.2

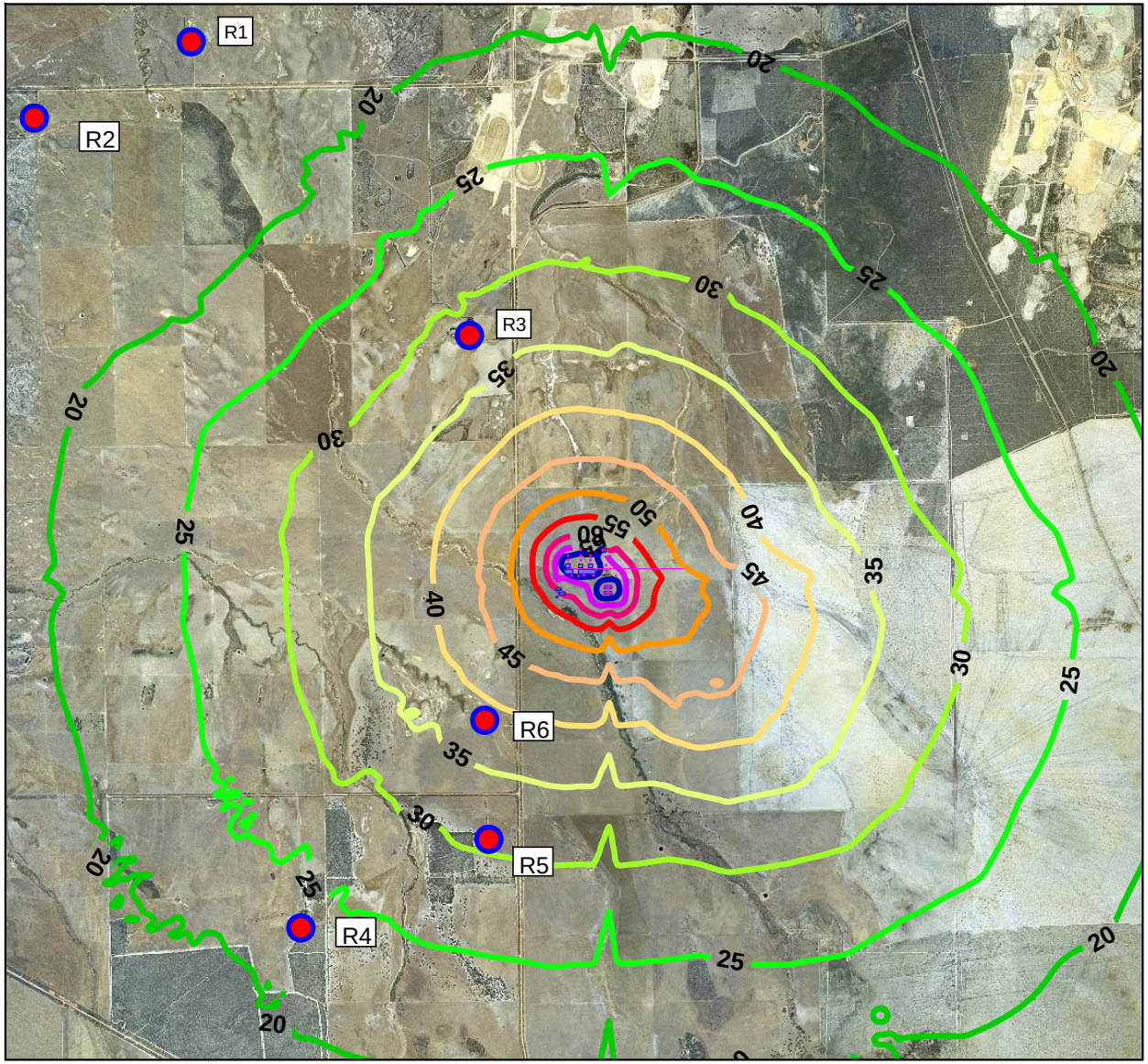
Plant Area	Source	Spectrum – dB(lin)									Overall	
		31.5	63	125	250	500	1k	2k	4k	8k	dB(lin)	dB(A)
Turbine Hall	Transformer 1 (West)	88.5	99.6	106.0	98.5	96.5	94.0	91.3	87.5	80.4	108.2	99.7
Turbine Hall	Transformer 2 (Mid)	88.5	99.6	106.0	98.5	96.5	94.0	91.3	87.5	80.4	108.2	99.7
Turbine Hall	Transformer 2 (East)	88.5	99.6	106.0	98.5	96.5	94.0	91.3	87.5	80.4	108.2	99.7
Turbine Hall	Turbine Hall (West)	103.6	102.0	99.4	95.3	93.4	94.1	94.3	89.3	88.6	107.8	99.8
Turbine Hall	Turbine Hall (East)	106.4	104.9	102.3	98.2	96.3	97.0	97.2	92.2	91.5	110.6	102.7
Utilities	Compressor House		92.2	92.1	90.6	94.2	97.0	96.8	95.0	92.1	103.4	102.6
Utilities	Diesel Generator	95.2	91.0	98.6	96.3	102.0	101.7	98.1	90.5	81.3	107.4	105.2
Utilities	Water Processing	94.5	87.3	92.6	94.2	94.0	97.3	95.9	94.2	88.4	103.6	102.0
Gas Turbines	GT1 Package		129.0	121.0	120.0	111.0	106.0	102.0	101.0	93.0	130.2	115.1
Gas Turbines	GT2 Package		129.0	121.0	120.0	111.0	106.0	102.0	101.0	93.0	130.2	115.1

APPENDIX C : NOISE CONTOURS

COOLIMBA POWER STATION

Noise Contours for Worst Case Night-time Conditions - Prepared 4 Nov 08

Figure C1



Noise levels
dB(A)

20
25
30
35
40
45
50
55
60
65
70

Length Scale 1:70000

0 0.5 1 2 km

SVT ENGINEERING CONSULTANTS

112 Cambridge Street
West Leederville WA 6007
Ph: +61 8 9489 2000
Fax: +61 8 9489 2088