



WHITEHAVEN COAL

Tarrawonga Coal Pty Ltd

ABN: 73 100 742 185

**Annual Environmental
Management Report (ML 1579)
and Annual Review (DA 88-4-
2005 MOD 1)**

for the

Tarrawonga Coal Mine



1 May 2011 – 30 April 2012

Tarrawonga Coal Pty Ltd

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Annual Review (DA 88-4-2005 MOD 1)
for the
Tarrawonga Coal Mine**

MOP Commencement Date **1-07-2010** – MOP Completion Date **30-06-2013**
AEMR Commencement Date **1-05-2011** – AEMR Completion Date **30-04-2012**

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- Department of Trade and Investment, Regional Infrastructure and Services – Primary Industries, Food and Water
- NSW Office of Water
- Gunnedah Shire Council
- Narrabri Shire Council
- Tarrawonga Coal Mine Community Consultative Committee

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ACRONYMS USED THROUGHOUT THIS DOCUMENT

AEMR	- Annual Environmental Management Review
AQIA	- Air Quality Impact Assessment
BCD	- Bollol Creek Downstream
BCU	- Bollol Creek Upstream
BOS	- Biodiversity Offset Strategy
CCC	- Community Consultative Committee
CHPP	- Coal Handling and Preparation Plant
DA	- Development Application
DECCW	- Department of Environment, Climate Change and Water (now EPA)
DoP	- Department of Planning (now DoPI)
DoPI	- Department of Planning and Infrastructure
DRE	- Division of Resources and Energy
EA	- Environmental Assessment
EC	- Electrical Conductivity
EEO	- Energy Efficiency Opportunity
EIS	- Environmental Impact Statement
EL	- Exploration Licence
EPA	- Environment Protection Authority
EPL	- Environment Protection Licence
I&I NSW	- Industry and Investment NSW (now DRE)
LOM	- Life-of-Mine
ML	- Mining Lease or Megalitres
MOP	- Mining Operations Plan
MSDS	- Material Safety Data Sheet
NCD	- Nagero Creek Downstream
NCU	- Nagero Creek Upstream
OEH	- Office of Environment and Heritage
PEA	- Preliminary Environmental Assessment
PM ₁₀	- Particulate Matter 10 microns in diameter or smaller
PRP	- Pollution Reduction Program
ROM	- Run-of-Mine
SB	- Sediment Basin
SD	- Storage Dam
SWL	- Standing Water Level
TCPL	- Tarrawonga Coal Pty Ltd
TSP	- Total Suspended Particles
TSS	- Total Suspended Solids
WCL	- Whitehaven Coal Limited
WC MPL	- Whitehaven Coal Mining Pty Ltd

1 INTRODUCTION AND OBJECTIVES

1.1 Scope

1.1.1 Introduction and Period of Reporting

This is the sixth Annual Environmental Management Report (AEMR) produced for the Tarrawonga Coal Mine, and it has been prepared in accordance with Condition 3 of Mining Lease (ML 1579) (Mining Act 1992) and Condition 3 (Schedule 5) of DA 88-4-2005 MOD 1. The AEMR generally follows the format identified in the Department of Primary Industries Mineral Resources (DPI-MR) document entitled *“Guidelines to the Mining, Rehabilitation and Environmental Management Process”* Version 3 dated January 2006. It also addresses Condition 3 (Schedule 5) of DA 88-4-2005 MOD 1 which requires provision of an Annual Review and is herein referred to as an AEMR/Annual Review.

Though primarily covering the period from 1st May 2011 to 30th April 2012 (the reporting period), where relevant the AEMR/Annual Review provides information on historical aspects of the operations, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing period, i.e. from 1st May 2012 to 30th April 2013, or beyond.

The Tarrawonga Coal Mine is located within the Narrabri Shire, approximately 42 km north-northwest of Gunnedah, and is 15 km north-east of Boggabri (Figure 1).

1.1.2 The Company

Tarrawonga Coal Mine is owned by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Mining Pty Ltd (WCMPL) (70%) and Idemitsu Boggabri Coal Ltd (IBC) (30%). WCMPL is a subsidiary company of Whitehaven Coal Limited (WCL), a publicly listed company which has several coal mining interests in the Gunnedah region of NSW. The mine is operated by WCMPL.

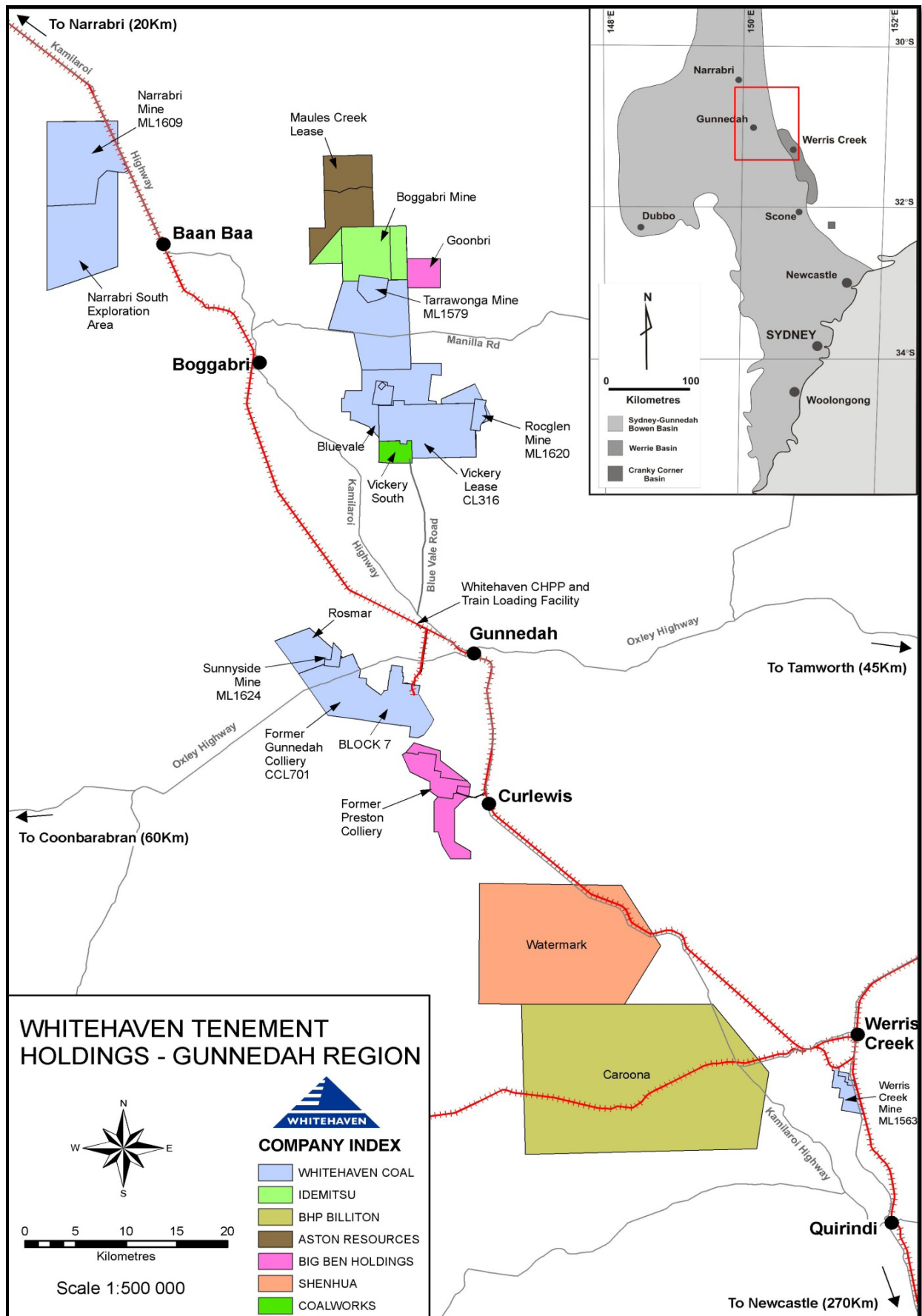


Figure 1 - Locality Plan

WCL's coal mining assets are as follows:

- Canyon Coal Mine (formerly Whitehaven Coal Mine), 10km south of Tarrawonga, 100% owned by WCL, which ceased production in July 2009 and is currently under final rehabilitation;
- Whitehaven Rail Siding and Coal Handling and Preparation Plant (CHPP), 6km north-west of Gunnedah, 100% owned by WCL;
- Werris Creek Coal Mine, 4km south of Werris Creek, 100% owned by WCL;
- Narrabri Underground Coal Mine, 30km south-southeast of Narrabri, 70% owned by subsidiary company Narrabri Coal Pty Ltd. Production commenced mid 2010.
- Rocglen Coal Mine (formerly Belmont Coal Mine), 28km north of Gunnedah, 100% owned by WCL, which commenced operations in 2008;
- Sunnyside Coal Mine, 15km south west of Gunnedah, 100% owned by subsidiary company Namoi Mining Pty Ltd, which commenced production in 2008;
- WCL also has 100% ownership of the Bonshaw project near Ashford, and
- 100% ownership of the former Gunnedah Colliery through Namoi Mining Pty Ltd;
- 100% ownership of the former Vickery site, with environmental assessment work underway with a view to re-opening the former Vickery and adjacent deposits;
- 100% ownership of the Maules Creek Project, via the Aston Resources/Whitehaven merger. The Environmental Assessment for the Project is currently being determined by the Department of Planning and Infrastructure.
- WCL is also actively pursuing other prospective tenements with a view of maintaining a long-term presence in the Gunnedah Basin.

1.1.3 Background and History of the Tarrawonga Coal Mine

The Tarrawonga Coal Mine was developed after substantial investigations were undertaken under Exploration Licence 5967, granted in July 2002. Following completion of relevant assessments and studies, the Department of Planning provided approval to the development via Development Consent (DA-88-4-2005) on the 9th November 2005. Environment Protection Licence (EPL) 12365 was also granted on 9th January 2006.

The Development Consent provided for the extraction of approximately 12.4 million tonnes of ROM coal, at a maximum rate of 2 million tonnes per year. The consent allowed for the crushing and screening of ROM coal at the mine site prior to transport to the Whitehaven CHPP near Gunnedah. It also allowed for the disposal of rejects from the Whitehaven CHPP at the mine.

Prior to commencement of operations in 2006, a Mining Operations Plan (MOP) was developed for a period of up to 6 years, until February 2012. In late 2009, following additional exploration works, an extension of the open cut pit limit and modifications to the northern and southern waste emplacements were identified to enable access to a further 4 million tonnes of coal. Consequently, a modification to the original consent DA-88-4-2005 was applied for under Section 75W of the *Environmental Planning and Assessment Act*. This modification was approved on 15th October 2010. As a consequence of this approval, an amendment to the existing MOP was developed and subsequently approved by the former I&I NSW in December 2010 (effective from the period 1st July 2010 – 30th June 2013).

Taking into consideration coal extraction rates up to 2010, the additional resource available, and an increase in productivity to 2 Mtpa, it is anticipated that the identified coal resource within the open cut pit limit will be exhausted by mid 2013.

The external boundary of ML 1579 corresponds to the DA Area referred to in DA 88-4-2005 MOD 1 and covers an area of approximately 656 ha.

1.1.4 Products and Markets

Coal within the Tarrawonga coal deposit can be described as a high volatility coal which will produce a very low sulphur semi-soft coking/thermal coal with typically <10% ash. It is expected that up to 65% of coal produced would be suitable for marketing as a thermal or semi soft coking coal without the requirement for further washing. The coal also contains a low percentage of sulphur and phosphorous and exhibits a high energy.

The majority of coal produced is exported to Asia. Tarrawonga mine produces thermal coal which is suitable for power generation and for use in steel mills.

1.1.5 Operational and Environmental Management

1.1.5.1 Contacts

The management personnel responsible for operational and environmental performance at the Tarrawonga Coal Mine and their relevant contacts are as follows:

- Mr Chris Stephens, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6743 4000.
- Mr Casper Dieben, General Manager, Operations - oversees open cut operations for the Whitehaven Group. Contact: 0407 123 958.
- Mr Danny Young, Environmental Manager – oversees day to day environmental and rehabilitation performance across the site. Contact: (02) 6741 9316 or mobile: 0427 497 710.

Mining operations are undertaken by Whitehaven Coal Mining Pty Ltd personnel. The day-to-day operational responsibilities are allocated to the Project Manager, Mr Jason Conomos. Contact: (02) 6743 4000.

1.1.5.2 Support Personnel

In addition to the personnel identified in Section 1.1.5.1, Tarrawonga Coal utilises specialist assistance as and when required. Specialist environmentally-based or related companies or consultants involved in activities at the mine during the reporting period included:

- ALS Acirl Pty Ltd;
- PAE Holmes;
- Eco Logical Australia Pty Ltd;
- Orica Blasting Limited;
- Spectrum Acoustics;
- G&B Ward Earthmoving;
- URS Australia;
- Dust Control Solutions;
- Geoterra Pty Ltd;
- Lindsay Gilbert & Associates Pty Ltd.

All mining and environmental management activities are undertaken generally in accordance with the MOP, management plans and procedures prepared in satisfaction of Tarrawonga Coal's Mining Lease, EPL 12365, Development Consent and the relevant legislation.

1.1.6 Corporate Environmental Policy

WCL has a documented Health, Safety and Environmental Policy which states:

Whitehaven intends to conduct business in a way that maintains a safe and healthy workplace for its employees, contractors, visitors and the surrounding community and will protect the environment in all stages of exploration, mining, processing and train loading.

Whitehaven aims to:

- *Achieve zero injuries and occupational illnesses.*
- *Achieve zero equipment damage.*
- *Achieve zero environmental incidents.*

Whitehaven will strive to achieve these goals by:

- *Ensuring health, safety and environment is considered in all planning and work activities.*
- *Involve employees through regular communication, consultation and training.*
- *Identifying and controlling all potential hazards in the workplace through hazard identification and risk analysis.*
- *Ensuring all incidents are reported, controlled and learning's applied and shared.*
- *Providing effective injury management and rehabilitation for all employees.*
- *Seeking continuous improvement in performance by taking into account employee & community concerns and advances in health, safety and environment.*
- *Complying with legislative and other requirements and providing necessary training and resources.*

Whitehaven will ensure the availability of human, financial and physical resources to maintain and implement the Health and Safety Management System.

Responsibilities of people employed at Whitehaven Coal:

All persons employed by Whitehaven have a personal responsibility to comply with this policy and associated Health, Safety & Environment systems. No work is to be undertaken without a clear understanding of a safe method that minimizes the risk of injury, equipment damage and environmental harm.

Whitehaven employees shall:

- *Work in a healthy, safe and environmentally responsible manner.*
- *Encourage others to work in a healthy, safe and environmentally responsible manner.*
- *Promptly report incidents, unsafe practices or conditions and environmental concerns as they become apparent.*
- *Co-operate with Management in the support of promotion of health and safety responsible environmental management in the work place.*

This policy applies to all mines operated by Whitehaven Coal Limited and its subsidiaries.

1.2 Approval Status

1.2.1 Leases, Licences and Approvals

Table 1 identifies the leases, licences and approvals in place for the Tarrawonga Coal Mine at the end of the reporting period, the issuing/responsible Authority, dates of issue, duration (where limited) and relevant comments. The list is presented chronologically according to the date of issue.

Reviews of compliance/performance with the conditions identified in DA-88-4-2005 MOD 1 (Appendix 1), EPL 12365 (Appendix 2), and ML 1579, are presented in Appendix 3, Tables A3-1, A3-2 and A3-3 respectively.

1.2.2 Amendments to Leases, Licences and Approvals

Amendments to leases, licences and approvals for the Tarrawonga Coal Mine during the reporting period (or planned for the next reporting period) are as follows:

- EPL 12365 – a licence variation application was submitted to OEH in August 2011 with the following variations:
 - Replacing deposited dust gauge D3 with deposited dust gauge D15. D3 was located in close proximity to an unsealed road which has resulted in consistently elevated deposited dust levels. D15 is located on the same property in an area which is closer to the mine and further from the unsealed road;
 - Inclusions of additional wet weather discharge points SB22, SB23 and SB24, which were installed as part of the approved modification;
 - Inclusion of a condition that allows for exceedance of TSS concentration limits for licenced discharge points during rainfall events that exceed 38.4mm of rainfall (5 day 90%ile rainfall depth). Discharge dams have been designed to have sufficient storage to contain the nominated rainfall event;
 - Variation of the noise criteria to align with DA 88-4-2005 MOD 1 (37dB(A) for “Kyalla”);
 - Amendment to blasting hours to 9am to 5pm Monday to Saturday inclusive, to align with blasting hours specified in DA 88-4-2005 MOD 1; and
 - Inclusion of continuous real-time air quality and noise monitoring.

The variations were subsequently approved via issue of an updated EPL on the 20th December 2011 which also included:

- More comprehensive requirements for noise monitoring;
 - A requirement for a site specific Best Management Practice determination to be conducted to identify the most practicable means to reduce particulate emissions; and
 - Removal of monitoring sites that are located on project related properties.
- MOP – An error with the blasting hours specified in the currently approved MOP was identified in January 2012 whereby the MOP only allowed for blasting on Monday to Friday compared to DA 88-4-2005 MOD 1 and EPL 12365 which also allowed for blasting on Saturdays. Whitehaven requested written advice from DRE as to their acceptance of blasting on Saturdays and an acceptance letter was issued by the Department on the 6th January 2012.
 - A number of management plans were updated during the last reporting period in accordance with DA 88-4-2005 MOD 1. Responses were received for some plans during the later stages of this reporting period. These plans will be updated as required during the coming months and the remaining plans will be finalised following receipt of comments from relevant Departments.

A Project Application and Preliminary Environmental Assessment (PEA) for a proposed life of mine (LOM) extension were submitted to the former Department of Planning in February 2011. An Environmental Assessment was subsequently prepared to address the items contained in the Director General's requirements, which were issued 7th July 2011. The Project Application was endorsed as proceeding under the provisions of Part 3A of the *Environmental Planning and Assessment Act 1979*, which was still current at the time of the application. The Environmental Assessment was submitted for adequacy review on 7th November 2011 and was subsequently placed on public exhibition over the period 24th January 2012 to 29th February 2012. The application is currently pending determination.

If further approvals are obtained, a new MOP will be developed at that time which will provide for a full 7 year MOP term.

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Department of Primary Industries (DPI) ^{*1}	Exploration Licence (EL 5967)	24/07/2002	23/07/2012	Renewed 4/10/2007 until 23 July 2012
DA originally issued by Minister for Infrastructure and Planning ^{*2}	Development Application (DA) 88-4-2005	09/11/2005	09/11/2017	Original consent
Department of Primary Industries - Mineral Resources ^{*1}	Mining Lease (ML) 1579	03/04/2006	02/04/2027	Expires 21 years from commencement
Department of Primary Industries - Mineral Resources ^{*1}	Mining Operations Plan (MOP)	09/05/2006	28/02/2012	Replaced by MOP Amendment approved in 2010 (see below)
Department of Environment, Climate Change and Water (DECCW) ^{*3}	Environment Protection Licence (EPL) No. 12365 (Appendix 2)	09/01/2006	Anniversary date: 9 January	Variations to EPL made in Dec 07, Sep 08, May 09 and Dec 11
Department of Water and Energy (DWE) ^{*4}	90BL253276 90BL253278 90BL253279 90BL253280 90BL254253 90BL254254 90BL254255 90BL254221 90BL254214 90BL255766 90BL254692	18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 18/05/2006 24/04/2007 05/04/2007 04/04/2007 19/08/2012 12/05/2009	Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity 11/05/2014	Monitoring bores 50ML Mining
Director, Mining and Industry Projects for Department of Planning ^{*2}	Notice of Modification (DA) 88-4-2005 MOD 1 (Appendix 1)	15/10/2010	09/11/2017	Modification to original consent
Industry & Investment NSW ^{*1}	Mining Operations Plan (MOP) Amendment	01/07/2010	31/06/2013	Current for a term of 3 years

^{*1} Now, Department of Trade and Investment, Regional Infrastructure and Services, Division of Resources and Energy (DTIRIS – DRE)
^{*2} Now, Department of Planning and Infrastructure (DoPI)
^{*3} Now, Office of Environment and Heritage (EOH)
^{*4} Now, NSW Office of Water (NOW)

The annual environmental meeting for the 2010/2011 AEMR for the Tarrawonga Coal Mine was undertaken by DRE on the 24th April 2012. General compliance was

noted during the inspection with special mention for the effective management of the workshop and laydown area, especially in relation to hydrocarbon management.

The delay in rehabilitation as a result of the proposed LOM extension was discussed however DRE noted that rehabilitation had recently commenced on the western face of the southern emplacement.

The issues identified by DRE are provided in Table 2 with actions undertaken to address the issues discussed below.

Table 2 – DRE Review Issues/Considerations

No.	Issue/Observation	Action to be completed	Due
1	Workshop drain blocked with sediment	Desilt drain adjacent to the new concreted area to allow clear drainage.	Immediately and report in the next AEMR
2	No bioremediation area	Construct bioremediation area.	Next AEMR

1. The drain was cleaned immediately following the inspection. The acceptance letter from DRE noted that this action had been completed.
2. A bioremediation area will be constructed during the next reporting period.

2 SUMMARY OF OPERATIONS

2.1 Exploration, Resources / Reserves and Mine Life

2.1.1 Exploration

During the reporting period, a contractor drilled six HQ cored holes for a total of 871m, and 50 open holes for 5,711m.

In addition 29 open holes were drilled using the mine's blasthole drill rig, for a total of 1,408m. All holes were logged by a geologist.

2.1.2 Resources and Reserves

Eight coal seams are present within the Tarrawonga Open Cut and are listed below in increasing depth from the surface:

- Braymont (BR);
- Bollol Creek (BC);
- Jeralong (JE);
- Jeralong Lower (JEL);
- Merriown (ME);
- Merriown Lower (MEL);
- Velyama (VE); and
- Nagero (NA).

The coal seams range in thickness up to 4.0m, with an average thickness of 1.5m. Significant conglomerate interburden below the Nagero seam presents a practical divide between those seams mineable by open cut methods and those for which the potential may exist for future underground mining (the Northam, Therribri, Flixton and Tarrawonga seams).

2.1.3 Estimated Mine Life

The total thickness of the coal to be mined is approximately 20m with the depth below the natural surface varying between 20m and 120m. It is estimated that the coal resource remaining within the current approved Tarrawonga deposit will be exhausted within the term of the current MOP.

2.2 Land Preparation

Land preparation activities undertaken at the mine during the reporting period were conducted in accordance with commitments identified in Section 3 of the MOP and included:

- Vegetation removal in advance of the active pit over an area of approximately 17.7 ha comprising the White Cypress Pine – Narrow-leaved Ironbark Shrub/Grass Open Forest of the Western Nandewar Bioregion vegetation type.
- The White Box grassy woodland of the Nandewar and Brigalow Belt South bioregions (Zone 5 – Grassy White Box Community and Zone 4 – Grassy White Box Community Derived Grassland – Continued Grazing) was also disturbed during the reporting period in the areas of the relocated soil stockpile and the infrastructure area to the west of the main access road.
- Stripping of topsoil, subsoil and friable overburden was undertaken over the area cleared of vegetation. All soil stripped during the reporting period was classified as Soil Mapping Unit 1 from the current MOP.
- During the reporting period, a total of 399,031 m³ topsoil, subsoil and friable overburden was stripped. Existing stockpile locations are shown on Plan 3.

Table 3 shows that at the end of the reporting period, a total of 57,460 m³ subsoil and topsoil had been replaced on reshaped areas of the final landform. A further 799,797 m³ of topsoil and subsoil remains stockpiled within the mining lease. This stockpiled volume represents a significant reduction in the previously reported stockpiled volumes (2010/11 FY - 1,293,423 m³) however it provides a much more accurate representation of actual stockpiled volumes as it has been estimated by recent survey. The inaccuracy in soil stockpile volumes is believed to have occurred during 2008/2009 and is likely to have coincided with the changeover to the Pulse production reporting system.

An additional row has been added to Table 3 this year to include details on domestic coal haulage.

During the reporting period, the mine, which was developed as a series of approximately 60 m wide strips, advanced approximately 180m to the south and east. This comprises the actual working pit area and stripping in advance of the open cut.

Approximately 148,000 tonnes of coarse reject was disposed at the site during the reporting period. This is approximately 50,000 tonnes less than the previous reporting period which is a result of coarse reject being stored at the Whitehaven CHPP for construction of three new fine reject ponds.

Table 3 - Production and Waste Summary

	Cumulative Production			
	Start of Reporting Period (up to 30/4/11)	During Reporting Period (1/5/11 to 30/4/12)	Cumulative Total at End of Reporting Period	End of next Reporting Period (estimated)
Soil Stripped (m ³)	1,066,586	87,539	1,154,125	1,170,000
Soil Used/spread (m ³)	266,789	57,740	324,529	340,000
Waste Rock (m ³)	60,490,610	19,743,814	80,234,424	103,000,000
ROM Coal (t)	6,589,385	1,746,625	8,336,010	10,300,000
Product (t)	5,758,585	1,626,555	7,385,140	9,293,140
Domestic Product (t)	41,804	47,538	89,342	143,342

ROM Coal is total production at the mine site. The difference between ROM Coal and final Product is related to changes in stockpile volumes both at the mine and the CHPP during the reporting period.

2.3 Construction

Construction activities over the last 12 months have generally been limited to water storage facilities, namely SB24, SB22 and additional pit water storage dam PW3. SB16 was also extended to increase dirty water storage capacity.

2.4 Mining

2.4.1 Mining Method

All mining during the reporting period was undertaken by open cut methods using the techniques identified in the MOP, namely:

- Separate topsoil and subsoil removal by open bowl scraper;
- Friable overburden removal by scraper;
- Drilling and blasting the underlying competent overburden;
- Overburden (and interburden) removal by bulldozers and/or excavator and dump trucks, with the overburden placed in and over the mined-out areas of the open cut; and
- Coal extraction by excavator loading into haul trucks for transport to the ROM stockpile.

All coal was assessed in pit and, depending on the seam, known quality and the extent of dilution, was classified into:

- “clean” - (by-pass) top seam; and
- “dirty” - (to be washed);

The in-pit classification determines the form of subsequent processing undertaken on-site or off-site.

During the reporting period, a total of 19,743,814 bcm friable and competent overburden was removed to produce 1,746,625 t ROM coal at an average overburden:coal stripping ratio of 11:1 (See Table 3). The higher strip ratio is a result of mining through the hill section of the ML where greater overburden removal is required to access the coal.

Plan 4 presents the status of mine and infrastructure development as of 30 April 2012. Plan 4 also identifies the limit of mining at the commencement of the reporting period.

2.4.2 Mining Constraints

Day-to-day mining activities are primarily constrained by economic considerations which, in turn, are determined to a large extent by factors beyond Tarrawonga Coal’s control (i.e. coal price and demand). Economic factors determine the viability of the determined overburden:coal stripping ratio and hence the lateral extent of mining undertaken.

Other constraints to mining operations at the mine have included or continue to include:

- The depth of weathering of the coal seams which influences the volume of overburden requiring removal to access the coal;
- The potential presence of faulting within the seam structure which may influence the sequence and possibly the method of mining;
- The potential for an uneven coal seam floor which could potentially complicate vehicular access to the coal;
- Agricultural and ecological considerations;
- Inclement weather; and
- The existence of Aboriginal heritage sites within the ML area.

2.4.3 Mining Equipment

Table 4 presents a list of mining equipment in use at the mine at the end of the reporting period, together with its principal function(s) and frequency of use.

Table 4 - Mining Equipment

ITEM	NUMBER IN OPERATION	FUNCTION
O & K RH170 Excavator	3	Overburden excavation and loading
Hitachi EX1900 Excavator	1	Overburden / interburden / coal loading
Hitachi EX2500 Excavator	1	Overburden excavation and loading
Terex Dump Truck	7	Overburden / interburden
CAT 785 Dump Trucks	3	Overburden / interburden
CAT Dump Truck 777F	3	Overburden / interburden / coal haulage
Terex SK50 Drill	1 (f/t), 1 (p/t)	Blasthole drilling
Cubex 1320 Drill	1	Blasthole drilling
CAT D11R Dozer	5	Clearing; interburden / coal ripping / pushing; dump maintenance
CAT D10T Dozer	2	Clearing; interburden / coal ripping / pushing; dump maintenance
Water Cart	3	Dust suppression
CAT 16M Grader	2	Road maintenance
637-2 Scraper	3	Soil removal and stockpiling
Service Truck	2	Machinery servicing
Cummins Genset	2	Power for site offices, workshop and coal loader
Mobile Crusher	1 (p/t)	Crushing
IT38G Loader	2	Loading
Lighting Plant	15	Lighting
CAT 988H Loader	2	Coal pad

2.4.4 Hours of Operations

Open cut mining activities, including processing of coal occurred between the hours of 7.00am and midnight Monday to Friday, between midnight and 3.30am Tuesday to Saturday, and 7.00am to 6.00pm Saturdays.

Coal transportation from the mine site is permitted between the hours of 7:00am to 9:15pm Monday to Friday and 7:00am to 5:15pm on Saturdays. These times ensure that all coal trucks are off the public road network by 10.00pm Monday to Friday and 6:00pm Saturdays.

General maintenance activities were permitted any time Monday to Sunday.

The above hours of operation are consistent with the permitted hours of operation identified in DA 88-4-2005 MOD 1.

2.5 Processing

2.5.1 Outline of Processing Activities

With the exception of coal crushing to <200 mm, no coal processing was undertaken within the DA Area.

Figure 2 presents a schematic of coal movements and washery inputs, outputs and yields for the reporting period. The flowchart shows that over the last 12 months a total of 1,627,907 tonnes of coal was transported from the Tarrawonga site to the CHPP. 955,662 tonnes was direct bypass coal (i.e. crushed product coal not requiring washing) whilst 722,080 tonnes was directed through the washery, producing 610,329 tonnes of washed product (average yield of 85%). Coal from the CHPP was despatched via rail to domestic and export markets (Figure 2).

The slight variations in totals (ie. washery input + bypass does not total coal from site and washery output + bypass coal does not total coal sales) are simply a result of variations in stockpiles.

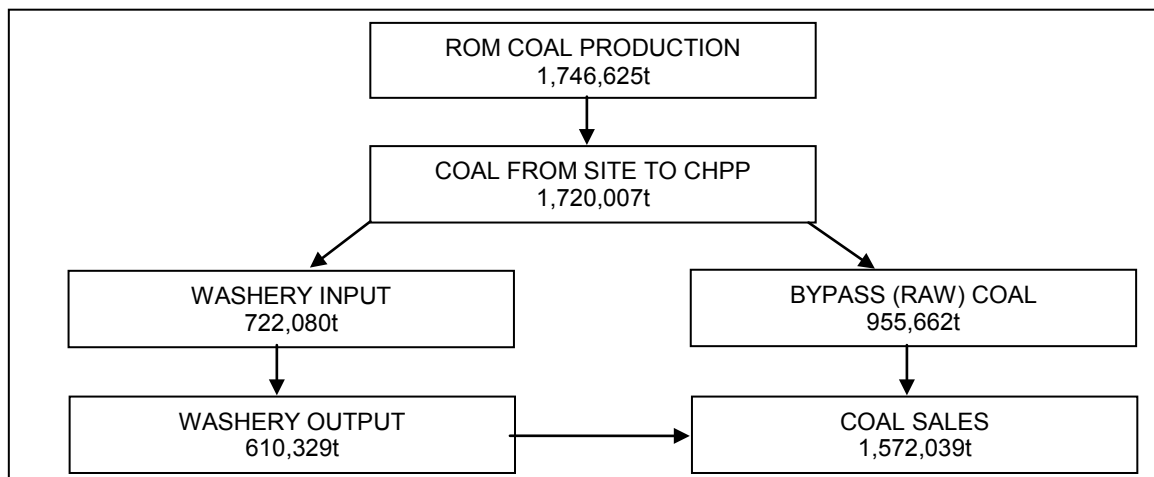


**Figure 2 - Coal Movement and Production Summary
(2011/2012 Reporting Period)**

2.5.2 Changes or Additions to the Process or Facilities

No significant changes or additions to processes carried out at the mine have occurred.

2.6 Waste Management

2.6.1 Introduction

Wastes produced from the Tarrawonga Coal Mine (or at the Whitehaven CHPP) remain unchanged from those identified in the previous AEMR and Environmental Assessment and are comprised of:

- General domestic-type wastes from on-site buildings and routine maintenance consumables;
- Oils and grease;
- Sewage;
- Overburden and interburden;
- Mine equipment tyres; and
- Coarse and fine coal rejects from any coal preparation undertaken.

The following sub-sections identify the management procedures adopted for each of these wastes throughout the reporting period. Management procedures remain unchanged from those previously identified and will be continued for the ensuing reporting period.

2.6.2 Domestic Type Wastes

All general wastes were collected on-site and placed into large storage receptacles on a daily basis. An industrial waste collector collected this waste on a fortnightly basis. TCPL has established a recycling program for domestic type wastes which are collected in separate receptacles and delivered to the Gunnedah Waste Management Centre for recycling.

2.6.3 Oil Containment and Disposal

Waste oils from the maintenance building were pumped from machinery to bulk storage tanks banded in accordance with EPA requirements (also see Section 2.8.2). When breakdown maintenance was undertaken away from this location, oil was pumped from the equipment to a tank on the service truck from which it was subsequently transferred to the bulk storage tank.

Waste oil stored at the maintenance building was collected and disposed of by a licensed contractor approximately once every three months.

Oil filters at Tarrawonga are crushed prior to collection.

Runoff from the concrete vehicle and equipment wash pad was directed to an oil separator and containment system for subsequent pump out and disposal.

2.6.4 Sewage Treatment and Disposal

Effluent from the sewage and ablutions facilities at the mine was managed through the Council-approved septic system which is serviced by a licenced contractor. Pump outs are undertaken by a licensed waste disposal contractor on an as-needs-basis.

2.6.5 Mine Equipment Tyres

Mine equipment tyres are retained (stored) on site until disposal within the open cut void. Tyres were disposed of in-pit during the reporting period with the disposal location recorded by site personnel.

2.6.6 Overburden and Interburden

Overburden and interburden materials at the mine comprise conglomerates, sandstones, shales and mudstones which are prone to various degrees of breakdown on exposure to the atmosphere. The overburden is cast into the mined-out areas by blasting or removed from above the coal seam by a combination of dozer pushing and excavator loading and hauling using dump trucks. Interburden removal to enable lower coal ply excavation is undertaken by excavator and dump truck.

During the reporting period, all overburden and interburden was blasted/pushed/dumped within areas nominated in the MOP for overburden emplacement.

2.6.7 Processing Plant Residues

2.6.7.1 Physical and Chemical Characteristics

The coarse and fine rejects produced from washing Tarrawonga coal comprise a mixture of coal and non-coal materials, e.g. sedimentary rocks such as shale, mudstone or claystone, and sand, silts and clays which either occur naturally within the coal seam or represent overburden or interburden materials which dilute the coal during its extraction.

2.6.7.2 Reject Handling and Disposal Procedures

Coarse Reject – As rehabilitation progresses at the mine, coarse reject produced from the Whitehaven CHPP will be backloaded to the mine for placement in the open cut prior to reshaping and rehabilitation. Coarse reject emplacement commenced in the current emplacement area in August 2010 following approval under Section 100 of

the *Coal Mine Health and Safety Act 2002*. Approximately 148,000 tonnes of coarse reject has been disposed at the site during the reporting period.

Fine Reject – Pumped to a series of seven fine reject ponds within the Whitehaven CHPP balloon loop and adjacent to the Whitehaven CHPP for consolidation. Reject produced throughout the reporting period was pumped to the reject ponds within the rail loop and those adjacent to the CHPP. The ponds are encircled by bunding and drains to contain fine reject in the event of a pond failure. Following consolidation, the fine rejects are excavated and transported to the former Gunnedah Colliery for use in final landform development and emplacement in the Melville and North Cut Void.

2.6.7.3 Monitoring and Management of Containment Facilities

Routine management and monitoring of reject material at the Whitehaven Siding is undertaken by Whitehaven Coal personnel under the direction of the Plant Manager. Inspections of the reject ponds at the Whitehaven CHPP are undertaken by officers of DRE, the statutorily responsible Authority.

2.7 Stockpile Capacity

All ROM coal produced is delivered to clean and dirty ROM stockpiles. ROM stockpile capacity at the Tarrawonga Coal Mine totals 150,000 tonnes. Average stockpile volume during the reporting period was 41,020 tonnes, with volumes ranging from 7,620 tonnes to 89,643 tonnes.

2.8 Water Management

2.8.1 Objectives

The mine lies within the catchment of the Namoi River. Locally, and within proximity of the project site, Goonbri Creek, Bollol Creek and Nagero Creek all provide flows to the Namoi River during runoff events. The design of sediment detention basins within the disturbed area of the mine aims to limit the opportunity of discharge of runoff from mine-disturbed area, i.e. after appropriate detention time to satisfy licensed discharge criteria.

As discussed in Section 1.2.2, an EPL variation application was made to EPA during the reporting period to include SB-22, SB-23 and SB-24 as additional wet weather discharge points (as identified in the Section 75W modification). As a result, there are

eight wet weather discharge points nominated in the current EPL 12365. These are SD17, SD16, SD9, SB14, SD20, SB22, SB23 and SB24 (Plan 4).

A further variation application will be submitted in the next reporting period to remove SD20 from the EPL as it has now been mined through.

Management of water at the mine is undertaken with the following objectives:

- (i) The quantity of water exhibiting elevated suspended solids loadings is minimised;
- (ii) Erosion is minimised;
- (iii) Sediment-laden water is contained for a sufficient period that if it discharges, satisfies the discharge criteria identified in EPL 12365;
- (iv) Surface water is harvested off-site to the extent permissible, thereby minimising water extraction from bores or other sources;
- (v) Groundwater is not contaminated;
- (vi) Downstream water users are not adversely affected by the Mine's operations, either in terms of quantity or quality; and
- (vii) The water management system is consistent with planned rehabilitation objectives and long-term land use.

2.8.2 Surface Water Management

Water within the DA Area is nominally classified either as "clean", "sediment-laden" or "dirty", or "contaminated" depending on the source of the flow and its potential for physical or chemical contamination.

"Clean water" comprises water which emanates from areas undisturbed by mining activities, flows from sediment basins following its clarification in those structures or is contained within or discharges from storage dams. Within the DA Area, clean surface water flows either pass to natural drainage lines and hence off-site or are collected by diversion banks and directed to the storage dams for use on-site. All water flowing from sediment basins ultimately flows to storage dams.

"Dirty water" comprises water which does or could potentially contain elevated levels of suspended solids originating from areas of mining-related disturbance.

Dirty water originating from surface runoff is collected by catch banks located down slope of the potential sources of pollution and directed to the sediment basins. Water collecting within the sediment basins is used for dust suppression in addition to waters in the storage dams to avoid potential for off-site water discharge.

The sediment basins are either cleaned out once their capacity is reduced by 20% or supplementary structures are installed to provide the required storage volume. In the event of structure replacement, the contents of the former structure will be allowed to dry prior to being capped and rehabilitated.

The principal components of the water management systems in place at the end of the reporting period are shown on Plan 4.

“Contaminated Water Management”. Two self bunded diesel fuel tanks with capacities of 68,000L and 105,000L (62,000L and 94,500L safe fill respectively) are maintained adjacent to the Tarrawonga workshop area. This ensures that in the event of a leak from the tanks, there is sufficient capacity to adequately store the full complement of diesel from those tanks. Tarrawonga Coal has also installed an additional concrete bund adjacent to the fuel tanks to house other oils and lubricants in a safe and efficient manner. Any associated spills within the bund then report to an oil separating unit for disposal by an appropriately licensed contractor. Waters potentially contaminated with hydrocarbons from the workshop area are also diverted to the oil separator, with clean water used for dust suppression purposes. Spill kits are also maintained on the mine site.

The likelihood of localised spills of fuel or oil external to bunded areas is kept to a minimum by the adoption of the above practice. In the event that localised spills do occur, immediate action would be undertaken to ensure appropriate clean-up and minimisation of harm.

Water originating from the open cut pit is pumped to Void Water Dams or retained in pit within managed sumps. Pit water is also used for dust suppression.

2.8.3 Discharges

A number of wet weather discharges have occurred during the reporting period. Each discharge is discussed in Section 3.3.2.

2.8.4 Water Sources, Demand and Use

Within the DA Area and immediate vicinity of the mine, surface water resources are limited to a number of ephemeral drainage lines which flow for a short period after substantial rainfall, farm dams, water storage dams and a series of interlinked sediment basins within the DA Area as shown on Plans 3 and 4.

Water is required on the mine site primarily for dust suppression purposes, with minor quantities required for potable, toilet and ablutions purposes. Where practicable, water collected on-site is retained or reused, with water for dust

suppression sourced from a combination of on-site water harvesting, inflows from the exposed coal seam, overburden and interburden, and groundwater extraction. Water for potable, toilet and ablutions purposes is trucked to the site from Gunnedah or Boggabri.

During the reporting period, a total of approximately 369 ML was used for mine site and processing facility dust suppression purposes, all of which was sourced within the DA Area. The volumes obtained are as follows:

- 148 ML from groundwater/surface water inflows to the open cut (majority being surface water inflows); and
- 221 ML from surface flows to sediment basins and storage dams within the DA area.

This water use is twice as much as the last year and much higher than predictions made in the original EIS for the project which indicated a water requirement of approximately 89 ML per year for dust suppression and processing requirements. As per last year, the excessive volumes were not specifically related to production requirements but rather the need to “waste” water, as such, around site for many months in order to reduce the water stored in the sediment basin/storage dam chain and in pit. Water cart use was also increased during dry times in order to reduce dust generation from the site. Two additional 30,000 L Volvo water carts were introduced to site during the reporting period.

An updated Water Management Plan was submitted for review to the former DoP and DECCW in March 2011, as required by DA 88-4-2005 MOD 1. In accordance with Condition 2(11) of DA 88-4-2005 MOD 1, TCPL proposed to submit revised sub-components of the plan (that continue to apply to the development onsite) on a progressive basis. In the submission, TCPL proposed that this would occur by the end of June 2011 however advice from DoP (now DoPI) did not issue advice in relation to this request. URS Australia Pty Ltd has been engaged to complete the Plan to a standard which addresses the requirements in the Consent. It is expected that the updated Plan will be submitted for approval in the early months of the next reporting period.

2.8.5 Stored Water

Table 5 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 5 - Stored Water

	Volumes Held (m ³)		Storage Capacity at the end of the Reporting Period (m ³)
	Start of Reporting Period	At end of Reporting Period	
Clean Water (in Storage Dams)	60,000	63,060	110,053
Dirty Water (in Sediment Basins)	65,000	76,563	166,620
Controlled Discharge Water (salinity trading schemes)	N/A*	N/A*	N/A*
Pit Water	16,000	21,850	47,120
* N/A = Not applicable for the Tarrawonga Coal Mine			

2.8.6 Groundwater Management

Inflows into the open cut are irregular and result from a combination of:

- Direct rainfall runoff and infiltration through the emplaced overburden which flows down-dip to the open cut sumps;
- Where the open cut workings expose water stored within fractures in the rock mass or coal seams; and/or
- From areas where weakly cemented gravel overburden has been encountered.

As noted in Section 2.8.4, during the reporting period, a total of 148 ML was pumped from the open cut sump(s). This water comprised mostly surface runoff (from the previously mentioned extremely wet months in late 2011 and early 2012) and a small proportion of groundwater inflows. All of this water was contained onsite.

Inflows not reporting to the sump(s) within the open cut either evaporate or are incorporated within the coal or replaced overburden.

Contamination of groundwater is controlled by the management of chemical, oil and grease spills and storage, with:

- Vehicle maintenance carried out in designated areas;
- Any spills being cleaned up; and
- Fuels, oil and greases being stored within a bunded area, constructed in accordance with AS 1240-2004 (also see Section 2.8.2) and/or EPA requirements.

Groundwater from surrounding bores, as well as the mine production bore, is monitored on a regular basis to detect and assess any changes in groundwater quality or level that may be attributable to the mine (see Section 3.4.2).

2.9 Hazardous and Explosive Material Management

No explosive materials are retained within the mine site. Orica Mining Services has a storage facility located between the Tarrawonga and Canyon sites to remove the requirement for on-site storage.

Mixing of nitropril with distillate to produce an explosive is undertaken on the day of each blast using a purpose built explosives mixer and in a quantity adequate only for that particular blast.

Materials Safety Data Sheets (MSDS) are retained on-site for all hazardous materials, independent of the quantity. Additionally, all contractors are required to supply MSDS sheets for any hazardous goods they may bring onto the site.

2.10 Infrastructure Management

Management of infrastructure (e.g. buildings, roads, generators and pumps) and other facilities not specified elsewhere within this AEMR/Annual Review, is undertaken on an as-needs basis or in accordance with Statutory requirements in order to maintain them in an operationally efficient, safe, neat and tidy condition, and one which does not result in the direct or indirect generation of unacceptable environmental impacts.

2.11 Product Transport

All sized (<200 mm) ROM coal delivered to the Whitehaven CHPP that is destined for the export market is transported via rail to the Port Waratah or Kooragang Island ship loaders at the Port of Newcastle. Approximately 1,720,000 tonnes of coal was transported from the mine over the reporting period in just less than 43,000 truckloads. This equated to an average of 114 truckloads of coal being transported per haulage day from the mine to the Whitehaven CHPP.

3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

The following sub-sections document the implementation and effectiveness of the various control strategies adopted at the Tarrawonga Coal Mine, together with monitoring data for the reporting period. Existing monitoring sites are shown in Figure 3. Where relevant, life of mine monitoring data is also included as a basis for discussion on longer-term trends. A risk identification matrix and the relevant Environmental Management procedures are identified in the Tarrawonga Coal Mine MOP.

3.1 Air Pollution

3.1.1 Criteria

The air quality criteria applicable to the Tarrawonga Coal Mine are specified in DA 88-4-2005 MOD 1 Schedule 3, Tables 6, 7 & 8 (Appendix 1), which is summarised below:

- Acceptable mean annual increase in deposited dust – $2\text{g/m}^2/\text{month}$.
- Mean annual dust deposition (all sources) – $4\text{g/m}^2/\text{month}$.
- Mean annual TSP (all sources) concentration – $90\text{ }\mu\text{g/m}^3$.
- Mean annual PM_{10} particulate level – $30\text{ }\mu\text{g/m}^3$.
- 24 hour average PM_{10} particulate level – $50\text{ }\mu\text{g/m}^3$.

Additionally, exhaust gases on earthmoving/mining equipment should not be visible for more than 10 seconds continuously.

Routine air quality monitoring at the Tarrawonga Coal Mine is required for deposited dust and PM_{10} particulates. Monitoring of deposited dust is undertaken on a monthly basis whilst PM_{10} levels are monitored every 6 days.

As discussed in Section 1.2.2, the EPL variation issued in December 2011 removed all deposited dust and PM_{10} monitoring sites that are located on project-related properties. Monitoring will still continue at all sites but exceedances on project-related properties are now not reportable to the EPA and monitoring results are not reportable via the Annual Return.

The requirement for real time continuous PM_{10} monitoring was included in EPL 12365 in late December 2011 however, due to supply delays and minor issues associated with setup and establishment, reliable data was not available until the end of the reporting period. Discussions on real time monitoring will therefore commence in the next AEMR/Annual Review.

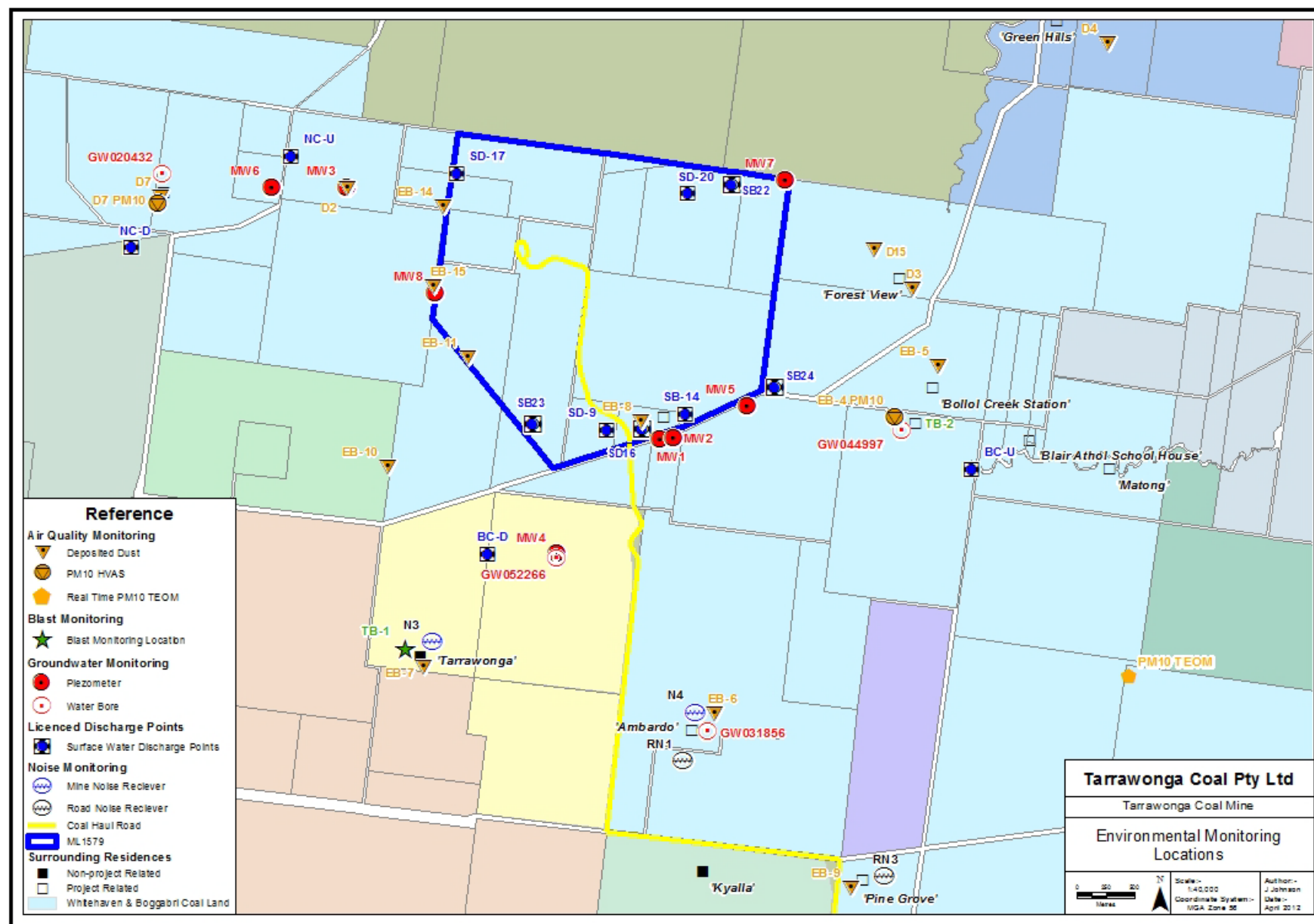


Figure 3 - Environmental Monitoring Locations

3.1.2 Control Procedures

In order to satisfy the criteria identified above, Tarrawonga Coal employs a range of air pollution control measures including:

- Use of trunks, branches and litter from clearing for mine site rehabilitation. No materials are burnt;
- Limiting groundcover removal in advance of mining consistent with operational requirements. Under normal operational circumstances, a maximum of 100 m is prepared in advance of mining;
- Groundcover removal as part of the topsoil removal activities, rather than prior to topsoil removal;
- Where practicable, limiting soil stripping activities to periods when there is sufficient soil moisture to prevent significant dust lift-off and avoiding periods of high winds;
- Soil stripping using open bowl scrapers, thereby eliminating the dust generated from elevated scrapers;
- Application of water to exposed surfaces, with emphasis on those areas subject to frequent vehicle / equipment movements which may cause dust generation and dispersal;
- Use of water injection on the drilling rig;
- Use of imported aggregates for blast hole stemming;
- Water application at the crusher and on the conveyor discharge point to the coal bin;
- Cessation of coal processing activities during periods of concurrent high winds and temperatures which cause coal dust dispersal, independent of water applications. This situation did not arise during the reporting period;
- ROM coal pad watering;
- Progressive shaping and rehabilitation of areas once they are no longer required for mining purposes;
- Speed limit restrictions on all vehicles and equipment on the mine site;
- Equipment exhaust positioning to avoid exhausts impinging on the ground and causing dust lift-off; and
- Use of covers on all product coal trucks. Toll is the principal contractor engaged in the haulage of coal from the Tarrawonga Mine to the CHPP. All

Toll vehicles and those operated by its contractors are fitted with roll-over tarpaulins.

As noted in Section 1.2.2, TCPL was informed by the EPA in late 2011 of the development of a Pollution Reduction Program (PRP) that requires the preparation of a report on the practicability of implementing best practice measures to reduce particle emissions from coal mines. The requirement to conduct a site specific Best Management Practice (BMP) determination and submit a report to the EPA was subsequently included in EPL 12365 on the 20th December 2011. Work on the PRP was conducted during the latter part of the reporting period. As the PRP is not due until the 29th June 2012, further discussion on the outcomes of these works will be provided in next year's AEMR/Annual Review.

3.1.3 Dust Monitoring

Table 6 presents a summary of the deposited dust monitoring data for the reporting period while Appendix 4 presents the results of all dust monitoring over the life of the mine to date. A graphical representation of the total insoluble solids and ash content data for each of the sites monitored during the reporting period is also included in Appendix 4.

It should be noted that the deposited dust result recorded for September 2009 (October 2009 for Idemitsu monitors) has been excluded from the long term average for each site. Dry conditions prevailed over the latter part of 2009 which contributed to severe dust storms around late September 2009. The results during the period do not represent normal deposited dust levels. The highly anomalous result of 254g/m²/month recorded in October 2009 at D-15 Forest View has also been excluded from the long term average.

Figure 3 identifies the locations of the various deposited dust gauges maintained during the reporting period. In mid 2011, Boggabri Coal submitted a licence variation to replace the D-3 monitor with D-15. Following issue of an updated EPL from the EPA, Tarrawonga also submitted a licence variation for the same change. D-3 has continued to show anomalous results which are related to its close proximity to an unsealed public road. D-15 is located in between the mine and D-3 and has proved to be a more reliable monitor. As D-3 was monitored for a portion of this reporting period, its results have been provided. It will be excluded from subsequent AEMR/Annual Reviews.

Table 6 - Deposited Dust Monitoring Data

Site (see Figure 3)	Property Name	Mean Annual Total Insoluble Solids* ¹ (g/m ² /month)	Cumulative Total Insoluble Solids* ² (g/m ² /month)	Mean Ash* ¹ (g/m ² /month)	Long Term Mean Total Insoluble Solids (g/m ² /month)
EB-4	TEMPLEMORE	2.6	3.8	1.3	2.4
EB-5	BOLLOL CREEK STATION	2.3	3.5	1.9	2.6
EB-6	AMBARDO	1.0	2.2	0.6	1.2
EB-7	TARRAWONGA	0.9	2.1	0.6	1.1
EB-8	THUIN	5.2	6.4	4.7	2.4
EB-9	PINE GROVE	0.7	1.9	0.5	1.0
EB-10	TARRAWONGA MINE	3.3	4.5	1.1	2.7
EB-11	TARRAWONGA MINE	1.2	2.4	0.8	1.9
EB-14	WESTERN BOUNDARY OF ML	2.3	3.5	1.3	3.0
EB-15	WESTERN BOUNDARY OF ML	3.4	4.6	2.4	4.1
D-2* ³	NAGERO	2.1	3.3	-	2.1
D-3* ³	FOREST VIEW	7.8	9.0	-	6.5
D-4* ³	GREEN HILLS	6.8	8.0	-	3.6
D-7* ³	MERRIOWN	1.3	2.5	-	1.3
D-15* ³	FOREST VIEW	2.0	3.2	-	1.4
Grey = project related (TCPL or Boggabri Coal) * ¹ At end of reporting period * ² Site is monitored and maintained by Boggabri Coal, ash results not provided * ³ Includes 1.2g/m ² /month background levels					

A review of Table 6 and Appendix 4 shows that:

- The mean annual total insoluble solids (deposited dust) criterion was satisfied at all monitoring locations, except for EB-8 “Thuin”, D-3 “Forest View” and D-4 “Green Hills”. All sites where the mean annual deposited dust criteria exceeded the 4g/m²/month criteria are on project related property.
- EB-8, “Thuin”, is located within the southern boundary of the mining lease and is adjacent to the haul route used by scrapers to relocate the soil stockpile.
- As discussed above, D-3 has been replaced by D-15 due to its continuous anomalous results related to the adjacent unsealed public road.

- D-4 is located to the north-east of Tarrawonga and with the predominant wind directions being north/north-westerly/south-easterly it is not believed these elevated results are closely related to activities at the mine. On this basis, it is believed that the results would more likely be related in part to operations at Boggabri Coal (only when westerly winds persist) and mostly other non-mining related sources such as the nearby unsealed public road and contamination (bird droppings etc).

TCPL has a High Volume Air Sampler (PM₁₀) located at the property “Templemore”, to the south-east of the mine site. There is another PM₁₀ monitor located on the “Merriown” property, to the west of the mine site which is operated by Boggabri Coal and is used as a cumulative impact monitor for the Boggabri and Tarrawonga mines. Each sampler runs for 24 hours every 6 days, with filter papers sent to an accredited laboratory for analysis.

Throughout the reporting period, the PM₁₀ results at the “Templemore” monitor have indicated compliance with the 24 hour criteria. The “Templemore” monitor remains within the annual average compliance criteria of 30 µg/m³, with an annual average at the end of April 2012 of 14.9 µg/m³ (Figure 4).

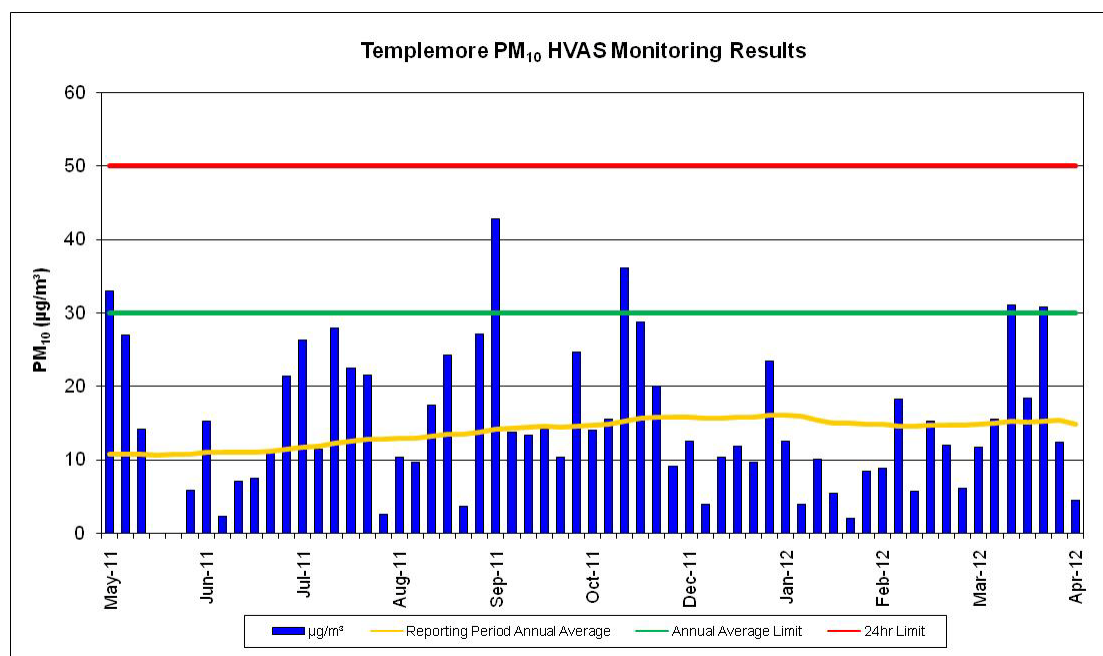


**Figure 4 - Templemore HVAS PM₁₀ Data
May 2011 – April 2012**

Throughout the reporting period, the PM₁₀ results at the “Merriown” monitor have indicated compliance with the 24hr criteria. The “Merriown” monitor remains within the annual average compliance criteria of 30 µg/m³, with the running annual average of 9.84 µg/m³ at the end of the reporting period (Figure 5). This is a reduction of approximately 2 µg/m³ over the reporting period.

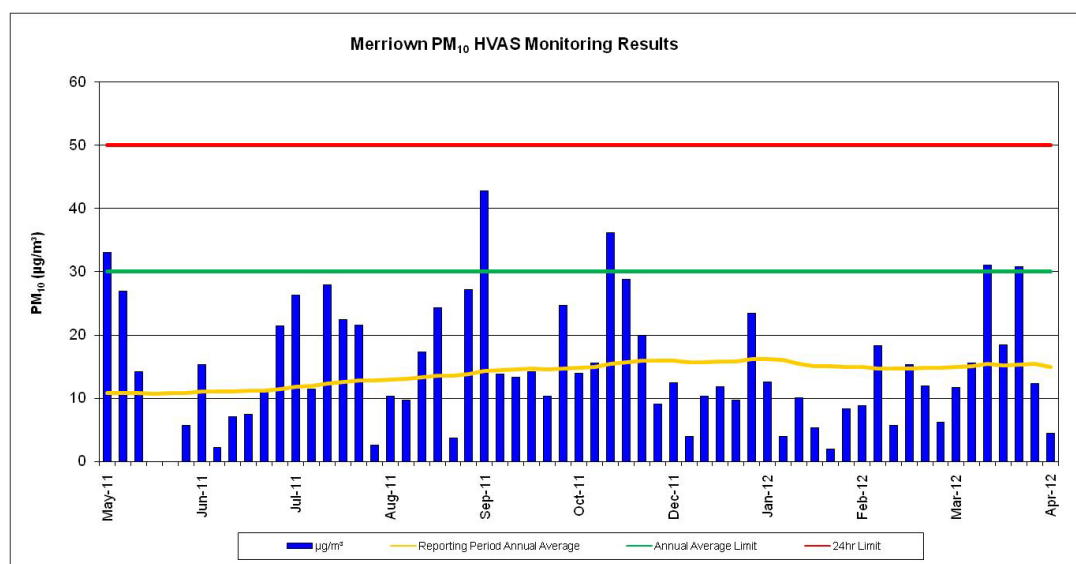


**Figure 5 - Merriown HVAS PM₁₀ Data
May 2011 – April 2012**

The full data set for the PM₁₀ monitoring over the life of the mine, including graphs of long term data records, is contained within Appendix 4.

Tarrawonga received an official caution from the EPA in November 2011 in relation to excessive dust from the mine site. The caution letter indicated that EPA did not believe Whitehaven had met Condition O3.1 of EPL 12365 which states that “*all operations and activities at the premises must be carried out in a manner that will minimise the emission of dust from the premises*”.

Tarrawonga has continued to receive a number of complaints about dust (both onsite operations and offsite gravel haulage) despite significantly improving dust management practices over the last 6 months. Dust impacts are further complicated by cumulative impacts from Tarrawonga and Boggabri Coal. On multiple occasions, complainants have indicated that they cannot define where the dust is originating from but because Tarrawonga is the mine they can see they assume all dust is coming from Tarrawonga.

Another factor contributing to visible dust in the wider valley is dust generation from gravel roads such as Rangari Road, Goonbri Road, Wean Road, Dripping Rock Road and Leard Forest Road. During the winter period, with temperature inversions prevalent, a layer of dust is visible during the early morning until the inversion layer dissipates. The impact of road dust on overall dust levels has been identified on preliminary dust charts produced by the real time PM₁₀ units located at the “Flixton” and “Tarrawonga” properties, with spikes in PM₁₀ concentrations correlating with additional road use associated with shift change events at the mine sites.

3.1.4 Comparison with EA Predictions

The Air Quality Impact Assessment (AQIA) undertaken by Heggies Pty Ltd as part of the Modification EA (*Tarrawonga Coal Mine Modification Environmental Assessment, Appendix C, 2010*) predicted air quality impacts associated with the modified mining operation. The predicted levels and comparisons with actual monitoring data are included below for both dust deposition and PM₁₀.

Dust Deposition

The AQIA predicted that the annual average dust deposition levels at all receptors surrounding the modified mine would be below the relevant criteria of 4g/m²/month for cumulative dust deposition when using a background dust deposition level of 1.2g/m²/month.

The reporting period average for “Tarrawonga” (the only privately owned property surrounding the mine) was 0.9g/m²/month. Combined with the background dust deposition level, this monitor matches the Modification EA prediction of not exceeding 4g/m²/month.

All monitoring locations where exceedances have occurred are on project-related properties. D-3 is excluded from these comparisons due to its previously noted impact from the adjacent unsealed road and subsequent replacement by D-15.

EB-8, as previously discussed, is within the southern boundary of ML 1579 and also immediately adjacent to the scraper haul road which is being used to relocate a large soil stockpile and Goonbri Road which is an unsealed public road. EB-4 and EB-6 are the closest off-site monitoring locations to the south-east and annual averages at these monitors indicate the impact at EB-8 is localised.

EB-10 is located between the south-west boundary of the ML and the unsealed Goonbri Road. Dust generated by mining activities would generally not travel in a south-westerly direction and as a result the exceedance of cumulative deposited dust levels is considered to be not directly associated with operations at Tarrawonga. This is also the case with D-4 “Greenhills” to the north-east of the mine.

The cumulative exceedance at EB-15 is not unexpected as this monitoring is located between Boggabri Coal’s ROM pad and Tarrawonga operations.

PM₁₀

The AQIA predicted that cumulative impacts from the modified Tarrawonga mine and background levels would not exceed the annual average PM₁₀ limit of 30 µg/m³ at any receiver or the 24 hour PM₁₀ concentration limit of 50 µg/m³ at any privately-owned receiver. The highest 24 hour concentration recorded during the reporting period was 42.8 µg/m³ at “Templemore” and 34.8 µg/m³ at “Merriown”. The highest annual average during the reporting period was 16.11 µg/m³ at “Templemore” and

12.87 $\mu\text{g}/\text{m}^3$ at “Merriown”. Therefore, both the 24 hour and annual average results at both monitoring locations match the predictions provided in the Modification EA.

3.2 Erosion and Sedimentation

3.2.1 Management

Methods for the management of erosion and sediment control at the mine are presented in the MOP, the Soil Stripping Management and Erosion and Sediment Control Plans and Site Water Management Plan.

Control of erosion and sediment generation is achieved primarily through the implementation of water management controls identified in Section 2.8.2 and shown on Plan 4 and water usage for dust suppression which ensures adequate storage capacity is available within the various water containment structures to receive inflows. Additional measures which assist in the control of erosion and sedimentation include:

- Minimising the extent of disturbance consistent with operational requirements;
- Revegetation of long-term subsoil and topsoil stockpiles, areas shaped to their final landform and areas no longer required for mining-related purposes;
- Undertaking soil management activities generally in accordance with the soil stripping and stockpiling recommendations from Geoff Cunningham Natural Resource Consultants; and
- Installation of contour banks and rock-lined waterways on the final landform following soil application.

Soil stockpiles have been placed in gently sloping or near flat areas surrounded by grassland which effectively reduces the runoff velocity, and hence erosive potential, from any run-on waters. However, Tarrawonga Coal is aware of the potential for stockpile erosion and will adopt stockpile protective procedures to minimise impacts as required over the remaining life of the mine. All soil stockpiles on the site have been sown to cover crops on completion to aid in stabilisation.

3.2.2 Performance

The effectiveness of the procedures for erosion and sedimentation management are assessed visually as part of routine mine operations and supervision undertaken by Tarrawonga Coal, with any ameliorative works initiated as and when required.

Despite the persistent wet weather during late 2011/early 2012, no significant localised erosion occurred onsite. A number of wet weather discharges with elevated TSS levels did, however, occur (see Section 3.3.2).

3.2.3 Comparison with EA Measures

The Modification EA stated that new and existing erosion and sediment control structures would be inspected by mine personnel on a regular basis and following rainfall events greater than 25mm in a 24 hour period to assess integrity, identify instances of potential erosion and determine retained capacity. This had occurred on an ad hoc basis during the first half of the reporting period, however, more thorough inspections were implemented following the multiple discharges and exceedances in late 2011 and early 2012. This also culminated in the Environmental Officer relocating from the Gunnedah CHPP to the Tarrawonga mine site for full time oversight of environmental performance. The Environmental Officer is responsible for undertaking monthly environmental inspections as well as inspections after heavy rainfall. Site mining supervisors also undertake daily inspections of the site which include visual assessment of water management structures.

The Modification EA identified that all sediment basins would be cleaned of accumulated sediment once their capacity has been reduced by 20%. Obviously with the ongoing wet weather and higher than normal volumes of water stored, any cleanout has not been possible during the reporting period.

Progressive construction of water management on rehabilitated areas, as identified in the Modification EA, has occurred as required. For example, extension of the rock lined waterway on the western face of the northern emplacement commenced at the end of the reporting period. In addition, the sediment control structures nominated in the Modification EA have also all been constructed as required.

3.3 Surface Water Pollution

3.3.1 Management

The prevention of surface water pollution is achieved through the management of surface water as presented in Section 2.8.2.

3.3.2 Performance

3.3.2.1 Wet Weather Discharges

Tarrawonga Coal has, at all times, made every effort practically possible to avoid discharge and to minimise impacts when discharge is inevitable (ie. maintenance of sediment control fencing). Circumstances during the reporting period, however, prevented discharge from being avoided. The consistent rainfall over the period September 2011 to February 2012 resulted in the site being unable to adequately utilise the water stored in the discharge storages in adequate time to make additional storage available. On each discharge occasion, the discharge was sampled in accordance with the requirements of EPL 12365 (Appendix 5). Rainfall records are shown in Appendix 10. This section provides discussion on all wet weather discharges during the reporting period.

9th September 2011

SB14 and SD9 discharged following 38.2mm of rainfall in the preceding 24 hours. SD9 was compliant with all criteria however SB14 had a TSS level of 131mg/L. All other criteria were satisfied.

29th September 2011

SB14 and SD9 also discharged on the 29th September 2011 after 38.6mm of rainfall. Both exceeded the TSS threshold with results of 414mg/L and 228mg/L, respectively.

14th November 2011

A discharge occurred from SD9 on the 14th November 2011 following 34.0mm of rainfall on the previous day. The discharge water quality was compliant with all criteria except TSS (144mg/L). The only creek flow able to be sampled at the time was Bollol Creek Downstream (BCD), which is downstream of the SD9 discharge point. TSS in the BCD sample was 29mg/L indicating the discharge waters did not have a significant impact on creek flow water quality.

18th November 2011

Rainfall totalling 62.5mm in the preceding 5 days (including the 34.0mm on the 13th November 2011 noted above) resulted in discharge from SD16 on the 18th November 2011. The discharge was compliant with all criteria except TSS (64mg/L). Again, the BCD sample had a much lower TSS level (32mg/L), therefore indicating the well

vegetated land between the discharge point and the creek allowed for settling out of sediment. Nagero Creek Upstream (NCU) and Nagero Creek Downstream (NCD) were both sampled despite discharges not occurring from the northern discharge points. Both these samples had elevated TSS levels (146mg/L and 147mg/L respectively).

23rd and 24th November 2011

Significant rainfall on the 23rd November 2011 (41.4mm in 24 hours) resulted in flows in all four ambient water quality monitoring locations, with the following TSS levels.

- BCU – 64mg/L
- BCD – 24mg/L
- NCU – 98mg/L
- NCD – 103mg/L

SD17 discharged on the 24th November 2011 following the 41.4mm which fell during the preceding day. Again, the discharge water was compliant with all criteria except TSS (620mg/L).

31st January 2012

The site began to discharge from SB23, SD9, SD16, SB14 and SB24 on the 31st January 2012 following 37.6mm of rainfall in the five days leading up to the discharge. This is just under the 5 day 90th percentile rainfall depth and therefore the elevated TSS levels (listed below) from all discharging points, except SB24, are considered non-compliances. All other parameters were compliant.

- SB23 – 1340 mg/L
- SD9 – 116 mg/L
- SD16 – 124 mg/L
- SB14 – 1170 mg/L
- SB24 – 37 mg/L
- BCU – 584 mg/L
- NCU – 78 mg/L
- NCD – 132 mg/L

A further discharge occurred from the site on the 31st January 2012 however the discharge occurred from a non-licensed discharge point. The incident was initially reported to Danny Young, Group Environmental Manager, by a neighbour of the

mine site who noticed what appeared to be a dam wall breach at the eastern end of the mine lease. A volume of water had flowed off the mine site and onto Goonbri Road, before running into Goonbri Creek.

Upon receiving notification of the incident, Danny Young travelled to the Tarrawonga site and observed a substantial break in a bank/wall which had been constructed at the western end from an existing soil stockpile, and ending on the eastern end where it joined an existing access road. It was clear that water held behind the bank/wall had overtopped the bank before it collapsed and travelled off site. It is unclear as to the volume of water that would have left site from this wall breach, albeit the width of flow could be ascertained from the tall grass being laid over within the road reserve.

The bank/wall that collapsed was not a design feature in the Tarrawonga site water management system, and was constructed by site personnel in early January 2012 as a means of storing additional dirty water prior to discharge through licensed discharge points at the southern end of the lease. The construction of the bank/wall was not subject to survey to confirm that water would discharge via the existing drainage system, and as a consequence overtopped the bank. The requirement to ensure all proposed surface water management structures are in accordance with appropriate design and determined as appropriate in accordance with Mining Operations Plans and Site Water Management Plan has been discussed with the Project Manager to ensure this type of incident is not repeated. The Project Manager has also provided this advice direct to the Open Cut Examiners on site.

At the time of investigating the breach, it was determined that Goonbri Creek was not running east of the mine site, but was running below the mine site. A sample of the water was taken from a point where Goonbri Creek crosses the private haul road to Tarrawonga to determine water quality. The sample returned a result of 2,720mg/L.

On the day of the breach, 35.2mm of rain was recorded at the Tarrawonga weather station (10mm of this falling in the period between discharges from licenced points and this discharge), totalling 99.2mm for the month of January. A further 151mm fell from the 1st – 3rd February, and as a consequence wet weather discharge continued to occur from licensed discharge points that had been sampled on the 31st January 2012.

The event was reported to the EPA Pollution Hotline at the time on the basis that the discharge occurred due to a bank failure and was not from a licensed discharge location. Advice was also issued to the EPA on the morning of the 1st February 2012, with a letter report on the 7th February 2012 providing additional details as to the

nature of the incident. The incident was investigated by the EPA and resulted in two Penalty Infringement Notices being issued to the Company.

During the site inspection by DRE and EPA on April 2012, DRE representatives requested that DRE be notified of major unplanned incidents such as these.

21st February 2012

Discharge occurred from SB14, SD15 and SB23 on the 21st February 2012 following 64.6mm in the preceding 5 days and 0.2mm on the day of discharge. Again, water quality from these discharges complied with all parameters except TSS (193mg/L, 59mg/L and 396mg/L, respectively). Given the amount of rainfall exceeds the 5 day 90thile design criteria, these discharges were not reported as non-compliances.

3.3.2.2 Conclusion

As a means of managing wet weather discharge issues, actions have been taken in terms of trialling liquid flocculant in final storages, as well as constructing additional storages as identified in the water management measures prescribed in the Tarrawonga Modification Environmental Assessment. Gauge boards will also be installed where required to allow for easy identification of necessary storage capacities. In addition to this, URS Australia Pty Ltd has been engaged to review surface water management on site, with the purpose of identifying any deficiencies and formalising the updated Water Management Plan, required by DA 88-4-2005 MOD 1.

In August 2011, Whitehaven submitted a licence variation application to OEH requesting the inclusion of a condition allowing for exceedance to TSS levels following rainfall events which exceeded 38.4mm which equates to the 5 day 90thile rainfall depth for Gunnedah. The licence was issued on the 20th December 2011 and therefore any TSS exceedances prior to this date have to be considered as non-compliances. If this condition had applied prior to the 20th December, the discharges on the 18th and 24th November 2011 would not have been reportable exceedances. November was a particularly wet month with 220.4mm of rain recorded at the site. The last time such rainfall occurred in the area during the month of November (as per Boggabri (Retreat) rainfall records) was in 1950.

Despite efforts to address sediment loads, particularly through use of water from final discharge points, the extent of rainfall over the latter part of last year clearly exceeded the 90thile rainfall depth design parameters and made utilisation of this volume of water impossible.

Tarrawonga received an official caution in November 2011 in relation to discharge of sediment laden water following a complaint. The caution letter noted that Whitehaven was provided with a verbal Official Caution in June 2011 concerning a water discharge in September 2010 where TSS limits were exceeded. Whitehaven had advised the EPA that a new Water Management Plan was being developed and the EPA noted that they had not received a copy of the updated Plan. The caution letter stated that the EPA expects Whitehaven to meet all pollutant concentration discharge limits associated with all water discharge points on the licence following finalisation of the licence variation application for inclusion of a 5 day 90%ile rainfall depth condition.

The Whitehaven Group subsequently received a written Official Caution in March 2012 for general poor environmental performance including ongoing wet weather discharges from multiple sites. Whitehaven management met with EPA representatives following issue of this caution to discuss the EPA's concerns and Whitehaven's plan to improve environmental performance. Actions on this have included completion of an Environmental Risk Assessment and subsequent regular review of identified risks to close out required actions. Site has also been working with EnviroPacific to trial different flocculants, and has also trialled a product produced by Dust Control Solutions. The preferred method of control will be described in the Water Management Plan currently being prepared by URS.

3.3.2.3 Surface Water Storages

In addition to monitoring of wet weather discharge events, TCPL undertakes quarterly sampling of surface waters, with samples during the reporting period referred to ALS Acirl Pty Ltd for analysis. The results of analysis are presented in Appendix 5.

Whilst there are no criteria or concentration limits specified for the quarterly surface water samples, the results do provide an indication as to the quality of waters on-site.

The 2010 Modification EA identified minor enrichment of Arsenic, Antimony and Selenium in solids and relative solubility of Arsenic, Molybdenum and Selenium. Because of this, the Geochemistry Assessment undertaken by Geo-Environmental Management recommended that these elements be included in the site water quality monitoring program in order to confirm that the release of these elements from the stockpiled overburden will not adversely impact the water quality on the receiving environment. Monitoring results are provided in Appendix 5 and at this stage do not provide any indication of worsening water quality for these parameters. Antimony levels are slightly higher in SB16 than other storages however they are

remaining consistent. The ANZECC guidelines do not provide a trigger level for Antimony, advising that there is insufficient data to derive a reliable trigger value. Given the consistent water quality results no further investigation is proposed at this stage.

EC levels in various storages have shown to be variable, and have been subject of previous discussions during AEMR reviews. Results presented over the last 12 months continue to identify fluctuating EC levels, albeit results from November 2011 and February 2012 have returned EC levels back to the expected range for surface storage, and may be associated with significant “flushing” of storages as a consequence of significant surface runoff over that period. The EC levels will be closely monitored over the next 6-12 months to confirm if the EC results remain within these parameters.

3.3.3 Comparison with EA predictions

The 2010 Modification EA identified no consistent difference between water quality at sites upstream and downstream of the mine. It did however note potential impacts on creek water quality from elevated suspended solids contained in runoff and/or leakage or spillage of hydrocarbons from infrastructure area. No hydrocarbon related issues have occurred during the reporting period. Section 2.8.3, however, identifies the issues with localised flooding and elevated TSS levels in discharge waters throughout the reporting period which were not identified in the Modification EA.

As discussed in Section 3.3.2.3, the geochemistry assessment in the Modification EA identified relatively minor enrichments of Arsenic, Molybdenum and Selenium. Monitoring results are provided in Appendix 5 and at this stage do not provide any indication of worsening water quality for these parameters.

Construction and maintenance of water management structures has generally followed commitments made in the Modification EA. SB22, SB23, SB24, SD18 and two new mine water dams have all been constructed. Whilst not identified in the Modification, the mine extended SB16 during the reporting period to increase dirty water storage on the site. As per the Modification EA, off-site creek monitoring locations have not changed and SD20 has been mined through.

3.4 Groundwater Pollution

3.4.1 Management

With the exception of fuels and oils, no materials occur, or are retained on the mine site which are likely to be a source of groundwater pollution.

The methods for management of potential pollutants are summarised in Section 2.8. Ongoing monitoring to assess trends in groundwater chemistry will enable assessment of potential contaminants to groundwater, with particular emphasis on Total Petroleum Hydrocarbons, heavy metals, and major cations and anions. Groundwater monitoring requirements are identified in the Site Water Management Plan.

3.4.2 Performance

Throughout the life of the mine to date, Tarrawonga Coal's performance with respect to groundwater management, the prevention of pollution and the assessment of impacts on groundwater availability to other surrounding users, has been assessed through groundwater level and chemistry monitoring undertaken at a series of operating and abandoned bores within ML 1579 and extending to distances of up to 3km from the mining activities, where practicable, at the frequency and for the parameters identified in the Site Water Management Plan.

Appendix 6 presents the results of the groundwater monitoring undertaken since the commencement of mining at the Tarrawonga Coal Mine. Monitoring sites are shown on Figure 3.

Groundwater sampling and analysis was conducted by ALS Acirl Pty Ltd during the reporting period. A review of the groundwater monitoring results presented in Appendix 6 shows the following trends:

Groundwater levels

Groundwater levels within most bores remained relatively consistent throughout the first half of the reporting period and then showed recharge in late 2011/early 2012 as a result of the persistent wet weather. Templemore B continues to show fluctuations which is understood to be associated with farming activity while the SWL in MW7 has continued to drop as a result of a reduction in groundwater pressure due to extraction of both the Tarrawonga and Boggabri Coal pits. As MW7 is located on mine-owned property there has been no requirement to activate the groundwater contingency plan for the site.

Groundwater quality

- The water in most bores is generally neutral in pH to mildly alkaline.
- The water in all bores can be described as fresh to brackish.

- During the reporting period the water quality at all monitoring locations has been within the ANZECC guideline trigger values for livestock drinking water. Lead levels at MW4 have previously slightly exceeded the guideline level of 0.1mg/L however levels have returned to well below the guideline limit during this reporting period. Lead levels have fluctuated at this monitoring location since monitoring commenced in 2007.
- Water level loggers were re-installed in MW1 and MW2 following recommendations from Geoterra Pty Ltd, who conducted the independent review of surface water and groundwater monitoring in November 2009. Loggers have been changed out and downloaded on a 6 monthly basis via RCA Australia. RCA Australia has provided the downloaded data following each logger change-out for our records. Logger data continues to demonstrate a consistent trend of no perceptible drawdown as a consequence of mining operations, with water levels remaining relatively constant except during those periods of wet weather where recharge was identified.

3.4.3 Comparison with EA predictions

The Modification EA identified that the drawdown effect from the open cut mine would only be in an area where no privately-owned bores are located. It also indicated that variations in standing water levels across the monitoring network are generally considered to be typical of natural effects and a response to rainfall trends and farming activity. This has been the case throughout the reporting period with the standing water level in MW7 (on project-related property) continuing to drop as a result of depressurisation from the Tarrawonga and Boggabri Coal pits and all other bores showing some recharge following ongoing wet weather or continued fluctuations (eg. Templemore B).

The Modification EA indicated that Antimony, Molybdenum and Selenium would be added to the groundwater monitoring regime. Void water has been monitored for these parameters during the reporting period however groundwater monitoring locations have not. The Water Management Plan currently being developed will include monitoring of these parameters in subsequent groundwater sampling events.

3.5 Contaminated or Polluted Land

Prior to mining, the DA Area was a greenfields site. Discussion with landowners during the preparation of the EIS revealed that no environmentally harmful products had been used on their landholding nor had there been any disposal of potential

environmental contaminants. This situation has remained unchanged throughout the life of the mine to date and consequently there is no reason to expect that contaminated lands would be present within the DA Area.

3.6 Threatened Flora

Investigations undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd as part of the Mine EIS identified no significant impact on threatened flora species, endangered ecological communities, endangered flora populations or critical habitat as a consequence of the development.

Notwithstanding the findings of the initial flora investigations, procedures are identified in the Flora and Fauna Management Plan for ongoing monitoring, specifically through the establishment of flora monitoring quadrats for use in future rehabilitation of the mine site.

Establishment of monitoring plots commenced in April 2007 and has continued as required. Over the life of the mine, a total of 28 quadrats are to be established across rehabilitation sites and control sites. Standard monitoring by Geoff Cunningham Natural Resource Consultants was not undertaken during the reporting period as a more comprehensive vegetation monitoring process has been implemented through Eco Logical Australia Pty Ltd. Monitoring comprised:

- Remote sensing on the 13th September 2011;
- Pasture area surveys on the 7th December 2011, including:
 - Pasture biomass and composition;
 - Weed survey;
 - Soil character (pH, EC, organic matter, N & P) – top 15cm; and
 - Soil profile.
- Woodland surveys of five plots from rehabilitated woodland and five plots from control areas, including:
 - Vegetation surveys on the 10th December 2011 comprising a suite of parameters that relate to woodland vegetation health and habitat value; and
 - Soil test pits on the 14th and 15th December 2011 to approximately 1m and described using standard field measurements with particular notice of horizon boundaries and ecological function (eg. root establishment, evidence of soil fauna);
 - Terrestrial fauna and habitat monitoring (discussed in Section 3.7).

Results from these monitoring events form a baseline data set for future monitoring and therefore will not be discussed in detail in this AEMR (see Appendix 7 for full

report). Monitoring conducted during the next reporting period will allow for the commencement of more meaningful analysis of the progress of rehabilitation onsite.

As part of the 2010 modification approval, an additional biodiversity offset was identified, and has been incorporated into the Whitehaven Regional Biobank site, comprising 3,051 credits to account for disturbance associated with the approved modification. A Biodiversity Offset Strategy (BOS) was originally submitted in March 2011 and was subsequently revised in consultation with OEH and DoPI and resubmitted in November 2011. The revised BOS included the transfer of an existing offset liability from the original 2005 Development Consent to the Whitehaven Coal Regional Biodiversity Offset Area located near the Rocglen Coal Mine. The Strategy was approved in January 2012 subject to final confirmation of successful retirement of a total of 5,782 biodiversity credits in the Whitehaven Coal Regional Biodiversity Offset Area (3,051 credits for the Tarrawonga Modification 1 offset and 2,731 credits for the original 2005 offset). The approval letter noted that DA 88-4-2005 MOD 1 requires that, within 6 months of approval of the BOS:

- A long term security of offset is provided;
- A biodiversity management plan is submitted for approval; and
- A conservation bond is lodged.

The Department acknowledged that these requirements are likely to be met on implementation of the Biobanking Agreement for the Regional Offset Area and retirement of biodiversity credits. On approval of the Biobanking Agreement, a copy must be provided to the Department to demonstrate these conditions have been met. The Biobanking Agreement had not yet been approved at the end of the reporting period.

3.6.1 Comparisons with EA Measures

The Biodiversity Assessment undertaken as part of the Modification EA outlines the disturbance areas that have been assessed. Approximately 17.7 ha were cleared in advance of the pit during the reporting period. All clearing occurred within approved disturbance areas. Flora and fauna monitoring has occurred as identified in the Modification EA (see Appendix 7 for reports).

Biodiversity offsets are discussed in detail in Section 3.6.

3.7 Threatened Fauna

Investigations into the occurrence of threatened fauna within the DA Area were undertaken by Countrywide Ecological Service (CES) as part of the original EIS

preparation phase. Those investigations identified that the proposed development was unlikely to significantly affect threatened species found or likely to occur in or around the mine site.

Notwithstanding these findings, the Flora and Fauna Management Plan requires ongoing monitoring to establish impacts on native fauna diversity. This is assessed using the control quadrats established for flora monitoring purposes, the re-establishing of native vegetation community quadrats, the re-establishing of pasture land monitoring quadrats, the enrichment planting area quadrats, and will also involve additional sampling for amphibians, mammals and birds external to these quadrats to gain an appreciation of any significant changes to the native fauna assemblage in the presence of mining and absence of grazing.

The annual fauna monitoring program was not undertaken in 2011 by CES due to ongoing wet weather. Eco Logical Australia Pty Ltd however undertook terrestrial fauna and habitat monitoring as part of their Rehabilitation Monitoring Report for Spring 2011. The report is provided in Appendix 7 and includes details on the suite of monitoring undertaken. As with flora monitoring, the results from the Eco Logical assessment will form a quantitative set of baseline data for ongoing monitoring via these methods.

A total of 70 bird species were recorded across all monitoring sites, with the majority of species being recorded in the woodland control plots. Six species listed as vulnerable under the TSC Act and one species listed as migratory under the EPBC Act were recorded during the survey, most of which occurred in control plots. Other fauna recorded were restricted to control plots except the Eastern Grey Kangaroo which was also recorded in a rehabilitation plot.

See Section 3.6 for details on biodiversity offsets.

3.7.1 Comparison with EA Measures

The Modification EA identified pre-clearance fauna surveys, rehabilitation and revegetation of disturbed areas and fauna monitoring as measures to avoid or mitigate impacts on fauna. Appendix 7 provides the Rehabilitation Monitoring Report undertaken by Eco Logical Australia. Rehabilitation is discussed in Section 5.

See Section 3.6 for details on biodiversity offsets.

3.8 Weeds

3.8.1 Management

Weed management within the DA Area involves general observations as well as six-monthly targeted inspections to determine levels of weed infestation. Weed control is undertaken by contractors or Whitehaven's Field Officer. All persons involved with weed control hold required chemical handling certificates.

3.8.2 Performance

Ongoing weed management during the reporting period comprised:

- Spot spraying of African Boxthorn within the ML (particularly along the old access road and in the waste emplacement rehabilitation);
- Spot spraying of general weeds and grasses around the administration office and workshops;
- Spot spraying of Prickly Pear, Bathurst Burr and Noogoora Burr within the ML; and
- Spraying of grasses along rip lines and mounded areas to reduce competition with planted tubestock in rehabilitation areas.

Infestations of Roly Poly and Galvanised Burr had previously been identified on the rehabilitated western face of the northern emplacement area. Control measures were not recommended at the time on the basis of the infestations being part of successional development, with native grasses expected to develop over time to eventually outcompete their dominance. The extent of Roly Poly and Galvanised Burr cover has continued to decrease over the last 12 months with a greater proportion of native groundcovers becoming established. Tarrawonga Coal will continue to monitor for the presence of weeds or invasive species to ensure conditions remain suitable to native grasses re-establishing across the site.

3.9 Blasting

3.9.1 Blast Criteria and Control Procedures

3.9.1.1 Blast Criteria

Blasting criteria for the Tarrawonga Coal Mine are nominated in DA 88-4-2005 MOD 1 and specify that:

- Blasting must only be carried out between 9.00 am and 5.00 pm, Monday to Saturday inclusive. Blasting is not allowed on Sundays, public holidays or at any other time without the written approval of the Director-General.
- The overpressure level from blasting operations must not:
 - exceed 115dB (Lin Peak) for more than 5% of the total number of blasts over a period of 12 months; and
 - exceed 120dB (Lin Peak) at any time.
- Ground vibration peak particle velocity from the blasting operations must not:
 - exceed 5mm/s for more than 5% of the total number of blasts during each reporting period; and
 - exceed 10mm/s at any time,at any residence on privately-owned land.

Previously, the EPL specified that blasting must only be carried out between the hours of 9:00 am and 5:00 pm Monday to Friday. Whitehaven submitted a licence variation during the reporting period requesting that these times be varied to align with DA 88-4-2005 MOD 1. The variation was subsequently approved in December 2011 (Appendix 2).

The EPL also specifies that only one blast per day is permitted and that hours of blasting operations may be varied if the EPA gives written consent to the variation.

3.9.1.2 Control Procedures

Flyrock, air vibration, ground vibration and dust from blasting are controlled using a combination of design and operational methods which are detailed in the MOP and/or documented blasting procedures.

3.9.2 Performance

During the reporting period, a total of 69 blasts were initiated (all of which were monitored).

There was an issue on the 1st July 2011 with two blasts occurring on the one day which is a non-compliance in relation to the EPL and Consent. Blast monitoring reports show that the blasts occurred at 11:54am and 12:15pm. The blasts occurred in two different areas, one at each end of the pit, and were intended to be concurrently detonated however a technical issue resulted in the blast at the southern end of the pit being delayed.

Two blasts also occurred on the 30th November 2011 however these blasts were only four minutes apart. The first shot was a small pre-split consisting of approximately 50 holes and the other was a large production shot directly behind and above the pre-split. It was planned to fire these on separate days but rain prevented mobile manufacturing unit (MMU) access onto the inclined pre-split and therefore prevented loading. The location of the pre-split made it necessary to fire this prior to it being buried by the production shot.

Once loading of the production shot was completed it was a priority for blasting and therefore it was decided to fire the production and pre-split simultaneously. At the time of firing there were communication problems with the firing units that caused the delay between the two shots firing. The pre-split only contained approximately 2% of the total explosive that was in the production shot.

The issue of two shots occurring on the one day has been discussed with site management and Orica. It has been made clear that the conditions of Project Approval and the EPL allow only one shot per day, unless separate approval is obtained. DoPI and EPA have been notified of both issues.

There have been three monitoring results exceeding 115 dBL during the reporting period, with two at privately owned "Tarrawonga" and one at project-related "Templemore". A further blast exceeded 120 dBL at "Tarrawonga" in January 2012 for which DoPI and EPA were notified. Even with this exceedance, the number of shots exceeding 115 dBL at "Tarrawonga" does not exceed 5% of the shots in the reporting period and therefore the shots that recorded a result between 115 dBL and 120 dBL have not been reported to either department. The following table provides a summary of the blast exceedances.

Table 7 - Airblast Overpressure Exceedances

Blast #	Date	Property	Ground Vibration (mm/s)	Airblast Overpressure (dBL)
309	25/07/2011	Tarrawonga	0.6755	115.9
320	16/09/2011	Tarrawonga	0.9736	115.3
326	19/10/2011	Templemore	0.5506	115.9
342	27/01/2012	Tarrawonga	0.4292	127.4

The maximum recorded ground vibration during the reporting period was 2.705 mm/s recorded at "Templemore" on the 26th April 2012. This is well inside the consent criteria of 5 mm/s.

All blast monitoring results for the reporting period, including the time of initiation has been included in Appendix 8.

3.9.3 Comparison with EA predictions

Blasting impact predictions are presented in Appendix B of the Modification EA and indicate that vibration and air blast emissions would comply with the relevant human comfort and structural damage criteria at nearby privately-owned receivers. Table 7 above identifies blasts that exceeded 115 dB or 120 dB during the reporting period. EPL 12365 allows for 5% of blasts to exceed 115 dB so those blasts that did not exceed 120 dB are not non-compliances.

“Thuin”, the project-related property at the foot of the southern waste emplacement, was predicted to exceed the building damage criteria for vibration. Blast mitigation measures were provided in the Modification EA however they will not be required as the “Thuin” house was relocated during the reporting period.

3.10 Operational Noise

3.10.1 Criteria

The noise criteria specified in DA 88-4-2005 MOD 1 is as follows:

Noise Criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{A1} (1 \text{ min})$
15 – Kyalla	37	37	37	45
All privately-owned land	35	35	35	45

Road Traffic Noise Criteria dB(A) $L_{Aeq} (1 \text{ hour})$

Location	Day	Evening	Night
Any residence on privately-owned land	60	60	55

This differed from the criteria specified in the EPL ($L_{Aeq(15 \text{ min})}$ limit of 35 dB(A) for all residences during the day, evening and night) so a licence variation application was submitted requesting that the EPL be amended to align with the consent. The modified noise limits have since been updated in the EPL (Appendix 2).

A number of other specific conditions (ie. acquisition, monitoring protocols and cumulative impacts) are listed in DA 88-4-2005 MOD 1 (Appendix 1) and EPL 12365 (Appendix 2).

3.10.2 Control Procedures

Control of noise generation and propagation on the mine site is by a combination of general source and propagation path methods including:

- Installation and maintenance of appropriate mufflers on plant and equipment;
- Where operationally feasible, scheduling activities to minimise operation of equipment in exposed locations when winds are blowing towards residences;
- Equipment removal or replacement;
- Changing operational procedures;
- Restricting hours of operations;
- Enclosure of fixed items of plant, eg generators;
- Bunding close to noise sources to create obstructions to the propagation path;
- On-going site road maintenance using the mine-based grader; and
- Regular equipment maintenance.

Tarrawonga Coal also regularly liaises with the majority of surrounding neighbours to seek feedback not only on noise, but on all mining activities. Any issues raised are investigated and appropriate measures are implemented to alleviate further impacts.

3.10.3 Operational Noise Monitoring

3.10.3.1 Introduction

Routine attended noise monitoring programs were undertaken quarterly during the reporting period by Spectrum Acoustics. Unattended noise monitoring is no longer undertaken following agreement with the former DECCW. The noise monitoring sites are identified on Figure 3. Measurements from “Pine Grove” relate to road transport noise only.

A copy of all the attended noise monitoring reports is presented in Appendix 9.

In addition to the operational noise requirements, Tarrawonga Coal monitors road transport noise along both private and public sections of the coal haulage route. The results of this noise monitoring is also contained within Appendix 9.

As reported in previous AEMRs, Tarrawonga Coal has experienced difficulties in complying with the noise criteria (35dB(A)) along the private sections of the haul

route, particularly during the winter period when inversions are most prevalent. Despite application of a range of measures to reduce road transport noise (removal of ramps, improved road surface, separation distances for trucks), it became apparent that achievement of the compliance criteria of 35dB(A) was going to remain problematic at the “Ambardo”, “Kyalla” and “Pine Grove” residences. As a consequence, private agreements were sought with those property owners, and achieved in the period October to December 2009. The outcome of these agreements removed the consent requirement of 35dB(A) from road transport noise from private sections of the haul route at those residences. “Ambardo” and “Pine Grove” have since been purchased by Whitehaven and the applicable noise criteria is now 50dB(A) at “Kyalla”.

In accordance with the requirements of DA 88-4-2005 MOD 1 and EPL 12365, TCPL undertook real time noise monitoring during the reporting period. Monitoring was confined to the “Sylvania” and “Coomalgah” properties over a period of several months following ongoing concerns about noise from the landholders who own both properties. There was no indication that the mine was exceeding compliance limits during this period of monitoring. A summary of monitoring results was provided to the landholders.

The following sub-sections present a summary of the outcomes of attended noise monitoring over the reporting period. EPL 12365 now includes additional requirements in terms of monitoring periods and reporting. These requirements will be implemented during the next reporting period.

3.10.3.2 June 2011 Noise Monitoring - Attended

On the 23rd and 24th June 2011 attended noise monitoring programmes were undertaken at “Bollol Creek Station” (N2), “Pine Grove”, “Tarrawonga” (N3) and “Ambardo” (N4). Spectrum Acoustics reported that noise emissions from operations associated with the mine did not exceed the operational noise criteria at any monitoring location during any of the monitoring period.

In addition to the operational noise, the noise from the mine must not exceed 45 dB(A), L_{1(1min)} between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. During the night time measurement circuit the L_{1(1min)} noise from the mine did not exceed 45 dB(A) at any monitoring location.

3.10.3.3 September 2011 Noise Monitoring – Road Noise

Road noise monitoring was conducted at the “Brooklyn” (2 residences) and “Weroona” properties on the 13th September 2011, with the following observations and results:

- 37 truck movements were recorded during the measurement period for Residence 1 at “Brooklyn” (7:50am to 8:50am). Residence 2 at “Brooklyn” was monitored between 8:30am and 9:30am. The total measured noise level at Residence 1 at “Brooklyn” was 54 dB(A) L_{eq} (1 hour) and the calculated contribution from mine-related vehicles was 54 dB(A), L_{eq} (1 hour). The calculated contribution from mine-related vehicles at Residence 2 was 49 dB(A), L_{eq} (1 hour). Both results are below the daytime criterion of 60 dB(A) L_{eq} (1 hour).
- Over the course of the measurement period at “Weroona” there were 34 coal truck movements related to Tarrawonga and Rocglen. The total measured contribution from mine-related vehicles at “Weroona” was 50 dB(A), L_{eq} (1 hour). This is below the daytime criterion of 60 dB(A) L_{eq} (1 hour).

3.10.3.4 September 2011 Noise Monitoring – Attended

On the 13th and 14th September 2011 attended noise monitoring programmes were undertaken at “Bollol Creek Station” (N2), “Pine Grove”, “Tarrawonga” (N3) and “Ambardo” (N4). Noise from the mine was below the operational noise criteria, or within prescribed agreement limits, at all privately owned residences during the monitoring period.

During the night time measurement circuit the $L1_{(1min)}$ noise from the mine did not exceed 45 dB(A) at any monitoring location.

3.10.3.5 December 2011 Noise Monitoring – Attended

Noise monitoring was undertaken on the 20th and 21st December 2011. The monitoring report showed that noise from the mine was in excess of the operational noise criterion at “Tarrawonga” during the night time period (39 dBA). All other monitoring locations and times were compliant.

During the night time measurement circuit the $L1_{(1min)}$ noise from the mine did not exceed 45 dB(A) at any monitoring location.

3.10.3.6 March 2012 Noise Monitoring – Attended

Noise monitoring was undertaken on the 15th and 16th March 2012. Results from the monitoring show that noise emissions from operations associated with the mine were higher than the operational noise criterion of 35 dB(A), $L_{eq}(15min)$ at “Tarrawonga” during the evening (37 dBA) and night time (38 dBA) surveys. All other locations and times were compliant.

During the night time measurement circuit the $L1_{(1min)}$ noise from the mine did not exceed 45 dB(A) at any monitoring location.

3.10.3.7 April 2012 Noise Monitoring – Road Noise

Road noise monitoring was conducted at the “Brooklyn” (2 residences) and “Weroona” properties on the 27th April 2012, with the following observations and results:

- 38 coal truck movements were recorded during the measurement period (11:14am to 12:14am) at Residence 1 at “Brooklyn”. The calculated contribution from mine-related vehicles to the overall noise level was 52 dB(A), $L_{eq}(1\text{ hour})$. The calculated contribution from mine-related vehicles at Residence 2 was 42 dB(A), $L_{eq}(1\text{ hour})$, with 43 truck movements recorded during the monitoring period (12:21pm to 1:21pm). Both results are below the daytime criterion of 60 dB(A) $L_{eq}(1\text{ hour})$.
- Over the course of the measurement period at “Weroona” (1:35pm to 2:35pm) there were 43 coal truck movements related to Tarrawonga and Rocglen. The total measured contribution from mine-related vehicles at “Weroona” was 43 dB(A), $L_{eq}(1\text{ hour})$. This is below the daytime criterion of 60 dB(A) $L_{eq}(1\text{ hour})$.

3.10.4 Comparison with EA predictions

Noise exceedances under calm meteorological conditions were modelled in the Modification EA for the “Ambardo” property, which is now project-related. The “Tarrawonga” (privately owned) and “Ambardo” properties were predicted to exceed the criteria by greater than 5 dBA during evening and night periods under adverse meteorological conditions. “Ambardo” is not discussed further as it is project-related.

As discussed in Section 3.10.3, noise exceedances were recorded at “Tarrawonga” in December 2011 and March 2012. The “Tarrawonga” landholders hold compulsory acquisition rights under DA 88-4-2005 MOD 1 which they have not yet triggered.

Whitehaven has continued discussions on acquisition through negotiation with the landholders during the reporting period with no resolution. This included the offer of independent mediation on the matter. The EPA and DoPI are aware of these ongoing discussions and will be notified of any further progress. In the meantime, the mine will continue to make every effort to minimise noise impacts however this is unlikely to result in noise levels below 35dB(A), as per the predictions in the noise model for the site.

DA 88-4-2005 MOD 1 required the Noise Management Plan to include a program for validating the accuracy of the tenth percentile methodology used to predict noise impacts from the mine. Wilkinson Murray was engaged to undertake validation of the model, with their report provided at the end of Appendix 9. The report shows that real time monitoring results from the “Sylvania” property, to the east of the site, indicate a good accuracy of the tenth percentile methodology. The data set from “Blair Athol” was too small to provide a statistically robust conclusion. Given comprehensive data sets are not available for the current reporting period, Whitehaven intends to collect more data during the next reporting period to allow for better validation. Results will be provided in the next AEMR/Annual Review.

3.11 Visual, Light

3.11.1 Management

Management/minimisation of local and more distant visual impacts is achieved by:

- Undertaking activities in accordance with the various management plans applicable to the mine, all of which incorporate safeguards which indirectly reduce visual impact;
- Minimising the extent of land disturbance / clearing in advance of mining;
- Progressive rehabilitation of disturbed areas; and
- Sympathetic positioning and direction of lights to avoid them impacting on local residences.

3.11.2 Performance

Tarrawonga Coal has minimised the visual impact of its activities to the extent practicable, however, the continued progression of the southern waste emplacement to the south and the increased height of the emplacement have resulted in increased visibility from non-mining related properties. Progressive rehabilitation of the waste emplacement has been delayed on the basis of awaiting approval for the Section 75W and LOM extension modifications, with rehabilitation

works only re-commencing at the end of the reporting period. The mine is aware of the visual impact this emplacement has created and will fast-track rehabilitation as much as possible.

No complaints have been received during the reporting period in relation to lighting. Visual impacts from dust generation are discussed in Sections 3.1.3 and 4.1.

3.11.3 Comparison with EA Predictions

The Modification EA provided visual simulations from neighbouring properties as well as predictions for general visual impacts created by the mine. No specific complaints have been made during the reporting period in relation to the visual impact of the mine. Comment was made by Community Consultative Committee (CCC) members at the February 2012 CCC meeting about the light from waste emplacement lighting plants shining in their windows at night. Both members who raised concern confirmed at the next meeting that light positioning had improved. The property of one of those members is also now project-related.

Mine management continually reiterates the importance of sympathetic positioning of lighting plant however it is difficult at times to locate lighting to avoid any offsite impact whilst maintaining safety requirements.

The Modification EA also notes progressive rehabilitation as a visual impact mitigation measure. Section 5 discusses rehabilitation during the reporting period.

3.12 Aboriginal Heritage Management

3.12.1 Sites Management and Performance

An investigation of Aboriginal cultural heritage was undertaken as part of the EIS for the Tarrawonga Coal Mine and identified 4 sites of significance within the project site and 4 sites within the proposed transport route as shown on Plan 3, and listed below:

- NST 1 – a scarred tree (3 scars – 1 on fallen trunk, and 2 on tree stump);
- NAS01 – Artefact scatter – 2 flake scars, core and scraper/adze;
- NAS02 – Artefact scatter – Flake and scraper/adze, flaked piece scraper;
- NIS01 – Isolated Artefact – Probable hand-axe or hatchet;
- GG051 – Open Scatter – 15-20 artefacts in an area approximately 60m (N-S) by 45m (E-W);

- GG052 – Open Scatter – 20-25 artefacts in an area approximately 60m (N-S) by 45m (E-W);
- GG053 – Open Scatter – 8-10 artefacts in an area of approximately 15m diameter; and
- GG054 – Open Scatter – 5 artefacts in an erosion feature of an area approximately 3m (N-S) by 9m (E-W).

Following a cultural heritage significance assessment by Red Chief Local Aboriginal Land Council and Bigundi Biame Gunnedarr Traditional People, their recommendations were incorporated into the site's Archaeology and Cultural Heritage Management Plan.

Initial development required only the salvage of NAS01 and NIS01 and relocation to Cumbo Gunerah Keeping Place. Scarred tree NST1 has been fenced within a 20 metre radius of the tree and clearly marked.

Isolated artefact NAS02 was salvaged in early 2011 under Aboriginal Heritage Impact Permit (AHIP) 1123843. The artefact was transferred to the Cumbo Gunerah Keeping Place in Gunnedah.

In addition to the day-to-day Aboriginal cultural heritage management at the site, a Cultural Heritage Assessment was undertaken by Landskape Natural and Cultural Heritage Management Pty Ltd for the Section 75W Modification EA. No additional artefacts or places were identified where additional disturbance was proposed.

3.12.2 Consultation

Tarrawonga Coal, through the soil stripping contractor, regularly consults with Red Chief Local Aboriginal Land Council (LALC). In accordance with the agreement with the Red Chief LALC, notification of planned topsoil stripping is provided by the soil stripping contractor directly to the Red Chief LALC site monitors approximately 2 to 3 days in advance of planned activities.

Given that pre-stripping (separate stripping of topsoil, subsoil and friable overburden) is undertaken well in advance of mining and the soil stripping contractor is also engaged in other activities on the mine site, the flexibility exists to delay topsoil stripping activities should the situation ever arise in the future where monitors are temporarily unavailable.

During the reporting period, no cultural material of significance was identified during soil stripping activity. To date, the measures in place to protect Aboriginal cultural heritage are considered satisfactory, with all measures identified in the EIS and consent criteria in place.

3.12.3 Comparison with EA Measures

Management measures for Aboriginal Heritage items are detailed in the Modification EA. All measures, where applicable, have been implemented during the reporting period including monitoring of soil stripping and ground disturbance activities by Aboriginal stakeholder representatives.

3.13 Natural Heritage

There are no features of natural heritage within the DA Area and hence, no specific management procedures are required.

3.14 Spontaneous Combustion

3.14.1 Management

Tarrawonga Coal has a low percentage of inorganic sulphur and hence a low potential for exothermic oxidation reactions. The short residence time of ROM coal stockpiles at the mine also minimises the potential for spontaneous combustion incidents.

In the event of spontaneous combustion Tarrawonga Coal personnel are present within the area of the ROM coal stockpiles during work hours and are trained to watch for indications of spontaneous combustion. Any incident would be followed by excavation to identify the source and extinguishment through water saturation.

3.14.2 Performance

There were no incidents of spontaneous combustion during the reporting period.

3.15 Bushfire Management

3.15.1 Management

The existing Bushfire Management Plan was updated in April 2011, as required by Condition 46 of Schedule 3 of DA 88-4-2005 MOD 1. The plan identifies policies, procedures, responsibilities, equipment and equipment maintenance schedules, emergency response procedures and contact details in place for the Tarrawonga Coal Mine. As required by the consent, the Plan was issued to the Rural Fire Service and Narrabri Shire Council for review with both responses received during the reporting period. The Plan was finalised in September 2011 and is available on the Whitehaven website.

Tarrawonga Coal maintains firebreaks around both its landholding and the mine area and maintains fire fighting equipment as well as earthmoving equipment, a water truck etc which would be used in the control of fires.

3.15.2 Performance

There were no bushfire incidents on or adjacent to the DA Area during the 2011/2012 reporting period.

3.16 Mine Subsidence

Mine subsidence is not an issue with open cut mines and hence it is not an issue with the Tarrawonga Coal Mine.

3.17 Hydrocarbon Contamination

3.17.1 Management

It is Tarrawonga Coal's objective that:

- All bulk hydrocarbons, i.e. fuel, oils, grease etc (both new and waste) retained at the Tarrawonga Coal Mine be contained within bunded areas within the contained water management system as described in Section 2.8.2;
- All fixed or portable equipment incorporate self-contained bunding;
- Hydrocarbon-contaminated materials be disposed of appropriately; and
- Minor spillages, if occurring, are cleaned up and the contaminated soil either bio-remediated or transferred off-site to an appropriately licensed waste disposal area.

Major spillages, if occurring, would be treated in accordance with the three-phase system identified in the relevant management plan required under the Consent.

3.17.2 Performance

Tarrawonga Coal's procedures for hydrocarbon management have been effective throughout the reporting period with:

- No surface or groundwater contamination evident or reported by landowners; and
- No requirement for off-site disposal of contaminated materials.

A concrete apron has been constructed at the refuelling area to contain any spillages and prevent soil contamination.

3.17.3 Greenhouse Gas Emissions

Diesel Consumption

During the reporting period, a total of 16,868,659 litres of diesel fuel was used on site for mining related activity, which is an increase of approximately 3.73 million litres since the last reporting period. This is a result of increased production at the mine. Assuming an energy content of Automotive Diesel Oil of 38.6 GJ/kL and using Table 3 of the *National Greenhouse Accounts (NGA) Factors – July 2011*, the estimated direct – Scope 1 Greenhouse Gas emissions including all CO₂ and non CO₂ gases are shown in Table 8.

Table 8 - GHG Emissions - Diesel Fuel

	Diesel Fuel Usage kL	Emission Factor T CO ₂ -e/kL	Equivalent Tonnes
GHG 2011/12	16,169	2.7	45,254

The Tarrawonga site does not utilise electricity from the power grid, but via a number of diesel powered gensets. The emissions associated with diesel consumption by the gensets are included in the table above.

Explosives

During the reporting period, a total of 13,655 tonnes of explosives was used at Tarrawonga Coal Mine, which is an increase of approximately 1,500 tonnes from last year and 5,000 tonnes since the previous year as a direct result of increased production. Assuming a conversion factor of 0.1778, it is estimated that blasting at the mine yielded 2,428 equivalent tonnes of CO₂.

Fugitive Emissions

ROM coal production is used to estimate fugitive emission factors. Based on 1,746,625 tonnes of ROM coal production during the reporting period and a conversion factor of 0.045 (from Table 8 of the “National Greenhouse Accounts (NGA) Factors” – November 2008), it is estimated that approximately 78,600 tonnes of CO₂ were emitted during the reporting period.

Summary

A summary of calculated total CO₂ equivalent tonnes/year for the reporting period is provided in Table 9.

Table 9 - GHG Emissions Summary

Source	Calculated Total CO₂ Equivalent tonnes/year
Diesel	45,254
Explosives	2,428
Fugitive Emissions	78,600
TOTAL	126,282

The potential for reducing greenhouse gas emissions at Tarrawonga is related predominantly to consumption of diesel use by plant and equipment. Methods are in place at site to maximise efficiency from the mining fleet through regular maintenance scheduling and, where possible, minimising the gradient and length of loaded haul runs for the operating dump trucks.

Tarrawonga Coal remains committed to a reduction in emission levels as a result of operations at the mine site. As part of this process, Tarrawonga Coal continues to run a fleet of Terex dump trucks (electric drive) which have proven to burn less diesel fuel as compared to the standard mechanical drive fleet at our Rocglen site. Initial comparisons indicate a diesel saving of 0.23 litres/bcm/truck using the Terex partial electric drive, which, whilst only a modest saving, does represent real savings in terms of fuel burn and emission levels.

The fuel burn rate has increased over the last 12 months with an average rate of 9.7 litres/tonne of ROM coal. This compares to 8.3litres/tonne ROM coal in the 2010/2011, 5.74litres/tonne of ROM coal in the 2009/2010 AEMR period, 6.45litres/tonne ROM coal in the 2007/2008 AEMR reporting period and 5.43litres/tonne ROM coal in the 2008/2009 AEMR reporting period. The further increase since last year is again likely attributable to the longer haul distances, high overburden:coal strip ratio (11:1) and an increase in use of ancillary equipment not specifically related to coal production (ie. water carts).

As part of Whitehaven's participation in the Commonwealth government's Energy Efficiency Opportunities (EEO) Program, the Tarrawonga site is subject to review and assessment of energy use performance and potential energy savings mechanisms. The Assessment and Reporting Schedule (ARS) was approved by the Department of Resources, Energy and Tourism in March 2011 and the first public and government reports were submitted in December 2011, with the public report available on the Whitehaven website. EEO meetings are held with the Tarrawonga, Rocglen and Werris Creek Project Manager's, Open Cut Maintenance Manager, Open Cut Electrical Supervisor and environmental staff on a monthly basis to discuss progress

of commitments in the ASR, public and government reports and to identify any new energy efficiency opportunities. Actions include:

- Use of dust suppressant during dry times to reduce water truck usage;
- Trialling and, where appropriate, implementation of energy efficient lighting and timers;
- Use of high efficiency AC motors; and
- Reduction in turbo idle timers.

3.17.4 Comparison with EA Predictions

Greenhouse gas emissions associated with the mine were assessed in Appendix C of the Modification EA. The total direct (Scope 1) emissions were estimated to be approximately 0.14 million tonnes of carbon-dioxide equivalent (Mt CO₂-e) per annum. Scope 1 emissions are the release of greenhouse gases into the atmosphere as a direct result of an activity, or series of activities, that constitute the facility and include fugitive emissions from coal mines and diesel combustion. Actual consumption (combining the major Scope 1 contributors of fugitive emissions, diesel consumption and explosives) totalled approximately 126,000 tonnes (or 0.126 Mt), which is slightly lower than the predicted emissions. This will largely be as a result of the mine not reaching maximum predicted production of 2 million tonnes per annum during the reporting period.

3.18 Methane Drainage / Ventilation

Methane drainage / ventilation are not of relevance to open cut mines and hence are not an issue at the mine.

3.19 Public Safety

3.19.1 Management

The mine is located wholly on WCL and Boggabri Coal owned land in a relatively remote area, in excess of 1 km from any public road and accessible only by a single access road which is locked when no mine-related personnel are at the mine. The site is fenced and appropriate signs installed.

Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied. Procedures are in place with respect to blasting to ensure the area around each blast

site is clear of personnel and that all surrounding residents are advised in advance of proposed blasts.

3.19.2 Performance

The procedures in place have been effective throughout the reporting period.

3.20 Feral Animal Control

Feral animals are not a significant land management issue on TCPL's landholding and are limited to isolated occurrences of foxes, hares and rabbits.

In view of the low frequency of occurrence, and in the absence of an extensive programme by all surrounding landowners, no broad scale feral animal control programme was considered warranted during the reporting period.

In accordance with prior commitments, Tarrawonga Coal will continue to monitor feral animal occurrences and implement necessary control programmes if and when necessary.

3.21 Land Capability

All land currently disturbed by mining is classified as Land Capability Class III, IV, VI and VII with the remaining areas to be disturbed over the life of the approved mine primarily comprising Class III, IV & VI. All disturbance during the reporting period was undertaken on Class III, VI and VII land.

On completion of all mining activities, the successful rehabilitation of areas of disturbance and the relinquishment of the mining leases, the land affected by mining within the DA Area will, in the main, be returned to a classification similar to that prior to mining.

3.22 Meteorological Monitoring

3.22.1 Introduction

In August 2006, a meteorological station was commissioned at the mine site office. The station, shown on Plan 4, has been operating continuously since that time recording 15 minute wind speed, wind direction, temperatures, humidity and rainfall. Daily data for the reporting period is presented in Appendix 10. Rocglen weather data has been used for April 2012 as the weather station at Tarrawonga ceased working correctly.

The EPA was notified in writing of a wet weather discharge which occurred on the 21st February 2012 during a time where the weather station was only working intermittently. Tarrawonga was subsequently issued with a written Official Caution as Condition M4.2 of EPL 12365 requires that the weather station must be maintained so as to be capable of continuously monitoring the parameters within the licence.

In light of the ongoing issues with this weather station, a new station has been installed at the project-related “Templemore” property. Next year’s AEMR/Annual Review will include information from this new station. An EPL licence variation will also be submitted to reflect the new location.

3.22.2 Rainfall

Rainfall data for the reporting period recorded from the mine’s meteorological station is presented in Table 10 and Figure 6. Full station data is presented in Appendix 10.

Table 10 - Rainfall Data
(1 May 2011 – 30 April 2012)

Month	Monthly Rainfall Reporting Period	Long Term Average Rainfall*¹	Raindays Reporting Period (>1mm)	Long Term Average Raindays*¹ (≥1mm)
May 2011	57.4	42.5	5	4.1
June 2011	19.6	43.6	5	4.8
July 2011	2.2	42.4	0	4.8
August 2011	25.2	41.5	5	4.8
September 2011	80.8	40.3	4	4.5
October 2011	74.6	55.5	7	5.4
November 2011	220.4	62.6	11	5.7
December 2011	64.2	70.1	7	6.0
January 2012	99.2	71.3	12	5.6
February 2012	219.6	67.3	10	5.1
March 2012	8.8	47.7	2	3.9
April 2012	27.2	37.5	4	3.4
TOTAL	899.2	622.3	72	58.1

*¹ Gunnedah Pool (Station 055 023) Averages from 1876-2012

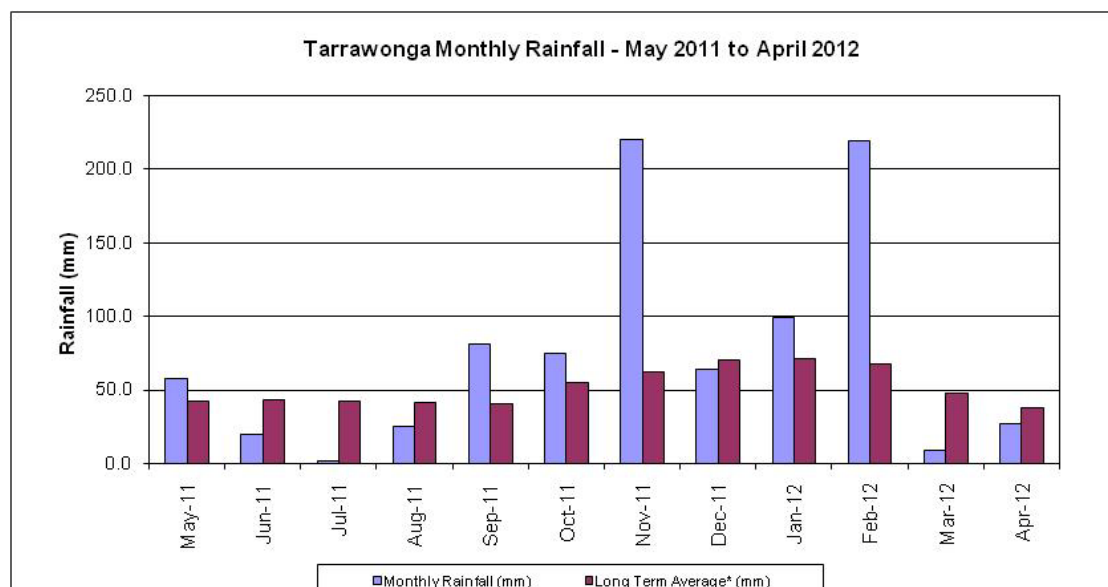


Figure 6 - Monthly Rainfall Data

A review of Table 10 and Figure 6 shows that the total rainfall at the mine during the reporting period was 899.2mm. The total rainfall at the site was 276.9mm higher than the annual average rainfall for Gunnedah and 229.6mm higher than the mine's total rainfall for the 2010/2011 AEMR reporting period. Below average rainfall was experienced in June, July and August 2011 as well as March and April 2012. The above average rainfall received between September 2011 and February 2012 was the cause of multiple wet weather discharges that are discussed in Section 3.3.2.

3.22.3 Temperature

Average maximum and minimum temperatures for the reporting period are presented in Table 11 together with long-term monthly averages for Gunnedah Pool (Bureau of Meteorology Station 055023).

Table 11 shows generally average or higher than average minimum temperatures throughout the year and very mild maximums with ten of the 12 months being below average temperature, one month being the same as that long term average and one month being slightly warmer than the average.

**Table 11 - Average Monthly Temperatures
(May 2011 – April 2012)**

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 055023 (Gunnedah Pool)* (°C)	
	Min	Max	Min	Max
May 2011	6.3	19.3	7.1	21.3
June 2011	5.1	16.9	4.3	17.6
July 2011	3.9	16.0	3.0	16.9
August 2011	6.7	19.3	4.2	18.9
September 2011	7.8	22.8	7.0	22.8
October 2011	10.8	24.5	10.8	26.7
November 2011	17.0	29.7	14.2	30.3
December 2011	15.7	26.2	16.8	32.9
January 2012	17.6	29.5	18.4	34.0
February 2012	18.0	28.8	18.1	32.9
March 2012	16.3	28.1	15.8	30.7
April 2012	11.4	25.7	11.4	26.4
Annual Average	11.4	23.9	10.9	26.0

* Averages from 1876-2012

3.22.4 Wind Speed and Direction

Fifteen minute average wind speed and direction data is collected from the Tarrawonga meteorological station, as it, together with operational records and environmental monitoring results, can be used to assess the environmental effects or consequences of specific activities undertaken at the mine or in surrounding areas. Monthly wind roses show that the dominant wind directions during the reporting period were from the north and south-east (Appendix 10).

3.22.5 Inversions

The meteorological station at Tarrawonga is fitted with temperature sensors at 2m and 10m intervals to assist in the determination of inversion conditions. As the noise results obtained over the reporting period were generally in compliance, with the exception of the “Tarrawonga” property, no specific investigation into temperature inversion impacts on noise propagation was undertaken during the reporting period. Noise exceedances at the “Tarrawonga” property were modelled in the modification assessment and the owner of this property has compulsory acquisition rights under DA 88-4-2005 MOD 1.

4 COMMUNITY RELATIONS

4.1 Environmental Complaints

Tarrawonga Coal maintains a designated complaints line, with messages checked on a daily basis (seven days/week) by the Environmental Manager. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on a "Complaints Form".

Twenty four complaints were received during the reporting period. The nature of the complaints, details and responses to each complaint are presented in Table 12. The number of complaints has increased significantly since previous reporting periods (10 recorded in the 2010/2011 AEMR period and 9 recorded during the 2009/2010 AEMR period) however there is some doubling up of complaints whereby a complaint was made directly to the mine and then additional via the EPA. Table 13 provides a comparison of complaints received over the past AEMR reporting periods.

The most common complaints were related to dust (including gravel haulage on the unsealed section of Manilla Road), blasting and issues with coal haulage.

Any complaints that are made are reported to the Community Consultative Committee and documented in the AEMR/Annual Review.

Table 12 - Complaints Summary (2011/2012 Reporting Period)

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	13/05/2011 3:00pm	Complaint relating to dust on Monday morning and Monday afternoon 9 th May. Also in relation to noise, on occasions it becomes quite audible at their property.	A review of the weather conditions will be undertaken to determine any incidence of inversion that may have caused dust to become trapped beneath the inversion layer, causing it to become concentrated and visible. It is also intended to locate the real time noise monitor at the "Sylvania" property to obtain some noise data files. The complainant also asked if she could see the zone of affectation for the Tarrawonga extension proposal. She was advised that modelling was not yet completed for noise or dust impacts, but that advice would be provided to her upon completion of draft modelling.	Contact will be made with the complainant once the real time noise monitor was available to place at her property.
Phone call to Environmental Manager	16/05/2011 9:40am	Complaint relating to dust on Monday morning 16 th May. Dust plume from Tarrawonga site floating out towards their property.	The complainant was advised that an Environmental Officer would investigate the dust generation from site to ensure dust lift off was minimised. Dust was evident across the valley and some localised dust generation was identified at Tarrawonga. Site personnel advised that water trucks commenced watering roads before mining commenced and that the water trucks had been operational throughout the morning. Dust generation was also noted on adjacent unsealed public roads and from Boggabri Coal. A member of staff who lives in close proximity to the mine said that the dust haze was present at 7am before mining commenced and was obviously associated with vehicles travelling on unsealed roads.	Follow up contact will be made with the complainant at the same time that the real-time noise monitor is available to place at her property.
Phone call to Environmental Manager	27/05/2011 2:00pm	Whilst in the area today for other matters, Jessica Creed from OEH noticed a significant amount of dust emanating from the Tarrawonga site, predominantly in the south west corner.	During discussions it was identified that the dust source was most likely related to scraper operations transferring topsoil from the stockpiles below the southern dump to the new stockpiling location west of the haul road. OEH were advised that the matter would be investigated and water carts directed to the area as necessary. Subsequently, the Project Manager was contacted and he advised that the scrapers had only been operating in that locality for around an hour. He advised that he would make arrangements for the water carts to service the access roads for the scrapers to minimise dust generation.	Nil required. Jessica indicated she would make contact next week to arrange a meeting to discuss issues around Tarrawonga and the other sites.
Anonymous complaint to Environmental Manager via OEH	21/06/2011 2:30pm	Complaint on behalf of anonymous complainant in relation to dust generation off the Tarrawonga site.	An Environmental Officer travelled to site to review conditions. Dust was observed leaving site due to strong north-westerly winds. Whilst some dust was evident from overburden dumping, the majority of dust was associated with soil relocation from stockpiles at the southern end of site to the new stockpiling location west of the haul road. The issue was raised with the Project Manager and it was determined that shortening the haul length for topsoil relocation, and additional runs by the water carts would reduce dust lift off. This practice was implemented and observed to effectively reduce dust impact.	No further action required.
Phone call on Tarrawonga complaints line	25/07/2011 12:27pm	Complaint in relation to blast at Tarrawonga which rattled her windows and house, and the extent of yellow plume drifting to her property following the blast.	The complainant was contacted to discuss the investigation being undertaken, and a message to this effect left on the answering machine. It was identified that upon availability of the blast results, and receipt of the video for the blast, a report would issue to the complainant outlining the results.	Letter response issued on 29 July identifying blast within compliance limits.
Anonymous complaint to Environmental Manager via OEH	25/07/2011 1:00pm	From anonymous complainant in relation to a blast at the Tarrawonga site on 25 July 2011. Complainant concerned about the extent of window rattling and vibration at her home and yellow plume that spread towards her property.	Advised OEH that we would obtain the blast monitor results to identify vibration and overpressure results and if in compliance at monitoring locations. Matter also discussed with Orica who advised that the fume generation rated a 2 on their scale (up to 5). Video of the blast has been requested to enable review of fume produced.	Advice issued to OEH same as to complainant.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	28/07/2011 12:00pm	Complaint in relation to Toll truck T19 spilling a piece of coal from rear trailer onto windscreen of wife's vehicle, causing windscreen to crack. Incident occurred south of the Rocglen turn off at around 10:55am with T19 travelling towards Gunnedah and his wife travelling in the opposite direction. The coal piece was retrieved at the time of the incident and the truck number identified.	The matter was discussed with the Toll Project Manager and the Environmental Manager met with the complainant at their residence and viewed the damaged windscreen and the nominated coal piece which caused the damage. The complainant's were advised that the matter would be discussed between Toll and Whitehaven for resolution and advice would issue back to them as soon as possible.	Whilst Toll generally has a policy not to replace windscreens, on this occasion the cost of replacement was covered by Toll.
Phone call to Environmental Manager	2/08/2011 10:00am	Complaint in relation to extent of dust in the area during the morning, which seemed to be travelling east from the direction of the mines. It was acknowledged that conditions were very dry and prevailing winds determined how dust dispersed however it was requested that more be done to control dust from off the mine sites.	The extent of dust during the morning was acknowledged with Boggabri Coal and review of photographs taken by the Boggabri Coal Environmental Coordinator. Both Boggabri and Tarrawonga mines acknowledge dust generation from their operations, however, a significant proportion of dust is also generated from traffic on the nearby unsealed roads including Manilla Road, Wean Road, Goonbri Road, Dripping Rock Road and Leard Forest Road. This road dust, combined with dust generation from the mine sites is creating a cumulative dust impact that is most visible in the early morning due to temperature inversions preventing the dust from dispersing. Visual observations of the mine sites during the day generally confirm a reduced dust impact once the inversion layer has dispersed. Notwithstanding this, actions currently under investigation to reduce dust impact include consideration to ongoing gravel collection by Narrabri Shire Council requiring Council to water the affected roads to reduce dust impact; review of water cart operations on both day and night shift to confirm adequate dust suppression is being implemented; and consideration to the use of a surfactant to further reduce dust lift off from haul roads on the mine site.	A meeting was held on the 22 August 2011 between the complainants and representatives from Boggabri Coal and Whitehaven to discuss cumulative impacts.
Phone call to Environmental Manager	29/09/2011 1:34pm	Complaint in relation to truck exiting Tarrawonga private section of haul route onto Manilla Road and crossing centre line of road into incorrect lane. This caused the complainant to brake in order to allow the truck to enter correct lane.	Immediately following the complaint, the Environmental Manager contacted the Co-ordinator for Domestic Coal Sales at Tarrawonga site to verify if a domestic coal truck had recently departed site. It was confirmed a truck matching the description provided by the complainant had departed site at approximately 1:20pm. On the 30 September 2011, contact was made with the haulage contractor who agreed to raise the matter with the driver of the truck. It was reiterated to the haulage contractor that any trucks undertaking haulage to and from the Tarrawonga site must be compliant with all rules and regulations or face the prospect of being banned from entering site.	No further action required.
Phone call to Environmental Manager	25/10/2011 8:30am	Extent of dust in the area during the morning, particularly relating to dust from Tarrawonga site and dust from gravel trucks departing site for Narrabri Shire Council.	Upon receipt of the complaint the Environmental Manager travelled to site to review the extent of dust in the area. It was clearly dusty and hazy across the valley. On discussion with the Project Manager at Tarrawonga, he confirmed that dusty/hazy conditions were prevalent early in the morning even prior to Tarrawonga site commencing production. It was commented that gravel trucks departing site along Goonbri Road and then Manilla Road were creating significant dust lift off, with Council not providing any dust suppression on the Council roads. Following discussions, it was agreed that scraper operations be suspended at Tarrawonga site until dust levels cleared. It was also agreed that discussions should be held with Council on the basis that Tarrawonga would no longer supply gravel unless Council undertook to provide a water cart for dust suppression of its roads during gravel cartage. Contact was made with Council in relation to this and it was agreed they supply a water cart for this purpose.	No further action required.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	25/10/2011 9:30am	Extent of dust in the area during the morning, particularly relating to dust from Tarrawonga site.	As per above complaint.	No further action required.
Phone call to Environmental Manager from OEH	25/10/2011 12:30pm	Extent of dust in the area during the morning, particularly relating to dust from Tarrawonga site and complaints from surrounding community.	As per above complaint. OEH were advised that Tarrawonga ceased scraper operations from 9:30am to reduce dust dispersal and that Council had been requested to provide water carts for its roads when transporting gravel. It was also advised that Tarrawonga now also utilises a dust suppressant (surfactant) for spraying on its haul roads as a further means of reducing dust lift off from site.	No further action required.
Phone call to CHPP offices – transferred to Environmental Officer	21/11/2011 9:10am	Number of Toll trucks (from Tarrawonga and Rocglen) on Blue Vale Rd when the school bus is travelling between Canyon turnoff and Old Blue Vale Rd during the morning and afternoon. The complainant asked that trucks are staggered or held back to reduce the number of trucks on the road at that time (ie. 15-20 minutes from 8:05am). She also made comment that each day there is about 10 trucks that overtake the school bus. Her complaint was also in relation to regular cracks and chips in her windscreen from coal falling from trucks. She noted T31 at 7:45am, 21 st Nov 2011 being so full that the tarp was only half extended.	The Environmental Officer committed to raising the concerns with the appropriate personnel within Whitehaven and Toll and advised the complainant to contact Whitehaven any time she has any issues with the trucks. A letter was issued to the complainant on the 9 th December 2011 advising that the current roadworks are causing congestion at times and in general delaying the trucks while the bus is on Blue Vale Road would require an extension to haulage hours which isn't an option at this stage. The letter also reiterated that the trucks are in UHF contact with the bus driver and that recent discussions with him indicated that he didn't have concerns with the Toll drivers. Toll were advised of the complaint regarding T31 and were requested to remind drivers about the requirement to have trucks fully covered.	
Phone call to Environmental Manager	9/01/2012 4:00pm	Complaint in relation to dust generation from Manilla Road as a consequence of haulage of gravel from Tarrawonga to Narrabri Coal.	Immediately following the complaint, the Environmental Manager contacted Narrabri Coal to confirm if it had a water cart operating on Manilla Road. Narrabri Coal advised that a water cart had been stationed on the road all day. The time of the complaint and details of the location of the complaint were provided to Narrabri Coal who advised they would cease haulage immediately and investigate the situation and revert with an appropriate response. Upon investigation it was confirmed that the water cart commenced operations on the road at 7am. The water cart operator is a sub-contractor servicing both Narrabri Coal and Narrabri Shire Council during gravel haulage. The water cart operator has a designated fill point located adjacent to the Tarrawonga mine entrance and on this basis, it is thought that the truck was on refill at the time the complainant travelled the road. The gravel truck operators were questioned in relation to the extent of dust being generated during haulage on this day, both indicating the dust lift off was minimal. Inspection of the road was undertaken the following week, with the water cart identified operating and the road generating minimal dust.	No further follow up required. Complainant was advised that the matter would be investigated and appropriate action taken.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	14/01/2012 10:00am	Complaint in relation to dust generation from Manilla Road as a consequence of haulage of gravel from Tarrawonga to Narrabri Coal or to Narrabri Shire Council.	Immediately following the complaint, the Environmental Manager contacted the Tarrawonga Project Manager with an instruction to confirm that a water cart was stationed on Manilla Road. Narrabri Coal ceased haulage upon notification of the complaint. Confirmation was made that the water cart was operating and that truck operators considered the extent of dust generation acceptable. A shower of rain also occurred on Saturday morning which assisted in dust suppression. Inspection of the route was undertaken early the following week with the water cart identified as operating and the road well watered – minimal dust was observed during truck haulage. Discussions have been held with Project Manager in relation to redirecting gravel haulage down Goonbri Road rather than using the gravel section of Manilla Road. This would take the dust impacts further away from the residents in proximity to Manilla Road, with only one residence within proximity to Goonbri Road, at its western connection with the tar sealed Leard Forest Road. If this action is taken, the water cart will be removed from Manilla Road and stationed at Goonbri Road.	No further follow up required. Complainant was advised that the matter would be investigated and appropriate action taken.
Phone call to Environmental Manager	13/02/2012 5:40pm	Complaint in relation to coal truck exiting Tarrawonga haul road without its tarp fully extended. Coal was clearly visible above the sides of the trailer and the coal appeared to be blocking the tarp from full extension.	The matter was taken up with Toll. A truck number was not provided, however was described as having the rounded edge trailer, and exited Tarrawonga haul road at approximately 17:40pm. Toll confirmed that Truck 26 experienced a tarp failure on its "A" trailer after loading from Tarrawonga, and returned direct to the Toll Depot at 17:53pm for repairs. Upon entry to the Depot the B Tarp was fully extended and operational. The problem with the A tarp was corrected prior to truck leaving the depot and running into the CHPP.	No further follow up required. Outcome of investigation explained to complainant – 16/2/2012.
Phone call to Environmental Manager	3/03/2012 10:40am	Complaint in relation to blast at Tarrawonga which shook the complainant's house. Described as one of the worst blasts they had felt.	The complainant was advised that once the monitoring results were available a formal response to the complaint would issue. An offer was made to undertake a structural inspection of the property by an Engineer to verify if any blast related damage had occurred. The offer was declined. Blast results have since confirmed that the blast was within compliance limits at both monitoring points, with the blast not triggering at the "Tarrawonga" property and returning a 102.3dBL overpressure and 1.099mm/s in vibration at the "Templemore" property. Orica were also requested to consider any reasons that this particular blast may have exacerbated impacts at further afield locations on the basis of other complaints received in relation to this blast.	A written response was issued on 16/03/2012 including summary of Orica investigation.
Phone call to Environmental Manager	3/03/2012 11:06am	Complaint in relation to blast at Tarrawonga which impacted at the complainant's property above normal levels. Requested confirmation of blast results once they become available.	A message was left with the complainant indicating that once results were made available we would advise of the results. Blast results confirmed compliance at blast monitors with the "Tarrawonga" monitor not triggering and the "Templemore" monitor triggering at 102.3dBL overpressure and 1.099mm/sec in vibration. Orica were also requested to provide advice as to why the blast impacted at far field locations when compared to the monitor results which are well below compliance limits.	A written response was issued on 16/03/2012 including summary of Orica investigation.
Phone call to Environmental Manager	5/03/2012 9:20am	Complaint in relation to blast at Tarrawonga which impacted at the complainant's property above normal levels. Complainant indicated this was not the first time they had experienced blast impacts from	The complainant was advised that blast monitoring results were not yet available at the time of his complaint, but that they would be provided as soon as they were known. The results have indicated compliance with compliance limits, recording 102.3dBL overpressure and 1.099 mm/s vibration at "Templemore" with the "Tarrawonga" monitor not triggering. Given the extent of concerns raised further afield, Orica has been asked to undertake an investigation into the blast to verify causes/reasons behind blast impacts being generated at far field monitors and not	A written response was issued on 16/03/2012 including summary of Orica investigation.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
		mines located further to the north, however this blast caused significant vibration in their property and it is concerning given the proposed Vickery Mine so close to his property.	locally at the monitoring points.	
Email to Environmental Officer from EPA on behalf of anonymous complainant	14/03/2012 2:16pm	EPA advised that a number of complaints had been received following the 3 rd March blast. One complaint read: "A huge blast Saturday 03.03.12 at about 12 noon shook the house & cracked glass window paines (sic). Everyone in the house was very startled with the blast as you could feel it through the ground like a shock. There was another blast Monday 05.03.12 about 12.30pm which was strong, though not as bad. Caller is about 3k from the mine in Boggabri".	The EPA was advised on 8 March at Tarrawonga that the blast had occurred. They were advised that blast monitoring indicated compliance however three complaints and an enquiry had been received following the blast. Whitehaven requested that Orica provide an investigation report into the blast and this report, along with a letter from Whitehaven, was subsequently issued to the EPA on 16 March. The EPA was also advised that each complainant had been provided with a summary of the Orica report.	No further action required at this stage.
Email to Environmental Officer from EPA on behalf of anonymous complainant	22/03/2012 10:22am	EPA advised that an anonymous complaint had been received on the Environment Pollution Line regarding dust at Tarrawonga. The complainant advised that the incident time was 21:00 hours and the description provided was "A very large quantity of dust coming from Tarrawonga Mine".	Site personnel investigated the complaint with afternoon shift supervisors advising that water carts were operating as per standard practice around the time of the complaint. An email response was provided to EPA advising of standard water cart use and the fact that it would be impossible at night to see dust outside the immediate sphere of the lighting plant so Whitehaven can only assume that a halo around a lighting plant (which could have been caused by a single dump truck passing the lighting plant) led the complainant to believe the entire site was generating dust. Notwithstanding this, the requirement for adequate dust control at all times has been reiterated to all supervisors and operators.	No further action required at this stage.
Phone call to Environmental Officer	27/03/12 8:10am	Complaint in relation to dust at Tarrawonga that morning (and the previous day) and light from Rocglen. Was unable to define where dust was actually coming from (Tarrawonga and/or Boggabri Coal) but said she could see Tarrawonga which is why she called us. Complainant also asked about the noise monitoring report Whitehaven is to provide. Suggested that report	Environmental Officer immediately called Tarrawonga Project Manager and asked that the dust situation be assessed and any additional controls be implemented if issues are identified. The Project Manager and Mine Planner inspected the site and were unable to ascertain any dust generation that could have caused concern. Some dust generation from Boggabri Coal was noticeable and photos of both sites were taken. The paddock directly south of the Tarrawonga Mine was also being ploughed at the time of the complaint. The Rocglen Project Manager was made aware of the complaint in relation to light impacts. It was identified that whilst site personnel are aware of the need for sympathetic positioning of light, often it is very difficult to position the lights in such a way that allow for safe operations whilst not affected neighbouring landholders. The complainant's property is approximately 15km from the mine site.	

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken / Follow-up
		will be issued on return of Environmental Manager from Annual Leave.		
Phone call to Environmental Officer	2/04/2012 8:25am	Complaint in relation to dust from gravel haulage on Manilla Road.	Environmental Officer immediately called Tarrawonga Project Manager who advised that gravel haulage would be ceased until the road was appropriately watered. A water cart had been provided by the Council however haulage had commenced before the road was watered. Tarrawonga personnel had previously requested that the road be watered for an hour prior to haulage and this requirement was reiterated to NSC personnel. The complainant said it was extremely dangerous and motorists were unable to see where they were going.	No further action required.
Email to Environmental Manager	25/04/2012 9:29am	Complaint in relation to noise over the previous three days and concerns over the location of a proposed gravel crushing plant.	Complainant was advised by return email of intent to undertake an attended noise monitoring event at their property with noise consultants when next undertaking compliance monitoring. The matter pertaining to the proposed Council gravel crushing and screening facility is a Council matter, and should be discussed with Council. A letter response will issue to the complainant.	No further action required.

Table 13 - Yearly Complaints Comparison

AEMR period	Issue										Total
	Dust	Noise	Driver behaviour – coal trucks	Blasting	Multiple impacts (dust, noise, blasting)	Other traffic issues	Load coverage – coal trucks	Compliance with haulage hours	No monitoring results supplied	Ground-water	
2006-2007				1		1				1	3
2007-2008	4		2	2	2			2		2	14
2008-2009			5					4	1		10
2009-2010		1	2	1	1	1	2	1			9
2010-2011			1	3	2	2	1	1			10
2011-2012	12	1	1	6	1	1	2				24

4.2 Employment Status, Demography and Socio-Economic Contributions

4.2.1 Employment Status and Demography

By the end of the reporting period, the mine had approximately 110 Tarrawonga personnel and 18 full time contractors. This is an increase of approximately 22 people over the reporting period. Additional personnel were employed by contractors in the haulage of coal from the mine site back to the Whitehaven CHPP.

Approximately 50% of mine related employees reside in the Gunnedah / Boggabri area with the remainder residing in adjoining areas of Narrabri, Manilla and Curlewis.

4.2.2 Social and Economic Contributions

In addition to direct and indirect employment, and the purchase of goods and services from local suppliers, the Whitehaven Group continues to support the local community. Whitehaven also provides cadetships to local university students in a variety of fields.

As members of the Gunnedah / Boggabri area community, mine-related employees also contribute socially and economically through their involvement in community sporting, educational and social organisations and expenditure of a component of their disposable income.

4.3 Community Liaison

In accordance with Condition 5 of Schedule 5 of DA 88-4-2005, a Community Consultative Committee (CCC) was formed prior to the commencement of mine operations. The committee comprises representatives of Narrabri and Gunnedah Shire Councils, Tarrawonga Coal and the community and is chaired by Narrabri Shire Councillor, Clr Ken Bates.

Since its inception, the CCC has met on a regular basis, meeting 4 times per year in accordance with the condition of consent. During the reporting period meetings were held on the 4th May 2011, 27th July 2011, 16th November 2011 and 15th February 2012.

Tarrawonga Coal representatives continue to maintain regular personal contact with the neighbours in the vicinity of the mine and CHPP. These contacts not only provide

a means of information dissemination, but also enable Tarrawonga Coal to ascertain and address any potential issues which may arise from time to time.

Community organisations and other local business and institutions regularly identify an interest with activities occurring at the mine site. In this regard, and to maintain links with those business and community members, information is provided as required, and on occasion, guided tours of the facility have been undertaken. Tours during the reporting period included a bus tour in October 2011 as part of the Community Information Day for the proposed LOM extension.

Whitehaven also employs a Community Liaison Officer who has a long term association with Gunnedah and was formerly employed with Gunnedah Shire Council.

5 REHABILITATION

5.1 Buildings

The smaller cottage at “Thuin” (within the southern boundary of the ML) has been relocated to the Blair Athol Schoolhouse property and the main “Thuin” residence was advertised for tender with the successful bidder relocating it to another property. All relocation was undertaken in accordance with Council requirements.

5.2 Rehabilitation of Disturbed Land

5.2.1 Objectives

Tarrawonga Coal’s rehabilitation / land use objectives for the DA Area, (ie. the area within the boundary of ML 1579) are as follows:

(a) Areas affected by mining – short term

- Stabilise all earthworks, drainage lines and disturbed areas that are no longer required for mine related activities.
- Reduce the visibility of mining activities from adjacent properties and the local road network.

(b) Areas affected by mining – long term

- Provide a low maintenance, geotechnically stable and safe landform which is commensurate with a variety of agricultural land uses and/or nature conservation.
- Blend created landforms with the surrounding land fabric.
- Revegetate the majority of the post mining landform to communities which emulate the existing vegetative communities or those that occurred prior to agricultural related disturbance.

(c) Areas to be unaffected by mining

- Remove grazing pressure from areas of relatively intact native tree, shrub and grassland communities and thereby encourage the extension / diversification of those communities.

- Undertake enrichment plantings as a means of extending or encouraging the development of native bushland communities.
- Grazing exclusion and enrichment plantings were part of the offset strategies approved under DA 88-4-2005 MOD 1 and are detailed in the MOP.

5.2.2 Achievements During the Reporting Period

Rehabilitation achievements at the mine have been limited as a result of planned extension works. The only revegetation activities during the reporting period comprised in-fill planting of understorey species as outlined in Table 14.

Table 14 – Understorey Species

Date	Location	Species	Total
20-22 June 2011	Right hand side of road along western face of northern emplacement	<i>Acacia decora</i>	200
		<i>Acacia salicina</i>	80
		<i>Acacia hakeoides</i>	80
		<i>Acacia implexa</i>	40
		<i>Senna artemisioides</i>	120
		<i>Hardenbergia violacea</i>	40
		<i>Dodonaea viscosa</i>	80
		Total	640

Existing rehabilitation on the northern and western faces of the northern emplacement are progressing well.

G&B Ward Earthmoving commenced maintenance and upgrade of water management structures (contour banks etc) at the end of the reporting period. Other works scheduled for the immediate future (ie. next couple of months) include:

- Topsoiling and seeding of dams;
- Shaping and seeding of soil stockpiles;
- Ripping and seeding the area adjacent to Goonbri Road (where the soil stockpile used to be located);
- Shaping, topsoiling, installing contour banks and seeding of the western face of the southern waste emplacement;
- Extension of the rock waterway on the western face of the northern emplacement, topsoiling, installation of contour banks and seeding; and
- Construction of clean water diversion banks to the east of the advancing pit.

Table 15 - Rehabilitation Summary

		Area Affected (hectares)		
		This Report Period (as of 30.04.12)	Last Report Period (as of 30.04.11)	Next Report Period (estimated)
A: MINE LEASE AREA				
A1	Mine Lease(s) Area			
B: DISTURBED AREAS				
B1	Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	21.6	21.6	21.6
B2:	Active Mining Area (excluding items B3 - B5 below)	113.3	99	119
B3	Waste emplacements, (active/unshaped/in or out-of-pit)	149.9	143.47	156.9
B4	Tailings emplacements, (active/unshaped/uncapped)	4.25	4.25	4.25
B5	Shaped waste emplacement (awaits final vegetation)	4.85	4.1	4.0
ALL DISTURBED AREAS		293.9	268.17	305.75
C REHABILITATION PROGRESS				
C1	Total Rehabilitated area* (except for maintenance)	27.5	27.5	27.5
D: REHABILITATION ON SLOPES				
D1	10 to 18 degrees	0	0	0
D2	Greater than 18 degrees	0	0	0
E: SURFACE OF REHABILITATED LAND				
E1	Pasture and grasses	9.4	9.4	13.4
E2	Native forest/ecosystems*	27.5	27.5	27.5
E3	Plantations and crops	0	0	0
E4	Other (include non vegetative outcomes)	0	0	0

* Areas with established tube stock are considered to be "native forest/ecosystem" and contribute to the Total Rehabilitated Area. "Pasture and Grasses" includes areas with recently planted tube stock that are not yet established.

Table 16 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report period	Next period	
Additional erosion control works (drains re-contouring, rock protection)	Nil	Nil	
Re-covering (detail - further topsoil, subsoil sealing etc)	Nil	Nil	
Soil treatment (detail - fertilizer, lime, gypsum etc)	Nil	Nil	
Treatment/Management (detail - grazing, cropping, slashing etc)	Nil	Nil	
Re-seeding/Replanting (detail - species density, season etc)	Nil	Nil	
Adversely Affected by Weeds (detail - type and treatment)	5	5	General weed control.
Feral animal control (detail - additional fencing, trapping, baiting etc)	*	Nil	* See Section 3.20

5.3 Rehabilitation Monitoring and Performance

Rehabilitation/revegetation monitoring by Whitehaven personnel has been confined to inspections of water management structures, soil stockpiles and seeded/planted areas for evidence of instability or poor germination. Results over the reporting period were excellent in terms of the minimal erosion experienced over prolonged periods of wet weather. In addition, planted seedlings continue to develop well, particularly those planted on the northern face of the northern emplacement in mid 2009. Sections 3.6 and 3.7 and Appendix 7 provide details on the rehabilitation monitoring undertaken by Eco Logical Australia in late 2011.

Rehabilitation activities continue to be behind schedule, which is a direct result of the modifications occurring at the site. Further rehabilitation of the waste emplacements has been postponed as further dumping will now occur which will encroach on some areas that have already been rehabilitated. The mine is aware of the visual impact and dust concerns associated with large areas of exposed material and will prioritise rehabilitation activities as soon as areas are available.

6 CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES

6.1 Objectives

TCPL has an ongoing commitment to environmental management and aims to minimise any adverse impacts on the physical, biological, cultural and socio-economic environment in the area of the mine and in surrounding areas.

Improvements in environmental management will be achieved through the effective implementation of the operational and monitoring aspects of the MOP, which in turn, will incorporate relevant aspects of various management plans and monitoring programs prepared in accordance with the mine's relevant Development Consent.

6.2 Achievements to Date

Achievements at the mine over its sixth year of operation have included:

- Completion of an Independent Environmental Audit, as required by DA 88-4-2005 MOD 1;
- Upgrade of the site's water management structures;
- Continuation of cumulative impacts meetings with Boggabri Coal and Aston Resources (prior to the merger); and
- Ongoing relationship with local community, neighbours and community groups. Tarrawonga Coal recognises its role in the local community and that its activities have the potential to create benefits which extend beyond the life of the mine.

6.3 Targets and Goals

Targets and goals for the 2012 / 2013 reporting period include:

- Completion of all action plans items identified during the Independent Environmental Audit;
- Completion of updated management plans as required by DA 88-4-2005 MOD 1;
- Implementation of a full time onsite Environmental Officer position;
- The rehabilitation of 4 hectares no longer required for mining related activities;
- Continued community liaison, support and involvement / education in the mines activities;
- Compliance with all relevant conditions of the lease, licences and consents; and
- Finalisation of the Regional Offset and retirement of credits applicable to the 75W modification.



TARRAWONGA
COAL PTY LTD



LEGEND

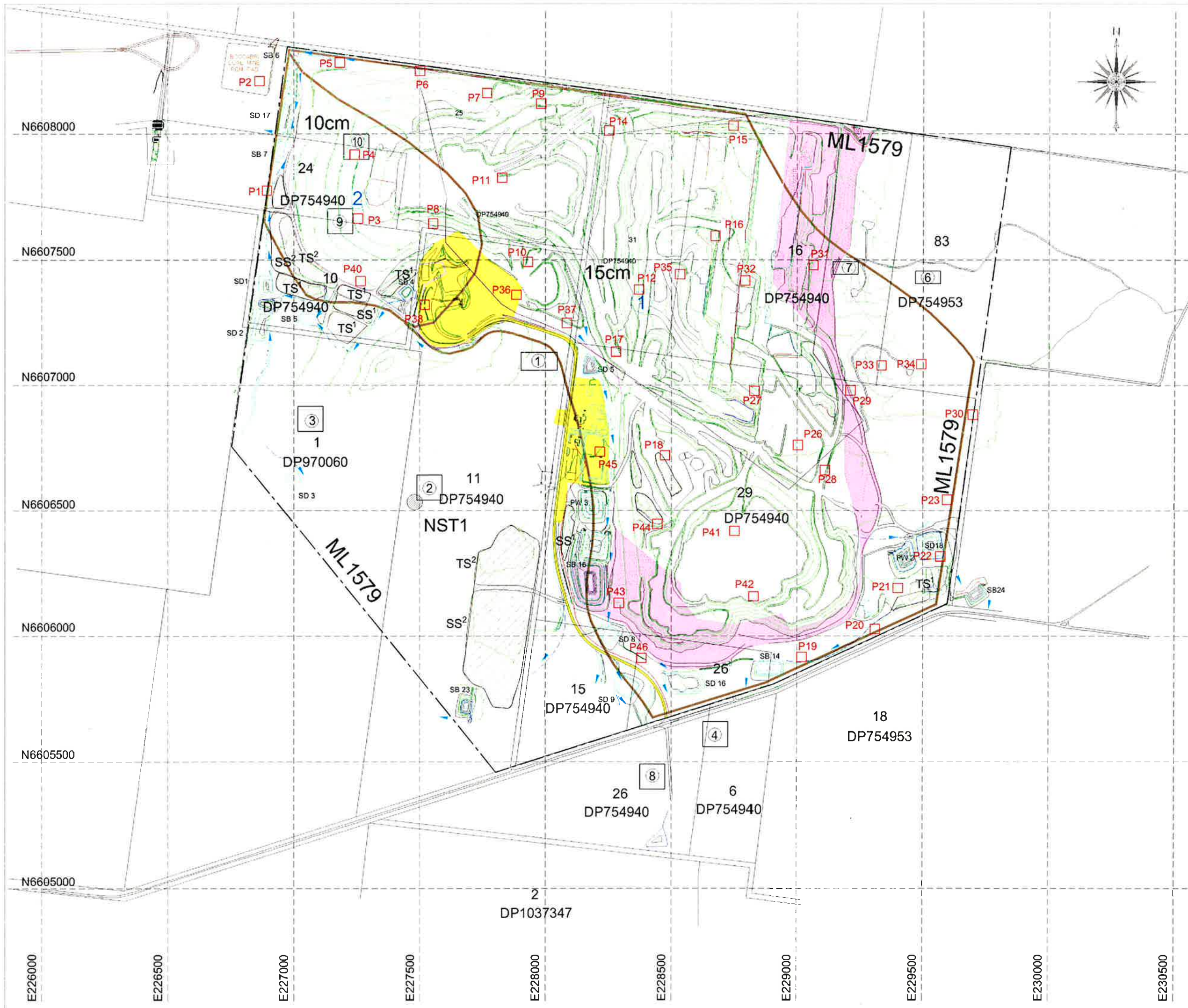
- Proposed Soil Stripping Area (2012/2013 AEMR)
- Soil Stripping Area (to 30/4/11)
- Soil Stripping Area (2011/2012 AEMR)
- Stockpile Areas
- Infrastructure Areas
- Sediment Basin (Dirty)
- Storage Dam (Clean)
- Soil Test Pit Site
- Soil Mapping Unit
- Topsoil Stripping Depth
- Mining Lease Boundary
- Limit of Open Cut
- Soil Mapping Unit Boundary
- Topsoil (SMU1)
- Subsoil (SMU1)
- Topsoil (SMU2)
- Subsoil (SMU2)
- Vegetation Monitoring Quadrat
- Aboriginal Site

PLAN 3 LAND PREPARATION TARRAWONGA MINE

File Ref: TA120430

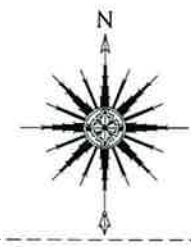
Surveyor:

Date: 30/4/2012





TARRAWONGA
COAL PTY LTD



REDUCTION RATIO
1:5000 @ A0

LEGEND

- Proposed Rehab Areas (2012/2013 AEMR)
- Soil Covered Slopes (10°-18°)
- Soil Covered Slopes (<10°)
- Infrastructure Areas
- Sediment Basin (Dirty)
- Storage Dam (Clean)
- Area shaped not soiled
- Flow (Dirty)
- Flow (Clean)
- Mining Lease Boundary
- Diversion/Catch Bank
- Extent of Mining to 30/4/11
- Extent of Mining (This AEMR)
- Waste Emplacement (This AEMR)
- Vegetation to Native Water Management Structure (installed this AEMR)
- Coal Stockpile
- Contour banks
- Rock Waterway
- Vegetation Monitoring Quadrat

PLAN 4
MINING & REHABILITATION
TARRAWONGA MINE

File Ref:	TA120430
Surveyor:	<i>CR Stewart</i>
Date:	30/4/2012

Appendix 1

DA 88-4-2005 MOD 1

Notice of Modification

Section 75W of the *Environmental Planning and Assessment Act 1979*

As the delegate of the Minister for Planning, I modify the development consent referred to in Schedule 1, subject to the conditions in Schedule 2.



David Kitto
Director, Mining and Industry Projects

Sydney 15 OCTOBER

2010

SCHEDULE 1

The development consent (DA 88-4-2005) for the Tarrawonga Coal Mine (formerly called the East Boggabri Coal Mine) granted by the Minister for Planning on 9 November 2005.

SCHEDULE 2

1. In Schedule 1, delete the description for "Proposed Development" and replace with:
Construction and operation of the Tarrawonga Coal Mine and associated infrastructure.
2. In Schedule 1, delete everything following the description of the "Proposed Development".
3. Replace everything after Schedule 1 with the following:

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DEFINITIONS

Annual review	The review required by Condition 3 of Schedule 5
Applicant	Whitehaven Coal Mining Limited and Idemitsu Boggabri Coal Pty Limited
BCA	Building Code of Australia
CCC	Community Consultative Committee
Conditions of this consent	Conditions contained in Schedules 2 to 5 inclusive
DA	Development Application
Day	The period from 7 am to 6 pm on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays
DECCW	The Department of Environment, Climate Change and Water
Department	The Department of Planning
Director-General	Director-General of Department of Planning, or delegate
EA	The environmental assessment titled <i>Tarrawonga Coal Mine Environmental Assessment</i> , dated April 2010, and associated <i>Tarrawonga Coal Mine - Response to Submissions</i> , dated 25 June 2010
EIS	The environmental impact statement titled <i>Proposed East Boggabri Coal Mine and Specialist Consultant Studies Compendium</i> , dated May 2005
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPL	Environment Protection Licence issued under the POEO Act
Evening	The period from 6 pm to 10 pm
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
GSC	Gunnedah Shire Council
I&I NSW	Department of Industry and Investment, trading as Industry & Investment NSW
Land	In general, the definition of land is consistent with the definition in the EP&A Act. However, in relation to the noise and air quality conditions in Schedules 3 & 4 of this consent, it means the whole of a lot, or contiguous land owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this consent
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Minister	Minister for Infrastructure and Planning, or delegate
Mining operations	Includes the removal of overburden; and the extraction, processing, handling, storage and transportation of coal
Mitigation	Activities associated with reducing the impacts of the development
Night	The period from midnight to 7 am and 10 pm to midnight Monday to Saturday and midnight to 8 am and 10 pm to midnight on Sundays and public holidays
NOW	NSW Office of Water
NSC	Narrabri Shire Council
PCA	Principal Certifying Authority appointed under Section 109E of the Act
Privately-owned land	Land that is not owned by a public agency, a mining company (or its subsidiary)
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The treatment or management of land disturbed by the development for the purpose of establishing a safe, stable and non-polluting environment
RTA	Roads and Traffic Authority
Site	Land to which the DA applies, which includes the mine site and the privately-owned sections of the transport route
Transport route	The route used to transport coal from the mine site to the Whitehaven Siding Coal Handling and Preparation Plant, which includes a combination of private and public roads

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

Obligation to Minimise Harm to the Environment

1. The Applicant shall implement all reasonable and feasible measures to prevent or minimise any material harm to the environment that may result from the construction, operation or rehabilitation of the development.

Terms of Approval

2. The Applicant shall carry out the development generally in accordance with the:
 - (a) EIS;
 - (b) EA; and
 - (c) conditions of this consent.

Note: The general layout of the development is shown in Appendix 2.

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.
4. The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of:
 - (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with the conditions of this consent; and
 - (b) the implementation of any actions or measures contained in these documents.

Limits on Approval

5. The Applicant may carry out mining operations on the site until 9 November 2017.

Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Director-General and the Director-General of I&I NSW. Consequently, this consent will continue to apply in all other respects - other than the right to conduct mining operations - until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.

6. The Applicant shall not extract more than 2 million tonnes of coal from site in a calendar year.

Structural Adequacy

7. The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings or structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- Under Part 4A of the EP&A Act, the Applicant is required to obtain construction and occupation certificates for the proposed building works; and
- Part 8 of the EP&A Regulation sets out the requirements for the certification of development.

Demolition

8. The Applicant shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

Operation of Plant and Equipment

9. The Applicant shall ensure that all the plant and equipment used on site, or to transport coal along the transport route, is:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

Section 94 Contributions

10. Within 3 months of the date of this consent, the Applicant shall develop (and following approval implement) a Contributions Plan for the development in conjunction with the GSC and the NSC, and to the satisfaction of the Director-General. The plan must:
 - determine a fair and reasonable contribution towards the provision of public amenities/services; and
 - include a program outlining how and when the proposed contributions will be provided.

Staged Submission of any Strategy, Plan or Program

11. With the approval of the Director-General, the Applicant may submit any strategy, plan or program required by this consent on a progressive basis.

Note: While any strategy, plan or program may be submitted on a progressive basis, the Applicant will need to ensure that the operations of the site are covered by suitable strategies, plans or programs at all times.

12. Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall continue to implement the existing strategies, plans or programs that apply to any development on site.
-

SCHEDULE 3 ENVIRONMENTAL PERFORMANCE CONDITIONS

ACQUISITION UPON REQUEST

1. Upon receiving a written request for acquisition from an owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.

Table 1: Land subject to acquisition upon request

4 - Tarrawonga	5 - Ambardo

Note: To identify the locations referred to in Table 1, see the figure in Appendix 3.

NOISE

Noise Criteria

2. Except for the land referred to in Table 1, the Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{Aeq} (15 \text{ min})$	$L_{A1} (1 \text{ min})$
15- Kyalla	37	37	37	45
All privately-owned land	35	35	35	45

Notes:

- To identify the locations referred to in Table 2, see the figure in Appendix 3; and
- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise Acquisition Criteria

3. If the noise generated by the development exceeds the criteria in Table 3 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.

Table 3: Land acquisition criteria dB(A) $L_{Aeq} (15 \text{ min})$

Location	Day	Evening	Night
All privately-owned land	40	40	40

Notes:

- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedances of the criteria must be systemic.

Additional Noise Mitigation Measures

4. Upon receiving a written request from the owner of any residence:
 - (a) on the land listed in Table 1; or
 - (b) on privately-owned land where subsequent noise monitoring shows that the noise generated by the project is greater than or equal to $L_{Aeq} (15 \text{ minute})$ 38 dB(A), on a systemic basis,

the Applicant shall implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

Road Traffic Noise Criteria

5. Except for the land referred to in Table 1, the Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 4.

Table 4: Road Traffic Noise Criteria dB(A) LAeq (1 hour)

Location	Day	Evening	Night
Any residence on privately-owned land	60	60	55

Note: Road traffic noise generated on public roads by the development is to be measured in accordance with the relevant procedures and exemptions of the NSW Environmental Criteria for Road Traffic Noise guideline.

Operating Conditions

6. During mining operations, the Applicant shall only carry out mining operations on site between 7 am and midnight Monday to Friday, Midnight to 3.30 am Tuesday to Saturday, and 7 am to 6 pm Saturday, excluding public holidays. However, the Applicant may undertake maintenance activities on site at any time Monday to Sunday.
7. The Applicant shall:
 - (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency and road traffic noise generated by the development;
 - (b) regularly assess the real-time noise monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions in this consent, and
 - (c) co-ordinate the noise management on site with the noise management of the Boggabri mine, or any other mines in the vicinity of the site, to minimise the cumulative noise impacts of the mines,
 to the satisfaction of the Director-General.

Noise Management Plan

8. The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must:
 - (a) be prepared in consultation with DECCW, and submitted to the Director-General for approval by the end of March 2011;
 - (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent, including a real-time noise management system that use reactive and proactive mitigation measures; and
 - (c) include a noise monitoring program that:
 - uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the development;
 - includes a protocol for determining exceedances with the relevant conditions of this consent; and
 - includes a program for validating the accuracy of the tenth percentile methodology used to predict the potential noise impacts of the development.
 - (d) include a protocol that has been prepared in consultation with the owners of any nearby mines to minimise the cumulative noise impacts of the mines.

BLASTING

Blasting Criteria

9. The Applicant shall ensure that the blasting on site does not cause exceedances of the criteria in Table 5.

Table 5: *Blasting criteria*

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately-owned land	115	5	5% of the total number of blasts over a period of 12 months
	120	10	0%

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Blasting Hours

10. The Applicant shall only carry out blasting on site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of Director-General.

Blasting Frequency

11. The Applicant shall not carry out more than 1 blast a day on site, unless an additional blast is required following a blast misfire.

Property Inspections

12. If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on their land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall:
 - (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
 - establish the baseline condition of the buildings and/or structures on the land or update the previous property inspection report;
 - identify any measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and
 - (b) give the landowner a copy of the new or updated property inspection report.

Property Investigations

13. If the owner of any privately-owned land claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Applicant shall:
 - (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damages to the satisfaction of the Director-General.

If the Applicant or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.

Operating Conditions

14. During mining operations, the Applicant shall
 - (a) implement best blasting management practice on site to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private property in the surrounding area; and
 - minimise the dust and fume emissions from blasting on site;
 - (b) co-ordinate the blasting on site with the blasting at the Boggabri mine, or any other coal mine in the vicinity of the site, to minimise the cumulative blasting impacts of the mines; and
 - (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule,
 to the satisfaction of the Director-General.

Blast Management Plan

15. The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Director-General. This program must:
- be prepared in consultation with DECCW, and be submitted to the Director-General for approval by the end of March 2011;
 - describe the blast mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent;
 - include a protocol that has been prepared in consultation with the owners of the Boggabri mine, and any other mines in the vicinity of the site, to minimise the cumulative blasting impacts of the mines;
 - describe the measures that would be implemented to ensure the public can get up-to-date information of the proposed blasting schedule; and
 - include a blast monitoring program to evaluate the performance of the development.

AIR QUALITY & GREENHOUSE GAS

Odour

16. The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.

Greenhouse Gas Emissions

17. The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Director-General.

Air Quality Assessment Criteria

18. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 6, 7 and 8 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 6: Long term criteria for particulate matter

Pollutant	Averaging period	^dCriterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 7: Short term criterion for particulate matter

Pollutant	Averaging period	^dCriterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 8: Long term criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes for Tables 6-8:

- ^a Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the project on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agree to by the Director-General in consultation with DECCW.

Air Quality Acquisition Criteria

19. If the dust emissions generated by the development exceed the criteria in Tables 9, 10, and 11 at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.

Table 9: Long term acquisition criteria for particulate matter

Pollutant	Averaging period	^dCriterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 10: Short term acquisition criteria for particulate matter

Pollutant	Averaging period	^dCriterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 150 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 11: Long term acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes:

- ^a Total impact (i.e. incremental increase in concentrations due to the project plus background concentrations due to other sources);
- ^b Incremental impact (i.e. incremental increase in concentrations due to the project on its own);
- ^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and
- ^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agree to by the Director-General in consultation with DECCW.

Operating Conditions

20. The Applicant shall:
- implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including any spontaneous combustion emissions;
 - minimise any visible air pollution generated by the development;
 - regularly assess the real-time air quality monitoring and meteorological forecasting data and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent; and
 - co-ordinate the air quality management on site with the air quality management of the Boggabri mine, and any other mines in the vicinity of the site, to minimise the cumulative air quality impacts of the mines,
- to the satisfaction of the Director-General.

Air Quality & Greenhouse Gas Management Plan

21. The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This program must:
- be prepared in consultation with DECCW, and submitted to the Director-General for approval by the end of March 2011;
 - describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including a real-time air quality management system; and
 - include an air quality monitoring program, that:
 - uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the project, and

- includes a protocol for determining exceedances with the relevant conditions of this consent; and
- (d) include a protocol that has been prepared in consultation with the owners of the nearby mines to minimise the cumulative air quality impacts of the mines.

METEOROLOGICAL MONITORING

22. While development is being carried out on site, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that:
- (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
 - (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*.

SOIL & WATER

Water Licences

23. The Applicant shall obtain the necessary water licences for the development on site under the *Water Act 1912* or *Water Management Act 2000*.

Compensatory Water Supply

24. The Applicant shall provide compensatory water supply to any landowner of privately-owned land whose water entitlements are impacted (other than an impact that is negligible) as a result of the development, in consultation with NOW and to the satisfaction of the Director-General.

The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the development. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified.

If the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

If the Applicant is unable to provide an alternative long-term supply of water, then the Applicant shall provide alternative compensation to the satisfaction of the Director-General.

Water Discharges

25. The Applicant shall ensure that all surface water discharges from the site comply with the relevant discharge limits (both volume and quality) in any EPL.

Water Management Plan

26. The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Director-General. This plan must:

- (a) be prepared in consultation with NOW & DECCW;
- (b) be submitted to the Director-General for approval by the end of March 2011; and
- (c) include:
 - a Site Water Balance;
 - an Erosion and Sediment Control Plan;
 - a Surface Water Monitoring Program;
 - a Groundwater Monitoring Program; and
 - a Surface & Ground Water Response Plan.

27. The Site Water Balance must:

- (a) include
 - sources and security of water supply;
 - water use on site;
 - water management on site; and
 - reporting procedures;
- (b) describe what measures would be implemented to minimise water use on site; and
- (c) reviewed each year, with the results being included in the annual review (see Condition 3 of Schedule 5).

28. The Erosion and Sediment Control Plan shall:
 - (a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);
 - (b) identify activities that could cause soil erosion and generate sediment;
 - (c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters;
 - (d) describe the location, function, and capacity of erosion and sediment control structures; and
 - (e) describe what measures would be implemented to maintain the structures over time.
29. The Surface Water Monitoring Program shall include:
 - (a) detailed baseline data on surface water flows and quality in creeks and other water bodies that could be affected by the project;
 - (b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts; and
 - (c) a program to monitor:
 - surface water flows, quality, and impacts on water users;
 - stream health; and
 - channel stability,
 in the creeks and other water bodies that could be affected by the development on site, including the Bollol and Driggle Draggie Creeks in the vicinity of the road crossing works.
30. The Groundwater Monitoring Program must include a program to:
 - (a) detailed baseline data of groundwater levels, yield and quality in the region, and particularly any groundwater bores, springs and seeps (including spring and seep fed dams) that may be affected by mining operations on site;
 - (b) a program to augment the baseline data over the life of the project;
 - (c) groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
 - (d) a program to monitor and/or validate:
 - groundwater inflows to the open cut mining operations;
 - the impacts of the project on:
 - the surrounding aquifers; and
 - any groundwater bores, springs and seeps on privately-owned land;
 - (e) a program to validate the groundwater model for the project, and calibrate it to site specific conditions.
31. The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to:
 - (a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria;
 - (b) compensate landowners of privately-owned land whose water supply is adversely affected by the project; and
 - (c) mitigate and/or offset any adverse impacts on riparian vegetation.

BIODIVERSITY

Biodiversity Offset

32. By the end of March 2011, the Applicant shall prepare a revised Biodiversity Offset Strategy for the development as a whole to the satisfaction of the Director-General. This strategy must:
 - (a) be prepared in consultation with DECCW;
 - (b) offset all the vegetation clearing associated with the approved development on site;
 - (c) maintain or improve biodiversity conservation values in the region in the medium to long term.

Long Term Security of Offset

33. Within 6 months of the approval of the Biodiversity Offset Strategy, the Applicant shall make suitable arrangements to provide appropriate long-term security for the offset areas in the strategy to the satisfaction of the Director-General.

Biodiversity Management Plan

34. The Applicant shall prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Director-General. This plan must:
 - (a) be prepared in consultation with DECCW,
 - (b) be submitted to the Director-General within 6 months of the approval of the Biodiversity Offset Strategy;
 - (c) describe how the implementation of the Biodiversity Offset Strategy would be integrated with the overall rehabilitation of the site (see below);

- (d) include:
- detailed performance and completion criteria for the implementation of the Biodiversity Offset Strategy;
 - a detailed description of the measures that would be implemented over the next 3 years for:
 - implementing revegetation and regeneration within the offset areas, including establishment of canopy, sub-canopy (if relevant), understorey and ground strata;
 - protecting vegetation and soil outside the disturbance areas;
 - conserving and reusing topsoil;
 - undertaking pre-clearance surveys;
 - managing impacts on fauna;
 - salvaging and reusing material from the site for habitat enhancement;
 - propagating threatened flora and native grassland;
 - controlling weeds and feral pests;
 - managing grazing and agriculture on site;
 - controlling access; and
 - bushfire management.
 - a program to monitor the effectiveness of these measures, and evaluate progress against the detailed performance and completion criteria; and
 - details of who would be responsible for monitoring, reviewing and implementing the plan.

Conservation Bond

35. Within 6 months of the approval of the Biodiversity Management Plan, the Applicant shall lodge a conservation bond with the Department to ensure that the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by:
- (a) calculating the full cost of implementing the offset strategy; and
 - (b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Director-General.

If the Biodiversity Offset Strategy is completed to the satisfaction of the Director-General, the Director-General will release the conservation bond.

If the Biodiversity Offset Strategy is not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the conservation bond, and arrange for the satisfactory completion of the relevant works.

With the agreement of the Director-General, this bond may be combined with the rehabilitation securities administered by the Minister for Mineral Resources.

ABORIGINAL HERITAGE

Aboriginal Heritage Management Plan

36. The Applicant shall prepare and implement an Aboriginal Heritage Management Plan for the development to the satisfaction of the Director-General. This plan must:
- (a) be prepared in consultation with DECCW and the Aboriginal community;
 - (b) be submitted to the Director-General for approval by the end of March 2011; and
 - (c) describe the program/procedures that would be implemented for:
 - recording, salvaging, and/or managing the Aboriginal sites and potential archaeological deposits within the approved disturbance area;
 - conserving, managing and monitoring the Aboriginal sites outside the approved disturbance area;
 - responding to the discovery of any new Aboriginal objects or skeletal remains during the development;
 - enabling the Aboriginal community to get access to archaeological sites on site; and
 - involving the Aboriginal community in the conservation and management of Aboriginal cultural heritage on site.

TRANSPORT

Coal Transportation

37. The Applicant shall only dispatch coal from the site by road between the hours of:
- (a) 7 am to 9.15 pm Monday to Friday;
 - (b) 7 am to 5.15 pm Saturday; and
 - (c) at no time on public holidays.

Transport Route

38. The Applicant shall ensure that:
- (a) coal from the mine site is only transported along the private sections of the transport route, Rangari Road, Hoad Lane, Blue Vale Road, and the Kamilaroi Highway to the Whitehaven Siding coal handling and preparation plant;
 - (b) trucks travelling to and from the mine site do not exceed 40 kilometres per hour in the vicinity of the school bus when it is operating on Hoad Lane; and
 - (c) spillage from coal haulage vehicles is minimised; and
 - (d) any spillage is promptly managed to avoid harm to the environment.

Road Maintenance

39. During mining operations, the Applicant shall continue to implement its existing road maintenance agreements with NSC and GSC for the maintenance of the public roads affected by the development to the satisfaction of the respective Council.

Monitoring

40. The Applicant shall:
- (a) keep accurate records of the:
 - amount of coal transported from the site in a calendar year (on a monthly basis); and
 - number of coal haulage truck movements generated by the development (on a daily basis); and
 - (b) make these records publicly-available on its website at the end of each calendar year.

VISUAL

Operating Conditions

41. The Applicant shall minimise the visual impacts of the development, including:
- (a) minimises the visual contrasts of the development on site;
 - (b) progressively rehabilitating the disturbed areas on site;
 - (c) taking all practicable measures to mitigate lighting impacts from the mine site;
 - (d) minimising lighting impacts within the *Siding Spring Observatory Dark Skies Region*; and
 - (e) ensuring that all external lighting associated with the development complies with *Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting*, to the satisfaction of the Director-General.

Additional Visual Mitigation Measures

42. Upon receiving a written request from the owner of any residence on privately-owned land which has significant direct views of the mining operations on site, the Applicant shall implement additional visual mitigation measures (such as landscaping treatments or vegetation screens) on the land in consultation with the owner. These measures must be reasonable and feasible, and directed towards minimising the visibility of the mining operations from the residence.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.

WASTE

43. The Applicant shall:
- (a) minimise the waste (including coal reject) generated by the development;
 - (b) ensure that the waste generated by the development is appropriately stored, handled and disposed of, to the satisfaction of the Director-General.
44. The Applicant shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Director-General. This plan must be submitted to the Director-General for approval by the end of March 2011.

BUSHFIRE MANAGEMENT

45. The Applicant shall:
- (a) ensure that the development is suitably equipped to respond to any fires on-site; and
 - (b) assist the emergency services as much as possible if there is a fire on-site during the development.

Note: Local emergency services involved in fire control are the Boggabri No.1 and Nandewar Rural Fire Brigades.

46. Within 6 months of the date of this consent, the Applicant shall prepare and implement a Bushfire Management Plan for the site, to the satisfaction of the NSC in consultation with the Boggabri No.1 and Nandewar Rural Fire Brigades.

REHABILITATION

Rehabilitation

47. The Applicant shall rehabilitate the site to the satisfaction of the Director-General of I&I NSW. To the extent that mining operations permit, this rehabilitation must be carried out progressively, that is, as soon as reasonably practicable following disturbance.

Restoration of Agricultural Land

48. The Applicant shall ensure that at least 100 hectares within the proposed Native Vegetation (Rehabilitation) or Proposed Offset areas depicted in the figure in Appendix 4 are rehabilitated or retained to comply with the specifications for Class 3 agricultural land suitability.

Rehabilitation Strategy

49. By the end of March 2011, the Applicant shall prepare a Rehabilitation Strategy for the site to the satisfaction of the Director-General. This strategy must:
- (a) be prepared in consultation with I&I NSW and the owners of the Boggabri coal mine;
 - (b) investigate the opportunities for improving the integration between the proposed final landform of the development on site with the proposed landform on the adjoining Boggabri coal mine;
 - (c) identify the land on site that will be rehabilitated to Class 3 agricultural land suitability;
 - (d) describe how the rehabilitation of the site will be integrated with the Biodiversity Offset Strategy (see above);
 - (e) define the rehabilitation objectives for the site; and
 - (f) include detailed plans of the proposed rehabilitation of the site, including suitable cross sections.

Rehabilitation Management Plan

50. The Applicant shall prepare and implement a Rehabilitation Management Plan for the development on site to the satisfaction of the Director-General of I&I NSW. This plan must:
- (a) be prepared in consultation with the Department, DECCW, NOW, Council and the CCC;
 - (b) be prepared in accordance with any relevant I&I NSW guidelines;
 - (c) be submitted to the Director-General of I&I NSW for approval within 6 months of the approval of the Rehabilitation Strategy (see above); and
 - (d) build, to the maximum extent practicable, on the other management plans required under this consent.
-

SCHEDULE 4 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. By the end of November 2010, the Applicant shall notify in writing the owners of:
 - (a) the land listed in Table 1 of Schedule 3 that they have the right to require the Applicant to acquire their land at any stage during the development; and
 - (b) any residence on the land listed in Table 1 that they are entitled to ask for additional noise mitigation measures to be installed at their residence at any stage during the development.
2. Within 2 weeks of obtaining results showing:
 - (a) an exceedance of the relevant criteria in Schedule 3, the Proponent shall notify the affected landowners and tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the development is complying with the relevant criteria;
 - (b) an exceedance of the relevant criteria in Condition 4(b) of Schedule 3, that they are entitled to ask for additional noise mitigation measures to be installed at their residence; and
 - (c) an exceedance of the relevant air quality criteria in Schedule 3, send the affected landowners and tenants (including the tenants of any mine-owned land) a copy of the NSW Health fact sheet entitled "*Mine Dust and You*" (as may be updated from time to time).

INDEPENDENT REVIEW

3. If an owner of privately-owned land considers the development on site to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land.

If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision the Applicant shall:

- (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the development on site is complying with the relevant criteria in Schedule 3; and
 - if the development on site is not complying with these criteria then:
 - determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine towards the impact on the land;
 - identify the measures that could be implemented to ensure compliance with the relevant criteria; and
- (b) give the Director-General and landowner a copy of the independent review.

4. If the independent review determines that the development on site is complying with the relevant criteria in Schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the development on site is not complying with the relevant criteria in Schedule 3, and that the development on site is primarily responsible for this non-compliance, then the Applicant shall:

- (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or
- (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General.

If the independent review determines that the development on site is not complying with the relevant acquisition criteria in Schedule 3, and that the development on site is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 6-7 below.

5. If the independent review determines that the relevant criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Applicant shall:
 - (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until there is compliance with the relevant criteria; or
 - (b) secure a written agreement with the landowner and other relevant mines to allow exceedances of the relevant criteria in Schedule 3, to the satisfaction of the Director-General.

If the independent review determines that the relevant acquisition criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this exceedance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s in accordance with the procedures in Conditions 6-7 below.

LAND ACQUISITION

6. Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:
- (a) the current market value of the landowner's interest in the land at the date of this written request, as if the property was unaffected by the land, having regard to the:
 - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
 - presence of improvements on the land and/or any approved building or structure which has been physically commenced on the land at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of any additional noise mitigation measures under Condition 4 of Schedule 3;
 - (b) the reasonable costs associated with:
 - relocating within the Gunnedah or Narrabri local government areas, or to any other local government area determined by the Director-General; and
 - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
 - (c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if at the end of this period, the Applicant and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Director-General for resolution.

Upon receiving such a request, the Director-General will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to:

- consider submissions from both parties;
- determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
- prepare a detailed report setting out the reasons for any determination; and
- provide a copy of the report to both parties.

Within 14 days of receiving the independent valuer's report, the Applicant shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Director-General for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Director-General will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report disputing the independent valuer's determination, and any other relevant submissions.

Within 14 days of this determination, the Applicant shall make a binding written offer to the landowner to purchase the land at a price not less than the Director-General's determination.

If the landowner refuses to accept the Applicant's binding written offer under this condition within 6 months of the offer being made, then the Applicant's obligations to acquire the land shall cease, unless the Director-General determines otherwise.

7. The Applicant shall pay all reasonable costs associated with the land acquisition process described in Condition 6 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.

SCHEDULE 5

ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Director-General. This strategy must:
 - (a) be submitted to the Director-General for approval by the end of March 2011;
 - (b) provide the strategic framework for environmental management of the development;
 - (c) identify the statutory consents and approvals that apply to the development;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the development;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise during the course of the development;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this consent; and
 - a clear plan depicting all the monitoring required to be carried out under this consent.

Management Plan Requirements

2. The Applicant shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the development;
 - effectiveness of any management measures (see c above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the development over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

Note: The Director-General may waive some of these requirements if they are unnecessary or unwarranted.

Annual Review

3. By the end of March 2012, and annually thereafter, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must:
 - (a) describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year;
 - (b) include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years; and
 - the relevant predictions in any EIS or EA for the development;

- (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- (d) identify any trends in the monitoring data over the life of the development;
- (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- (f) describe what measures will be implemented over the next year to improve the environmental performance of the development.

Revision of Strategies, Plans and Programs

- 4. Within 3 months of:
 - (a) the submission of an annual review under Condition 3 above;
 - (b) the submission of an incident report under Condition 6 below;
 - (c) the submission of an audit report under Condition 8 below; and
 - (d) any modification to the conditions of this consent (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

Community Consultative Committee

- 5. The Applicant shall establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Director-General. This CCC must be established and operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version).

Notes:

- *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this approval.*
- *In accordance with the Guideline, the Committee should comprise an independent chair and appropriate representation from the Applicant, affected councils, recognised environmental groups, and the local community.*

REPORTING

Incident Reporting

- 6. The Applicant shall notify the Director-General and any other relevant agencies of any incident associated with the development as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident.

Regular Reporting

- 7. The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting requirements under the conditions of this consent or any plans or programs approved under the conditions of this consent, and to the satisfaction of the Director-General.

INDEPENDENT ENVIRONMENTAL AUDIT

- 8. By the end of December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must:
 - (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
 - (b) include consultation with the relevant agencies;
 - (c) assess the environmental performance of the development and whether it is complying with the requirements in this consent and any relevant EPL or Mining Lease (including any assessment, plan or program required under these licences or leases);
 - (d) review the adequacy of any approved strategies, plans or programs required under these approvals; and
 - (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor and include experts in noise, biodiversity and rehabilitation, and any other fields specified by the Director-General.

9. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

10. From the end of December 2010, the Applicant shall:
- (a) make copies of the following publicly available on its website:
 - the documents referred to in Condition 2 of Schedule 2;
 - the current statutory approvals for the development;
 - all approved strategies, plans and programs required under the conditions of this consent;
 - the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any plans or programs approved under the conditions of this consent;
 - a complaints register, updated on a monthly basis;
 - minutes of CCC meetings;
 - the annual reviews of the development;
 - any independent environmental audit of the development, and the Proponent's response to the recommendations in any audit; and
 - any other matter required by the Director-General.
 - (b) keep this information up-to-date, to the satisfaction of the Director-General:
-

**APPENDIX 1
SCHEDULE OF LAND**

East Boggabri Mine Site

DESCRIPTION	
Lots 10, 15, 16, 24, 25, 29, 31	DP 754940
Part Lots 11, 26	DP 754940
Part Lot 83	DP 754953
Part Lot 1	DP 970060
Enclosed Crown roads between the above lots	

Transport Route (Northern Section)

DESCRIPTION	
Lots 26	DP 754940
Lots 1, 2	DP 1037347
Lot 1	DP 434333
Lots 138, 140	DP 754926
Lot 1	DP 1015797
Enclosed Crown roads between the above lots	
Public roads, namely sections of Goonbri and Rangari Roads and Hoad Lane	

Transport Route (Southern Section)

DESCRIPTION	
Lot 1	DP 1015797
Crown roads and public roads, namely sections of Hoad Lane, Blue Vale Road and Kamilaroi Highway	

APPENDIX 2 PROJECT LAYOUT

APPENDIX 3
LAND OWNERSHIP PLANS

APPENDIX 4
PROPOSED NATIVE VEGETATION REHABILITATION & OFFSET AREAS

Appendix 2

ENVIRONMENT PROTECTION LICENCE 12365

Environment Protection Licence

Licence - 12365



Licence Details	
Number:	12365
Anniversary Date:	09-January

Licensee
TARRAWONGA COAL PTY LTD
PO BOX 600
GUNNEDAH NSW 2380

Premises
TARRAWONGA COAL MINE
469 GOONBRI ROAD
BOGGABRI NSW 2382

Scheduled Activity
Coal Works
Mining for Coal

Fee Based Activity	Scale
Coal works	0-2000000 T handled
Mining for coal	> 500000-2000000 T produced

Region
North West - Armidale
Level 1, NSW Govt Offices, 85 Faulkner Street
ARMIDALE NSW 2350
Phone: (02) 6773 7000
Fax: (02) 6772 2336
PO Box 494 ARMIDALE
NSW 2350

Environment Protection Licence

Licence - 12365



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Environment Protection Licence

Licence - 12365



Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act); and
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

Environment Protection Licence

Licence - 12365



The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

TARRAWONGA COAL PTY LTD
PO BOX 600
GUNNEDAH NSW 2380

subject to the conditions which follow.

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1 Administrative Conditions

A1 What the licence authorises and regulates

- A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal Works	Coal works	0 - 2000000 T handled
Mining for Coal	Mining for coal	> 500000 - 2000000 T produced

A2 Premises or plant to which this licence applies

- A2.1 The licence applies to the following premises:

Premises Details
TARRAWONGA COAL MINE
469 GOONBRI ROAD
BOGGABRI
NSW 2382
LOT 10 DP 754940, PART LOT 11 DP 754940, LOT 15 DP 754940, LOT 16 DP 754940, PART LOT 24 DP 754940, PART LOT 25 DP 754940, LOT 29 DP 754940, LOT 31 DP 754940, PART LOT 83 DP 754953, PART LOT 1 DP 970060
PRIVATE HAUL ROAD BETWEEN GOONBRI AND RANGARI RD ON PROPERTIES "THUIN" AND "TARRAWONGA"; PRIVATE HAUL ROAD BETWEEN RANGARI RD AND HOAD LANE ON PROPERTIES "KYALLA" AND "BUNGALOW"; PRIVATE HAUL ROAD BETWEEN HOAD LANE AND THE BOUNDARY OF WHITEHAVEN COAL MINE PREMISES.

A3 Information supplied to the EPA

- A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

- the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

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2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

<i>Air</i>			
EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
28	Ambient air monitoring		Real time air quality monitor located on 'Flixton' as referred to in map titled "Real Time Air Monitor Location- Tarrawonga Coal Mine" received by the EPA on 16 November 2011 (DOC11/56063).

P1.2 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

P1.3 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

<i>Water and land</i>			
EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Wet weather discharge	Wet weather discharge	Discharge point located on the western boundary and labelled "SD17" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
	Discharge water quality monitoring	Discharge water quality monitoring	
2	Wet weather discharge	Wet weather discharge	Spillway on Storage Dam 9 located on southern boundary of premises labelled "SD9" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
	Discharge water quality monitoring	Discharge water quality monitoring	
3	Wet weather discharge	Wet weather discharge	Spillway on Sediment Basin 14 located east of Thuin house on southern boundary labelled "SB14" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
	Discharge water quality monitoring	Discharge water quality monitoring	

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4	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Storage Dam 20 located on northern boundary of premises labelled "SD20" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
5	Ambient water quality monitoring		Bollol Creek upstream of discharge from premises labelled "BC-U" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
6	Ambient water quality monitoring		Bollol Creek downstream of discharge from premises labelled "BC-D" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
7	Ambient water quality monitoring		Nagero Creek upstream of discharge from premises labelled "NC-U" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
8	Ambient water quality monitoring		Nagero Creek downstream of discharge from premises labelled "NC-D" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.
9	Groundwater monitoring		Groundwater monitoring bore located on property "Thuin" labelled MW-1 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
10	Groundwater monitoring		Groundwater monitoring bore located on property "Bollol Ck Station" labelled MW-2 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
11	Groundwater monitoring		Groundwater monitoring bore located on property "Nagero" labelled MW-3 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005

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12	Groundwater monitoring		Groundwater monitoring bore located on property "Tarrawonga" labelled MW-4 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
13	Surface water quality monitoring		Mining void (variable location) labelled MV1 on Figure 5 Water Monitoring Locations in the Site Water Management Plan submitted with licence application 17 November 2005
24	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Storage Dam 16 located on the southern side of the premises labelled "SD16" on "Figure 1: Existing and Proposed Water Discharge Monitoring Points" submitted with licence variation application form dated 14-5-09
25	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 22 located on northern side of premises labelled "SB22" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.
26	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 23 located on northern side of premises labelled "SB23" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.
27	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	Spillway on Sediment Basin 24 located on northern side of premises labelled "SB24" in Figure titled "Tarrawonga Mine Site. Licensed Discharge Points" submitted with licence variation application form dated 19 August 2011.

P1.4 The following point(s) in the table are identified in this licence for the purpose of the monitoring of weather parameters at the point.

EPA Identification number	Type of Monitoring Point	Description of Location

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W1	Weather analysis	Weather station located on the Tarrawonga Mine Site adjacent to site office labelled as "W1" on Figure 4: Proposed Water Discharge Points and Weather Station submitted with licence variation application form 13 October 2008.

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Concentration limits

- L2.1 For each monitoring/discharge point or utilisation area specified in the table\ below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.
- L2.2 Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.
- L2.3 To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\.
- L2.4 Water and/or Land Concentration Limits

POINT 24,1,3,2,4,25,26,27

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				10
pH	pH				6.5 - 8.5
Total suspended solids	milligrams per litre	20	35		50

- L2.5 The Total Suspended Solids concentration limits specified for Points 1, 2, 3, 4, 24, 25, 26 and 27 may be exceeded for water discharged provided that:
- (a) the discharge occurs solely as a result of rainfall measured at the premises that exceeds 38.4 millimetres over any consecutive 5 day period immediately prior to the discharge occurring; and

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(b) all practical measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store run off from a 38.4 millimetre, 5 day rainfall event.

Note: 38.4 mm equates to the 5 day 90%ile rainfall depth for Gunnedah sourced from Table 6.3a Managing Urban Stormwater: Soils and Construction Volume 1: 4th edition, March 2004.

L3 Waste

- L3.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.
- L3.2 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.
- L3.3 Reject material from the Whitehaven CHPP can be disposed of at the premises in accordance with the disposal method outlined in the Environmental Impact Statement titled "East Boggabri Joint Venture, Environmental Impact Statement for the Proposed East Boggabri Coal Mine, May 2005" prepared by R.W. Corkery & Co. Pty. Limited dated May 2005, or as otherwise approved by the EPA.

L4 Noise limits

- L4.1 Noise generated at the premises must not exceed the noise limits in the table below.

Locality and Location	Day- LAeq (15 minute)	Evening- LAeq (15 minute)	Night- LAeq (15 minute)	Night- LA1 (1 minute)
Kyalla	37	37	37	45
All other surrounding residences	35	35	35	45

- L4.2 For the purpose of the table above:

- a) Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays;
- b) Evening is defined as the period from 6pm to 10pm;
- c) Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L4.3 Determining Compliance

To determine compliance:

- a) with the Leq(15 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located:
- i) approximately on the property boundary, where any dwelling is situated 30 metres or less from

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- the property boundary closest to the premises; or
- ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
- iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
- b) with the LA1(1 minute) noise limits in the Noise Limits table, the noise measurement equipment must be located within 1 metre of a dwelling façade.
- c) with the noise limits in the Noise Limits table, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

- L4.4** The noise limits set out in the Noise Limits table apply under all meteorological conditions except for the following:
- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
 - b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
 - c) Stability category G temperature inversion conditions.

For the purposes of this condition:

- a) Data recorded by the meteorological station identified as EPA Identification Point(s) W1 must be used to determine meteorological conditions; and
- b) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

- L4.5** For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

L5 Blasting

- L5.1** The overpressure level from blasting operations at the premises must not exceed 120dB (Lin Peak) at any time and at any point within 30 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L5.2** The overpressure level from blasting operations at the premises must not exceed 115dB (Lin Peak) for more than five per cent of the total number of blasts over each reporting period at any time and at any point within 30 metres of any non-project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L5.3** Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 10mm/sec at any time and at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.

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- L5.4 Ground vibration peak particle velocity from the blasting operations at the premises must not exceed 5mm/sec for more than five per cent of the total number of blasts over each reporting period at any point within 3.5 metres of any non project related residential building or other noise sensitive location. Error margins associated with any monitoring equipment used to measure this are not to be taken into account in determining whether or not the limit has been exceeded.
- L5.5 Blasting operations on the premises must only be carried out between the hours 9am to 5pm, Monday to Saturday, inclusive.
- L5.6 The hours of operation for blasting operations specified in condition L7.3 may be varied if the EPA, having regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.
- L5.7 Blasting at the premises is limited to 1 blast on each day on which blasting is permitted.

Note: Additional blasts are permitted where it is demonstrated to be necessary for safety reasons and the EPA and neighbours have been notified of the intended blast prior to the additional blast being fired.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

- O1.1 Licensed activities must be carried out in a competent manner.
This includes:
 - a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and
 - b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

- O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:
 - a) must be maintained in a proper and efficient condition; and
 - b) must be operated in a proper and efficient manner.

O3 Dust

- O3.1 All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.
- O3.2 Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.

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O4 Effluent application to land

- O4.1 The quantity of effluent applied to the utilisation area(s) must not exceed the capacity of the utilisation area(s) to effectively utilise the effluent.

For the purpose of this condition, “effectively utilise” includes the ability of the soil to absorb the nutrient, salt and hydraulic loads and the applied organic material without causing harm to the environment.

- O4.2 Effluent application to the utilisation area(s) must not occur in a manner that causes surface run-off from the utilisation area(s).
- O4.3 Spray from effluent application to the utilisation area(s) must not drift beyond the boundary of the utilisation area(s) to which it has been applied.
- O4.4 Effluent must only be applied to the following areas: Point 14 defined in condition P1.3 of this licence.

Note: Monitoring of land and receiving waters to determine the impact of wastewater application may be required by the EPA.

5 Monitoring and Recording Conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
- a) in a legible form, or in a form that can readily be reduced to a legible form;
 - b) kept for at least 4 years after the monitoring or event to which they relate took place; and
 - c) produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
- a) the date(s) on which the sample was taken;
 - b) the time(s) at which the sample was collected;
 - c) the point at which the sample was taken; and
 - d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

- M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:

M2.2 Air Monitoring Requirements

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POINT 28

Pollutant	Units of measure	Frequency	Sampling Method
PM10	micrograms per cubic metre	Continuous	AM-22

M2.3 Water and/ or Land Monitoring Requirements

POINT 5,6,7,8

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

POINT 9,10,11,12

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Every 6 months	Grab sample
Lead	milligrams per litre	Every 6 months	Grab sample
pH	pH	Every 6 months	Grab sample
Standing Water Level	metres	Every 6 months	In situ

POINT 13

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Quarterly	Grab sample
Oil and Grease	milligrams per litre	Quarterly	Grab sample
pH	pH	Quarterly	Grab sample
Total suspended solids	milligrams per litre	Quarterly	Grab sample

POINT 24,1,3,2,4,25,26,27

Pollutant	Units of measure	Frequency	Sampling Method
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Oil and Grease	milligrams per litre	Special Frequency 1	Grab sample
pH	pH	Special Frequency 1	Grab sample

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Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

- M2.4 For the purposes of the table(s) above Special Frequency 1 means the collection of samples as soon as practicable after a discharge from points 1, 2, 3, 4, 24, 25, 26, and 27 commences and in any case not more than 12 hours after a discharge commences.
- M2.5 For the purposes of condition M2.1, this licence acknowledges that points 15, 16, 20 and 21 are established, maintained and monitored by the licensee who holds Environment Protection Licence number 12407. The holder of environment protection licence 12365 obtains monitoring data from Licensee 12407 for these points to meet their obligations under this licence. The licensee is deemed to have not breached condition M2.1 of this licence where the licensee is unable to obtain the monitoring data to meet this condition.

M3 Testing methods - concentration limits

- M3.1 Monitoring for the concentration of a pollutant emitted to the air required to be conducted by this licence must be done in accordance with:
- any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
 - if no such requirement is imposed by or under the Act, any methodology which a condition of this licence requires to be used for that testing; or
 - if no such requirement is imposed by or under the Act or by a condition of this licence, any methodology approved in writing by the EPA for the purposes of that testing prior to the testing taking place.
- M3.2 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

Note: The *Protection of the Environment Operations (Clean Air) Regulation 2010* requires testing for certain purposes to be conducted in accordance with test methods contained in the publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW".

M4 Weather monitoring

- M4.1 For each monitoring point specified in the table below the licensee must monitor (by sampling and obtaining results by analysis) the parameters specified in Column 1. The licensee must use the sampling method, units of measure, averaging period and sample at the frequency, specified opposite in the other columns.

Point W1

Parameter	Units of Measure	Frequency	Averaging Period	Sampling Method

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Temperature @ 2 metres	°C	Continuous	15 minute	AM-4
Wind direction @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Wind speed @ 10 metres	m/s	Continuous	15 minute	AM-2 & AM-4
Sigma theta @ 10 metres	°	Continuous	15 minute	AM-2 & AM-4
Rainfall	mm/h	Continuous	1 hour	AM-4
Solar Radiation	W/m2	Continuous	15 minute	AM-4
Temperature @ 10 metres	°C	Continuous	15 minute	AM-4
Additional requirements - Siting - Measurement				AM-1 & AM-4 AM-2 & AM-4

M4.2 The meteorological weather station must be maintained so as to be capable of continuously monitoring the parameters specified in this section.

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:

- the date and time of the complaint;
- the method by which the complaint was made;
- any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- the nature of the complaint;
- the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
- if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.

M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.

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- M6.3 The preceding two conditions do not apply until 3 months after:
- a) the date of the issue of this licence or
 - b) if this licence is a replacement licence within the meaning of the Protection of the Environment Operations (Savings and Transitional) Regulation 1998, the date on which a copy of the licence was served on the licensee under clause 10 of that regulation.

M7 Other monitoring and recording conditions

- M7.1 For each monitoring point specified below, the Licensee must monitor the noise or vibration parameter specified in Column 1. The Licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.

Points: N1

Parameter	Units of Measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Frequency of monitoring as detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.	As detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.

- M7.2 Point: N3

Parameter	Units of Measure	Frequency	Sampling Method
Ambient Noise	LAeq (15 minute) LAmax LA1 LA10 LA90 LAmin	Continuous real time noise monitoring as detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.	As detailed in the most recently approved "Noise Management Plan" and "Road Noise Management Plan" for the premises.

- M7.3 Points: N1

Parameter	Units of measure	Frequency	Sample Method
Blast Noise	DB(Lin Peak)	Every Blast	Type 1 Noise Blast Logger
Blast Vibration	mm/s	Every Blast	Geophone Logger or Similar

- M7.4 For the purpose of conditions M7.1 and M7.2, the noise monitoring locations are described as:

EPA Identification No.	Description of Location
N1	Within 30m of the residence on property "Tarrowonga"

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N3

Portable monitor

- M7.5 Note: N3 is a portable monitor enabling the monitor to be relocated to areas of potential greatest impact. The licensee is responsible to ensure that it is located at the most suitable location.
- M7.6 Note: The location, frequency of monitoring and the parameters to be monitored may be varied by the EPA once the variability of the noise impact is established.
- M7.7 To assess compliance with the noise limits presented in the Noise Limits table, attended noise monitoring must be undertaken in accordance with the condition titled Determining Compliance, outlined above, and:
- a) at each one of the locations listed in the Noise Limits table;
 - b) occur Quarterly in a reporting period;
 - c) occur during each day, evening and night period as defined in the NSW Industrial Noise Policy for a minimum of:
 - i) 1.5 hours during the day;
 - ii) 30 minutes during the evening; and
 - iii) 1 hour during the night.
 - d) occur for three consecutive operating days.

6 Reporting Conditions

R1 Annual return documents

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
- a) a Statement of Compliance; and
 - b) a Monitoring and Complaints Summary.
- At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.
- R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.
- R1.3 Where this licence is transferred from the licensee to a new licensee:
- a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
 - b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.
- R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:
- a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
 - b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

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- R1.5 The Annual Return for the reporting period must be supplied to the EPA by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').
- R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.
- R1.7 Within the Annual Return, the Statement of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:
- a) the licence holder; or
 - b) by a person approved in writing by the EPA to sign on behalf of the licence holder.
- R1.8 A person who has been given written approval to certify a certificate of compliance under a licence issued under the Pollution Control Act 1970 is taken to be approved for the purpose of this condition until the date of first review of this licence.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

- R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.
- R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify the EPA of incidents causing or threatening material harm to the environment as soon as practicable after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

R3 Written report

- R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
- a) where this licence applies to premises, an event has occurred at the premises; or
 - b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
- and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.
- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
- a) the cause, time and duration of the event;
 - b) the type, volume and concentration of every pollutant discharged as a result of the event;
 - c) the name, address and business hours telephone number of employees or agents of the

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- licensee, or a specified class of them, who witnessed the event;
- d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
- e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
- f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
- g) any other relevant matters.

R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

R4 Other reporting conditions

- R4.1 A noise compliance assessment report must be submitted to the EPA within thirty (30) days of the completion of the quarterly noise monitoring. The assessment must be prepared by a suitably qualified and experienced acoustical consultant and include:
- a) an assessment of compliance with noise limits detailed in the limit conditions of this licence;
 - and
 - b) an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of this licence.

7 General Conditions

G1 Copy of licence kept at the premises or plant

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

8 Pollution Studies and Reduction Programs

U1 Coal Mine Particulate Matter Control Best Practice

- U1.1 The Licensee must conduct a site specific Best Management Practice (BMP) determination to identify the most practicable means to reduce particle emissions.
- U1.2 The Licensee must prepare a report which includes, but is not necessarily limited to, the following:
- identification, quantification and justification of existing measures that are being used to minimise particle emissions;

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- identification, quantification and justification of best practice measures that could be used to minimise particle emissions;

- evaluation of the practicability of implementing these best practice measures; and

- a proposed timeframe for implementing all practicable best practice measures.

In preparing the report, the Licensee must utilise the document entitled *Coal Mine Particulate Matter Control Best Practice – Site Specific Determination Guideline - November 2011*.

U1.3 All cost related information is to be included as Appendix 1 of the Report required by condition U1.2 above.

U1.4 The report required by condition U1.2 must be submitted by the Licensee to the EPA's Regional Manager, Simon Smith, at PO Box 494 Armidale NSW 2350 by 29 June 2012.

U1.5 The report required by condition U1.2 above, except for cost related information contained in Appendix 1 of the Report, must be made publicly available by the Licensee on the Licensee's website by 6 July 2012.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Robert O'Hern

Environment Protection Authority

(By Delegation)

Date of this edition: 09-January-2006

End Notes

1	Licence varied by notice 1082112, issued on 25-Feb-2008, which came into effect on 25-Feb-2008.
2	Licence varied by notice 1093269, issued on 10-Nov-2008, which came into effect on 10-Nov-2008.
3	Licence varied by notice 1103021, issued on 18-Aug-2009, which came into effect on 18-Aug-2009.
4	Licence varied by notice 1126949, issued on 13-Jul-2011, which came into effect on 13-Jul-2011.
5	Licence varied by notice 1501194 issued on 20-Dec-2011

Appendix 3

COMPLIANCE REVIEWS

- DA 88-4-2005 MOD 1 (Table A3-1)
- EPL 12365 (Table A3-2)
- ML 1579 (Table A3-3)

TABLE A3.1
Compliance Review – DA 88-4-2005 MOD 1

Cond.	Conditional Requirement	Compliance	Comments
Schedule 2: Administrative Conditions			
1.	The Applicant shall implement all reasonable and feasible measures to prevent or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	No	See AEMR main text for details on non-compliances, official cautions and Penalty Infringement Notices.
2.	The Applicant shall carry out the development generally in accordance with the: (a) EIS; (b) EA; and (c) conditions of this consent.	Yes	The activities on site were being undertaken generally in accordance with the nominated documents.
3.	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency.	Not Applicable	
4.	The Applicant shall comply with any reasonable requirement/s of the Director-General arising from the Department's assessment of; (a) any reports, strategies, plans, programs, reviews, audits or correspondence that are submitted in accordance with the conditions of this consent; and (b) the implementation of any actions or measures contained in these documents.	No	See discussions below related to specific management plans.
5.	The Applicant may carry out mining operations on the site until 9 November 2017.	Not Yet Applicable	
6.	The Applicant shall not extract more than 2 million tonnes of coal from site in a calendar year.	Yes	During the reporting period, 1,746,625 tonnes of ROM coal was extracted.
7.	The Applicant shall ensure that all new buildings and structures, and any alterations or additions to existing buildings or structures, are constructed in accordance with the relevant requirements of the BCA.	Yes	All buildings meet relevant requirements
8.	The Applicant shall ensure that all demolition work is carried out in accordance with <i>Australian Standard AS 2601-2001: The Demolition of Structures</i> , or its latest version.	Yes	Relocation of "Thuin" buildings undertaken with relevant Council approvals.
9.	The Applicant shall ensure that all the plant and equipment used on site, or to transport coal along the transport route, is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	All plant and equipment maintained and operated in proper and efficient manner.
10.	Within 3 months of the date of this consent, the Applicant shall develop (and following approval implement) a Contributions Plan for the development in conjunction with the GSC and the NSC, and to the satisfaction of the Director-General. The plan must: - determine a fair and reasonable contribution towards the provision of public amenities/services; and - include a program outlining how and when the proposed contributions will be provided.	Yes	Contributions Plan developed in consultation with both NSC and GSC
11.	With the approval of the Director-General, the Applicant may submit any strategy, plan or program required by this consent on a progressive basis.	Not Applicable	No approval sought during reporting period.

Cond.	Conditional Requirement	Compliance	Comments
12.	Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall continue to implement the existing strategies, plans or programs that apply to any development on site.	Yes	As per condition.
Schedule 3: Environmental Performance Conditions			
1.	Upon receiving a written request for acquisition from an owner of the land listed in Table 1 (Tarrawonga, Ambardo), the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.	Not Yet Applicable	"Ambardo" now project related. Written request not received to date from "Tarrawonga" landholders.
2.	Except for the land referred to in Table 1, the Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 (35dB(A) $L_{Aeq(15min)}$ at all properties during day, evening and night except Kyalla [37] and 45 $L_{Aeq(1 min)}$ at all properties at night) at any residence on privately-owned land or on more than 25 percent of any privately-owned land. Criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the limit.	No	Exceedances at "Tarrawonga". See Section 3.10.3 for details.
3.	If the noise generated by the development exceeds the criteria in Table 3 (40dB(A) $L_{Aeq(15 min)}$ at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.	Not Yet Applicable	Written request not received to date.
4.	Upon receiving a written request from the owner of any residence: (a) on the land listed in Table 1; or (b) on privately-owned land where subsequent noise monitoring shows that the noise generated by the project is greater than or equal to $L_{Aeq(15 minute)} 38 \text{ dB(A)}$, on a systemic basis, the Applicant shall implement additional noise mitigation measures (such as double glazing, insulation, and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible. If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.	Not Yet Applicable	Written request not received to date.
5.	Except for the land referred to in Table 1, the Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 4 (60dB(A) $L_{Aeq(1 hour)}$ during the day, evening and night).	Yes	No recorded exceedances in road noise criteria.
6.	During mining operations, the Applicant shall only carry out mining operations on site between 7 am and midnight Monday to Friday, Midnight to 3.30 am Tuesday to Saturday, and 7 am to 6 pm Saturday, excluding public holidays. However, the Applicant may undertake maintenance activities on site at any time Monday to Sunday.	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
7.	The Applicant shall: (a) implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the operational, low frequency and road traffic noise generated by the development; (b) regularly assess the real-time noise monitoring and meteorological forecasting data, and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions in this consent, and (c) co-ordinate the noise management on site with the noise management of the Boggabri mine, or any other mines in the vicinity of the site, to minimise the cumulative noise impacts of the mines, to the satisfaction of the Director-General.	Yes	As per condition.
8.	The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with DECCW, and submitted to the Director-General for approval by the end of March 2011; (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent, including a real-time noise management system that use reactive and proactive mitigation measures; and (c) include a noise monitoring program that: • uses a combination of real-time and supplementary attended monitoring measures to evaluate the performance of the development; • includes a protocol for determining exceedances with the relevant conditions of this consent.; and • includes a program for validating the accuracy of the tenth percentile methodology used to predict the potential noise impacts of the development. (d) include a protocol that has been prepared in consultation with the owners of any nearby mines to minimise the cumulative noise impacts of the mines.	Yes	Noise Management Plan submitted to DECCW (now EPA) and DG in March 2011 for review. EPA has recently advised that they will not be providing comment. DG comments received near end of reporting period. Noise Management Plan will be finalised during next reporting period.
9.	The Applicant shall ensure that the blasting on site does not cause exceedances of the criteria in Table 5. • 115dBL, Allowable exceedances: 5% of the total number of blasts in a 12 month period. • 120dBL at any time. • 5mm/s Allowable exceedances: 5% of the total number of blasts in a 12 month period. • 10mm/s at any time.	No	See Section 3.9.2 and Appendix 8 for details.
10.	The Applicant shall only carry out blasting on site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of Director-General.	Yes	As per condition.
11.	The Applicant shall not carry out more than 1 blast a day on site, unless an additional blast is required following a blast misfire.	No	See Section 3.9.2 and Appendix 8 for details.

Cond.	Conditional Requirement	Compliance	Comments
12.	If the Applicant receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on their land, or to have a previous property inspection report updated, then within 2 months of receiving this request the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to: - establish the baseline condition of the buildings and/or structures on the land or update the previous property inspection report; - identify any measures that should be implemented to minimise the potential blasting impacts of the development on these buildings and/or structures; and (b) give the landowner a copy of the new or updated property inspection report.	Not Yet Applicable	No requests received since approval of modification in October 2010.
13.	If the owner of any privately-owned land claims that the buildings and/or structures on his/her land have been damaged as a result of blasting on site, then within 2 months of receiving this claim the Applicant shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to investigate the claim; and (b) give the landowner a copy of the property investigation report. If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Applicant shall repair the damages to the satisfaction of the Director-General. If the Applicant or landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Director-General for resolution.	Not Yet Applicable	A landholder claimed that the blast on the 3rd March 2012 shook her house but did not specify any damage as a result. An independent structural assessment was offered by Whitehaven but was declined. An anonymous complaint was made via EPA which claimed window panes had cracked. Whitehaven is unable to commission an investigation based on an anonymous complaint.
14.	During mining operations, the Applicant shall (a) implement best blasting management practice on site to: - protect the safety of people and livestock in the surrounding area; - protect public or private property in the surrounding area; and - minimise the dust and fume emissions from blasting on site; (b) co-ordinate the blasting on site with the blasting at the Boggabri mine, or any other coal mine in the vicinity of the site, to minimise the cumulative blasting impacts of the mines; and (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting schedule, to the satisfaction of the Director-General.	No	See Section 3.9.2 for details of exceedances.

Cond.	Conditional Requirement	Compliance	Comments
15.	The Applicant shall prepare and implement a Blast Management Plan for the development to the satisfaction of the Director-General. This program must: (a) be prepared in consultation with DECCW, and be submitted to the Director-General for approval by the end of March 2011; (b) describe the blast mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent; (c) include a protocol that has been prepared in consultation with the owners of the Boggabri mine, and any other mines in the vicinity of the site, to minimise the cumulative blasting impacts of the mines; (d) describe the measures that would be implemented to ensure the public can get up-to-date information of the proposed blasting schedule; and (e) include a blast monitoring program to evaluate the performance of the development.	Yes	Blast Management Plan prepared in consultation with Boggabri Coal and submitted to DECCW (now EPA) and DG in March 2011. EPA have advised that they will not be reviewing the Plan. The DG has not provided comment on the Plan.
16.	The Applicant shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.	Yes	As per condition.
17.	The Applicant shall implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site to the satisfaction of the Director-General.	Yes	As per condition.
18.	The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that the particulate emissions generated by the project do not exceed the criteria listed in Tables 6, 7 and 8 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.	No	See Section 3.1.3 for details on Official Caution issued by EPA for dust generation.
19.	If the dust emissions generated by the development exceed the criteria in Tables 9, 10, and 11 at any residence on privately-owned land or on more than 25 percent of any privately owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.	Not Yet Applicable	Written request not received to date.
20.	The Applicant shall: (a) implement best practice air quality management on site, including all reasonable and feasible measures to minimise the off-site odour, fume and dust emissions generated by the project, including any spontaneous combustion emissions, (b) minimise any visible air pollution generated by the development; (c) regularly assess the real-time air quality monitoring and meteorological forecasting data and relocate, modify and/or stop operations on site to ensure compliance with the relevant conditions of this consent; and (d) co-ordinate the air quality management on site with the air quality management of the Boggabri mine, and any other mines in the vicinity of the site, to minimise the cumulative air quality impacts of the mines, to the satisfaction of the Director-General.	No	See Section 3.1.3 for details on Official Caution issued by EPA for dust generation. Real time air quality monitoring commenced at the end of the reporting period. Cumulative impact discussions ongoing with Boggabri Coal and Maules Creek.

Cond.	Conditional Requirement	Compliance	Comments
21.	The Applicant shall prepare and implement a detailed Air Quality & Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This program must: (a) be prepared in consultation with DECCW, and submitted to the Director-General for approval by the end of March 2011; (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, including a real-time air quality management system; and (c) include an air quality monitoring program, that: • uses a combination of real-time monitors, high volume samplers and dust deposition gauges to evaluate the performance of the project, and • includes a protocol for determining exceedances with the relevant conditions of this consent; and (d) include a protocol that has been prepared in consultation with the owners of the nearby mines to minimise the cumulative air quality impacts of the mines.	Yes	Air Quality and Greenhouse Gas Management Plan submitted to DECCW (now EPA) and DG in March 2011. EPA has advised that they will not be reviewing the plan. No comments received from DG.
22.	While development is being carried out on site, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that: (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy.	No	See Section 3.22.1 for details of Official Caution issued by EPA for non-compliance with requirement to continuously monitor meteorological conditions.
23.	The Applicant shall obtain the necessary water licences for the development on site under the <i>Water Act 1912</i> or <i>Water Management Act 2000</i> .	Yes	As per condition.
24.	The Applicant shall provide compensatory water supply to any landowner of privately-owned land whose water entitlements are impacted (other than an impact that is negligible) as a result of the development, in consultation with NOW and to the satisfaction of the Director-General. The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the development. Equivalent water supply must be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Applicant and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution. If the Applicant is unable to provide an alternative long-term supply of water, then the Applicant shall provide alternative compensation to the satisfaction of the Director-General.	Not Yet Applicable	No compensatory water supply required to date.
25.	The Applicant shall ensure that all surface water discharges from the site comply with the relevant discharge limits (both volume and quality) in any EPL.	No	Exceedances in discharge criteria. See Section 3.3.2 for details.

Cond.	Conditional Requirement	Compliance	Comments
26.	The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with NOW & DECCW; (b) be submitted to the Director-General for approval by the end of March 2011; and (c) include: • a Site Water Balance; • an Erosion and Sediment Control Plan; • a Surface Water Monitoring Program; • a Groundwater Monitoring Program; and • a Surface & Ground Water Response Plan.	No	Interim Water Management Plan submitted to DECCW (now EPA), NOW and DG in March 2011 with commitment to provide final Plan for review by June 2011. Plan has not been finalised but will be submitted during the next reporting period. Site has been operating on the Interim Plan until such time as URS finalise the Water Management Plan currently being prepared.
27.	The Site Water Balance must: (a) include • sources and security of water supply; • water use on site; • water management on site; and • reporting procedures; (b) describe what measures would be implemented to minimise water use on site; and (c) reviewed each year, with the results being included in the annual review (see Condition 3 of Schedule 5).	No	As per Condition 26.
28.	The Erosion and Sediment Control Plan shall: (a) be consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version); (b) identify activities that could cause soil erosion and generate sediment; (c) describe measures to minimise soil erosion and the potential for the transport of sediment to downstream waters; (d) describe the location, function, and capacity of erosion and sediment control structures; and (e) describe what measures would be implemented to maintain the structures over time.	No	As per Condition 26.
29.	The Surface Water Monitoring Program shall include: (a) detailed baseline data on surface water flows and quality in creeks and other water bodies that could be affected by the project; (b) surface water quality and stream health assessment criteria, including trigger levels for investigating any potentially adverse surface water impacts; and (c) a program to monitor: • surface water flows, quality, and impacts on water users; • stream health; and • channel stability, in the creeks and other water bodies that could be affected by the development on site, including the Bollol and Driggle Draggie Creeks in the vicinity of the road crossing works.	No	As per Condition 26.

Cond.	Conditional Requirement	Compliance	Comments
30.	The Groundwater Monitoring Program must include a program to: (a) detailed baseline data of groundwater levels, yield and quality in the region, and particularly any groundwater bores, springs and seeps (including spring and seep fed dams) that may be affected by mining operations on site; (b) a program to augment the baseline data over the life of the project; (c) groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts; (d) a program to monitor and/or validate: • groundwater inflows to the open cut mining operations; • the impacts of the project on: – the surrounding aquifers; and – any groundwater bores, springs and seeps on privately-owned land; (e) a program to validate the groundwater model for the project, and calibrate it to site specific conditions.	No	As per Condition 26.
31.	The Surface and Ground Water Response Plan must describe what measures and/or procedures would be implemented to: (a) respond to any exceedances of the surface water, stream health, and groundwater assessment criteria; (b) compensate landowners of privately-owned land whose water supply is adversely affected by the project; and (c) mitigate and/or offset any adverse impacts on riparian vegetation.	No	As per Condition 26.
32.	By the end of March 2011, the Applicant shall prepare a revised Biodiversity Offset Strategy for the development as a whole to the satisfaction of the Director-General. This strategy must: (a) be prepared in consultation with DECCW; (b) offset all the vegetation clearing associated with the approved development on site; (c) maintain or improve biodiversity conservation values in the region in the medium to long term.	Yes	Biodiversity Offset Strategy submitted to DECCW (now EPA) and DG in March 2011. Strategy was approved in January 2012. See Section 3.6 for further details.
33.	Within 6 months of the approval of the Biodiversity Offset Strategy, the Applicant shall make suitable arrangements to provide appropriate long-term security for the offset areas in the strategy to the satisfaction of the Director-General.	Not Yet Applicable	6 month period continues beyond end of this reporting period.

Cond.	Conditional Requirement	Compliance	Comments
34.	The Applicant shall prepare and implement a Biodiversity Management Plan for the development to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with DECCW, (b) be submitted to the Director-General within 6 months of the approval of the Biodiversity Offset Strategy; (c) describe how the implementation of the Biodiversity Offset Strategy would be integrated with the overall rehabilitation of the site (see below); (d) include: • detailed performance and completion criteria for the implementation of the Biodiversity Offset Strategy; • a detailed description of the measures that would be implemented over the next 3 years for: • a program to monitor the effectiveness of these measures, and evaluate progress against the detailed performance and completion criteria; and • details of who would be responsible for monitoring, reviewing and implementing the plan.	Not Yet Applicable	6 month period continues beyond end of this reporting period.
35.	Within 6 months of the approval of the Biodiversity Management Plan, the Applicant shall lodge a conservation bond with the Department to ensure that the Biodiversity Offset Strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by: (a) calculating the full cost of implementing the offset strategy; and (b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Director-General. If the Biodiversity Offset Strategy is completed to the satisfaction of the Director-General, the Director-General will release the conservation bond. If the Biodiversity Offset Strategy is not completed to the satisfaction of the Director-General, the Director-General will call in all or part of the conservation bond, and arrange for the satisfactory completion of the relevant works With the agreement of the Director-General, this bond may be combined with the rehabilitation securities administered by the Minister for Mineral Resources.	Not Yet Applicable	Biodiversity Management Plan not yet approved.

Cond.	Conditional Requirement	Compliance	Comments
36.	The Applicant shall prepare and implement an Aboriginal Heritage Management Plan for the development to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with DECCW and the Aboriginal community; (b) be submitted to the Director-General for approval by the end of March 2011; and (c) describe the program/procedures that would be implemented for: • recording, salvaging, and/or managing the Aboriginal sites and potential archaeological deposits within the approved disturbance area; • conserving, managing and monitoring the Aboriginal sites outside the approved disturbance area; • responding to the discovery of any new Aboriginal objects or skeletal remains during the development; • enabling the Aboriginal community to get access to archaeological sites on site; and • involving the Aboriginal community in the conservation and management of Aboriginal cultural heritage on site.	Yes	Aboriginal Heritage Management Plan submitted to DECCW (now EPA) and DG in March 2011. No responses received. TCPL was awaiting advice from DECCW (EPA) regarding consultation with Aboriginal groups however as a response has not been received, the plan was issued to all registered stakeholders in early May 2011 for review. No responses have been received from Aboriginal stakeholders.
37.	The Applicant shall only dispatch coal from the site by road between the hours of; (a) 7 am to 9.15 pm Monday to Friday; (b) 7 am to 5.15 pm Saturday; and (c) at no time on public holidays.	Yes	As per condition.
38.	The Applicant shall ensure that: (a) coal from the mine site is only transported along the private sections of the transport route, Rangari Road, Hoad Lane, Blue Vale Road, and the Kamilaroi Highway to the Whitehaven Siding coal handling and preparation plant; (b) trucks travelling to and from the mine site do not exceed 40 kilometres per hour in the vicinity of the school bus when it is operating on Hoad Lane; and (c) spillage from coal haulage vehicles is minimised; and (d) any spillage is promptly managed to avoid harm to the environment.	Yes	As per condition.
39.	During mining operations, the Applicant shall continue to implement its existing road maintenance agreements with NSC and GSC for the maintenance of the public roads affected by the development to the satisfaction of the respective Council.	Yes	Road maintenance agreement in place.
40.	The Applicant shall: (a) keep accurate records of the: • amount of coal transported from the site in a calendar year (on a monthly basis); and • number of coal haulage truck movements generated by the development (on a daily basis); and (b) make these records publicly-available on its website at the end of each calendar year.	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
41.	The Applicant shall minimise the visual impacts of the development, including: (a) minimises the visual contrasts of the development on site; (b) progressively rehabilitating the disturbed areas on site; (c) taking all practicable measures to mitigate lighting impacts from the mine site; (d) minimising lighting impacts within the Siding Spring Observatory Dark Skies Region; and (e) ensuring that all external lighting associated with the development complies with Australian Standard AS4282 (INT) 1995 – Control of Obtrusive Effects of Outdoor Lighting, to the satisfaction of the Director-General.	Yes	As per condition.
42.	Upon receiving a written request from the owner of any residence on privately-owned land which has significant direct views of the mining operations on site, the Applicant shall implement additional visual mitigation measures (such as landscaping treatments or vegetation screens) on the land in consultation with the owner. These measures must be reasonable and feasible, and directed towards minimising the visibility of the mining operations from the residence. If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Director-General for resolution.	Not Yet Applicable	No written requests received.
43.	The Applicant shall: (a) minimise the waste (including coal reject) generated by the development; (b) ensure that the waste generated by the development is appropriately stored, handled and disposed of, to the satisfaction of the Director-General.	Yes	As per condition
44.	The Applicant shall prepare and implement a Waste Management Plan for the project to the satisfaction of the Director-General. This plan must be submitted to the Director-General for approval by the end of March 2011.	Yes	Waste Management Plan submitted to DG in March 2011. No response received.
45.	The Applicant shall: (a) ensure that the development is suitably equipped to respond to any fires on-site; and (b) assist the emergency services as much as possible if there is a fire on-site during the development.	Yes	Fire fighting equipment available onsite.
46.	Within 6 months of the date of this consent, the Applicant shall prepare and implement a Bushfire Management Plan for the site, to the satisfaction of the NSC in consultation with the Boggabri No.1 and Nandewar Rural Fire Brigades.	Yes	Bushfire Management Plan submitted to NSC and Rural Fire Service by due date. Responses received by 1 st September 2011 and final Plan issued to NSC, RFS and DoPI on the 2 nd September 2011.
47.	The Applicant shall rehabilitate the site to the satisfaction of the Director-General of I&I NSW. To the extent that mining operations permit, this rehabilitation must be carried out progressively, that is, as soon as reasonably practicable following disturbance.	Yes	As per condition.
48.	The Applicant shall ensure that at least 100 hectares within the proposed Native Vegetation (Rehabilitation) or Proposed Offset areas depicted in the figure in Appendix 4 are rehabilitated or retained to comply with the specifications for Class 3 agricultural land suitability.	Not Yet Applicable	

Cond.	Conditional Requirement	Compliance	Comments
49.	By the end of March 2011, the Applicant shall prepare a Rehabilitation Strategy for the site to the satisfaction of the Director-General. This strategy must: (a) be prepared in consultation with I&I NSW and the owners of the Boggabri coal mine; (b) investigate the opportunities for improving the integration between the proposed final landform of the development on site with the proposed landform on the adjoining Boggabri coal mine; (c) identify the land on site that will be rehabilitated to Class 3 agricultural land suitability; (d) describe how the rehabilitation of the site will be integrated with the Biodiversity Offset Strategy (see above); (e) define the rehabilitation objectives for the site; and (f) include detailed plans of the proposed rehabilitation of the site, including suitable cross sections.	No	Extension to due date requested in March 2011. Letter received from DoPI on 25 May 2011 indicated that there is no provision for extension. Comments from DRE and Boggabri Coal were received during the reporting period. Strategy will be finalised during next reporting period.
50.	The Applicant shall prepare and implement a Rehabilitation Management Plan for the development on site to the satisfaction of the Director-General of I&I NSW. This plan must: (a) be prepared in consultation with the Department, DECCW, NOW, Council and the CCC; (b) be prepared in accordance with any relevant I&I NSW guidelines; (c) be submitted to the Director-General of I&I NSW for approval within 6 months of the approval of the Rehabilitation Strategy (see above); and (d) build, to the maximum extent practicable, on the other management plans required under this consent.	Not Yet Applicable	Rehabilitation Strategy not approved.
Schedule 4: Additional Procedures			
1.	By the end of November 2010, the Applicant shall notify in writing the owners of: (a) the land listed in Table 1 of Schedule 3 that they have the right to require the Applicant to acquire their land at any stage during the development; and (b) any residence on the land listed in Table 1 that they are entitled to ask for additional noise mitigation measures to be installed at their residence at any stage during the development.	No	Notification to Tarrawonga occurred in January 2011. No notification to Ambardo as the mine had already commenced acquisition negotiations.
2.	Within 2 weeks of obtaining results showing: (a) an exceedance of the relevant criteria in Schedule 3, the Proponent shall notify the affected landowners and tenants in writing of the exceedance, and provide regular monitoring results to each of these parties until the development is complying with the relevant criteria; (b) an exceedance of the relevant criteria in Condition 4(b) of Schedule 3, that they are entitled to ask for additional noise mitigation measures to be installed at their residence; and (c) an exceedance of the relevant air quality criteria in Schedule 3, send the affected landowners and tenants (including the tenants of any mine-owned land) a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time).	Yes	Residents notified as required.

Cond.	Conditional Requirement	Compliance	Comments
3.	If an owner of privately-owned land considers the development on site to be exceeding the relevant criteria in Schedule 3, then he/she may ask the Director-General in writing for an independent review of the impacts of the development on his/her land. If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision the Applicant shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to: - consult with the landowner to determine his/her concerns; - conduct monitoring to determine whether the development on site is complying with the relevant criteria in Schedule 3; and - if the development on site is not complying with these criteria then: - determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine towards the impact on the land; - identify the measures that could be implemented to ensure compliance with the relevant criteria; and (b) give the Director-General and landowner a copy of the independent review.	Not Yet Applicable	No requests to date.
4.	If the independent review determines that the development on site is complying with the relevant criteria in Schedule 3, then the Applicant may discontinue the independent review with the approval of the Director-General. If the independent review determines that the development on site is not complying with the relevant criteria in Schedule 3, and that the development on site is primarily responsible for this non-compliance, then the Applicant shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until the project complies with the relevant criteria; or (b) secure a written agreement with the landowner to allow exceedances of the relevant criteria, to the satisfaction of the Director-General. If the independent review determines that the development on site is not complying with the relevant acquisition criteria in Schedule 3, and that the development on site is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land in accordance with the procedures in Conditions 6-7 below.	Not Yet Applicable	

Cond.	Conditional Requirement	Compliance	Comments
5.	If the independent review determines that the relevant criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Applicant shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent person, and conduct further monitoring until there is compliance with the relevant criteria; or (b) secure a written agreement with the landowner and other relevant mines to allow exceedances of the relevant criteria in Schedule 3, to the satisfaction of the Director-General. If the independent review determines that the relevant acquisition criteria in Schedule 3 are being exceeded, but that more than one mine is responsible for this exceedance, then upon receiving a written request from the landowner, the Applicant shall acquire all or part of the landowner's land on as equitable a basis as possible with the relevant mine/s in accordance with the procedures in Conditions 6-7 below.	Not Yet Applicable	
6.	Within 3 months of receiving a written request from a landowner with acquisition rights, the Applicant shall make a binding written offer to the landowner based on:	Not Yet Applicable	
7.	The Applicant shall pay all reasonable costs associated with the land acquisition process described in Condition 6 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.	Not Yet Applicable	
Schedule 5: Environmental Management, Reporting and Auditing			
1.	The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Director-General. This strategy must: (a) be submitted to the Director-General for approval by the end of March 2011; (b) provide the strategic framework for environmental management of the development; (c) identify the statutory consents and approvals that apply to the development; (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the development; (e) describe the procedures that would be implemented to: - keep the local community and relevant agencies informed about the operation and environmental performance of the development; - receive, handle, respond to, and record complaints; - resolve any disputes that may arise during the course of the development; - respond to any non-compliance; - respond to emergencies; and (f) include: - copies of any strategies, plans and programs approved under the conditions of this consent; and - a clear plan depicting all the monitoring required to be carried out under this consent.	No	Extension requested in March 2011. Letter from DoPI on 25th May 2011. Advised that there is no provision for extensions of time. EMS submitted July 2011. No comments received to date.

Cond.	Conditional Requirement	Compliance	Comments
2.	The Applicant shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (a) detailed baseline data; (b) a description of: • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (d) a program to monitor and report on the: • impacts and environmental performance of the development; • effectiveness of any management measures (see c above); (e) a contingency plan to manage any unpredicted impacts and their consequences; (f) a program to investigate and implement ways to improve the environmental performance of the development over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan. <i>Note: The Director-General may waive some of these requirements if they are unnecessary or unwarranted.</i>	Yes	Plans prepared in accordance with this condition, where relevant.

Cond.	Conditional Requirement	Compliance	Comments
3.	By the end of March 2012, and annually thereafter, the Applicant shall review the environmental performance of the development to the satisfaction of the Director-General. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past year, and the development that is proposed to be carried out over the next year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in any EIS or EA for the development; (c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; (d) identify any trends in the monitoring data over the life of the development; (e) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (f) describe what measures will be implemented over the next year to improve the environmental performance of the development.	Yes	Confirmation provided from DoPI that Annual Review can be combined with AEMR and submitted according to existing AEMR schedule.
4.	Within 3 months of: (a) the submission of an annual review under Condition 3 above; (b) the submission of an incident report under Condition 6 below; (c) the submission of an audit report under Condition 8 below; and (d) any modification to the conditions of this consent (unless the conditions require otherwise), the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Director-General. <i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.</i>	No	Management plans updates required by Independent Audit not completed within 3 months of submission of audit report.
5.	The Applicant shall establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Director-General. This CCC must be established and operated in general accordance with the <i>Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects</i> (Department of Planning, 2007, or its latest version).	Yes	See Section 4.3 for details.
6.	The Applicant shall notify the Director-General and any other relevant agencies of any incident associated with the development as soon as practicable after the Applicant becomes aware of the incident. Within 7 days of the date of the incident, the Applicant shall provide the Director-General and any relevant agencies with a detailed report on the incident.	No	See Section 3.3.2 for details on non-licensed discharge and notification to EPA. No written advice provided to DG.
7.	The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting requirements under the conditions of this consent or any plans or programs approved under the conditions of this consent, and to the satisfaction of the Director-General.	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
8.	By the end of December 2011, and every 3 years thereafter, unless the Director-General directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development. This audit must: (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General; (b) include consultation with the relevant agencies; (c) assess the environmental performance of the development and whether it is complying with the requirements in this consent and any relevant EPL or Mining Lease (including any assessment, plan or program required under these licences or leases); (d) review the adequacy of any approved strategies, plans or programs required under these approvals; and (e) recommend appropriate measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals. <i>Note: This audit team must be led by a suitably qualified auditor and include experts in noise, biodiversity and rehabilitation, and any other fields specified by the Director-General.</i>	Yes	Audit conducted by Umwelt (approved by DG). Site inspection conducted 3 rd November 2011 and final report issued to Whitehaven in January 2012.
9.	Within 6 weeks of the completion of this audit, or as otherwise agreed by the Director-General, the Applicant shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	Yes	Submitted to DG on the 21st February 2012. No comments received.
10.	From the end of December 2010, the Applicant shall: (a) make copies of the following publicly available on its website: • the documents referred to in Condition 2 of Schedule 2; • the current statutory approvals for the development; • all approved strategies, plans and programs required under the conditions of this consent; • the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any plans or programs approved under the conditions of this consent; • a complaints register, updated on a monthly basis; • minutes of CCC meetings; • the annual reviews of the development; • any independent environmental audit of the development, and the Proponent's response to the recommendations in any audit; and • any other matter required by the Director-General. (b) keep this information up-to-date, to the satisfaction of the Director-General:	Yes	As per condition.

TABLE A3.2

Compliance Review – Environment Protection Licence 12365

Condition	Conditional Requirement	Compliance	Comments
A1.1	Carry out coal mining at specified premises at a scale not exceeding >500 000 – 2 000 000t.	Yes	ROM coal production in 2011/2012 reporting period = 1,746,625 t.
A3.1	Carry out works and activities in accordance with proposal contained in licence application.	Yes	Activities carried out in accordance with EIS/Modification EA which accompanied licence application and subsequent licence variation applications.
L1.1	Comply with Section 120 of the POEO Act 1997 (re water quality).	No	See Section 3.3.2 for details of non compliance.
L2	Comply with concentration limits: Oil & Grease 10 mg/L pH 6.5 – 8.5 TSS 50 mg/L TSS concentration limit may be exceeded for discharge provided rainfall measured exceeds 38.4mm over any consecutive 5 day immediately prior to discharge and all measures have been implemented to dewater all sediment dams within 5 days of rainfall such that they have sufficient capacity to store runoff from a 38.4mm, 5 day rainfall event.	No	Monitoring data confirms non compliance with TSS limits – see Section 3.3.2.
L3.1	Ensure no waste receipt or disposal at premises, except as permitted by licence.	Yes	No unauthorised waste received or disposed of at site.
L4.1	Ensure noise compliance: (a) $L_{Aeq(15min)}$ criterion of 40dB(A) during construction period; (b) $L_{Aeq(15min)}$ criterion of 35dB(A) during operational stage; and (c) $L_{A1(1min)}$ criterion of 45dB(A) at night.	No	Exceedances at “Tarrawonga”. See Section 3.10.3.
L4.2	Noise to be measured at any residence not on the premises to determine compliance	Yes	Noise levels monitored at residences as identified and approved in the Noise Management Plan. See Appendix 9 for details.

Condition	Conditional Requirement	Compliance	Comments
L5.1 and L5.2	Airblast overpressure from blasting in or on the premises must not exceed: • 115dB(Lin Peak) for more than 5% of total number of blasts over reporting period; and • 120dB(Lin Peak) at any time. At any point within 30 metres of any non-project related residential building.	No	See Section 3.9.2 and Appendix 8 for details on exceedance.
L5.3 and L5.4	Ground vibration peak particle velocity from blasting operations must not exceed: • 5mm/s for more than 5% of the total number of blasts during the reporting period; and • 10mm/s at any time.	Yes	See Appendix 8. No exceedances during reporting period.
L5.5	Blasting operations on the premises must only be carried out between the hours of 9am to 5pm, Monday to Saturday, inclusive.	Yes	See Appendix 8.
L5.6	The hours of operation for blasting may be varied if the EPA, have regard to the effect that the proposed variation would have on the amenity of the residents in the locality, gives written consent to the variation.	Not Yet Applicable	
L5.7	Blasting at the premises is limited to 1 blast on each day on which blasting is permitted.	No	Two occasions where 2 blasts occurred on 1 day. See Section 3.9.2 and Appendix 8 for details.
O1.1	Carry out licensed activities in a competent manner, i.e. (a) processing, handling, movement and storage of materials and substances; and (b) treatment, storage, processing, reprocessing, transport and disposal of generated waste.	No	EPA determined that Tarrawonga contravened this condition as a result of the non licenced discharge discussed in Section 3.3.2.

Condition	Conditional Requirement	Compliance	Comments
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity must: (a) be maintained in a proper and efficient condition; and (b) be operated in a proper and efficient manner.	Yes	All plant and equipment is closely monitored and regularly serviced by Tarrawonga personnel.
O3.1	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.	No	See Section 3.1.3 for details of Official Caution received from EPA.
O3.2	Trucks transporting coal from the premises must be covered immediately after loading to prevent wind blown emissions and spillage. The covering must be maintained until immediately before unloading the trucks.	Yes	All trucks are required to use tarpaulins in the transport of coal.
O4.1	Effluent only applied to Point 14 as per Condition P1.3.	Yes	Effluent used as per licence condition and only to extent it can be effectively utilised.
M1.1	Record and retain monitoring results required as per this licence.	Yes	Monitoring records documented in the AEMRs.
M1.2	Keep all monitoring records associated with this licence: (a) in a legible form; (b) for at least 4 years; for production to any EPA authorised officer.	Yes	Monitoring records documented in the AEMRs.
M1.3	Keep the following records in respect to samples required: (a) sampling date; (b) sampling time; (c) sampling location; and (d) sample collector's name.	Yes Yes Yes Yes	This information is held on chain-of-custody documentation compiled to accompany samples to the laboratory.
M2.1	Monitor the concentration of each pollutant specified using the sampling method, units and frequency specified.	Yes	Monitoring undertaken as required.
M3.1	Monitor air pollutants in accordance with the Approved Methods publication or as approved by EPA.	Yes	Test method used refer to the EPA approved publication "Approved Methods for the Sampling and Analysis of Air Pollutants in NSW."
M3.2	Monitor pollutants discharged to waters in accordance with the Approved Methods publication or as approved by EPA.	Yes	Discharges are monitored in accordance with EPA requirements.

Condition	Conditional Requirement	Compliance	Comments
M4.1 and M4.2	Monitor weather parameters specified. The meteorological weather station must be maintained so as to be capable of continuously monitoring the parameters specified.	No	See Section 3.22.1 for details of Official Caution from EPA regarding meteorological station not continuously monitoring weather parameters.
M5.1	Keep a legible record of all complaints re pollution arising from licenced activity.	Yes	Complaints register maintained by Environmental Officer.
M5.2	Keep the following records of complaints. (a) date and time of complaint; (b) method complaint made; (c) any personal details of complainant; (d) nature of complaint; (e) licensee's action in response, any follow-up contact; and (f) if no action – reason why.	Yes Yes Yes Yes Yes Yes	Complaints records are compiled in accordance with the condition.
M5.3	Keep records of complaints for 4 years.	Yes	All records have been kept to date.
M5.4	Present records to EPA upon request.	Yes	All records would be made available to the EPA upon request.
M6.1	Operate telephone complaints line for receipt of complaints from the public.	Yes	TCPL operates a complaints hotline on telephone No. 0429 497 730.
M6.2	Notify the public of the complaints telephone line number.	Yes	Complaints hotline advertised in local press and on Whitehaven website.
M7	Monitor noise and blasting parameters specified.	Yes	As per condition.
R1.1	Complete and supply Annual Return to EPA comprising: (a) Statement of Compliance; (b) Monitoring & Complaints Summary.	Yes	Annual return completed each year.
R1.5	Provide EPA with Annual Return no later than 60 days after end of each reporting period.	Yes	Returns submitted within the nominated 60 day period.
R1.7	Retain copy of Annual Return for 4 years.	Yes	All annual returns kept on file.
R1.8	Certify the Statement of Compliance within the Annual Return and sign the Monitoring and Complaints Summary by: (a) licence holder; or (b) approved person.	Yes	Documents certified and signed by a Director and the Company Secretary.

Condition	Conditional Requirement	Compliance	Comments
R2.1	Notify EPA of threatening or harmful incidents as soon as practicable by phoning EPA's Pollution Line service.	Yes	Non licenced discharge reported. See Section 3.3.2 for details.
R2.2	Provide written details of the incident to EPA within 7 days of incident.	Yes	Non licenced discharge reported. See Section 3.3.2 for details.
R3.1	Upon an EPA officer suspecting that an event is causing or likely to cause environmental harm: (a) at the premises; or (b) in connection with vehicles or plant associated with the licenced activities; a request may be made for a written report of the event.	Not Yet Applicable	No requests received by Tarrawonga Coal during reporting period (or to date).
R3.2	Tarrawonga Coal make inquiries in relation to the event and supply the report to the EPA within the time specified.	Not Yet Applicable	No requests received by Tarrawonga Coal during reporting period (or to date).
R3.3	The report may be required to include: (a) event cause, time and duration; (b) type, volume and concentration of every pollutant discharged; (c) contact details of employees or agents of licensee who witnessed event; (d) contact details of any other persons witnessing the event; (e) the action taken and follow-up contact with complainants in relation to event; (f) mitigation measures proposed to prevent recurrence; (g) any other relevant matters.	Not Yet Applicable	No requests received by Tarrawonga Coal during reporting period (or to date).
R3.4	EPA may request further details – must be supplied within specified time.	Not Yet Applicable	No requests received by Tarrawonga Coal during reporting period (or to date).

Condition	Conditional Requirement	Compliance	Comments
R4.1	A noise compliance assessment must be submitted to the EPA within 30 days of the completion of quarterly noise monitoring.	No	First round of monitoring since condition added to licence was 15/16th March 2012, however, by oversight, this round of monitoring did not follow the increased monitoring timeframe. As a consequence the required noise compliance assessment was not submitted. This was rectified for the following round of noise monitoring.
G1.1	Retain a copy of this licence at premises to which the licence applies.	Yes	Retained in the Tarrawonga Coal Site Office.
G1.2	Produce licence to EPA officer upon request.	Not Yet Applicable	Tarrawonga Coal personnel would be pleased to produce the licence upon request.
G1.3	Make licence available for inspection by any employee or agent of licensee working at premises.	Yes	Licence is located in Tarrawonga Coal Site Office if required. Tarrawonga personnel would be pleased to produce the licence upon request.
U1	The licensee must conduct a site specific Best Management Practice (BMP) determination to identify the most practicable means to reduce particle emissions. The report must be submitted by the 29th June 2012.	Not Yet Applicable	Due date outside of reporting period.

TABLE A3-3
Compliance Review – ML 1579

Relevant Condition	Conditional Requirement	Compliance	Comments
1	Service of notice on landholders of granting of mining lease.	Yes	All affected landholders were advised within the 3 months of the grant date.
2	Prepare and submit a MOP in accordance with DG's guidelines.	Yes	Initial MOP lodged with DMR and accepted on the 9 th May 2006. MOP amendment for Section 75W extension approved in October 2010.
3	Submit AEMR to DG and prepare AEMR in accordance with DG's guidelines.	Yes	This document has been prepared in satisfaction with this condition. Content of AEMR follows guidelines.
5	Maintain at least 27 employees or expend not less than \$472,500 per year in mining operations	Yes	As per condition.
6	Comply with direction of Environmental Officer of Department.	Not Yet Applicable	No directions issued.
7	Provision of Exploration Report at each anniversary of grant of lease.	Yes	Exploration report supplied as required.
11(a)	Ground vibration from blasting must not exceed 10mm/s at any time, and must not exceed 5mm/s in more than 5% of the total number of blasts over a 12 month period.	Yes	See Appendix 8. No exceedances recorded.
11(b)	Peak Overpressure from blasting must not exceed 120dB at any time, and must not exceed 115dB in more than 5% of the total number of blasts over a 12 month period.	No	See Section 3.9.2 and Appendix 8.
12	Operations must be carried out in such a way as to ensure the safety of persons or stock in the vicinity of operations	Yes	As per condition.
13(a)	Land disturbed is to be rehabilitated to a stable and permanent form in accordance with the MOP.	Yes	Current rehabilitation activities are in accordance with commitments identified in the MOP
13(b)	Topsoil is to be stored and maintained in a manner acceptable to the Director General.	Yes	Topsoil is stockpiled and seeded in accordance with commitments identified in the MOP.
14	Comply with directions issued by the Director-General regarding stabilisation and revegetation of mine residues, tailings or overburden dumps	Not Yet Applicable	No directions issued.
15(1)	Advise DNR Regional hydrogeologist of intention to drill exploration holes 28 days prior to commencement	Yes	As per condition.

Relevant Condition	Conditional Requirement	Compliance	Comments
15(2)	All exploration drill holes must be completed to the satisfaction of the Director General in relation to:- -adequate marking/survey -sealed to prevent collapse -sealed with cement plugs to prevent discharge of groundwaters -if meets gas, it is plugged to prevent escape -if meets artesian or sub-artesian flow is sealed to prevent contamination of aquifer -once no longer used, is sealed according to Department guidelines -once no longer used, the land is left in a clean, tidy and stable condition.	Yes	As per condition.
16	Operations must be carried out so as not to cause or aggravate air pollution, water pollution or soil contamination or erosion.	No	See Section 3.3.2 for details on wet weather discharges.
17	Operations must not interfere with transmission lines, pipelines or any other utility	Yes	As per condition.
18	Activities must not interfere with or damage fences, and gates must be closed or left open in accordance with landholder requirements.	Yes	As per condition.
19(a)	Operations must not affect any road unless in accordance with the MOP or written approval of Director General.	Yes	As per condition
19(b)	Leaseholder must pay to the authority responsible for the road the cost incurred in fixing any damage to the roads caused by the operations.	Yes	Agreement in place with GSC and NSC.
20	Access tracks kept to a minimum and positioned so as not to cause unnecessary damage. Temporary tracks to be ripped, re-topsoiled and revegetated when no longer required.	Yes	As per condition.
21(a)	Trees must not be felled without the consent of the landholder who is entitled to the use of the timber.	Yes	As per condition.
21(b)	Trees must not be felled on the lease area except where it directly obstructs or prevents the carrying out of operations.	Yes	As per condition.
21(c)	Timber from Crown land within the lease area must not be used until all relevant approvals have been obtained.	Yes	As per condition.
23	Comply with direction of Director General if notice is issued with regard to resource recovery.	Not Yet Applicable	No notice issued.
25	Provision of Security of \$100,000 to the Minister to ensure fulfilment of lease conditions.	Yes	As per condition.

Appendix 4

DUST MONITORING RESULTS

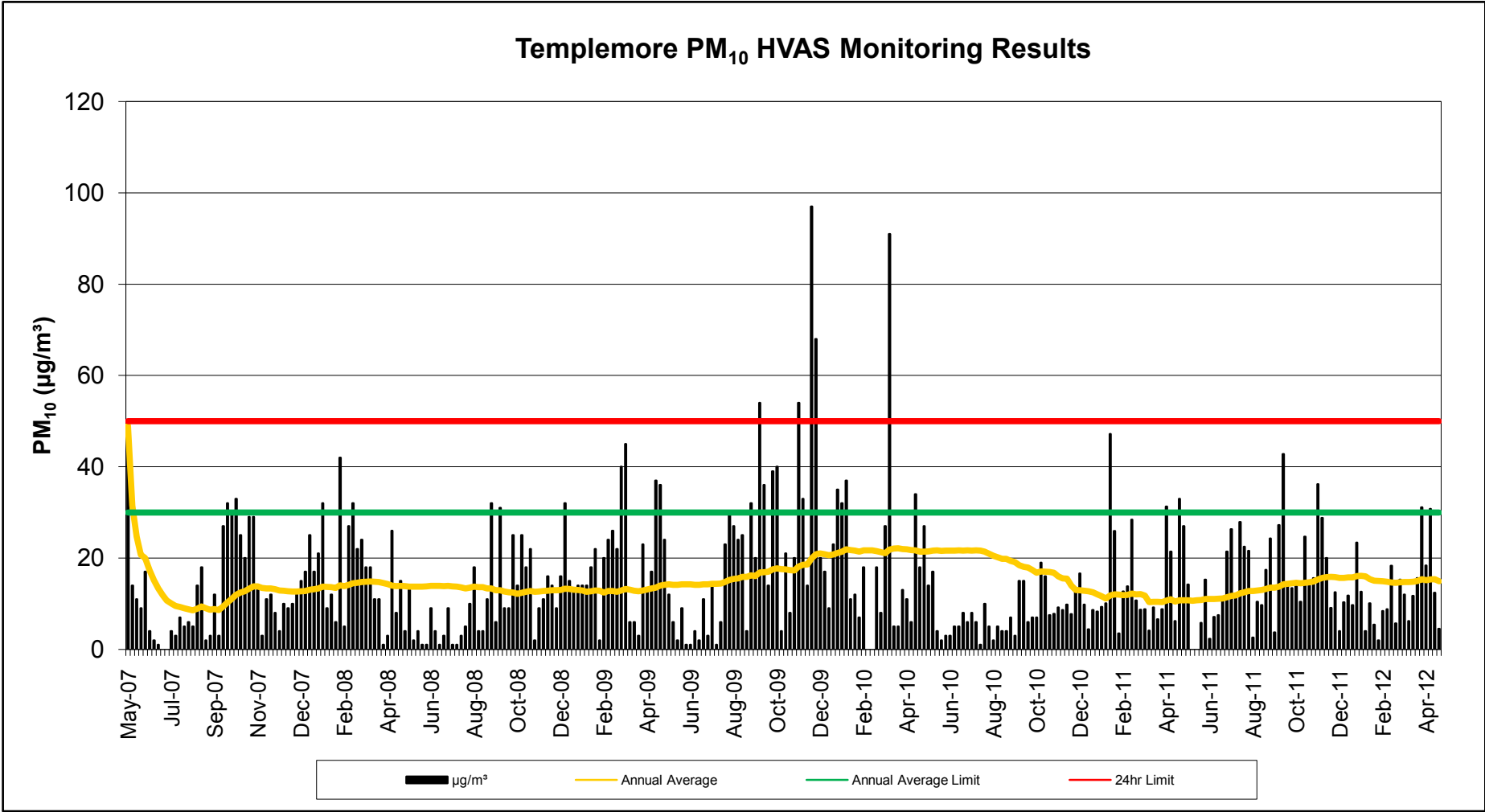
TEMPLEMORE PM₁₀ HIGH VOLUME AIR SAMPLER

Site	Site Id	Datum	Zone	Easting	Northing	
Templemore	EB4	MGA	56	230706	6605640	
Date	mg/paper	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
5/05/2007	78.1	49	49.00	30	50	
11/05/2007	23	14	31.50	30	50	
17/05/2007	16.9	11	24.67	30	50	
23/05/2007	14.3	9	20.75	30	50	
29/05/2007	26.5	17	20.00	30	50	
4/06/2007	7	4	17.33	30	50	
10/06/2007	3.4	2	15.14	30	50	
16/06/2007	1.9	1	13.38	30	50	
22/06/2007	0.1	0	11.89	30	50	
28/06/2007	0.3	0	10.70	30	50	
4/07/2007	5.6	4	10.09	30	50	
10/07/2007	4.9	3	9.50	30	50	
16/07/2007	11.7	7	9.31	30	50	
22/07/2007	9	5	9.00	30	50	
28/07/2007	10.4	6	8.80	30	50	
3/08/2007	8.5	5	8.56	30	50	
9/08/2007	13.7	14	8.88	30	50	
15/08/2007	30	18	9.39	30	50	
21/08/2007	2.6	2	9.00	30	50	
27/08/2007	5.2	3	8.70	30	50	
2/09/2007	18.8	12	8.86	30	50	
8/09/2007	4.1	3	8.59	30	50	
14/09/2007	41.2	27	9.39	30	50	
20/09/2007	48.9	32	10.33	30	50	
26/09/2007	46.2	30	11.12	30	50	
2/10/2007	51.8	33	11.96	30	50	
8/10/2007	39.4	25	12.44	30	50	
14/10/2007	32.4	20	12.71	30	50	
20/10/2007	46	29	13.28	30	50	
26/10/2007	44.9	29	13.80	30	50	
1/11/2007	13	13	13.77	30	50	
7/11/2007	3	3	13.44	30	50	
13/11/2007	11	11	13.36	30	50	
19/11/2007	12	12	13.32	30	50	
25/11/2007	8	8	13.17	30	50	
1/12/2007	5.5	4	12.92	30	50	
7/12/2007	14.9	10	12.84	30	50	
13/12/2007	14.1	9	12.74	30	50	
19/12/2007	14.7	10	12.67	30	50	
25/12/2007	19.2	12	12.65	30	50	
31/12/2007	22.3	15	12.71	30	50	
6/01/2008	25.7	17	12.81	30	50	
12/01/2008	37.2	25	13.09	30	50	
18/01/2008	25.3	17	13.18	30	50	
24/01/2008	32.4	21	13.36	30	50	
30/01/2008	47.9	32	13.76	30	50	
5/02/2008	13.3	9	13.66	30	50	
11/02/2008	18.7	12	13.63	30	50	
17/02/2008	9.6	6	13.47	30	50	
23/02/2008	62.5	42	14.04	30	50	
29/02/2008	7.1	5	13.86	30	50	
6/03/2008	41.1	27	14.12	30	50	
12/03/2008	48.4	32	14.45	30	50	
18/03/2008	33.9	22	14.59	30	50	
24/03/2008	35.6	24	14.76	30	50	
30/03/2008	27.8	18	14.82	30	50	
5/04/2008	27.9	18	14.88	30	50	
11/04/2008	17.2	11	14.81	30	50	
17/04/2008	17.2	11	14.75	30	50	

Date	mg/paper	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
23/04/2008	1.9	1	14.52	30	50	
29/04/2008	4.9	3	14.33	30	50	
5/05/2008	41.3	26	13.95	30	50	
11/05/2008	12.8	8	13.85	30	50	
17/05/2008	22.5	15	13.92	30	50	
23/05/2008	5.9	4	13.84	30	50	
29/05/2008	20.6	13	13.77	30	50	
4/06/2008	2.5	2	13.74	30	50	
10/06/2008	6.8	4	13.77	30	50	
16/06/2008	1.6	1	13.77	30	50	
22/06/2008	1	1	13.79	30	50	
28/06/2008	15.4	9	13.93	30	50	
4/07/2008	6.5	4	13.93	30	50	
10/07/2008	1.2	1	13.90	30	50	
16/07/2008	4.7	3	13.84	30	50	
22/07/2008	14	9	13.90	30	50	
28/07/2008	1.8	1	13.82	30	50	
3/08/2008	3.3	1	13.75	30	50	
9/08/2008	4.2	3	13.57	30	50	
15/08/2008	7.5	5	13.36	30	50	
21/08/2008	15.5	10	13.49	30	50	
27/08/2008	28.1	18	13.74	30	50	
2/09/2008	7	4	13.61	30	50	
8/09/2008	6.6	4	13.62	30	50	
14/09/2008	16.7	11	13.36	30	50	
20/09/2008	48.1	32	13.36	30	50	
26/09/2008	9.5	6	12.97	30	50	
2/10/2008	47.2	31	12.93	30	50	
8/10/2008	14.3	9	12.67	30	50	
14/10/2008	14.1	9	12.49	30	50	
20/10/2008	38.5	25	12.43	30	50	
26/10/2008	21.7	14	12.18	30	50	
1/11/2008	39.9	25	12.38	30	50	
7/11/2008	27.6	18	12.62	30	50	
13/11/2008	34.5	22	12.80	30	50	
19/11/2008	3.6	2	12.64	30	50	
25/11/2008	14.5	9	12.66	30	50	
1/12/2008		11	12.77	30	50	
7/12/2008		16	12.87	30	50	
13/12/2008		14	12.95	30	50	
19/12/2008		9	12.93	30	50	
25/12/2008		16	13.00	30	50	
31/12/2008		32	13.28	30	50	
6/01/2009	21.7	15	13.25	30	50	
12/01/2009	19.6	13	13.05	30	50	
18/01/2009	22.1	14	13.00	30	50	
24/01/2009	19.7	14	12.89	30	50	
30/01/2009	20.8	14	12.59	30	50	
5/02/2009	25.9	18	12.74	30	50	
11/02/2009	34.1	22	12.90	30	50	
17/02/2009	3.2	2	12.84	30	50	
23/02/2009	29.5	20	12.48	30	50	
1/03/2009	35.3	24	12.79	30	50	
7/03/2009	40.1	26	12.77	30	50	
13/03/2009	33	22	12.61	30	50	
19/03/2009	59.8	40	12.90	30	50	
25/03/2009	68.5	45	13.25	30	50	
31/03/2009	8.7	6	13.05	30	50	
6/04/2009	9.8	6	12.85	30	50	
12/04/2009	5.3	3	12.72	30	50	
18/04/2009	35.3	23	12.92	30	50	
24/04/2009	20.6	13	13.11	30	50	
30/04/2009	26.8	17	13.34	30	50	
6/05/2009	57.6	37	13.52	30	50	

Date	mg/paper	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
12/05/2009	56.1	36	13.98	30	50	
18/05/2009	36.8	24	14.13	30	50	
24/05/2009	18.3	12	14.26	30	50	
30/05/2009	10.1	6	14.15	30	50	
5/06/2009	3.2	2	14.15	30	50	
11/06/2009	14.6	9	14.23	30	50	
17/06/2009	2	1	14.23	30	50	
23/06/2009	2.6	1	14.23	30	50	
29/06/2009	3.2	4	14.15	30	50	
5/07/2009	2.9	2	14.11	30	50	
11/07/2009	17.1	11	14.28	30	50	
17/07/2009	4.4	3	14.28	30	50	
23/07/2009	21.8	14	14.36	30	50	
29/07/2009	4.1	1	14.36	30	50	
4/08/2009	9.2	6	14.44	30	50	
10/08/2009	35.4	23	14.77	30	50	
16/08/2009	46	30	15.18	30	50	
22/08/2009	41.3	27	15.46	30	50	
28/08/2009	36.7	24	15.56	30	50	
3/09/2009	39.5	25	15.90	30	50	
9/09/2009	6.8	4	15.90	30	50	
15/09/2009	49.2	32	16.25	30	50	
21/09/2009	30	20	16.05	30	50	
27/09/2009	83.2	54	16.84	30	50	
3/10/2009	55.1	36	16.92	30	50	
9/10/2009	22.7	14	17.00	30	50	
15/10/2009	59.3	39	17.49	30	50	
21/10/2009	60.8	40	17.74	30	50	
27/10/2009	6.3	4	17.57	30	50	
2/11/2009	31.4	21	17.51	30	50	
8/11/2009	11	8	17.34	30	50	
14/11/2009	30.5	20	17.31	30	50	
20/11/2009	78.5	54	18.16	30	50	
26/11/2009	49.3	33	18.56	30	50	
2/12/2009	21.4	14	18.61	30	50	
8/12/2009	140.2	97	19.93	30	50	
14/12/2009	101.9	68	20.82	30	50	
20/12/2009	30.4	20	21	30	50	
26/12/2009	25.4	17	20.83	30	50	
1/01/2010	13.7	9	20.64	30	50	
7/01/2010	33.8	23	20.77	30	50	
13/01/2010	51.7	35	21.13	30	50	
19/01/2010	48.7	32	21.43	30	50	
25/01/2010	55.3	37	21.93	30	50	
31/01/2010	16.8	11	21.75	30	50	
6/02/2010	18	12	21.66	30	50	
12/02/2010	11.1	7	21.41	30	50	
18/02/2010	27.2	18	21.67	30	50	
24/02/2010			21.70	30	50	No power
2/03/2010			21.66	30	50	No power
8/03/2010	23.1	18	21.53	30	50	
14/03/2010	12.8	8	21.29	30	50	
20/03/2010	40.6	27	21.07	30	50	
26/03/2010	136.5	91	21.85	30	50	
1/04/2010	7.5	5	22.10	30	50	
7/04/2010	7.7	5	22.14	30	50	
13/04/2010	20.4	13	21.97	30	50	
19/04/2010	16.6	11	21.93	30	50	
25/04/2010	9.2	6	21.74	30	50	
1/05/2010	52	34	21.69	30	50	
7/05/2010	28.6	18	21.38	30	50	
13/05/2010	42.5	27	21.43	30	50	
19/05/2010	22.4	14	21.47	30	50	
25/05/2010	26.5	17	21.66	30	50	

Date	mg/paper	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
31/05/2010	6.6	4	21.69	30	50	
6/06/2010	2.7	2	21.57	30	50	
12/06/2010	5.3	3	21.60	30	50	
18/06/2010	4.2	3	21.64	30	50	
24/06/2010	7.7	5	21.66	30	50	
30/06/2010	7.6	5	21.71	30	50	
6/07/2010	12.6	8	21.66	30	50	
12/07/2010	9	6	21.71	30	50	
18/07/2010	12.3	8	21.60	30	50	
24/07/2010	10.2	6	21.69	30	50	
30/07/2010	0.9	1	21.60	30	50	
5/08/2010	15.1	10	21.38	30	50	
11/08/2010	8	5	20.95	30	50	
17/08/2010	3.6	2	20.52	30	50	
23/08/2010	7.5	5	20.19	30	50	
29/08/2010	7.1	4	19.83	30	50	
4/09/2010	6.4	4	19.83	30	50	
10/09/2010	10.4	7	19.40	30	50	
16/09/2010	5.3	3	19.10	30	50	
22/09/2010	23.4	15	18.43	30	50	
28/09/2010	22.2	15	18.07	30	50	
4/10/2010	9	6	17.93	30	50	
10/10/2010	11.4	7	17.38	30	50	
16/10/2010	11.2	7	16.81	30	50	
22/10/2010	28.7	19	17.07	30	50	
28/10/2010	24.4	16	16.98	30	50	
3/11/2010	12.3	7.5	16.97	30	50	
9/11/2010	12.8	7.8	16.76	30	50	
15/11/2010	15.1	9.2	15.99	30	50	
21/11/2010	14	8.6	15.57	30	50	
27/11/2010	16	9.8	15.50	30	50	
3/12/2010	12.5	7.7	13.96	30	50	
9/12/2010	20.9	12.8	13.01	30	50	
15/12/2010	27	16.6	12.95	30	50	
21/12/2010	16	9.8	12.82	30	50	
27/12/2010	7.2	4.4	12.74	30	50	
2/01/2011	14.1	8.6	12.50	30	50	
8/01/2011	13.5	8.3	12.04	30	50	
14/01/2011	15.2	9.3	11.64	30	50	
20/01/2011	16.5	10.1	11.18	30	50	
26/01/2011	28.9	47.2	11.81	30	50	
1/02/2011	42.3	25.9	12.04	30	50	
7/02/2011	5.7	3.5	11.98	30	50	
13/02/2011	20.7	12.7	11.89	30	50	
19/02/2011	22.6	13.8	11.93	30	50	
25/02/2011	46.4	28.4	12.20	30	50	
3/03/2011	17.1	10.7	12.08	30	50	
9/03/2011	14.2	8.7	12.09	30	50	
15/03/2011	14.3	8.8	11.79	30	50	
21/03/2011	6.7	4.1	10.34	30	50	
27/03/2011	15	9.2	10.41	30	50	
2/04/2011	10.7	6.6	10.44	30	50	
8/04/2011	14.3	8.8	10.37	30	50	
14/04/2011	51	31.3	10.70	30	50	
20/04/2011	35	21.4	10.96	30	50	
26/04/2011	10.1	6.2	10.50	30	50	
2/05/2011	53.8	33	10.75	30	50	



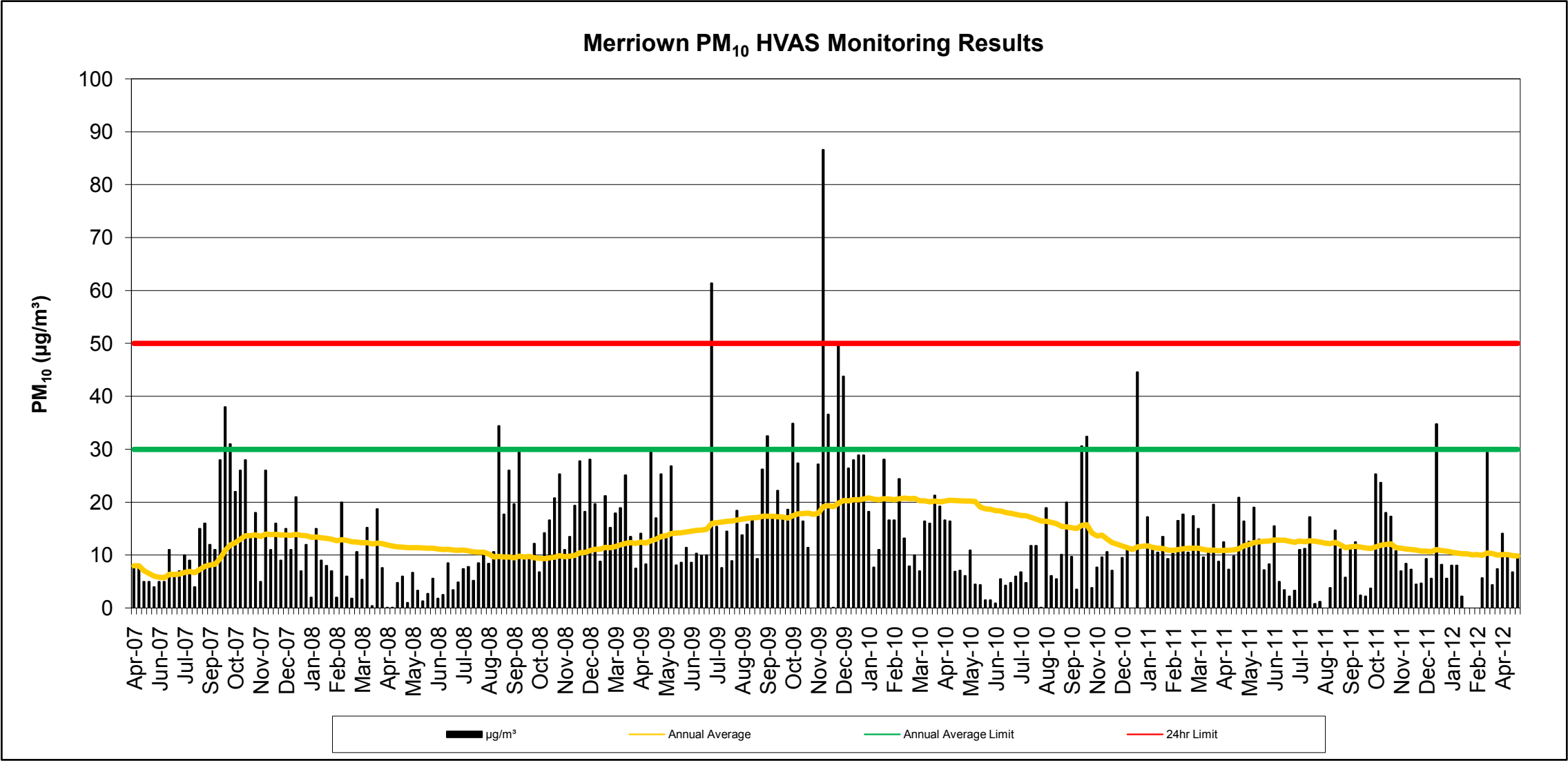
MERRIOWN PM₁₀ HIGH VOLUME AIR SAMPLER

Site	Site Id	Note: This site is monitored by Idemitsu Boggabri Coal			
Merriown	D7				
Date	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
28/04/2007	8	8.00	30	50	
22/05/2007	8	8.00	30	50	
28/05/2007	5	7.00	30	50	
3/06/2007	5	6.50	30	50	
9/06/2007	4	6.00	30	50	
16/06/2007	5	5.83	30	50	
21/06/2007	5	5.71	30	50	
27/06/2007	11	6.38	30	50	
4/07/2007	6	6.33	30	50	
10/07/2007	7	6.40	30	50	
15/07/2007	10	6.73	30	50	
21/07/2007	9	6.92	30	50	
28/07/2007	4	6.69	30	50	
21/08/2007	15	7.29	30	50	
26/08/2007	16	7.87	30	50	
1/09/2007	12	8.13	30	50	
7/09/2007	11	8.29	30	50	
14/09/2007	28	9.39	30	50	
19/09/2007	38	10.89	30	50	
25/09/2007	31	11.90	30	50	
1/10/2007	22	12.38	30	50	
7/10/2007	26	13.00	30	50	
19/10/2007	28	13.65	30	50	
25/10/2007	14	13.67	30	50	
31/10/2007	18	13.84	30	50	
6/11/2007	5	13.50	30	50	
12/11/2007	26	13.96	30	50	
18/11/2007	11	13.86	30	50	
24/11/2007	16	13.93	30	50	
30/11/2007	9	13.77	30	50	
6/12/2007	15	13.81	30	50	
12/12/2007	11	13.72	30	50	
18/12/2007	21	13.94	30	50	
30/12/2007	7	13.74	30	50	
5/01/2008	12	13.69	30	50	
11/01/2008	2	13.36	30	50	
17/01/2008	15	13.41	30	50	
23/01/2008	9	13.29	30	50	
29/01/2008	8	13.15	30	50	
4/02/2008	7	13.00	30	50	
10/02/2008	2	12.73	30	50	
16/02/2008	20	12.90	30	50	
22/02/2008	6	12.74	30	50	
28/02/2008	1.8	12.50	30	50	
5/03/2008	10.6	12.45	30	50	
11/03/2008	5.4	12.30	30	50	
18/03/2008	15.2	12.36	30	50	
23/03/2008	0.4	12.11	30	50	
29/03/2008	18.7	12.25	30	50	
4/04/2008	7.6	12.15	30	50	
10/04/2008	0.1	11.92	30	50	
16/04/2008	0.1	11.69	30	50	
22/04/2008	4.8	11.56	30	50	
28/04/2008	6	11.52	30	50	
4/04/2008	1	11.39	30	50	
16/05/2008	6.7	11.42	30	50	
22/05/2008	3.3	11.39	30	50	
28/05/2008	1.3	11.34	30	50	
3/06/2008	2.7	11.30	30	50	
9/06/2008	5.6	11.31	30	50	
15/06/2008	1.8	11.13	30	50	
21/06/2008	2.5	11.07	30	50	
3/07/2008	8.5	11.10	30	50	
9/07/2008	3.4	10.97	30	50	
15/07/2008	4.9	10.89	30	50	
21/07/2008	7.4	10.96	30	50	
27/07/2008	7.8	10.82	30	50	

Date	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
2/08/2008	5.2	10.62	30	50	
8/08/2008	8.5	10.55	30	50	
14/08/2008	10.6	10.55	30	50	
20/08/2008	8.4	10.18	30	50	
26/08/2008	10.6	9.66	30	50	
1/09/2008	34.4	9.72	30	50	
7/09/2008	17.7	9.64	30	50	
13/09/2008	26	9.64	30	50	
19/09/2008	19.7	9.48	30	50	
25/09/2008	30.3	9.79	30	50	
1/10/2008	9.8	9.64	30	50	
7/10/2008	9.9	9.73	30	50	
13/10/2008	12.2	9.47	30	50	
19/10/2008	6.8	9.39	30	50	
25/10/2008	14.2	9.36	30	50	
6/11/2008	16.6	9.50	30	50	
12/11/2008	20.8	9.61	30	50	
18/11/2008	25.3	9.88	30	50	
24/11/2008	11	9.69	30	50	
30/11/2008	13.5	9.81	30	50	
6/12/2008	19.4	9.95	30	50	
12/12/2008	27.8	10.44	30	50	
18/12/2008	18.2	10.50	30	50	
24/12/2008	28.1	10.86	30	50	
30/12/2008	19.7	11.08	30	50	
17/02/2009	8.8	11.12	30	50	
23/02/2009	21.2	11.48	30	50	
1/03/2009	15.2	11.39	30	50	
7/03/2009	17.9	11.61	30	50	
13/03/2009	18.9	11.93	30	50	
19/03/2009	25.1	12.21	30	50	
25/03/2009	13.5	12.36	30	50	
31/03/2009	7.5	12.22	30	50	
6/04/2009	14.1	12.47	30	50	
12/04/2009	8.3	12.28	30	50	
18/04/2009	30	12.70	30	50	
24/04/2009	17	13.02	30	50	
30/04/2009	25.3	13.49	30	50	
6/05/2009	13.8	13.66	30	50	
12/05/2009	26.8	14.06	30	50	
19/05/2009	8.1	14.19	30	50	
25/05/2009	8.6	14.23	30	50	
31/05/2009	11.4	14.38	30	50	
6/06/2009	8.6	14.52	30	50	
12/06/2009	10.3	14.66	30	50	
18/06/2009	9.9	14.74	30	50	
24/06/2009	10	14.90	30	50	
30/06/2009	61.4	16.01	30	50	
6/07/2009	15.4	16.14	30	50	
12/07/2009	7.6	16.22	30	50	
18/07/2009	14.5	16.40	30	50	
24/07/2009	8.9	16.43	30	50	
30/07/2009	18.4	16.63	30	50	
5/08/2009	13.8	16.79	30	50	
17/08/2009	15.8	16.93	30	50	
23/08/2009	17.3	17.05	30	50	
29/08/2009	9.3	17.07	30	50	
4/09/2009	26.2	17.36	30	50	
10/09/2009	32.5	17.33	30	50	
16/09/2009	17.6	17.33	30	50	
24/09/2009	22.2	17.25	30	50	
30/09/2009	17.4	17.21	30	50	
6/10/2009	18.6	16.99	30	50	
13/10/2009	34.9	17.46	30	50	
19/10/2009	27.4	17.79	30	50	
25/10/2009	16.4	17.87	30	50	
31/10/2009	11.4	17.96	30	50	
6/11/2009	0	17.69	30	50	
12/11/2009	27.2	17.89	30	50	
19/11/2009	86.6	19.13	30	50	
25/11/2009	36.6	19.35	30	50	

Date	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
1/12/2009	0.1	19.14	30	50	
7/12/2009	50.3	19.84	30	50	
13/12/2009	43.8	20.30	30	50	
20/12/2009	26.4	20.27	30	50	
26/12/2009	28	20.45	30	50	
9/01/2010	28.9	20.47	30	50	
9/01/2010	28.9	20.64	30	50	
15/01/2010	18.2	20.82	30	50	
21/01/2010	7.7	20.57	30	50	
27/01/2010	11	20.49	30	50	
2/02/2010	28.1	20.68	30	50	
8/02/2010	16.6	20.64	30	50	
14/02/2010	16.6	20.48	30	50	
20/02/2010	24.4	20.68	30	50	
2/03/2010	13.2	20.79	30	50	
8/03/2010	7.9	20.67	30	50	
14/03/2010	10	20.70	30	50	
20/03/2010	7	20.27	30	50	
26/03/2010	16.4	20.26	30	50	
1/04/2010	16	20.08	30	50	
7/04/2010	21.3	20.22	30	50	
13/04/2010	19.2	20.08	30	50	
19/04/2010	16.6	20.24	30	50	
25/04/2010	16.4	20.39	30	50	
1/05/2010	6.9	20.30	30	50	
8/05/2010	7.1	20.28	30	50	
16/05/2010	6.1	20.20	30	50	
22/05/2010	10.9	20.22	30	50	
28/05/2010	4.5	20.11	30	50	
3/06/2010	4.4	19.04	30	50	
9/06/2010	1.5	18.77	30	50	
15/06/2010	1.5	18.66	30	50	
21/06/2010	0.9	18.40	30	50	
27/06/2010	5.5	18.34	30	50	
3/07/2010	4.3	18.07	30	50	
9/07/2010	4.8	17.90	30	50	
16/07/2010	6	17.72	30	50	
22/07/2010	6.8	17.52	30	50	
28/07/2010	4.8	17.43	30	50	
3/08/2010	11.8	17.16	30	50	
9/08/2010	11.8	16.77	30	50	
15/08/2010	0.1	16.44	30	50	
21/08/2010	18.9	16.38	30	50	
27/08/2010	6.1	16.17	30	50	
2/09/2010	5.5	15.92	30	50	
8/09/2010	10.1	15.45	30	50	
14/09/2010	20	15.31	30	50	
20/09/2010	9.7	15.18	30	50	
6/10/2010	3.5	15.04	30	50	
12/10/2010	30.6	15.61	30	50	
18/10/2010	32.4	15.71	30	50	
27/10/2010	3.8	14.15	30	50	
2/11/2010	7.7	13.60	30	50	
8/11/2010	9.6	13.78	30	50	
14/11/2010	10.6	13.03	30	50	
20/11/2010	7.1	12.34	30	50	
26/11/2010	<0.1	12.07	30	50	
2/12/2010	9.5	11.72	30	50	
8/12/2010	11.7	11.38	30	50	
14/12/2010	<0.1	11.04	30	50	
20/12/2010	44.6	11.56	30	50	
2/01/2011	<0.1	11.64	30	50	
9/01/2011	17.2	11.76	30	50	
15/01/2011	11.8	11.43	30	50	
21/01/2011	10.5	11.31	30	50	
27/01/2011	13.5	11.25	30	50	
2/02/2011	9.3	10.95	30	50	
8/02/2011	10.3	10.89	30	50	
14/02/2011	16.5	11.06	30	50	
20/02/2011	17.7	11.22	30	50	
26/02/2011	10.5	11.29	30	50	

Date	µg/m ³	Annual Average	Annual Average Limit	24hr Limit	Comments
4/03/2011	17.4	11.31	30	50	
10/03/2011	15	11.29	30	50	
16/03/2011	9.6	11.05	30	50	
22/03/2011	10.7	10.88	30	50	
28/03/2011	19.6	10.94	30	50	
3/04/2011	8.8	10.79	30	50	
9/04/2011	12.5	10.90	30	50	
15/04/2011	7.3	10.91	30	50	
21/04/2011	9.8	10.98	30	50	
27/04/2011	20.9	11.18	30	50	
3/05/2011	16.4	11.77	30	50	
9/05/2011	12.6	12.00	30	50	
15/05/2011	19	12.38	30	50	
21/05/2011	13	12.54	30	50	
27/05/2011	7.2	12.60	30	50	
2/06/2011	8.3	12.67	30	50	
8/06/2011	15.5	12.87	30	50	
14/06/2011	5	12.83	30	50	
20/06/2011	3.4	12.80	30	50	
28/06/2011	2.2	12.60	30	50	
2/07/2011	3.3	12.42	30	50	
8/07/2011	11	12.65	30	50	
14/07/2011	11.2	12.49	30	50	
20/07/2011	17.2	12.72	30	50	
26/07/2011	0.8	12.62	30	50	
1/08/2011	1.2	12.44	30	50	
7/08/2011	<0.1	12.28	30	50	
13/08/2011	3.8	12.15	30	50	
19/08/2011	14.7	12.39	30	50	
25/08/2011	11.1	11.97	30	50	
6/09/2011	5.8	11.41	30	50	
12/09/2011	11.4	11.57	30	50	
18/09/2011	12.5	11.67	30	50	
24/09/2011	2.4	11.52	30	50	
30/09/2011	2.2	11.34	30	50	
31/08/2011	3.7	11.27	30	50	
3/10/2011	25.3	11.56	30	50	
9/10/2011	23.7	11.86	30	50	
15/10/2011	18	11.99	30	50	
21/10/2011	17.3	12.10	30	50	
27/10/2011	10.8	11.41	30	50	
2/11/2011	7	11.32	30	50	
8/11/2011	8.4	11.14	30	50	
14/11/2011	7.3	11.05	30	50	
20/11/2011	4.5	10.93	30	50	
26/11/2011	4.7	10.76	30	50	
2/12/2011	9.3	10.76	30	50	
8/12/2011	5.6	10.66	30	50	
16/12/2011	34.8	11.03	30	50	
22/12/2011	8.2	10.84	30	50	
28/12/2011	5.6	10.74	30	50	
3/01/2012	8.05	10.55	30	50	
9/01/2012	8.05	10.41	30	50	
15/01/2012	2.2	10.27	30	50	
21/01/2012	<0.1	10.26	30	50	
27/01/2012	<0.1	10.06	30	50	
2/02/2012		10.09	30	50	No sample as unit flooded and it was too dangerous to turn on
15/03/2012	5.7	9.94	30	50	Unit dismantled for repairs, back in service 15/03/2012
21/03/2012	29.4	10.41	30	50	
27/03/2012	4.4	10.30	30	50	
2/04/2012	7.4	10.01	30	50	
8/04/2012	14.1	10.10	30	50	
14/04/2012	10.1	10.10	30	50	
20/04/2012	6.8	9.90	30	50	
26/04/2012	9.4	9.84	30	50	

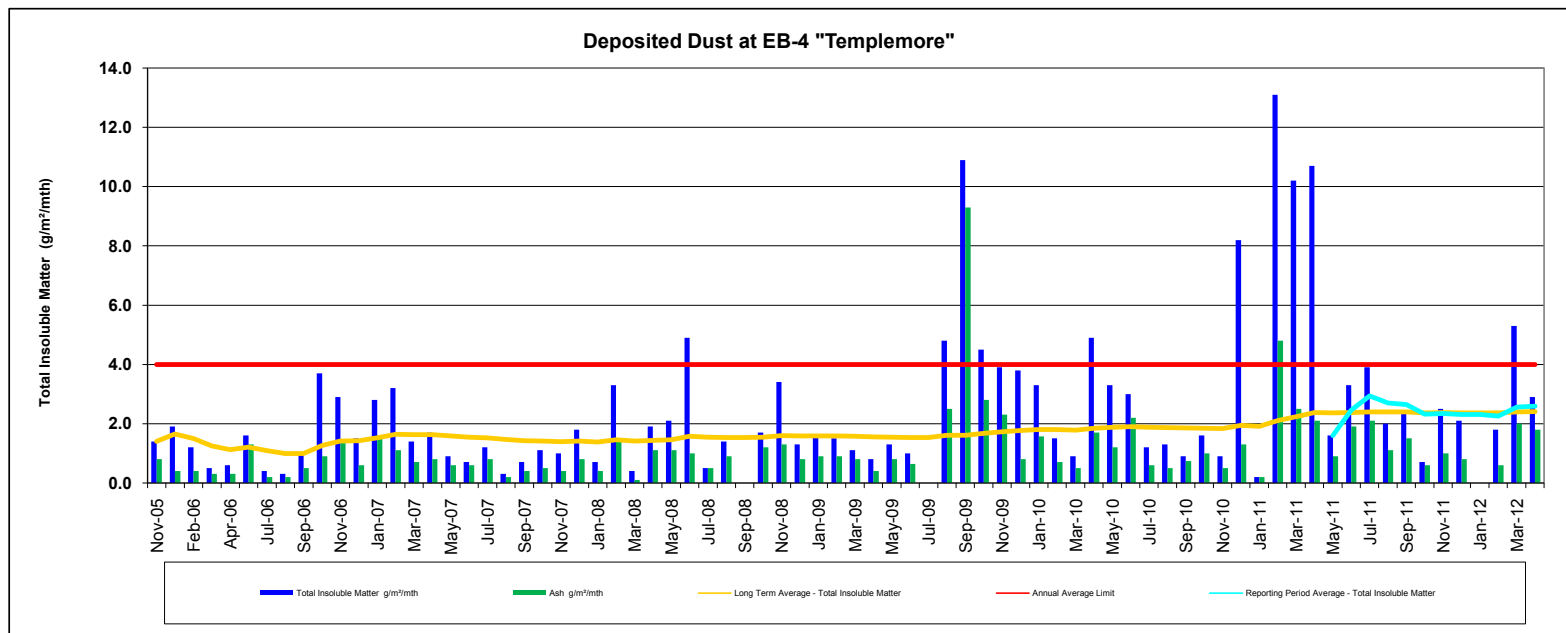


Deposited Dust EB-4 "Templemore"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.03	EB-3	02-Dec-05	Nov-05	Client		2800	1.4		1.4	4.0	0.8	
22570.03	EB-3	02-Feb-06	Jan-06	Client		1825	1.9		1.7	4.0	0.4	
22746.03	EB-3	02-Mar-06	Feb-06	Client		1450	1.2		1.5	4.0	0.4	
23208.03	EB-3	03-Apr-06	Mar-06	Client	1430	175	0.5		1.3	4.0	0.3	
23334.03	EB-3	02-May-06	Apr-06	S Burns EEL		0825	525		1.1	4.0	0.3	
23880.02	EB-4	04-Jul-06	Jun-06	Client	1020	800	1.6		1.2	4.0	1.3	Site Name changed from EB-3 to EB-4
24082.02	EB-4	01-Aug-06	Jul-06	Client	1315	980	0.4		1.1	4.0	0.2	
24416.02	EB-4	03-Sep-06	Aug-06	Client	1620	220	0.3		1.0	4.0	0.2	
24693.02	EB-4	03-Oct-06	Sep-06	Client	1800	200	1.0		1.0	4.0	0.5	
24977.02	EB-4	06-Nov-06	Oct-06	Client	1735	1300	3.7		1.3	4.0	0.9	
25438.02	EB-4	03-Dec-06	Nov-06	Client	0800	295	2.9		1.4	4.0	1.4	
25540.02	EB-4	02-Jan-07	Dec-06	Client		230	1.5		1.4	4.0	0.6	
25843.02	EB-4	02-Feb-07	Jan-07	Client	0855	40	2.8		1.5	4.0	1.6	
26120.02	EB-4	05-Mar-07	Feb-07	Client		1235	1050		1.6	4.0	1.1	
26427.02	EB-4	03-Apr-07	Mar-07	Client	1330	220	1.4		1.6	4.0	0.7	
26631.02	EB-4	02-May-07	Apr-07	Client	1000	360	1.7		1.6	4.0	0.8	
26960.02	EB-4	03-Jun-07	May-07	Client	0730	945	0.9		1.6	4.0	0.6	
27234.02	EB-4	02-Jul-07	Jun-07	Client	0930	1170	0.7		1.5	4.0	0.6	
27531.02	EB-4	04-Aug-07	Jul-07	Client	1200	265	1.2		1.5	4.0	0.8	
27820.02	EB-4	02-Sep-07	Aug-07	Client	0950	930	0.3		1.5	4.0	0.2	
28119.02	EB-4	01-Oct-07	Sep-07	Client	1000	265	0.7		1.4	4.0	0.4	
28398.02	EB-4	03-Nov-07	Oct-07	Client	0735	335	1.1		1.4	4.0	0.5	
28663.02	EB-4	02-Dec-07	Nov-07	Client	1645	410	1.0		1.4	4.0	0.4	
28924.02	EB-4	03-Jan-08	Dec-07	Client	1105	2025	1.8		1.4	4.0	0.8	
29225.02	EB-4	04-Feb-08	Jan-08	Client	1045	>2060	0.7		1.4	4.0	0.4	
29526.02	EB-4	04-Mar-08	Feb-08	Client	1730	1105	3.3		1.5	4.0	1.5	
29774.02	EB-4	05-Apr-08	Mar-08	Client	1000	310	0.4		1.4	4.0	0.1	
30056.02	EB-4	5-May-08	Apr-08	Client	1430	260	1.9		1.4	4.0	1.1	
30387.02	EB-4	3-Jun-08	May-08	Client	1410	665	2.1		1.5	4.0	1.1	
30661.02	EB-4	05-Jul-08	Jun-08	Client	1020	400	4.9		1.6	4.0	1.0	
30903.01	EB-4	05-Aug-08	Jul-08	Client	1550	500	0.5		1.5	4.0	0.5	
31211.02	EB-4	09-Sep-08	Aug-08	Client	1405	905	1.4		1.5	4.0	0.9	
31528.01	EB-4	02-Oct-08	Sep-08	Client	NS	NS	NS		1.5	4.0	NS	Too wet to sample
31776.01	EB-4	02-Nov-08	Oct-08	Client	1330	1525	1.7		1.5	4.0	1.2	
32024.01	EB-4	6-Dec-08	Nov-08	Client	1045	1535	3.4		1.6	4.0	1.3	
32519.01	EB-4	3-Jan-09	Dec-08	Client	1750	1205	1.3		1.6	4.0	0.8	
32247.01	EB-4	4-Feb-09	Jan-09	Client	0925	40	1.6		1.6	4.0	0.9	
32864.01	EB-4	3-Mar-09	Feb-09	Client	1640	1030	1.5		1.6	4.0	0.9	
2600 1008 - 0	EB-4	29-Mar-09	Mar-09	Client		50	1.1		1.6	4.0	0.8	
2600 1018 - 00	EB-4	04-May-09	Apr-09	Client		600	0.8		1.5	4.0	0.4	Bird Droppings, Grazing
2600 1033 - 01	EB-4	31-May-09	May-09	Client		600	1.3		1.5	4.0	0.8	
2600 1039 - 01	EB-4	30-Jun-09	Jun-09	Client		600	1.0		1.5	4.0	0.6	
2600 1051 - 01	EB-4	04-Aug-09	Jul-09	Client			NS		1.5	4.0		Missing from batch. Listed on field sheet as "bottle not supplied"
2600 1062 - 00	EB-4	03-Sep-09	Aug-09	Client	1630	20	4.8		1.6	4.0	2.5	
2600 1096 - 01	EB-4	04-Oct-09	Sep-09	Client	1235	750	10.9		1.6	4.0	9.3	
2600 1126 - 00	EB-4	03-Nov-09	Oct-09	Client	0940	750	4.5		1.7	4.0	2.8	Insects, Grazing
2600 1204 - 00	EB-4	01-Dec-09	Nov-09	Client	1325	75	3.9		1.7	4.0	2.3	
2600 1222 - 00	EB-4	05-Jan-10	Dec-09	Client	1045	2500	3.8		1.8	4.0	0.8	
2600 1234	EB-4	03-Feb-10	Jan-10	Client	1445	250	3.3		1.8	4.0	1.6	
2600 1247	EB-4	04-Mar-10	Feb-10	Client	1245	2500	1.5		1.8	4.0	0.7	
2600 1260	EB-4	05-Apr-10	Mar-10	Client	1035	2500	0.9		1.8	4.0	0.5	
2600 1268	EB-4	03-May-10	Apr-10	Client	0945	300	4.9		1.8	4.0	1.7	
2600 1277	EB-4	02-Jun-10	May-10	TCPL	1355		3.3		1.9	4.0	1.2	Grazing and Mining Activity
2600 1288-805-1	EB-4	04-Jul-10	Jun-10	TCPL	1005		3		1.9	4.0	2.2	Grazing and Mining Activity
2600 1298 - 887	EB-4	03-Aug-10	Jul-10	TCPL	1110	1300	1.2		1.9	4.0	0.6	Grazing & Mining Activity
26001309-914	EB-4	04-Sep-10	Aug-10	TCPL	1030	1000	1.3		1.9	4.0	0.5	Plant Material,Bird Droppings,Mining Activity

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
2600431904.00	EB-4	05-Oct-10	Sep-10	TCPL	1650	-	0.9		1.9	4.0	0.7	Mining Activity
6800-4368-10	EB-4	21-Oct-10	Oct-10	TCPL	1655	600	1.6		1.8	4.0	1.0	
1002977-001	EB-4	02-Dec-10	Nov-10	TCPL			0.9		1.8	4.0	0.5	
1100063-001	EB-4	04-Jan-11	Dec-10	TCPL	1110		8.2		1.9	4.0	1.3	Funnel blocked by bird droppings
1100335-001	EB-4	04-Feb-11	Jan-11	TCPL	1415		0.2		1.9	4.0	0.2	
1100549-001	EB-4	03-Mar-11	Feb-11	TCPL	1000		13.1		2.1	4.0	4.8	Cow manure in funnel
1100793-001	EB-4	03-Apr-11	Mar-11	TCPL	0940		10.2		2.2	4.0	2.5	Fully blocked by bird droppings
EN1101030.001	EB-4	02-May-11	Apr-11	TCPL		1050	10.7		2.4	4.0	2.1	
EN1101344-001	EB-4	05-Jun-11	May-11	Merton Past. Co.	1230		1.6	1.6	2.4	4.0	0.9	
EN1101700-001	EB-4	04-Jul-11	Jun-11	Merton Past. Co.	0850		3.3	2.5	2.4	4.0	1.9	Grazing activity, mining activity
EN1102064-001	EB-4	03-Aug-11	Jul-11	Merton Past. Co.	950		3.9	2.9	2.4	4.0	2.1	Mining Activity
EN1102639-001	EB-4	05-Sep-11	Aug-11	Merton Past. Co.	1130		2.0	2.7	2.4	4.0	1.1	Bird droppings, Grazing activity, Mining Activity-Funnel part blocked
EN1103081-001	EB-4	03-Oct-11	Sep-11	Merton Past. Co.	1510		2.4	2.6	2.4	4.0	1.5	
EN1103410-001	EB-4	05-Nov-11	Oct-11	Merton Past. Co.	1050	1050	0.7	2.3	2.4	4.0	0.6	
EN1104053-001	EB-4	05-Dec-11	Nov-11	Merton Past. Co.	0945		2.5	2.3	2.4	4.0	1.0	
EN1200212-002	EB-4	06-Jan-11	Dec-11	Merton Past. Co.	1730		2.1	2.3	2.4	4.0	0.8	Funnel fully blocked
EN1200212-002	EB-4	06-Jan-11	Jan-12	Merton Past. Co.				2.3	2.4	4.0		Unable to sample-road closed due to flooding
EN1201033-001	EB-4	04-Mar-12	Feb-12	Merton Past. Co.	1230		1.8	2.3	2.4	4.0	0.6	
EN1201376-001	EB-4	02-Apr-12	Mar-12	Merton Past. Co.	1500		5.3	2.6	2.4	4.0	2.0	
EN1201718-001	EB-4	04-May-12	Apr-12	Merton Past. Co.	1020		2.9	2.6	2.4	4.0	1.8	

* September 2009 result excluded from long term average (regional dust storms).

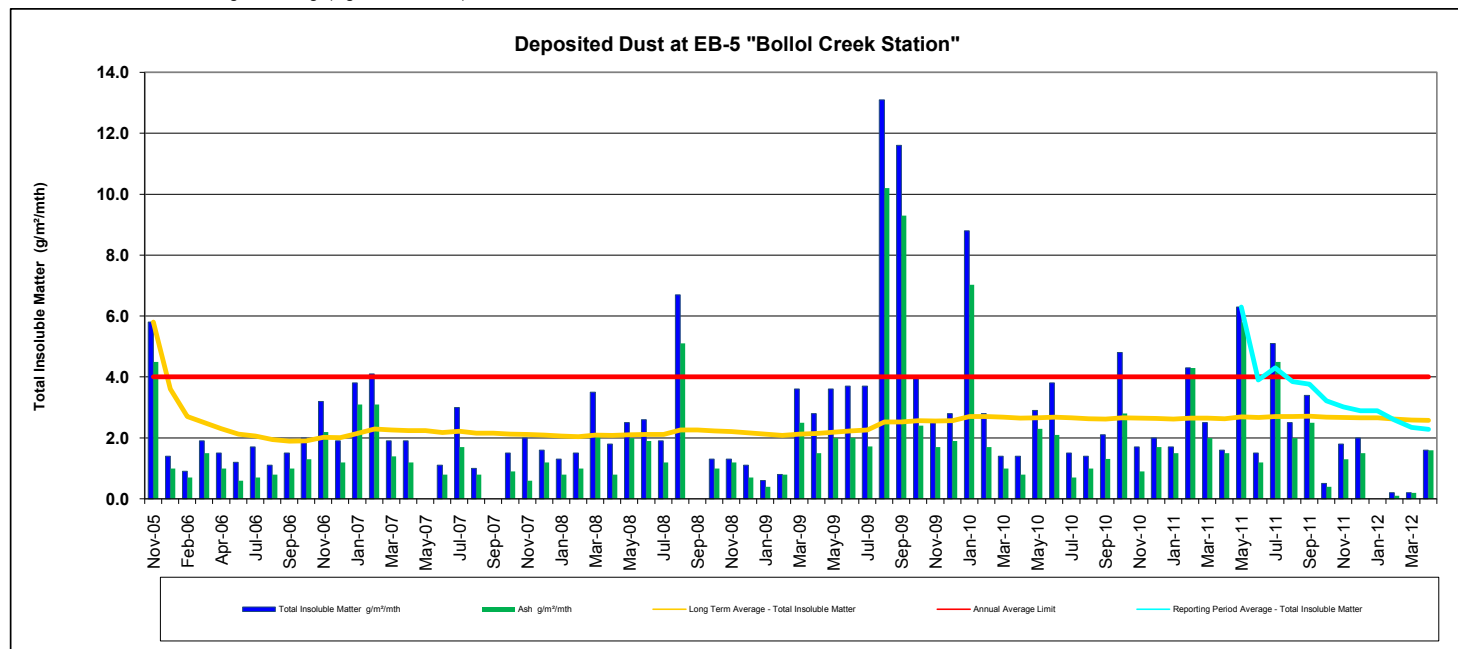


Deposited Dust EB-5 "Bollol Creek Station"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.04	EB-5	02-Dec-05	Nov-05	Client		2775	5.8		5.8	4.0	4.5	
22570.04	EB-5	02-Feb-06	Jan-06	Client		2210	1.4		3.6	4.0	1.0	
22746.04	EB-5	02-Mar-06	Feb-06	Client		1500	0.9		2.7	4.0	0.7	
23208.04	EB-5	03-Apr-06	Mar-06	Client	1437	250	1.9		2.5	4.0	1.5	
23334.04	EB-5	02-May-06	Apr-06	S Burns EEL	0835	700	1.5		2.3	4.0	1.0	
23880.03	EB-5	04-Jul-06	Jun-06	Client	1040	700	1.2		2.1	4.0	0.6	Site Name changed from EB-4 to EB-5
24082.03	EB-5	01-Aug-06	Jul-06	Client	1320	970	1.7		2.1	4.0	0.7	
24416.03	EB-5	03-Sep-06	Aug-06	Client	1645	430	1.1		1.9	4.0	0.8	
24693.03	EB-5	03-Oct-06	Sep-06	Client	1830	200	1.5		1.9	4.0	1.0	
24977.03	EB-5	06-Nov-06	Oct-06	Client	1745	1320	2.0		1.9	4.0	1.3	
25438.03	EB-5	03-Dec-06	Nov-06	Client	0810	380	3.2		2.0	4.0	2.2	
25540.03	EB-5	02-Jan-07	Dec-06	Client		150	1.9		2.0	4.0	1.2	
25843.03	EB-5	02-Feb-07	Jan-07	Client	0900	40	3.8		2.1	4.0	3.1	
26120.03	EB-5	05-Mar-07	Feb-07	Client	1225	655	4.1		2.3	4.0	3.1	
26427.03	EB-5	03-Apr-07	Mar-07	Client	1340	165	1.9		2.3	4.0	1.4	
26631.03	EB-5	02-May-07	Apr-07	Client	1010	270	1.9		2.2	4.0	1.2	
26960.03	EB-5	03-Jun-07	May-07	Client					2.2	4.0		No Access
27234.03	EB-5	02-Jul-07	Jun-07	Client	0945	1900	1.1		2.2	4.0	0.8	
27531.03	EB-5	04-Aug-07	Jul-07	Client	1215	150	3.0		2.2	4.0	1.7	
27820.03	EB-5	02-Sep-07	Aug-07	Client	0955	1045	1.0		2.2	4.0	0.8	
28119.03	EB-5	01-Oct-07	Sep-07	Client					2.2	4.0		No Entry due to Equine Influenza
28398.03	EB-5	03-Nov-07	Oct-07	Client	0745	345	1.5		2.1	4.0	0.9	
28663.03	EB-5	02-Dec-07	Nov-07	Client	1630	720	2.0		2.1	4.0	0.6	
28924.03	EB-5	03-Jan-08	Dec-07	Client	1045	>2500	1.6		2.1	4.0	1.2	
29225.03	EB-5	04-Feb-08	Jan-08	Client	1035	>2060	1.3		2.1	4.0	0.8	
29526.03	EB-5	04-Mar-08	Feb-08	Client	1715	1500	1.5		2.0	4.0	1.0	
29774.03	EB-5	05-Apr-08	Mar-08	Client	0950	265	3.5		2.1	4.0	2.1	
30056.03	EB-5	5-May-08	Apr-08	Client	1450	50	1.8		2.1	4.0	0.8	
30387.03	EB-5	3-Jun-08	May-08	Client	1425	695	2.5		2.1	4.0	2.0	
30661.03	EB-5	05-Jul-08	Jun-08	Client	1010	495	2.6		2.1	4.0	1.9	
30903.01	EB-5	05-Aug-08	Jul-08	Client	1605	525	1.9		2.1	4.0	1.2	
31211.03	EB-5	09-Sep-08	Aug-08	Client	1355	850	6.7		2.3	4.0	5.1	
31528.02	EB-5	02-Oct-08	Sep-08	Client	NS	NS	NS		2.3	4.0	NS	Too wet to sample
31776.02	EB-5	02-Nov-08	Oct-08	Client	1350	1460	1.3		2.2	4.0	1.0	
32024.02	EB-5	6-Dec-08	Nov-08	Client	1100	1570	1.3		2.2	4.0	1.2	
32519.02	EB-5	3-Jan-09	Dec-08	Client	1810	1200	1.1		2.2	4.0	0.7	
32247.02	EB-5	4-Feb-09	Jan-09	Client	0915	<10	0.6		2.1	4.0	0.4	
32864.02	EB-5	3-Mar-09	Feb-09	Client	1650	1550	0.8		2.1	4.0	0.8	
2600 1008 - 0	EB-5	29-Mar-09	Mar-09	Client		50	3.6		2.1	4.0	2.5	
2601 1018 - 00	EB-5	04-May-09	Apr-09	Client		500	2.8		2.1	4.0	1.5	Bird Droppings
2600 1033 - 01	EB-5	31-May-09	May-09	Client		550	3.6		2.2	4.0	2.0	
2601 1039 - 01	EB-5	30-Jun-09	Jun-09	Client		550	3.7		2.2	4.0	2.0	
2601 1051 - 01	EB-5	04-Aug-09	Jul-09	Client	1645	200	3.7		2.3	4.0	1.7	
2600 1062 - 00	EB-5	03-Sep-09	Aug-09	Client	1640	20	13.1		2.5	4.0	10.2	Bird Droppings
2600 1096 - 01	EB-5	04-Oct-09	Sep-09	Client	1245	840	11.6		2.5	4.0	9.3	
2600 1126 - 00	EB-5	03-Nov-09	Oct-09	Client	0950	900	4		2.6	4.0	2.4	
2600 1204 - 00	EB-5	01-Dec-09	Nov-09	Client	1335	50	2.5		2.6	4.0	1.7	
2600 1222 - 00	EB-5	05-Jan-10	Dec-09	Client	1055	2500	2.8		2.6	4.0	1.9	
2600 1234	EB-5	03-Feb-10	Jan-10	Client	1455	400	8.8		2.7	4.0	7.0	
2600 1247	EB-5	04-Mar-10	Feb-10	Client	1255	2500	2.8		2.7	4.0	1.7	
2600 1260	EB-5	05-Apr-10	Mar-10	Client	1045	2500	1.4		2.7	4.0	1.0	
2600 1268	EB-5	03-May-10	Apr-10	Client	0955	350	1.4		2.6	4.0	0.8	
2600 1277	EB-5	02-Jun-10	May-10	TCPL	1345		2.9		2.7	4.0	2.3	Farming and Mining Activity
2600 1288-805-1	EB-5	04-Jul-10	Jun-10	TCPL	1015		3.8		2.7	4.0	2.1	Farming, Grazing and Mining Activity
2601 1298 - 887	EB-5	03-Aug-10	Jul-10	TCPL	1120	1800	1.5		2.7	4.0	0.7	Mining Activity
26001309-914	EB-5	04-Sep-10	Aug-10	TCPL	1040	1450	1.4		2.6	4.0	1.0	Plant Material,Bird Droppings, Farming activity

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
2600431904	EB-5	05-Oct-10	Sep-10	TCPL	1640	-	2.1		2.6	4.0	1.3	Grazing Activity, Mining Activity
6800-4368-10	EB-5	21-Oct-10	Oct-10	TCPL	1700	500	4.8		2.7	4.0	2.8	
1002977-002	EB-5	02-Dec-10	Nov-10	TCPL			1.7		2.6	4.0	0.9	Fence with bottle attached knocked over by cattle
1100063-002	EB-5	04-Jan-11	Dec-10	TCPL	1120		2		2.6	4.0	1.7	
1100335-002	EB-5	04-Feb-11	Jan-11	TCPL	1425		1.7		2.6	4.0	1.5	
1100549-002	EB-5	03-Mar-11	Feb-11	TCPL	1015		4.3		2.6	4.0	4.3	
1100793-002	EB-5	03-Apr-11	Mar-11	TCPL	0950		2.5		2.6	4.0	2.0	Top of bottle broken
EN1101030-002	EB-5	02-May-11	Apr-11	TCPL	1055		1.6		2.6	4.0	1.5	Spider webs
EN1101344-002	EB-5	05-Jun-11	May-11	TCPL	1240		6.3	6.3	2.7	4.0	5.8	Funnel Smashed
EN1101700-002	EB-5	04-Jul-11	Jun-11	TCPL	0840		1.5	3.9	2.7	4.0	1.2	Grazing activity, mining activity
EN1102064-002	EB-5	03-Aug-11	Jul-11	TCPL	1000		5.1	4.3	2.7	4.0	4.5	Mining Activity-Funnel broken-new funnel
EN1102639-002	EB-5	05-Sep-11	Aug-11	TCPL	1140		2.5	3.9	2.7	4.0	2.0	Grazing activity, mining activity
EN1103081-002	EB-5	03-Oct-11	Sep-11	TCPL	1520		3.4	3.8	2.7	4.0	2.5	Broken funnel
EN1103410-002	EB-5	05-Nov-11	Oct-11	TCPL	1100	1100	0.5	3.2	2.7	4.0	0.4	
EN1104053-002	EB-5	05-Dec-11	Nov-11	TCPL	0955		1.8	3.0	2.7	4.0	1.3	Funnel broken
EN1200212-003	EB-5	06-Jan-11	Dec-11	TCPL	1740		2	2.9	2.7	4.0	1.5	
EN1200212-003	EB-5	06-Jan-11	Jan-12	TCPL				2.9	2.7	4.0		Unable to sample-road closed due to flooding
EN1201033-002	EB-5	04-Mar-12	Feb-12	TCPL	1240		0.2	2.6	2.6	4.0	0.1	
EN1201376-002	EB-5	02-Apr-12	Mar-12	TCPL	1500		0.2	2.4	2.6	4.0	0.2	Site damaged by cattle
EN1201718-002	EB-5	04-May-12	Apr-12	TCPL	1030		1.6	2.3	2.6	4.0	1.6	Broken funnel again

* September 2009 result excluded from long term average (regional dust storms).

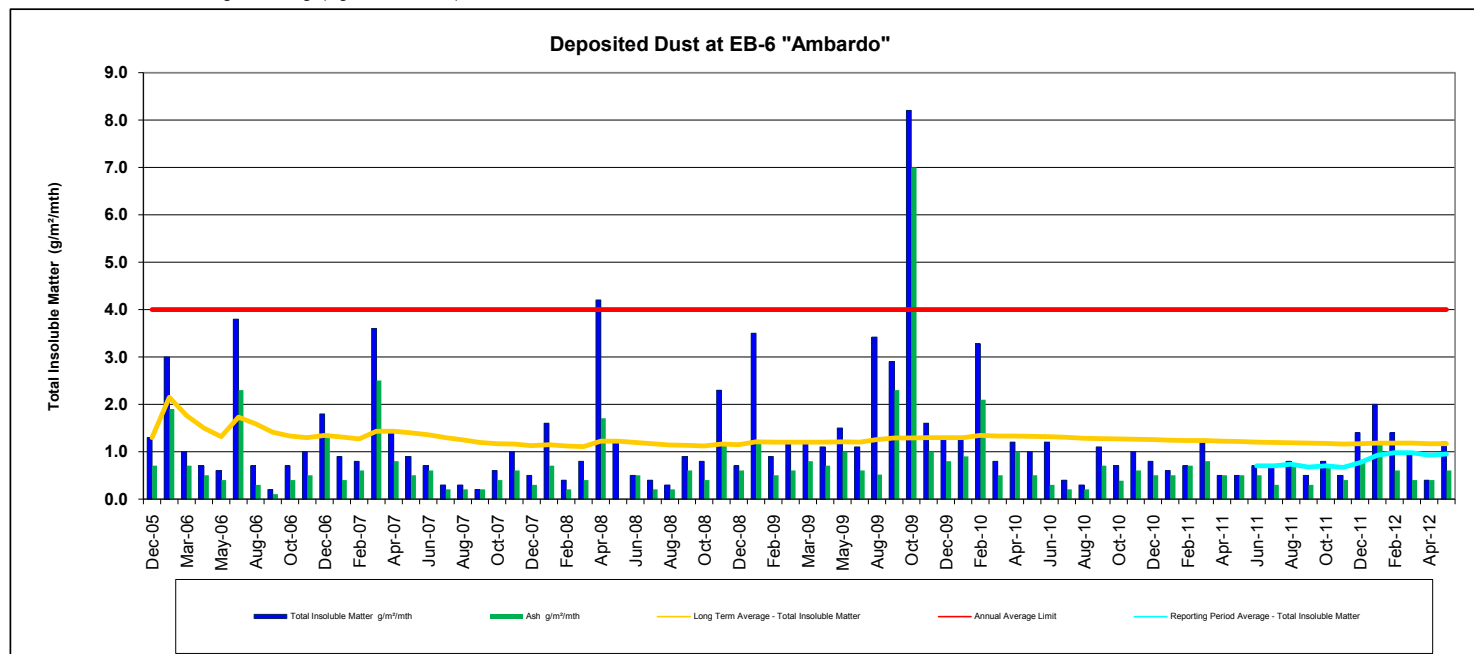


Deposited Dust EB-6 "Ambardo"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.06	EB-6	02-Dec-05	Nov-05	Client		2625	1.3		1.3	4.0	0.7	
22570.06	EB-6	02-Feb-06	Jan-06	Client		1835	3.0		2.2	4.0	1.9	
22746.06	EB-6	02-Mar-06	Feb-06	Client		900	1.0		1.8	4.0	0.7	
23208.06	EB-6	03-Apr-06	Mar-06	Client	1449	100	0.7		1.5	4.0	0.5	
23334.06	EB-6	02-May-06	Apr-06	S Burns EEL	0910	800	0.6		1.3	4.0	0.4	
23880.04	EB-6	04-Jul-06	Jun-06	Client	1115	850	3.8		1.7	4.0	2.3	
24082.04	EB-6	01-Aug-06	Jul-06	Client	1348	1050	0.7		1.6	4.0	0.3	
24416.04	EB-6	03-Sep-06	Aug-06	Client	1700	240	0.2		1.4	4.0	0.1	
24693.04	EB-6	03-Oct-06	Sep-06	Client	1600	350	0.7		1.3	4.0	0.4	
24977.04	EB-6	06-Nov-06	Oct-06	Client	1815	1410	1.0		1.3	4.0	0.5	
25438.04	EB-6	03-Dec-06	Nov-06	Client	0850	330	1.8		1.3	4.0	1.3	
25540.04	EB-6	02-Jan-07	Dec-06	Client		240	0.9		1.3	4.0	0.4	
25853.04	EB-6	02-Feb-07	Jan-07	Client	0930	170	0.8		1.3	4.0	0.6	
26120.04	EB-6	05-Mar-07	Feb-07	Client		1320	3.6		1.4	4.0	2.5	
26427.04	EB-6	03-Apr-07	Mar-07	Client	1450	290	1.4		1.4	4.0	0.8	
26631.04	EB-6	02-May-07	Apr-07	Client	1040	490	0.9		1.4	4.0	0.5	
26960.04	EB-6	03-Jun-07	May-07	Client	0820	880	0.7		1.4	4.0	0.6	
27234.04	EB-6	02-Jul-07	Jun-07	Client	1020	1235	0.3		1.3	4.0	0.2	
27531.04	EB-6	04-Aug-07	Jul-07	Client	1100	230	0.3		1.2	4.0	0.2	
27820.04	EB-6	02-Sep-07	Aug-07	Client	0900	1165	0.2		1.2	4.0	0.2	
28119.04	EB-6	01-Oct-07	Sep-07	Client	0900	125	0.6		1.2	4.0	0.4	
28398.04	EB-6	03-Nov-07	Oct-07	Client	0810	565	1.0		1.2	4.0	0.6	
28663.04	EB-6	02-Dec-07	Nov-07	Client	1300	715	0.5		1.1	4.0	0.3	
28924.04	EB-6	03-Jan-08	Dec-07	Client	1000	2050	1.6		1.2	4.0	0.7	
29225.04	EB-6	04-Feb-08	Jan-08	Client	1000	>2065	0.4		1.1	4.0	0.2	
29526.04	EB-6	04-Mar-08	Feb-08	Client	1645	1545	0.8		1.1	4.0	0.4	
29774.04	EB-6	05-Apr-08	Mar-08	Client	0900	120	4.2		1.2	4.0	1.7	
30056.04	EB-6	5-May-08	Apr-08	Client	1420	300	1.2		1.2	4.0		
30387.04	EB-6	3-Jun-08	May-08	Client	1320	760	0.5		1.2	4.0	0.5	
30661.04	EB-6	05-Jul-08	Jun-08	Client	1040	705	0.4		1.2	4.0	0.2	
30903.01	EB-6	05-Aug-08	Jul-08	Client	1500	475	0.3		1.1	4.0	0.2	
31211.04	EB-6	09-Sep-08	Aug-08	Client	1330	945	0.9		1.1	4.0	0.6	
31528.03	EB-6	05-Oct-08	Sep-08	Client	0830	1645	0.8		1.1	4.0	0.4	
31776.03	EB-6	02-Nov-08	Oct-08	Client	1240	310	2.3		1.2	4.0	1.2	
32024.03	EB-6	6-Dec-08	Nov-08	Client	1010	1655	0.7		1.1	4.0	0.6	
32519.03	EB-6	3-Jan-09	Dec-08	Client	1710	1020	3.5		1.2	4.0	1.2	
32247.03	EB-6	4-Feb-09	Jan-09	Client	1000	325	0.9		1.2	4.0	0.5	
32864.03	EB-6	3-Mar-09	Feb-09	Client	1600	1335	1.2		1.2	4.0	0.6	
2600 1008 - 0	EB-6	29-Mar-09	Mar-09	Client		50	1.2		1.2	4.0	0.8	
2610 1018 - 00	EB-6	04-May-09	Apr-09	Client		500	1.1		1.2	4.0	0.7	
2600 1033 - 01	EB-6	31-May-09	May-09	Client		600	1.5		1.2	4.0	1.0	
2602 1039 - 01	EB-6	30-Jun-09	Jun-09	Client		600	1.1		1.2	4.0	0.6	
2602 1051 - 01	EB-6	04-Aug-09	Jul-09	Client	1600	350	3.4		1.3	4.0	0.5	
2600 1062 - 00	EB-6	03-Sep-09	Aug-09	Client	1600	50	2.9		1.3	4.0	2.3	
2600 1096 - 01	EB-6	04-Oct-09	Sep-09	Client	1200	850	8.2		1.3	4.0	7.0	
2600 1126 - 00	EB-6	03-Nov-09	Oct-09	Client	0900	950	1.6		1.3	4.0	1.0	
2600 1204 - 00	EB-6	01-Dec-09	Nov-09	Client	1250	50	1.3		1.3	4.0	0.8	
2600 1222 - 00	EB-6	05-Jan-10	Dec-09	Client	1015	2500	1.3		1.3	4.0	0.9	
2600 1234	EB-6	03-Feb-10	Jan-10	Client	1400	250	3.3		1.3	4.0	2.1	
2600 1247	EB-6	04-Mar-10	Feb-10	Client	1210	2500	0.8		1.3	4.0	0.5	
2600 1260	EB-6	05-Apr-10	Mar-10	Client	1010	2500	1.2		1.3	4.0	1.0	Insects
2600 1268	EB-6	03-May-10	Apr-10	Client	0900	2500	1.0		1.3	4.0	0.5	Vegetation
2600 1277	EB-6	02-Jun-10	May-10	TCPL	1310		1.2		1.3	4.0	0.3	Grazing and Mining Activity
2600 1288-805-1	EB-6	04-Jul-10	Jun-10	TCPL	0930		0.4		1.3	4.0	0.2	Grazing and Mining Activity
2602 1298 - 887	EB-6	03-Aug-10	Jul-10	TCPL	1030	1500	0.3		1.3	4.0	0.2	Grazing & Mining Activity
26001309-914	EB-6	04-Sep-10	Aug-10	TCPL	1100	1450	1.1		1.3	4.0	0.7	Plant Material, Grazing Activity, Mining Activity

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
2600431904.00	EB-6	05-Oct-10	Sep-10	TCPL	1640	-	0.7		1.3	4.0	0.4	Grazing Activity, Mining Activity
6800-4368-10	EB-6	21-Oct-10	Oct-10	TCPL	1625	450	1.0		1.3	4.0	0.6	
1002977-003	EB-6	02-Dec-10	Nov-10	TCPL			0.8		1.3	4.0	0.5	
1100063-003	EB-6	04-Jan-11	Dec-10	TCPL	1035		0.6		1.2	4.0	0.5	Spider webs, tree nuts and leaves present
1100335-003	EB-6	04-Feb-11	Jan-11	TCPL	1510		0.7		1.2	4.0	0.7	
1100549-003	EB-6	03-Mar-11	Feb-11	TCPL	0900		1.2		1.2	4.0	0.8	
1100793-003	EB-6	03-Apr-11	Mar-11	TCPL	0915		0.5		1.2	4.0	0.5	Funnel blocked with spider web
EN1101030.003	EB-6	02-May-11	Apr-11	TCPL	1010		0.5		1.2	4.0	0.5	
EN1101344-003	EB-6	05-Jun-11	May-11	TCPL	1205		0.7	0.7	1.2	4.0	0.5	
EN1101700-003	EB-6	04-Jul-11	Jun-11	TCPL	0935		0.7	0.7	1.2	4.0	0.3	Grazing activity, mining activity
EN1102064-003	EB-6	03-Aug-11	Jul-11	TCPL	915		0.8	0.7	1.2	4.0	0.7	Farming activity, Mining Activity-next to workshop
EN1102639-003	EB-6	05-Sep-11	Aug-11	TCPL	1100		0.5	0.7	1.2	4.0	0.3	Grazing activity, mining activity
EN1103081-003	EB-6	03-Oct-11	Sep-11	TCPL	1435		0.8	0.7	1.2	4.0	0.7	
EN1103410-003	EB-6	05-Nov-11	Oct-11	TCPL	1015	1015	0.5	0.7	1.2	4.0	0.4	
EN1104053-003	EB-6	05-Dec-11	Nov-11	TCPL	0915		1.4	0.8	1.2	4.0	0.8	Full
EN1200212-004	EB-6	06-Jan-11	Dec-11	TCPL	1700		2.0	0.9	1.2	4.0	1.2	
EN1200627-001	EB-6	08-Feb-12	Jan-12	TCPL	1555		1.4	1.0	1.2	4.0	0.6	Grazing activity, mining activity-near workshop
EN1201033-003	EB-6	04-Mar-12	Feb-12	TCPL	115		1	1.0	1.2	4.0	0.4	
EN1201376-003	EB-6	02-Apr-12	Mar-12	TCPL	1500		0.4	0.9	1.2	4.0	0.4	
EN1201718-003	EB-6	04-May-12	Apr-12	TCPL	0945		1.2	1.0	1.2	4.0	0.6	Spider web

* September 2009 result excluded from long term average (regional dust storms).

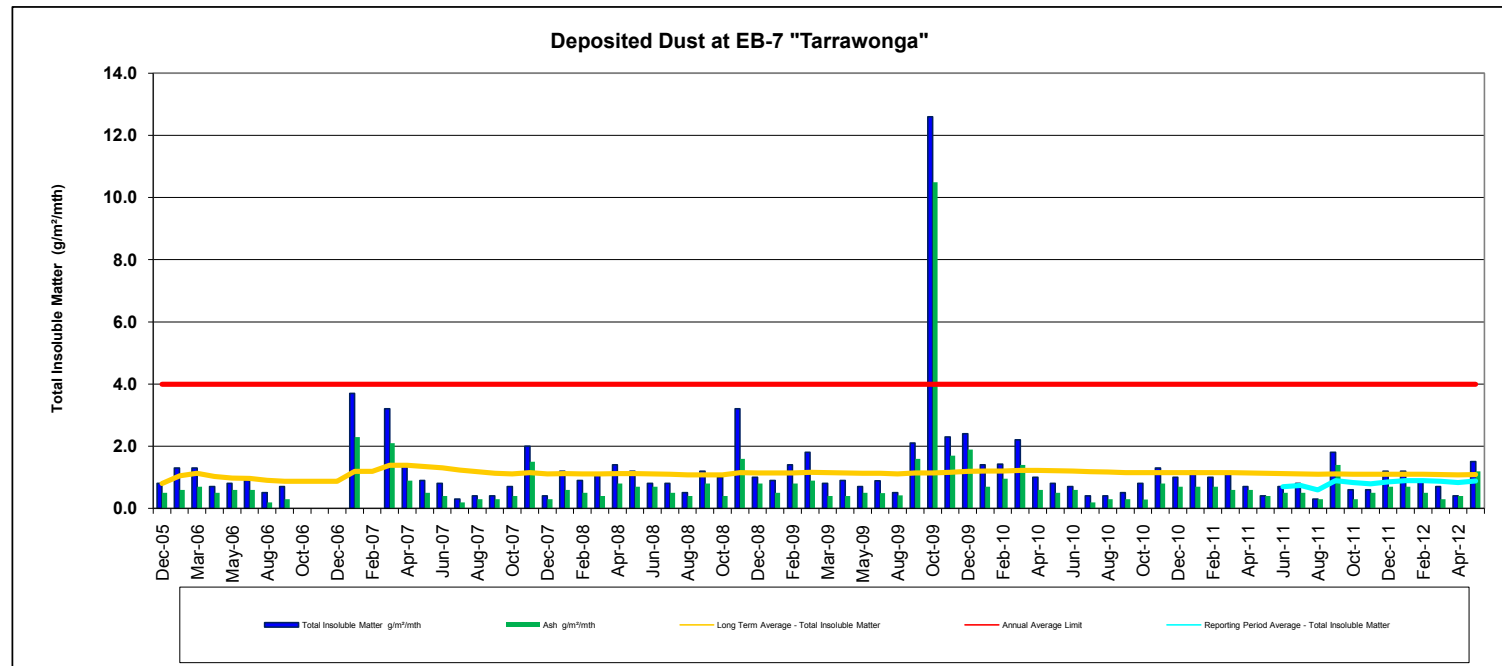


Deposited Dust EB-7 "Tarrawonga"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.07	EB-7	02-Dec-05	Nov-05	Client		2750	0.8		0.8	4.0	0.5	
22570.07	EB-7	02-Feb-06	Jan-06	Client		1800	1.3		1.1	4.0	0.6	
22746.07	EB-7	02-Mar-06	Feb-06	Client		925	1.3		1.1	4.0	0.7	
23208.07	EB-7	03-Apr-06	Mar-06	Client	1503	100	0.7		1.0	4.0	0.5	
23334.07	EB-7	02-May-06	Apr-06	S Burns EEL	0930	250	0.8		1.0	4.0	0.6	
23880.05	EB-7	04-Jul-06	Jun-06	Client	1130	925	0.9		1.0	4.0	0.6	
24082.05	EB-7	01-Aug-06	Jul-06	Client	1400	980	0.5		0.9	4.0	0.2	
24416.05	EB-7	03-Sep-06	Aug-06	Client	1715	280	0.7		0.9	4.0	0.3	
24693.05	EB-7	03-Oct-06	Sep-06	Client					0.9	4.0		No sample
24977.05	EB-7	06-Nov-06	Oct-06	Client					0.9	4.0		No sample
25438.05	EB-7	03-Dec-06	Nov-06	Client					0.9	4.0		No sample
25540.05	EB-7	02-Jan-07	Dec-06	Client		900	3.7		1.2	4.0	2.3	
25843.05	EB-7	02-Feb-07	Jan-07	Client					1.2	4.0		No sample
26120.05	EB-7	05-Mar-07	Feb-07	Client	1255	1230	3.2		1.4	4.0	2.1	
26427.05	EB-7	03-Apr-07	Mar-07	Client	1440	50	1.4		1.4	4.0	0.9	
26631.05	EB-7	02-May-07	Apr-07	Client	0930	330	0.9		1.4	4.0	0.5	
26960.05	EB-7	03-Jun-07	May-07	Client	0810	845	0.8		1.3	4.0	0.4	
27234.05	EB-7	02-Jul-07	Jun-07	Client	1000	1030	0.3		1.2	4.0	0.2	
27531.05	EB-7	04-Aug-07	Jul-07	Client	1115	225	0.4		1.2	4.0	0.3	
27820.05	EB-7	02-Sep-07	Aug-07	Client	0915	1035	0.4		1.1	4.0	0.3	
28119.05	EB-7	01-Oct-07	Sep-07	Client	0920	100	0.7		1.1	4.0	0.4	
28398.05	EB-7	03-Nov-07	Oct-07	Client	0755	<10	2.0		1.2	4.0	1.5	Funnel and Bottle Broken
28663.05	EB-7	02-Dec-07	Nov-07	Client	1315	800	0.4		1.1	4.0	0.3	
28924.05	EB-7	03-Jan-08	Dec-07	Client	1130	1360	1.2		1.1	4.0	0.6	
29225.05	EB-7	04-Feb-08	Jan-08	Client	1120	>2500	0.9		1.1	4.0	0.5	
29526.05	EB-7	04-Mar-08	Feb-08	Client	1625	1335	1.1		1.1	4.0	0.4	
29774.05	EB-7	05-Apr-08	Mar-08	Client	1040	250	1.4		1.1	4.0	0.8	
30056.05	EB-7	5-May-08	Apr-08	Client	1400	130	1.2		1.1	4.0	0.7	
30387.05	EB-7	3-Jun-08	May-08	Client	1340	665	0.8		1.1	4.0	0.7	
30661.05	EB-7	05-Jul-08	Jun-08	Client	1055	640	0.8		1.1	4.0	0.5	
30903.01	EB-7	05-Aug-08	Jul-08	Client	1520	415	0.5		1.1	4.0	0.4	
31211.05	EB-7	09-Sep-08	Aug-08	Client	1435	1025	1.2		1.1	4.0	0.8	
31528.04	EB-7	05-Oct-08	Sep-08	Client	0845	1730	1.0		1.1	4.0	0.4	
31776.04	EB-7	02-Nov-08	Oct-08	Client	1300	160	3.2		1.2	4.0	1.6	
32024.04	EB-7	6-Dec-08	Nov-08	Client	1025	1770	1.0		1.1	4.0	0.8	
32519.04	EB-7	3-Jan-09	Dec-08	Client	1730	1250	0.9		1.1	4.0	0.5	
32247.04	EB-7	4-Feb-09	Jan-09	Client	0940	420	1.4		1.1	4.0	0.8	
32864.04	EB-7	3-Mar-09	Feb-09	Client	1620	1800	1.8		1.2	4.0	0.9	
2600 1008 - 0	EB-7	29-Mar-09	Mar-09	Client		50	0.8		1.2	4.0	0.4	
2600 1018 - 00	EB-7	04-May-09	Apr-09	Client		450	0.9		1.1	4.0	0.4	
2600 1033 - 01	EB-7	31-May-09	May-09	Client		650	0.7		1.1	4.0	0.5	
2603 1039 - 01	EB-7	30-Jun-09	Jun-09	Client		650	0.9		1.1	4.0	0.5	
2603 1051 - 01	EB-7	04-Aug-09	Jul-09	Client	1615	400	0.5		1.1	4.0	0.4	
2600 1062 - 00	EB-7	03-Sep-09	Aug-09	Client	1615	20	2.1		1.1	4.0	1.6	
2600 1096 - 01	EB-7	04-Oct-09	Sep-09	Client	1215	780	12.6		1.1	4.0	10.5	
2600 1126 - 00	EB-7	03-Nov-09	Oct-09	Client	0920	950	2.3		1.2	4.0	1.7	
2600 1204 - 00	EB-7	01-Dec-09	Nov-09	Client	1310	75	2.4		1.2	4.0	1.9	
2600 1222 - 00	EB-7	05-Jan-10	Dec-09	Client	1030	2500	1.4		1.2	4.0	0.7	
2600 1234	EB-7	03-Feb-10	Jan-10	Client	1430	200	1.4		1.2	4.0	1.0	
2600 1247	EB-7	04-Mar-10	Feb-10	Client	1230	2500	2.2		1.2	4.0	1.4	
2600 1260	EB-7	05-Apr-10	Mar-10	Client	1020	2500	1		1.2	4.0	0.6	
2600 1268	EB-7	03-May-10	Apr-10	Client	0920	300	0.8		1.2	4.0	0.5	Insects, Vegetation
2600 1277	EB-7	02-Jun-10	May-10	TCPL	1415		0.7		1.2	4.0	0.6	Farming and Mining Activity
2600 1288-805-1	EB-7	04-Jul-10	Jun-10	TCPL	0950		0.4		1.2	4.0	0.2	Farming and Mining Activity
2603 1298 - 887	EB-7	03-Aug-10	Jul-10	TCPL	1050	1500	0.4		1.2	4.0	0.3	Vegetation, Farming & Mining activity

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
26001309-914	EB-7	04-Sep-10	Aug-10	TCPL	1020	1050	0.5		1.2	4.0	0.3	Plant Material, Farming Activity, Mining Activity
2600431904	EB-7	05-Oct-10	Sep-10	TCPL	1620	-	0.8		1.2	4.0	0.3	Farming activity, Grazing Activity, Mining Activity
6800-4368-10	EB-7	21-Oct-10	Oct-10	TCPL	1635	600	1.3		1.2	4.0	0.8	
1002977-004	EB-7	02-Dec-10	Nov-10	TCPL			1.0		1.2	4.0	0.7	
1100063-004	EB-7	04-Jan-11	Dec-10	TCPL	1055		1.2		1.2	4.0	0.7	Partly blocked with webs and leaves
1100335-004	EB-7	04-Feb-11	Jan-11	TCPL	1400		1		1.1	4.0	0.7	
1100549-004	EB-7	03-Mar-11	Feb-11	TCPL	0915		1.1		1.1	4.0	0.6	
1100793-004	EB-7	03-Apr-11	Mar-11	TCPL	0925		0.7		1.1	4.0	0.6	Close to workshop
EN1101030-004	EB-7	02-May-11	Apr-11	TCPL	1030		0.4		1.1	4.0	0.4	
EN1101344-004	EB-7	05-Jun-11	May-11	TCPL	1215		0.7	0.7	1.1	4.0	0.5	Spider Webs. Next to Workshop.
EN1101700-004	EB-7	04-Jul-11	Jun-11	TCPL	0915		0.8	0.8	1.1	4.0	0.5	Farming, grazing & mining activity- next to workshop
EN1102064-004	EB-7	03-Aug-11	Jul-11	TCPL	930		0.3	0.6	1.1	4.0	0.3	Grazing Activity, Mining activity
EN1102639-004	EB-7	05-Sep-11	Aug-11	TCPL	1115		1.8	0.9	1.1	4.0	1.4	Farming, mining activity, funnel & top of bottle smashed
EN1103081-004	EB-7	03-Oct-11	Sep-11	TCPL	1450		0.6	0.8	1.1	4.0	0.3	
EN1103410-004	EB-7	05-Nov-11	Oct-11	TCPL	1030	1030	0.6	0.8	1.1	4.0	0.5	
EN1104053-004	EB-7	05-Dec-11	Nov-11	TCPL	0930		1.2	0.9	1.1	4.0	0.7	Bird droppings
EN1200212-005	EB-7	06-Jan-11	Dec-11	TCPL	1715		1.2	0.9	1.1	4.0	0.7	
EN1200627-002	EB-7	08-Feb-12	Jan-12	TCPL	1620		0.9	0.9	1.1	4.0	0.5	Grazing activity, mining activity
EN1201033-004	EB-7	04-Mar-12	Feb-12	TCPL	1210		0.7	0.9	1.1	4.0	0.3	
EN1201376-004	EB-7	02-Apr-12	Mar-12	TCPL	1500		0.4	0.8	1.1	4.0	0.4	Next to workshop
EN1201718-004	EB-7	04-May-12	Apr-12	TCPL	1005		1.5	0.9	1.1	4.0	1.2	Broken funnel again

* September 2009 result excluded from long term average (regional dust storms).

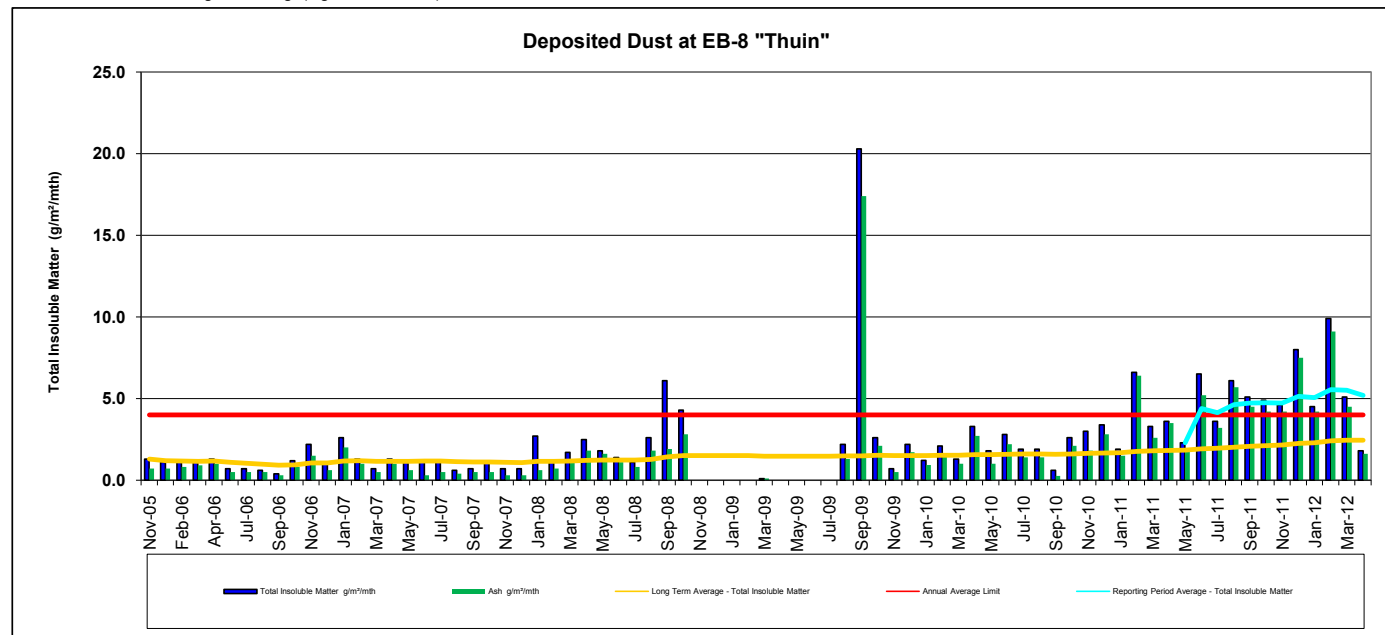


Deposited Dust EB-8 "Thuin"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.02	EB-2	02-Dec-05	Nov-05	Client		2700	1.3		1.3	4.0	0.7	
22570.02	EB-2	02-Feb-06	Jan-06	Client		1425	1.1		1.2	4.0	0.7	
22746.02	EB-2	02-Mar-06	Feb-06	Client		1000	1.1		1.2	4.0	0.8	
23208.02	EB-2	03-Apr-06	Mar-06	Client	1415	200	1.1		1.2	4.0	0.9	
23334.02	EB-2	02-May-06	Apr-06	S Burns EEL	0815	600	1.3		1.2	4.0	1.0	
23880.06	EB-8	04-Jul-06	Jun-06	Client	1010	800	0.7		1.1	4.0	0.5	Site name changed from EB-2 to EB-8
24082.06	EB-8	01-Aug-06	Jul-06	Client	1400	1040	0.7		1.0	4.0	0.5	
24416.06	EB-8	03-Sep-06	Aug-06	Client	1605	400	0.6		1.0	4.0	0.5	
24693.06	EB-8	03-Oct-06	Sep-06	Client	1720	250	0.4		0.9	4.0	0.3	
24977.06	EB-8	06-Nov-06	Oct-06	Client	1720	1175	1.2		1.0	4.0	0.8	
25438.06	EB-8	03-Dec-06	Nov-06	Client	0755	365	2.2		1.1	4.0	1.5	
25540.06	EB-8	02-Jan-07	Dec-06	Client		275	1.0		1.1	4.0	0.6	
25843.06	EB-8	02-Feb-07	Jan-07	Client	0845	50	2.6		1.2	4.0	2.0	
26120.06	EB-8	05-Mar-07	Feb-07	Client		1245	1.3		1.2	4.0	1.0	
26427.06	EB-8	03-Apr-07	Mar-07	Client	1350	195	0.7		1.2	4.0	0.5	
26631.06	EB-8	02-May-07	Apr-07	Client	0945	375	1.3		1.2	4.0	1.0	
26960.06	EB-8	03-Jun-07	May-07	Client	0745	855	1.2		1.2	4.0	0.6	
27234.06	EB-8	02-Jul-07	Jun-07	Client	0920	890	1.2		1.2	4.0	0.3	
27531.06	EB-8	04-Aug-07	Jul-07	Client	1150	250	1.2		1.2	4.0	0.5	
27820.06	EB-8	02-Sep-07	Aug-07	Client	0945	1010	0.6		1.1	4.0	0.4	
28119.06	EB-8	01-Oct-07	Sep-07	Client	0950	140	0.7		1.1	4.0	0.5	
28398.06	EB-8	03-Nov-07	Oct-07	Client	0725	400	1.1		1.1	4.0	0.5	
28663.06	EB-8	02-Dec-07	Nov-07	Client	1655	485	0.7		1.1	4.0	0.3	
28924.06	EB-8	03-Jan-08	Dec-07	Client	1115	1910	0.7		1.1	4.0	0.3	
29225.06	EB-8	04-Feb-08	Jan-08	Client	1100	>2055	2.7		1.1	4.0	0.6	
29526.06	EB-8	04-Mar-08	Feb-08	Client	1800	1320	1.1		1.1	4.0	0.7	
29774.06	EB-8	05-Apr-08	Mar-08	Client	1020	250	1.7		1.2	4.0	1.1	
30056.06	EB-8	5-May-08	Apr-08	Client	1445	160	2.5		1.2	4.0	1.8	
30387.06	EB-8	3-Jun-08	May-08	Client	1400	750	1.8		1.2	4.0	1.6	
30661.06	EB-8	05-Jul-08	Jun-08	Client	1100	430	1.4		1.2	4.0	1.1	
30903.01	EB-8	05-Aug-08	Jul-08	Client	1540	465	1.1		1.2	4.0	0.8	
31211.06	EB-8	09-Sep-08	Aug-08	Client	1415	870	2.6		1.3	4.0	1.8	
31528.05	EB-8	05-Oct-08	Sep-08	Client	0915	1535	6.1		1.4	4.0	1.9	
31776.05	EB-8	02-Nov-08	Oct-08	Client	1315	120	4.3		1.5	4.0	2.8	
32024.05	EB-8	6-Dec-08	Nov-08	Client					1.5	4.0		No access
32519.05	EB-8	3-Jan-09	Dec-08	Client					1.5	4.0		No access
	EB-8	4-Feb-09	Jan-09	Client					1.5	4.0		No access
32864.05	EB-8	3-Mar-09	Feb-09	Client					1.5	4.0		No access
2600 1008 - 0	EB-8	29-Mar-09	Mar-09	Client		<50	0.1		1.5	4.0	0.1	
2600 1018 - 00	EB-8	04-May-09	Apr-09	Client					1.5	4.0		No sample
	EB-8	31-May-09	May-09	Client					1.5	4.0		No sample due to mining activity
	EB-8	30-Jun-09	Jun-09	Client					1.5	4.0		No sample due to mining activity
	EB-8	03-Aug-09	Jul-09	Client					1.5	4.0		No sample due to mining activity
2600 1062 - 00	EB-8	31-Aug-09	Aug-09	Client	1340	20	2.2		1.5	4.0	1.3	
2600 1096 - 01	EB-8	29-Sep-09	Sep-09	Client	1156	700	20.3		1.5	4.0	17.4	
2600 1126 - 00	EB-8	03-Nov-09	Oct-09	Client	1232	850	2.6		1.5	4.0	2.1	
2600 1204 - 00	EB-8	02-Dec-09	Nov-09	Client	1020	DRY	0.7		1.5	4.0	0.5	
2600 1222 - 00	EB-8	04-Jan-10	Dec-09	Client	1505	2500	2.2		1.5	4.0	1.7	
2600 1234	EB-8	01-Feb-10	Jan-10	Client	1340	200	1.2		1.5	4.0	0.9	
2600 1247	EB-8	02-Mar-10	Feb-10	Client	1155	2500	2.1		1.5	4.0	1.5	
2600 1260	EB-8	05-Apr-10	Mar-10	Client	1155	2500	1.3		1.5	4.0	1	
2600 1268	EB-8	03-May-10	Apr-10	Client	1150	350	3.3		1.6	4.0	2.7	
2600 1277	EB-8	25-May-10	May-10	ALS Acirl	1305	10	1.8		1.6	4.0	1	Plant Material
2600 1288-805-1	EB-8	24-Jun-10	Jun-10	ALS Acirl	1110	800	2.8		1.6	4.0	2.2	Insects
2605 1298 - 887	EB-8	03-Aug-10	Jul-10	ALS Acirl	1150	500	1.9		1.6	4.0	1.4	Insects, Plant Material
26001309-914	EB-8	04-Sep-10	Aug-10	ALS Acirl	0955	1100	1.9		1.6	4.0	1.4	Insects, Plant Material

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
2600431904	EB-8	05-Oct-10	Sep-10	ALS Acirl	1350	800	0.6		1.6	4.0	0.2	Farming activity, Grazing Activity
6800-4368-14	EB-8	21-Oct-10	Oct-10	ALS Acirl	1005	400	2.6		1.6	4.0	2.1	
1002886-001	EB-8	22-Nov-10	Nov-10	ALS Acirl	1050	2100	3		1.6	4.0	1.8	
1003101-001	EB-8	22-Dec-10	Dec-10	ALS Acirl	1145		3.4		1.7	4.0	2.8	
1100199-001	EB-8	21-Jan-11	Jan-11	ALS Acirl	1200	300	1.9		1.7	4.0	1.5	
1100446-001	EB-8	22-Feb-11	Feb-11	ALS Acirl	1050	600	6.6		1.8	4.0	6.4	
1100695-001	EB-8	24-Mar-11	Mar-11	ALS Acirl	1010	600	3.3		1.8	4.0	2.6	
EN1100922-001	EB-8	20-Apr-11	Apr-11	ALS Acirl	1000	400	3.6		1.8	4.0	3.5	
EN1101205-001	EB-8	20-May-11	May-11	ALS Acirl	1050	Dry	2.3	2.3	1.8	4.0	1.9	Insects
EN1101448-001	EB-8	20-Jun-11	Jun-11	ALS Acirl	1000	1500	6.5	4.4	1.9	4.0	5.2	Insects/Plant Material
EN1101812-001	EB-8	19-Jul-11	Jul-11	ALS Acirl	1110	100	3.6	4.1	1.9	4.0	3.2	Insects, plant material
EN1102301-001	EB-8	17-Aug-11	Aug-11	ALS Acirl	1010	80	6.1	4.6	2.0	4.0	5.7	Bird Droppings, Plant material
EN1102773-001	EB-8	16-Sep-11	Sep-11	ALS Acirl	1100	800	5.1	4.7	2.1	4.0	4.5	Plant material
EN1103124-001	EB-8	17-Oct-11	Oct-11	ALS Acirl	1050	1400	4.9	4.8	2.1	4.0	4.2	Insects, Scrapers operating near gauge
EN1103467-001	EB-8	15-Nov-11	Nov-11	ALS Acirl	1045	600	4.6	4.7	2.2	4.0	4.2	Insects, Plant material
EN1104232-001	EB-8	15-Dec-11	Dec-11	ALS Acirl	1100	2500	8	5.1	2.2	4.0	7.5	Insects, Plant material
EN1200242-001	EB-8	13-Jan-12	Jan-12	ALS Acirl	1100	300	4.5	5.1	2.3	4.0	4.2	Insects, Plant material
EN1200606-001	EB-8	13-Feb-12	Feb-12	ALS Acirl	1100	2500	9.9	5.6	2.4	4.0	9.1	Insects, Plant material
EN1201026-001	EB-8	15-Mar-12	Mar-12	ALS Acirl	1030	500	5.1	5.5	2.4	4.0	4.5	Insects, Plant material
EN1201453-001	EB-8	16-Apr-12	Apr-12	ALS Acirl	1010	<100	1.8	5.2	2.4	4.0	1.6	Insects, Plant material

* September 2009 result excluded from long term average (regional dust storms).

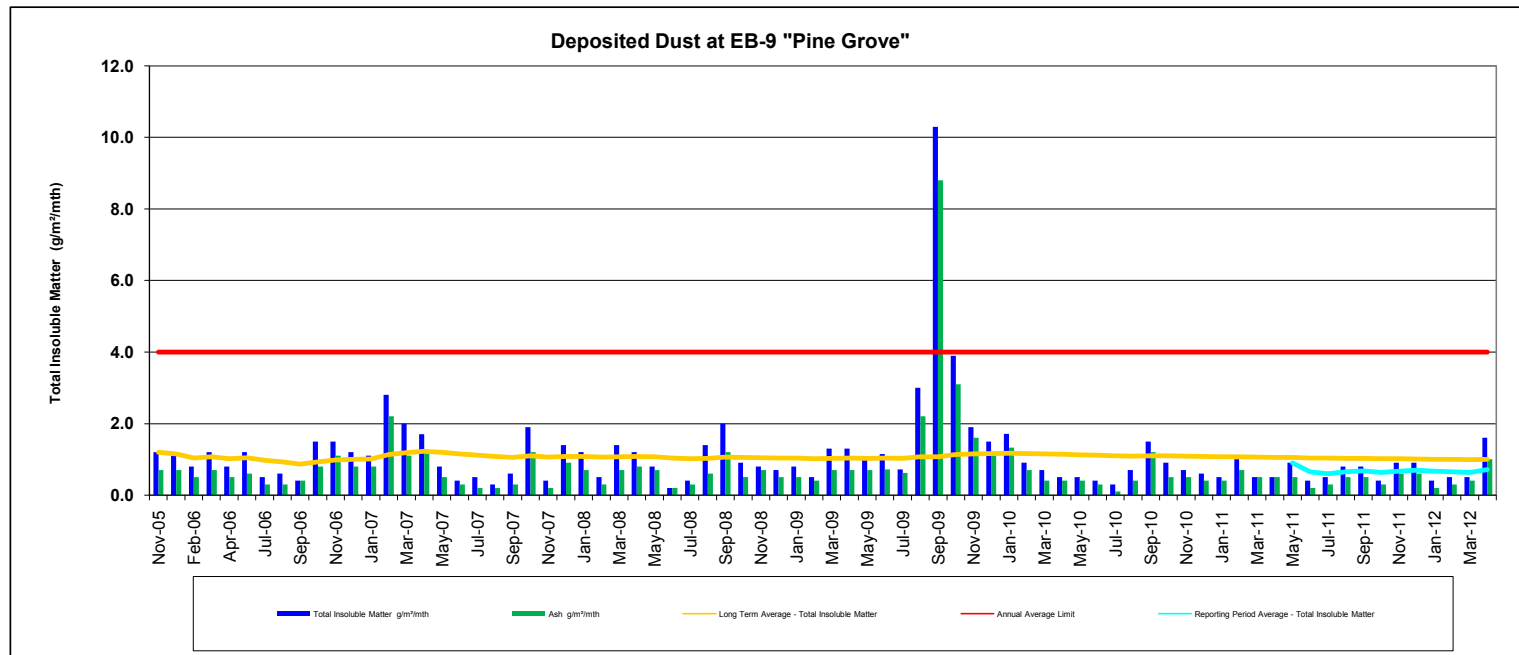


Deposited Dust EB-9 "Pine Grove"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
21992.05	EB - 5	02-Dec-05	Nov-05	Client		2750	1.2		1.2	4.0	0.7	
22570.05	EB - 5	02-Feb-06	Jan-06	Client		2095	1.1		1.2	4.0	0.7	
22746.05	EB - 5	02-Mar-06	Feb-06	Client		450	0.8		1.0	4.0	0.5	
23208.05	EB - 5	03-Apr-06	Mar-06	Client	1445	180	1.2		1.1	4.0	0.7	
23334.05	EB - 5	02-May-06	Apr-06	S Burns EEL	0855	700	0.8		1.0	4.0	0.5	
23880.03	EB - 5	04-Jul-06	Jun-06	Client	1040	700	1.2		1.1	4.0	0.6	
24082.07	EB - 9	01-Aug-06	Jul-06	Client	1338	1150	0.5		1.0	4.0	0.3	Site name changed from EB-5 to EB-9
24416.07	EB - 9	03-Sep-06	Aug-06	Client	1635	270	0.6		0.9	4.0	0.3	
24693.07	EB - 9	03-Oct-06	Sep-06	Client	1630	350	0.4		0.9	4.0	0.4	
24977.07	EB - 9	06-Nov-06	Oct-06	Client	1800	1100	1.5		0.9	4.0	0.8	
25438.07	EB - 9	03-Dec-06	Nov-06	Client	0825	280	1.5		1.0	4.0	1.1	
25540.07	EB - 9	02-Jan-07	Dec-06	Client		375	1.2		1.0	4.0	0.8	
25843.07	EB - 9	02-Feb-07	Jan-07	Client	0915	640	1.1		1.0	4.0	0.8	
26120.07	EB - 9	05-Mar-07	Feb-07	Client	1215	1160	2.8		1.1	4.0	2.2	
26427.07	EB - 9	03-Apr-07	Mar-07	Client	1315	315	2.0		1.2	4.0	1.1	
26631.07	EB - 9	02-May-07	Apr-07	Client	1020	295	1.7		1.2	4.0	1.2	
26960.07	EB - 9	03-Jun-07	May-07	Client	0715	1055	0.8		1.2	4.0	0.5	
	EB-9	02-Jul-07	Jun-07	Client	1030	1230	0.4		1.2	4.0	0.3	
27531.07	EB-9	04-Aug-07	Jul-07	Client	1235	340	0.5		1.1	4.0	0.2	
27820.07	EB-9	02-Sep-07	Aug-07	Client	1020	1280	0.3		1.1	4.0	0.2	
28119.07	EB-9	01-Oct-07	Sep-07	Client	1020	230	0.6		1.1	4.0	0.3	
28398.07	EB-9	03-Nov-07	Oct-07	Client	0825	1075	1.9		1.1	4.0	1.2	
28663.07	EB-9	02-Dec-07	Nov-07	Client	1615	690	0.4		1.1	4.0	0.2	
28924.07	EB-9	03-Jan-08	Dec-07	Client	1020	2245	1.4		1.1	4.0	0.9	
29225.07	EB-9	04-Feb-08	Jan-08	Client	1015	>2500	1.2		1.1	4.0	0.7	
29526.07	EB-9	04-Mar-08	Feb-08	Client	1700	1720	0.5		1.1	4.0	0.3	
29774.07	EB-9	05-Apr-08	Mar-08	Client	0930	275	1.4		1.1	4.0	0.7	
30056.07	EB-9	5-May-08	Apr-08	Client	1530	345	1.2		1.1	4.0	0.8	
30387.07	EB-9	3-Jun-08	May-08	Client	1445	805	0.8		1.1	4.0	0.7	
30661.07	EB-9	05-Jul-08	Jun-08	Client	1000	575	0.2		1.0	4.0	0.2	
30903.01	EB-9	05-Aug-08	Jul-08	Client	1625	600	0.4		1.0	4.0	0.3	
31211.07	EB-9	09-Sep-08	Aug-08	Client	1345	120	1.4		1.0	4.0	0.6	
31528.06	EB-9	05-Oct-08	Sep-08	Client	0945	1760	2.0		1.1	4.0	1.2	
31776.06	EB-9	02-Nov-08	Oct-08	Client		465	0.9		1.1	4.0	0.5	
32024.06	EB-9	6-Dec-08	Nov-08	Client	1130	2175	0.8		1.0	4.0	0.7	
32519.06	EB-9	3-Jan-09	Dec-08	Client	1830	1550	0.7		1.0	4.0	0.5	
32247.06	EB-9	4-Feb-09	Jan-09	Client	0900	195	0.8		1.0	4.0	0.5	
32864.06	EB-9	3-Mar-09	Feb-09	Client	1710	1640	0.5		1.0	4.0	0.4	
2600 1008 - 0	EB-9	29-Mar-09	Mar-09	Client		50	1.3		1.0	4.0	0.7	
2600 1018 - 00	EB-9	04-May-09	Apr-09	Client		400	1.3		1.0	4.0	0.7	
2600 1033 - 01	EB-9	31-May-09	May-09	Client		550	1.0		1.0	4.0	0.7	
2605 1039 - 01	EB-9	30-Jun-09	Jun-09	Client		550	1.1		1.0	4.0	0.7	
2604 1051 - 01	EB-9	04-Aug-09	Jul-09	Client	1700	400	0.7		1.0	4.0	0.6	
2600 1062 - 00	EB-9	03-Sep-09	Aug-09	Client	1710	20	3.0		1.1	4.0	2.2	
2600 1096 - 01	EB-9	04-Oct-09	Sep-09	Client	1310	800	10.3		1.1	4.0	8.8	
2600 1126 - 00	EB-9	03-Nov-09	Oct-09	Client	1020	900	3.9		1.1	4.0	3.1	
2600 1204 - 00	EB-9	01-Dec-09	Nov-09	Client	1350	75	1.9		1.2	4.0	1.6	
2600 1222 - 00	EB-9	05-Jan-10	Dec-09	Client	1110	2500	1.5		1.2	4.0	1.2	
2600 1234	EB-9	03-Feb-10	Jan-10	Client		200	1.7		1.2	4.0	1.3	
2600 1247	EB-9	04-Mar-10	Feb-10	Client	1315	2500	0.9		1.2	4.0	0.7	
2600 1260	EB-9	05-Apr-10	Mar-10	Client	1105	2500	0.7		1.2	4.0	0.4	
2600 1268	EB-9	03-May-10	Apr-10	Client	1105	300	0.5		1.1	4.0	0.4	
2600 1277	EB-9	02-Jun-10	May-10	TCPL	1330		0.5		1.1	4.0	0.4	Grazing, Mining and Farming Activity
2600 1288-805-1	EB-9	04-Jul-10	Jun-10	TCPL	1035		0.4		1.1	4.0	0.3	Grazing, Mining and Farming Activity
2604 1298 - 887	EB-9	22-Jul-10	Jul-10	TCPL	1135	1400	0.3		1.1	4.0	0.1	Mining Activity
26001309-914	EB-9	20-Aug-10	Aug-10	TCPL	1100	2000	0.7		1.1	4.0	0.4	Insects, Plant Material, Mining Activity

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
2600431904.00	EB-9	21-Sep-10	Sep-10	TCPL	1600		1.5		1.1	4.0	1.2	insects
6800-4368-10	EB-9	21-Oct-10	Oct-10	TCPL	1725	600	0.9		1.1	4.0	0.5	
1002977-005	EB-9	02-Dec-10	Nov-10	TCPL			0.7		1.1	4.0	0.5	
1100063-005	EB-9	04-Jan-11	Dec-10	TCPL	1135		0.6		1.1	4.0	0.4	Spider webs and grass from mowing
1100335-005	EB-9	04-Feb-11	Jan-11	TCPL	1445		0.5		1.1	4.0	0.4	Spider webs in funnel
1100549-005	EB-9	03-Mar-11	Feb-11	TCPL	1020		1.0		1.1	4.0	0.7	Spider webs
1100793-005	EB-9	03-Apr-11	Mar-11	TCPL	1005		0.5		1.1	4.0	0.5	
EN1101030.005	EB-9	02-May-11	Apr-11	TCPL	1115		0.5		1.1	4.0	0.5	
EN1101344-005	EB-9	05-Jun-11	May-11	TCPL	1315		0.9	0.9	1.1	4.0	0.5	
EN1101700-005	EB-9	04-Jul-11	Jun-11	TCPL	0830		0.4	0.7	1.0	4.0	0.2	Grazing activity, mining activity
EN1102064-005	EB-9	03-Aug-11	Jul-11	TCPL	1030		0.5	0.6	1.0	4.0	0.3	Insects, grazing, mining activity, light spider webs in funnel
EN1102639-005	EB-9	05-Sep-11	Aug-11	TCPL	1155		0.8	0.7	1.0	4.0	0.5	Grazing activity, mining activity
EN1103081-005	EB-9	03-Oct-11	Sep-11	TCPL	1545		0.8	0.7	1.0	4.0	0.5	
EN1103410-005	EB-9	05-Nov-11	Oct-11	TCPL	1120	1120	0.4	0.6	1.0	4.0	0.3	
EN1104053-005	EB-9	05-Dec-11	Nov-11	TCPL	1020		0.9	0.7	1.0	4.0	0.6	
EN1200212-006	EB-9	06-Jan-11	Dec-11	TCPL	1825		0.9	0.7	1.0	4.0	0.6	
EN1200627-003	EB-9	08-Feb-12	Jan-12	TCPL	1540		0.4	0.7	1.0	4.0	0.2	Mining activity
EN1201033-005	EB-9	04-Mar-12	Feb-12	TCPL	1115		0.5	0.7	1.0	4.0	0.3	
EN1201376-005	EB-9	02-Apr-12	Mar-12	TCPL	1500		0.5	0.6	1.0	4.0	0.4	
EN1201718-005	EB-9	04-May-12	Apr-12	TCPL	1050		1.6	0.7	1.0	4.0	1.0	

* September 2009 result excluded from long term average (regional dust storms).

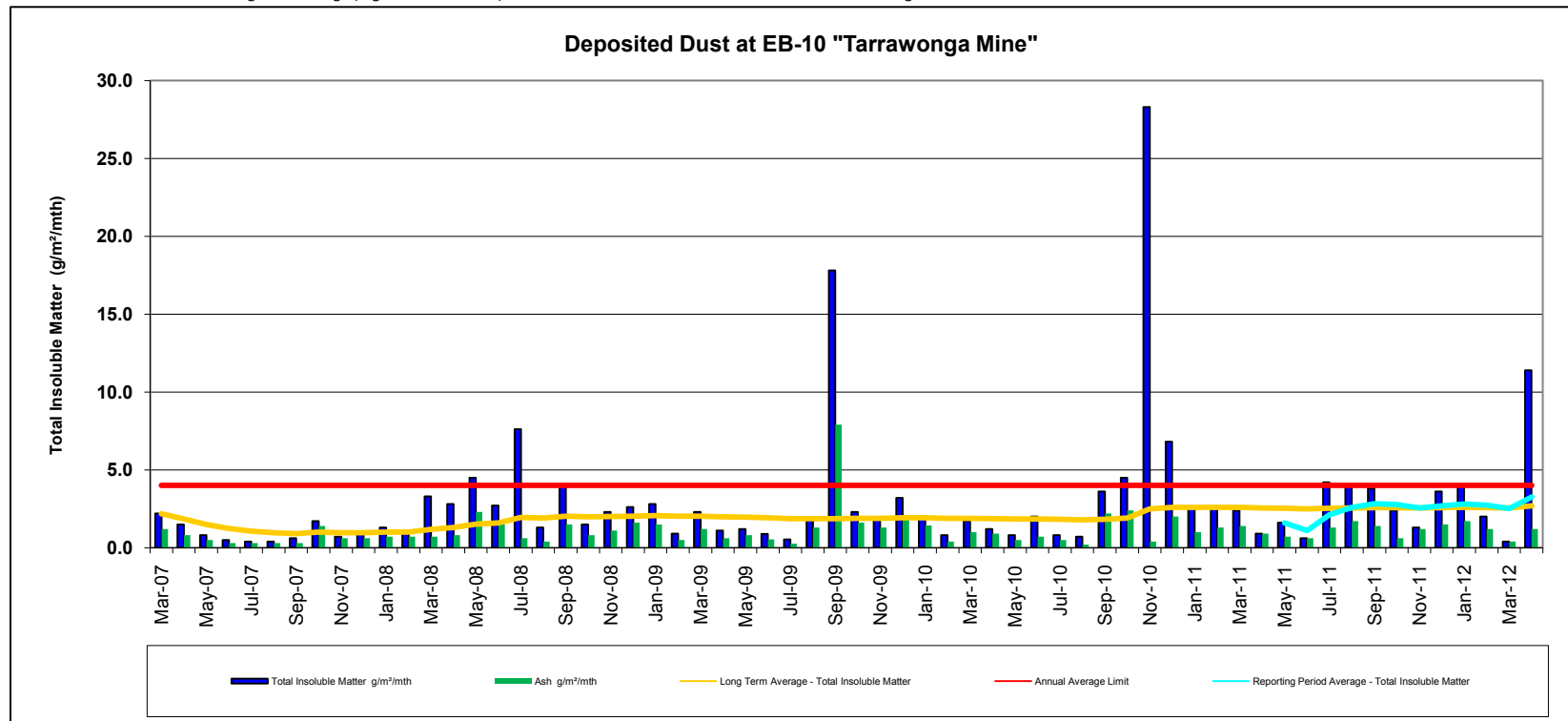


Deposited Dust EB-10 "Tarrawonga Mine"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
26427.08	EB - 10	03-Apr-07	Mar-07	Client	1400	135	2.2		2.2	4.0	1.2	
26631.08	EB - 10	02-May-07	Apr-07	Client	0920	310	1.5		1.9	4.0	0.8	
26960.08	EB - 10	03-Jun-07	May-07	Client	0950	1015	0.8		1.5	4.0	0.5	
27234.08	EB-10	02-Jul-07	Jun-07	Client	1115	1035	0.5		1.3	4.0	0.3	
27531.08	EB-10	04-Aug-07	Jul-07	Client	1650	180	0.4		1.1	4.0	0.3	
27820.08	EB-10	04-Sep-07	Aug-07	Client	0940	1095	0.4		1.0	4.0	0.3	
28119.08	EB-10	01-Oct-06	Sep-07	Client	1055	45	0.6		0.9	4.0	0.3	
28398.08	EB-10	02-Nov-07	Oct-07	Client	1230	420	1.7		1.0	4.0	1.4	
28663.08	EB-10	05-Dec-07	Nov-07	Client	1155	1020	0.7		1.0	4.0	0.6	
28924.08	EB-10	02-Jan-08	Dec-07	Client	1515	1640	1.0		1.0	4.0	0.6	
29225.08	EB-10	04-Feb-08	Jan-08	Client	1140	>2500	1.3		1.0	4.0	0.7	
29526.08	EB-10	03-Mar-08	Feb-08	Client	1000	1405	1.1		1.0	4.0	0.7	
29774.08	EB-10	01-Apr-08	Mar-08	Client	1635	70	3.3		1.2	4.0	0.7	
30056.08	EB-10	05-May-08	Apr-08	Client	1005	245	2.8		1.3	4.0	0.8	
30387.08	EB-10	02-Jun-08	May-08	Client	1015	210	4.5		1.5	4.0	2.3	
30661.08	EB-10	08-Jul-08	Jun-08	Client	1345	1200	2.7		1.6	4.0	1.5	
30903.01	EB-10	05-Aug-08	Jul-08	Client	1250	285	7.6		1.9	4.0	0.6	
31211.08	EB-10	01-Sep-08	Aug-08	Client	1417	530	1.3		1.9	4.0	0.4	
31528.07	EB-10	05-Oct-08	Sep-08	Client	1210	1520	4.1		2.0	4.0	1.5	
31776.07	EB-10	03-Nov-08	Oct-08	Client	1525	1390	1.5		2.0	4.0	0.8	
32024.07	EB-10	03-Dec-08	Nov-08	Client	1020	1100	2.3		2.0	4.0	1.1	
32519.07	EB-10	03-Jan-09	Dec-08	Client	1350	1220	2.6		2.0	4.0	1.6	
32247.07	EB-10	04-Feb-09	Jan-09	Client	1330	250	2.8		2.1	4.0	1.5	
32864.07	EB-10	03-Mar-09	Feb-09	Client	1250	1725	0.9		2.0	4.0	0.5	
2600 1008 - 0	EB-10	29-Mar-09	Mar-09	ALS		50	2.3		2.0	4.0	1.2	
2600 1018 - 00	EB-10	01-May-09	Apr-09	ALS		500	1.1		2.0	4.0	0.6	Insects
2600 1033 - 01	EB-10	04-Jun-09	May-09	ALS		600	1.2		2.0	4.0	0.8	
2606 1039 - 01	EB-10	6-Jul-09	Jun-09	ALS		600	0.9		1.9	4.0	0.5	Insects, Plant Material
2605 1051 - 01	EB-10	3-Aug-09	Jul-09	ALS	1245	300	0.5		1.9	4.0	0.2	
2600 1062 - 00	EB-10	31-Aug-09	Aug-09	ALS	1300	20	1.9		1.9	4.0	1.3	
2600 1096 - 01	EB-10	29-Sep-09	Sep-09	ALS	1132	800	17.8		1.9	4.0	7.9	Insects, Plant Material
2600 1126 - 00	EB-10	03-Nov-09	Oct-09	ALS	1215	900	2.3		1.9	4.0	1.6	Insects, Plant Material
2600 1204 - 00	EB-10	02-Dec-09	Nov-09	ALS	1000	15	1.8		1.9	4.0	1.3	Insects
2600 1222 - 00	EB-10	04-Jan-10	Dec-09	ALS	1440	2500	3.2		1.9	4.0	1.8	Insects, Plant Material, Bird Droppings
2600 1234	EB-10	1-Feb-10	Jan-10	ALS	1320	200	2.0		1.9	4.0	1.4	Insect, Plant Material
2600 1247	EB-10	2-Mar-10	Feb-10	ALS	1110	2300	0.8		1.9	4.0	0.4	Insects
2600 1260	EB-10	03-Apr-10	Mar-10	ALS	1110	2300	1.7		1.9	4.0	1.0	Insects, Plant Material
2600 1268	EB-10	03-May-10	Apr-10	ALS	1130	350	1.2		1.9	4.0	0.9	Insects, Plant Material
2600 1277	EB-10	25-May-10	May-10	ALS Acirl	1240	20	0.8		1.9	4.0	0.5	
2600 1288-805-1	EB-10	24-Jun-10	Jun-10	ALS Acirl	1050	700	2.0		1.9	4.0	0.7	Insects, Plant Material
2606 1298 - 887	EB-10	22-Jul-10	Jul-10	ALS Acirl	1130	500	0.8		1.8	4.0	0.5	Insects, Plant Material
26001309-914	EB-10	20-Aug-10	Aug-10	ALS Acirl	1010	2000	0.7		1.8	4.0	0.2	Insects
2600431904.00	EB-10	21-Sep-10	Sep-10	ALS Acirl	1325	700	3.6		1.8	4.0	2.2	Insects, plant material
6800-4368-14	EB-10	21-Oct-10	Oct-10	ALS Acirl	0930	500	4.5		1.9	4.0	2.4	
1002886-002	EB-10	22-Nov-10	Nov-10	ALS Acirl	1030	2200	28.3		2.5	4.0	0.4	
1003101-002	EB-10	22-Dec-10	Dec-10	ALS Acirl	1115		6.8		2.6	4.0	2.0	

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
1100199-002	EB-10	21-Jan-11	Jan-11	ALS Acirl	1215	300	2.6		2.6	4.0	1.0	
1100446-002	EB-10	22-Feb-11	Feb-11	ALS Acirl	1020	600	2.6		2.6	4.0	1.3	
1100695-002	EB-10	24-Mar-11	Mar-11	ALS Acirl	0940	500	2.4		2.6	4.0	1.4	
EN1100922-002	EB-10	20-Apr-11	Apr-11	ALS Acirl	0930	300	0.9		2.6	4.0	0.9	
EN1101205-002	EB-10	20-May-11	May-11	ALS Acirl	1030	Dry	1.6	1.6	2.5	4.0	0.7	Bird droppings
EN1101448-002	EB-10	20-Jun-11	Jun-11	ALS Acirl	0940	1100	0.6	1.1	2.5	4.0	0.6	Insects/Plant Material
EN1101812-002	EB-10	19-Jul-11	Jul-11	ALS Acirl	1025	50	4.2	2.1	2.5	4.0	1.3	Insects, bird droppings, plant material
EN1102301-002	EB-10	17-Aug-11	Aug-11	ALS Acirl	0940	80	4.0	2.6	2.6	4.0	1.7	Bird Droppings, Plant material
EN1102773-002	EB-10	16-Sep-11	Sep-11	ALS Acirl	1030	700	3.8	2.8	2.6	4.0	1.4	Insects, Bird Droppings, Plant material
EN1103124-002	EB-10	17-Oct-11	Oct-11	ALS Acirl	1015	1300	2.4	2.8	2.6	4.0	0.6	Insects, Plant material
EN1103467-002	EB-10	15-Nov-11	Nov-11	ALS Acirl	1020	600	1.3	2.6	2.6	4.0	1.2	Insects
EN1104232-002	EB-10	15-Dec-11	Dec-11	ALS Acirl	1030	2500	3.6	2.7	2.6	4.0	1.5	Insects, Plant material
EN1200242-002	EB-10	13-Jan-12	Jan-12	ALS Acirl	0940	600	3.9	2.8	2.6	4.0	1.7	Insects, Plant material
EN1200606-002	EB-10	13-Feb-12	Feb-12	ALS Acirl	1115	2500	2.0	2.7	2.6	4.0	1.2	Insects, Plant material
EN1201026-002	EB-10	15-Mar-12	Mar-12	ALS Acirl	1000	500	0.4	2.5	2.6	4.0	0.4	Insects, Plant material
EN1201453-002	EB-10	16-Apr-12	Apr-12	ALS Acirl	0925	200	11.4	3.3	2.7	4.0	1.2	Insects, Bird droppings, Plant material

* September 2009 result excluded from long term average (regional dust storms). Anomalous result in November 2010 excluded from averages.

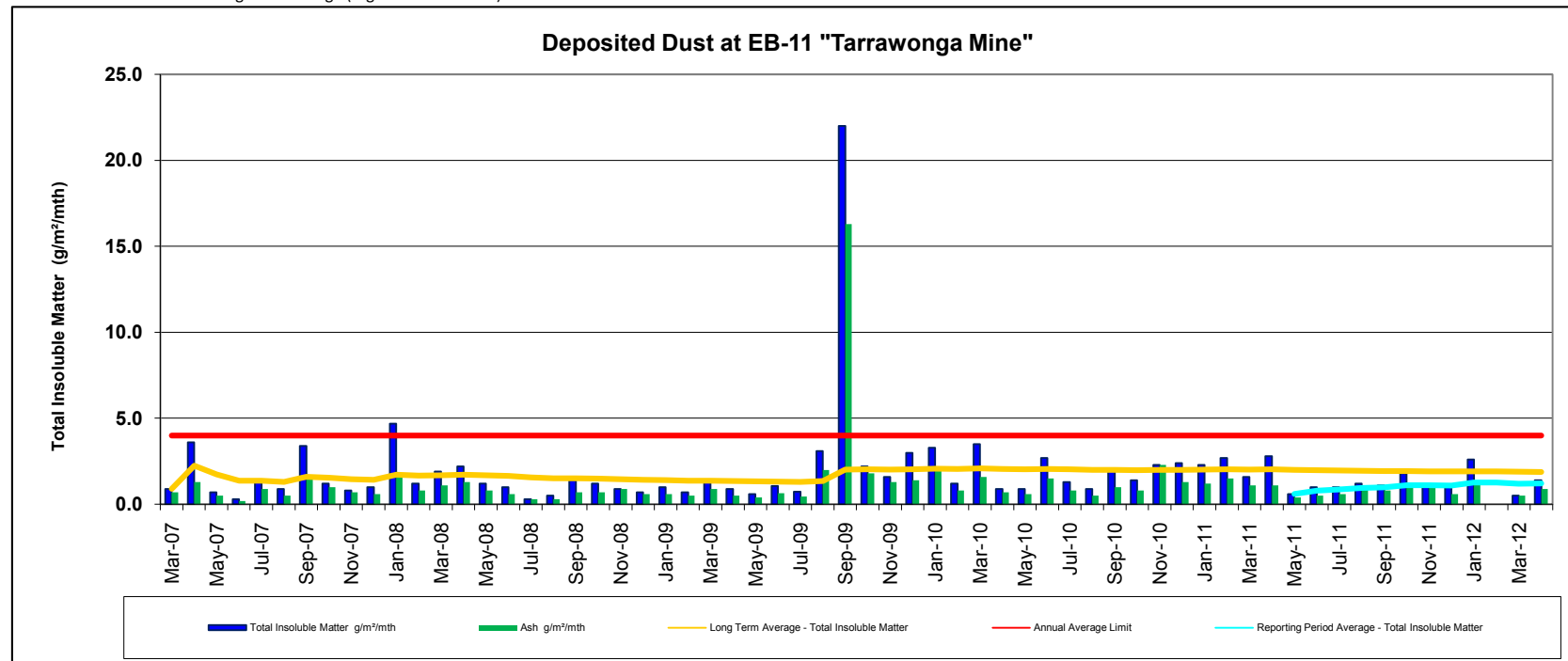


Deposited Dust EB-11 "Tarrawonga Mine"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
26427.09	EB-11	03-Apr-07	Mar-07	Client	1410	160	0.9		0.9	4.0	0.7	
26631.09	EB-11	02-May-07	Apr-07	Client	0935	340	3.6		2.3	4.0	1.3	
26960.09	EB-11	03-Jun-07	May-07	Client	1005	1015	0.7		1.7	4.0	0.5	
27234.09	EB-11	02-Jul-07	Jun-07	Client	1025	950	0.3		1.4	4.0	0.2	
27531.09	EB-11	04-Aug-07	Jul-07	Client	1640	190	1.4		1.4	4.0	0.9	
27820.09	EB-11	04-Sep-07	Aug-07	Client	0930	1240	0.9		1.3	4.0	0.5	
28119.09	EB-11	01-Oct-06	Sep-07	Client	1045	100	3.4		1.6	4.0	1.5	
28398.09	EB-11	02-Nov-07	Oct-07	Client	1220	405	1.2		1.6	4.0	1.0	
28663.09	EB-11	05-Dec-07	Nov-07	Client	1145	920	0.8		1.5	4.0	0.7	
28924.09	EB-11	02-Jan-08	Dec-07	Client	1525	1950	1.0		1.4	4.0	0.6	
29225.09	EB-11	04-Feb-08	Jan-08	Client	1130	2620	4.7		1.7	4.0	1.7	
29526.09	EB-11	03-Mar-08	Feb-08	Client	0945	1700	1.2		1.7	4.0	0.8	
29774.09	EB-11	01-Apr-08	Mar-08	Client	1625	100	1.9		1.7	4.0	1.1	
30056.09	EB-11	05-May-08	Apr-08	Client	0955	270	2.2		1.7	4.0	1.3	
30387.09	EB-11	02-Jun-08	May-08	Client	1025	240	1.2		1.7	4.0	0.8	
30661.09	EB-11	08-Jul-08	Jun-08	Client	1320	1145	1.0		1.7	4.0	0.6	
30903.01	EB-11	05-Aug-08	Jul-08	Client	1240	375	0.3		1.6	4.0	0.3	
31211.09	EB-11	01-Sep-08	Aug-08	Client	1405	640	0.5		1.5	4.0	0.3	
31528.08	EB-11	05-Oct-08	Sep-08	Client	1135	1635	1.4		1.5	4.0	0.7	
31776.08	EB-11	03-Nov-08	Oct-08	Client	1510	1390	1.2		1.5	4.0	0.7	
32024.08	EB-11	03-Dec-08	Nov-08	Client	1015	1280	0.9		1.5	4.0	0.9	
32519.08	EB-11	03-Jan-09	Dec-08	Client	1358	1565	0.7		1.4	4.0	0.6	
32247.08	EB-11	04-Feb-09	Jan-09	Client	1318	375	1.0		1.4	4.0	0.6	
32864.08	EB-11	03-Mar-09	Feb-09	Client	1235	1690	0.7		1.4	4.0	0.5	
2600 1008 - 0	EB-11	29-Mar-09	Mar-09	ALS		50	1.3		1.4	4.0	0.9	
2600 1018 - 00	EB-11	01-May-09	Apr-09	ALS		500	0.9		1.4	4.0	0.5	Insects
2600 1033 - 01	EB-11	04-Jun-09	May-09	ALS		600	0.6		1.3	4.0	0.4	
2607 1039 - 01	EB-11	6-Jul-09	Jun-09	ALS		600	1.1		1.3	4.0	0.6	Plant Material
2606 1051 - 01	EB-11	3-Aug-09	Jul-09	ALS	1250	400	0.7		1.3	4.0	0.5	Plant Material, Insects
2600 1062 - 00	EB-11	31-Aug-09	Aug-09	ALS	1310	20	3.1		1.4	4.0	2.0	Insects, Bird Droppings
2600 1096 - 01	EB-11	29-Sep-09	Sep-09	ALS	1140	900	22.0		2.0	4.0	16.3	Insects, Bird Droppings, Plant Material
2600 1126 - 00	EB-11	03-Nov-09	Oct-09	ALS	1221	900	2.2		2.0	4.0	1.8	Insects, Plant Material
2600 1204 - 00	EB-11	02-Dec-09	Nov-09	ALS	1010	50	1.6		2.0	4.0	1.3	Insects, Bird Droppings
2600 1222 - 00	EB-11	04-Jan-10	Dec-09	ALS	1450	2500	3.0		2.0	4.0	1.4	Bird Droppings
2600 1234	EB-11	1-Feb-10	Jan-10	ALS	1325	400	3.3		2.1	4.0	2.0	Bird Droppings, Plant Material
2600 1247	EB-11	2-Mar-10	Feb-10	ALS	1140	2500	1.2		2.1	4.0	0.8	Insects
2600 1260	EB-11	5-Apr-10	Mar-10	ALS	1140	2500	3.5		2.1	4.0	1.6	Insects, Bird Droppings, Plant Material
2600 1268	EB-11	3-May-10	Apr-10	ALS	1140	350	0.9		2.1	4.0	0.7	Insects
2600 1277	EB-11	25-May-10	May-10	ALS Acirl	1245	20	0.9		2.0	4.0	0.6	Insects
2600 1288-805-1	EB-11	24-Jun-10	Jun-10	ALS Acirl	1100	800	2.7		2.1	4.0	1.5	Insects, Bird Droppings
2607 1298 - 887	EB-11	22-Jul-10	Jul-10	ALS Acirl	1135	600	1.3		2.0	4.0	0.8	Insects, Plant Material
26001309-914	EB-11	20-Aug-10	Aug-10	ALS Acirl	0940	2200	0.9		2.0	4.0	0.5	Insects, Plant Material
2600431904.00	EB-11	21-Sep-10	Sep-10	ALS Acirl	1335	1200	2.1		2.0	4.0	1.0	Insects
6800-4368-14	EB-11	21-Oct-10	Oct-10	ALS Acirl	0935	600	1.4		2.0	4.0	0.8	
1002886-003	EB-11	22-Nov-10	Nov-10	ALS Acirl	1040	2200	2.3		2.0	4.0	2.3	

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
1003101-003	EB-11	22-Dec-10	Dec-10	ALS Acirl	1130		2.4		2.0	4.0	1.3	
1100199-003	EB-11	21-Jan-11	Jan-11	ALS Acirl	1135	400	2.3		2.0	4.0	1.2	
1100446-003	EB-11	22-Feb-11	Feb-11	ALS Acirl	1030	700	2.7		2.0	4.0	1.5	
1100695-003	EB-11	24-Mar-11	Mar-11	ALS Acirl	0945	600	1.6		2.0	4.0	1.1	
EN1100922-003	EB-11	20-Apr-11	Apr-11	ALS Acirl	0940	400	2.8		2.0	4.0	1.1	
EN1101205-003	EB-11	20-May-11	May-11	ALS Acirl	1020	Dry	0.6	0.6	2.0	4.0	0.4	Bird droppings
EN1101448-003	EB-11	20-Jun-11	Jun-11	ALS Acirl	0930	50	1.0	0.8	2.0	4.0	0.5	Insects/Plant Material/Funnel broken in bottle
EN1101812-003	EB-11	19-Jul-11	Jul-11	ALS Acirl	1015	100	1.0	0.9	2.0	4.0	0.6	Insects, plant material
EN1102301-003	EB-11	17-Aug-11	Aug-11	ALS Acirl	0950	80	1.2	1.0	2.0	4.0	0.9	Insects
EN1102773-003	EB-11	16-Sep-11	Sep-11	ALS Acirl	1040	800	1.1	1.0	1.9	4.0	0.8	
EN1103124-003	EB-11	17-Oct-11	Oct-11	ALS Acirl	1030	1500	1.8	1.1	1.9	4.0	1.0	Insects, Clearing vegetation near gauge
EN1103467-003	EB-11	15-Nov-11	Nov-11	ALS Acirl	1030	900	1.1	1.1	1.9	4.0	1.0	Insects, Plant material
EN1104232-003	EB-11	15-Dec-11	Dec-11	ALS Acirl	1040	2500	1.0	1.1	1.9	4.0	0.6	Insects, Plant material
EN1200242-003	EB-11	13-Jan-12	Jan-12	ALS Acirl	0955	600	2.6	1.3	1.9	4.0	1.2	Insects, Plant material
EN1200606-003	EB-11	13-Feb-12	Feb-12	ALS Acirl				1.3	1.9	4.0		Broken upon arrival
EN1201026-003	EB-11	15-Mar-12	Mar-12	ALS Acirl	0950	500	0.5	1.2	1.9	4.0	0.5	Insects, Plant material
EN1201453-003	EB-11	16-Apr-12	Apr-12	ALS Acirl	0910	200	1.4	1.2	1.9	4.0	0.9	Insects, Plant material

* September 2009 result excluded from long term average (regional dust storms).

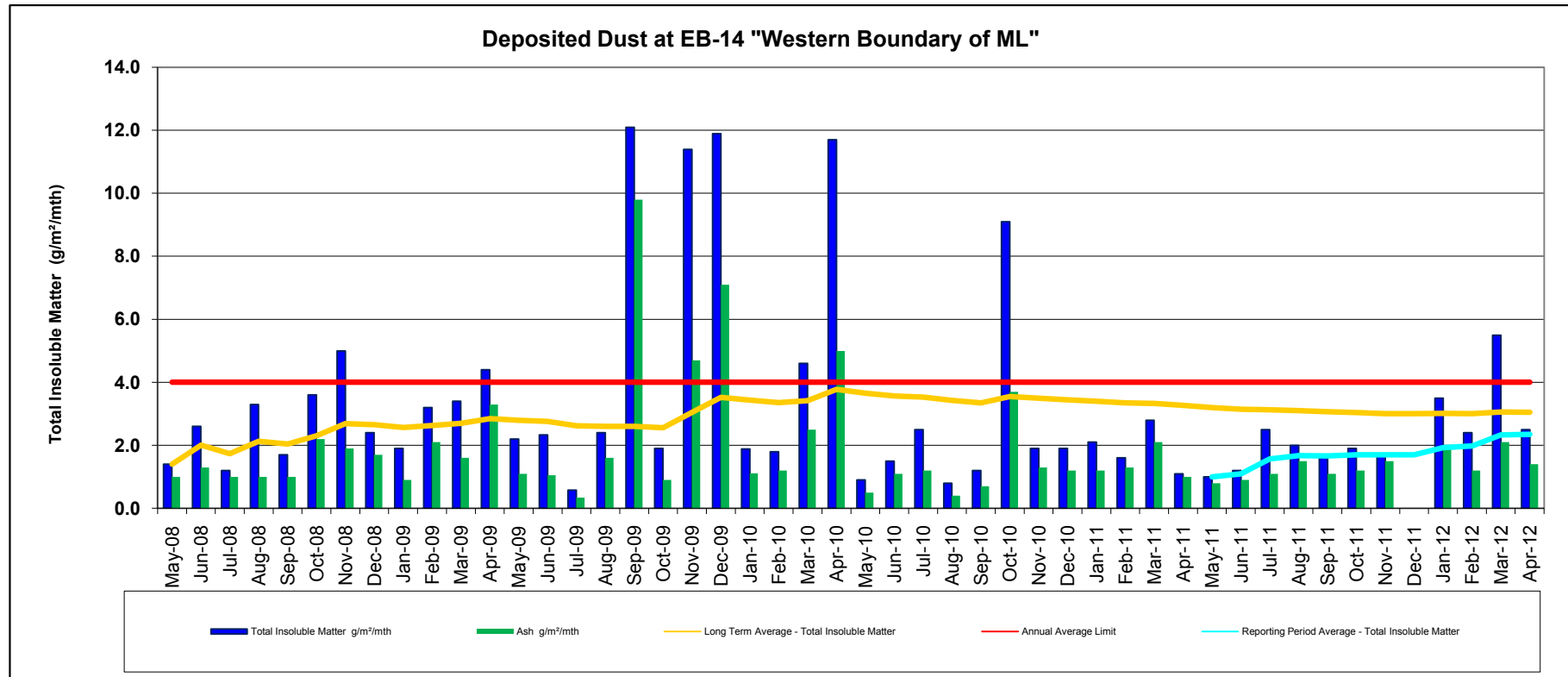


Deposited Dust EB-14 "Western Boundary of ML"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
30387.1	EB-14	02-Jun-08	May-08	Client	1045	220	1.4		1.4	4.0	1.0	
30661.1	EB-14	08-Jul-08	Jun-08	Client	1335	1195	2.6		2.0	4.0	1.3	
30903.0	EB-14	05-Aug-08	Jul-08	Client	1235	460	1.2		1.7	4.0	1.0	
31211.1	EB-14	01-Sep-08	Aug-08	Client	1350	720	3.3		2.1	4.0	1.0	
31528.1	EB-14	05-Oct-08	Sep-08	Client	1130	1400	1.7		2.0	4.0	1.0	
31776.1	EB-14	03-Nov-08	Oct-08	Client	1454	1295	3.6		2.3	4.0	2.2	
32024.1	EB-14	03-Dec-08	Nov-08	Client	1005	1165	5.0		2.7	4.0	1.9	
32519.1	EB-14	03-Jan-09	Dec-08	Client	1338	1110	2.4		2.7	4.0	1.7	
32247.1	EB-14	04-Feb-09	Jan-09	Client	1310	95	1.9		2.6	4.0	0.9	
32864.1	EB-14	03-Mar-09	Feb-09	Client	1225	1655	3.2		2.6	4.0	2.1	
2600 1008 - 0	EB-14	29-Mar-09	Mar-09	Client		50	3.4		2.7	4.0	1.6	
2600 1018 - 00	EB-14	01-May-09	Apr-09	ALS		600	4.4		2.8	4.0	3.3	Insects, Plant Material, Bird Droppings
2600 1033 - 01	EB-14	04-Jun-09	May-09	ALS		550	2.2		2.8	4.0	1.1	
2610 1039 - 01	EB-14	6-Jul-09	Jun-09	ALS		550	2.3		2.8	4.0	1.1	Insects, Plant Material
2609 1051 - 01	EB-14	3-Aug-09	Jul-09	ALS	1237	300	0.6		2.6	4.0	0.3	Insects
2600 1062 - 00	EB-14	31-Aug-09	Aug-09	ALS	1255	25	2.4		2.6	4.0	1.6	Insects, Bird Droppings, Plant Material
2600 1096 - 01	EB-14	29-Sep-09	Sep-09	ALS	1125	800	12.1		2.6	4.0	9.8	Insects, Plant Material
2600 1126 - 00	EB-14	03-Nov-09	Oct-09	ALS	1208	1000	1.9		2.6	4.0	0.9	Insects, Plant Material
2600 1204 - 00	EB-14	02-Dec-09	Nov-09	ALS	0950	10	11.4		3.1	4.0	4.7	Insects, Bird Droppings, Plant Material
2600 1222 - 00	EB-14	04-Jan-10	Dec-09	ALS	1435	2500	11.9		3.5	4.0	7.1	Insects, Plant Material
2600 1234	EB-14	1-Feb-10	Jan-10	ALS	1315	200	1.9		3.4	4.0	1.1	Insects, Plant Material
2600 1247	EB-14	2-Mar-10	Feb-10	ALS	1220	2500	1.8		3.4	4.0	1.2	Insects
2600 1260	EB-14	5-Apr-10	Mar-10	ALS	1220	2500	4.6		3.4	4.0	2.5	Insects, Bird Droppings, Plant Material
2600 1268	EB-14	3-May-10	Apr-10	ALS	1125	350	11.7		3.8	4.0	5.0	Insects, Bird Droppings, Plant Material
2600 1277	EB-14	25-May-10	May-10	ALS Acirl	1235	20	0.9		3.7	4.0	0.5	
2600 1288-805-1	EB-14	24-Jun-10	Jun-10	ALS Acirl	1045	850	1.5		3.6	4.0	1.1	Insects, Plant Material
2610 1298 - 887	EB-14	22-Jul-10	Jul-10	ALS Acirl	1120	500	2.5		3.5	4.0	1.2	Bird Droppings
26001309-914	EB-14	20-Aug-10	Aug-10	ALS Acirl	0930	2000	0.8		3.4	4.0	0.4	Insects, Plant Material
2600431904.00	EB-14	21-Sep-10	Sep-10	ALS Acirl	1320	1000	1.2		3.3	4.0	0.7	insects
6800-4368-14	EB-14	21-Oct-10	Oct-10	ALS Acirl	0920	400	9.1		3.5	4.0	3.7	
1002886-006	EB-14	22-Nov-10	Nov-10	ALS Acirl	1020	2200	1.9		3.5	4.0	1.3	
1003101-006	EB-14	22-Dec-10	Dec-10	ALS Acirl	1100		1.9		3.4	4.0	1.2	
1100199-006	EB-14	21-Jan-11	Jan-11	ALS Acirl	1100	300	2.1		3.4	4.0	1.2	
1100446-006	EB-14	22-Feb-11	Feb-11	ALS Acirl	1010	600	1.6		3.3	4.0	1.3	
1100695-006	EB-14	24-Mar-11	Mar-11	ALS Acirl	0930	500	2.8		3.3	4.0	2.1	
EN1100922-006	EB-14	20-Apr-11	Apr-11	ALS Acirl	0920	300	1.1		3.3	4.0	1.0	
EN1101205-006	EB-14	20-May-11	May-11	ALS Acirl	1000	Dry	1.0	1.0	3.2	4.0	0.8	No field observations
EN1101448-006	EB-14	20-Jun-11	Jun-11	ALS Acirl	0915	1200	1.2	1.1	3.1	4.0	0.9	Plant Material
EN1101812-006	EB-14	19-Jul-11	Jul-11	ALS Acirl	1030	100	2.5	1.6	3.1	4.0	1.1	Insects, plant material
EN1102301-006	EB-14	17-Aug-11	Aug-11	ALS Acirl	0925	100	2.0	1.7	3.1	4.0	1.5	Insects, Plant material
EN1102773-006	EB-14	16-Sep-11	Sep-11	ALS Acirl	1010	700	1.6	1.7	3.1	4.0	1.1	Insects
EN1103124-006	EB-14	17-Oct-11	Oct-11	ALS Acirl	0955	1400	1.9	1.7	3.0	4.0	1.2	Insects, plant material

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
EN1103467-006	EB-14	15-Nov-11	Nov-11	ALS Acirl	1010	600	1.7	1.7	3.0	4.0	1.5	Insects, Plant material
EN1200212-001	EB-14	6-Jan-11	Dec-11	ALS Acirl				1.7	3.0	4.0		Bottle Broken
EN1200242-006	EB-14	13-Jan-12	Jan-12	ALS Acirl	1010	600	3.5	1.9	3.0	4.0	1.9	Insects, Plant material
EN1200606-006	EB-14	13-Feb-12	Feb-12	ALS Acirl	1230	2500	2.4	2.0	3.0	4.0	1.2	Insects, Plant material
EN1201026-006	EB-14	15-Mar-12	Mar-12	ALS Acirl	1010	500	5.5	2.3	3.1	4.0	2.1	Insects, Plant material
EN1201453-006	EB-14	16-Apr-12	Apr-12	ALS Acirl	0940	100	2.5	2.3	3.0	4.0	1.4	Insects, Bird droppings, Plant material

* September 2009 result excluded from long term average (regional dust storms).

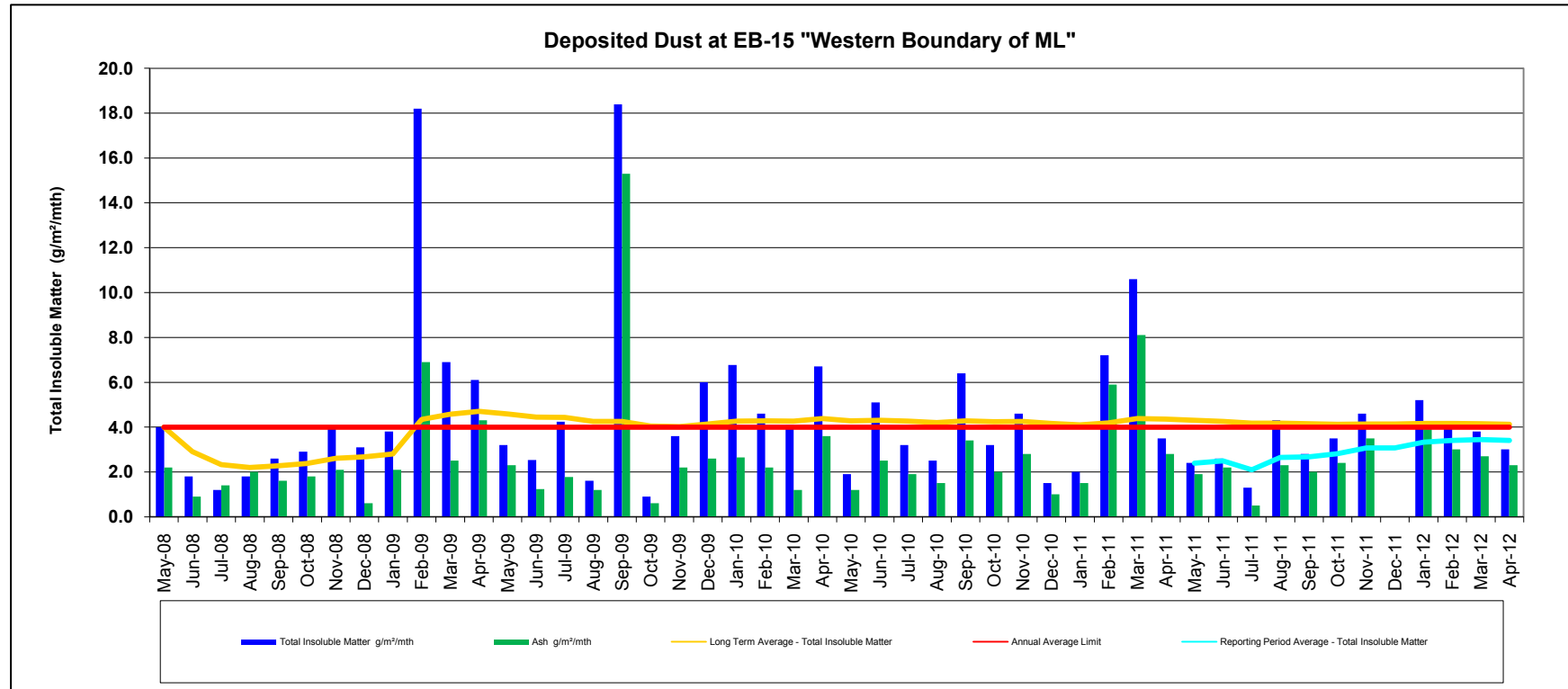


Deposited Dust EB-15 "Western Boundary of ML"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
30387.1	EB-15	02-Jun-08	May-08	Client	1035	165	4.0		4.0	4.0	2.2	
30661.1	EB-15	08-Jul-08	Jun-08	Client	1330	1145	1.8		2.9	4.0	0.9	
30903.0	EB-15	05-Aug-08	Jul-08	Client	1225	345	1.2		2.3	4.0	1.4	
31211.1	EB-15	01-Sep-08	Aug-08	Client	1345	635	1.8		2.2	4.0	2.0	
31528.1	EB-15	05-Oct-08	Sep-08	Client	1120	1605	2.6		2.3	4.0	1.6	
31776.1	EB-15	03-Nov-08	Oct-08	Client	1446	1375	2.9		2.4	4.0	1.8	
32024.0	EB-15	03-Dec-08	Nov-08	Client	1000	1340	4.0		2.6	4.0	2.1	
32519.1	EB-15	03-Jan-09	Dec-08	Client	1330	1600	3.1		2.7	4.0	0.6	
32247.1	EB-15	04-Feb-09	Jan-09	Client	1300	165	3.8		2.8	4.0	2.1	
32864.1	EB-15	03-Mar-09	Feb-09	Client	1216	2055	18.2		4.3	4.0	6.9	
2600 1008 - 0	EB-15	29-Mar-09	Mar-09	ALS		50	6.9		4.6	4.0	2.5	
2600 1018 - 00	EB-15	01-May-09	Apr-09	ALS		600	6.1		4.7	4.0	4.3	
2600 1033 - 01	EB-15	04-Jun-09	May-09	ALS		650	3.2		4.6	4.0	2.3	
2611 1039 - 01	EB-15	6-Jul-09	Jun-09	ALS		650	2.5		4.4	4.0	1.2	
2610 1051 - 01	EB-15	3-Aug-09	Jul-09	ALS	1230	450	4.2		4.4	4.0	1.8	Insects, Plant Material
2600 1062 - 00	EB-15	31-Aug-09	Aug-09	ALS	1245	50	1.6		4.2	4.0	1.2	Plant Material
2600 1096 - 01	EB-15	29-Sep-09	Sep-09	ALS	1115	900	18.4		4.2	4.0	15.3	Insects, Bird Droppings, Plant Material
2600 1126 - 00	EB-15	03-Nov-09	Oct-09	ALS	1202	1000	0.9		4.1	4.0	0.6	Insects, Bird Droppings, Plant Material
2600 1204 - 00	EB-15	02-Dec-09	Nov-09	ALS	0945	20	3.6		4.0	4.0	2.2	
2600 1222 - 00	EB-15	04-Jan-10	Dec-09	ALS	1430	2500	6.0		4.1	4.0	2.6	
2600 1234	EB-15	1-Feb-10	Jan-10	ALS	1310	600	6.8		4.3	4.0	2.7	
2600 1247	EB-15	2-Mar-10	Feb-10	ALS	1035	2500	4.6		4.3	4.0	2.2	
2600 1260	EB-15	5-Apr-10	Mar-10	ALS	1035	2500	4.1		4.3	4.0	1.2	
2600 1268	EB-15	03-May-10	Apr-10	ALS	1115	350	6.7		4.4	4.0	3.6	
2600 1277	EB-15	25-May-10	May-10	ALS Acirl	1230	50	1.9		4.3	4.0	1.2	Insects, Plant Material
2600 1288-805-1	EB-15	24-Jun-10	Jun-10	ALS Acirl	1040	900	5.1		4.3	4.0	2.5	Insects, Plant Material
2611 1298 - 887	EB-15	22-Jul-10	Jul-10	ALS Acirl	1110	500	3.2		4.3	4.0	1.9	Insects, Plant Material, Bird Droppings
26001309-914	EB-15	20-Aug-10	Aug-10	ALS Acirl	0915	2000	2.5		4.2	4.0	1.5	Insects, Plant Material
2600431904.00	EB-15	21-Sep-10	Sep-10	ALS Acirl	1310	1100	6.4		4.3	4.0	3.4	Insects
6800-4368-14	EB-15	21-Oct-10	Oct-10	ALS Acirl	0915	600	3.2		4.2	4.0	2.0	
1002886-007	EB-15	22-Nov-10	Nov-10	ALS Acirl	1000	2400	4.6		4.3	4.0	2.8	
1003101-007	EB-15	22-Dec-10	Dec-10	ALS Acirl	1045		1.5		4.2	4.0	1.0	
1100199-007	EB-15	21-Jan-11	Jan-11	ALS Acirl	1040	400	2.0		4.1	4.0	1.5	
1100446-007	EB-15	22-Feb-11	Feb-11	ALS Acirl	1000	600	7.2		4.2	4.0	5.9	
1100695-007	EB-15	24-Mar-11	Mar-11	ALS Acirl	0920	600	10.6		4.4	4.0	8.1	
EN1100922-007	EB-15	20-Apr-11	Apr-11	ALS Acirl	0910	400	3.5		4.4	4.0	2.8	
EN1101205-007	EB-15	20-May-11	May-11	ALS Acirl	945	Dry	2.4	2.4	4.3	4.0	1.9	
EN1101448-007	EB-15	20-Jun-11	Jun-11	ALS Acirl	0910	1200	2.6	2.5	4.3	4.0	2.2	Insects/Plant Material/Bird Droppings
EN1101812-007	EB-15	19-Jul-11	Jul-11	ALS Acirl	1040	100	1.3	2.1	4.2	4.0	0.5	Insects, bird droppings, plant material
EN1102301-007	EB-15	17-Aug-11	Aug-11	ALS Acirl	0915	150	4.3	2.7	4.2	4.0	2.3	Bird droppings
EN1102773-007	EB-15	16-Sep-11	Sep-11	ALS Acirl	0950	800	2.8	2.7	4.1	4.0	2.0	Insects, Plant material
EN1103124-007	EB-15	17-Oct-11	Oct-11	ALS Acirl	0940	1500	3.5	2.8	4.1	4.0	2.4	Insects, plant material
EN1103467-007	EB-15	15-Nov-11	Nov-11	ALS Acirl	1000	600	4.6	3.1	4.1	4.0	3.5	Insects, Plant material
EN1200212-002	EB-15	6-Jan-11	Dec-11	ALS Acirl				3.1	4.1	4.0		Bottle Broken in transit

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
EN1200242-007	EB-15	13-Jan-12	Jan-12	ALS Acirl	1030	600	5.2	3.3	4.2	4.0	3.9	Insects, Plant material
EN1200606-007	EB-15	13-Feb-12	Feb-12	ALS Acirl	1245	2500	4.0	3.4	4.2	4.0	3.0	Insects, Plant material
EN1201026-007	EB-15	15-Mar-12	Mar-12	ALS Acirl	0930	500	3.8	3.5	4.2	4.0	2.7	Insects, Bird droppings, Plant material
EN1201453-007	EB-15	16-Apr-12	Apr-12	ALS Acirl	0955	100	3.0	3.4	4.1	4.0	2.3	Insects, Bird droppings, Plant material

* September 2009 result excluded from long term average (regional dust storms).



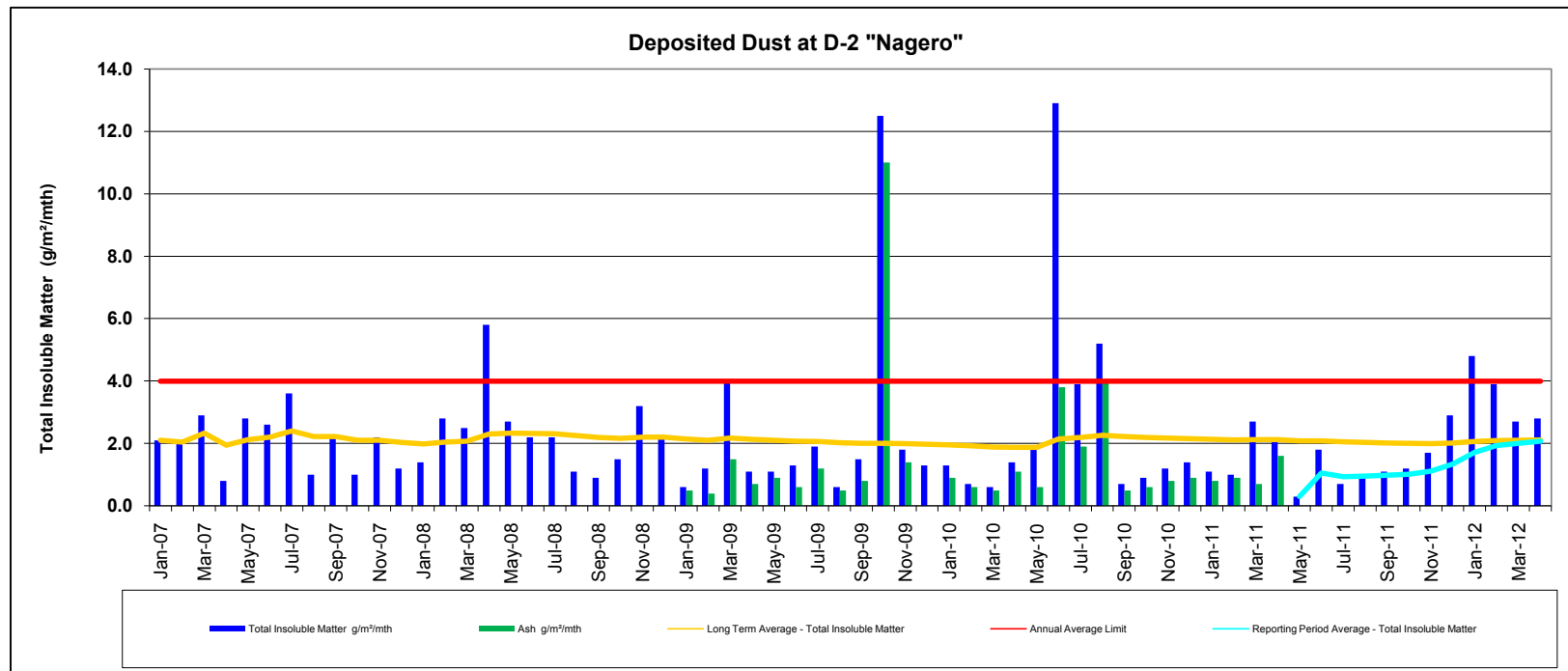
Deposited Dust D-2 "Nagero"

Note: This site is monitored by Idemitsu Boggabri Coal. The sample month generally reflects the period between the 15th of the previous month and the 15th of the sample month.

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-2	Jan-07	IBC			2.1		2.1	4.0		
D-2	Feb-07	IBC			2.0		2.1	4.0		
D-2	Mar-07	IBC			2.9		2.3	4.0		
D-2	Apr-07	IBC			0.8		2.0	4.0		
D-2	May-07	IBC			2.8		2.1	4.0		
D-2	Jun-07	IBC			2.6		2.2	4.0		
D-2	Jul-07	IBC			3.6		2.4	4.0		
D-2	Aug-07	IBC			1.0		2.2	4.0		
D-2	Sep-07	IBC			2.2		2.2	4.0		
D-2	Oct-07	IBC			1.0		2.1	4.0		
D-2	Nov-07	IBC			2.2		2.1	4.0		
D-2	Dec-07	IBC			1.2		2.0	4.0		
D-2	Jan-08	IBC			1.4		2.0	4.0		
D-2	Feb-08	IBC			2.8		2.0	4.0		
D-2	Mar-08	IBC			2.5		2.1	4.0		
D-2	Apr-08	IBC			5.8		2.3	4.0		
D-2	May-08	IBC			2.7		2.3	4.0		
D-2	Jun-08	IBC			2.2		2.3	4.0		
D-2	Jul-08	IBC			2.2		2.3	4.0		
D-2	Aug-08	IBC			1.1		2.3	4.0		
D-2	Sep-08	IBC			0.9		2.2	4.0		
D-2	Oct-08	IBC			1.5		2.2	4.0		
D-2	Nov-08	IBC			3.2		2.2	4.0		
D-2	Dec-08	IBC			2.2		2.2	4.0		
D-2	Jan-09	IBC			0.6		2.1	4.0	0.5	
D-2	Feb-09	IBC			1.2		2.1	4.0	0.4	
D-2	Mar-09	IBC			4.0		2.2	4.0	1.5	
D-2	Apr-09	IBC			1.1		2.1	4.0	0.7	
D-2	May-09	IBC			1.1		2.1	4.0	0.9	
D-2	Jun-09	IBC			1.3		2.1	4.0	0.6	
D-2	Jul-09	IBC			1.9		2.1	4.0	1.2	
D-2	Aug-09	IBC			0.6		2.0	4.0	0.5	
D-2	Sep-09	IBC			1.5		2.0	4.0	0.8	
D-2	Oct-09	IBC			12.5		2.0	4.0	11	
D-2	Nov-09	IBC			1.8		2.0	4.0	1.4	
D-2	Dec-09	IBC			1.3		2.0	4.0		
D-2	Jan-10	IBC			1.3		2.0	4.0	0.9	
D-2	Feb-10	IBC			0.7		1.9	4.0	0.6	
D-2	Mar-10	IBC			0.6		1.9	4.0	0.5	
D-2	Apr-10	IBC			1.4		1.9	4.0	1.1	
D-2	May-10	IBC			1.8		1.9	4.0	0.6	
D-2	Jun-10	IBC			12.9		2.1	4.0	3.8	
D-2	Jul-10	IBC			3.9		2.2	4.0	1.9	
D-2	Aug-10	IBC			5.2		2.3	4.0	4	
D-2	Sep-10	IBC			0.7		2.2	4.0	0.5	
D-2	Oct-10	IBC			0.9		2.2	4.0	0.6	
D-2	Nov-10	IBC			1.2		2.2	4.0	0.8	
D-2	Dec-10	IBC			1.4		2.2	4.0	0.9	

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-2	Jan-11	IBC			1.1		2.1	4.0	0.8	
D-2	Feb-11	IBC			1		2.1	4.0	0.9	
D-2	Mar-11	IBC			2.7		2.1	4.0	0.7	
D-2	Apr-11	IBC			2.1		2.1	4.0	1.6	
D-2	May-11	IBC			0.3	0.3	2.1	4.0		
D-2	Jun-11	IBC			1.8	1.1	2.1	4.0		
D-2	Jul-11	IBC			0.7	0.9	2.1	4.0		
D-2	Aug-11	IBC			1	1.0	2.0	4.0		
D-2	Sep-11	IBC			1.1	1.0	2.0	4.0		
D-2	Oct-11	IBC			1.2	1.0	2.0	4.0		
D-2	Nov-11	IBC			1.7	1.1	2.0	4.0		
D-2	Dec-11	IBC			2.9	1.3	2.0	4.0		
D-2	Jan-12	IBC			4.8	1.7	2.1	4.0		
D-2	Feb-12	IBC			3.9	1.9	2.1	4.0		
D-2	Mar-12	IBC			2.7	2.0	2.1	4.0		
D-2	Apr-12	IBC			2.8	2.1	2.1	4.0		

* October 2009 result excluded from long term average (regional dust storms).



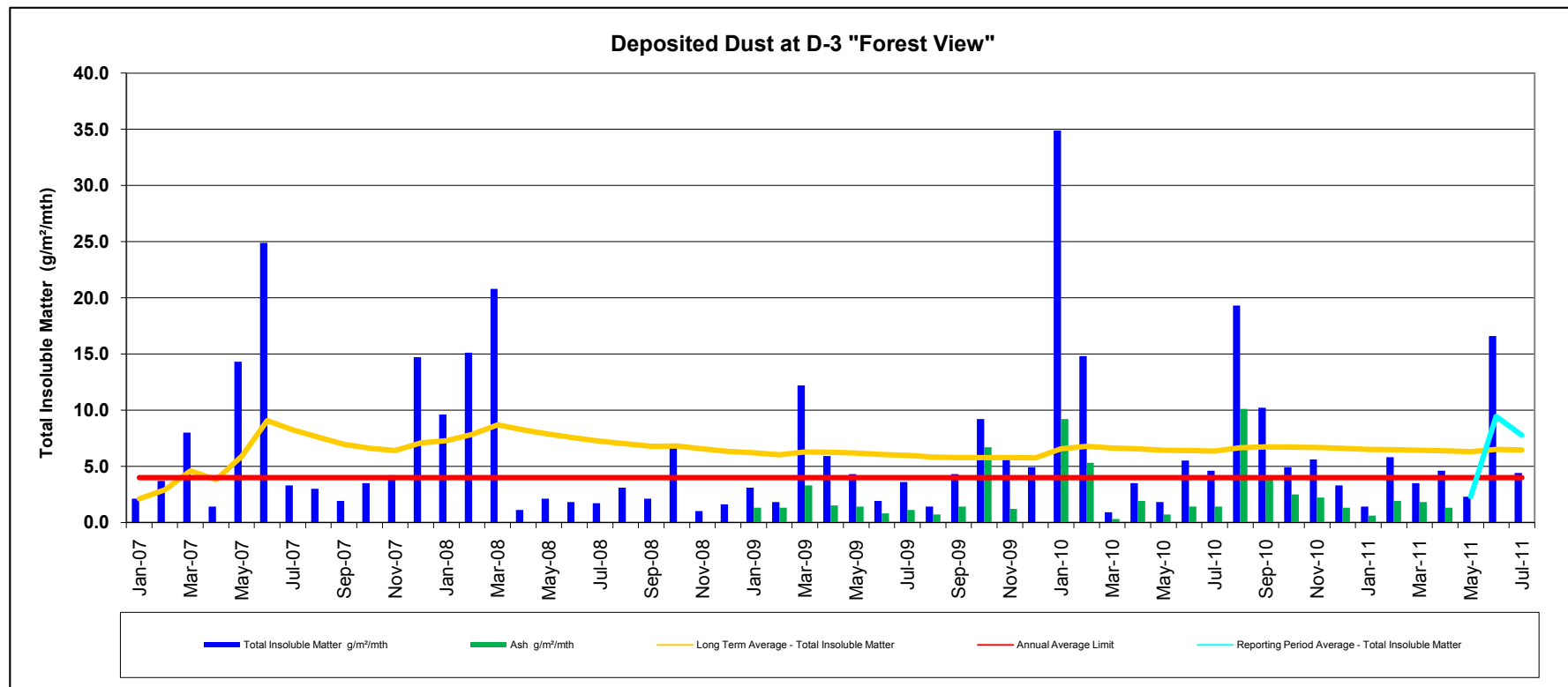
Deposited Dust D-3 "Forest View"

Note: This site is monitored by Idemitsu Boggabri Coal. The sample month generally reflects the period between the 15th of the previous month and the 15th of the sample month.

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-3	Jan-07	IBC			2.1		2.1	4.0		
D-3	Feb-07	IBC			3.7		2.9	4.0		
D-3	Mar-07	IBC			8.0		4.6	4.0		
D-3	Apr-07	IBC			1.4		3.8	4.0		
D-3	May-07	IBC			14.3		5.9	4.0		
D-3	Jun-07	IBC			24.9		9.1	4.0		
D-3	Jul-07	IBC			3.3		8.2	4.0		
D-3	Aug-07	IBC			3.0		7.6	4.0		
D-3	Sep-07	IBC			1.9		7.0	4.0		
D-3	Oct-07	IBC			3.5		6.6	4.0		
D-3	Nov-07	IBC			4.2		6.4	4.0		
D-3	Dec-07	IBC			14.7		7.1	4.0		
D-3	Jan-08	IBC			9.6		7.3	4.0		
D-3	Feb-08	IBC			15.1		7.8	4.0		
D-3	Mar-08	IBC			20.8		8.7	4.0		
D-3	Apr-08	IBC			1.1		8.2	4.0		
D-3	May-08	IBC			2.1		7.9	4.0		
D-3	Jun-08	IBC			1.8		7.5	4.0		
D-3	Jul-08	IBC			1.7		7.2	4.0		
D-3	Aug-08	IBC			3.1		7.0	4.0		
D-3	Sep-08	IBC			2.1		6.8	4.0		
D-3	Oct-08	IBC			7.0		6.8	4.0		
D-3	Nov-08	IBC			1.0		6.5	4.0		
D-3	Dec-08	IBC			1.6		6.3	4.0		
D-3	Jan-09	IBC			3.1		6.2	4.0	1.3	
D-3	Feb-09	IBC			1.8		6.0	4.0	1.3	
D-3	Mar-09	IBC			12.2		6.3	4.0	3.3	
D-3	Apr-09	IBC			5.9		6.3	4.0	1.5	
D-3	May-09	IBC			4.3		6.2	4.0	1.4	
D-3	Jun-09	IBC			1.9		6.0	4.0	0.8	
D-3	Jul-09	IBC			3.6		6.0	4.0	1.1	
D-3	Aug-09	IBC			1.4		5.8	4.0	0.7	
D-3	Sep-09	IBC			4.3		5.8	4.0	1.4	
D-3	Oct-09	IBC			9.2		5.8	4.0	6.7	
D-3	Nov-09	IBC			5.6		5.8	4.0	1.2	
D-3	Dec-09	IBC			4.9		5.7	4.0		
D-3	Jan-10	IBC			34.9		6.6	4.0	9.2	
D-3	Feb-10	IBC			14.8		6.8	4.0	5.3	
D-3	Mar-10	IBC			0.9		6.6	4.0	0.3	
D-3	Apr-10	IBC			3.5		6.5	4.0	1.9	
D-3	May-10	IBC			1.8		6.4	4.0	0.7	
D-3	Jun-10	IBC			5.5		6.4	4.0	1.4	
D-3	Jul-10	IBC			4.6		6.4	4.0	1.4	

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-3	Aug-10	IBC			19.3		6.7	4.0	10.1	
D-3	Sep-10	IBC			10.2		6.7	4.0	4	
D-3	Oct-10	IBC			4.9		6.7	4.0	2.5	
D-3	Nov-10	IBC			5.6		6.7	4.0	2.2	
D-3	Dec-10	IBC			3.3		6.6	4.0	1.3	
D-3	Jan-11	IBC			1.4		6.5	4.0	0.6	
D-3	Feb-11	IBC			5.8		6.5	4.0	1.9	
D-3	Mar-11	IBC			3.5		6.4	4.0	1.8	
D-3	Apr-11	IBC			4.6		6.4	4.0	1.3	
D-3	May-11	IBC			2.3	2.3	6.3	4.0		
D-3	Jun-11	IBC			16.6	9.5	6.5	4.0		
D-3	Jul-11	IBC			4.4	7.8	6.5	4.0		Monitor replaced with D-15

* October 2009 result excluded from long term average (regional dust storms).



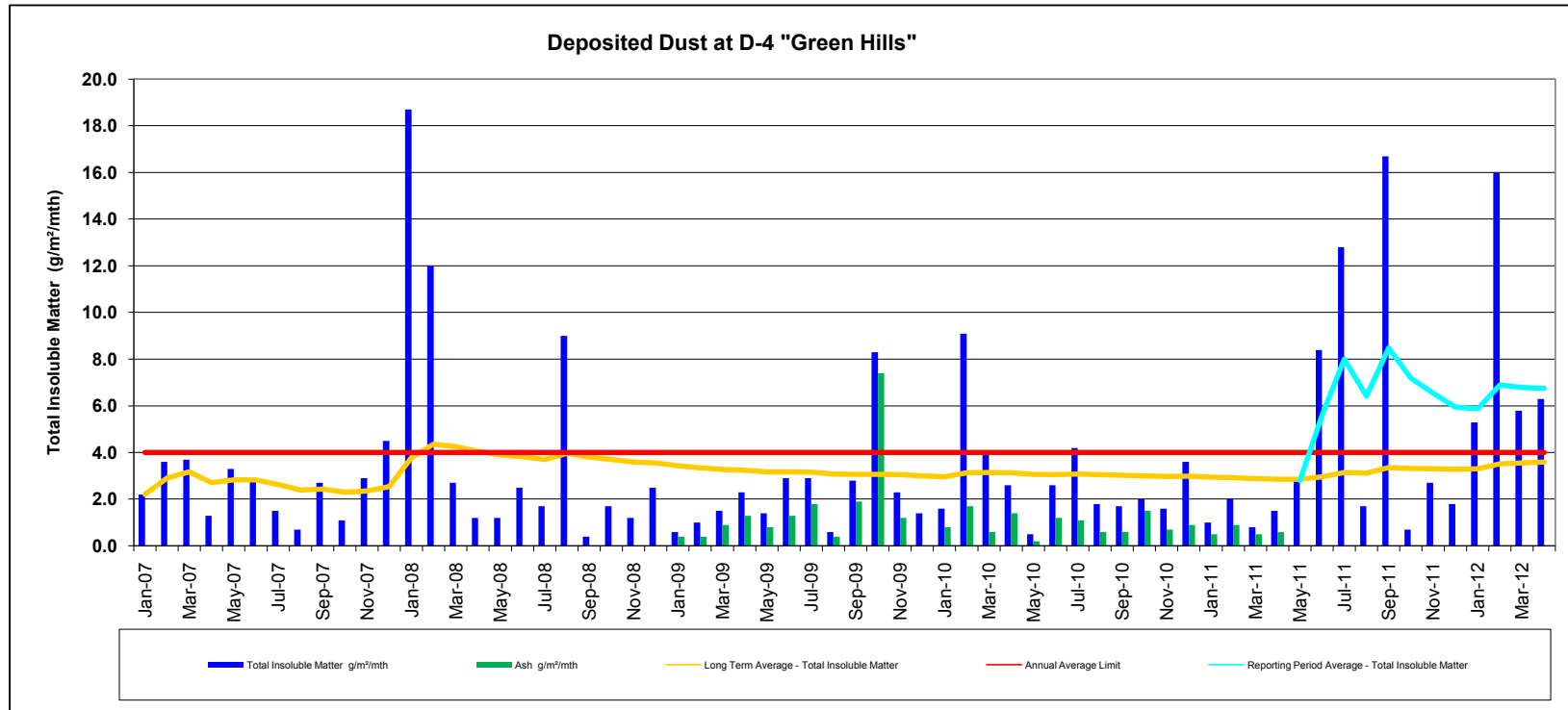
Deposited Dust D-4 "Green Hills"

Note: This site is monitored by Idemitsu Boggabri Coal. The sample month generally reflects the period between the 15th of the previous month and the 15th of the sample month.

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-4	Jan-07	IBC			2.2		2.2	4.0		
D-4	Feb-07	IBC			3.6		2.9	4.0		
D-4	Mar-07	IBC			3.7		3.2	4.0		
D-4	Apr-07	IBC			1.3		2.7	4.0		
D-4	May-07	IBC			3.3		2.8	4.0		
D-4	Jun-07	IBC			2.8		2.8	4.0		
D-4	Jul-07	IBC			1.5		2.6	4.0		
D-4	Aug-07	IBC			0.7		2.4	4.0		
D-4	Sep-07	IBC			2.7		2.4	4.0		
D-4	Oct-07	IBC			1.1		2.3	4.0		
D-4	Nov-07	IBC			2.9		2.3	4.0		
D-4	Dec-07	IBC			4.5		2.5	4.0		
D-4	Jan-08	IBC			18.7		3.8	4.0		
D-4	Feb-08	IBC			12.0		4.4	4.0		
D-4	Mar-08	IBC			2.7		4.2	4.0		
D-4	Apr-08	IBC			1.2		4.1	4.0		
D-4	May-08	IBC			1.2		3.9	4.0		
D-4	Jun-08	IBC			2.5		3.8	4.0		
D-4	Jul-08	IBC			1.7		3.7	4.0		
D-4	Aug-08	IBC			9.0		4.0	4.0		
D-4	Sep-08	IBC			0.4		3.8	4.0		
D-4	Oct-08	IBC			1.7		3.7	4.0		
D-4	Nov-08	IBC			1.2		3.6	4.0		
D-4	Dec-08	IBC			2.5		3.5	4.0		
D-4	Jan-09	IBC			0.6		3.4	4.0	0.4	
D-4	Feb-09	IBC			1.0		3.3	4.0	0.4	
D-4	Mar-09	IBC			1.5		3.3	4.0	0.9	
D-4	Apr-09	IBC			2.3		3.2	4.0	1.3	
D-4	May-09	IBC			1.4		3.2	4.0	0.8	
D-4	Jun-09	IBC			2.9		3.2	4.0	1.3	
D-4	Jul-09	IBC			2.9		3.2	4.0	1.8	
D-4	Aug-09	IBC			0.6		3.1	4.0	0.4	
D-4	Sep-09	IBC			2.8		3.1	4.0	1.9	
D-4	Oct-09	IBC			8.3		3.1	4.0	7.4	
D-4	Nov-09	IBC			2.3		3.0	4.0	1.2	
D-4	Dec-09	IBC			1.4		3.0	4.0		
D-4	Jan-10	IBC			1.6		3.0	4.0	0.8	
D-4	Feb-10	IBC			9.1		3.1	4.0	1.7	
D-4	Mar-10	IBC			3.9		3.1	4.0	0.6	
D-4	Apr-10	IBC			2.6		3.1	4.0	1.4	
D-4	May-10	IBC			0.5		3.1	4.0	0.2	
D-4	Jun-10	IBC			2.6		3.1	4.0	1.2	
D-4	Jul-10	IBC			4.2		3.1	4.0	1.1	
D-4	Aug-10	IBC			1.8		3.0	4.0	0.6	
D-4	Sep-10	IBC			1.7		3.0	4.0	0.6	
D-4	Oct-10	IBC			2		3.0	4.0	1.5	
D-4	Nov-10	IBC			1.6		3.0	4.0	0.7	
D-4	Dec-10	IBC			3.6		3.0	4.0	0.9	
D-4	Jan-11	IBC			1		2.9	4.0	0.5	

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-4	Feb-11	IBC			2		2.9	4.0	0.9	
D-4	Mar-11	IBC			0.8		2.9	4.0	0.5	
D-4	Apr-11	IBC			1.5		2.8	4.0	0.6	
D-4	May-11	IBC			2.8	2.8	2.8	4.0		
D-4	Jun-11	IBC			8.4	5.6	3.0	4.0		
D-4	Jul-11	IBC			12.8	8.0	3.1	4.0		
D-4	Aug-11	IBC			1.7	6.4	3.1	4.0		
D-4	Sep-11	IBC			16.7	8.5	3.4	4.0		
D-4	Oct-11	IBC			0.7	7.2	3.3	4.0		
D-4	Nov-11	IBC			2.7	6.5	3.3	4.0		
D-4	Dec-11	IBC			1.8	6.0	3.3	4.0		
D-4	Jan-12	IBC			5.3	5.9	3.3	4.0		
D-4	Feb-12	IBC			16	6.9	3.5	4.0		
D-4	Mar-12	IBC			5.8	6.8	3.5	4.0		
D-4	Apr-12	IBC			6.3	6.8	3.6	4.0		

* October 2009 result excluded from long term average (regional dust storms).



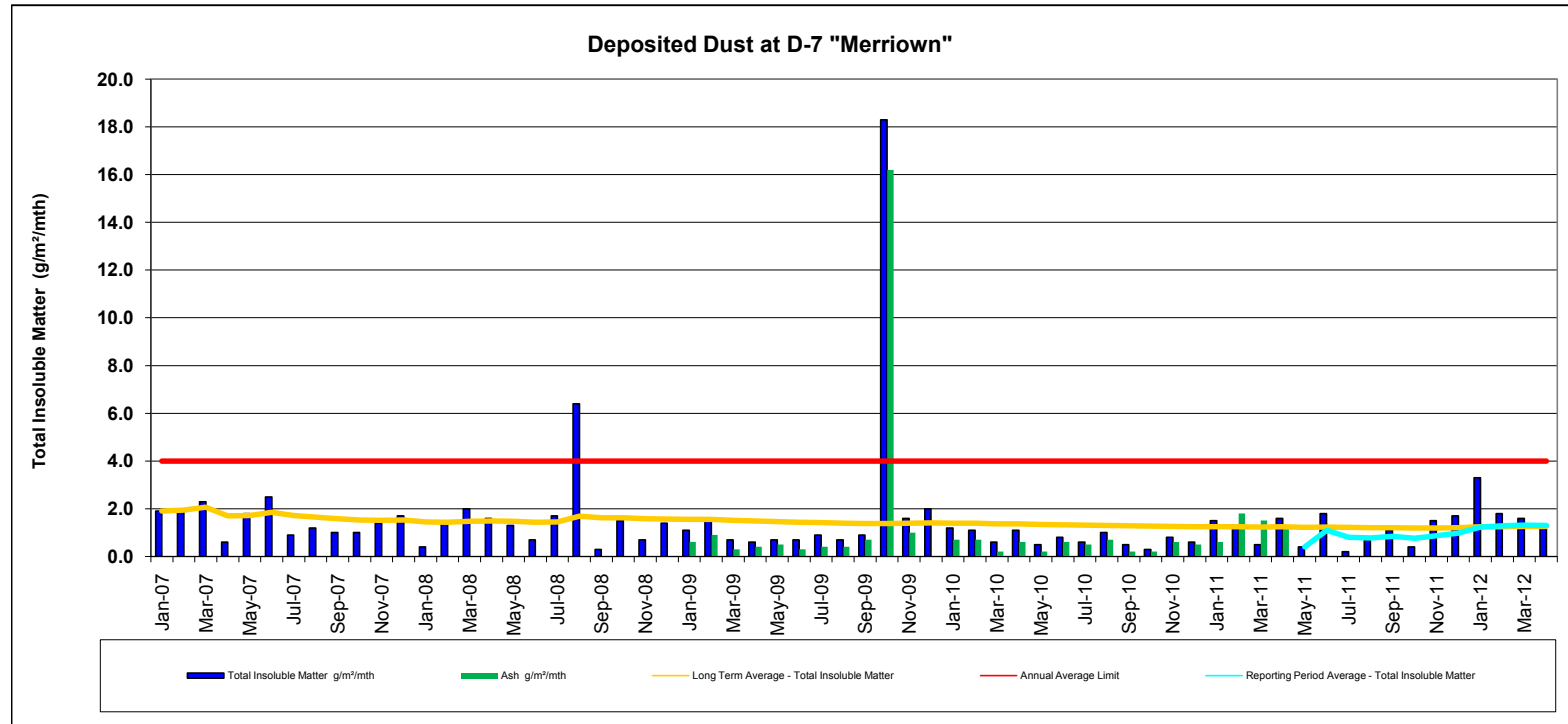
Deposited Dust D-7 "Merriown"

Note: This site is monitored by Idemitsu Boggabri Coal. The sample month generally reflects the period between the 15th of the previous month and the 15th of the sample month.

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-7	Jan-07	IBC			1.9		1.9	4.0		
D-7	Feb-07	IBC			2.0		2.0	4.0		
D-7	Mar-07	IBC			2.3		2.1	4.0		
D-7	Apr-07	IBC			0.6		1.7	4.0		
D-7	May-07	IBC			1.8		1.7	4.0		
D-7	Jun-07	IBC			2.5		1.9	4.0		
D-7	Jul-07	IBC			0.9		1.7	4.0		
D-7	Aug-07	IBC			1.2		1.7	4.0		
D-7	Sep-07	IBC			1.0		1.6	4.0		
D-7	Oct-07	IBC			1.0		1.5	4.0		
D-7	Nov-07	IBC			1.4		1.5	4.0		
D-7	Dec-07	IBC			1.7		1.5	4.0		
D-7	Jan-08	IBC			0.4		1.4	4.0		
D-7	Feb-08	IBC			1.4		1.4	4.0		
D-7	Mar-08	IBC			2.0		1.5	4.0		
D-7	Apr-08	IBC			1.6		1.5	4.0		
D-7	May-08	IBC			1.3		1.5	4.0		
D-7	Jun-08	IBC			0.7		1.4	4.0		
D-7	Jul-08	IBC			1.7		1.4	4.0		
D-7	Aug-08	IBC			6.4		1.7	4.0		
D-7	Sep-08	IBC			0.3		1.6	4.0		
D-7	Oct-08	IBC			1.5		1.6	4.0		
D-7	Nov-08	IBC			0.7		1.6	4.0		
D-7	Dec-08	IBC			1.4		1.6	4.0		
D-7	Jan-09	IBC			1.1		1.6	4.0	0.6	
D-7	Feb-09	IBC			1.5		1.6	4.0	0.9	
D-7	Mar-09	IBC			0.7		1.5	4.0	0.3	
D-7	Apr-09	IBC			0.6		1.5	4.0	0.4	
D-7	May-09	IBC			0.7		1.5	4.0	0.5	
D-7	Jun-09	IBC			0.7		1.4	4.0	0.3	
D-7	Jul-09	IBC			0.9		1.4	4.0	0.4	
D-7	Aug-09	IBC			0.7		1.4	4.0	0.4	
D-7	Sep-09	IBC			0.9		1.4	4.0	0.7	
D-7	Oct-09	IBC			18.3		1.4	4.0	16.2	
D-7	Nov-09	IBC			1.6		1.4	4.0	1	
D-7	Dec-09	IBC			2		1.4	4.0		
D-7	Jan-10	IBC			1.2		1.4	4.0	0.7	
D-7	Feb-10	IBC			1.1		1.4	4.0	0.7	
D-7	Mar-10	IBC			0.6		1.4	4.0	0.2	
D-7	Apr-10	IBC			1.1		1.4	4.0	0.6	
D-7	May-10	IBC			0.5		1.3	4.0	0.2	
D-7	Jun-10	IBC			0.8		1.3	4.0	0.6	
D-7	Jul-10	IBC			0.6		1.3	4.0	0.5	
D-7	Aug-10	IBC			1		1.3	4.0	0.7	
D-7	Sep-10	IBC			0.5		1.3	4.0	0.2	
D-7	Oct-10	IBC			0.3		1.3	4.0	0.2	
D-7	Nov-10	IBC			0.8		1.3	4.0	0.6	
D-7	Dec-10	IBC			0.6		1.2	4.0	0.5	
D-7	Jan-11	IBC			1.5		1.2	4.0	0.6	

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-7	Feb-11	IBC			1.3		1.2	4.0	1.8	
D-7	Mar-11	IBC			0.5		1.2	4.0	1.5	
D-7	Apr-11	IBC			1.6		1.2	4.0	1.2	
D-7	May-11	IBC			0.4	0.4	1.2	4.0		
D-7	Jun-11	IBC			1.8	1.1	1.2	4.0		
D-7	Jul-11	IBC			0.2	0.8	1.2	4.0		
D-7	Aug-11	IBC			0.7	0.8	1.2	4.0		
D-7	Sep-11	IBC			1.1	0.8	1.2	4.0		
D-7	Oct-11	IBC			0.4	0.8	1.2	4.0		
D-7	Nov-11	IBC			1.5	0.9	1.2	4.0		
D-7	Dec-11	IBC			1.7	1.0	1.2	4.0		
D-7	Jan-12	IBC			3.3	1.2	1.2	4.0		
D-7	Feb-12	IBC			1.8	1.3	1.2	4.0		
D-7	Mar-12	IBC			1.6	1.3	1.3	4.0		
D-7	Apr-12	IBC			1.2	1.3	1.3	4.0		

* October 2009 result excluded from long term average (regional dust storms).



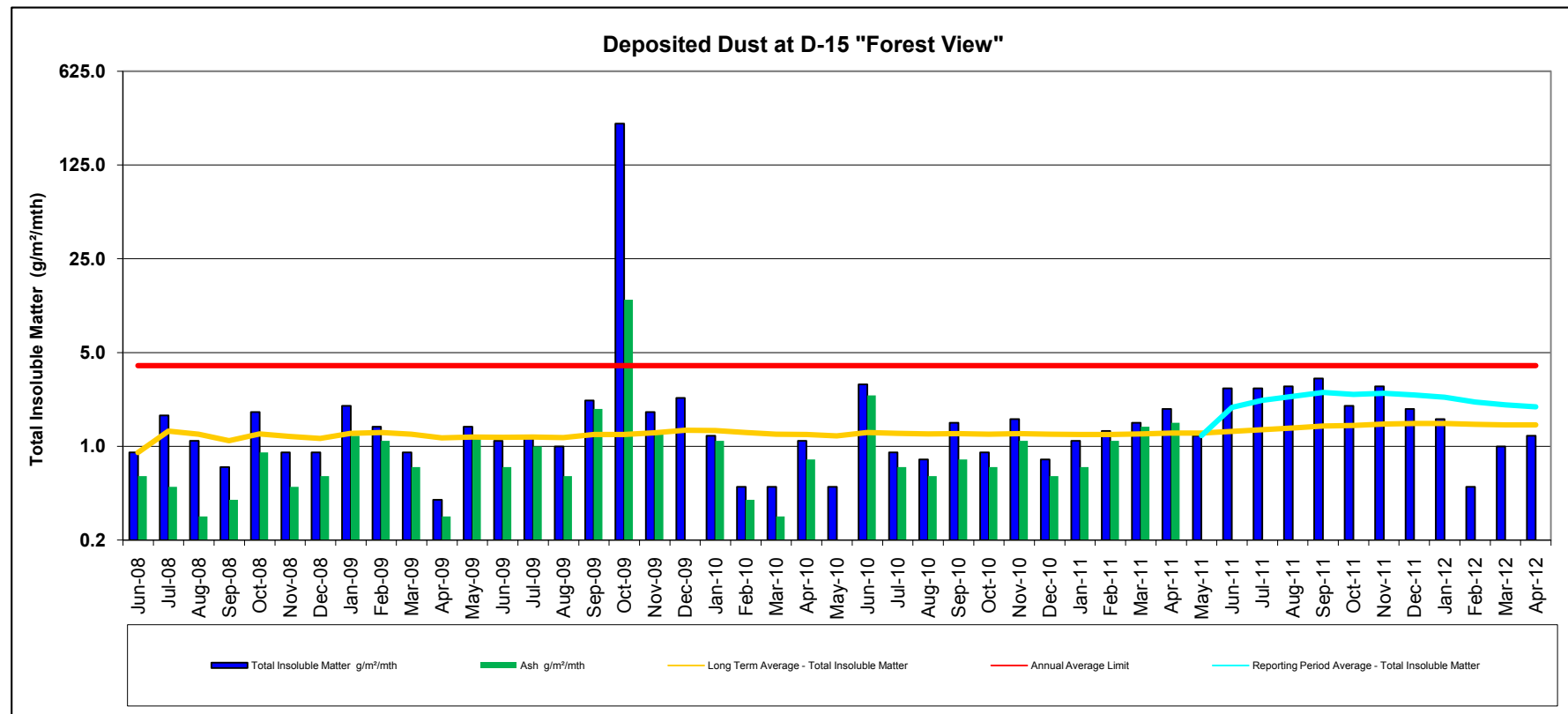
Deposited Dust D-15 "Forest View"

Note: This site is monitored by Idemitsu Boggabri Coal. The sample month generally reflects the period between the 15th of the previous month and the 15th of the sample month.

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-15	Jun-08	IBC			0.9		0.9	4.0	0.6	
D-15	Jul-08	IBC			1.7		1.3	4.0	0.5	
D-15	Aug-08	IBC			1.1		1.2	4.0	0.3	
D-15	Sep-08	IBC			0.7		1.1	4.0	0.4	
D-15	Oct-08	IBC			1.8		1.2	4.0	0.9	
D-15	Nov-08	IBC			0.9		1.2	4.0	0.5	
D-15	Dec-08	IBC			0.9		1.1	4.0	0.6	
D-15	Jan-09	IBC			2.0		1.3	4.0	1.2	
D-15	Feb-09	IBC			1.4		1.3	4.0	1.1	
D-15	Mar-09	IBC			0.9		1.2	4.0	0.7	
D-15	Apr-09	IBC			0.4		1.2	4.0	0.3	
D-15	May-09	IBC			1.4		1.2	4.0	1.2	
D-15	Jun-09	IBC			1.1		1.2	4.0	0.7	
D-15	Jul-09	IBC			1.2		1.2	4.0	1	
D-15	Aug-09	IBC			1.0		1.2	4.0	0.6	
D-15	Sep-09	IBC			2.2		1.2	4.0	1.9	
D-15	Oct-09	IBC			254		1.2	4.0	12.4	
D-15	Nov-09	IBC			1.8		1.3	4.0	1.3	
D-15	Dec-09	IBC			2.3		1.3	4.0		
D-15	Jan-10	IBC			1.2		1.3	4.0	1.1	
D-15	Feb-10	IBC			0.5		1.3	4.0	0.4	
D-15	Mar-10	IBC			0.5		1.2	4.0	0.3	
D-15	Apr-10	IBC			1.1		1.2	4.0	0.8	
D-15	May-10	IBC			0.5		1.2	4.0		
D-15	Jun-10	IBC			2.9		1.3	4.0	2.4	
D-15	Jul-10	IBC			0.9		1.3	4.0	0.7	
D-15	Aug-10	IBC			0.8		1.2	4.0	0.6	
D-15	Sep-10	IBC			1.5		1.2	4.0	0.8	
D-15	Oct-10	IBC			0.9		1.2	4.0	0.7	
D-15	Nov-10	IBC			1.6		1.2	4.0	1.1	
D-15	Dec-10	IBC			0.8		1.2	4.0	0.6	
D-15	Jan-11	IBC			1.1		1.2	4.0	0.7	
D-15	Feb-11	IBC			1.3		1.2	4.0	1.1	
D-15	Mar-11	IBC			1.5		1.2	4.0	1.4	
D-15	Apr-11	IBC			1.9		1.3	4.0	1.5	
D-15	May-11	IBC			1.2	1.2	1.3	4.0		
D-15	Jun-11	IBC			2.7	2.0	1.3	4.0		
D-15	Jul-11	IBC			2.7	2.2	1.3	4.0		
D-15	Aug-11	IBC			2.8	2.4	1.4	4.0		

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m ² /mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m ² /mth	Comment
D-15	Sep-11	IBC			3.2	2.5	1.4	4.0		
D-15	Oct-11	IBC			2	2.4	1.4	4.0		
D-15	Nov-11	IBC			2.8	2.5	1.5	4.0		
D-15	Dec-11	IBC			1.9	2.4	1.5	4.0		
D-15	Jan-12	IBC			1.6	2.3	1.5	4.0		
D-15	Feb-12	IBC			0.5	2.1	1.5	4.0		
D-15	Mar-12	IBC			1	2.0	1.4	4.0		
D-15	Apr-12	IBC			1.2	2.0	1.4	4.0		

* October 2009 result excluded from long term average (regional dust storms).



Appendix 5

SURFACE WATER AND WET WEATHER DISCHARGE MONITORING DATA

Quarterly Surface Water Monitoring Results

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
	8 September 2006		SD5	6.5	930	144		<2				
	8 September 2006		SD6	7.5	310	104		<2				
	8 September 2006		SD8	8.9	190	25		<6				
	8 September 2006		SD9	9	285	1940		<2				
	11 January 2007		SD5	8.4	3750	20		<2				
	11 January 2007		SD8	8.2	420	84						
	11 January 2007		SD9	8.6	440	15		<2				
	11 January 2007		MV1	7.7	3970	293		<2				
	18 April 2007		SD1	8.6	605	86		<2				
	18 April 2007		SD2	8.5	395	102		<2				
	18 April 2007		SD8	8.6	270	36		<2				
	18 April 2007		SD9	8.4	310	133		<2				
	18 April 2007		SD20	9.1	520	80		<2				
	18 April 2007		MV	7.8	4260	<2		<2				
27514.01	25 July 2007	1510	SD1	7.5	990	23		<2				
27514.02	25 July 2007	1525	SB5	8	1150	17		<2				
27514.03	25 July 2007	1540	MV1	7.6	3130	15		30				
27514.04	25 July 2007	1550	SD8	8.1	260	25		<2				
27514.05	25 July 2007	1600	SD9	7.7	290	22		<2				
27514.06	25 July 2007	1605	SD5	8.4	3370	8		<2				
28415.01	31 October 2007	1545	SD9	7.8	310	16		<2				
28415.02	31 October 2007	1555	SD8	8.8	780	32		<2				
28415.03	31 October 2007	1610	SB5	8.9	1200	60		<2				
28415.04	31 October 2007	1620	SB8*	9	2000	110		<2				
28415.05	31 October 2007	1630	SB7	8.4	560	27		<2				
28415.06	31 October 2007	1640	MV	8.1	2780	45		<2				
28415.07	31 October 2007	1650	SD5	8.3	2620	44		<2				
29740.01	18 March 2008	1035	SD9	6.9	245	27		<2				
29740.02	18 March 2008	1050	SD8	8.4	1340	19		<2				
29740.03	18 March 2008	1110	SD5									
29740.04	18 March 2008	1120	SD20	7.4	385	44		<2				
29740.05	18 March 2008	1130	Pit Water Dam	8.4	1620	14		<2				
29740.06	18 March 2008	1145	MV	7.8	3110	10		<2				
29740.07	18 March 2008	1155	SB5	7.8	870	54		<2				
29740.08	18 March 2008	1200	SB7	7.5	365	387		<2				
29740.09	18 March 2008	1205	SD17	7.4	460	58		<2				
31188.01	22 August 2008	1350	SD9	7.9	275	35		<2				
31188.02	22 August 2008	1355	SD8	8.9	1450	20		<2				
31188.03	22 August 2008	1405	SB16	8.8	1440	16		<2				
31188.04	22 August 2008	1425	SD5	8.7	1310	35		<2				
31188.05	22 August 2008	1430	SB4	8.7	1980	31		<2				
31188.06	22 August 2008	1440	SB5	8.5	955	13		<2				
31188.07	22 August 2008	1455	Pit Water Dam	8.7	2420	17		<2				
31333.01	5 September 2008	1600	BCD	7.2	75	150		<2				
31333.02	5 September 2008	1025	DAM1	7.4	185	4930		<2				
31490.01	23 September 2008	1400	BCU	6.8	95	92		<2				
31490.02	23 September 2008	1545	BCD	6.7	115	107		<2				
31490.03	23 September 2008	1516	SD8	8.9	995	24		<2				
31490.04	23 September 2008	1450	SD17	8.3	720	456		<2				
31597.01	7 October 2008	930	SD17	8.2	735	75		<2				
31597.02	7 October 2008	950	SD8	8.9	775	22		<2				
31597.03	7 October 2008	1015	SB14	8.5	255	43		<2				
32277.01	15 December 2008	1114	SD17	7.4	435	152		<2				
32277.02	15 December 2008	1140	SD9	7.3	245	24		3				
32277.03	15 December 2008	1130	SD8	8.2	635	22		<2				
32277.04	15 December 2008	1207	BCD	6.9	135	30		<2				
32738.01	10 February 2009	0620	MV	8.2	3370	13		<2				
32738.02	10 February 2009	0638	SD8	8.9	790	11		<2				
32738.03	10 February 2009	0655	SD9	8.5	330	16		<2				
32738.04	10 February 2009	0646	SB14	8	380	32		<2				
32738.05	10 February 2009	0604	SB5	8.8	1070	7		<2				
32738.06	10 February 2009	0631	SB16	9	1200	6		<2				
ES0909243-001	24 June 2009	0910	SB7	8.21	401	90	6	<5				
ES0909243-002	24 June 2009	0925	SB5	8.62	1180	12	8	<5				
ES0909243-003	24 June 2009	0935	Pit water	8.87	2330	148	5	<5				
ES0909243-004	24 June 2009	0950	SD9	8.33	335	5	8	<5				
ES0909243-005	24 June 2009	1010	SD16	8.16	550	20	5	<5				
ES0909243-006	24 June 2009	1040	SB14	7.71	351	29	9	<5				
ES0912983-001	27 August 2009	1035	SB7	8.1	418	62	5	<10				
ES0912983-002	27 August 2009	1050	SB5	8.64	1210	29	8	<10				
ES0912983-003	27 August 2009	1145	Pit water	8.2	2580	264	6	<10				
ES0912983-004	27 August 2009	1105	SD9	8.36	389	12	8	<10				
ES0913144-001	31 August 2009	0905	SB14	8.73	342	56	10	<10				
ES0913144-002	31 August 2009	0915	SD16	8.3	547	158	5	<10				
ES0919560-001	22 December 2009	1030	NCD	7.8	137	164	16	19				
ES0919560-002	22 December 2009	1100	BCU	7.32	150	220	25	-				
ES0919560-003	22 December 2009	1125	BCD	7.04	146	32	43	-				
ES0919731-001	29 December 2009	1300	BCD	6.88	75	47	15					
ES0919731-002	29 December 2009	1310	NCD	6.73	143	32	10					
ES0919731-003	29 December 2009	1320	NCU	6.79	95	34	18					
ES0919731-004	29 December 2009	1350	SD14	8.12	1080	65	4					
ES0919731-005	29 December 2009	1405	SB14	7.41	374	128	19					
ES0919731-006	29 December 2009	1410	Goonbri Creek	7.02	60	38	12					
ES1003581-001	25 February 2010	1400	SB7	8.14	197	194	3	5				
ES1003581-002	25 February 2010	1415	SB5	8.06	681	77	4	<5				
ES1003581-003	25 February 2010	1505	SD9	7.95	123	18	8	5				
ES1003581-004	25 February 2010	1445	SD16	8.49	734	257	3	<5				
ES1003581-005	25 February 2010	1455	SB14	8.03	232	40	6	<5				

Sample No.	Date	Time	Sample Location	pH	EC (µS/cm)	Total Suspended Solids (mg/L)	Total Organic Carbon (TOC)	Grease & Oil (mg/L)	Antimony	Arsenic	Molybdenum	Selenium
ES1003581-006	25 February 2010	1530	SD2	8.37	276	15	<5	<5				
ES1009879-001	24 May 2010	1030	SB7	8.41	291	17	4	13				
ES1009879-001	24 May 2010	1045	SB5	8.59	531	48	5	13				
ES1009879-001	24 May 2010	1110	SD9	8.62	148	10	8	6				
ES1009879-001	24 May 2010	1125	SD16	8.93	810	9	4	8				
ES1009879-001	24 May 2010	1205	SB14	7.76	251	538	8	6				
ES1013265-001	6 July 2010	1130	SB14	8.09	245	95	5	<5				
ES1015929-001	9 August 2010	1245	SB16	8.39	1170	10	3	<5				
ES1015929-002	9 August 2010	1320	Pit water	7.07	1940	37	2	<5				
ES1015929-003	9 August 2010	1150	SD9	7.72	147	24	9	<5				
ES1015929-004	9 August 2010	1210	SD16	8.29	793	40	5	<5				
ES1015929-005	9 August 2010	1220	SB14	7.69	260	1300	6	<5				
ES1022163-001	2 November 2010	1610	SB7 (pre floc)	8.33	332	38	4	<5				
ES1022525-001	4 November 2010	1530	SB7 (post floc)	8.72	339	10	3	<5				
ES1022922-01	10 November 2010	940	SB16	9.19	1140	14	3	<5				
ES1022922-02	10 November 2010	1020	SD9	7.94	168	16	11	<5				
ES1022922-03	10 November 2010	1000	SD16	9.49	831	11	5	<5				
ES1022922-04	10 November 2010	1010	SB14	7.72	323	56	5	<5				
ES1105082-001	9 March 2011	1120	SD17	8.38	393	42	6	<5				
ES1105082-002	9 March 2011	0915	SB16	7.17	968	20	6	<5				
ES1105082-003	9 March 2011	1200	VOID	7.95	2540	78	6	<5				
ES1105082-004	9 March 2011	1050	SD9	7.98	186	30	11	<5				
ES1105082-005	9 March 2011	1110	SD16	8.71	762	27	5	<5				
ES1105082-006	9 March 2011	1015	SB14	8.17	361	43	6	<5				
ES1109209-001	3 May 2011	11:00	SD16	8.58	1020	22	6	<5	<0.001	0.002	0.014	<0.01
ES1109209-002	3 May 2011	11:20	SB14	7.9	434	24	6	<5	<0.001	0.002	0.004	<0.01
ES1109209-003	3 May 2011	10:40	SD17	8.92	2040	20	6	<5	<0.001	0.004	0.014	<0.01
ES1109209-004	3 May 2011	10:50	SB16	8.58	1030	13	4	<5	0.003	0.2	0.029	<0.01
-	3 May 2011	-	VOID	Dry								
ES1116908-001	4 August 2011	14:10	SD16	8.64	975	32	8	<5	<0.001	0.002	0.011	<0.01
ES1116908-002	4 August 2011	14:25	SB14	8.33	414	24	6	<5	<0.001	0.001	0.003	<0.01
ES1116908-003	4 August 2011	13:40	SD17	8.53	925	10	8	<5	<0.001	0.002	0.006	<0.01
ES1116908-004	4 August 2011	13:10	SB16	8.52	891	24	4	<5	0.004	0.002	0.028	<0.01
ES1116908-005	4 August 2011	13:10	VOID	8.52	2890	49	5	<5		0.015		
ES1124591-001	9 November 2011	13:00	SD16	9.03	791	20	7	<5	<0.001	0.003	0.010	<0.01
ES1124591-002	9 November 2011	12:30	SB14	7.84	431	20	5	<5	<0.001	0.002	0.004	<0.01
ES1124591-003	9 November 2011	13:20	SD17	8.39	448	56	6	<5	<0.001	0.002	0.003	<0.01
ES1124591-004	9 November 2011	11:10	SB16	8.39	646	6	3	<5	0.003	0.002	0.026	<0.01
ES1124591-005	9 November 2011	14:00	VOID	8.08	1790	158	3	<5				
ES1204830-001	29 February 2012	1240	SD16	7.96	365	34	2	<5	<0.001	0.001	0.009	<0.01
ES1204830-002	29 February 2012	1220	SB14	8.15	443	174	5	<5	<0.001	0.002	0.003	<0.01
ES1204830-003	29 February 2012	1145	SD17	8.23	434	18	7	<5	<0.001	0.003	0.004	<0.01
ES1204830-004	29 February 2012	1200	SB16	8.17	433	23	1	<5	0.001	0.001	0.012	<0.01
ES1204830-007	29 February 2012	1115	VOID	8.3	727	1620	2	<5		0.008		

Wet Weather Discharge Results

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
26194.01	BCU	1 March 2007	1600	6.8	165	193	<2		
26194.02	NCU	1 March 2007	1530	7.0	105	78	4		
26194.03	NCD	1 March 2007	1545	6.5	65	304	<2		
26194.04	BCD	2 March 2007	900	6.4	105	45	4		
26194.05	SD1	2 March 2007	1345	7.5	540	524	3		
26194.06	SD2	2 March 2007	1350	7.8	610	290	2		
27779.01	BCD	23 August 2007	1015	6.2	110	23	<2		
27779.02	SD8	23 August 2007	1035	6.8	475	5	<2		
27779.03	BCU	23 August 2007	1100	6.8	180	46	2		
29122.01	SB14	17 January 2008	1420	7.3	570	100	<2		
29122.02	SD17	17 January 2008	1500	7.6	425	837	<2		
29122.03	SD8	17 January 2008	1715	7.4	725	173	<2		
29297.01	BCU	6 February 2008	1505	7.1	120	20	<2		
29297.02	SD9	6 February 2008	1525	7.4	220	42	<2		
29297.03	SD8	6 February 2008	1535	8.2	1170	26	<2		
29297.04	SD17	6 February 2008	1615	7.9	420	476	<2		
29297.05	BCD	6 February 2008	1700	7.3	135	9	<2		
32813.01	BCU	17 February 2009	1418	6.8	275	35	<2		
32813.02	SD9	17 February 2009	1510	7.1	90	22	<2		
32813.03	BCD	17 February 2009	1530	6.5	130	32	<2		
ES1000141-001	SD16	4 January 2010	1600	7.3	729	51	<5	20	
ES1000141-002	NC-D	4 January 2010	1630	7.56	189	29	<5	28	
ES1000141-003	NC-U	4 January 2010	1725	7.42	181	68	<5	20	
ES1000141-004	BC-D	4 January 2010	1750	7.43	125	5	<5	35	
ES1002193	SD16	8 February 2010	1055	7.63	633	242	7	3	
ES1002886-001	SD17	15 February 2010	1315	7.56	252	1020	<5	4	
ES1002886-002	SD9	15 February 2010	1350	7.18	55	75	<5	11	
ES1002886-003	SD16	15 February 2010	1400	7.54	741	263	<5	7	
ES1002886-004	BCU	15 February 2010	1445	7.22	63	94	<5	13	
ES1002886-005	NCD	15 February 2010	1505	7.09	101	40	<5	19	
ES1002886-006	NCD	15 February 2010	1525	6.89	71	40	<5	26	
ES1002886-007	NCU	15 February 2010	1545	6.6	78	24	<5	30	
ES1006095-001	SD16	31 March 2010	0850	7.95	816	23	<5	3	
ES1013940-001	SB14	14 July 2010	1255	8.04	246	30	<5	7	
ES1015037-003	SB14	28 July 2010	1354	7.71	74	41	<5	15	
ES1015037-001	NCU	28 July 2010	1312	8.05	26	1940	<5	10	
ES1015037-002	NCD	28 July 2010	1325	7.53	379	44	<5	16	
ES1015611-001	BCD	3 August 2010	1115	8.03	101	32	<5	28	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity ($\mu\text{S/cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
ES1016049-005	SB14	10 August 2010	1300	6.76	233	2630	<5	<10	
ES1016049-001	NCU	10 August 2010	1200	7.51	34	766	<5	7	
ES1016049-002	NCD	10 August 2010	1215	7.14	72	616	<5	8	
ES1016049-004	BCU	10 August 2010	1250	6.66	65	94	<5	13	
ES1016049-003	BCD	10 August 2010	1230	6.7	78	39	<5	19	
ES1016144-001	SD16	11 August 2010	1150	8.42	727	64	<5	4	
ES1016144-002	SD9	11 August 2010	1200	7.27	116	28	<5	12	
ES1016962-001	SD16	20 August 2010	1230	8.76	748	22	9	4	
ES1016962-002	SB14	20 August 2010	1250	8.36	264	666	33	5	
ES1016962-003	BCD	20 August 2010	1310	8.29	115	26	22	32	
ES1017959-001	SD16	2 September 2010	1620				<5		Resample for oil and grease only
ES1017959-002	SB14	2 September 2010	1630				5		
ES1017959-003	BCD	2 September 2010	1600				<5		
ES1018430-002	SB14	10 September 2010	1220	7.71	298	548	<5	5	
ES1018430-001	BCD	10 September 2010	1120	6.64	99	66	<5	22	
ES1018625-001	SB14	15 September 2010	0820	7.63	272	231	5	5	
ES1018625-002	SD16	15 September 2010	0840	8.52	795	21	<5	5	
ES1018625-003	SD9	15 September 2010	0850	7.28	110	78	<5	19	
ES1023143-001	SB14	12 October 2010	0930	6.75	98	58	6	17	
ES1023279-001	BCD	16 October 2010	1055	6.58	143	85	8	17	
ES1023279-002	NCD	16 October 2010	1115	6.86	140	118	<5	22	
ES1024688-001	SD16	1 December 2010	1130	8.03	857	6	<5	6	
ES1025100-001	SB14	3 December 2010	0800	7.64	321	122	<5	5	
ES1025103-001	BCD	6 December 2010	1420	6.72	152	46	<5	23	
ES1025678-001	SD17	10 December 2010	1000	7.31	232	152	<5	14	
ES1025678-002	NCD	10 December 2010	1030	6.97	132	79	<5	15	
ES1025678-003	NCU	10 December 2010	1055	6.57	29	181	<5	10	
ES1025678-004	SD16	10 December 2010	1140	8.14	800	45	<5	5	
ES1025678-005	SD9	10 December 2010	1200	7.25	118	66	<5	10	
ES1025678-006	SB14	10 December 2010	1210	6.9	77	156	<5	18	
ES1025678-007	BCD	10 December 2010	1230	6.83	77	65	<5	15	
ES1119817-001	NCD	9 September 2011	1030	7.14	76	76	<5	14	38.2mm in the previous 24 hours. Reported to EPA.
ES1119817-002	SB14	9 September 2011	1100	7.53	276	131	<5	9	
ES1119817-003	SD9	9 September 2011	1110	7.1	43	50	<5	12	

Sample No.	Sample Location	Date	Time	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (mg/L)	Comments
ES1121350-001	SB14	29 September 2011	1050	7.69	293	414	<5	5	38.6mm of rainfall on the day of discharge and 2.6mm on the previous day. Reported to EPA.
ES1121350-002	SD9	29 September 2011	1100	7.13	91	228	<5	7	
ES1121350-003	NCD	29 September 2011	1115	6.98	48	144	<5	10	
ES1124940-001	SD9	14 November 2011	1030	7.98	227	144	<5	10	34.0mm of rainfall on the previous day. Reported to EPA.
ES1124940-002	BCD	14 November 2011	1110	7.34	131	29	<5	35	
ES1125587-001	SD16	18 November 2011	0910	7.52	596	64	<5	8	62.5mm of rainfall in preceding 5 days. Reported to EPA.
ES1125587-003	BCD	18 November 2011	1000	6.72	222	32	<5	87	
ES1125587-004	NCD	18 November 2011	1019	7	115	147	<5	26	
ES1125587-005	NCU	18 November 2011	1030	6.57	26	146	<5	7	
ES1125999-001	BCD	23 November 2011	1540	6.64	79	24	<5	27	41.4mm of rainfall on the day.
ES1125999-002	NCD	23 November 2011	1555	7.04	103	133	<5	20	
ES1125999-003	NCU	23 November 2011	1610	6.64	28	98	<5	10	
ES1125999-004	BCU	23 November 2011	1640	7.27	177	64	<5	28	
ES1126008-001	SD17	24 November 2011	1025	7.7	304	620	<5	14	41.4mm of rainfall on previous day. Reported to EPA.
ES1202202-001	SB23	31 January 2012	1145	7.74	188	1340	<5	6	37.6mm of rainfall in previous 5 days. Reported to EPA.
ES1202202-002	SD9	31 January 2012	1130	7.39	48	116	<5	5	
ES1202202-003	SD16	31 January 2012	1150	7.79	301	124	<5	4	
ES1202202-004	SB14	31 January 2012	1200	7.92	356	1170	<5	3	
ES1202202-005	SB24	31 January 2012	1220	7.28	76	37	<5	11	
ES1202202-006	BCU	31 January 2012	1355	6.76	306	584	<5	14	
ES1202202-007	NCU	31 January 2012	1430	7.23	174	78	<5	14	
ES1202202-008	NCD	31 January 2012	1450	7.13	167	132	<5	9	
ES1202506-001	GCDW	31 January 2012	0710	7.6	710	2720	<5	10	Non Licenced Discharge. Reported to EPA and Penalty Infringement Notices issued.
ES1202506-002	BCD	31 January 2012	1230	7.15	102	30	<5	13	
ES1204080-001	BCU	21 February 2012	1020	7.91	633	6	<5	7	64.8mm of rainfall in preceding 5 days. This exceeds the 90%ile 5 day event criteria and therefore TSS exceedances were not reported to EPA.
ES1204080-002	GCD	21 February 2012	1047	8.01	696	35	<5	11	
ES1204080-003	GCU	21 February 2012	1100	7.59	401	12	<5	38	
ES1204080-004	SB14	21 February 2012	1115	8.07	661	193	<5	7	
ES1204080-005	SD16	21 February 2012	1125	7.64	339	59	<5	5	
ES1204080-006	SB23	21 February 2012	1140	7.6	137	396	<5	15	
ES1204197-001	BCD	21 February 2012	1400	7.7	471	5	<5	24	
ES1204197-002	NCD	21 February 2012	1425	8.17	903	29	<5	11	
ES1204197-003	NCU	21 February 2012	1500	7.79	379	<5	<5	23	

Appendix 6

GROUNDWATER MONITORING DATA

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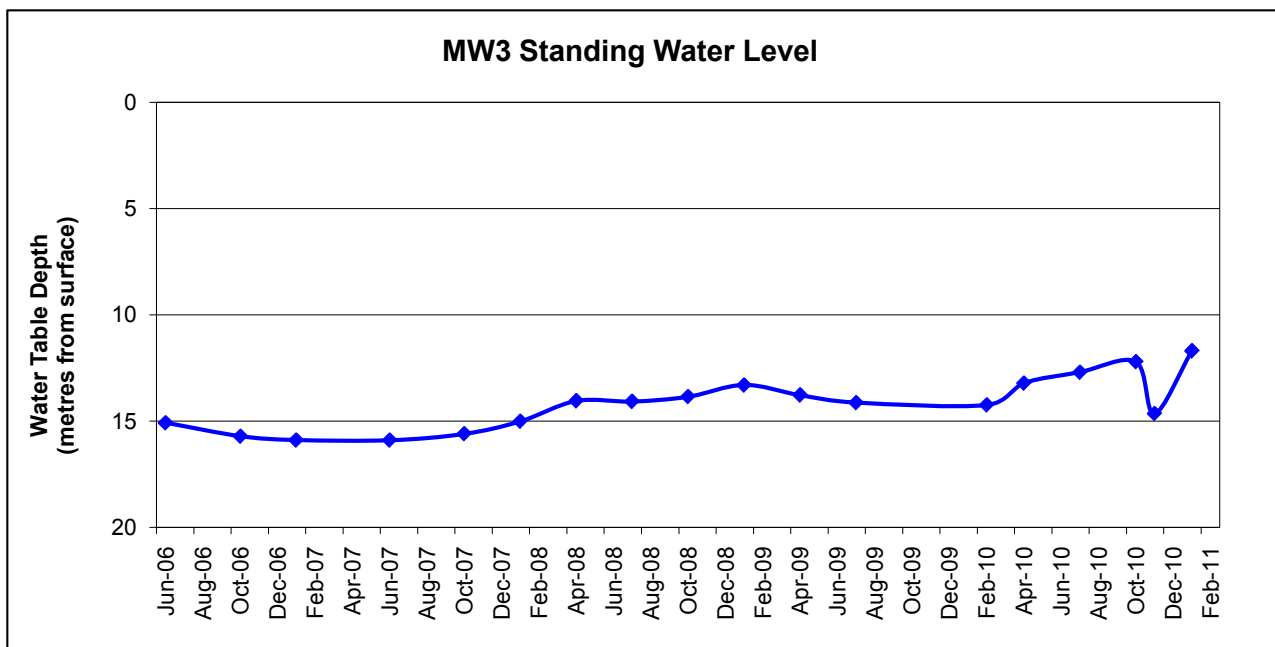
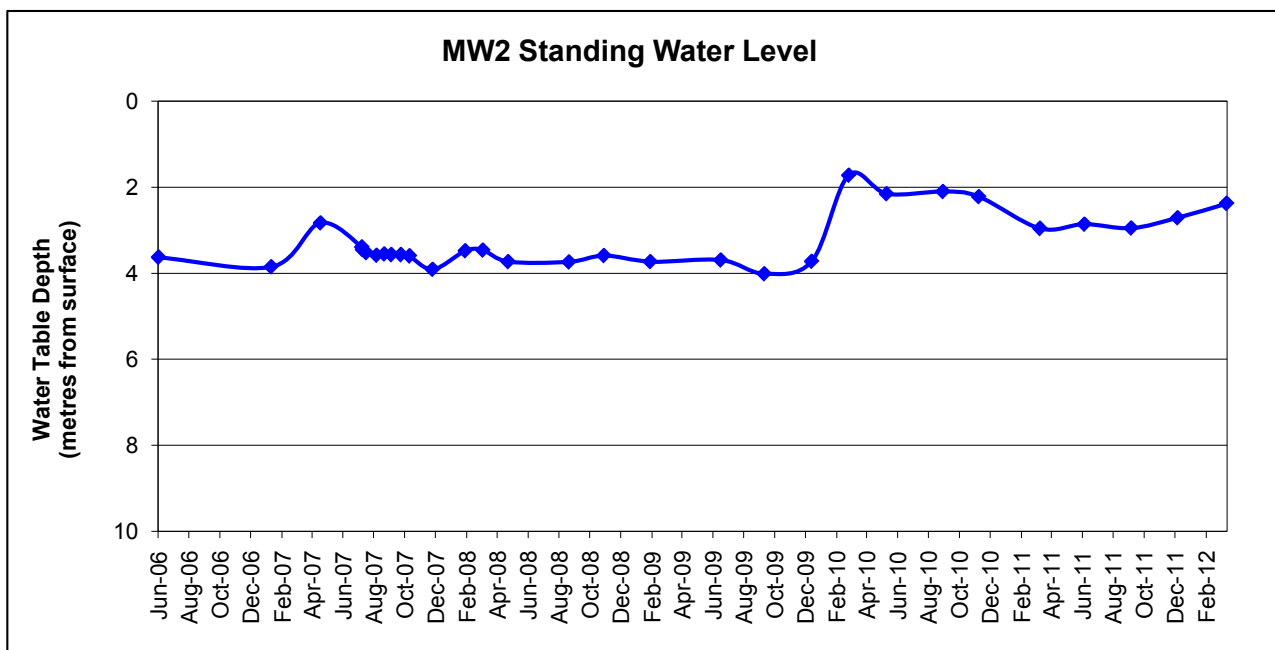
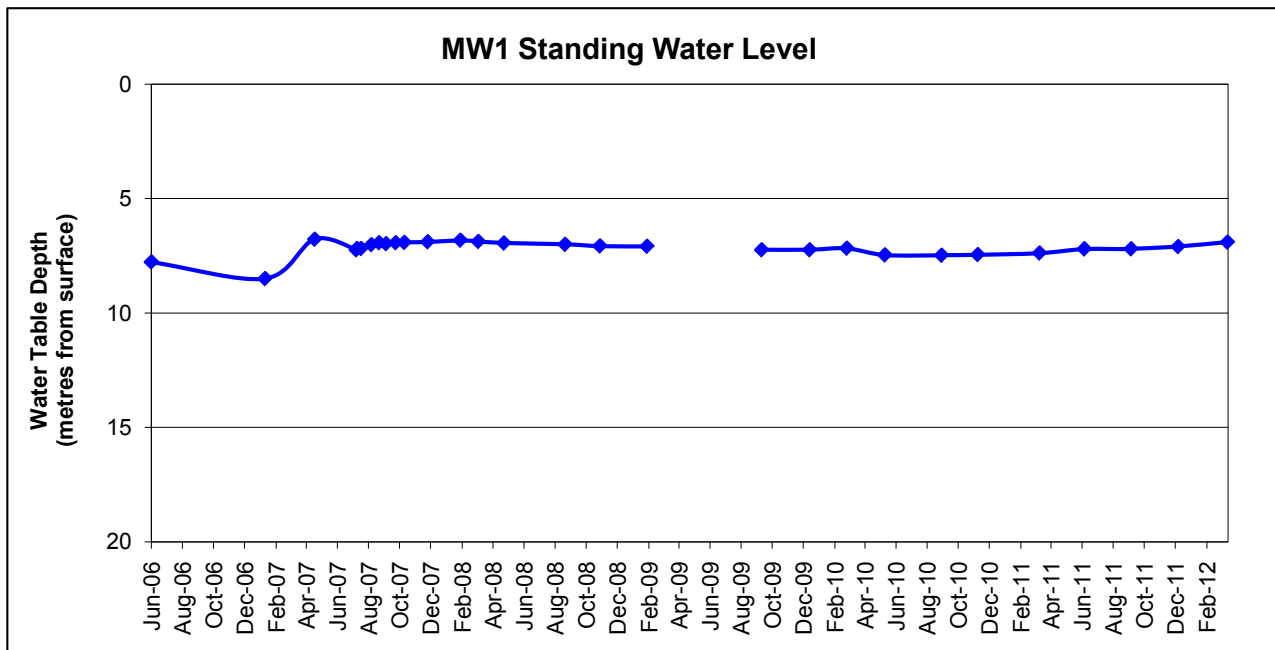
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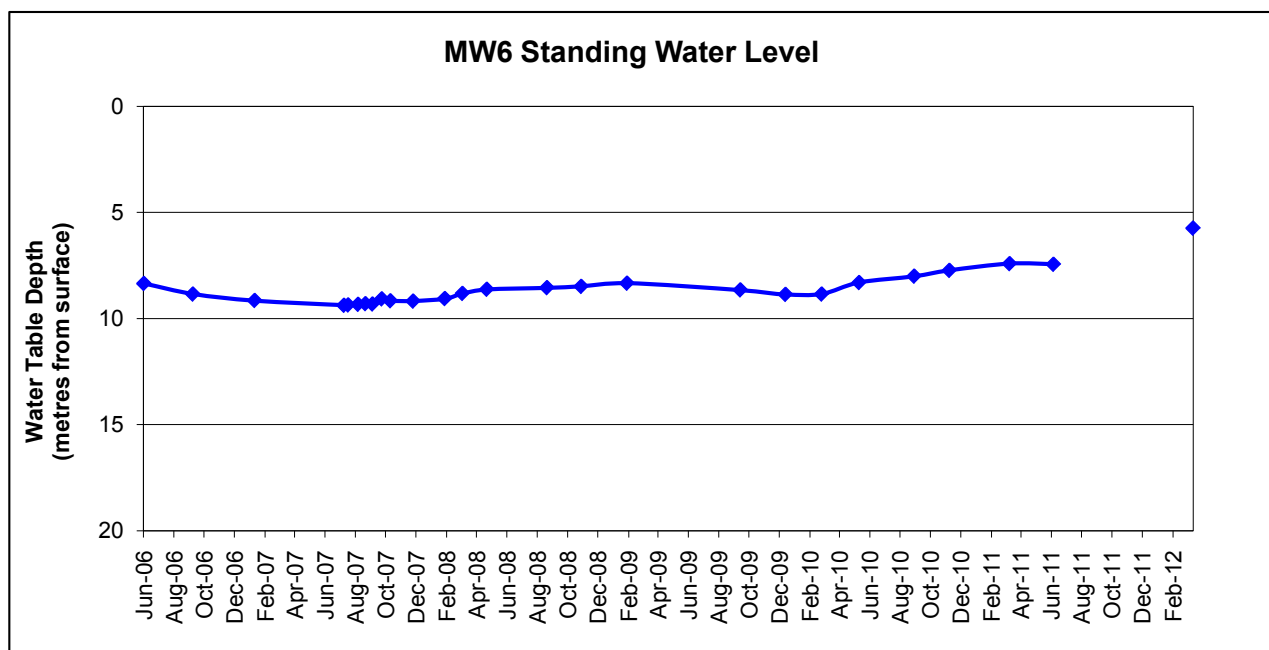
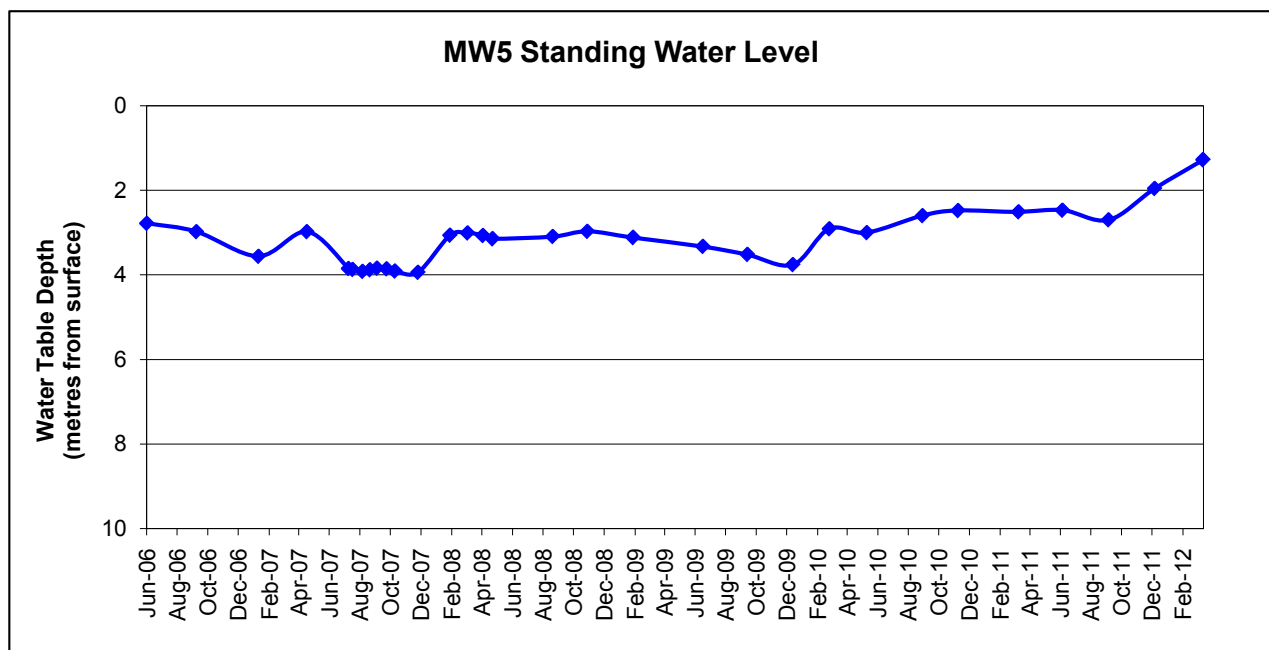
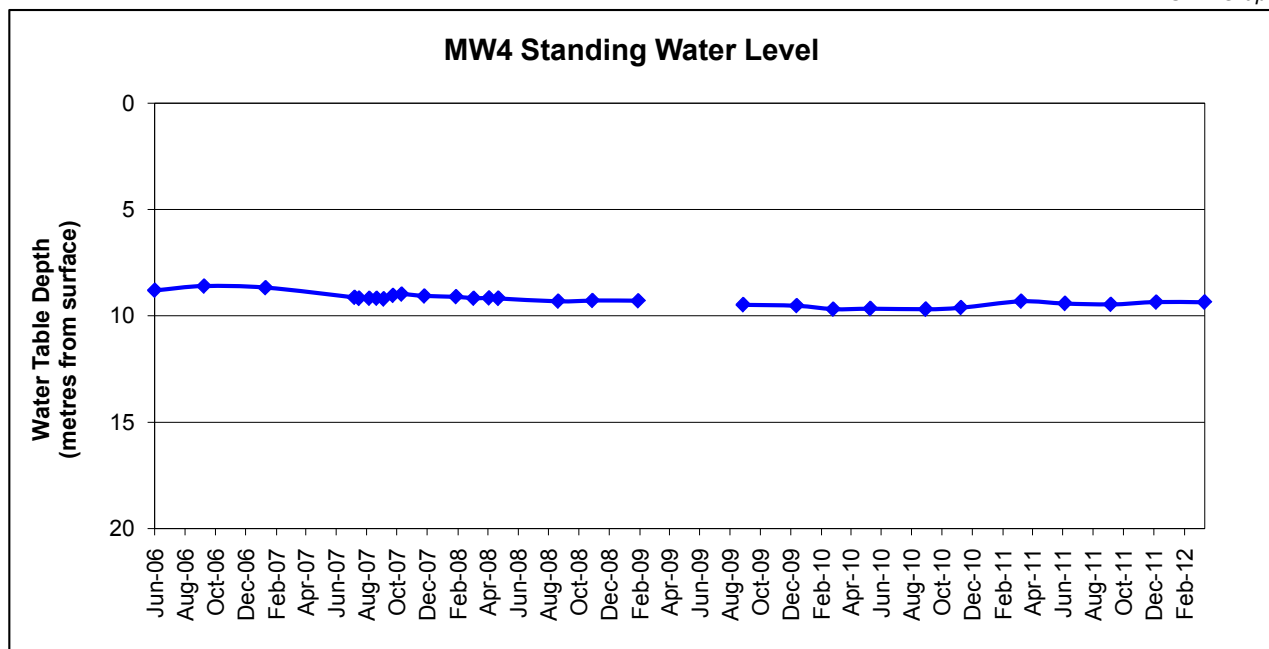
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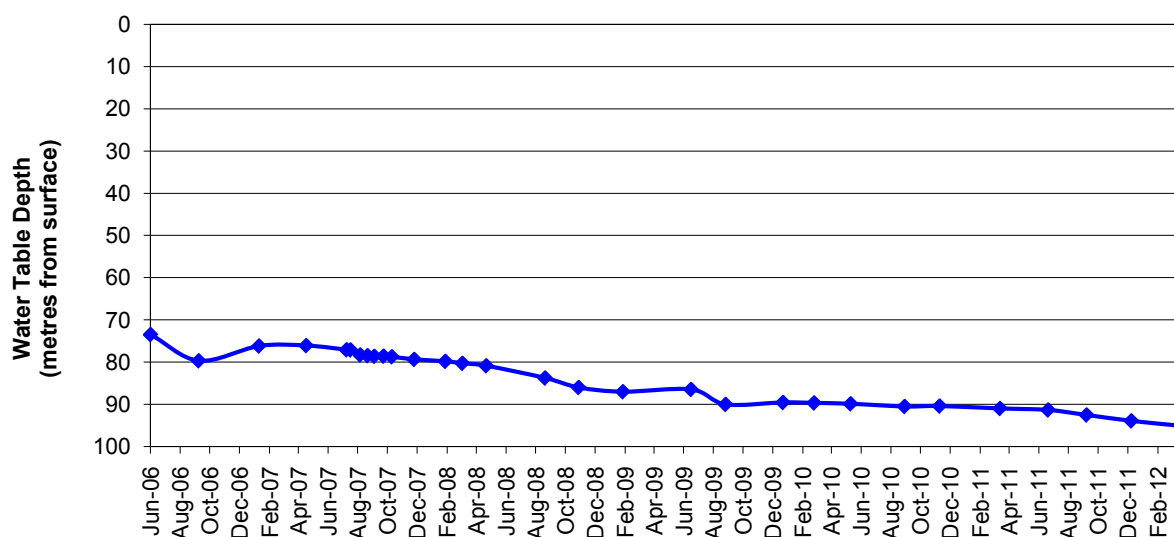
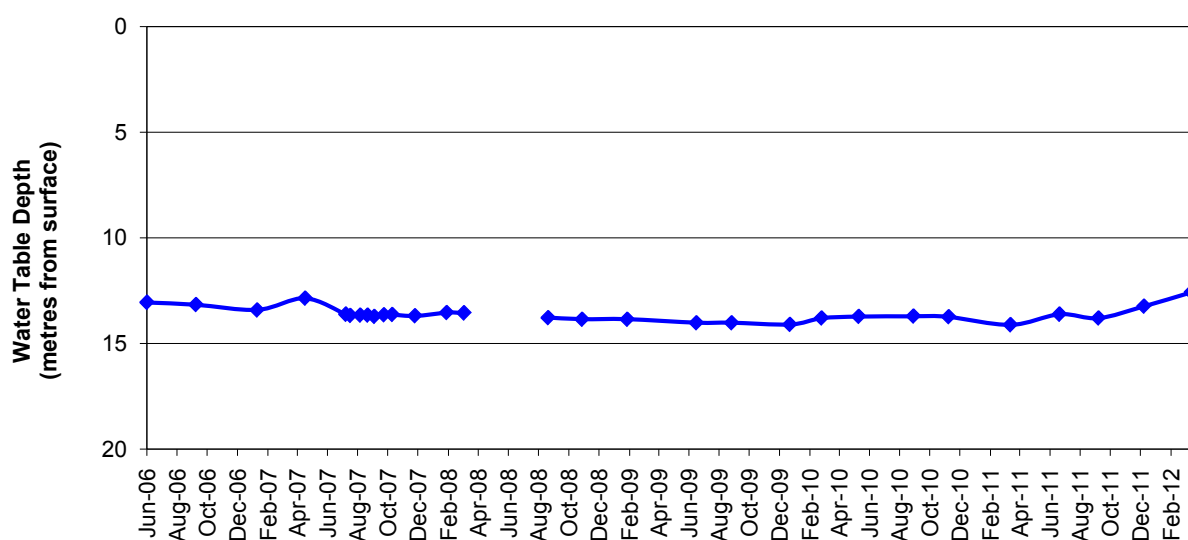
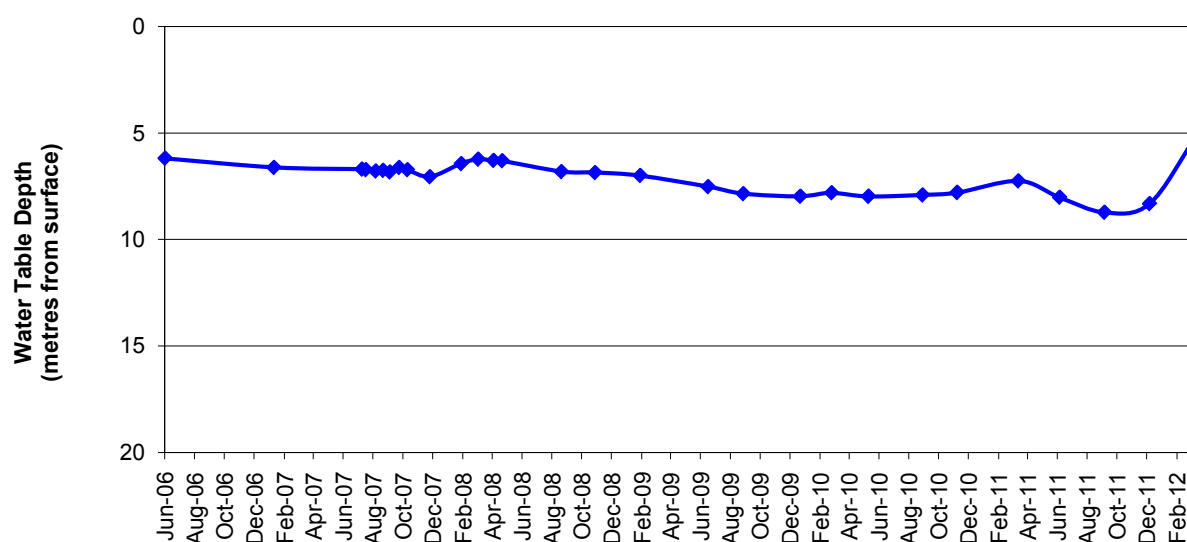
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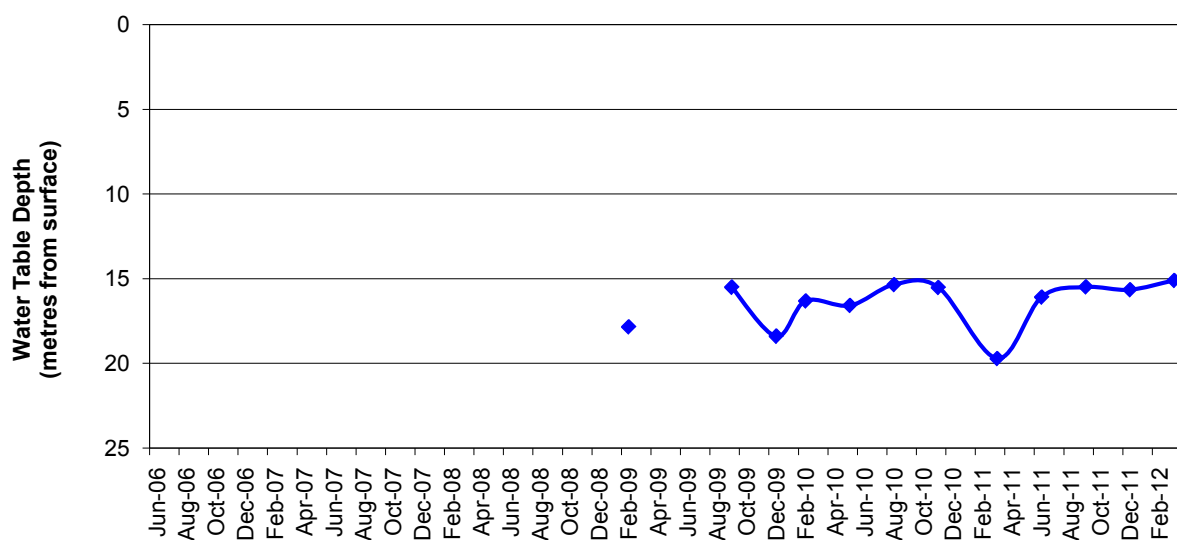
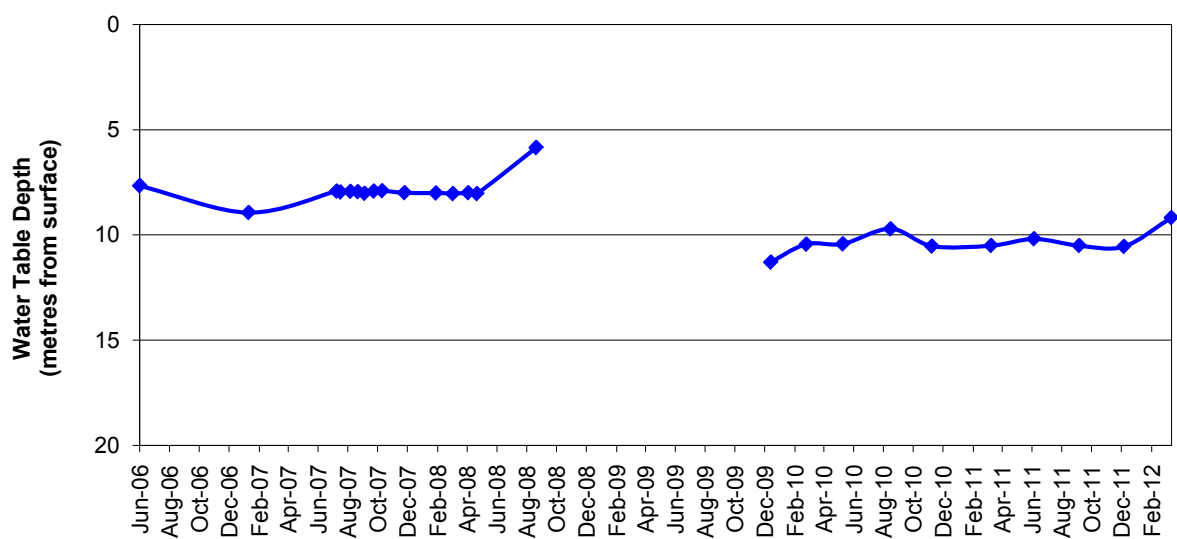
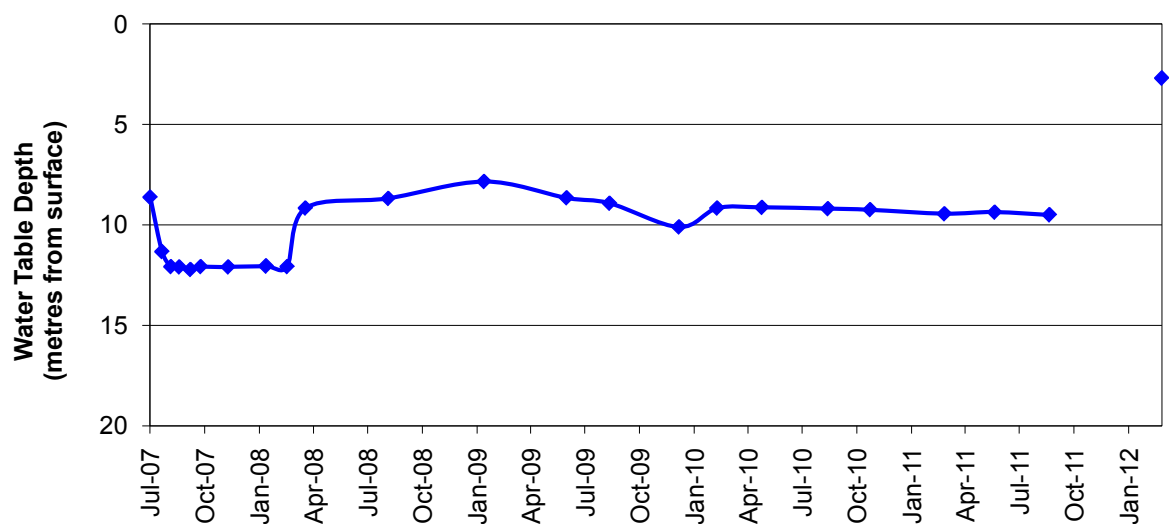
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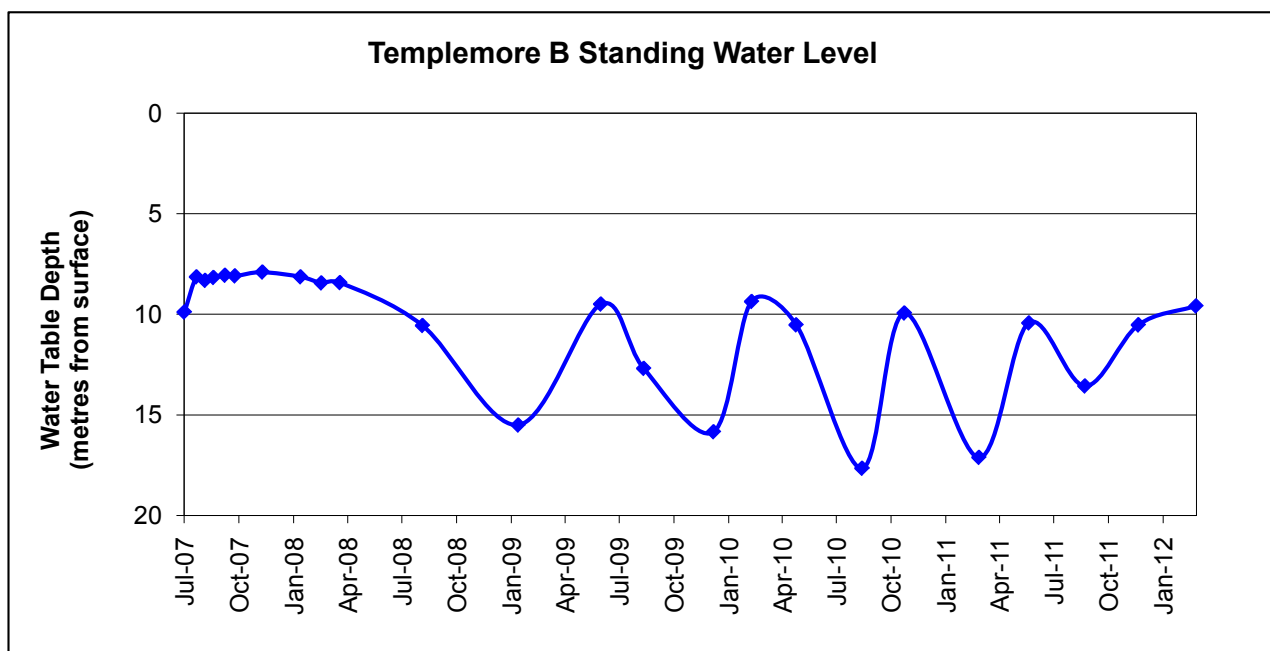
Denotes dissolved metals





MW7 Standing Water Level**MW8 Standing Water Level****GW044997 Standing Water Level**

GW031856 Standing Water Level**GW052266 Standing Water Level****Templemore A Standing Water Level**



Appendix 7

REHABILITATION MONITORING REPORT



Tarrawonga Coal Mine - Rehabilitation Monitoring Report

Spring 2011

Prepared for
Whitehaven Coal Mining Limited

17 July 2012



DOCUMENT TRACKING

ITEM	DETAIL
Project Name	Tarrawonga Rehabilitation Monitoring Report – Spring 2011
Project Number	12ARMECO-0003
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Abbreviations

ABBREVIATION	DESCRIPTION
CHM	Canopy Height Model
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
NDVI	Normalised Difference Vegetation Index
PCC	Projected Canopy Cover
PFC	Projected Foliar Cover
RMP	Rehabilitation Monitoring Program
TPFC	True Projected Foliage Cover
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW)
WCM	Whitehaven Coal Mining Limited

1 Introduction

Tarrawonga Coal Mine (Tarrawonga) commenced operations in 2006 when it was known as the “East Boggabri Coal Mine”. An extension within the original Mining Lease (ML) 1579 was granted in 2010. A further expansion was proposed in 2011 which goes beyond the boundary of ML 1579 to the east into Exploration Licence (EL) 5967 and to the north into Coal Lease (CL) 368. This latest expansion will increase the total life of mine coal production to around 55 Mt with a total mine life of approximately 23 years (TCPL 2011).

The mine is owned and operated by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Mining Limited (WCM) and Idemitsu Boggabri Coal Limited (IBC). The mine is situated approximately 15 km northeast of Boggabri and 42 km north-northwest of Gunnedah (**Figure 1-1**) and is located on parts of the properties “Thuin”, “Nagero” and “Forest View” (GCNRC & CES 2007). Prior to mining, the area was used for either grazing or farming, having been cleared to varying degrees.

TCPL is committed to the progressive rehabilitation of the mine area to restore landscape functionality (WCL 2010). There is also emphasis on the re-establishment of native vegetation across the site to provide amenable links to vegetation on the site and to the north in Leard State Forest.

1.1 PROJECT SCOPE

This rehabilitation monitoring report documents the Spring 2011 survey results and subsequent data analysis.

Rehabilitation monitoring surveys were undertaken in accordance with the *Rehabilitation Monitoring Program for Tarrawonga Coal Mine* (Eco Logical Australia 2011) and included:

- Remote-sensing based landscape assessment (multi-spectral imagery)
- Agricultural monitoring (using a combination of pasture and soil attributes)
- Native vegetation and fauna surveys
- Analysis of results including statistical analysis.

1.2 AIMS AND OBJECTIVES

The aim of this monitoring report is to document the Spring 2011 survey results and provide a quantitative assessment of rehabilitation performance against nearby unmined (i.e. control) landscapes.

Specific monitoring objectives include:

- Quantitative tracking of rehabilitation performance
- Assess key aspects of flora (upper, mid and lower strata), fauna and soil, in woodland areas
- Compare data with previous monitoring
- Evaluate monitoring results against monitoring triggers and rehabilitation objectives as outlined in the RMP
- Provide recommendations to assist with the improvement of rehabilitation or monitoring methods.

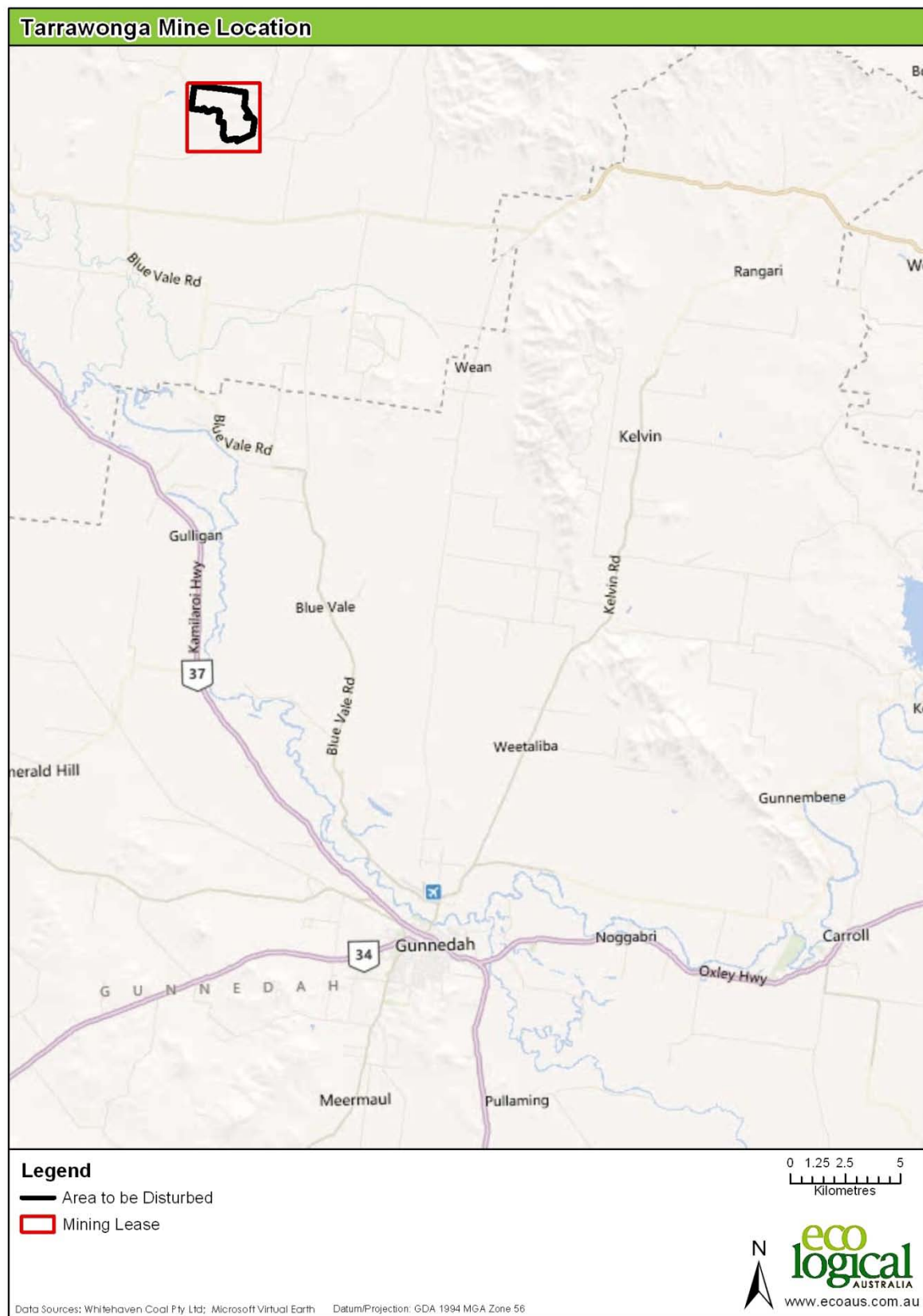


Figure 1-1: Tarrawonga Mine - Location

2 Site Background

For detailed site background please refer to *Rehabilitation Monitoring Program for Tarrawonga Coal Mine* (Eco Logical Australia 2011).

2.1 LAND TENURE AND USE

WCL and its joint venture partner IBC own all freehold land within the mine site which is made up of the “Thuin”, “Nagero” and “Forest View” properties. As a buffer to its operations WCL has also purchased the adjoining properties of “Bollol Creek”, “Templemore”, “Green Hills”, “Blair Athol School House” and “Matong” (WCL 2010).

The mine site had previously been cleared for grazing and cropping with some areas of remnant native vegetation. The surrounding land use is predominantly cattle grazing and cereal/fodder cropping of the flatter slopes. To the north are the Leard State Forest and the Boggabri Coal Mine.

To date, mining operations at Tarrawonga (with the exception of the haulage route) has been contained within ML 1579 with an area of 661 ha (WCL 2010). A further expansion was proposed in 2011 which goes beyond the boundary of ML 1579 to the east into Exploration Licence (EL) 5967 and to the north into Coal Lease (CL) 368.

2.2 CLIMATE

The area is characterised by mild to hot summers and cool winters. Rainfall is summer dominant with an annual average of 620 mm (WHC 2010). Average evaporation exceeds rainfall in all months.

2.3 TOPOGRAPHY

Tarrawonga is located in the foothills of the Willowtree Range east of the Namoi River. ML 1579 is made up of rolling hills and rises from approximately 270 m AHD on the southern and south-western boundaries to about 335 m AHD on the western boundary.

2.4 DRAINAGE

The northern portion of the site is bounded by the low-lying floodplains of Bollol Creek while Nagero Creek drains the north-western portions. These two creeks are ephemeral and are poorly defined channels that become wide, shallow and slow moving waterways during and after significant rain. These creeks both drain west to the Namoi River.

A small portion of the Nagero Creek catchment that originates in the north-western corner of the ML has been diverted from its original flow path for capture and treatment as part of the Tarrawonga surface water management system. The southern half of the ML is within the Bollol Creek catchment.

A small area in the east of the ML is drained by Goonbri Creek, a tributary of Bollol Creek. Goonbri Creek is also ephemeral.

2.4.1 Land capability

Rural land capability (**Table 2-1**) of the site varied between Class III land on the lower slopes, Class IV land on the mid slopes and parts of the upper slopes and Class VI land on upper slopes and ridges (GCNRC 2005a).

Table 2-1: Rural land capability class descriptions

LAND CAPABILITY CLASS	DESCRIPTION
Class III	Land capable of regular cultivation. Structural soil conservation works such as diversion banks, graded banks and waterways are required, together with soil conservation practices listed for Class II
Class IV	Land not capable of regular cultivation but suitable for grazing with occasional cultivation. Soil conservation practices such as pasture improvement, stock control, application of fertilizer and minimal cultivation for the establishment or re-establishment of permanent pasture
Class VI	Land not capable of being cultivated but suitable for grazing. Soil conservation practices including stock control, broadcasting of seed and fertiliser, prevention of fire and destruction of vermin. Some structural works may also be required

Source: Cunningham *et al.* n.d.

2.5 FLORA

Soil Conservation Service mapping indicates that the mine site is located within an area at the boundary between the Cypress Pine – Ironbark – White Box Community and the Bimble Box Community (Anon 1978 in GCNRC 2005b)

Prior to mining commencing at Tarrawonga the ML had been cleared for grazing and cropping. Eight vegetation communities were identified on the ML prior to mining activities (**Table 2-2**).

Table 2-2: Pre-mining vegetation communities

Comm. no.	VEGETATION COMMUNITY	TREE COVER & SPECIES ¹
1	Narrow Leaf Ironbark - White Cypress Pine Community	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark) and <i>Callitris glaucophylla</i> (White Cypress Pine) spaced 2-5 m apart. White Cypress Pine regeneration spaced 1-2 m apart occurs over the area.
2	White Box - Blakely's Red Gum - White Cypress Pine Community	Main tree species are <i>Eucalyptus albens</i> (White Box), White Cypress Pine, <i>Eucalyptus blakelyi</i> (Blakely's Red Gum) and <i>Eucalyptus populnea</i> ssp. <i>bimbil</i> (Bimble Box) generally spaced from <1- 5 m but up to 20 m apart. White Cypress Pine regeneration.
3	Belah Community	Occurs over a relatively small area and is dominated by <i>Casuarina cristata</i> (Belah) but contains scattered individuals of other species - <i>Alectryon oleifolius</i> (Western Rosewood), <i>Geijera parviflora</i> (Wilga) and <i>Capparis mitchellii</i> (Wild Orange).
4	Cleared Lands	Essentially treeless with some shade trees (50 – >100 m spacings) - White Box, Wilga, White Cypress Pine with some Western Rosewood and <i>Acacia pendula</i> (Myall).
5	Box - White Cypress Pine - Bull Oak Community	<i>Eucalyptus pilligaensis</i> (Pilliga Grey Box), Bimble Box, White Cypress Pine, <i>Allocasuarina luehmannii</i> (Bull Oak) generally spaced 1- 5 m apart on generally level land, sometimes with gilgais.
6	Regenerating White Cypress Pine - Narrow-leaved Ironbark - Wattle Community	Sloping areas dominated by regenerating White Cypress Pine spaced from <1-2 m. Scattered Narrow-leaved Ironbark trees.
7	White Box - Pilliga Grey Box - Narrow-leaved Ironbark Community	Transitional community between the Narrow-leaved Ironbark - White Cypress Pine Community and the White Box - Blakely's Red Gum - White Cypress Pine Community. Occurs on midslope locations and is comprised of various combinations of White Box, Narrow-leaved Ironbark, Pilliga Grey Box and White Cypress Pine. Trees are spaced <1-10 m apart.
8	Shrubby White Box Woodland Community	Tree cover dominated by White Box with White Cypress Pine common. Other tree species include Wilga, <i>Brachychiton populneus</i> (Kurrajong), Bull Oak and Narrow-leaved Ironbark. Understorey dominated by shrubs rather than grass and herb species.

¹ For full species list refer to GCNRC 2005b**Source: WCL 2010**

It is noted that Community 4 was captured as White Box Grassy Woodland of the Nandewar and Brigalow Belt South Bioregions by virtue of the biometric assessment methodology which was undertaken for the biobanking assessment for the Tarrawonga modification (ELA 2010 in WCL 2010).

While no threatened flora species occurred within the ML threatened ecological communities as listed under the TSC Act and the EPBC were identified (ELA 2010 in WCL 2010). These included the Box-Gum Woodland EEC and Box-Gum Grassy Woodlands and Derived Native Grasslands CEEC.

The open cut disturbance area over the life of the mine is estimated to be around 620 ha (TCPL 2011); this area includes the proposed expansion. Over the life of the Tarrawonga Open Cut Coal Mine, a total of 28 quadrats are to be established across rehabilitation sites and control sites under existing

requirements (GCNRS & CES 2007). Approximately 73 ha of native vegetation clearing has been undertaken at Tarrawonga.

Weed species listed as “noxious” under the *Noxious Weeds Act 1993* which were identified in both cropped areas and pastures (WCL 2010) include:

- African Boxthorn (*Lycium ferocissimum*)
- Noogoora Burr (*Xanthium occidentale*)
- Bathurst Burr (*Xanthium spinosum*)
- Paterson's Curse (*Echium plantagineum*)
- Prickly Pear (*Opuntia stricta*).

2.6 FAUNA

The following broad habitat types were identified on the pre-mining environment (CES 2004 in GCNRC, CES 2007):

- Open woodland forest (Vegetation Communities 1,2, 7 and 8)
- Roadside corridor habitat (equates with parts of Vegetation Community 2)
- Regenerating white cypress pine (Vegetation Community 6)
- Cultivated cleared paddocks (Vegetation Community 4)
- Remnant patch of Belah (Vegetation Community 3)
- Wetlands (man-made dams).

Threatened species have been previously recorded in the ML (**Table 2-3**). In addition threatened fauna species have also been recorded in the adjoining Leard State Forest (**Table 2-3**).

Table 2-3: Threatened fauna species previously recorded in the mining lease and nearby Leard State Forest

SCIENTIFIC NAME	COMMON NAME	LOCATION RECORDED
Birds		
<i>Calyptrorhynchus lathamii</i>	Glossy Black Cockatoo	ML 1579
<i>Neophema pulchella</i>	Turquoise Parrot	ML 1579
<i>Climacteris picumnus victoria</i>	Brown Treecreeper (Eastern sub-species)	ML 1579
<i>Pyrrholaemus saggitatus</i>	Speckled Warbler	ML 1579
<i>Melanodryas cucullata</i>	Hooded Robin	ML 1579
<i>Pomatostomus temporalis</i>	Grey Crowned Babbler (Eastern sub-species)	ML 1579
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater	Leard State Forest
<i>Stagonopleura guttata</i>	Diamond Firetail	Leard State Forest
<i>Tyto novaehollandiae</i>	Masked Owl	Leard State Forest
<i>Falco hypoleucos</i>	Grey Falcon	Leard State Forest
Mammals		
<i>Chalinolobus picatus</i>	Little Pied Bat	ML 1579
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	ML 1579
<i>Nyctophilus timoriensis</i>	Greater Long-eared Bat	Leard State Forest

3 Rehabilitation History and Objectives

3.1 REHABILITATION HISTORY

Coal extraction at the mine employed a conventional haulback system which involved up to ten sequential activities:

- Drainage installation
- Vegetation removal
- Soil stripping (including separate removal of topsoil and subsoil layers by scrapers)
- Overburden drilling and blasting
- Overburden removal from above the uppermost ply of the coal seam
- Upper coal ply excavation
- Interburden excavation and removal
- Lower coal ply excavation
- Final landform shaping and preparation
- Final landform revegetation.

Tarrawonga is being progressively developed (and rehabilitated) in an easterly direction in approximately 60 m wide strips (WC 2010). Rehabilitation involves reshaping the landscape, soil redeployment (in association with availability of materials and the desired post-mining land capability and land use), drainage control and revegetation with either native vegetation or pasture.

Rehabilitation activities will also extend into the biodiversity offset areas through grazing exclusion and enhancement of the adjoining offset areas. However, a transfer of these offset areas from the mine site to the Whitehaven Coal Regional Biobanking Site is intended.

3.2 REHABILITATION PROCEDURES

Rehabilitation of disturbed land (predominantly open cut mine and overburden emplacement) involves four stages (WCL 2010):

- *Overburden placement and shaping*: to create slopes with gradients of ≤ 10 degrees. Friable or weathered material is being placed below the subsoil, where practicable, to minimise large rock exposure on the final surface. The haulback method is being employed. Additional contour banks are being designed and built to control surface water runoff on the overburden emplacement.
- *Subsoil and topsoil replacement*: will occur (in the reverse order to stripping) with material from areas stripped in advance of mining or from stockpiles. Prior to redeploying soil, overburden emplacement is ripped along the line of the contour to break any compacted and/or smooth surfaces. Subsoil is generally placed at a maximum thickness of 50 cm, with topsoil replaced at a maximum thickness of 15 cm. Cleared trees and branches (<300 mm diameter) and other vegetative debris are being spread over areas designated for native woodland revegetation
- *Drainage installation*: is being undertaken by progressively developing contour banks. Flows are directed back to natural surface or to flumes constructed to control water flow off slopes of rehabilitated waste emplacements.
- *Cover crop establishment*: follows topsoil placement in which the area to be rehabilitated is seeded to a cover crop and pasture mix appropriate to the season. The seed mix includes fast

growing, short lived species and perennial grasses and legumes in accordance with species listed in **Table 3-1**. The mix generally incorporates a cover of Japanese Millet during spring/summer months and Rye Corn during the autumn/winter months.

Table 3-1: Rehabilitation pasture mix

PASTURE SPECIES	RATE (kg/ha)
Warm Season Grasses	
Bombastic Panic	1 – 2
Green Panic *2	2 – 4
Rhodes Grass *2	1 – 2
Purple Pigeon Grass	1 – 2
Annual Legumes	
Subterranean Clover	4 - 5
Cool Season Legumes *1	
Barrel (Sephi) medic	2 – 4
Snail (Sava) medic *2	3 – 5
Woolly Pod Vetch	4 – 6
Serradella (Elgara)	1 – 2
Lucerne	0.5
Cool Season Grasses	
Phalaris (Sirolon or Holdfast)	1 – 2
Wallaby Grass	0.3 - 1

Reference: Soil Services

Source: WCL 2010

Where practical, scratch or direct seeding techniques are being used in lieu of broadcast seeding so that seed germination and establishment are maximised. Where rapid soil stabilisation and erosion protection are required, straw mulching, bitumen mulching and hydro mulching is used. Fertiliser is applied at the time of seed application.

Native vegetation establishment: occurs once the cover crop dies off. The area is deep ripped or mounded in preparation for tubestock planting with the tree/shrub species listed in **Table 3-2**. Native tree and shrub species, grown from locally collected seed are planted at 4-5 m spacing (or 400 trees/ha). Tubestock are mulched, watered and protected by bags from grazing where required. Areas to plant include sections of the constructed landform within the “Thuin”, “Nagero” and “Forest View” properties.

Consideration is also to be given to direct seeding of eucalypt and understorey species, with trial plots allocated to this purpose to determine effectiveness. If proven effective, larger scale direct seeding may occur across areas designated to native woodland establishment.

Table 3-2: Tree/shrub species

COMMON NAME	SCIENTIFIC NAME
Trees	
White Box	<i>Eucalyptus albens</i>
Blakely's Red Gum	<i>Eucalyptus blakelyi</i>
Yellow Box	<i>Eucalyptus melliodora</i>
Narrow-leaved Ironbark	<i>Eucalyptus crebra</i>
Bimble Box	<i>Eucalyptus populnea</i>
Tumbledown Gum	<i>Eucalyptus dealbata</i>
Pilliga Grey Box	<i>Eucalyptus pilligaensis</i>
Wilga	<i>Geijera parviflora</i>
Belah	<i>Casuarina cristata</i>
Western Rosewood	<i>Alectryon oleifolius</i>
Shrubs	
Western Golden Wattle	<i>Acacia decora</i>
Amulla	<i>Eremophila debilis</i>
Sandalwood	<i>Santalum lanceolatum</i>
Eastern Cottonbush	<i>Maireana microphylla</i>
Native Jasmine	<i>Jasminum lineare</i>
Gargaloo	<i>Parsonsia eucalyptophylla</i>
Yellow Berry Bush	<i>Maytenus cunninghamii</i>
Wild Lemon	<i>Canthium oleifolium</i>
Wild Orange	<i>Capparis mitchellii</i>
Hopbush	<i>Dodonaea</i> spp.
Emubush	<i>Eremophila longifolia</i>
Native Olive	<i>Notelaea microcarpa</i>
Butterbush	<i>Pittosporum angustifolium</i>
Cough Bush	<i>Cassinia laevis</i>

Source: WCL 2010

Fencing is being established around rehabilitated areas. Monitoring of vegetation establishment on rehabilitated land is being undertaken, with particular focus on cover establishment. If adequate vegetation establishment is not attained, re-topsoiling, re-seeding or re-planting will be undertaken. Where high erosion is noted, devices will be implemented accordingly. Tree guards will be installed where stock exclusion has not occurred. Noxious weeds will be regularly monitored.

3.3 TIMELINE OF REHABILITATION ACTIVITIES AT TARRAWONGA MINE

Rehabilitation at Tarrawonga commenced in 2007 on the western edge of the northern emplacement zone (WCL 2010) with some areas of the northern and southern emplacement zones already rehabilitated.

Areas of completed rehabilitation (as at 2011) are shown in **Figure 3-1**. A summary of rehabilitation to dates is provided in **Table 3-3**.

Table 3-3: Rehabilitation summary

LOCATION	REHABILITATION LANDSCAPE TYPE	AREA (HA)	AREA REHABILITATED (ha)
Northern Emplacement	Native woodland with a small section of pasture	89 ha (including 9 ha of pasture)	32.4 ha (including 11 ha to final landscape i.e. native woodland)
Southern Emplacement	Native woodland with an additional area of pasture	102 ha	5.4 ha
Southern Pasture Zone	Pasture	24 ha	-
In-filled Open Cut (Final Void)	Native vegetation	231 ha	-
Other e.g. mine infrastructure areas	Native woodland	32 ha	-

Source: WCL 2010

The 2009/2010 AEMR recorded an area of 4.1 ha rehabilitated (reshaping and topsoiling) with a further 27.5 ha rehabilitation to native woodland (i.e. planted out to native tubestock).

The projected final rehabilitation plan is shown in **Figure 3-2**. A more definitive plan will be provided in either a MOP and/or Mine Closure Plan that will be prepared closer to the cessation of mining (WCL 2010).

3.4 REHABILITATION OBJECTIVES

The Project straddles the boundary between an area of native woodland vegetation to the north (Leard State Forest) and undulating predominantly cleared agricultural land used for livestock and occasional cropping to the south and east. TCPL aims to progressively rehabilitate and ultimately close the mine site in a manner that provides a sustainable balance between these existing land uses.

Woodland regeneration areas are to be incorporated into the rehabilitation program and designed to link with remnant native vegetation and contribute to the local and regional habitat corridors. Agricultural land would be retained and rehabilitated where practicable. The amount of rehabilitation left to the end of the mine life would be minimised by constructing the final outer slopes of waste emplacements during their development, and by progressively rehabilitating mine landforms and other disturbance areas throughout the mine life as they become available.

The external boundary of ML 1579 covers an area of approximately 726 ha. A total estimated area of 208.6 ha will be disturbed at the end of the current MOP (2010-2013). This is an additional 8 ha from the start of the MOP period. The total area disturbed over the life of the mine is projected to be 620 ha (TCPL 2011).

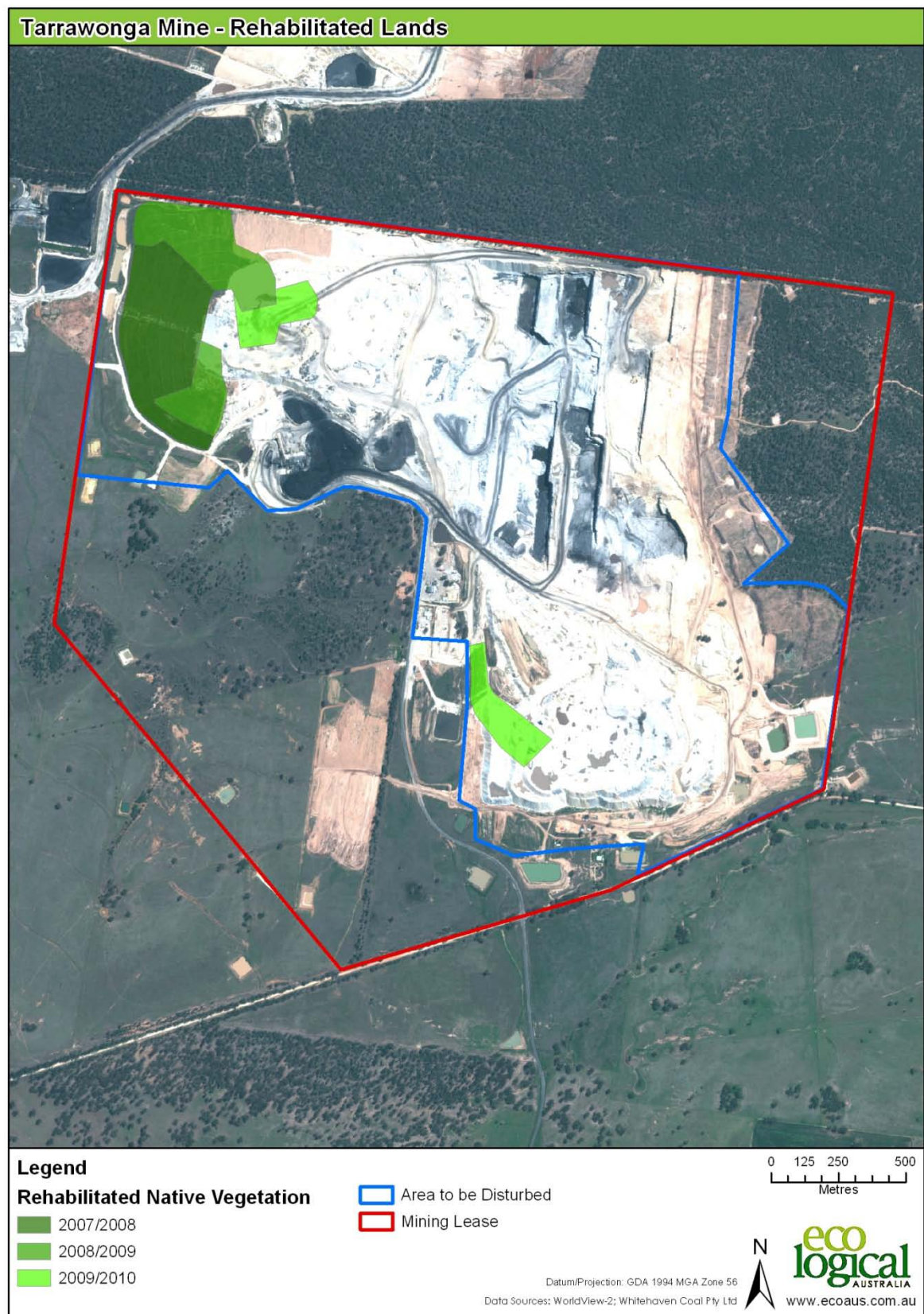


Figure 3-1: Tarrawonga Mine - existing rehabilitation areas

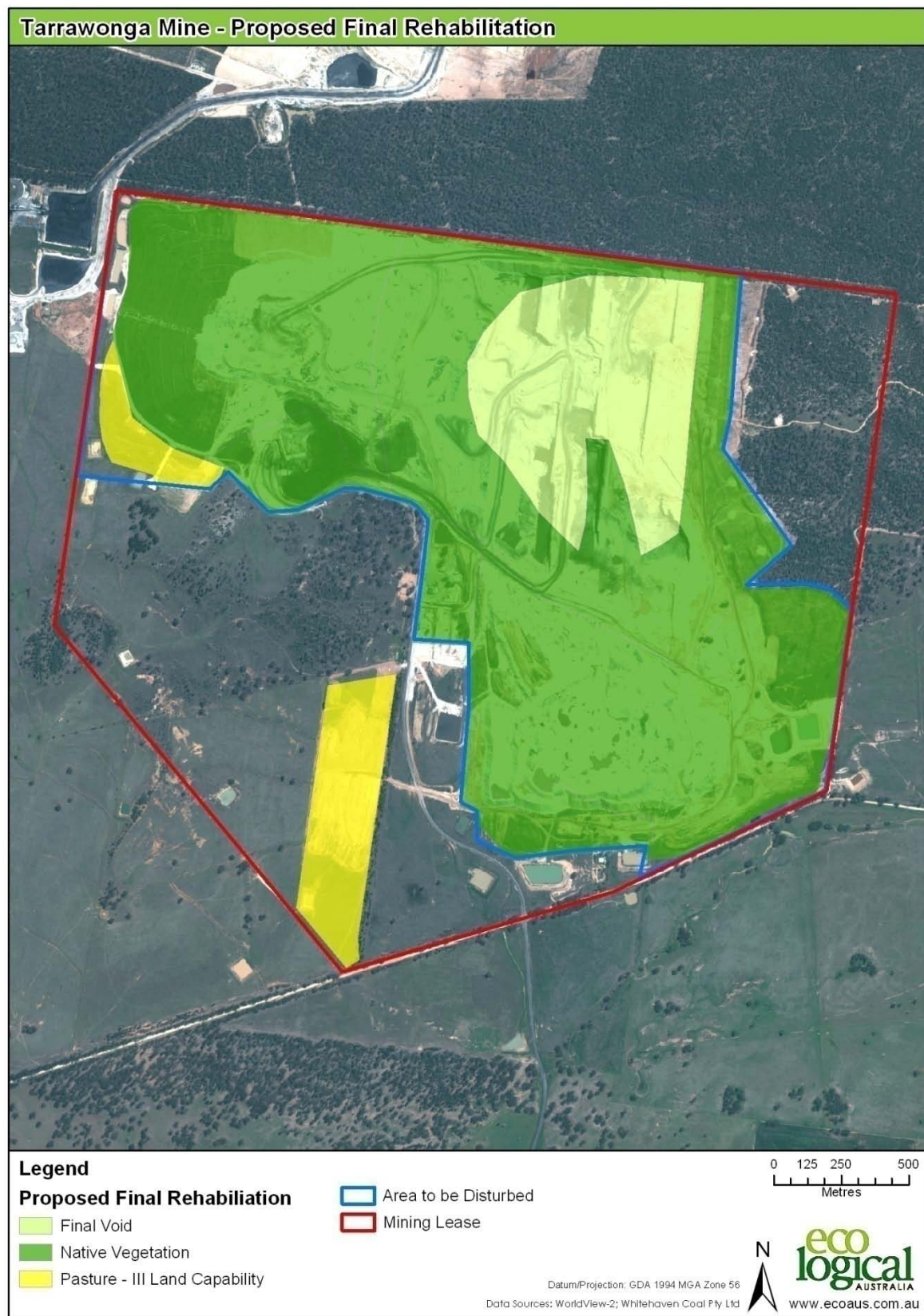


Figure 3-2: Tarrawonga Mine - proposed final rehabilitation plan

The final landscape for the site is predominately the return of native vegetation communities. An area previously identified for (agricultural) Class III capability land at the plateau of the northern waste emplacement is now to be re-established as native woodland to provide for a more connected vegetated landscape (WCL 2010). However, this land will still retain a Class III capability by way of the retained slope class and capacity for occasional cultivation.

At this stage of the mine's life, the final land form concept is largely theoretical, and greater detail will be applied in subsequent Mining Operations Plans and the Mine Closure Plan.

The rehabilitation/land use objectives as identified through the existing management plans (TCPL 2010; WCL 2010) are:

Short term:

- Stabilise earthworks, drainage lines and disturbed areas that are no longer required for mine related activities
- Establish groundcover for erosion control
- Establish tree plot plantings for screening of mine disturbance area

Long term:

- Provide a low maintenance, geotechnically stable and safe landform that is suitable for agricultural land uses and/or nature conservation.
- Re-create the post-mining landform to blend with the surrounding landscapes
- Revegetation of the majority of the post-mining landform to communities which emulate existing vegetative communities or those that occurred prior to agricultural related disturbance.

The relinquishment of ML 1579 will see the principal use of land will be for nature conservation in the area returned to native woodland. A few areas on the ML would be suitable for agriculture/grazing. This may be refined based on consultation with stakeholders, or as a result of rehabilitation monitoring (WCL 2010).

3.5 BIODIVERSITY OFFSET AREAS

The existing Development Consent requires the provision of a biodiversity offset strategy for the Tarrawonga Coal Mine. The approved offset strategy (as described in Corkery & Co. 2005) aims to provide linkages between post-mining landforms, existing remnant patches and Leard State Forest, thereby improving the habitat opportunities for local fauna which would be impacted by the Tarrawonga Coal Mine.

There are two components to the approved offset strategy:

- Rehabilitation and revegetation of post-mining landforms
- Enhancement of adjoining offset areas (including existing woodland/forest and derived grasslands).

The original offset (EIS) is comprised of 269 ha of land for conservation purposes and approximately 61 ha for agriculture. The modification proposed for the post mining landforms (approximately 327 ha) are rehabilitated to woodland vegetation and the final land use is conservation.

Under the original EIS and approvals, approximately 73 ha of remnant native woodland was to be cleared for the mine (GCNRC & CES 2007). This area of mining was to be compensated via:

- Conservation of 141 ha of existing native vegetation (including 30 ha of White Box Blakely's Red Gum White Cypress Pine community and 2 ha of Belah)
- Grazing exclusion from 132 ha
- Rehabilitation of 269 ha of native vegetation
- A 50 m buffer between the southern emplacement and the Project Site boundary is maintained to provide a corridor between the Leard State Forest and vegetation to the south and southwest of the mine area.
- "Thuin" and "Forest View" properties to be de-stocked and fenced to allow for natural regeneration. These areas comprise several stands of remnant native vegetation listed as threatened under the NSW or Commonwealth legislation and/or of significant habitat value (Corkery & Co. 2005)
- 268 ha (81%) of the area disturbed by the mine will be rehabilitated using native vegetation. In addition, 268 ha of the final landform will be fenced to exclude stock and allow for natural regeneration.
- The development of a Vegetation and Biodiversity Management Plan for East Boggabri Coal Mine
- Monitoring, reporting and management, including adaptive measures.

The offset would provide for an area of 492 ha in the final landform excluded from agricultural activities and linked to Leard State Forest.

A modified offset strategy has been proposed as part of the modified Tarrawonga Coal Mine. For the 2010 modification an additional 59.14 ha of native vegetation would be cleared requiring a total of between 221-305 ha required for the offset, if the offset site is in 'moderate/good' condition (i.e. below benchmark). The proposed Whitehaven Coal Regional Biobanking Site is located approximately 15 km south-east of the Tarrawonga mine adjacent to the Kelvin Aboriginal Area and will be utilised to offset the additional disturbance identified in the mine modification approval.

A proposal is currently being prepared to remove the offset requirements from the Tarrawonga site to the Regional Offset area. If approved, there will be no requirements to monitor offset establishment at the Tarrawonga site.

4 Management Triggers

4.1 REMOTE SENSING MONITORING TRIGGERS

A two-tiered system of triggers for management is proposed in response to changes identified via remote sensing.

The first tier of response is triggered by changes detected in the remote sensing time series analysis which instigates further investigation including targeted rapid on-ground assessments (**Table 4-1**).

The second tier of response is triggered if changes are confirmed or discovered on-ground (**Table 4-2**). These triggers instigate the development of site specific management responses and remedial actions.

This report documents the baseline collection and analysis of data over this site, hence these management triggers do not apply. However, any potential issues noted either using the remote sensing or field-based survey were documented and reported to WCM.

Table 4-1: Remote sensing monitoring triggers for management

TRIGGER	INVESTIGATION	MANAGEMENT
Remote sensing change detection identifies area of significant change ($> \pm 2$ std dev from average) in area greater than 0.1 ha	Investigate sources of change via desktop assessment: 1. Obvious external influence e.g. fire, major storm or unrelated development) 2. Potentially due to weed infestation, erosion / sedimentation, poor cover establishment	Respond to change based on likely source of impact: 1. Identify region of change and tag it as non-project specific impact; 2. Undertake directed field investigation via rapid field checking protocol (Table 4-2).

Table 4-2: Rapid field checking protocol and management

PARAMETER	METHOD	MANAGEMENT
Weed invasion	Document key weed species, estimate of % of weed cover in defined impact area Determine if invasive environmental or declared weed Enter location and extent of infestation (within limits of inspection) into GIS database	Weed management will be implemented to limit the spread and colonization of noxious and environmental weeds. All noxious weeds recorded are Category 4 noxious weeds, which must be controlled by the landowner according to the measures specified in a management plan published by the local control authority (NSC). Noxious weed management plans have been produced by the NSC for all noxious weed species except Galvanised Burr (<i>Sclerolaena birchii</i>). Follow-up inspections to assess the effectiveness of the weed management measures implemented and the requirement for any additional management measures.
Erosion or sedimentation	On ground inspection to record nature and extent of erosion (location, erosion type, depth of soil loss)	Identify cause / source and refer to Sediment Control Plan and/or seek expert advice to develop site specific management of erosion
Sedimentation (deposition)	On ground inspection to record nature and extent of sedimentation (location, extent, depth, sediment calibre)	
Bare soil	On ground inspection to record nature and extent of bare soil Investigate cause of bare soil and document likely reasons (soil testing may be required)	Develop a site specific management plan to ameliorate the bare soil area

4.2 FIELD SURVEY MONITORING TRIGGERS

The woodland area monitoring program has been designed to provide quantitative data on woodland habitat condition, fauna species and soil attributes. Management response triggers are linked primarily to statistically significant decline (cover or composition) in vegetation in any strata or other management issues noted by the field team during sampling (**Table 4-3**).

Table 4-3: Woodland area monitoring triggers for management

TRIGGER	MANAGEMENT
Statistically significant decline detected in either: • Native overstorey (cover, health, richness, recruitment) • Mid storey (cover, richness) • Groundcover (cover, richness) • Weeds (cover, richness) • % ground cover	Verify with field assessment and determine appropriate response
Exotic fauna	Notify WCM
Weed infestation	Notify WCM
Soil erosion	Notify WCM

The agricultural monitoring program has been designed to provide quantitative data on key pasture and soil attributes as they relate to land agricultural capability. Management response triggers are linked primarily to statistically significant decline in pasture or soil condition or other management issues noted by the field team during sampling (**Table 4-4**).

Table 4-4: Agricultural area monitoring triggers for management

TRIGGER	MANAGEMENT
Statistically significant change detected in either: • pasture biomass • pasture species composition • weed cover • soil character (pH, EC, OM, N or P)	Verify with field assessment and determine appropriate response e.g. assess soil fertility and condition and consider treatment
Weed infestation	Notify WCM
Soil erosion	Notify WCM

5 Methods

5.1 REMOTE SENSING

Multi-spectral imagery was captured across the entire target area and control areas on 13 September 2011 using WorldView-2. These data were then processed into a normalised difference vegetation index (NDVI). Data were stratified into the rehabilitation zones and control zones for both the pasture and woodland areas. Point data were extracted from the NDVI from which 1000 points were randomly selected to ensure equal sample size. Comparison was made using MDS plots and ANOVA to determine if data in any of the zones were significantly different from each other ($p < 0.05$). Tukey's HSD was used to identify where the differences occurred.

5.2 PASTURE AREA SURVEYS

Pasture area surveys were conducted by ecologist Lachlan Copeland and Damien Smith on 7 December 2012.

This monitoring procedure assessed parameters that relate to pasture productivity and soil nutrient status. Eight survey site locations were selected from each of the two pasture control zones (**Figure 5-2**) (**Appendix A1** for pasture plot coordinates and photographs). Survey sites were located to be:

- At least 50 m from a rehabilitation boundary
- Each site a minimum of 100 m from another site.

Sites already monitored by GCNRC and CES were not included into this monitoring program. Coordinates for site locations appeared to be in another datum or inaccurate as they did not align with site maps. Attempts to correct coordinates for datum changes were unsuccessful.

At each site a 1 m by 1 m quadrat was placed and assessed for pasture biomass (cover % estimate and biomass) and composition including weeds, whereby a weed species was determined to be a species which is undesirable to grazing stock. Following pasture survey a soil sample to 150 mm was taken from the centre of each quadrat location. The soil sample was bagged, stored appropriately and sent to East-West Enviroag for laboratory analysis of pH, EC, N, P and organic matter. Incidental observations of weed species were made when moving between quadrats. Significant weed outbreaks, if present, were noted, recorded with a GPS and reported to WC.

Monitoring will commence in rehabilitated pasture areas once rehabilitation is undertaken. Current monitoring of the control areas provides baseline data so that progression of rehabilitated areas can be monitored in the future.

Table 5-1: Pasture areas - monitoring program

DATA SOURCE	PARAMETERS	ANALYSIS	PURPOSE	SAMPLING FREQUENCY
Pasture biomass cuts	Pasture biomass	Comparative statistics	Give baseline variability in pasture biomass BACI comparisons	Baseline Every year – early spring
Pasture composition	Pasture species	Descriptive statistics Species list	Establish baseline pasture composition BACI comparisons	Baseline Every year – early spring
Weed survey	Weed species and cover	Descriptive statistics Species list	Establish baseline weed species and % cover BACI comparisons	Baseline Every year – early spring
Soil character (top 15 cm)	pH, EC, Organic matter, N, P	Comparative statistics	Give baseline variability in key soil parameters BACI comparisons	Baseline Every 3 years
Soil Pit	Soil profile	Qualitative assessment	Provide information on soil profile re- establishment and function	Baseline Every 3 years

5.3 WOODLAND SURVEYS

Five survey site locations were selected from each woodland rehabilitation zone and five from each of the two adjacent control areas using a targeted design (**Table 5-2; Figure 5-2**). Survey sites were located to be:

- At least 50 m from a rehabilitation boundary
- Each site a minimum of 150 m from another site.

Sites already monitored by GCNRC and CES were not included into this monitoring program. Coordinates for site locations appeared to be in another datum or inaccurate as they did not align with site maps.

Due to proposed future works at Tarrawonga, only one of the existing rehabilitation zones will remain. Only one control zone was surveyed as it is likely that both of the nominated control areas will be disturbed by the proposed Tarrawonga expansion.

Table 5-2: Location of woodland vegetation monitoring plots

TREATMENT	PLOT	START EASTING	START NORTHING	TRANSECT BEARING (°)
Control	1	229693	6607097	240
	2	229734	6607621	240
	3	229584	6607459	90
	4	229407	6607627	70
	5	229501	6607813	270
Rehabilitation	6	227083	6608091	10
	7	227053	6607908	20
	8	227063	6607720	160
	9	227203	6607927	360
	10	227208	6607711	210

The RMP proposes that five soil pits be established (three in the rehabilitation areas and one each in the control areas). Due to planned future works at Tarrawonga, some of the existing rehabilitation areas will be disturbed or mined in the near future. Therefore only two soil pits were established, one in an existing rehabilitation area (which will not be disturbed by proposed future works) and one in the woodland control area. Soil data were collected by ELA ecologist Damien Smith on 14 and 15 December 2011. Soil pits were dug to approximately 1 m and described using standard field measures with particular notice of horizon boundaries and ecological functionality (e.g. root establishment, evidence of soil fauna).

5.3.1 Vegetation

Vegetation surveys were conducted by ELA ecologist Lachlan Copeland on 10 December 2011.

The vegetation monitoring focused on the woodland rehabilitation zones and adjacent control areas with particular focus on the condition and function of the woodland vegetation. The woodland vegetation habitat monitoring sites are identified in **Figure 5-2**.

Vegetation condition monitoring included a suite of parameters that relate to woodland vegetation health and habitat value (**Table 5-3**). Key parameters were collected for the upper, mid and ground strata at both impact sites and control sites to permit comparison.

Table 5-3: Ecological attributes to be measured within condition plots

THEME	ATTRIBUTE	DESCRIPTION
Native overstorey (canopy)	Cover	Measured as Projected Crown Cover (PCC) along a 50 m transect Measured as Projected Foliage Cover (PFC) under three canopies
	Health	Categorised into four simple categories based on proportion of canopy dieback
	Richness	List of native overstorey species (including emergents)
	Recruitment	Presence/absence of trees in the juvenile and sapling diameter classes
Native midstorey (shrub and small tree)	Cover	Measured as Projected Crown Cover (PCC) along a 50 m transect
	Richness	List of native midstorey species
Native ground layer	Cover	Measured as Projected Foliage Cover (PFC) of native groundcover plants at each of 50 points along a 50 m transect
	Richness	List of native groundcover species
Exotic species	Cover	Measured as Projected Crown Cover (PCC) along a 50 m transect for exotic canopy and exotic midstorey species. Measured as Projected Foliage Cover (PFC) at each of 50 points along a 50 m transect in exotic ground layer species.
	Richness	List of exotic flora species
Groundcover	Large woody debris	Measured in the sub-plot as the total number and combined length of all sections of dead fallen timber ≥ 10 cm diameter, ≥ 0.5 m in length, and completely detached from living or dead standing trees
	Organic litter	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as % litter cover (OL)
	Cryptogams	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as cryptogam (Cr)
	Bare ground	Recorded as a 'hit' or 'miss' at each of 50 points along a 50 m transect, then calculated as bare ground (BG)
	Rock	Recorded as a 'hit' or 'miss' at each of 50 points along a 50m transect, then calculated as rock (Ro)

The base plot was to be 50 m x 20 m. It incorporated a 20 m x 20 m nested subplot, a 50 m centre transect, a photo point, and an alignment point.

A useful measure of vegetation condition is True Projected Foliage Cover (TPFC) which is effectively the proportion of a given area that is covered by foliage/branches/stems in a given stratum. It is easily visualised as the amount of shade cast by the canopy if the sun was shining directly overhead. The TPFC is calculated by multiplying the mean Projected Foliage Cover (PFC, expressed as a decimal) underneath a canopy, by the Projected Crown Cover (PCC) of each strata within a community. The method of calculating TPFC used in this project provides a more accurate percentage of cover than PFC or PCC alone.

Figure 5-1 shows the plot layout and **Table 5-4** summarises the sampling units. The standard plot layout is to be used in both modules.

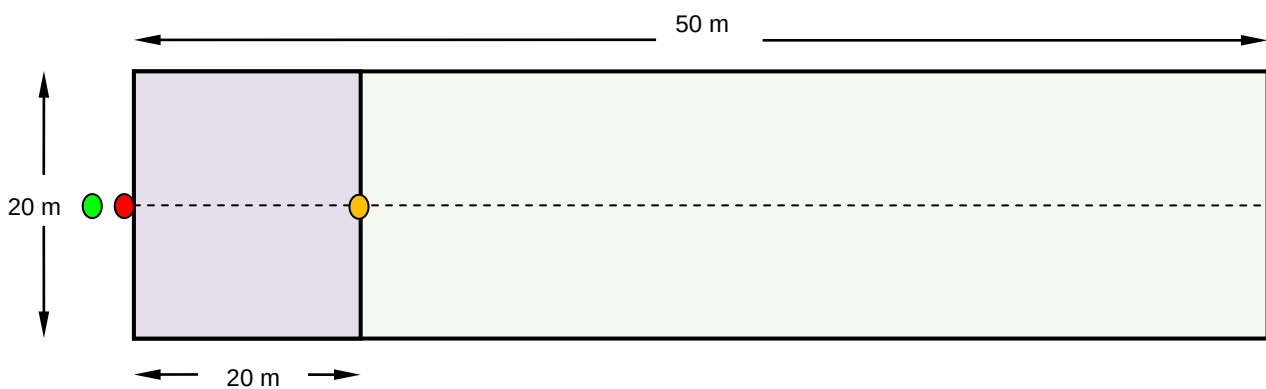


Figure 5-1: Plot design and layout

Table 5-4: Sampling units

SAMPLING UNIT	ATTRIBUTES MEASURED
Photo Point	Point from which plot is located and oriented, and from which plot image is recorded 5 m back behind reference point (taken after plot laid out)
Reference point	Site marker post with ID tag and flagging tape attached
Alignment Point	Positioned 20 m from reference point along the transect
Baseplot (50 m x 20 m)	Native canopy health Native and exotic canopy species Native and exotic midstorey species (shrub and small tree) Large tree density (native species only) Recruitment of native canopy species
Subplot (20 m x 20 m)	Native and exotic ground layer species Coarse woody debris

SAMPLING UNIT	ATTRIBUTES MEASURED
----- Transect (50 m)	Native canopy cover Native midstorey cover Native groundcover Exotic cover Organic litter Cryptogam Rock Bare ground

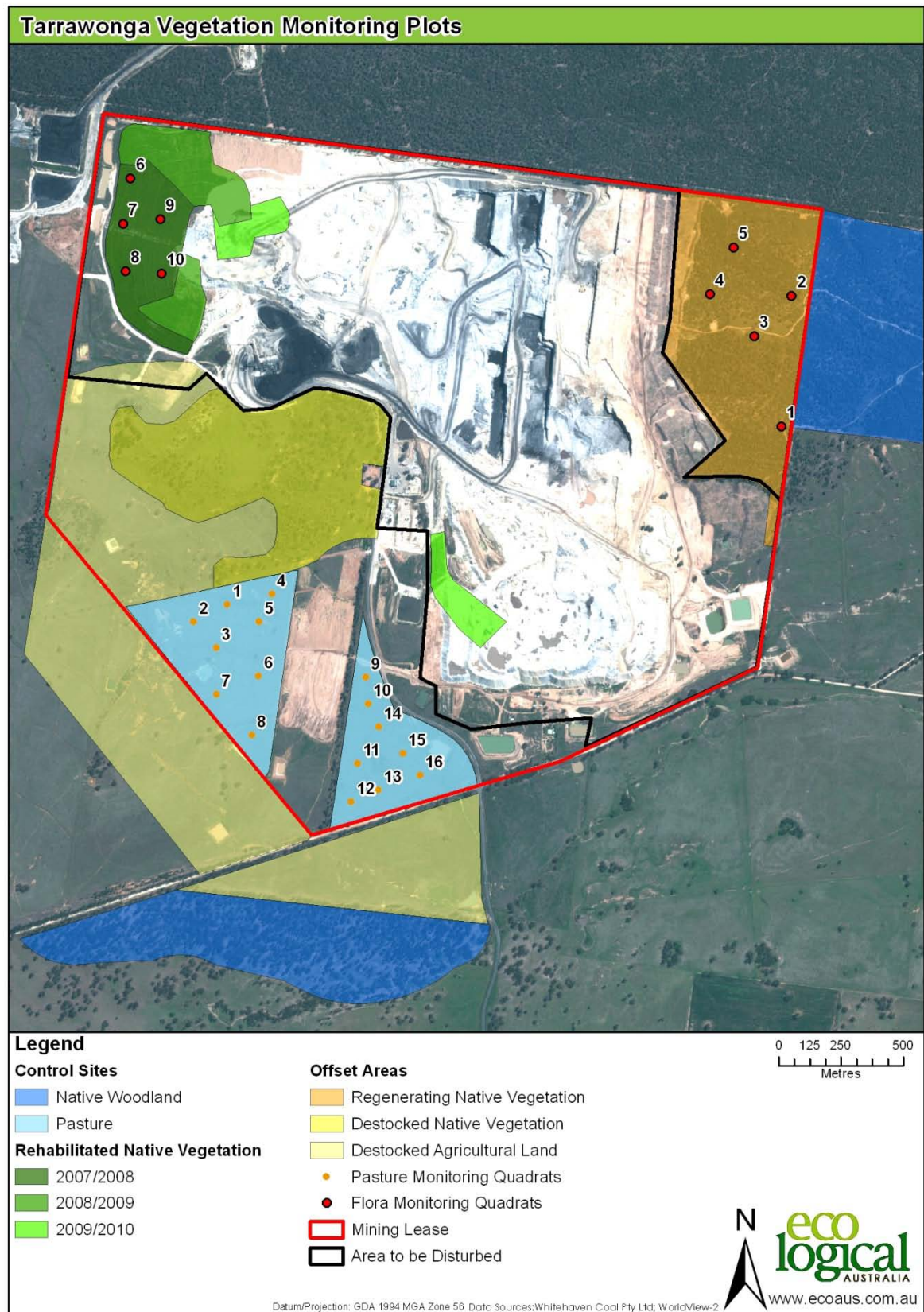


Figure 5-2: Pasture and Woodland Vegetation Monitoring Quadrats

5.3.2 Terrestrial fauna & habitat monitoring

Fauna monitoring was conducted by ELA ecologist Stephen Debus on 14 and 15 December 2011.

Terrestrial fauna and habitat monitoring surveys focused on woodland zones and targeted:

- Woodland birds as they are relatively mobile and quick to use available habitat. This survey also focused on Grey-crowned Babbler, Glossy Black Cockatoo, Turquoise Parrot, Brown Treecreeper, Speckled Warbler and Hooded Robin as they are listed threatened species already found at or near the site)
- Koalas as they are locally important
- Reptiles, as specific habitat was established to attract these species.

Problems were encountered in trying to access already established reference sites. New ones were established in consultation with WCM staff upon commencement of surveys. The terrestrial fauna and habitat monitoring sites are identified in **Figure 5-3**. Opportunistic fauna observations in other areas were also recorded.

Terrestrial fauna monitoring focused on rapid approaches to species identification and notes on habitat use. Where suitable, proxy measures for fauna (e.g. evidence of usage such as nests, scratching or scats) were also assessed.

Targeted faunal groups for monitoring and methodologies for survey were as per **Table 5-5**. During the woodland bird surveys particular attention was given to the presence of those threatened bird species identified in the pre-mining environment on the ML (i.e. Glossy Black Cockatoo, Turquoise Parrot, Brown Treecreeper, Speckled Warbler and Hooded Robin).

Table 5-5: Data to be collected for terrestrial fauna

PARAMETER	ANALYSIS	PURPOSE	SURVEY METHOD	SAMPLING FREQUENCY
Woodland birds	Presence/absence Habitat usage	Establish presence and habitat usage	A standardised search with a stopping rule as per Watson (2004) will be used to survey for woodland birds at dawn and dusk. At each site, from a fixed point position, two randomly selected transects should be established. Birds should be recorded while walking in a meandering path along each transect, with all birds recorded either through observation or calls. All birds seen or heard should be recorded in 5 minute intervals and recording continued until no new species are recorded for three consecutive 5 minute periods.	Baseline Bi-annual in spring & winter
Koalas	Presence/absence Habitat usage	Establish presence and habitat usage	Koala searches should be conducted at each mammal sites and include observations along a transect line, identifying direct sightings, scratching and scats.	Baseline Annual in spring
Hair tubes	Mammal species diversity	Establish presence	A trap line containing a combination of 5 large hair funnels and 5 small hair funnels should be placed on the ground or within habitat trees that may occur along the trap line for a period of 4 nights. Hair funnels should be baited with a mixture of honey, peanut butter and oats (ratio of 1:3:3). Hair funnels were not available for this round of sampling. Upon discussion with WCM staff it was decided to not undertake this aspect of the survey and consider more detailed fauna survey when vegetation community structure and concomitant habitat becomes more complex	Baseline Annual in spring
Reptile habitat	Species usage of habitat	Identify species diversity and usage	Lift artificial habitat (tiles) and record species	Annual in spring

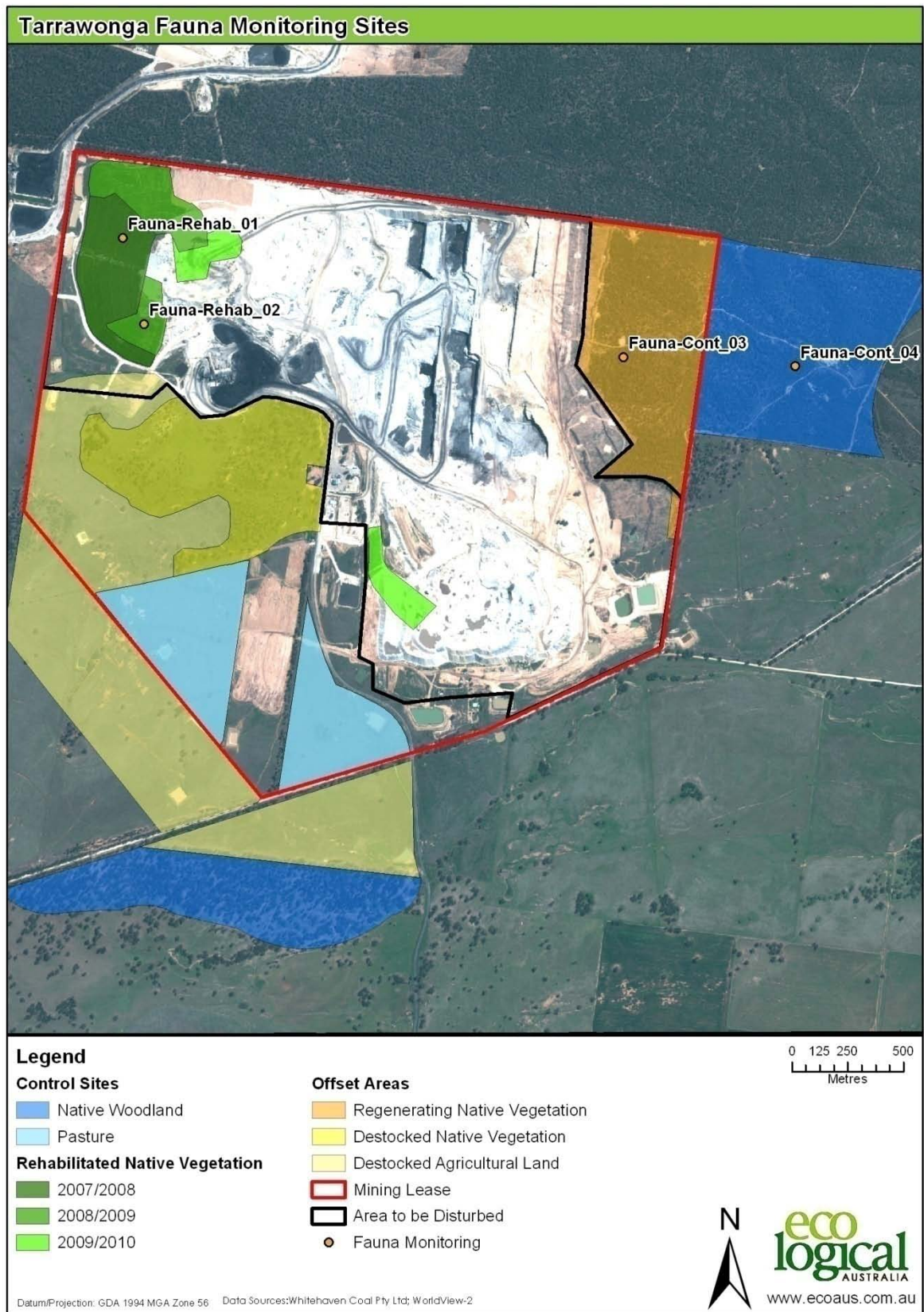


Figure 5-3: Fauna Monitoring Locations

5.4 WEATHER AT TIME OF SAMPLING

Temperatures in three months preceding the monitoring period were mild to warm and consistent with historical averages. Above average rainfall occurred in September through to January (**Table 5-6**) (Climate data from the nearest weather station Gunnedah Pool, Site number: 055023) (BoM 2012).

Table 5-6: Weather conditions preceding and during the monitoring period (BoM 2012)

MONTH	ACTUAL MONTHLY MEAN		TOTAL RAINFALL	HISTORICAL AVERAGES (1876-2011)		
	MIN TEMP (°C)	MAX TEMP (°C)		MIN TEMP (°C)	MAX TEMP (°C)	RAINFALL (mm)
Sept 2011	5	23.5	137.6	7	22.8	40.3
Oct 2011	9.4	24.4	135	10.8	26.7	55.5
Nov 2011	15.7	29.9	176.2	14.2	30.3	62.6
Dec 2011	14.3	27.1	175.8	16.8	32.9	70.1
Jan 2012	16.4	30.8	189.6	18.4	34	71.3

Temperatures during the field survey were warm with a little rain occurring on two of the survey days (**Table 5-7**) (Climate data from the nearest weather station, Gunnedah Pool, Site number: 055023) (BoM 2012).

Table 5-7: Weather conditions during the spring 2011 field surveys

DATE	MIN (°C)	MAX (°C)	RAIN (mm)	9 AM TEMP	3 PM TEMP	WIND DIRECTION AND MAXIMUM SPEED (km/h)
7/12/2011	12.3	19.9	2	15.6	17	ESE 11
14/12/2011	14.3	27	0.2	20	26.2	SSE 11
15/12/2011	13.2	27	0	19.4	25.8	ESE 13
10/01/2012	11.6	30.4	0	23.1	29.2	SW 15

5.5 STATISTICAL METHODS

Monitoring plots were compared using non-metric multidimensional scaling (MDS) in Primer 6 (PRIMER-E, Plymouth 2006). MDS plots allow multi-parametric data, such as species presence/absence, species abundance, or % cover, to be displayed in two dimensions. Sites with similar community compositions will appear close to each other on MDS plots, while those that are less similar will appear further apart (Clarke and Warwick 2001). For repeated sampling of quadrats it is possible to then detect and map changes in a community over time (Clarke and Warwick 2001), which is the intention with future monitoring. For the monitoring undertaken for this report this method was used to assess progression of the groundcover characteristics of rehabilitated areas towards control sites. It would be expected that those sites rehabilitated earliest would most resemble the control sites.

MDS plots were constructed for NDVI data and Tarrawonga groundcover data that were collected in spring 2011, following the calculation similarity matrices (Euclidean Distance for NDVI and Bray-Curtis for the remaining). MDS plots were made for the following:

- NDVI data for woodland and pasture zones
- Pasture species presence/absence
- Canopy and Midstorey species present within 20 m x 20 m plot
- Groundcover species presence/absence
- Groundcover species abundance

Groundcover composition (rock, bare earth, cryptogam, litter, native species, exotic species).

Analysis of Variance (ANOVA) was also conducted where applicable in order to determine if there was a significant difference in mean values, with a p-value less than 0.05 indicative of there being a significant difference. If significant difference was established Tukey's HSD was conducted to establish where the difference occurred.

5.6 DATA REVIEW

Appendix A of the Rehabilitation Monitoring Program (ELA 2011) summarises monitoring data collected between 2007 and 2010. This information has been reviewed in conjunction with spring 2011 survey results to track rehabilitation progress.

6 Results

6.1 REMOTE SENSING

WorldView-2 imagery of the rehabilitation zones and control areas was captured on 13 September 2011, assessed for quality and analysed to provide information for future change detection.

The combination of true colour, false colour and NDVI image visualisation products gives an indication of the extent and condition of each land cover type in the area (**Figure 6-2**; **Figure 6-3** and **Figure 6-4**). These images provide an indication of the difference between the rehabilitated areas and the control areas.

The NDVI image shows variation in photosynthetically active biomass (green vegetation) over the site, with blue areas showing low or no vegetation (e.g. bare soil, water or mine infrastructure) and red areas showing the highest amounts of green biomass. As expected the control woodland areas show the greatest amount of green biomass with the woodland rehabilitation areas (cyan and yellow) showing relatively less vegetation.

MDS plots of the NDVI data indicate that for woodland areas rehabilitated zones are yet to achieve biomass levels similar to the control zone (**Figure 6-1**). Further analysis using ANOVA and Tukey's HSD indicates significant differences ($p < 0.05$) between the two (control) pasture areas and all woodland areas.

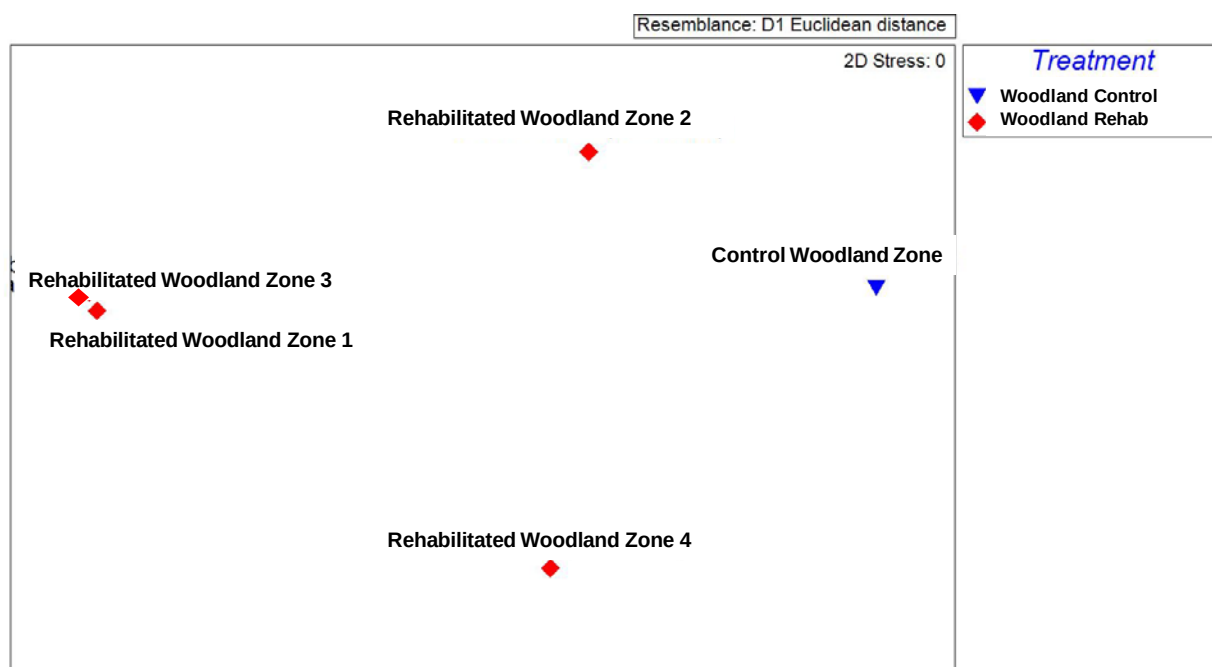


Figure 6-1: MSDS plot of NDVI data for woodland areas

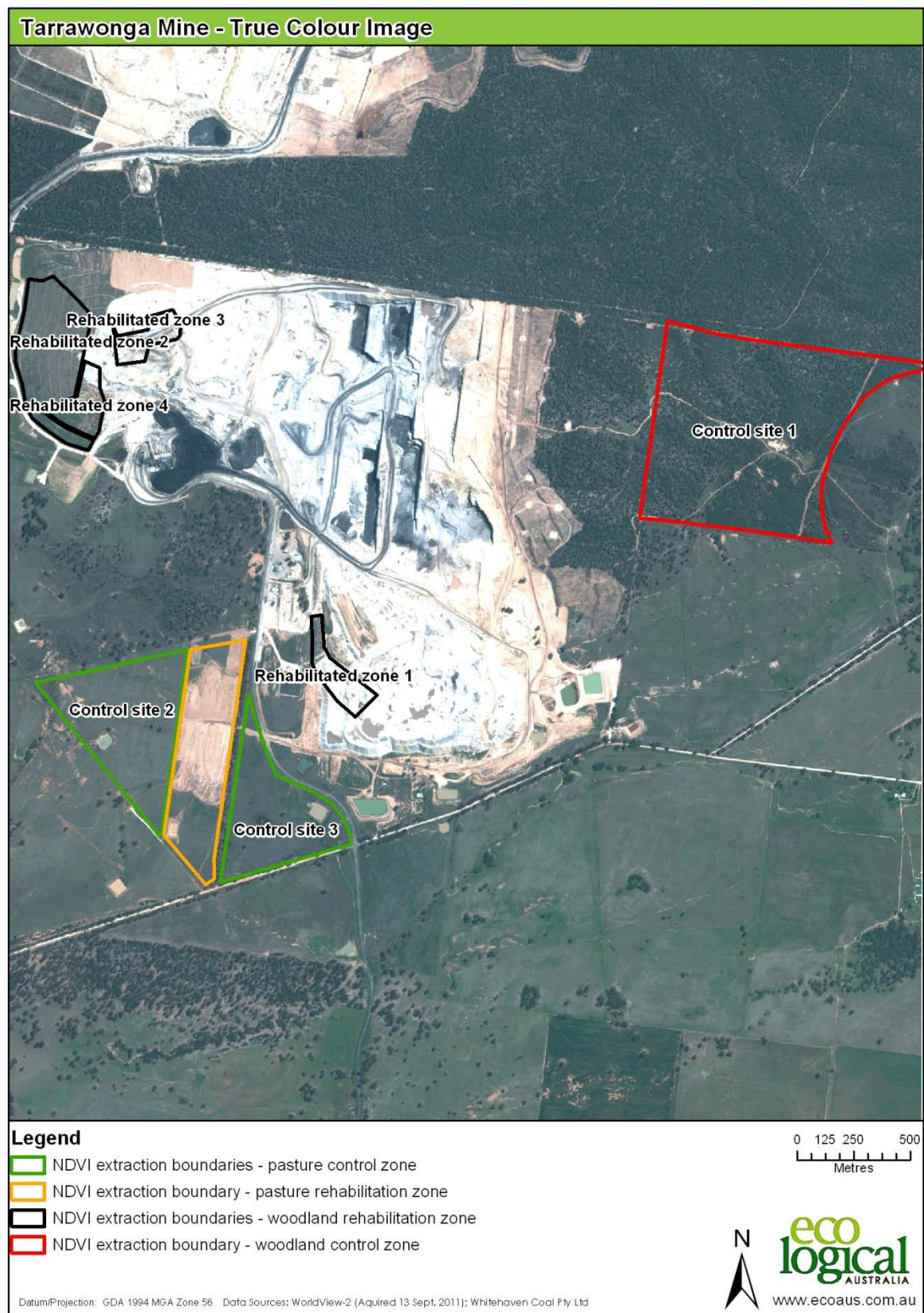


Figure 6-2: True Colour Image of Tarrawonga Mine

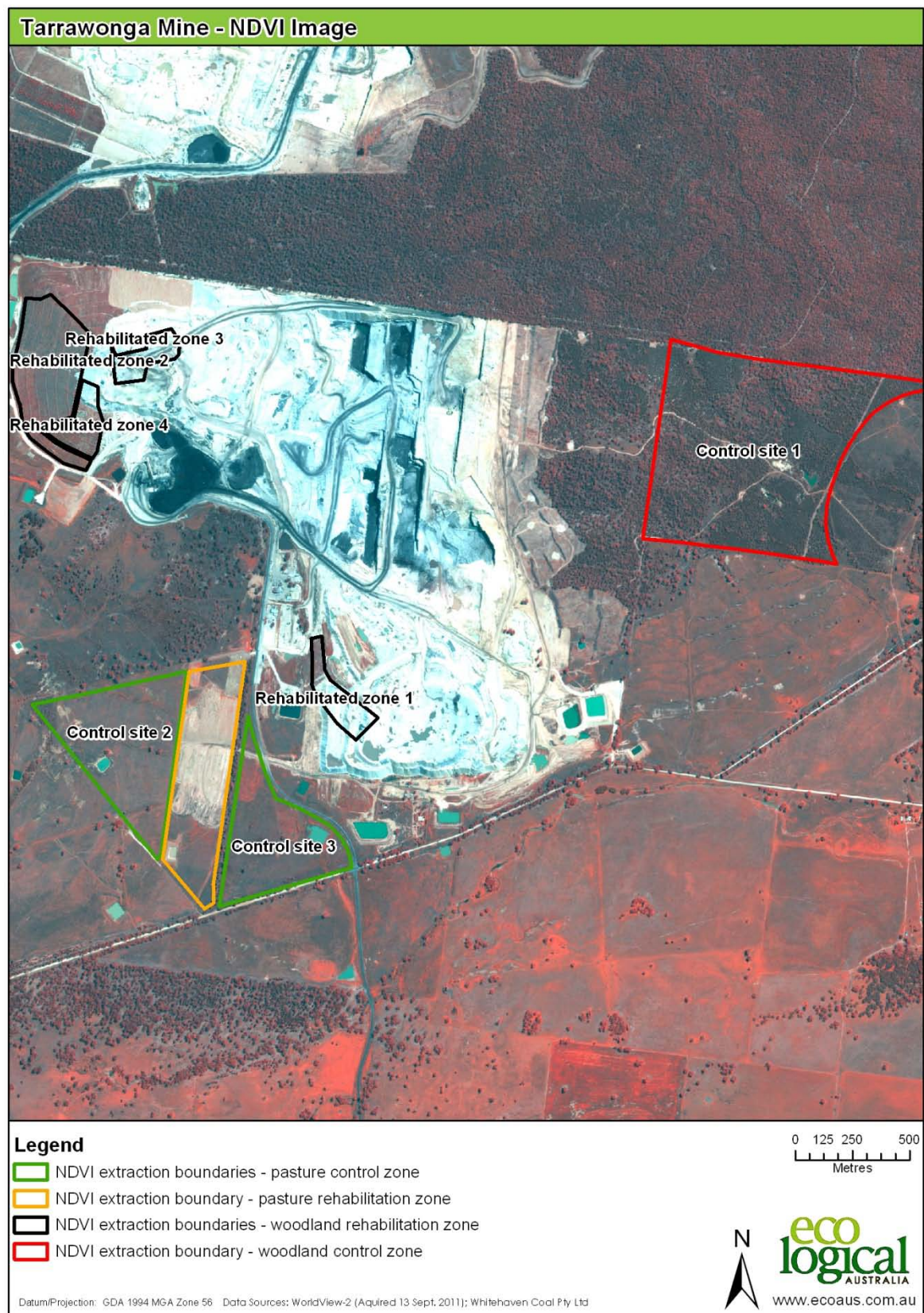


Figure 6-3: False colour image of Tarrawonga Mine

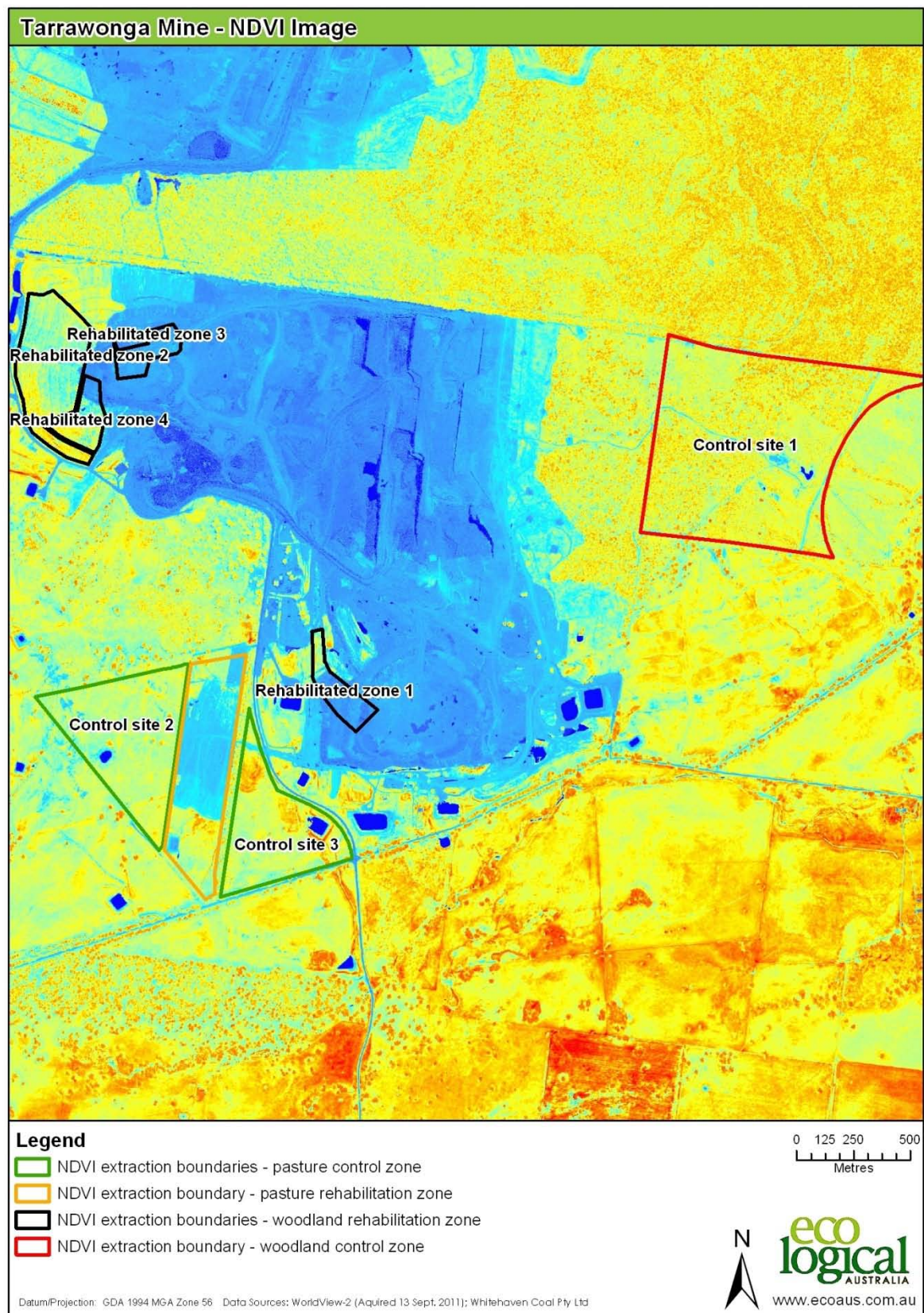


Figure 6-4: NDVI Image of Tarrawonga Mine

6.2 PASTURE AREA SURVEYS

The full suite of results for pasture area surveys is provided in **Appendix A**.

6.2.1 Pasture species

Pasture data were collected from two control zones. The MDS plot of species composition indicates that there is variability in species composition both between and within pasture zones (**Figure 6-5**). The number of species in Control Zone 1 ranged from 7 to 13, whilst in Control Zone 2 they ranged from 6 to 12.

The most common pasture species across all plots included:

- *Medicago polymorpha* (Burr Medic)
- *Petrorhagia nanteuilii* (Proliferous Pink)
- *Trifolium arvense* (Haresfoot Clover)
- *Cynodon dactylon* (Couch).

All of which are introduced pasture species, with the exception of couch.

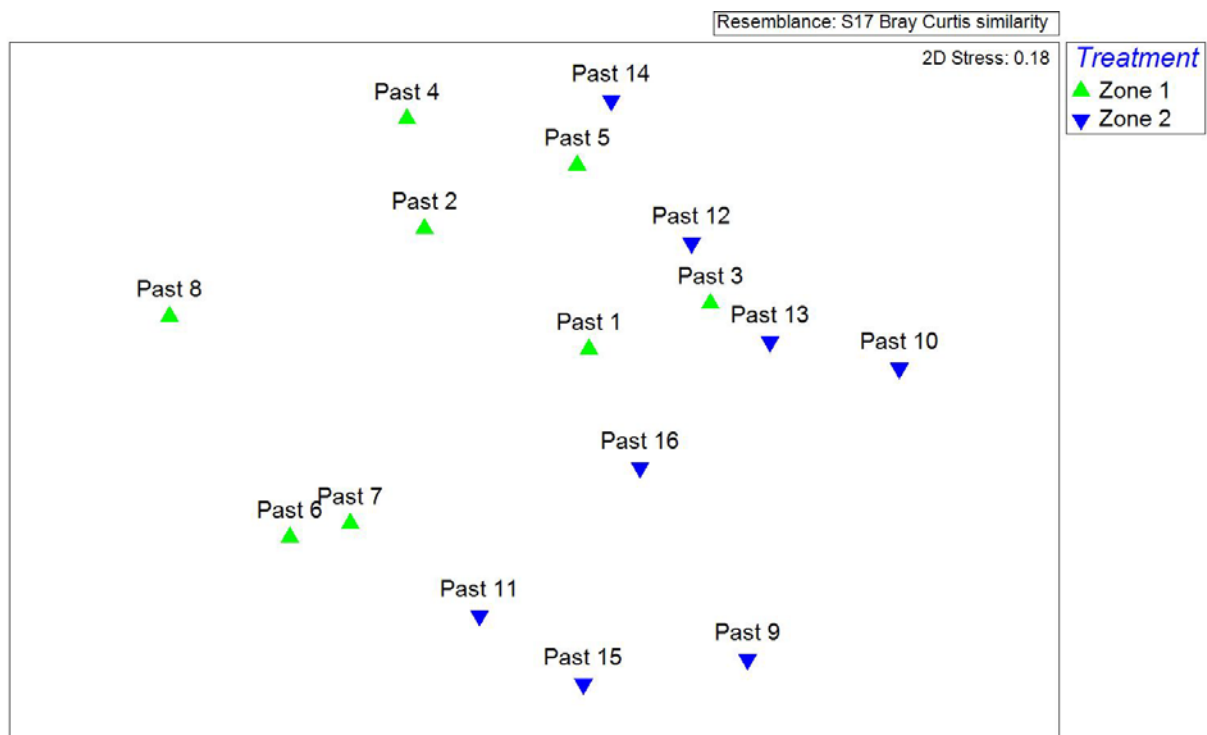


Figure 6-5: MDS plot of pasture species composition

Pasture cover ranged from 20 to 80% across all plots within Control Zone 1, with the average being 41.8%. Pasture cover ranged from 10 to 90%, with an average of 30% in the Control Zone 2 plots. ANOVA indicated that there was no significant difference in mean percentage pasture cover between the two control zones ($p > 0.05$; $p = 0.36$).

6.2.2 Weed species

For the purposes of monitoring the pasture zones a weed species was determined to be a species which is undesirable to grazing stock. Two species of weed were recorded in Zone 1, one in Plot 3 and one in Plot 5. Weeds were more widespread in Zone 2 with five species recorded across all plots with the exception of Plot 12. *Carthamus lanatus* (Saffron Thistle) and *Glandularia aristigera* (Mayne's Pest) were common to both pasture zones.

6.2.3 Biomass

Pasture biomass from plots within Zone 1 ranged from 500 kg dry matter per hectare (kg DM/ha) up to 3400 kg DM/ha. Pasture Biomass in Zone 2 plots ranged from 500 kg DM/ha up to 5550 kg DM/ha. ANOVA indicated that there was no significant difference in biomass between the two zones ($p>0.05$; $p=0.99$). Biomass was strongly correlated to pasture cover ($p>0.05$; $p=0.92$ Pearson Correlation).

6.2.4 Groundcover composition

Groundcover composition was recorded for each plot (percentage cover of weeds, pasture, bare ground and litter). ANOVA on all parameters indicated no significant difference between Zone 1 and Zone 2 (Table 6-1).

It is noted that bare earth was high in some plots ($>30\%$). NSW DPI (2005) state that in general at least 70% groundcover is required in order to minimise runoff and erosion

Table 6-1: Summary of groundcover composition

PARAMETER	ZONE 1			ZONE 2			P VALUE*
	MINIMUM RECORDED	MAXIMUM RECORDED	MEAN	MINIMUM RECORDED	MAXIMUM RECORDED	MEAN	
Weed cover (%)	0	1	0.25	0	60	14.3	0.08
Pasture cover (%)	20	80	41.9	10	90	30	0.36
Bare Ground (%)	0	50	16.8	0	15	2.1	0.09
Litter cover (%)	20	60	41.1	10	85	53.6	0.28

* $p>0.05$ indicates no significant difference between means.

6.2.5 Soil samples

Electrical conductivity in Zone 1 ranged from 0.02 to 0.03 dS/m, and in Zone 2 was between 0.02 and 0.11 dS/m. Plot 9 and 10 in Zone 2 had high EC, with measurements of 0.06 and 0.11 dS/m respectively. Soil pH was acidic at most plots, ranging from 5.01 to 5.75 in Zone 1, and 5.01 to 7.79 for Zone 2. As with the EC results, pH was relatively high in Plots 9 and 10, Plot 10 pH of 7.79 is on the verge of being basic, which can be limiting to pasture growth (Figure 6-6). Total Nitrogen, Exchangeable Phosphorus and Organic Carbon concentrations show no clear pattern between pasture zones, although mean Total Nitrogen concentration was significantly higher in Zone 1 (ANOVA, $P=0.03$) (Figure 6-6; Table 6-2).

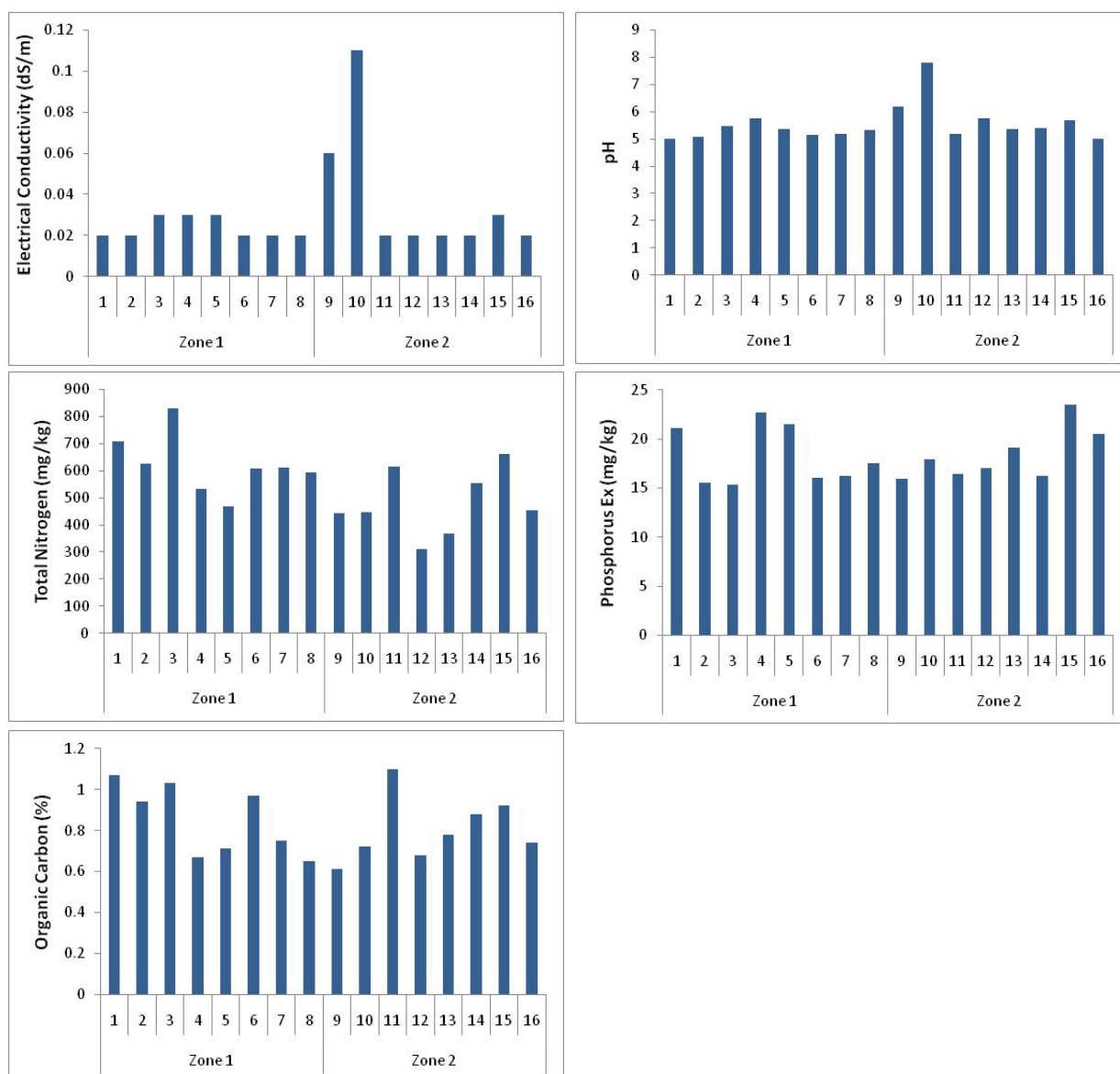


Figure 6-6: Soil physical chemistry results for pasture zones

Table 6-2: Summary of pasture plot soil physical-chemistry data

PARAMETER	ZONE 1 PLOTS			ZONE 2 PLOTS			P VALUE*
	MIN	MAX	MEAN	MIN	MAX	MEAN	
Electrical Conductivity (dS/m)	0.02	0.03	0.02	0.02	0.11	0.04	0.26
pH (CaCl ₂)	5.01	5.75	5.29	5.01	7.79	5.80	0.14
Total Nitrogen (mg/kg)	469	828	622	311	662	481	0.03
Phosphorus Ex (mg/kg)	15.3	22.7	18.2	15.9	23.5	18.3	0.95
Organic Carbon (%)	0.65	1.07	0.85	0.61	1.10	0.80	0.59

* p>0.05 indicates no significant difference between means.

6.3 WOODLAND SURVEYS

The full suite of results for woodland vegetation surveys is in **Appendix B**. Results for fauna surveys are in **Appendix C**.

6.3.1 Vegetation

Overstorey and midstorey species recorded within the 20 m x 50 m baseplot indicate that species planted within the rehabilitated area are different from those occurring in the control woodland. Species diversity in the rehabilitated area is low relative to the control woodland, with six species recorded in the rehabilitated plots compared with 17 in the control plots. There was no foliage cover recorded for canopy or midstorey along the 50 m transects in the rehabilitated plots. True projected foliage cover (TPFC) in the control plots ranged from 0% to 8% for canopy, and 0.6% to 10.5% for midstorey (**Table 6-3**). These data will form the baseline with which to monitor progression of rehabilitation towards control woodland condition.

Table 6-3: True Projected Foliage Cover for woodland control plots

PLOT	1	2	3	4	5
Canopy %	5%	0%	3%	8%	2%
Midstorey %	0.7%	10.5%	0.6%	2.8%	8.5%

In each 20 m by 20 m quadrat all tree and shrub species greater than 1 m in height were recorded. The difference in species composition between the control and treatment sites is apparent in the MDS plot of the data. Plot 6 was omitted from the MDS plot as it had no individuals recorded and therefore would have skewed the data (**Figure 6-7**).

There was only one common species recorded from the control woodland and the rehabilitated woodland, *Eucalyptus albens* (White Box). In terms of species diversity in general, ANOVA indicated that there was no significant difference between the two treatments ($p > 0.05$; $p = 0.07$).

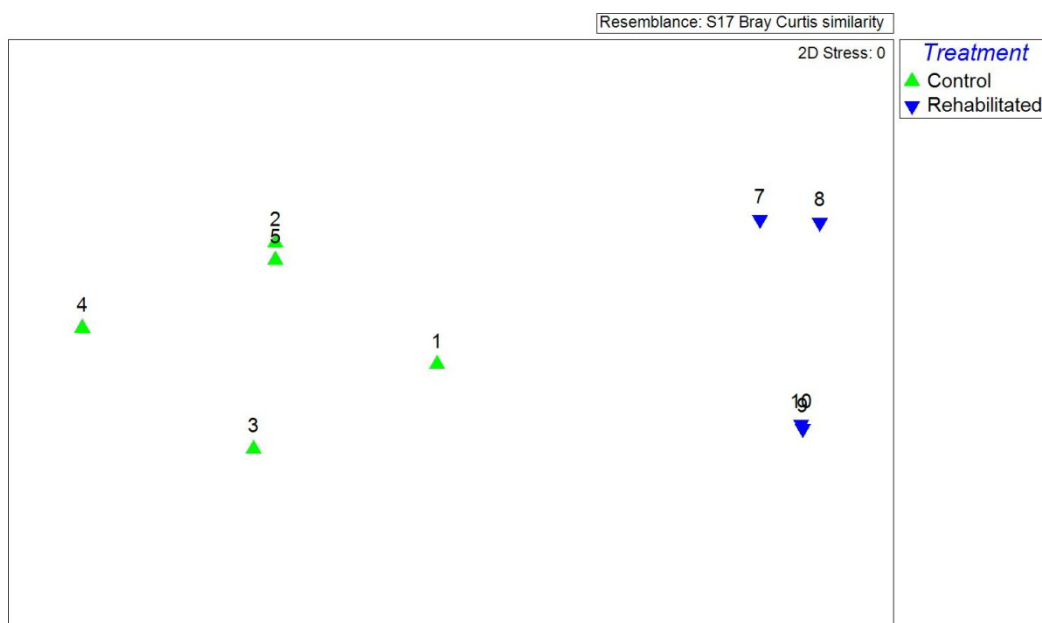


Figure 6-7: MDS plot of tree and shrub species >1 m in height recorded within 20 m x 20 m plot. Plot 6 has been omitted from this analysis as it did not contain any individuals.

Lycium ferocissimum (African Boxthorn) an invasive shrub species was recorded in plots 7 through to 10 (rehabilitation zones). African Boxthorn is a weed of national significance and Class 4 noxious weed within Gunnedah Shire Council. Noxious weeds are regulated under the *Noxious Weeds Act 1993* which is enforced by the local control authority (usually local government). This species must be managed in a manner that reduces its numbers spread and incidence and continuously inhibits its reproduction. African Boxthorn has an extensive, deep, branched taproot that will produce new growth if broken, therefore control and management generally requires the integration of a number of management techniques for effective control. WCM staff should refer to the site MOP for site weed management procedures. In addition NSW DPI (2012) lists a range of management methods which include:

- Mechanical removal of as much of the top growth and as many of the roots as possible. Removed plant material should then be burnt
- Cultivation after physical removal whereby suitable sites are deep-ripped, bringing most remaining root fragments to the surface to be raked and burnt. Follow up treatment will need to be commenced should there be regrowth
- Chemical control with a registered herbicide and used according to directions on the label, this may require multiple treatments as the plant often regenerates before it dies.
- Foliar spray is the most commonly used control method, application requires strategic timing and it is not an appropriate method for large bushes

Replacement with appropriate plants (as seedlings are susceptible to competition from other plants).

Control and management of African Boxthorn is more effective and economical if it is done when plants are young. The NSW Department of Primary Industries website describes various management actions in detail (<http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/profiles/african-boxthorn>). Management information can also be obtained from the Gunnedah Shire Council. ELA recommend that these plants are treated as soon as practical.

Groundcover species composition within the 20m x 20 m subplot differs between the rehabilitated plots and the control plots (**Figure 6-8**), with exotic species being almost proportionate to native species in most of the rehabilitated plots, whereas in the control plots the number of native species greatly exceed the number of exotic species (**Figure 6-9**). Ground cover species abundance is also different between the two treatment areas, with the exception of Plot 8, which is an outlier likely due to natives exceeding exotics in this rehabilitated plot. Species abundance differs little within treatments (**Figure 6-10**).

It was noted during the field surveys that plots located within the rehabilitated zone were heavily infested with weeds, in particular *Chloris*. Plots located within the control zone had relatively low incidence of weeds.

Groundcover composition in terms of native species, exotic species, bare ground, cryptogams and rocks shows a similar pattern; with composition being more similar within treatments rather than between (**Figure 6-11**). ANOVA indicated that these parameters, with the exception of bare ground and cryptogams were significantly different ($p < 0.05$) between the control and rehabilitated zones (**Table 6-4**).

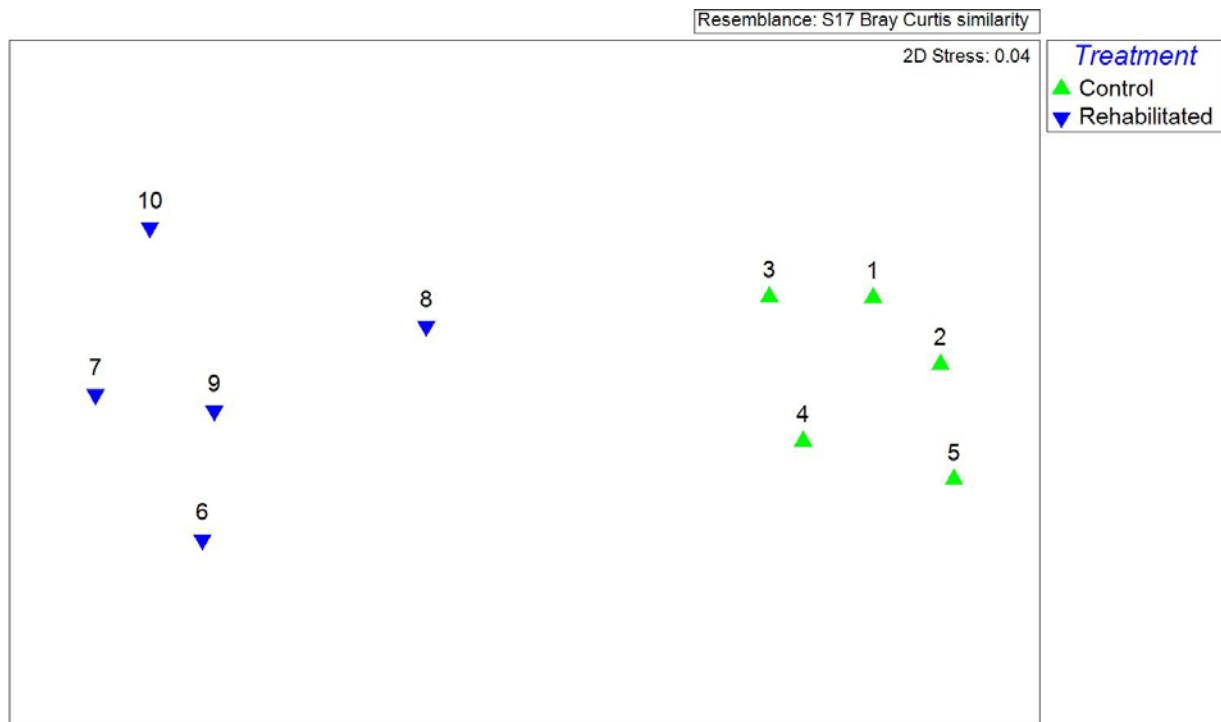


Figure 6-8: MDS of groundcover species composition within woodland monitoring sites

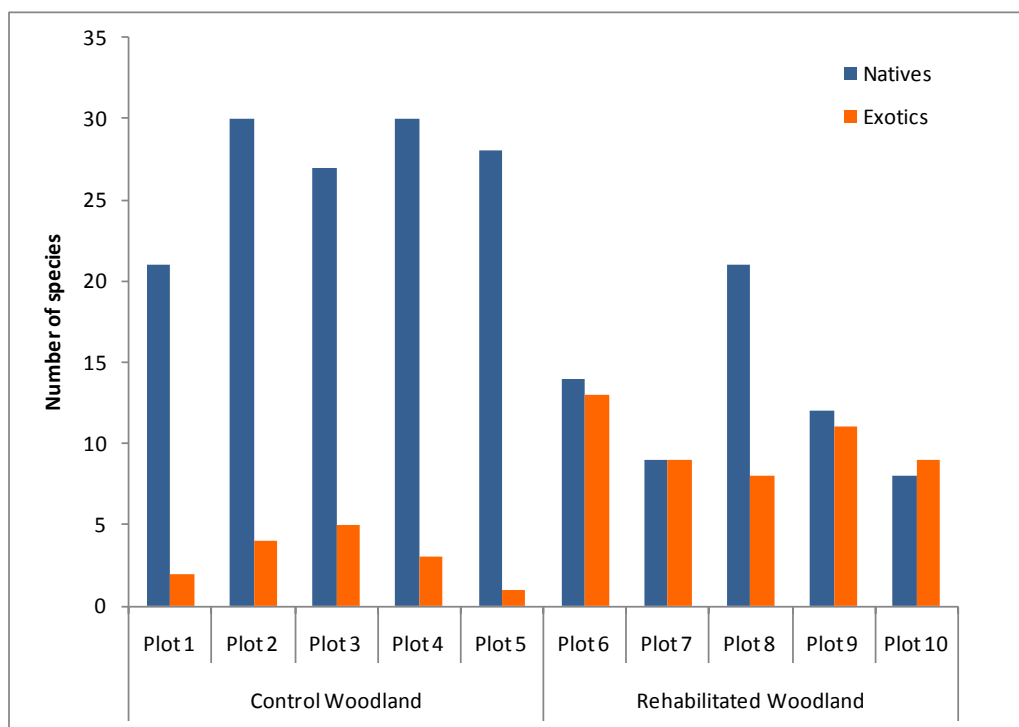


Figure 6-9: Native versus exotic groundcover species in woodland monitoring plots

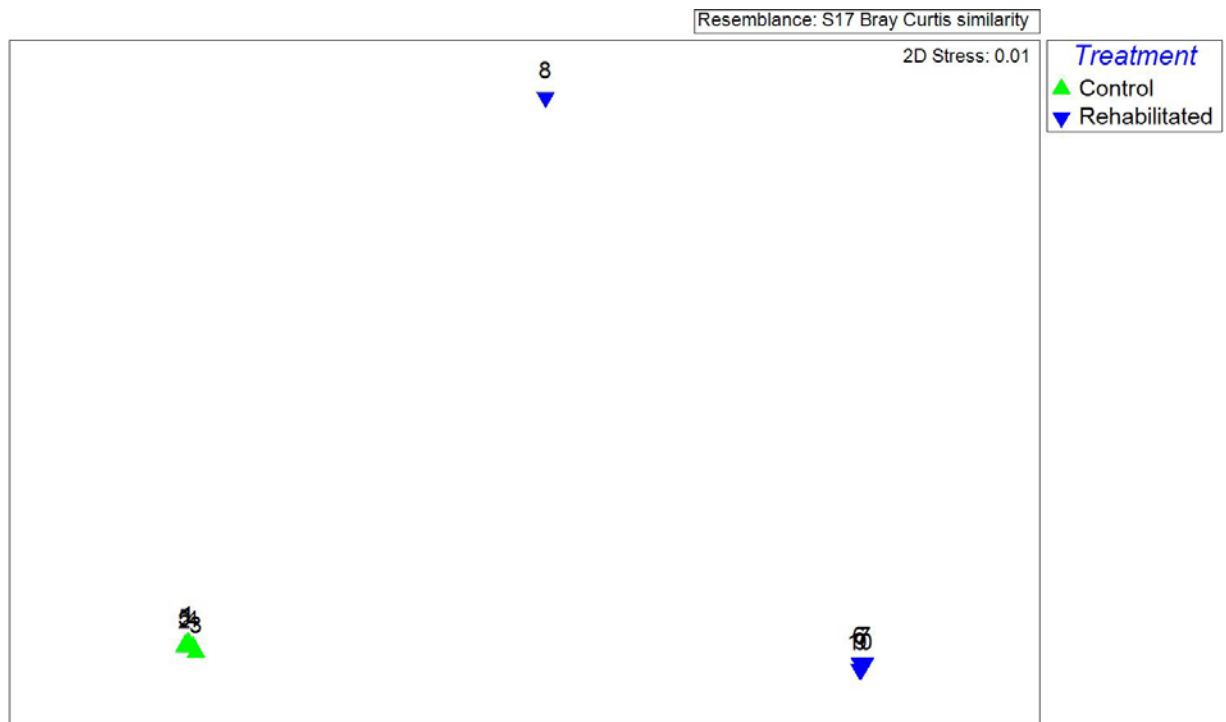


Figure 6-10: MDS plot of groundcover species abundance within woodland monitoring plots

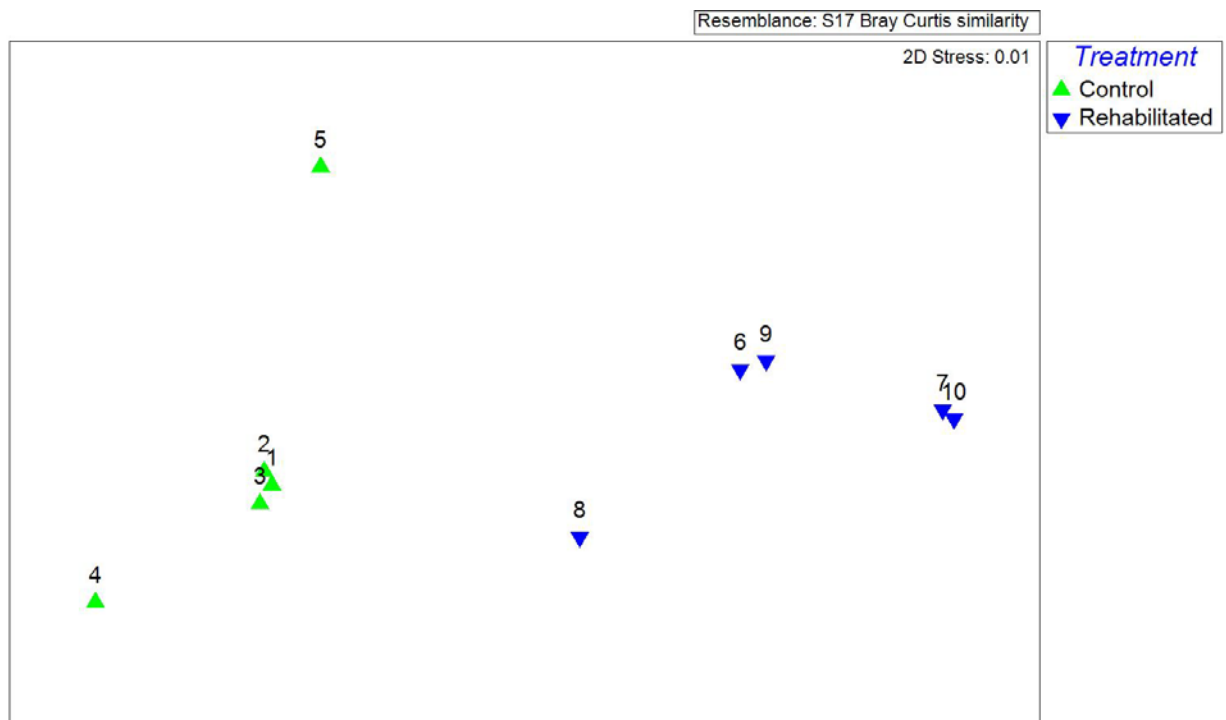


Figure 6-11: MDS plot of groundcover composition within woodland monitoring plots

Table 6-4 Summary of groundcover composition

PARAMETER	CONTROL PLOTS			REHABILITATED PLOTS			P VALUE*
	MINIMUM RECORDED	MAXIMUM RECORDED	MEAN	MINIMUM RECORDED	MAXIMUM RECORDED	MEAN	
Weed cover (%)	8	25	20	0	20	6.6	0.009
Pasture cover (%)	0	2	0.4	16	37	28.8	0.000
Bare Ground (%)	0	16	8.8	9	14	11.6	0.215
Litter cover (%)	14	19	16.6	2	7	4.6	0.000
Cryptogams (%)	0	9	2	0	0	0	0.084

* $p > 0.05$ indicates no significant difference between means.

Parameters such as canopy DBH thresholds, canopy species and age classes and coarse woody debris are indicators of self-sustaining vegetation communities. Coarse woody debris was recorded in all of the rehabilitated plots (with the exception of plot 8) and it is assumed that these have been introduced as habitat elements to the sites. The rehabilitated sites do not yet have a mature canopy and so DBH thresholds, canopy species and age classes were not recorded, however, it is expected that over time these sites will return similar measurements to those recorded at the control sites (**Appendix B5**).

6.3.2 Soil pits

The soil pit in the rehabilitation area showed root establishment was occurring with grass and other vegetation roots penetrating to depths of greater than 25 cm and between horizons (where present). Topsoil was largely missing from both zones, with the amount of stones and gravels within the overburden material increasing with depth in the rehabilitation zone.

Full descriptions of soil profiles are provided in **Appendix D**.

6.3.3 Terrestrial fauna and habitat monitoring

A total of 70 bird species were recorded across all monitoring sites, with the majority of species being recorded in the woodland control sites (49 species at Fauna-Cont_04 and 50 at Fauna-Cont_03). Eight species recorded at Fauna-Rehab_01 and four species at Fauna-Rehab_02.

Six species listed as vulnerable under the TSC Act and one species listed as migratory under the EPBC Act were recorded during the surveys, most of which occurred in the control sites (**Table 6-5**).

Other fauna recorded were restricted to the control areas, with the exception of *Macropus giganteus* (Eastern Grey Kangaroo) which was also recorded at Fauna-Rehab_01 (**Table 6-6**).

Table 6-5: Bird species with conservation status recorded during spring 2011 monitoring

SPECIES	CONSERVATION STATUS	FAUNA-Rehab_01	FAUNA-Rehab_02	FAUNA-Cont_03	FAUNA-Cont_04
<i>Chthonicola sagittata</i> Speckled Warbler	TSC Act - Vulnerable			X	X
<i>Circus assimilis</i> Spotted Harrier	TSC Act - Vulnerable	X		X	
<i>Daphoenositta chrysoptera</i> Varied Sittella	TSC Act - Vulnerable				X
<i>Glossopsitta pusilla</i> Little Lorikeet	TSC Act - Vulnerable				X
<i>Hirundapus caudacutus</i> White-throated Needletail	EPBC Act - Migratory			X	
<i>Lophoictinia isura</i> Square-tailed Kite	TSC Act - Vulnerable				X
<i>Neophema pulchella</i> Turquoise Parrot	TSC Act - Vulnerable				X

Table 6-6: Fauna recorded during spring 2011 monitoring

SCIENTIFIC NAME	FAUNA-Rehab_01	FAUNA-Rehab_02	FAUNA-Cont_03	FAUNA-Cont_04
Mammals				
<i>Macropus giganteus</i> Eastern Grey Kangaroo	X			X
<i>Macropus robustus</i> Common Wallaroo				X
<i>*Oryctolagus cuniculus</i> Rabbit				X
Reptiles and Amphibians				
<i>Crinia signifera</i> Eastern Froglet			X	
<i>Limnodynastes fletcheri</i> Barking Marsh-Frog			X	
<i>Litoria peronii</i> Peron's Tree-Frog			X	
<i>Morethia boulengeri</i> Boulenger's Skink			X	X

Due to substantial rainfall in the period preceding the fauna survey, grass growth was high and dense. In addition GPS locations of artificial reptile habitat were inaccurate, therefore artificial reptile habitats were unable to be located and visibility for fauna observations was reduced.

6.4 COMPARISON TO PREVIOUS SURVEYS

Whilst new monitoring quadrats for both pasture and woodland areas have been established at Tarrawonga Mine, general comparisons can be made on the progression of rehabilitation.

6.4.1 Pasture areas

Pasture monitoring quadrats for this monitoring period were located within control pasture areas, whereas in previous years monitoring has been undertaken in destocked native vegetation areas and destocked agricultural land areas. Comparisons to previous monitoring results are therefore unable to be made.

6.4.2 Woodland areas

Previous monitoring data for the rehabilitated woodland sites indicated that as rehabilitation was in its early stages and as data were insufficient, analysis was largely inconclusive. Previous monitoring notes an absence of midstorey and overstorey species, these are now present, albeit in juvenile growth stage. Woodland control sites have since undergone mining disturbance. Few comparisons can be drawn from previous monitoring data.

7 Discussion

This monitoring report documents the results of the Spring 2011 rehabilitation monitoring to provide a quantitative set of baseline information. These data will be used for ongoing monitoring to determine the effectiveness of rehabilitation over the Tarrawonga site. Rehabilitated landscapes include areas returned to agricultural and native woodland land uses. A multi-scale, multi-data source monitoring program was designed and implemented to quantify the performance of the rehabilitation works against control areas.

7.1 REMOTE SENSING

Multi-spectral remote sensing provides information relating to land cover and condition across the entire area including rehabilitation and control areas. These data are readily accessible and provide an inexpensive means of documenting land cover change and directing targeted field work.

EM survey data and LiDAR data were not captured or processed for this survey period. EM provide useful information on the spatial variability of shallow sub-surface conductivity. Repeat capture of EM data would provide a means of investigating changes in soil moisture, ion and texture zones over time. In addition comparisons to surrounding areas can be used to demonstrate the pattern and range of EM data in natural landscapes in comparison to the rehabilitated areas. Given that Tarrawonga is still a working mine, the feasibility of undertaking an EM survey for is limited. However, the use of EM surveys for monitoring of the final rehabilitated landform is still recommended.

LiDAR data are capable of providing high resolution information across the entire site for topography, tree canopy height and tree foliar density. Capture and analysis of LiDAR data would be useful for documenting landscape scale change in these three important parameters.

7.2 PASTURE AREA SURVEYS

Field surveys in pasture areas included collection and analysis of information relating to pasture composition and biomass, pasture weeds and soil character. Data were only collected from the control area to establish baseline data. Monitoring of rehabilitated pasture areas will be undertaken once rehabilitation within those areas has been undertaken.

7.3 WOODLAND SURVEYS

Woodland monitoring including flora and fauna parameters (canopy species composition, abundance, cover, woodland bird numbers etc) showed that the rehabilitated sites are yet to resemble control conditions. Floristic species for all strata differed between treatments. It is recommended that future revegetation be undertaken with species that occur in the control woodland area.

Hair tube traps were not used during this round of monitoring as equipment availability was limited. Upon discussion with WCM staff it was decided to not undertake this aspect of the survey and consider more detailed fauna survey when vegetation community structure and concomitant habitat becomes more complex.

It is also recommended that additional control sites for woodland survey are established within areas that will not be disturbed by mining in the long-term. Suitable sites have been nominated within the

Leard State Forest and it is recommended that discussions commence with State Forests regarding access. An application for *Special Purposes Permits for Research* will need to be submitted to undertake surveys within the Leard State Forest. As required under the conditions of this kind of permit, results of any surveys undertaken will be provided to State Forests. It is recommended that liaison with State Forests commence as soon as possible to allow the establishment of survey sites in Leard State Forest during the Spring 2012 monitoring period.

8 Recommendations

Limited rehabilitation of Tarrawonga has taken place and it is likely that future mining activities will impact on some existing rehabilitation sites.

It is recommended that WCM staff consider the results of this survey round and refine the monitoring design for ongoing survey and reporting. Key ongoing monitoring recommendations include:

- Capture and analysis of LiDAR information in 2012 if possible
- Capture of multi-spectral imagery in early spring 2012 for change detection and directed field survey as prescribed in the monitoring plan
 - A rapid letter style report to be provided to WCM immediately following analysis to permit timely directed field survey if required
- Liaise with State Forests to determine the possibility of establishing woodland control plots within Leard State Forest
- Repeat pasture and woodland flora survey for 2012 to confirm landscape functionality trends and patterns

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Appendix A1: Pasture plot coordinates and site photos

Plot 1 (E 227470; N 6606386)



Plot 2 (E 227347; N 6606313)



Plot 3 (E 227430; N 6606211)



Plot 4 (E 227648; N 6606433)



Plot 5 (E 227609; N 6606318)



Plot 6 (E 227599; N 6606097)



Plot 7 (E 227428; N 6606026)



Plot 8 (E 227571; N 6605860)



Plot 9 (E 228025; N 6606089)



Plot 10 (E 228041; N 6605987)



Plot 11 (E 227999; N 6605747)



Plot 12 (E 227972; N 6605640)



Plot 13 (E228080; N 6605640)



Plot 14 (E 228079; N 6605786)



Plot 15 (E 228176; N 6605786)



Plot 16 (E 228247; N 6605701)



Appendix A2: Pasture species

SPECIES	COMMON NAME	CONTROL ZONE 1								CONTROL ZONE 2								NUMBER OF TIMES SPECIES OCCURS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>Alternanthera denticulata</i>	Lesser Joyweed							X										1
* <i>Anagallis arvensis</i>	Scarlet Pimpernel							X	X			X	X					4
<i>Aristida personata</i>	Purple Wire-grass	X													X			2
<i>Austrodanthonia</i> sp.	Wallaby Grass		X		X		X											3
<i>Austrostipa scabra</i>	Speargrass	X	X	X		X				X								5
* <i>Avena</i> sp.	Wild Oats	X					X											2
* <i>Bidens subalternans</i>	Greater Beggar's Ticks										X					X		2
<i>Boerhavia</i> sp.	Tar-vine													X				1
<i>Bothriochloa decipiens</i>	Red Grass							X							X			2
<i>Calotis lappulacea</i>	Yellow Burr-daisy				X				X									2
<i>Carex inversa</i>	Knob Sedge		X															1
* <i>Centaurium</i> sp.						X			X						X			3
<i>Chloris truncata</i>	Windmill Grass		X		X	X	X	X	X									6

SPECIES	COMMON NAME	CONTROL ZONE 1								CONTROL ZONE 2								NUMBER OF TIMES SPECIES OCCURS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>Convolvulus graminetinus</i>									X									1
* <i>Conyza bonariensis</i>	Flaxleaf Fleabane							X									X	2
* <i>Cyclosporum leptophyllum</i>	Slender Celery			X			X										X	3
<i>Cynodon dactylon</i>	Couch							X			X	X		X		X	X	6
<i>Cyperus fulvus</i>	Sticky Sedge								X									1
<i>Daucus glochidiatus</i>	Native Carrot		X															1
<i>Dichanthium sericeum</i>	Queensland Bluegrass		X			X							X		X			4
<i>Dichondra repens</i>	Kidney Weed								X									1
<i>Dichondra</i> sp. A							X	X										2
<i>Digitaria divaricatissima</i>	Umbrella Grass		X				X	X	X									4
<i>Einadia polygonoides</i>										X						X		2
<i>Enneapogon nigricans</i>	Nineawns				X													1
<i>Euchiton</i> sp.							X		X			X			X			4
<i>Euchiton sphaericus</i>	Cudweed				X													1
* <i>Hedypnois rhagadioloides</i>	Cretan Weed								X									1
* <i>Hypochaeris microcephala</i>	White Flatweed										X							1
<i>Juncus</i> sp.															X			1
* <i>Lactuca serriola</i>	Prickly Lettuce									X		X					X	3

SPECIES	COMMON NAME	CONTROL ZONE 1								CONTROL ZONE 2								NUMBER OF TIMES SPECIES OCCURS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>*Lepidium africanum</i>				X	X													2
<i>*Lepidium bonariense</i>											X							1
<i>*Lolium sp.</i>	Ryegrass	X		X				X		X						X		5
<i>Malvastrum americanum</i>	Spiked Malvastrum			X														1
<i>*Medicago minima</i>	Wooly Burr Medic		X															1
<i>*Medicago polymorpha</i>	Burr Medic		X	X							X		X	X			X	6
<i>*Medicago sp.</i>					X						X							2
<i>*Misopates orontium</i>	Lesser Snapdragon	X					X	X						X			X	5
<i>Oxalis sp.</i>	Soursob													X		X		2
<i>Panicum effusum</i>	Hairy Panic	X			X													2
<i>Panicum sp.</i>							X			X		X					X	4
<i>*Petrorhagia nanteuilii</i>	Proliferous Pink	X	X	X	X	X							X	X	X		X	9
<i>*Polycarpon tetraphyllum</i>	Four-leaved Allseed														X			1
<i>Sida sp.</i>		X								X			X				X	4
<i>Solanum esuriale</i>	Quena		X													X		2
<i>*Sonchus oleraceus</i>	Common Sowthistle	X					X					X				X		4
<i>Sporobolus carolii</i>	Fairy Grass						X											1
<i>Sporobolus creber</i>	Slender Rat's Tail Grass				X			X										2

SPECIES	COMMON NAME	CONTROL ZONE 1								CONTROL ZONE 2								NUMBER OF TIMES SPECIES OCCURS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
<i>*Trifolium arvense</i>	Haresfoot Clover	X		X	X	X					X		X	X	X		X	9
<i>*Trifolium campestre</i>	Hop Clover	X	X		X			X				X						5
<i>Verbena gaudichaudii</i>															X			1
<i>Verbena</i> sp.									X									1
<i>Vittadinia cuneata</i>	Fuzzweed				X													1
<i>Vittadinia muelleri</i>						X												1
<i>Vittadinia</i> sp.	Fuzzweed						X	X								X	X	4
<i>Wahlenbergia communis</i>	Tufted Bluebell								X			X			X	X	X	5
Total Species		11	12	8	13	7	12	13	12	6	7	8	6	7	11	9	12	

*Denotes introduced species

Appendix A3: Weed species

SPECIES	COMMON NAME	CONTROL ZONE 1								CONTROL ZONE 2								NUMBER OF TIMES SPECIES OCCURS
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
* <i>Carthamus lanatus</i>	Saffron Thistle					X								X	X		X	4
<i>Cheilanthes sieberi</i>	Poison Mulga Fern											X			X			2
* <i>Chondrilla juncea</i>	Skeleton Weed										X	X		X				3
* <i>Glandularia aristigera</i>	Mayne's Pest			X						X						X		3
* <i>Verbena bonariensis</i>	Purpletop														X			1
Total species		0	0	1	0	1	0	0	0	1	1	2	0	2	3	1	1	

*Denotes introduced species

Appendix A4: Pasture plot results

TREATMENT	PLOT	EASTING	NORTHING	GROUND COVER COMPOSITION				SOIL CHEMISTRY					PASTURE BIOMASS (kg DM/ha)
				Weed Species (%)	Pasture Species (%)	Bare Ground (%)	Litter (%)	Electrical Conductivity (dS/m)	pH (CaCl ₂)	Total Nitrogen (mg/kg)	Phosphorus Ex (mg/kg)	Organic Carbon (%)	
Control Zone 1	1	227470	6606386	0	40	0	60	0.02	5.01	708	21.1	1.07	2600
	2	227347	6606313	0	80	0	20	0.02	5.06	625	15.5	0.94	3400
	3	227430	6606211	1	40	4	55	0.03	5.45	828	15.3	1.03	2500
	4	227648	6606433	0	30	40	30	0.03	5.75	533	22.7	0.67	1850
	5	227609	6606318	1	20	50	29	0.03	5.36	469	21.5	0.71	1250
	6	227599	6606097	0	40	5	55	0.02	5.13	607	16	0.97	1450
	7	227428	6606026	0	60	5	35	0.02	5.18	612	16.2	0.75	3350
	8	227571	6605860	0	25	30	45	0.02	5.34	592	17.5	0.65	500
Control Zone 2	9	228025	6606089	60	10	0	30	0.06	6.2	442	15.9	0.61	3000
	10	228041	6605987	5	10	0	85	0.11	7.79	446	17.9	0.72	650
	11	227999	6605747	5	10	0	85	0.02	5.17	616	16.4	1.1	500
	12	227972	6605591	0	90	0	10	0.02	5.74	311	17	0.68	5550
	13	228080	6605640	15	20	15	50	0.02	5.37	367	19.1	0.78	750
	14	228079	6605893	5	40	0	55	0.02	5.41	553	16.2	0.88	3250
	15	228176	6605786	10	30	0	60	0.03	5.69	662	23.5	0.92	2400
	16	228247	6605701	-	-	-	-	0.02	5.01	453	20.5	0.74	3400

Appendix B1: Woodland monitoring plot photographs

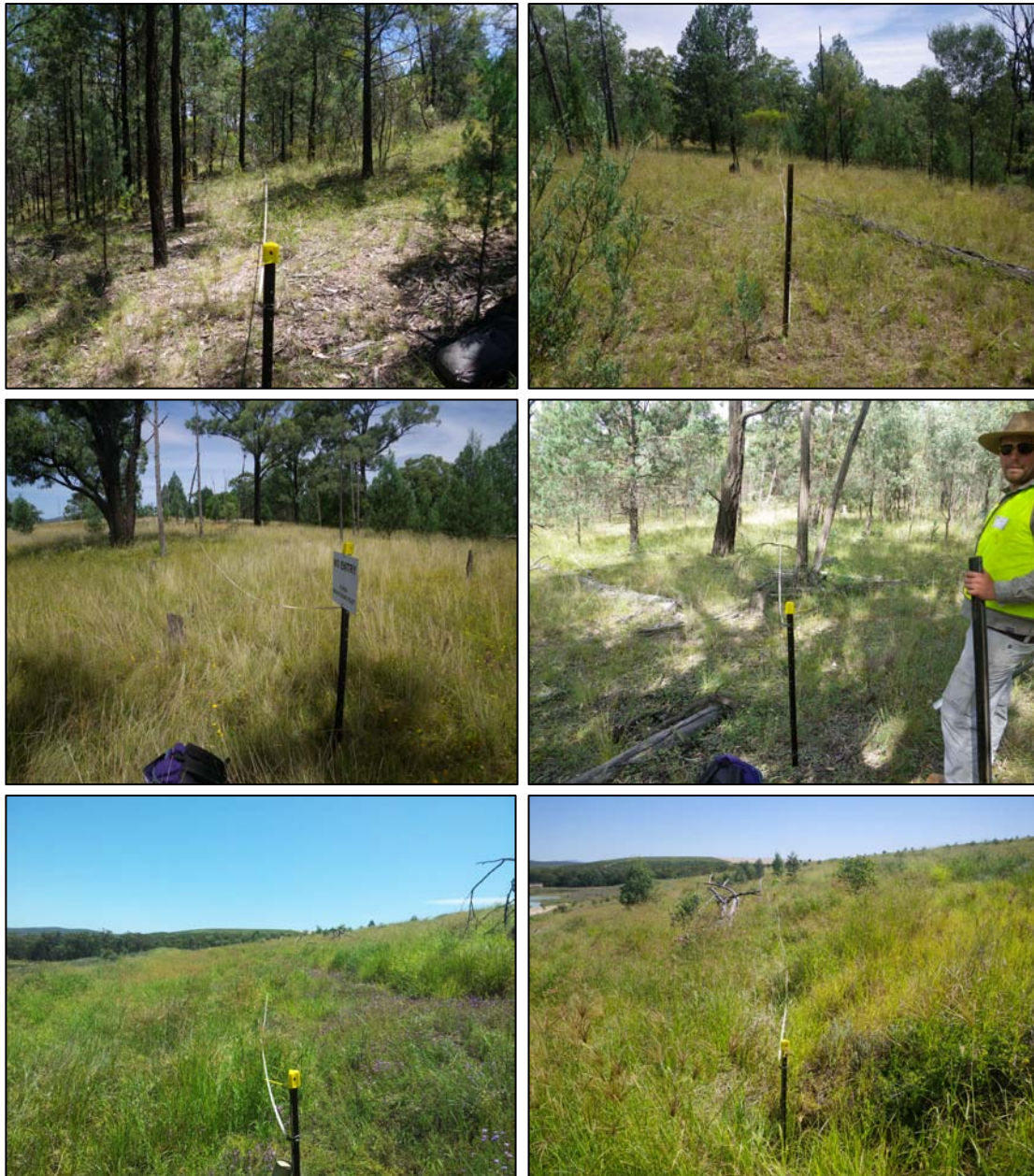


Figure B 1: Woodland monitoring plots. Plots 1 to 4; 6 and 7 (ordered top to bottom, left to right)



Figure B 2: Woodland monitoring plots. Plots 8 to 10 (ordered top to bottom, left to right)

Appendix B2: Overstorey and midstorey species (Braun Blanquet cover scores where applicable)

SPECIES	COMMON NAME	CONTROL					REHABILITATED				
		1	2	3	4	5	6	7	8	9	10
<i>Acacia cheelii</i>	Motherumbah		1								
<i>Acacia decora</i>	Western Silver Wattle	3	1	1	1	2					
<i>Alstonia constricta</i>	Bitter Bark	1	1								
<i>Amyema miquelii</i>					2						
<i>Beyeria viscosa</i>	Pinkwood				2	1					
<i>Callitris glaucophylla</i>	White Cypress Pine	4	3	2	3	4					
<i>Cassinia laevis</i>	Cough Bush	2	1		1	1					
<i>Casuarina cristata</i>	Belah								yes		
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>	Sticky Hop Bush	1				Yes					
<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark				1						
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	3	1	3	3	3					
<i>Geijera parviflora</i>	Wilga	1		1							
* <i>Lycium ferocissimum</i>	African Boxthorn								yes	1	

SPECIES	COMMON NAME	CONTROL					REHABILITATED				
		1	2	3	4	5	6	7	8	9	10
<i>Lysiana subfalcata</i>	Mistletoe	1			2						
<i>Notelaea microcarpa</i>	Native Olive				1						
<i>Parsonsia eucalyptophylla</i>	Gargaloo	1									
<i>Pimelea neo-anglica</i>	Poison Pimelea				1						
<i>Pittosporum angustifolium</i>	Weeping Pittosporum	1									
<i>Pysrdrax odorata</i>	Shiny-leaved Canthium	1									
<i>Eucalyptus populnea</i> subsp. <i>bimbil</i>	Bimble Box							1		1	1
<i>Eucalyptus albens</i>	White Box							1	yes	1	2
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum							1	yes		1
<i>Eucalyptus ? viridis</i>								1			
<i>Eucalyptus melliodora</i>	Yellow Box								Yes	1	1
<i>Casuarina cristata</i>	Belah									yes	1
Total Number of Species		11	6	4	10	6	0	4	5	5	5

*Denotes introduced species

Appendix B3: Groundcover species – Braun Blanquet cover scores

SPECIES	COMMON NAME	CONTROL					REHABILITATED				
		1	2	3	4	5	6	7	8	9	10
<i>Aristida personata</i>	Purple Wire-grass	3	3	3	3	3					
* <i>Aster subulatus</i>	Wild Aster						1				
<i>Austrodanthonia</i> sp.	Wallaby Grass							1	2		1
<i>Austrodanthonia racemosa</i> var. <i>obtusa</i>		2			2	2					
<i>Austrostipa scabra</i>	Speargrass	2	3	4	3	3					
<i>Boerhavia</i> sp.	Tar-vine		1			1					
<i>Bothriochloa decipiens</i>	Red Grass		2	2					3		
<i>Brunoniella australis</i>	Blue Trumpet	2	1			2					
<i>Calotis cuneifolia</i>	Purple Burr-daisy					1					
<i>Calotis lappulacea</i>	Yellow Burr-daisy	2	2	2	1	2	1		1		
<i>Carex inversa</i>	Knob Sedge						1				
* <i>Carthamus lanatus</i>	Saffron Thistle						2	1		2	
<i>Centaurium</i> sp.							2				1

<i>Cheilanthes distans</i>	Bristly Cloak fern				2						
<i>Cheilanthes sieberi</i>	Poison Mulga Fern		2	2	2	2					
* <i>Chloris gayana</i>	Rhodes Grass						4	4		4	5
<i>Chloris ventricosa</i>	Plump Windmill Grass		2		1						
<i>Chloris truncata</i>	Windmill Grass			2	1				2		
* <i>Chondrilla juncea</i>	Skeleton Weed							1			
<i>Chrysocephalum apiculatum</i>	Yellow Buttons					2					
<i>Convolvulus graminetinus</i>									1	1	1
* <i>Conyza bonariensis</i>	Flaxleaf Fleabane							2	2	2	2
* <i>Cyclospermum leptophyllum</i>	Slender Celery						1				
<i>Cymbopogon refractus</i>	Barbed Wire Grass	2	3	1	3	2			2	1	
<i>Cynodon dactylon</i>	Couch						2				
<i>Cyperus fulvus</i>			2	1							
<i>Cyperus gracilis</i>	Slender Flat-sedge	1		2	2	2					
<i>Desmodium brachypodium</i>	Large Tick-trefoil		2	2	2	2					
<i>Desmodium varians</i>	Slender Tick-trefoil	1	1	1	1	1					
<i>Dichanthium sericeum</i>	Queensland Bluegrass								2		
<i>Dichondra repens</i>	Kidney Weed						1				
<i>Dichondra</i> sp. A		2	2	2	3						
<i>Digitaria brownii</i>	Cotton Panic Grass	1		1							
<i>Digitaria breviglumis</i>				1							
<i>Digitaria divaricatissima</i>	Umbrella Grass			2					3		

<i>Echinopogon caespitosus</i>	Bushy Hedge-hog Grass		1								
<i>Einadia polygonoides</i>								1	1		
<i>Enneapogon nigricans</i>	Nineawns	2									
<i>Enneapogon</i> sp.	Nineawns		2	2	2	2					
<i>Eragrostis setifolia</i>	Bristly Love-grass			2	1						
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass						2		3	2	
<i>Euchiton sphaericus</i>	Cudweed				2		1			1	
<i>Evolvulus alsinoides</i>		1									
<i>Fimbristylis dichotoma</i>	Common Fringe-sedge		1	1		2					
* <i>Glandularia aristigera</i>	Mayne's Pest			1			3	3	2	2	2
<i>Glossogyne tannensis</i>	Native Cobblers Pegs	2		1	1	2					
<i>Glycine clandestina</i>	Variable Glycine	1		1					2		1
<i>Glycine tabacina</i>			1			1					
<i>Gonocarpus</i> sp.			1								
<i>Goodenia glabra</i>		1			1	1					
<i>Haloragis heterophylla</i>	Rough Raspwort					1					
<i>Hypericum gramineum</i>	Small St John's Wort					1					
* <i>Lactuca serriola</i>							2	1	2		2
<i>Leiocarpa panaetioides</i>	Woolly Buttons							1		1	
* <i>Lepidium africanum</i>							2				
* <i>Lepidium bonariense</i>							1		2		
<i>Leptorhynchus panaetioides</i>											1

<i>*Linaria arvensis</i>		1	1		2						
<i>Lomandra multiflora</i>	Many-flowered Mat-rush				1						
<i>Maireana microphylla</i>	Small-leaf Bluebush		1						3	1	
<i>*Malvastrum americanum</i>									1		
<i>*Medicago polymorpha</i>	Burr Medic									1	
<i>*Medicago sativa</i>	Lucerne								2		
<i>*Medicago</i> sp.											1
<i>*Misopates orontium</i>	Lesser Snapdragon			1							
<i>Oncinocalyx betchei</i>		1	2	1							
<i>*Opuntia stricta</i>	Common Prickly Pear		1		1						
<i>*Oxalis</i> sp.	Soursob					1			1		
<i>Panicum effusum</i>	Hairy Panic		3	3	2				1		
<i>*Panicum maximum</i>							3	2		3	3
<i>Paspalidium</i> sp.		1	2		1	2			1		
<i>*Petrorhagia nanteuillii</i>	Proliferous Pink		2	2							
<i>Phyllanthus virgatus</i>			1		1	1					
<i>Pimelea</i> sp.			1								
<i>*Polygonum aviculare</i>	Wireweed						2				
<i>*Rapistrum rugosum</i>	Turnip Weed								1	2	
<i>Rostellularia adscendens</i>	Pink Tongues	2	2			2					
<i>*Rumex crispus</i>	Curled Dock						1				
<i>Rumex brownii</i>	Swamp dock				1						1

<i>Salsola kali</i>								1			
<i>Sclerolaena birchii</i>	Galvanised Burr						2	1	1	1	
* <i>Schkuhria pinnata</i>	Dwarf Marigold			2						2	2
<i>Scutellaria humilis</i>					2						
<i>Senecio quadridentatus</i>	Cotton Fireweed				1		1	1		1	
* <i>Setaria incrassata</i>	Purple Pigeon Grass						2	3		3	3
<i>Sida corrugata</i>	Corrugated Sida					1					
<i>Sida cunninghamii</i>	Ridged Sida				1						
<i>Sida spinosa</i>					1		2	2	1		
* <i>Sida subspicata</i>		1	2	2	2					1	
* <i>Solanum nigrum</i>							1			1	
<i>Solanum parvifolium</i>		1		1							
* <i>Sonchus oleraceus</i>	Common Sowthistle										2
<i>Sporobolus creber</i>	Slender Rat's Tail Grass			1					1		
<i>Stackhousia viminea</i>	Slender Stackhousia		1								
<i>Tephrosia brachyodon</i>						1					
* <i>Trifolium arvense</i>	Haresfoot Clover							1			
* <i>Urochloa panicoides</i>	Urochloa Grass									1	
<i>Verbena gaudichaudii</i>									1	1	
* <i>Verbena litoralis</i>							1				
* <i>Vicia</i> sp.								1			
<i>Vittadinia dissecta</i>	Dissected New Holland daisy					1					

<i>Vittadinia muelleri</i>			1								
<i>Vittadinia</i> sp.	Fuzzweed	2		1	2	1	2	2	1	1	2
<i>Wahlenbergia communis</i>	Tufted Bluebell	2	2	1	2		1		1		1
<i>Wahlenbergia</i> sp.	Bluebell					1					
<i>Xerochrysum bracteatum</i>	Golden Everlasting		2	3			1	1	1		
<i>Xerochrysum viscosum</i>	Sticky Everlasting				1						
<i>Zornia dyctiocarpa</i>	Zornia		1								
Total Species		23	34	32	33	29	27	18	29	23	17

*Denotes introduced species

Appendix B4: Tree and shrub species >1 m tall

SPECIES	COMMON NAME	CONTROL					REHABILITATED				
		1	2	3	4	5	6	7	8	9	10
<i>Acacia cheelii</i>			1								
<i>Acacia decora</i>	Western Silver Wattle	3	1	1	2	1					
<i>Alstonia constricta</i>	Bitter Bark	1	1								
<i>Amyema miquelii</i>					2						
<i>Beyeria viscosa</i>	Pinkwood				1						
<i>Callitris glaucophylla</i>	White Cypress Pine	4	3	1	3	4					
<i>Cassinia laevis</i>	Cough Bush	1	1		1	1					
<i>Casuarina cristata</i>	Belah								Yes	Yes	1
<i>Dodonaea viscosa</i> subsp. <i>angustifolia</i>	Sticky Hop-bush	1				1					
<i>Eucalyptus ? viridis</i>								1	Yes		
<i>Eucalyptus albens</i>	White Box	1						1	Yes	Yes	1
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum								Yes		
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	3	1	3	3	3					
<i>Eucalyptus melliodora</i>	Yellow Box									Yes	1
<i>Eucalyptus populnea</i>	Bimble Box							1			1
<i>Geijera parviflora</i>	Wilga	1		1							

<i>*Lycium ferocissimum</i>	African Boxthorn							1	Yes	Yes	1
<i>Lysiana subfalcata</i>					2						
<i>Notelaea microcarpa</i>	Native Olive				1						
<i>Parsonsia eucalyptophylla</i>	Gargaloo	1									
<i>Pysdrax odoratum</i>	Shiny-leaved Canthium	1									
Total species		10	6	4	8	5	0	4	5	4	5

Appendix B5: Rehabilitated woodland and reference woodland habitat characteristics

	PLOT NUMBER:	CONTROL					REHABILITATED				
		1	2	3	4	5	6	7	8	9	10
	Veg type	Eucalyptus crebra; Callitris glaucophylla shrubby woodland	Partially cleared callitris glauco/Euc crebra woodland	Partially cleared callitris glauco/Euc crebra woodland	E. crebra; C. glauco woodland	Callitris glauc, Euc crebra woodland	Rehab area - derived grassland	Rehab area - derived grassland	Rehab area - derived grassland	Rehab area - derived grassland	Rehab area - derived grassland
	More than 1 stratum?	y	y	y	y	y	n	y	y	y	y
Canopy DBH Thresholds:	Large Tree ≥:	60	60	60	60	60	-	-	-	-	-
	Mature Tree ≥:	30	30	30	30	30	-	-	-	-	-
	Advanced Regrowth (xcm to x cm):	10 to 30	-	-	-	-	-	-	-	-	-
	Sapling ≤ xcm to xcm:	1 to 10	-	-	-	-	-	-	-	-	-
	Seedlings < xcm dbh:	1	-	-	-	-	-	-	-	-	-
	Canopy ≥ xm:	-	-	-	-	-	-	-	-	-	-
	Midstorey xm to xm:	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ xm:	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes:	No. of native canopy species:	3	2	2	3	2	0	0	0	0	0
	No. of large trees:	0	0	0	1	0	0	0	0	0	0
	Juveniles present (Y/N):	y	y	y	y	y	n	n	n	y	y
	Mature trees present (Y/N):	y	y	y	y	y	n	n	n	n	n
	Seedlings present (Y/N):	n	y	n	n	n	n	n	n	n	n
	Advanced regrowth present (Y/N):	y	y	y	y	y	n	n	n	n	n
Coarse Woody Debris:	Total length of CWD (m):	56	30	9	78	42	68	31	nil	26	28
	No. of sections of CWD:	25	11	3	26	12	11	7		6	8
Midstorey, Understorey Species:	No. of native midstorey species:	9	-	2	7	-		3	4	3	4
	No. of native species in ground layer:	22	-	30	33	-	14	9	22	12	6
Transect:	% Projected Crown Cover- Canopy Species:	36	No overstorey along transect but true o/s cover 10%)	12	44	12	-	-	-	-	-
	% Projected Crown Cover - Midstorey Species:	14	6	6	20	68	-	-	-	-	-

Appendix C: Fauna data

SCIENTIFIC NAME	SITE			
	Fauna-Rehab_01	Fauna-Rehab_02	Fauna-Cont_03	Fauna-Cont_04
<i>Acanthagenys rufogularis</i> Spiny-cheeked Honeyeater			X	X
<i>Acanthiza apicalis</i> Inland Thornbill			X	X
<i>Acanthiza chrysorrhoa</i> Yellow-rumped Thornbill				X
<i>Acanthiza nana</i> Yellow Thornbill			X	X
<i>Accipiter cirrocephalus</i> Collared Sparrowhawk			X	
<i>Alisterus scapularis</i> Australian King-Parrot			X	
<i>Anthus novaeseelandiae</i> Australasian Pipit	X	X		
<i>Aprosmictus erythropterus</i> Red-winged Parrot			X	
<i>Aquila audax</i> Wedge-tailed Eagle				X
<i>Artamus cyanopterus</i> Dusky Woodswallow			X	X
<i>Barnardius zonarius</i> Australian Ringneck			X	
Bar-shouldered Dove <i>Geopelia humeralis</i>			X	X
<i>Cacatua galerita</i> Sulphur-crested Cockatoo			X	
<i>Cacomantis variolosus</i> Brush Cuckoo				X
<i>Chalcites basalis</i> Horsfield's Bronze-Cuckoo			X	
<i>Chalcites lucidus</i> Shining Bronze-Cuckoo				X
<i>Chalcites osculans</i> Black-eared Cuckoo				X
<i>Chthonicola sagittata</i> Speckled Warbler			X	X
<i>Cincloramphus mathewsi</i> Rufous Songlark	X		X	X
<i>Circus assimilis</i> Spotted Harrier	X		X	
<i>Colluricincla harmonica</i> Grey Shrike-thrush			X	X
<i>Coracina novaehollandiae</i> Black-faced Cuckoo-shrike			X	X

SCIENTIFIC NAME	SITE			
	Fauna-Rehab_01	Fauna-Rehab_02	Fauna-Cont_03	Fauna-Cont_04
<i>Cormobates leucophaea</i> White-throated Treecreeper			X	X
<i>Corvus coronoides</i> Australian Raven	X		X	X
<i>Coturnix ypsilophora</i> Brown Quail	X		X	
<i>Cracticus nigrogularis</i> Pied Butcherbird				X
<i>Cracticus tibicen</i> Australian Magpie				X
<i>Cracticus torquatus</i> Grey Butcherbird			X	
<i>Daphoenositta chrysoptera</i> Varied Sittella				X
<i>Dicaeum hirundinaceum</i> Mistletoebird			X	X
<i>Eopsaltria australis</i> Eastern Yellow Robin			X	X
<i>Eurystomus orientalis</i> Dollarbird				X
<i>Geopelia striata</i> Peaceful Dove				X
<i>Gerygone fusca</i> Western Gerygone				X
<i>Glossopsitta pusilla</i> Little Lorikeet				X
<i>Haliastur sphenurus</i> Whistling Kite			X	
# <i>Hirundapus caudacutus</i> White-throated Needletail			X	
<i>Hirundo neoxena</i> Welcome Swallow			X	
<i>Lalage sueurii</i> White-winged Triller			X	X
<i>Lichenostomus penicillatus</i> White-plumed Honeyeater			X	X
<i>Lichenostomus virescens</i> Singing Honeyeater			X	X
<i>Lichmera indistincta</i> Brown Honeyeater			X	
<i>Lophoictinia isura</i> Square-tailed Kite				X
<i>Malurus cyaneus</i> Superb Fairy-wren	X	X	X	X
<i>Malurus leucopterus</i> White-winged Fairy-wren	X	X		
<i>Manorina melanocephala</i> Noisy Miner			X	
<i>Megalurus timoriensis</i> Tawny Grassbird	X			

SCIENTIFIC NAME	SITE			
	Fauna-Rehab_01	Fauna-Rehab_02	Fauna-Cont_03	Fauna-Cont_04
<i>Melithreptus brevirostris</i> Brown-headed Honeyeater			X	X
[^] <i>Neophema pulchella</i> Turquoise Parrot				X
<i>Ocyphaps lophotes</i> Crested Pigeon				X
<i>Pachycephala rufiventris</i> Rufous Whistler			X	X
<i>Pardalotus punctatus</i> Spotted Pardalote			X	X
<i>Pardalotus striatus</i> Striated Pardalote			X	
<i>Petrochelidon nigricans</i> Tree Martin			X	X
<i>Petroica goodenovii</i> Red-capped Robin			X	X
<i>Philemon citreogularis</i> Little Friarbird			X	
<i>Philemon corniculatus</i> Noisy Friarbird				X
<i>Platycercus eximius</i> Eastern Rosella			X	X
<i>Plectorhyncha lanceolata</i> Striped Honeyeater			X	X
<i>Pomatostomus superciliosus</i> White-browed Babbler				X
<i>Psephotus haematonotus</i> Red-rumped Parrot			X	
<i>Ptilonorhynchus maculatus</i> Spotted Bowerbird				X
<i>Rhipidura albiscapa</i> Grey Fantail			X	X
<i>Rhipidura leucophrys</i> Willie Wagtail			X	X
<i>Smicrornis brevirostris</i> Weebill		X	X	X
<i>Strepera graculina</i> Pied Currawong			X	X
<i>Struthidea cinerea</i> Apostlebird			X	X
<i>Taeniopygia bichenovii</i> Double-barred Finch			X	X
<i>Turnix varia</i> Painted Button-quail			X	X
<i>Zosterops lateralis</i> Silvereye			X	X
Total	8	4	49	50

#Denotes Migratory; ^ denotes threatened

Appendix D: Soil pit summaries

Soil Pit 1 Woodland Control (E: 230157; N: 6607432)



HORIZON AND DEPTH	SOIL DESCRIPTION
1: 0 – 0.20 m	Texture-<10mm very sandy soil, dark in colour. Some large stones present 25-70mm. Grass and tree roots throughout
2: 0.20 – 0.40 m	Texture-<10mm very sandy. Transition between horizons, mixture of some horizons above and below. Stones 25-70mm. Tree and grass roots throughout
3: 0.40 – 1.00 m	Texture-<10mm very sandy. Stones from 25-100mm decreasing in abundance with increasing depth. Roots present to 80cm, decreasing with depth

This site was on a moderate eastern slope (about 1km from the top of the hill), with the vegetation in the area heavily dominated by white cypress pines.

Small stones were present in all horizons, decreasing in size and abundance with increasing depth.

Duplex soil.

Soil Pit 2 Woodland Rehabilitation (E: 227219; N: 6607825)

HORIZON AND DEPTH	SOIL DESCRIPTION
1: 0 – 0.20 m	Texture-100-120mm, light brown in colour very heavy smooth and reasonably workable. Low in stone, some small stones of 5mm were present (very low). Roots throughout
2: 0.20 – 0.65 m	Texture-50-70mm, very coarse texture. Slightly darker in colour than A1. Stones increased with small stones up to 25mm (still very low) and some large stones up to 50mm. Roots throughout decreasing with depth.
3: 0.65 -1.00 m	Texture-1-2cm, very coarse texture, grey mine waste. Very high in small and large stones with size increasing with depth, up to 150mm.
Site was on the higher slopes of the rehab woodland, about 50m from the highest existing rehab point, with a strong westerly aspect.	
Grasses were the dominant veg on the site.	

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Appendix 8

BLAST MONITORING RESULTS

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dB)	TIME
1	8/06/2006	Bollol Creek	0.64	92.90	14:07:33
1	8/06/2006	Tarrawonga Station	DNT	DNT	
1	8/06/2006	Templemore	0.94	92.80	14:07:44
2	29/06/2006	Bollol Creek	0.75	101.00	14:14:46
2	29/06/2006	Tarrawonga Station	0.32	98.10	14:49:49
2	29/06/2006	Templemore	0.47	99.30	14:49:48
3	20/07/2006	Bollol Creek	0.65	98.40	14:16:30
3	20/07/2006	Tarrawonga Station	0.55	87.90	14:15:03
3	20/07/2006	Templemore	0.67	98.10	14:16:32
4	28/07/2006	Bollol Creek	0.55	100.50	12:04:22
4	28/07/2006	Tarrawonga Station	0.40	96.70	12:04:23
4	28/07/2006	Templemore	0.55	100.30	12:04:23
5	4/09/2006	Bollol Creek	0.32	107.50	12:33:46
5	4/09/2006	Tarrawonga Station	DNT		
5	4/06/2006	Bundaleer	DNT		
5	4/09/2006	Templemore	0.27	108.50	12:33:46
6	21/09/2006	Bollol Creek	0.57	103.40	12:09:08
6	21/09/2006	Tarrawonga Station	0.32	102.70	12:08:30
6	21/09/2006	Templemore	0.40	107.70	12:09:09
7	25/10/2006	Bollol Creek	0.50	109.20	12:09:17
7	25/10/2006	Tarrawonga Station	0.10	111.90	12:09
7	25/10/2006	Templemore	0.25	81.20	12:09:18
8	1/11/2006	Bollol Creek	0.67	105.30	11:39:41
8	1/11/2006	Tarrawonga Station	0.45	105.40	11:38:36
8	1/11/2006	Templemore	0.30	105.30	11:39:44
9	20/11/2006	Bollol Creek	0.30	108.30	15:52:40
9	20/11/2006	Tarrawonga Station	DNT		
9	20/11/2006	Templemore	DNT		
10 & 11	30/11/2006	Bollol Creek	0.57	102.30	11:59:49
10 & 11	30/11/2006	Tarrawonga Station	0.42	108.30	11:59:12
10 & 11	30/11/2006	Templemore	0.42	102.10	11:59:52
12	20/12/2006	Bollol Creek	0.42	103.00	11:56:26
12	20/12/2006	Tarrawonga Station	0.10	110.10	11:56:21
12	20/12/2006	Templemore	0.30	105.30	11:56:29
13	16/01/2007	Bollol Creek	DNT		
13	16/01/2007	Tarrawonga Station	DNT		
13	16/01/2007	Templemore	0.50	107.70	12:05:30
14	30/01/2007	Bollol Creek	0.57	105.30	12:09:50
14	30/01/2007	Tarrawonga Station	0.67	104.10	12:07:41
14	30/01/2007	Templemore	0.45	105.30	12:09:52
15	7/02/2007	Bollol Creek	0.40	103.40	9:04:38
15	7/02/2007	Tarrawonga Station	0.27	107.90	9:04:38
15	7/02/2007	Templemore	0.35	102.40	9:40:40
16	9/02/2007	Bollol Creek	0.72	104.00	12:05:18
16	9/02/2007	Tarrawonga Station	0.47	101.80	12:05:16
16	9/02/2007	Templemore	0.52	103.50	12:05:19
17	21/02/2007	Bollol Creek	DNT		
17	21/02/2007	Tarrawonga Station	DNT		
17	21/02/2007	Templemore	DNT		
18	1/03/2007	Bollol Creek	0.52	101.50	10:53:02
18	1/03/2007	Tarrawonga Station	0.47	114.20	10:52:46
18	1/03/2007	Templemore	0.32	103.20	10:53:04
19	13/03/2007	Bollol Creek	0.75	104.70	16:36:04
19	13/03/2007	Tarrawonga Station	DNT		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
19	13/03/2007	Templemore	0.55	103.80	16:36:06
20	19/03/2007	Bollol Creek	0.57	102.70	12:06:16
20	19/03/2007	Tarrawonga Station	0.32	101.80	12:05:50
20	19/03/2007	Templemore	0.60	103.2	12:06:18
21	21/03/2007	Bollol Creek	0.50	104.1	12:06:24
21	21/03/2007	Tarrawonga Station	0.27	99.3	12:05:56
21	21/03/2007	Templemore	0.45	105.0	12:06:26
22	23/03/2007	Bollol Creek	0.57	101.0	10:10:19
22	23/03/2007	Tarrawonga Station	0.37	97.4	10:09:50
22	23/03/2007	Templemore	0.32	100.8	10:10:22
23	3/04/2007	Bollol Creek	DNT		
23	3/04/2007	Tarrawonga Station	DNT		
23	3/04/2007	Templemore	DNT		
24	17/04/2007	Bollol Creek	0.50	101.0	12:07:10
24	17/04/2007	Tarrawonga Station	0.27	99.9	12:06:28
24	17/04/2007	Templemore	0.40	100.8	12:07:02
25	30/04/2007	Bollol Creek	0.40	103.4	12:18:26
25	30/04/2007	Tarrawonga Station	0.32	103.8	12:17:32
25	30/04/2007	Templemore	0.32	104.7	12:18:18
26	3/05/2007	Bollol Creek	DNT		
26	3/05/2007	Tarrawonga Station	0.07	112.1	15:03:42
26	3/05/2007	Templemore	0.40	87.2	12:18:18
27	9/05/2007	Bollol Creek	0.94	99.3	12:18:26
27	9/05/2007	Tarrawonga Station	0.37	98.14	12:17:32
27	9/05/2007	Templemore	0.80	98.4	12:18:18
28	17/05/2007	Bollol Creek	0.52	106.6	12:18:26
28	17/05/2007	Tarrawonga Station	0.25	107.4	12:17:32
28	17/05/2007	Templemore	0.55	106.8	12:18:18
29	24/05/2007	Bollol Creek	0.94	106.1	12:24:50
29	24/05/2007	Tarrawonga Station	0.35	105.9	12:23:41
29	24/05/2007	Templemore	0.65	106.3	12:24:33
30	1/06/2007	Bollol Creek	DNT		
30	1/06/2007	Tarrawonga Station	DNT		
30	1/06/2007	Templemore	DNT		
31	15/06/2007	Bollol Creek	0.99	105.0	13:19:50 PM
31	15/06/2007	Tarrawonga Station	0.50	99.9	13:18:25 PM
31	15/06/2007	Templemore	0.99	105.0	13:19:50 PM
32	22/06/2007	Bollol Creek	DNT		
32	22/06/2007	Tarrawonga Station	DNT		
32	22/06/2007	Templemore	DNT		
33	27/06/2007	Bollol Creek	DNT		
33	27/06/2007	Tarrawonga Station	DNT		
33	27/06/2007	Templemore	DNT		
35	5/07/2007	Bollol Creek	0.76	90.2	16:29:57
35	5/07/2007	Bollol Creek	0.08	117.0	16:30:07
35	5/07/2007	Tarrawonga Station	0.10	111.1	16:26:19
35	5/07/2007	Templemore	0.15	110.5	16:35:05
36	13/07/2007	Bollol Creek	0.63	85.8	12:04:51
36	13/07/2007	Tarrawonga Station	0.40	111.4	12:04:50
35	13/07/2007	Templemore	0.40	107	12:04:47
34	17/07/2007	Bollol Creek	DNT		
34	17/07/2007	Tarrawonga Station	DNT		
34	17/07/2007	Templemore	0.27	102.4	12:04:47
37	20/07/2007	Bollol Creek	0.48	94.3	11:53:19
37	20/07/2007	Tarrawonga Station	0.12	111.8	11:10:30
37	20/07/2007	Templemore	0.52	103.8	11:53:15

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
38	27/07/2007	Bollol Creek	0.53	100.3	11:47:19
38	27/07/2007	Tarrawonga Station	0.25	97.4	11:48:46
38	27/07/2007	Templemore	0.40	100.3	11:48:55
39	2/08/2007	Bollol Creek	DNT		
39	2/08/2007	Tarrawonga Station	DNT		
39	2/08/2007	Templemore	DNT		
40	6/08/2007	Bollol Creek	0.50	103.8	13:59:42
40	6/08/2007	Tarrawonga Station	0.44	101.1	13:59:37
40	6/08/2007	Templemore	0.48	103.4	13:59:49
41	9/08/2007	Bollol Creek	0.51	97.4	15:24:51
41	9/08/2007	Tarrawonga Station	0.51	96.6	15:24:46
41	9/08/2007	Templemore	0.52	97.7	13:59:49
42	16/08/2007	Bollol Creek	0.43	112.7	11:00:44
42	16/08/2007	Tarrawonga Station	0.41	111.7	11:00:49
42	16/08/2007	Templemore	0.42	112.3	11:00:39
43/44	28/08/2007	Bollol Creek	0.96	101.2	12:08:54
43/44	28/08/2007	Tarrawonga Station	0.58	102.3	12:08:49
43/44	28/08/2007	Templemore	0.76	102.4	12:08:57
45	31/08/2007	Bollol Creek	0.66	111.1	11:19:07
45	31/08/2007	Tarrawonga Station	0.43	111.1	11:19:01
45	31/08/2007	Templemore	0.53	112.01	11:19:10
46	7/09/2007	Bollol Creek	0.41	107.7	10:07:53
46	7/09/2007	Tarrawonga Station	No data recorded		
46	7/09/2007	Templemore	0.33	107.4	10:07:58
47	12/09/2007	Bollol Creek	1.07	103.4	10:10:04
47	12/09/2007	Tarrawonga Station	0.33	103.9	10:09:59
47	12/09/2007	Templemore	0.71	103.2	10:10:08
49	17/09/2007	Bollol Creek	DNT		11:00:00
49	17/09/2007	Tarrawonga Station	DNT		11:00:00
49	17/09/2007	Templemore	DNT		11:00:00
48	19/09/2007	Bollol Creek	0.76	104.2	9:34:51
48	19/09/2007	Tarrawonga Station	0.46	108.1	9:34:33
48	19/09/2007	Templemore	0.43	104.2	9:34:56
50	21/09/2007	Bollol Creek	DNT		11:50:02
50	21/09/2007	Tarrawonga Station	DNT		11:50:02
50	21/09/2007	Templemore	0.30	92.5	11:50:02
51	27/09/2007	Bollol Creek	0.63	103.0	10:53:48
51	27/09/2007	Tarrawonga Station	DNT		10:53:48
51	27/09/2007	Templemore	0.33	104.5	10:53:53
52	5/10/2007	Bollol Creek	0.71	110.90	9:13:06
52	5/10/2007	Tarrawonga Station	0.71	112.00	9:12:37
52	5/10/2007	Templemore	0.63	111.80	9:13:11
53	15/10/2007	Bollol Creek	0.74	108.40	11:53:18
53	15/10/2007	Tarrawonga Station	DNT		11:53:18
53	15/10/2007	Templemore	0.35	105.90	11:52:25
54	17/10/2007	Bollol Creek	DNT		12:05:46
54	17/10/2007	Tarrawonga Station	DNT		12:05:46
54	17/10/2007	Templemore	0.48	98.50	12:05:46
55	25/10/2007	Bollol Creek	0.91	106.40	11:02:37
55	25/10/2007	Tarrawonga Station	0.33	102.80	11:01:55
55	25/10/2007	Templemore	0.35	106.20	11:02:43
56	30/10/2007	Bollol Creek	0.28	96.30	14:54:09
56	30/10/2007	Tarrawonga Station	DNT		
56	30/10/2007	Templemore	0.56	94.60	14:54:04
57	1/11/2007	Bollol Creek	DNT		12:06:00
57	1/11/2007	Tarrawonga Station	DNT		12:06:00
57	1/11/2007	Templemore	DNT		12:06:00

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
58	2/11/2007	Bollol Creek	0.68	100.70	12:06:00
58	2/11/2007	Tarrawonga Station	0.41	100.40	12:02:45
58	2/11/2007	Templemore	0.48	101.10	12:03:41
59	14/11/2007	Bollol Creek	0.60	103.10	12:34:43
59	14/11/2007	Tarrawonga Station	DNT		
59	14/11/2007	Templemore	0.35	99.10	12:35:53
60	15/11/2007	Bollol Creek	0.61	102.10	16:27:43
60	15/11/2007	Tarrawonga Station	DNT		
60	15/11/2007	Templemore	0.35	99.60	16:27:51
61	20/11/2007	Bollol Creek	DNT		
61	20/11/2007	Tarrawonga Station	DNT		
61	20/11/2007	Templemore	DNT		
62	27/11/2007	Bollol Creek	0.79	105.50	12:03:34
62	27/11/2007	Tarrawonga Station	0.48	107.40	12:03:31
62	27/11/2007	Templemore	0.50	103.90	12:03:34
63	28/11/2007	Bollol Creek	0.68	100.70	12:06:00
63	28/11/2007	Tarrawonga Station	DNT		
63	28/11/2007	Templemore	DNT		
64	30/11/2007	Bollol Creek	DNT		
64	30/11/2007	Tarrawonga Station	DNT		
64	30/11/2007	Templemore	DNT		
65/66	6/12/2007	Bollol Creek	0.91	103.00	12:03:43
65/66	6/12/2007	Tarrawonga Station	DNT		
65/66	6/12/2007	Templemore	0.68	103.90	12:03:34
67	13/12/2007	Bollol Creek	0.66	86.10	11:30:57
67	13/12/2007	Tarrawonga Station	DNT		
67	13/12/2007	Templemore	0.15	111.00	23:30:52
68	19/12/2007	Bollol Creek	0.61	99.50	0:01:06
68	19/12/2007	Tarrawonga Station	0.43	99.20	12:00:48
68	19/12/2007	Templemore	0.60	98.70	12:01:11
69	15/01/2008	Bollol Creek	DNT		12:00:00
69	15/01/2008	Tarrawonga Station	DNT		12:00:00
69	15/01/2008	Templemore	DNT		12:00:00
70	25/01/2008	Bollol Creek	1.32	105.20	9:40:31
70	25/01/2008	Tarrawonga Station	0.53	106.40	9:30:50
70	25/01/2008	Templemore	0.86	103.90	9:40:34
71	4/02/2008	Bollol Creek	0.71	102.60	12:02:02
71	4/02/2008	Tarrawonga Station	0.35	108.80	12:01:14
71	4/02/2008	Templemore	0.53	101.60	12:02:06
72	8/02/2008	Bollol Creek	DNT		
72	8/02/2008	Tarrawonga Station	DNT		
72	8/02/2008	Templemore	DNT		
73	15/02/2008	Bollol Creek	0.81	101.20	12:06:03
73	15/02/2008	Tarrawonga Station	0.68	101.90	12:05:08
73	15/02/2008	Templemore	0.53	100.20	12:06:07
74	20/02/2008	Bollol Creek	0.82	101.50	12:04:23
74	20/02/2008	Tarrawonga Station	0.69	102.30	12:03:08
74	20/02/2008	Templemore	No Monitor		
75/76	22/02/2008	Bollol Creek	0.82	101.50	12:04:23
75/76	22/02/2008	Tarrawonga Station	0.38	113.50	12:30:25
75/76	22/02/2008	Templemore	0.40	109.50	12:30:26
77	28/02/2008	Bollol Creek	DNT		
77	28/02/2008	Tarrawonga Station	DNT		
77	28/02/2008	Templemore	DNT		
78/79	7/03/2008	Bollol Creek	0.56	106.40	13:56:16
78/79	7/03/2008	Tarrawonga Station	0.41	102.30	13:56:07
78/79	7/03/2008	Templemore	0.73	106.20	13:56:17

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
80	14/03/2008	Bollol Creek	1.29	104.90	12:01:10
80	14/03/2008	Tarrawonga Station	0.61	114.80	12:03:22
80	14/03/2008	Templemore	0.73	106.20	12:01:12
81/82	19/03/2008	Bollol Creek	0.63	107.20	12:03:39
81/82	19/03/2008	Tarrawonga Station	0.61	114.80	12:03:22
81/82	19/03/2008	Templemore	No Monitor Set		
83	28/03/2008	Bollol Creek	0.66	106.70	12:07:15
83	28/03/2008	Tarrawonga Station	DNT		
83	28/03/2008	Templemore	0.28	104.80	12:07:19
84	8/04/2008	Bollol Creek	0.01	106.70	12:00:42
84	8/04/2008	Tarrawonga Station	0.10	113.60	12:00:44
84	8/04/2008	Templemore	DNT		
85	10/04/2008	Bollol Creek	DNT		
85	10/04/2008	Tarrawonga Station	DNT		
85	10/04/2008	Templemore	DNT		
86	14/04/2008	Bollol Creek	0.43	94.60	12:06:12
86	14/04/2008	Tarrawonga Station	0.66	93.20	12:15:34
86	14/04/2008	Templemore	0.28	99.60	12:06:48
87	15/04/2008	Bollol Creek	DNT		
87	15/04/2008	Tarrawonga Station	DNT		
87	15/04/2008	Templemore	DNT		
88	18/04/2008	Bollol Creek	0.48	103.50	15:30:09
88	18/04/2008	Tarrawonga Station	DNT		
88	18/04/2008	Templemore	0.43	103.30	15:30:13
89-90	23/04/2008	Bollol Creek	0.71	107.50	12:09:24
89-90	23/04/2008	Tarrawonga Station	0.48	112.40	12:09:15
89-90	23/04/2008	Templemore	0.48	110.00	12:09:25
91	1/05/2008	Bollol Creek	0.74	113.10	14:08:55
91	1/05/2008	Tarrawonga Station	0.10	111.30	14:08:51
91	1/05/2008	Templemore	0.50	113.70	14:08:57
92	5/05/2008	Bollol Creek	0.56	103.80	12:02:57
92	5/05/2008	Tarrawonga Station	DNT		
92	5/05/2008	Templemore	0.53	103.20	12:03:00
93-94	9/05/2008	Bollol Creek	0.53	101.70	14:02:06
93-94	9/05/2008	Tarrawonga Station	DNT		
93-94	9/05/2008	Templemore	0.61	110.70	14:02:32
95	13/05/2008	Bollol Creek	DNT		
95	13/05/2008	Tarrawonga Station	DNT		
95	13/05/2008	Templemore	DNT		
96	16/05/2008	Bollol Creek	0.76	101.70	12:07:43
96	16/05/2008	Tarrawonga Station	0.30	109.40	12:07:09
96	16/05/2008	Templemore	0.77	101.60	12:07:51
97	19/05/2008	Bollol Creek	DNT		
97	19/05/2008	Tarrawonga Station	DNT		
97	19/05/2008	Templemore	DNT		
98	21/05/2008	Bollol Creek	0.53	101.80	12:10:12
98	21/05/2008	Tarrawonga Station	DNT		
98	21/05/2008	Templemore	0.51	101.70	12:10:19
99	22/05/2008	Bollol Creek	DNT		
99	22/05/2008	Tarrawonga Station	DNT		
99	22/05/2008	Templemore	DNT		
100	23/05/2008	Bollol Creek	DNT		
100	23/05/2008	Tarrawonga Station	DNT		
100	23/05/2008	Templemore	0.50	108.40	12:02:14
101	30/05/2008	Bollol Creek	0.91	102.10	12:05:08
101	30/05/2008	Tarrawonga Station	0.43	109.80	12:04:35
101	30/05/2008	Templemore	0.73	106.70	12:05:11

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
102	2/06/2008	Bollol Creek	0.74	94.60	14:56:54
102	2/06/2008	Tarrawonga Station	DNT	DNT	
102	2/06/2008	Templemore	0.43	99.60	14:56:58
103	6/06/2008	Bollol Creek	0.46	98.20	13:59:42
103	6/06/2008	Tarrawonga Station	DNT		
103	6/06/2008	Templemore	0.43	96.40	13:59:47
104	12/06/2008	Bollol Creek	0.42	99.40	12:00:10
104	12/06/2008	Tarrawonga Station	0.28	98.60	11:59:22
104	12/06/2008	Templemore	0.43	99.60	12:06:00
105	17/06/2008	Bollol Creek	DNT		
105	17/06/2008	Tarrawonga Station	DNT		
105	17/06/2008	Templemore	DNT		
106	18/06/2008	Bollol Creek	DNT		
106	18/06/2008	Tarrawonga Station	DNT		
106	18/06/2008	Templemore	DNT		
107-108	20/06/2008	Bollol Creek	0.38	98.20	12:10:13
107-108	20/06/2008	Tarrawonga Station	0.33	99.80	12:09:26
107-108	20/06/2008	Templemore	0.43	99.60	12:10:18
109	23/06/2008	Bollol Creek	DNT		
109	23/06/2008	Tarrawonga Station	DNT		
109	23/06/2008	Templemore	DNT		
110	27/06/2008	Bollol Creek	DNT		
110	27/06/2008	Tarrawonga Station	DNT		
110	27/06/2008	Templemore	DNT		
111	30/06/2008	Bollol Creek	0.72	106.50	12:28:11
111	30/06/2008	Tarrawonga Station	0.10	112.00	12:28:21
111	30/06/2008	Templemore	0.73	106.70	12:28:15
112	3/07/2008	Bollol Creek	0.40	106.10	14:20:19
112	3/07/2008	Tarrawonga Station	DNT		
112	3/07/2008	Templemore	0.40	106.20	14:20:17
113	9/07/2008	Bollol Creek	0.41	90.60	11:45:06
113	9/07/2008	Tarrawonga Station	0.28	93.20	11:45:04
113	9/07/2008	Templemore	DNT		
114	10/07/2008	Bollol Creek	0.40	106.10	14:20:19
114	10/07/2008	Tarrawonga Station	DNT		
114	10/07/2008	Templemore	0.40	106.20	14:20:17
115	25/07/2008	Bollol Creek	1.32	100.70	12:09:06
115	25/07/2008	Tarrawonga Station	0.46	104.60	12:07:59
115	25/07/2008	Templemore	1.01	99.60	12:09:11
116	31/07/2008	Bollol Creek	1.24	109.20	12:07:13
116	31/07/2008	Tarrawonga Station	0.43	105.60	12:06:02
116	31/07/2008	Templemore	0.69	108.80	12:07:18
117	5/08/2008	Bollol Creek	0.81	101.20	13:07:38
117	5/08/2008	Tarrawonga Station	0.28	100.90	13:06:24
117	5/08/2008	Templemore	0.68	98.50	13:07:43
118	12/08/2008	Bollol Creek	0.76	111.70	12:09:02
118	12/08/2008	Tarrawonga Station	0.33	112.40	12:07:44
118	12/08/2008	Templemore	0.71	105.40	12:09:07
119	19/08/2008	Bollol Creek	1.42	108.20	12:03:53
119	19/08/2008	Tarrawonga Station	0.38	113.90	12:02:30
119	19/08/2008	Templemore	DNT		
120	21/08/2008	Bollol Creek	0.41	110.20	12:03:09
120	21/08/2008	Tarrawonga Station	0.13	112.60	12:02:10
120	21/08/2008	Templemore	0.43	109.20	12:03:16
121/122	28/08/2008	Bollol Creek	No result*		
121/122	28/08/2008	Tarrawonga Station	No result*		
121/122	28/08/2008	Templemore	No result*		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
123	8/09/2008	Bollol Creek	0.91	108.20	12:41:20
123	8/09/2008	Tarrawonga Station	0.30	103.60	12:39:35
123	8/09/2008	Templemore	0.66	109.80	12:41:12
124	10/09/2008	Bollol Creek	DNT		
124	10/09/2008	Tarrawonga Station	DNT		
124	10/09/2008	Templemore	DNT		
125	15/09/2008	Bollol Creek	0.46	109.60	15:05:45
125	15/09/2008	Tarrawonga Station	DNT		
125	15/09/2008	Templemore	0.45	109.70	15:05:48
126/127	18/09/2008	Bollol Creek	No result*		
126/127	18/09/2008	Tarrawonga Station	No result*		
126/127	18/09/2008	Templemore	No result*		
128	26/09/2008	Bollol Creek	No result*		
128	26/09/2008	Tarrawonga Station	No result*		
128	26/09/2008	Templemore	No result*		
129	1/10/2008	Bollol Creek	0.13	114.60	12:06:00
129	1/10/2008	Tarrawonga Station	0.10	113.50	12:06:17
129	1/10/2008	Templemore	DNT		
130	9/10/2008	Bollol Creek	DNT		
130	9/10/2008	Tarrawonga Station	DNT		
130	9/10/2008	Templemore	DNT		
131	13/10/2008	Bollol Creek	1.46	102.00	12:12:42
131	13/10/2008	Tarrawonga Station	DNT		
131	13/10/2008	Templemore	1.47	102.10	12:12:32
132	14/10/2008	Bollol Creek	DNT		
132	14/10/2008	Tarrawonga Station	DNT		
132	14/10/2008	Templemore	DNT		
133	16/10/2008	Bollol Creek	0.28	102.80	11:54:40
133	16/10/2008	Tarrawonga Station	DNT		
133	16/10/2008	Templemore	DNT		
134	23/10/2008	Bollol Creek	DNT		
134	23/10/2008	Tarrawonga Station	DNT		
134	23/10/2008	Templemore	DNT		
135	27/10/2008	Bollol Creek	No result*		
135	27/10/2008	Tarrawonga Station	No result*		
135	27/10/2008	Templemore	No result*		
136	28/10/2008	Bollol Creek	Unable to read monitor reports		
136	28/10/2008	Tarrawonga Station	DNT		
136	28/10/2008	Templemore	Unable to read monitor reports		
137	4/11/2008	Bollol Creek	DNT		
137	4/11/2008	Tarrawonga Station	DNT		
137	4/11/2008	Templemore	DNT		
138	10/11/2008	Bollol Creek	2.38	100.10	11:56:59
138	10/11/2008	Tarrawonga Station	DNT		
138	10/11/2008	Templemore	0.35	100.20	11:56:22
139	12/11/2008	Bollol Creek	1.07	103.40	12:27:14
139	12/11/2008	Tarrawonga Station	0.35	105.30	12:24:57
139	12/11/2008	Templemore	1.04	103.20	11:27:24
140	14/11/2008	Bollol Creek	0.28	99.50	11:57:54
140	14/11/2008	Tarrawonga Station	DNT		
140	14/11/2008	Templemore	0.28	100.70	11:58:03
141/142	27/11/2008	Bollol Creek	0.51	114.10	13:26:04
141/142	27/11/2008	Tarrawonga Station	0.58	111.90	13:23:35
141/142	27/11/2008	Templemore	0.53	113.80	13:26:15
143	26/11/2008	Bollol Creek	No result*		
143	26/11/2008	Tarrawonga Station	No result*		
143	26/11/2008	Templemore	No result*		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
144	3/12/2008	Bollol Creek	No result*		
144	3/12/2008	Tarrawonga Station	No result*		
144	3/12/2008	Templemore	No result*		
145	10/12/2008	Bollol Creek	1.50	114.90	12:06:14
145	10/12/2008	Tarrawonga Station	DNT		
145	10/12/2008	Templemore	1.46	115.00	12:06:25
146	17/12/2008	Bollol Creek	DNT		
146	17/12/2008	Tarrawonga Station	DNT		
146	17/12/2008	Templemore	DNT		
147	8/01/2009	Tarrawonga Station	DNT		
147	8/01/2009	Templemore	DNT		
148	14/01/2009	Tarrawonga Station	0.35	105.30	12:12:57
148	14/01/2009	Templemore	1.47	102.10	12:12:32
149	16/01/2009	Bollol Creek	DNT		
149	16/01/2009	Tarrawonga Station	DNT		
149	16/01/2009	Templemore	1.04	106.00	12:03:39
150	21/01/2009	Tarrawonga Station	DNT		
150	21/01/2009	Templemore	0.13	111.20	12:21:20
151	22/01/2009	Tarrawonga Station	DNT		
151	22/01/2009	Templemore	DNT		
152	4/02/2009	Tarrawonga Station	DNT		
152	4/02/2009	Templemore	0.61	101.80	12:03:24
153	6/02/2009	Tarrawonga Station	DNT		
153	6/02/2009	Templemore	0.76	100.50	12:06:40
154	13/02/2009	Tarrawonga Station	DNT		
154	13/02/2009	Templemore	0.76	113.50	12:07:44
155	17/02/2009	Tarrawonga Station	DNT		
155	17/02/2009	Templemore	DNT		
156	20/02/2009	Tarrawonga Station			
156	20/02/2009	Templemore	0.39	111.30	12:02:17
157/158	27/02/2009	Tarrawonga Station	0.58	111.90	12:01:35
157/158	27/02/2009	Templemore	0.53	113.80	12:01:15
159	5/03/2009	Tarrawonga Station	DNT		
159	5/03/2009	Templemore	DNT		
160	6/03/2009	Tarrawonga Station	1.60	101.70	12:07:10
160	6/03/2009	Templemore	0.76	111.70	12:07:39
161	11/03/2009	Tarrawonga Station	0.13	111.10	12:08:41
161	11/03/2009	Templemore	0.28	104.90	12:08:13
162	16/03/2009	Tarrawonga Station	DNT		
162	16/03/2009	Templemore	0.10	106.70	12:03:42
163	19/03/2009	Tarrawonga Station	0.10	113.20	12:00:11
163	19/03/2009	Templemore	0.38	106.30	12:00:16
164	23/03/2009	Tarrawonga Station	2.86	111.10	12:18:05
164	23/03/2009	Templemore	DNT		
165	25/03/2009	Tarrawonga Station	DNT		
165	25/03/2009	Templemore	DNT		
166	27/03/2009	Tarrawonga Station	DNT		
166	27/03/2009	Templemore	0.71	107.70	12:08:00
167	31/03/2009	Tarrawonga Station	0.35	102.60	11:53:13
167	31/03/2009	Templemore	0.10	109.40	11:53:14
168	2/04/2009	Tarrawonga Station	0.10	106.90	11:53:22
168	2/04/2009	Templemore	0.78	109.40	11:53:27
169	9/04/2009	Tarrawonga Station	1.55	107.70	13:39:54
169	2/04/2009	Templemore	DNT		
170	21/04/2009	Tarrawonga Station	DNT		
170	21/04/2009	Templemore	DNT		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
171	22/04/2009	Tarrawonga Station	No result*		
171	22/04/2009	Templemore	No result*		
172	28/04/2009	Tarrawonga Station	DNT		
172	28/04/2009	Templemore	0.35	110.40	13:02:28
173	1/05/2009	Tarrawonga Station	DNT		
173	1/05/2009	Templemore	0.43	96.20	11:48:07
174	6/05/2009	Tarrawonga Station	0.33	112.70	13:10:04
174	6/05/2009	Templemore	1.11	102.20	13:11:30
175	12/05/2009	Tarrawonga Station	0.86	111.90	13:20:13
175	12/05/2009	Templemore	1.52	106.00	13:18:42
176	16/05/2009	Tarrawonga Station	0.33	103.30	12:58:39
176	16/05/2009	Templemore	0.63	105.80	13:00:09
177	28/05/2009	Tarrawonga Station	DNT		
177	28/05/2009	Templemore	0.84	103.00	13:34:41
178	10/06/2009	Tarrawonga Station	0.33	106.70	12:01:32
178	10/06/2009	Templemore	0.76	109.70	12:01:35
180	12/06/2009	Tarrawonga Station	DNT		
180	12/06/2009	Templemore	DNT		
181	16/06/2009	Tarrawonga Station	0.25	106.20	12:02:13
181	16/06/2009	Templemore	DNT		
182	19/06/2009	Tarrawonga Station	DNT		
182	19/06/2009	Templemore	DNT		
179	24/06/2009	Tarrawonga Station	DNT		
179	24/06/2009	Templemore	1.11	106.00	12:07:00
183	2/07/2009	Tarrawonga Station	0.48	100.10	12:02:40
183	2/07/2009	Templemore	0.74	104.60	12:07:02
184	9/07/2009	Tarrawonga Station	0.63	108.20	12:01:57
184	9/07/2009	Templemore	0.94	108.90	12:01:57
185/186	15/07/2009	Tarrawonga Station	0.28	112.60	12:40:05
185/186	15/07/2009	Templemore	0.92	107.40	12:39:24
187	24/07/2009	Tarrawonga Station	DNT		
187	24/07/2009	Templemore	0.78	103.70	12:30:24
188	30/07/2009	Tarrawonga Station	Not Set by Orica		
188	30/07/2009	Templemore	Not Set by Orica		
189	31/07/2009	Tarrawonga Station	0.76	102.40	11:39:09
189	31/07/2009	Templemore	0.38	81.40	11:39:15
190	12/08/2009	Tarrawonga Station	0.89	103.70	15:50:53
190	12/08/2009	Templemore	1.82	107.90	15:50:48
191	13/08/2009	Tarrawonga Station	0.78	111.30	11:57:38
191	13/08/2009	Templemore	0.25	113.30	11:57:44
192	31/08/2009	Tarrawonga Station	0.30	93.40	12:11:25
192	31/08/2009	Templemore	1.19	101.50	12:11:45
193	2/09/2009	Tarrawonga Station	DNT		
193	2/09/2009	Templemore	0.48	99.30	12:12:54
194	7/09/2009	Tarrawonga Station	1.22	111.90	11:16:04
194	7/09/2009	Templemore	0.91	109.80	11:15:59
195	10/09/2009	Tarrawonga Station	DNT		
195	10/09/2009	Templemore	0.71	105.00	12:03:02
196	11/09/2009	Tarrawonga Station	0.33	114.60	12:15:36
196	11/09/2009	Templemore	0.78	108.40	12:15:29
197	21/09/2009	Tarrawonga Station	0.61	100.90	12:07:39
197	21/09/2009	Templemore	0.58	111.20	12:05:10
198	29/09/2009	Tarrawonga Station	0.56	104.30	12:29:18
198	29/09/2009	Templemore	0.10	107.00	12:29:33
199	1/10/2009	Tarrawonga Station	1.10	106.20	11:58:40
199	1/10/2009	Templemore	0.35	101.90	11:58:59

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
200	19/10/2009	Tarrawonga Station	DNT		
200	19/10/2009	Templemore	1.42	115.30	12:09:04
201	30/10/2009	Tarrawonga Station	1.15	105.70	12:00:00
201	30/10/2009	Templemore	2.41	108.20	12:00:00
202	11/11/2009	Tarrawonga Station	DNT		11:58:54
202	11/11/2009	Templemore	1.22	102.40	11:58:54
203	18/11/2009	Tarrawonga Station	DNT		12:01:34
203	18/11/2009	Templemore	1.16	101.90	12:01:34
204	4/12/2009	Tarrawonga Station	0.46	108.20	12:01:09
204	4/12/2009	Templemore	1.42	114.90	12:03:13
205	9/12/2009	Tarrawonga Station	DNT		12:04:22
205	9/12/2009	Templemore	0.94	108.60	12:03:13
206	15/12/2009	Tarrawonga Station	DNT		12:18:30
206	15/12/2009	Templemore	0.66	101.90	12:18:30
207	6/01/2010	Tarrawonga Station	DNT		12:04:24
207	6/01/2010	Templemore	0.48	102.40	12:04:24
208	13/01/2010	Tarrawonga Station	0.43	102.80	12:14:33
208	13/01/2010	Templemore	1.34	101.80	12:14:33
209	22/01/2010	Tarrawonga Station	0.97	106.70	12:11:07
209	22/01/2010	Templemore	2.20	101.80	12:1: PM
210	4/02/2010	Tarrawonga Station	0.56	108.60	12:03:43
210	4/02/2010	Templemore	1.67	103.20	12:03:45
211	18/02/2010	Tarrawonga Station	DNT		
211	18/02/2010	Templemore	DNT		
212	23/02/2010	Tarrawonga Station	DNT		
212	23/02/2010	Templemore	0.66	107.50	11:55:28
213	9/03/2010	Tarrawonga Station	DNT		
213	9/03/2010	Templemore	0.56	98.60	11:58:38
214	11/03/2010	Tarrawonga Station	1.42	108.00	12:08:52
214	11/03/2010	Templemore	0.84	108.80	12:10:48
215	23/03/2010	Tarrawonga Station	DNT		
215	23/03/2010	Templemore	0.51	97.90	12:06:17
216	26/03/2010	Tarrawonga Station	DNT		
216	26/03/2010	Templemore	DNT		
217	9/04/2010	Tarrawonga Station	DNT		
217	9/04/2010	Templemore	DNT		
218	21/04/2010	Tarrawonga Station	DNT		
218	21/04/2010	Templemore	1.16	103.20	12:02:13
219	29/04/2010	Tarrawonga Station	DNT		
219	29/04/2010	Templemore	0.13	109.80	12:05:32
220	30/04/2010	Tarrawonga Station	0.38	103.50	12:06:01
220	30/04/2010	Templemore	2.33	99.90	12:05:32
221	5/05/2010	Tarrawonga Station	DNT		12:04:00
221	5/05/2010	Templemore	DNT		12:04:00
222	10/05/2010	Tarrawonga Station	DNT		
222	10/05/2010	Templemore	1.04	108.60	12:08:15
223	13/05/2010	Tarrawonga Station	DNT		
223	13/05/2010	Templemore	0.61	104.60	11:45:25
224	19/05/2010	Tarrawonga Station	DNT		11:59:00
224	19/05/2010	Templemore	DNT		11:59:00
225	21/05/2010	Tarrawonga Station	1.67	101.90	11:59:00
225	21/05/2010	Templemore	DNT		11:59:00
226	27/05/2010	Tarrawonga Station	DNT		
226	27/05/2010	Templemore	0.43	101.60	11:58:14
227	9/06/2010	Tarrawonga Station	DNT		
227	9/06/2010	Templemore	DNT		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
228	17/06/2010	Tarrawonga Station	0.61	113.30	12:02:08
228	17/06/2010	Templemore	1.09	110.70	12:01:44
229	21/06/2010	Tarrawonga Station	DNT		
229	21/06/2010	Templemore	DNT		
230	25/06/2010	Tarrawonga Station	DNT		
230	25/06/2010	Templemore	0.86	110.50	12:06:25
231	1/07/2010	Tarrawonga Station	DNT		
231	1/07/2010	Templemore	0.91	99.90	12:03:02
232	7/07/2010	Tarrawonga Station	DNT		
232	7/07/2010	Templemore	0.66	107.50	12:05:28
233	16/07/2010	Tarrawonga Station	DNT		
233	16/07/2010	Templemore	1.22	102.40	12:00:54
234	19/07/2010	Tarrawonga Station	DNT		
234	19/07/2010	Templemore	0.71	106.50	11:57:40
235	21/07/2010	Tarrawonga Station	DNT		
235	21/07/2010	Templemore	0.48	100.40	11:55:24
236	22/07/2010	Tarrawonga Station	DNT		
236	22/07/2010	Templemore	0.48	100.40	11:55:24
237	28/07/2010	Tarrawonga Station	DNT		
237	28/07/2010	Templemore	0.52	97.80	12:06:17
238	4/08/2010	Tarrawonga Station	DNT		
238	4/08/2010	Templemore	DNT		
239	9/08/2010	Tarrawonga Station	0.45	110.80	12:34:59
239	9/08/2010	Templemore	1.44	110.00	12:38:41
240	18/08/2010	Tarrawonga Station	0.73	90.00	12:09:03
240	18/08/2010	Templemore	0.48	109.20	12:09:52
241	31/08/2010	Tarrawonga Station	DNT		
241	31/08/2010	Templemore	1.42	112.70	12:11:49
242	2/09/2010	Tarrawonga Station	DNT		
242	2/09/2010	Templemore	DNT		
243	3/09/2010	Tarrawonga Station	DNT		
243	3/09/2010	Templemore	DNT		
244	7/09/2010	Tarrawonga Station	DNT		
244	7/09/2010	Templemore	0.66	104.40	11:16:04
245	9/09/2010	Tarrawonga Station	DNT		
245	9/10/2010	Templemore	0.58	85.90	12:06:35
246	17/09/2010	Tarrawonga Station	DNT		
246	17/09/2010	Templemore	0.52	103.50	11:55:49
247	20/09/2010	Tarrawonga Station	1.17	108.40	11:59:59
247	20/09/2010	Templemore	1.55	97.00	11:59:57
248	24/09/2010	Tarrawonga Station	DNT		
248	24/09/2010	Templemore	0.34	96.00	12:02:33
249	28/09/2010	Tarrawonga Station	DNT		
249	28/09/2010	Templemore	0.74	110.10	12:02:37
250	7/10/2010	Tarrawonga Station	DNT		
250	7/10/2010	Templemore	0.50	106.90	12:01:07
251	13/10/2010	Tarrawonga Station	0.64	97.20	13:10:42
251	13/10/2010	Templemore	0.63	110.20	13:10:51
252	15/10/2010	Tarrawonga Station	DNT		
252	15/10/2010	Templemore	DNT		
253	20/10/2010	Tarrawonga Station	DNT		
253	20/10/2010	Templemore	1.00	108.80	12:10:08
254	25/10/2010	Tarrawonga Station	DNT		
254	25/10/2010	Templemore	2.88	97.90	12:08:09
255	29/10/2010	Tarrawonga Station	DNT		
255	29/10/2010	Templemore	1.23	105.20	12:06:35

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
256	2/11/2010	Tarrawonga Station	DNT		
256	2/11/2010	Templemore	DNT		
257	4/11/2010	Tarrawonga Station	DNT		
257	4/11/2010	Templemore	DNT		
258	10/11/2010	Tarrawonga Station	DNT		
258	10/11/2010	Templemore	DNT		
259	14/11/2010	Tarrawonga Station	DNT		
259	14/11/2010	Templemore	0.28	107.20	12:06:49
260	22/11/2010	Tarrawonga Station	DNT		
260	22/11/2010	Templemore	DNT		
261	25/11/2010	Tarrawonga Station	DNT		
261	25/11/2010	Templemore	0.45	103.90	12:07:36
262	30/11/2010	Tarrawonga Station	DNT		
262	30/11/2010	Templemore	DNT		
263	6/12/2010	Tarrawonga Station	DNT		
263	6/12/2010	Templemore	0.13	110.20	12:04:21
263/1	6/12/2010	Misfire	No Monitors*		16:00:00
263/1	6/12/2010	Misfire	No Monitors*		16:00:00
264	9/12/2010	Tarrawonga Station	DNT		
264	9/12/2010	Templemore	0.33	107.60	12:04:58
263/2	10/12/2010	Misfire	No Monitors*		9:37:00
263/2	10/12/2010	Misfire	No Monitors*		9:37:00
263/3	13/12/2010	Misfire	No Monitors*		14:20:00
263/3	13/12/2010	Misfire	No Monitors*		14:20:00
263/4	14/12/2010	Misfire	No Monitors*		10:05:00
263/4	14/12/2010	Misfire	No Monitors*		10:05:00
265	16/12/2010	Tarrawonga Station	DNT		
265	16/12/2010	Templemore	DNT		
266	23/12/2011	Tarrawonga Station	DNT		
266	23/12/2011	Templemore	DNT		
267	4/01/2011	Tarrawonga Station	DNT		
267	4/01/2011	Templemore	0.10	113.50	12:08:44
268	7/01/2011	Tarrawonga Station	0.28	108.40	15:06:02
268	7/01/2011	Templemore	DNT		15:06:02
269	11/01/2011	Tarrawonga Station	0.10	111.50	9:31:14
269	11/01/2011	Templemore	0.52	99.30	9:31:14
270	14/01/2011	Tarrawonga Station	DNT		
270	14/01/2011	Templemore	DNT		
271	18/01/2011	Tarrawonga Station	DNT		
271	18/01/2011	Templemore	DNT		
272	24/01/2011	Tarrawonga Station	DNT		
272	24/01/2011	Templemore	DNT		
273	1/02/2011	Tarrawonga Station	DNT		
273	1/02/2011	Templemore	0.62	107.20	11:58:33
274	7/02/2011	Tarrawonga Station	DNT		
274	7/02/2011	Templemore	1.09	102.80	12:46:57
275	9/02/2011	Tarrawonga Station	DNT		
275	9/02/2011	Templemore	DNT		
276	11/02/2011	Tarrawonga Station	0.40	113.70	11:58:43
276	11/02/2011	Templemore	0.75	104.30	11:58:43
277	15/02/2011	Tarrawonga Station	DNT		
277	15/02/2011	Templemore	DNT		
278	18/02/2011	Tarrawonga Station	DNT		
278	18/02/2011	Templemore	0.99	101.40	12:01:35
279	28/02/2011	Tarrawonga Station	DNT		
279	28/02/2011	Templemore	DNT		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
280	4/03/2011	Tarrawonga Station	DNT		
280	4/03/2011	Templemore	DNT		
281	10/03/2011	Tarrawonga Station	DNT		
281	10/03/2011	Templemore	DNT		
282	15/03/2011	Tarrawonga Station	DNT		
282	15/03/2011	Templemore	0.55	114.80	12:03:00
283	18/03/2011	Tarrawonga Station	DNT		
283	18/03/2011	Templemore	DNT		
284	24/03/2011	Tarrawonga Station	1.22	107.60	13:08:37
284	24/03/2011	Templemore	DNT		
285	1/04/2011	Tarrawonga Station	DNT		
285	1/04/2011	Templemore	1.17	108.30	11:52:50
286	8/04/2011	Tarrawonga Station	0.73	106.70	11:57:13
286	8/04/2011	Templemore	1.20	106.60	11:56:53
287	19/04/2011	Tarrawonga Station	DNT		
287	19/04/2011	Templemore	1.20	110.70	12:03:10
288	21/04/2011	Tarrawonga Station	DNT		
288	21/04/2011	Templemore	1.27	115.80	11:54:44
289	29/04/2011	Tarrawonga Station	DNT		
289	29/04/2011	Templemore	DNT		
290	4/05/2011	Tarrawonga Station	DNT		12:03:00
290	4/05/2011	Templemore	DNT		12:03:00
291	6/05/2011	Tarrawonga Station	DNT		11:58:00
291	6/05/2011	Templemore	1.04	83.70	11:58:04
292	9/05/2011	Tarrawonga Station	DNT		12:06:11
292	9/05/2011	Templemore	0.44	83.70	12:06:11
293	11/05/2011	Tarrawonga Station	DNT		12:00:00
293	11/05/2011	Templemore	DNT		12:00:00
294	16/05/2011	Tarrawonga Station	0.48	105.10	12:35:27
294	16/05/2011	Templemore	1.25	100.20	12:35:15
295	19/05/2011	Tarrawonga Station	DNT		12:05:00
295	19/05/2011	Templemore	DNT		12:05:00
296	20/05/2011	Tarrawonga Station	DNT		12:37:00
296	20/05/2011	Templemore	1.07	102.5	12:37:11
297	24/05/2011	Tarrawonga Station	DNT		12:00:00
297	24/05/2011	Templemore	DNT		12:00:00
298	27/05/2011	Tarrawonga Station	DNT		12:02:00
298	27/05/2011	Templemore	DNT		12:02:00
299	7/06/2011	Tarrawonga Station	DNT		12:02:02
299	7/06/2011	Templemore	DNT		12:02:00
300	9/06/2011	Tarrawonga Station	DNT		12:04:00
300	9/06/2011	Templemore	DNT		12:04:00
301	20/06/2011	Tarrawonga Station	0.60	89.7	12:09:19
301	20/06/2011	Templemore	0.10	112.7	12:09:13
302	27/06/2011	Tarrawonga Station	DNT		16:15:00
302	27/06/2011	Templemore	DNT		16:15:00
303	28/06/2011	Tarrawonga Station	DNT		12:03:00
303	28/06/2011	Templemore	DNT		12:03:00
304	1/07/2011	Tarrawonga Station	0.13	113.1	11:54:26
304	1/07/2011	Templemore	1.59	103.4	11:54:27
305	1/07/2011	Tarrawonga Station	0.480	100.9	12:15:43
305	1/07/2011	Templemore	0.470	98.8	12:15:44
306	6/07/2011	Tarrawonga Station	DNT		12:13:00
306	6/07/2011	Templemore	DNT		12:13:00
307	7/07/2011	Tarrawonga Station	0.430	104.1	11:55:06
307	7/07/2011	Templemore	0.100	114.7	11:57:57

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
308	14/07/2011	Tarrawonga Station	0.1014	113.4	12:06:50
308	14/07/2011	Templemore	0.9066	107.6	12:06:45
309	25/07/2011	Tarrawonga Station	0.6755	115.9	12:02:46
309	25/07/2011	Templemore	4.820	102.5	12:02:45
310	27/07/2011	Tarrawonga Station	DNT		12:27:00
310	27/07/2011	Templemore	DNT		12:27:00
311	2/08/2011	Tarrawonga Station	0.8616	99.46	12:01:08
311	2/08/2011	Templemore	0.9344	106.1	12:01:12
312	3/08/2011	Tarrawonga Station	DNT		11:59:00
312	3/08/2011	Templemore	0.4506	102.9	11:59:26
313	11/08/2011	Tarrawonga Station	DNT		12:12:00
313	11/08/2011	Templemore	DNT		12:12:00
314	17/08/2011	Tarrawonga Station	0.101	113.40	12:12:28
314	17/08/2011	Templemore	0.106	112.50	12:12:30
315	19/08/2011	Tarrawonga Station	DNT		12:05:00
315	19/08/2011	Templemore	1.077	83.58	12:05:00
316	25/08/2011	Tarrawonga Station	DNT		12:07:21
316	25/08/2011	Templemore	0.677	83.58	12:07:00
317	26/08/2011	Tarrawonga Station	0.481	102.90	12:03:09
317	26/08/2011	Templemore	DNT		12:03:00
318	1/09/2011	Tarrawonga Station	DNT		12:18:00
318	1/09/2011	Templemore	DNT		12:18:00
319	7/09/2011	Tarrawonga Station	DNT		12:10:00
319	7/09/2011	Templemore	DNT		12:10:00
320	16/09/2011	Tarrawonga Station	0.9736	115.30	12:06:44
320	16/09/2011	Templemore	0.3568	107.80	12:06:00
321	23/09/2011	Tarrawonga Station	DNT		12:06:00
321	23/09/2011	Templemore	1.007	103.40	12:06:35
322	26/09/2011	Tarrawonga Station	0.0883	114.30	12:07:51
322	26/09/2011	Templemore	DNT		12:07:00
323	30/09/2011	Tarrawonga Station	DNT		12:04:00
323	30/09/2011	Templemore	DNT		12:04:00
324	5/10/2011	Tarrawonga Station	DNT		12:02:00
324	5/10/2011	Templemore	DNT		12:02:00
325	18/10/2011	Tarrawonga Station	DNT		12:21:00
325	18/10/2011	Templemore	DNT		12:21:00
326	19/10/2011	Tarrawonga Station	1.5950	108.00	12:00:11
326	19/10/2011	Templemore	0.5506	115.90	12:00:05
327	27/10/2011	Tarrawonga Station	0.3636	105.10	16:50:42
327	27/10/2011	Templemore	1.0510	103.60	16:50:39
328	1/11/2011	Tarrawonga Station	DNT		12:00:00
328	1/11/2011	Templemore	DNT		12:00:00
329	9/11/2011	Tarrawonga Station	DNT		12:05:00
329	9/11/2011	Templemore	DNT		12:05:00
330	15/11/2011	Tarrawonga Station	2.0850	106.30	11:57:42
330	15/11/2011	Templemore	DNT		11:57:00
331	23/11/2011	Tarrawonga Station	0.4434	87.34	13:05:00
331	23/11/2011	Templemore	0.5035	88.14	13:05:00
332	30/11/2011	Tarrawonga Station	0.0714	112.40	16:21:00
332	30/11/2011	Tarrawonga Station	0.0908	111.90	16:25:00
332	30/11/2011	Templemore	2.3130	104.80	16:21:00
332	30/11/2011	Templemore	0.2200	87.24	16:25:00
333	2/12/2011	Tarrawonga Station	0.5364	100.30	16:36:05
333	2/12/2011	Templemore	0.8239	97.45	16:36:28
334	7/12/2011	Tarrawonga Station	0.4021	103.50	12:07:00
334	7/12/2011	Templemore	0.4036	99.04	12:07:00

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
335	13/12/2011	Tarrawonga Station	DNT		12:02:00
335	13/12/2011	Templemore	DNT		12:02:00
336	15/12/2011	Tarrawonga Station	DNT		11:58:00
336	15/12/2011	Templemore	1.2770	97.24	11:58:00
337	21/12/2011	Tarrawonga Station	DNT		12:00:00
337	21/12/2011	Templemore	DNT		12:00:00
338	4/01/2012	Tarrawonga Station	DNT		12:30:00
338	4/01/2012	Templemore	DNT		12:30:00
339	11/01/2012	Tarrawonga Station	DNT		12:00:00
339	11/01/2012	Templemore	0.9539	104.50	12:00:45
340	13/01/2012	Tarrawonga Station	DNT		11:58:00
340	13/01/2012	Templemore	0.4484	107.90	11:57:28
341	18/01/2012	Tarrawonga Station	DNT		12:24:00
341	18/01/2012	Templemore	0.4218	104.60	12:24:05
342	27/01/2012	Tarrawonga Station	0.4292	127.40	16:44:00
342	27/01/2012	Templemore	0.7113	112.30	16:44:24
343	7/02/2012	Tarrawonga Station	DNT		12:11:00
343	7/02/2012	Templemore	1.1070	99.86	12:11:58
344	17/02/2012	Tarrawonga Station	DNT		13:09:24
344	17/02/2012	Templemore	1.65	100.4	13:09:34
345	22/02/2012	Tarrawonga Station	0.048	108.3	12:11:09
345	22/02/2012	Templemore	2.251	97.11	12:10:58
346	28/02/2012	Tarrawonga Station	DNT		12:11:00
346	28/02/2012	Templemore	DNT		12:11:00
347	3/03/2012	Tarrawonga Station	DNT		10:34:00
347	3/03/2012	Templemore	1.099	102.3	10:34:48
348	9/03/2012	Tarrawonga Station	DNT		11:56:00
348	9/03/2012	Templemore	1.297	104	11:56:03
349	14/03/2012	Tarrawonga Station	DNT		12:04:00
349	14/03/2012	Templemore	0.407	96.31	12:04:16
350	16/03/2012	Tarrawonga Station	DNT		11:56:00
350	16/03/2012	Templemore	0.929	95.72	11:56:52
351	21/03/2012	Tarrawonga Station	DNT		12:02:00
351	21/03/2012	Templemore	DNT		12:02:00
352	26/03/2012	Tarrawonga Station	DNT		12:03:00
352	26/03/2012	Templemore	0.420	105.7	12:03:26
353	27/03/2012	Tarrawonga Station	DNT		11:56:00
353	27/03/2012	Templemore	1.050	106.1	11:56:48
354	5/04/2012	Tarrawonga Station	1.980	101.7	11:56:43
354	5/04/2012	Templemore	0.350	96.6	11:56:46
355	12/04/2012	Tarrawonga Station	DNT		12:00:00
355	12/04/2012	Templemore	DNT		12:00:00
356	13/04/2012	Tarrawonga Station	2.232	105.5	12:10:27
356	13/04/2012	Templemore	0.584	92.09	12:10:59
357	26/04/2012	Tarrawonga Station	0.477	105.5	12:00:34
357	26/04/2012	Templemore	2.705	106.3	12:00:31

*no monitor results obtained on basis of blast size (coal/parting shots or misfires)

Appendix 9

NOISE MONITORING RESULTS

Attended Noise Monitoring

June 2011

September 2011

December 2011

March 2012



27 June 2011

Ref: 04095/4020

Mr Danny Young
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JUNE 2011 NOISE MONITORING RESULTS – TARRAWONGA MINE

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 23 and 24 June 2011.

NOISE CRITERIA

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

Day (Operational Stage) Leq (15 min)	Evening Leq (15 min)	Night Leq (15 min)	Night L1 (1 min)
35	35	35	45

Table 7: Noise Impact Assessment Criteria dB(A)

Notes:

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - o wind speeds of up to 3 m/s at 10 metres above ground level; or
 - o Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

Day/Evening Leq (1 hr)	Night Leq (1 hr)	Property
60	55	Any residence on privately-owned land.

Table 8: Road Traffic Noise Criteria dB(A)

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the EPA's *NSW Industrial Noise Policy* (INP) defines non-compliance with noise limits as follows:

"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird ¹	
N2 – “Bollol Creek Station”	J. Picton ¹	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo” ²	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo” ²	D. Wellwood	Private
“Pine Grove” ²	J., S., M, & C. Bull	Private
“Brooklyn”	R. Kelly	Public

¹ This property is now mine-owned.

² Agreements are in place to allow for noise criteria of 45 dB(A) at Ambardo and 50 dB(A) at Pine Grove.

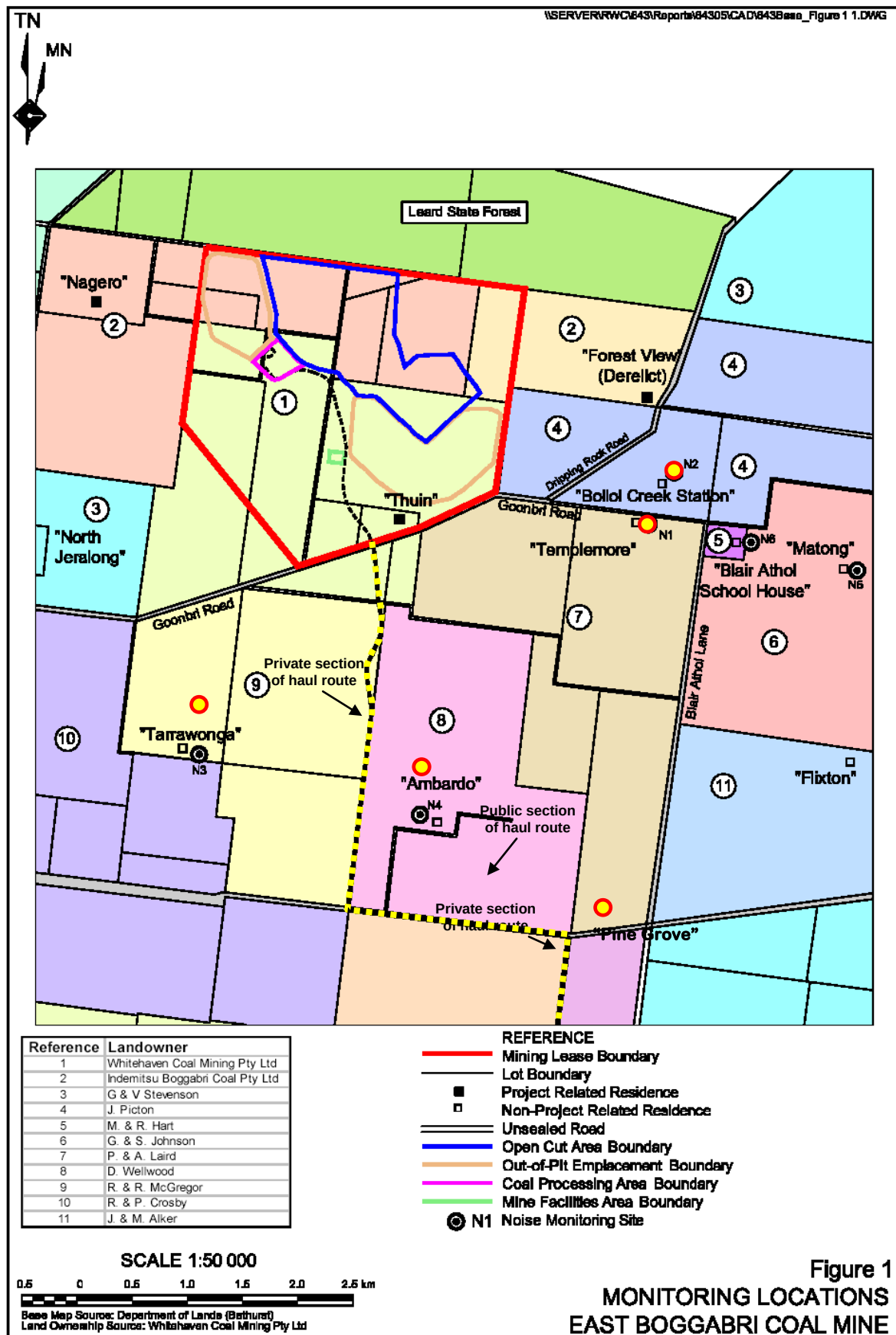
Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3** and **4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times at receivers *N2* and *N3*, and **40dB(A) Leq (15 min)** for all operating times at *N4* (Ambardo) and Pine Grove.

Table 2 TCM Noise Monitoring Results – 23/24 June 2011 (Day)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	5:10 pm	33	Calm	Birds (33), TCM (23)
N3 Tarrawonga	8:21 am	35	Calm	Cattle (34), TCM (28)
N4 Ambardo	7:59 am	54	Calm	Birds (54), TCM (39) ¹ , trucks on public road (39)
Pine Grove	8:50 am	50	Calm	Birds (50), TCM (40) ² , trucks on public road (37)

¹ Trucks on private section of haul road 38, mine noise 32.

² Trucks on private section of haul road

Table 3 TCM Noise Monitoring Results – 23 June 2011 (evening)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	8:41 pm	30	0.5 m/s, NE	TCM (30)
N3 Tarrawonga	6:11 pm	35	0.5 m/s, E	Cattle (34), TCM (28)
N4 Ambardo	6:35 pm	43	0.5 m/s, E	TCM (39) ¹ , trucks on public road (39), birds (36)

¹ Trucks on private section of haul road.

Table 4 TCM Noise Monitoring Results – 23/24 June 2011 (night)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	12:35 am	30	<0.5m/s, SE	TCM (30)
N3 Tarrawonga	10:03 pm	25	0.5 m/s, NE	Cattle (25), TCM inaudible
N4 Ambardo	10:22 pm	30	0.5 m/s, NE	Traffic (28), wind (25), TCM inaudible

DISCUSSION OF RESULTS

The results in Tables 2 - 4 show that, under the operational and atmospheric conditions at the time, noise emissions from with TCM did not exceed the operational noise criteria at any monitoring location during any of the monitoring periods.

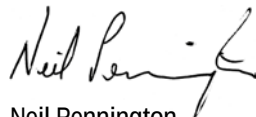
In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant



7 November 2011

Ref: 04095/4141

Mr Danny Young
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: SEPTEMBER 2011 NOISE MONITORING RESULTS – TARRAWONGA MINE

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 13th and 14th September, 2011.

NOISE CRITERIA

Construction and operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

Day (Operational Stage) Leq (15 min)	Evening Leq (15 min)	Night Leq (15 min)	Night L1 (1 min)
35	35	35	45

Table 7: Noise Impact Assessment Criteria dB(A)

Notes:

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - o wind speeds of up to 3 m/s at 10 metres above ground level; or
 - o Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

Day/Evening Leq (1 hr)	Night Leq (1 hr)	Property
60	55	Any residence on privately-owned land.

Table 8: Road Traffic Noise Criteria dB(A)

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the EPA's *NSW Industrial Noise Policy* (INP) defines non-compliance with noise limits as follows:

"A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition."

The 2 dB 'tolerance' is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

"A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified."

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird ¹	
N2 – “Bollol Creek Station”	J. Picton ¹	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo” ²	D. Wellwood	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo” ²	D. Wellwood	Private
“Pine Grove” ²	J., S., M, & C. Bull	Private
“Brooklyn”	R. Kelly	Public

¹ This property is now mine-owned.

² Agreements are in place to allow for noise criteria of 45 dB(A) at Ambardo and 50 dB(A) at Pine Grove.

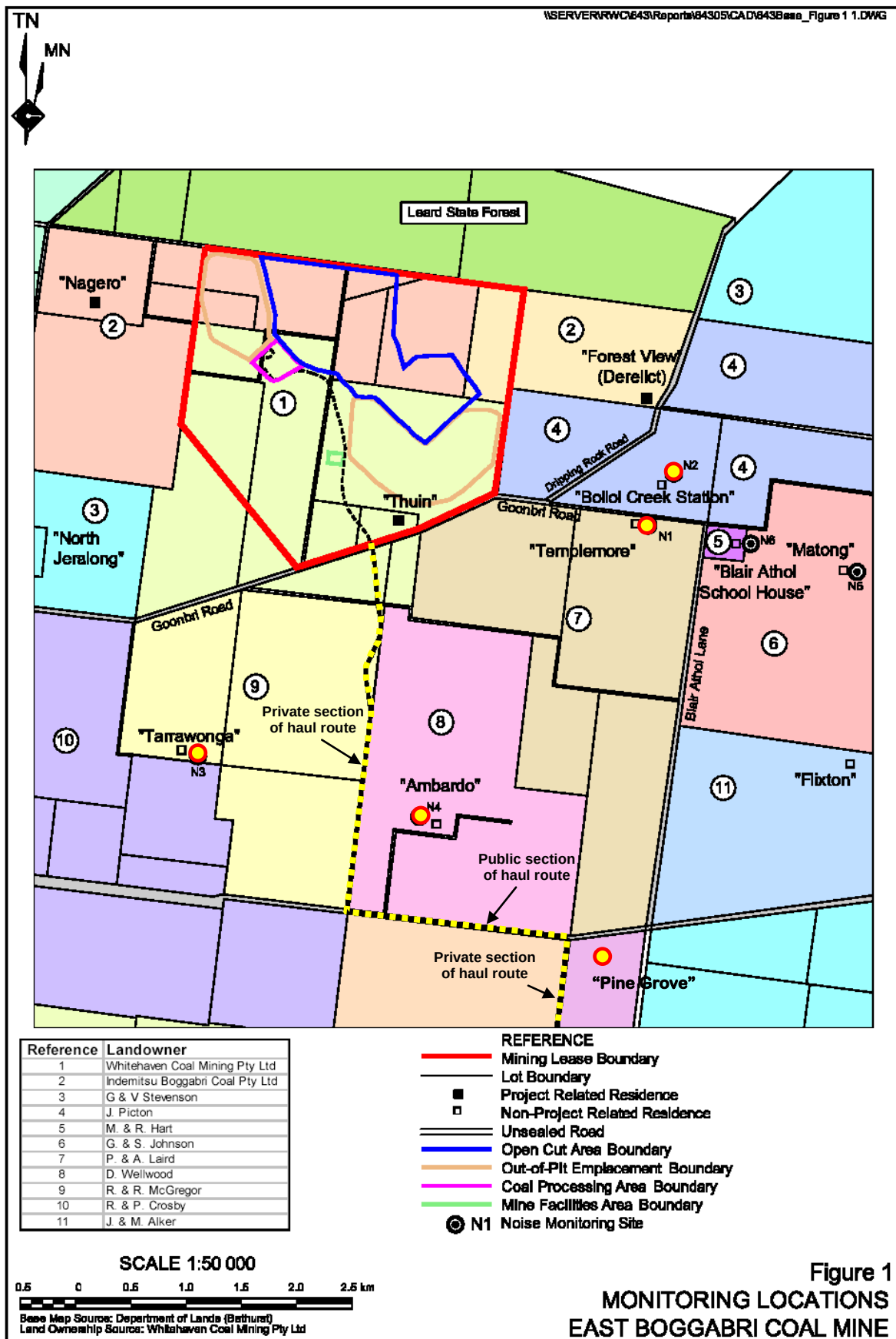
Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2m above ground level.



MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3 and 4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times. “Bollol Creek Station” and “Ambardo” are now project related properties. An agreement is in place at the “Pine Grove” property whereby noise limits related to trucks on private sections of haul route is set at 50dB(A).

Table 2 TCM Noise Monitoring Results – 13 September 2011 (Day) (Ambardo and Pine Grove on 14 September)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	3:00 pm	39	2 m/s, W	Wind (36), birds (33), TCM (33)
N3 Tarrawonga	4:26 pm	36	1.5 m/s W	Wind in trees (36), birds (25), TCM (barely audible)
N4 Ambardo	7:05 am	49	Calm	Birds (48), TCM (42) ¹ , traffic (35)
Pine Grove	7:05 am	44	Calm	Birds (42), TCM (39) ¹

¹ Trucks on private section of haul road (38), mine noise (34).

Table 3 TCM Noise Monitoring Results – 13 September 2011 (evening)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	8:10 pm	39	0.5 m/s, WNW	TCM (39), frogs (32)
N3 Tarrawonga	7:53 pm	32	0.8 m/s, WNW	TCM (32)
N4 Ambardo	7:23 pm	43	0.8 m/s, WNW	TCM (43) ¹ , traffic (34)

¹ Trucks on private section of haul road (42), mine noise (35).

Table 4 TCM Noise Monitoring Results – 13 September 2011 (night)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	10:45 pm	43	0.5 m/s, NW	TCM (43)
N3 Tarrawonga	10:15 pm	33	0.5 m/s, NW	TCM (33)
N4 Ambardo	10:34 pm	32	0.5 m/s, NW	TCM (32)

DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from TCM were below the operational noise criteria, or within prescribed agreement limits, at all privately owned residences during the monitoring event.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

During the night time measurement circuit the L1 (1min) noise from TCM did not exceed 45 dB(A) at any monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Neil Pennington
Acoustical Consultant

Review:



Ross Hodge
Acoustical Consultant



4 January 2012

Ref: 04095/4244

Mr Danny Young
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: DECEMBER 2011 NOISE MONITORING RESULTS – TARRAWONGA MINE

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 20th and 21st December, 2011.

NOISE CRITERIA

Operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

Day (Operational Stage) Leq (15 min)	Evening Leq (15 min)	Night Leq (15 min)	Night L1 (1 min)
35	35	35	45

Table 7: Noise Impact Assessment Criteria dB(A)

Notes:

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - o wind speeds of up to 3 m/s at 10 metres above ground level; or
 - o Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

Day/Evening Leq (1 hr)	Night Leq (1 hr)	Property
60	55	Any residence on privately-owned land.

Table 8: Road Traffic Noise Criteria dB(A)

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

“A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition.”

The 2 dB ‘tolerance’ is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

“A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified.”

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird ¹	
N2 – “Bollol Creek Station”	J. Picton ¹	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo”	D. Wellwood ¹	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo”	D. Wellwood ¹	Private
“Pine Grove” ²	J., S., M, & C. Bull	Private
“Brooklyn”	R. Kelly	Public

¹ This property is now mine-owned.

² An agreement is in place to allow for a noise criterion of 50 dB(A) at Pine Grove.

Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

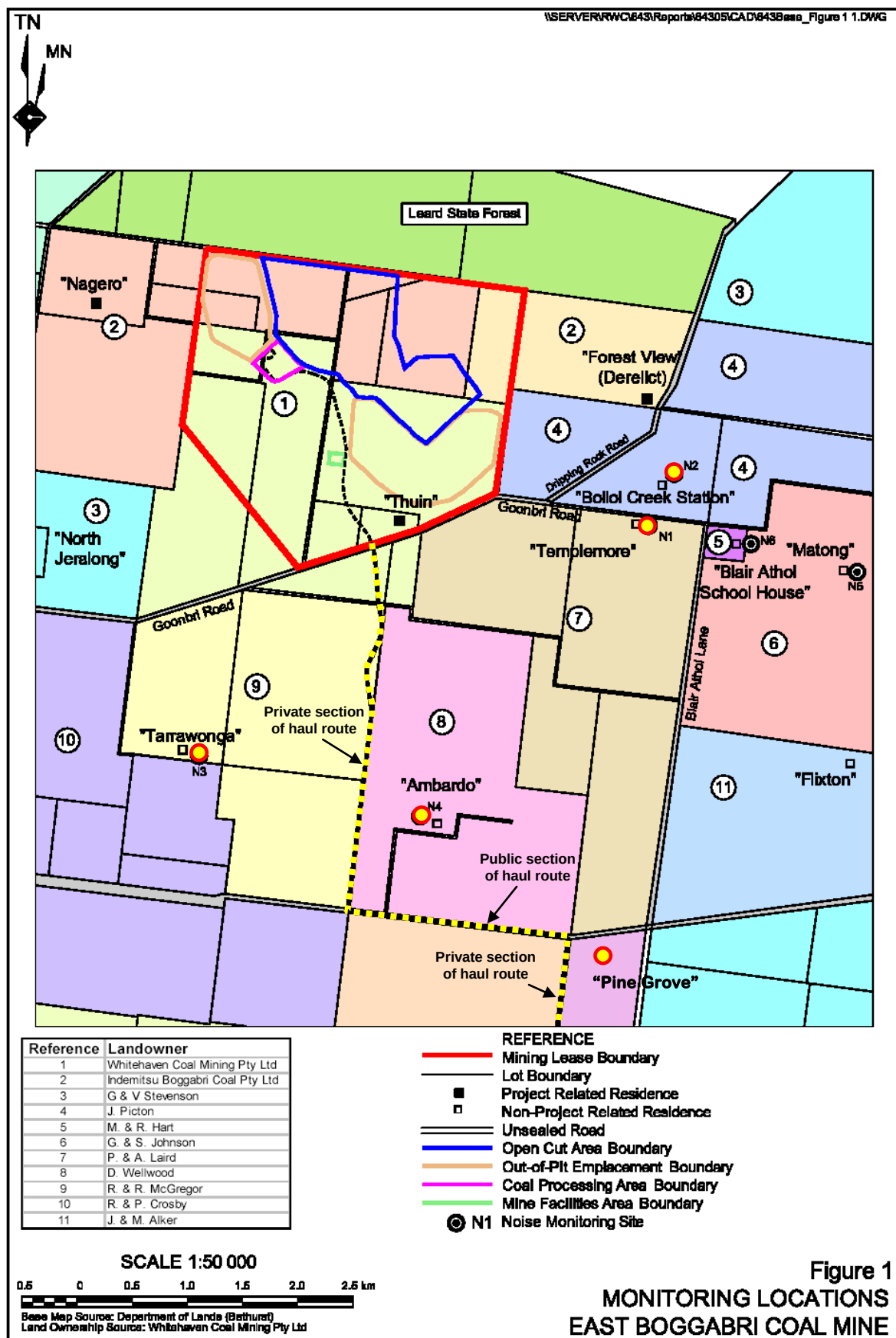
NOISE MONITORING PROGRAM

TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Both residences are mine owned.

Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2.5m above ground level.



MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3 and 4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times, **45dB(A) Leq (15 min)** at N4 (Ambardo) and **50dB(A) Leq (15 min)** at Pine Grove, for all operating times. It is noted that receivers N2 and N4 are now mine owned.

Table 2 TCM Noise Monitoring Results – 20 December 2011 (day)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	11:57 am	53	1.0 m/s, SE	Birds & insects (53), TCM (26)
N3 Tarrawonga	7:54 am	45	0.2 m/s SE	Birds & insects (45), TCM (24)
N4 Ambardo	7:22 am	50	Calm	Birds (50), TCM (34) ¹ , traffic (25)
Pine Grove	7:21 am	42	Calm	Birds (41), TCM (36) ² , traffic (30)

¹ Trucks on private section of haul road (34), mine noise (20).

² Trucks on private section of haul road.

Table 3 TCM Noise Monitoring Results – 20 December 2011 (evening)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	7:34 pm	42	0.2 m/s, SW	Birds & insects (42), TCM (26)
N3 Tarrawonga	8:24 pm	40	Calm	Birds & insects (40), TCM (20)
N4 Ambardo	6:48 pm	60	Calm	Birds & insects (60), TCM (37) ¹ , traffic (30)

¹ Trucks on private section of haul road (37), mine noise (25).

Table 4 TCM Noise Monitoring Results – 20/21 December 2011 (night)				
Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	10:20 pm	43	0.5 m/s, SE	Birds & insects (40), TCM (30)
N3 Tarrawonga	1:25 am (21/12)	43	1.5 m/s, SE	Insects (40), TCM (39), other mines (32)
N4 Ambardo	10:03 pm	46	0.5 m/s, NW	Birds & insects (46), TCM (30)

DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from with TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the night time period. Noise emissions from TCM were below the operational noise criteria at all other monitoring locations at all times.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

At the Tarrawonga monitoring location during the night period the L1 (1 min) noise from mining was 45 dB(A), attributable to an impact noise from trucks dumping at TCM.

The L1 (1min) noise from TCM did not exceed 45 dB(A) during the night at any other monitoring location.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,
SPECTRUM ACOUSTICS PTY LIMITED

Author:



Ross Hodge
Acoustical Consultant

Review:



Neil Pennington
Acoustical Consultant



23 March 2012

Ref: 04095/4311

Mr Danny Young
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: MARCH 2012 NOISE MONITORING RESULTS – TARRAWONGA MINE

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 15th and 16th March, 2012.

NOISE CRITERIA

Operational noise criteria for TCM are contained in Conditions 4(6) and 4(7) of the Development Consent, as reproduced below.

- 4(6) *The Applicant shall ensure that the noise generated by the development, including the noise generated on the private sections of the transport route, does not exceed the noise impact assessment criteria presented in Table 7 at any residence on privately-owned land.*

Day (Operational Stage) Leq (15 min)	Evening Leq (15 min)	Night Leq (15 min)	Night L1 (1 min)
35	35	35	45

Table 7: Noise Impact Assessment Criteria dB(A)

Notes:

- *Noise from the development is to be measured at the most affected point or within the residential boundary, or at the most affected point within 30 metres of a dwelling (rural situations) where the dwelling is more than 30 metres from the boundary,*
- *To determine compliance with the Leq(15 min) noise limits in the above table, where it can be demonstrated that direct measurement of noise from the development is impractical, the DEC may accept alternative means of determining compliance (see Chapter 11 of the NSW Industrial Noise Policy).*

- The modification factors in Section 4 of the NSW Industrial Noise Policy shall also be applied to the measured noise levels where applicable.
- Noise from the development is to be measured at 1 metre from the dwelling façade to determine compliance with the L1 (1 min) noise limits in the above table
- The noise emission limits identified in the above table apply under meteorological conditions of:
 - o wind speeds of up to 3 m/s at 10 metres above ground level; or
 - o Temperature inversion conditions of up to 3°C/100m, and wind speeds of up to 2 m/s at 10 metres above ground level.

4(7) The Applicant shall ensure that the noise generated by the development on public roads does not exceed the criteria in Table 8.

Day/Evening Leq (1 hr)	Night Leq (1 hr)	Property
60	55	Any residence on privately-owned land.

Table 8: Road Traffic Noise Criteria dB(A)

Note: The road traffic noise criteria apply to the cumulative impact from all mine-related sources

Section 11.1.3 of the NSW Industrial Noise Policy (INP) defines non-compliance with noise limits as follows:

“A development will be deemed to be in non-compliance with a noise consent or license condition if the monitored noise level is more than 2 dB above the statutory noise level specified in the consent or license condition.”

The 2 dB ‘tolerance’ is given because this represents the theoretical minimum noise level difference discernible by the human ear. Section 11.1.3 of the INP goes on to define a breach as:

“A development will be in breach of a noise consent or license condition if sustained non-compliances are not addressed and rectified.”

These statements mean that a breach occurs when noise emissions are repeatedly measured at a level more than 2 dB above the limit given in the consent, and the proponent does not endeavour to manage or mitigate the exceedance.

NOISE MONITORING LOCATIONS

Noise monitoring locations were nominated in the Noise Management Plan (NMP) and Road Noise Management Plan (RNMP) for the project. These locations are listed in **Table 1** below and shown on **Figure 1**.

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	Land owner	
N1 – “Templemore”	P. & A. Laird ¹	
N2 – “Bollol Creek Station”	J. Picton ¹	
N3 – “Tarrawonga”	R. & R. McGregor	
N4 – “Ambardo”	D. Wellwood ¹	
Road traffic noise monitoring locations		
Receiver	Land owner	Road type
“Ambardo”	D. Wellwood ¹	Private
“Pine Grove” ²	J., S., M, & C. Bull	Private
“Brooklyn”	R. Kelly	Public

¹ This property is now mine-owned.

² An agreement is in place to allow for a noise criterion of 50 dB(A) at Pine Grove.

Monitoring location *N4* (“Ambardo”) is included for both site (operational) noise and coal transport noise. “Pine Grove” is very unlikely to be affected by site noise but is the closest residence to a private section of the haul route (shown as a yellow dotted line in Figure 1).

NOISE MONITORING PROGRAM

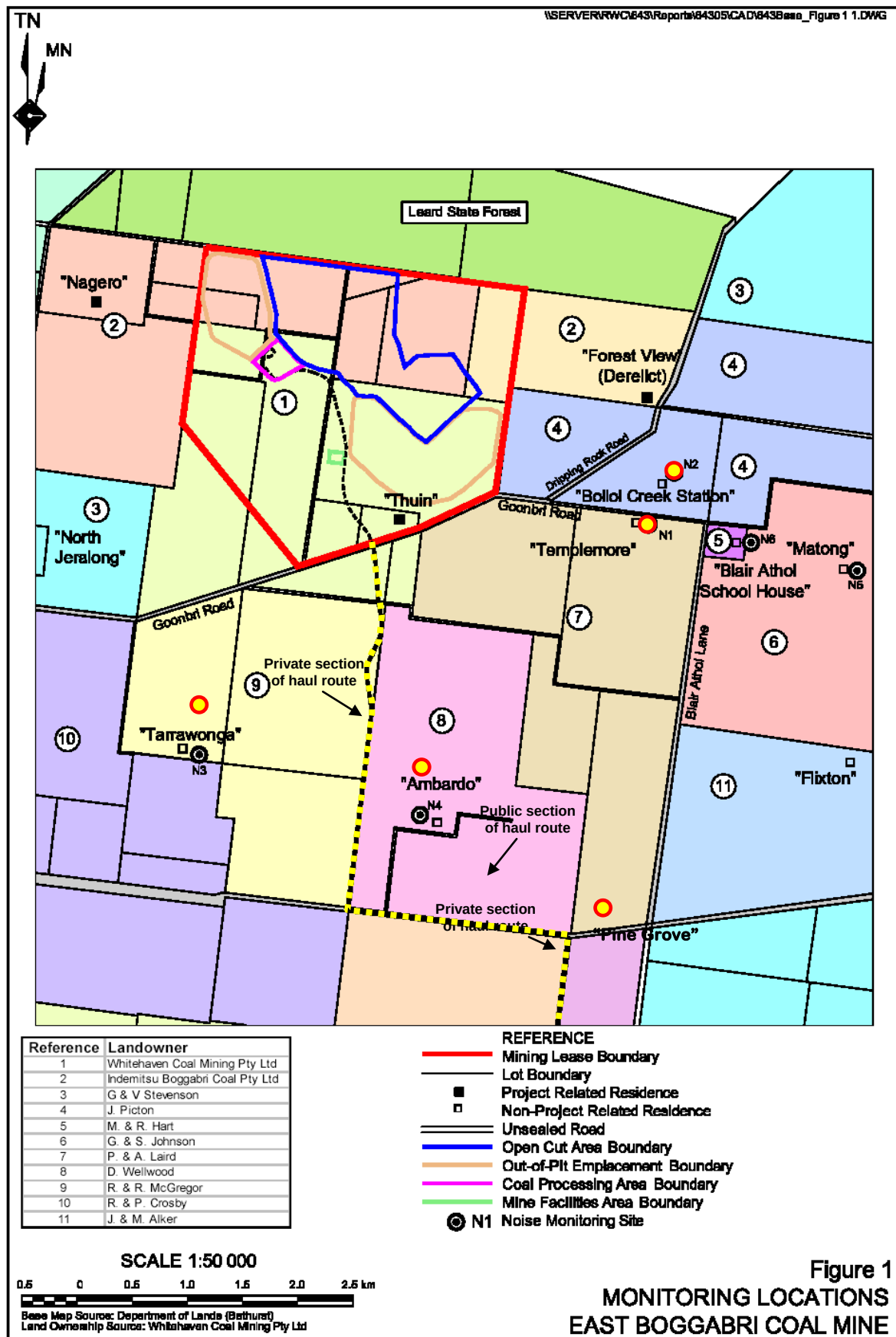
TCM is in its operational phase and noise monitoring was conducted at Locations *N2*, *N3* and *N4*. Locations *N1* and *N2* are very close together relative to their distance from TCM and the measurement at *N2* was considered to represent the worst case for both. Both residences are mine owned.

Coal was being transported from TCM to the Whitehaven Coal Preparation Plant near Gunnedah, so measurements were also taken at “Pine Grove”.

Noise emission levels were measured by two personnel using Brüel & Kjær Type 2260 and 2250 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 “Sound Level Meters”. Calibration of the instruments was confirmed with a Brüel & Kjær Type 4231 Sound Level Calibrator prior to and at the completion of measurements.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2.5m above ground level.

Day time monitoring at Ambardo and Pine Grove was carried out during the morning of 16th March.



MEASURED NOISE LEVELS

Measured noise levels at each location are summarised in **Tables 2, 3 and 4**. The total measured Leq (15 min) is shown. Bruel & Kjaer “*Evaluator*” analysis software was used to quantify the contributions of the various noise sources. The identified noise sources are listed, along with the contribution of each source, in descending order (shown in brackets). The noise criterion for the operational phase of the TCM project is **35dB(A) Leq (15 min)** for all operating times, **45dB(A) Leq (15 min)** at N4 (Ambardo) and **50dB(A) Leq (15 min)** at Pine Grove, for all operating times. It is noted that receivers N2 and N4 are now mine owned.

Table 2 TCM Noise Monitoring Results – 15/16 March 2012 (day)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	4:26 pm	41	1.5 m/s, SE	Birds & insects (41), TCM barely audible
N3 Tarrawonga	4:25 pm	37	1.5 m/s SE	Birds & insects (37), TCM (<15)
N4 Ambardo	7:55 am	54	Calm	Birds (50), TCM (39) ¹ , farm machinery (37)
Pine Grove	7:33 am	46	Calm	Birds (43), traffic (41), TCM (39) ²

¹ Trucks on private section of haul road (38), mine noise (31).

² Trucks on private section of haul road (38), mine noise (30).

Table 3 TCM Noise Monitoring Results – 15 March 2012 (evening)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	8:39 pm	41	Calm	Insects (41), TCM inaudible
N3 Tarrawonga	9:12 pm	41	Calm	Insects (39), TCM (37)
N4 Ambardo	7:54 pm	48	Calm	Birds & insects (47), TCM (41) ¹ , traffic (36)

¹ Trucks on private section of haul road (40), mine noise (35).

Table 4 TCM Noise Monitoring Results – 15/16 March 2012 (night)				
Location	Time	dB(A), Leq (15 min)	Wind speed/ direction	Identified Noise Sources
N2 Bollol Ck Station	10:10 pm	43	1 m/s, NE	Insects (43), dog (25), TCM (<25)
N3 Tarrawonga	1:23 am (16/3)	43	Calm	Birds & insects (43), TCM (38), other mines (33)
N4 Ambardo	11:08 pm	44	0.5 m/s, NE	Insects (44), TCM (33)

DISCUSSION OF RESULTS

The results in Tables 1-3 show that noise emissions from with TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the evening and night time periods. Noise emissions from TCM were below the operational noise criteria at all other monitoring locations at all times.

In addition to the operational noise, the noise from TCM must not exceed 45 dB(A) L1 (1min) between the hours of 10 pm and 7 am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine.

Throughout the night time survey the worst case L1 (1 min) noise from mining activity was at the Tarrawonga monitoring location. A noise level of 43 dB(A) L1 (1 min) was attributable to noise from dozer tracks at TCM.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Author:



Ross Hodge
Acoustical Consultant

Review:



Neil Pennington
Acoustical Consultant

Road Noise Monitoring

September 2011

April 2012



16 September 2011

Ref: 06259/4119

Mr. Danny Young
Whitehaven Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, SEPTEMBER 2011

This letter report presents the results of a road noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at “Brooklyn” and “Werona” on Blue Vale Road with the intention of determining the $L_{Aeq(1\text{ hour})}$ noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on “Brooklyn” and simultaneous noise measurements were made at the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A), $L_{eq(1\text{ hour})}$ during the day and 55 dB(A), $L_{eq(1\text{ hour})}$ during the night at these locations. For the purposes of traffic noise assessment the *Environmental Criteria for Road Traffic Noise* (ECRTN) defines day as 7am – 10pm and night as 10pm – 7am. On Sundays and public holidays the daytime transition changes to 8am.

The noise measurements were made adjacent to the front (eastern) facade of Residence 1 at “Brooklyn” between 7:50 am and 8:50 am and at Residence 2 at “Brooklyn” between 8:30 am and 9:30 am and at “Werona” between 7:25 am and 8:25 am on Wednesday September 14 with third-octave band Bruel & Kjaer Observer sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

Over the course of the measurement period at “Brooklyn” there were 37 coal truck movements related to TCM and RCM. Other noise sources observed throughout the monitoring period included a contribution from birds but this did not significantly influence the total measured noise level.

A breakdown of the heavy vehicle movements for “Brooklyn” is summarised in **Table 1**.

Table 1 Coal Truck pass bys - "Brooklyn", Blue Vale Road 13/09/11	
Time (am)	Vehicle direction of travel
7:51	Laden coal truck to CPP
7:53	Empty coal truck to mine
7:53	Laden coal truck to CPP
7:54	Laden coal truck to CPP
8:00	Laden coal truck to CPP
8:06	Empty coal truck to mine
8:07	Laden coal truck to CPP
8:08	Empty coal truck to mine
8:08	Empty coal truck to mine
8:08	Empty coal truck to mine
8:12	Laden coal truck to CPP
8:13	Laden coal truck to CPP
8:15	Laden coal truck to CPP
8:15	Empty coal truck to mine
8:19	Laden coal truck to CPP
8:21	Empty coal truck to mine
8:23	Laden coal truck to CPP
8:24	Laden coal truck to CPP
8:25	Empty coal truck to mine
8:26	Empty coal truck to mine
8:30	Laden coal truck to CPP
8:32	Laden coal truck to CPP
8:36	Empty coal truck to mine
8:36	Laden coal truck to CPP
8:36	Laden coal truck to CPP
8:39	Laden coal truck to CPP
8:39	Empty coal truck to mine
8:40	Laden coal truck to CPP
8:41	Laden coal truck to CPP
8:43	Laden coal truck to CPP
8:44	Laden coal truck to CPP
8:44	Empty coal truck to mine
8:45	Empty coal truck to mine
8:46	Empty coal truck to mine
8:47	Laden coal truck to CPP
8:47	Laden coal truck to CPP
8:49	Laden coal truck to CPP
8:50	Empty coal truck to mine

The total measured noise level at Residence 1 at "Brooklyn" was 54 dB(A) L_{eq} (1 hour) and the calculated contribution from mine-related vehicles was **54 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

The calculated contribution from mine-related vehicles at Residence 2 was **49 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

Over the course of the measurement period at “Werona” there were 34 coal truck movements related to TCM and RCM. A breakdown of the heavy vehicle movements for “Werona” is summarised in **Table 2**.

Table 2 Coal Truck pass bys - “Werona”, Blue Vale Road 13/09/11	
Time (am)	Vehicle direction of travel
7:25	Empty coal truck to mine
7:25	Empty coal truck to mine
7:26	Empty coal truck to mine
7:27	Empty coal truck to mine
7:28	Laden coal truck to CPP
7:28	Laden coal truck to CPP
7:30	Empty coal truck to mine
7:31	Empty coal truck to mine
7:31	Laden coal truck to CPP
7:36	Laden coal truck to CPP
7:40	Laden coal truck to CPP
7:43	Empty coal truck to mine
7:47	Laden coal truck to CPP
7:47	Laden coal truck to CPP
7:49	Empty coal truck to mine
7:50	Laden coal truck to CPP
7:50	Laden coal truck to CPP
7:55	Laden coal truck to CPP
8:02	Empty coal truck to mine
8:03	Laden coal truck to CPP
8:03	Empty coal truck to mine
8:04	Empty coal truck to mine
8:04	Empty coal truck to mine
8:08	Laden coal truck to CPP
8:09	Laden coal truck to CPP
8:11	Laden coal truck to CPP
8:11	Empty coal truck to mine
8:15	Laden coal truck to CPP
8:17	Empty coal truck to mine
8:19	Laden coal truck to CPP
8:20	Laden coal truck to CPP
8:20	Empty coal truck to mine
8:21	Empty coal truck to mine
8:25	Laden coal truck to CPP

The total measured contribution from mine-related vehicles at “Werona” was **50 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Author:



Ross Hodge
Acoustical Consultant

Review:



Neil Pennington
Acoustical Consultant



7 May 2012

Ref: 06259/4362

Mr. Danny Young
Whitehaven Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, APRIL 2012

This letter report presents the results of a road noise measurements conducted for the Tarrawonga Coal Mine (TCM) and Rocglen Coal Mine (RCM). The measurements were conducted at “Brooklyn” and “Werona” on Blue Vale Road with the intention of determining the $L_{Aeq(1\text{ hour})}$ noise contribution from mine-related vehicles, particularly coal haul trucks. There are two separate residences on “Brooklyn” and noise measurements were made at, or near, the front of both residences. Residence 1 is closest to Blue Vale Road (approximately 90m) whilst Residence 2 is approximately 480m from the road.

The approvals granted for TCM and RCM state that the cumulative noise level from traffic generated by the two mines must not exceed 60 dB(A), $L_{Aeq(1\text{ hour})}$ during the day and 55 dB(A), $L_{Aeq(1\text{ hour})}$ during the night at these locations. For the purposes of traffic noise assessment the *Environmental Criteria for Road Traffic Noise* (ECRTN) defines day as 7am – 10pm and night as 10pm – 7am. On Sundays and public holidays the daytime transition changes to 8am.

The noise measurements were made adjacent to the front (eastern) facade of Residence 1 at “Brooklyn” between 11:14 am and 12:14 am and at Residence 2 at “Brooklyn” between 12:21 pm and 1:21 pm and at “Werona” between 1:35 pm and 2:35 pm on Friday, April 27 with third-octave band Bruel & Kjaer Observer sound level meters (IEC Type 1). The sound level meters were placed on tripods and recorded continuously at 1-second statistical intervals while notes on passing vehicles were written down.

Over the course of the measurement period at Residence 1 at “Brooklyn” there were 38 coal truck movements related to TCM and RCM. Other noise sources observed throughout the monitoring period included a contribution from birds, planes and other traffic on Blue Vale Road. All of this extraneous noise was removed during the analysis process.

A breakdown of the heavy vehicle movements for Residence 1 at “Brooklyn” is summarised in **Table 1**.

Table 1 Coal Truck pass bys - "Brooklyn", (Residence 1) - Blue Vale Road 27/04/12	
Time	Vehicle direction of travel
11:14 am	Empty coal truck to mine
11:15	Empty coal truck to mine
11:15	Laden coal truck from mine
11:16	Empty coal truck to mine
11:16	Laden coal truck from mine
11:16	Laden coal truck from mine
11:24	Laden coal truck from mine
11:28	Empty coal truck to mine
11:29	Empty coal truck to mine
11:30	Laden coal truck from mine
11:30	Empty coal truck to mine
11:31	Laden coal truck from mine
11:32	Empty coal truck to mine
11:33	Laden coal truck from mine
11:36	Laden coal truck from mine
11:38	Laden coal truck from mine
11:39	Laden coal truck from mine
11:40	Laden coal truck from mine
11:43	Laden coal truck from mine
11:44	Empty coal truck to mine
11:44	Empty coal truck to mine
11:48	Laden coal truck from mine
11:50	Empty coal truck to mine
11:51	Empty coal truck to mine
11:51	Laden coal truck from mine
11:52	Empty coal truck to mine
11:55	Empty coal truck to mine
12:00 pm	Laden coal truck from mine
12:01	Empty coal truck to mine
12:01	Laden coal truck from mine
12:03	Laden coal truck from mine
12:04	Empty coal truck to mine
12:05	Empty coal truck to mine
12:05	Laden coal truck from mine
12:07	Laden coal truck from mine
12:09	Laden coal truck from mine
12:11	Laden coal truck from mine
12:14	Empty coal truck to mine

The calculated contribution from mine-related vehicles to the overall noise level at Residence 1 at "Brooklyn" was **52 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

Over the course of the measurement period at Residence 2 at "Brooklyn" there were 43 coal truck movements related to TCM and RCM. Other noise sources observed throughout the monitoring period included a contribution from cattle, birds, planes and other traffic on Blue Vale Road. All of this extraneous noise was removed during the analysis process.

A breakdown of the heavy vehicle movements for Residence 2 at "Brooklyn" is summarised in **Table 2**.

Table 2 Coal Truck pass bys - "Brooklyn", (Residence 2) - Blue Vale Road 27/04/12	
Time	Vehicle direction of travel
12:22 pm	Empty coal truck to mine
12:22	Empty coal truck to mine
12:22	Laden coal truck from mine
12:23	Laden coal truck from mine
12:25	Empty coal truck to mine
12:25	Laden coal truck from mine
12:27	Laden coal truck from mine
12:29	Laden coal truck from mine
12:34	Empty coal truck to mine
12:36	Empty coal truck to mine
12:38	Laden coal truck from mine
12:38	Empty coal truck to mine
12:40	Empty coal truck to mine
12:40	Empty coal truck to mine
12:41	Empty coal truck to mine
12:42	Empty coal truck to mine
12:43	Laden coal truck from mine
12:48	Empty coal truck to mine
12:51	Laden coal truck from mine
12:52	Empty coal truck to mine
12:52	Empty coal truck to mine
12:55	Laden coal truck from mine
12:56	Laden coal truck from mine
12:57	Laden coal truck from mine
12:58	Laden coal truck from mine
12:59	Laden coal truck from mine
1:00	Empty coal truck to mine
1:00	Empty coal truck to mine
1:03	Laden coal truck from mine
1:05	Empty coal truck to mine
1:06	Laden coal truck from mine
1:07	Empty coal truck to mine
1:08	Empty coal truck to mine
1:08	Laden coal truck from mine
1:09	Empty coal truck to mine
1:10	Laden coal truck from mine
1:14	Empty coal truck to mine
1:15	Laden coal truck from mine
1:15	Empty coal truck to mine
1:17	Laden coal truck from mine
1:20	Empty coal truck to mine
1:20	Laden coal truck from mine

The calculated contribution from mine-related vehicles at Residence 2 was **42 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

Over the course of the measurement period at "Werona" there were 43 coal truck movements related to TCM and RCM. A breakdown of the heavy vehicle movements for "Werona" is summarised in **Table 3**.

Table 3 Coal Truck pass bys - "Werona", Blue Vale Road 27/04/12	
Time	Vehicle direction of travel
1:35 pm	Empty coal truck to mine
1:36	Empty coal truck to mine
1:37	Laden coal truck to CPP
1:40	Empty coal truck to mine
1:40	Laden coal truck to CPP
1:41	Laden coal truck to CPP
1:42	Laden coal truck to CPP
1:42	Empty coal truck to mine
1:46	Laden coal truck to CPP
1:47	Empty coal truck to mine
1:49	Empty coal truck to mine
1:56	Laden coal truck to CPP
1:57	Empty coal truck to mine
1:57	Laden coal truck to CPP
1:58	Laden coal truck to CPP
1:59	Laden coal truck to CPP
1:59	Laden coal truck to CPP
2:00	Laden coal truck to CPP
2:03	Empty coal truck to mine
2:03	Empty coal truck to mine
2:05	Empty coal truck to mine
2:06	Laden coal truck to CPP
2:07	Laden coal truck to CPP
2:08	Empty coal truck to mine
2:08	Laden coal truck to CPP
2:14	Laden coal truck to CPP
2:17	Laden coal truck to CPP
2:20	Laden coal truck to CPP
2:20	Empty coal truck to mine
2:21	Laden coal truck to CPP
2:22	Empty coal truck to mine
2:22	Laden coal truck to CPP
2:24	Empty coal truck to mine
2:25	Empty coal truck to mine
2:26	Empty coal truck to mine
2:26	Empty coal truck to mine
2:27	Empty coal truck to mine
2:28	Empty coal truck to mine
2:29	Laden coal truck to CPP
2:30	Laden coal truck to CPP
2:31	Empty coal truck to mine
2:33	Laden coal truck to CPP
2:35	Laden coal truck to CPP
2:36	Empty coal truck to mine

The total measured contribution from mine-related vehicles at "Werona" was **43 dB(A), L_{eq} (1 hour)**. This is below the daytime criterion of **60 dB(A) L_{eq} (1 hour)**.

We trust this report fulfils your requirements at this time, however, should you require additional information or assistance please contact the undersigned on 4954 2276.

Yours faithfully,

SPECTRUM ACOUSTICS PTY LIMITED

Author:



Ross Hodge
Acoustical Consultant

Review:



Neil Pennington
Acoustical Consultant

TARRAWONGA COAL MINE

VALIDATION OF THE ACCURACY OF THE TENTH PERCENTILE NOISE MODELLING

REPORT NO. 09341-C
VERSION B

OCTOBER 2012

PREPARED FOR

WHITEHAVEN COAL LIMITED
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DOCUMENT CONTROL

Version	Status	Date	Prepared By	Reviewed By
A	Final	8 September 2012	Glenn Krogel	John Wassermann
B	Final	6 October 2012	John Wassermann	-

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We are committed to and have implemented AS/NZS ISO 9001:2008 "Quality Management Systems – Requirements". This management system has been externally certified and Licence No. QEC 13457 has been issued.



AAAC

This firm is a member firm of the Association of Australian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.



Celebrating 50 Years in 2012

Wilkinson Murray is an independent firm established 50 years ago originally as Carr & Wilkinson. In 1976 Barry Murray joined founding partner Roger Wilkinson and the firm adopted the name which remains today. From a successful operation in Australia, Wilkinson Murray expanded its reach into Asia by opening a Hong Kong office early in 2006. 2010 saw the introduction of our Queensland office and 2011 the introduction of our Orange office to service a growing client base in these regions. From these offices, Wilkinson Murray services the entire Asia-Pacific region.



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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

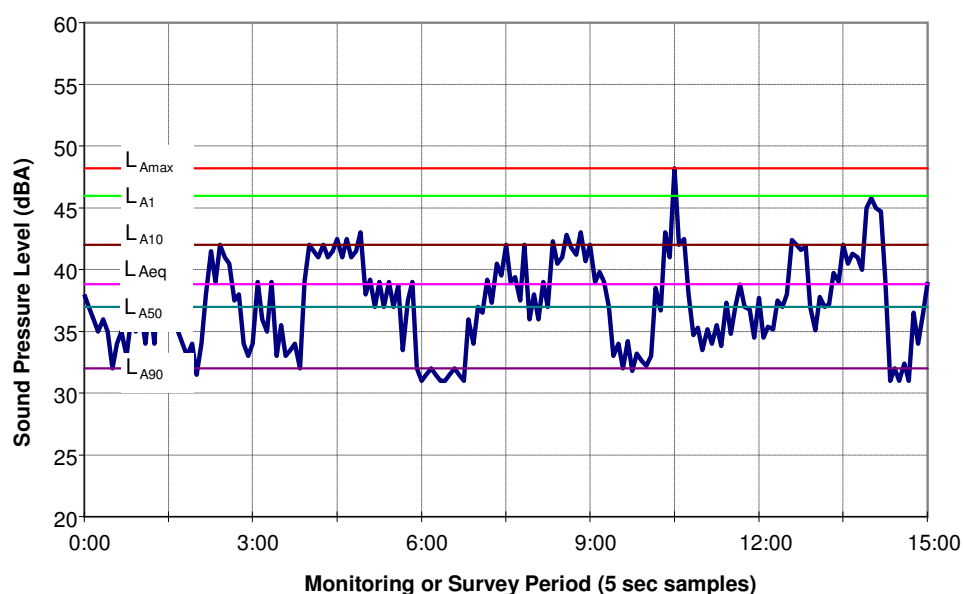
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

The Tarrawonga Coal Mine is located within the Narrabri Shire, approximately 42 km north-northwest of Gunnedah, and is 15 km north-east of Boggabri (**Figure 1-1**).

Tarrawonga Coal Mine (TCM) is owned by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Mining Pty Ltd Limited (WCMPL) (70%) and Idemitsu Boggabri Coal Ltd (IBC) (30%). WCMPL is a subsidiary company of Whitehaven Coal Limited (WCL), a publicly listed company which has several coal mining interests in the Gunnedah region of NSW. The mine is operated by WCMPL.

The mine involves the following activities.

- Open cut mining over an area of approximately 160ha ("the open cut area").
- Programmed placement of overburden and interburden external to and within the open cut area, commencing with the northern emplacement using the initial overburden/interburden produced and ultimately transferring to placement in pit and within the southern emplacement.
- On-site size reduction and screening of the ROM coal within the coal processing area to the west of the open cut area.
- Progressive shaping and rehabilitation of all areas of disturbance.
- A sealed transport route between the mine site and the Whitehaven Coal Handling and Preparation Plant (CHPP), via the Canyon Coal Mine.
- Transportation of coal by road to the Whitehaven CHPP at a rate of up to 2 000 000tpa. Coarse rejects from the coal processing may be back-loaded to the open cut mine void, if required.
- A range of services, structures and facilities including site office, ablution facilities and workshop.

Wilkinson Murray has been commissioned by WCMPL to analyse noise data obtained from unattended TCM noise surveys conducted at Blair Athol (1d) and Sylvania (60b), using the mines unattended noise monitoring system (**Figure 1-2**), and compare the monitored data with previous noise predictions (10th percentile noise predictions) presented in the Tarrawonga Coal Mine Modification Environmental Assessment (Resource Strategies, 2010).

The aim of this study is to gain an appreciation of the accuracy of the 10th percentile noise predictions used in the Tarrawonga Coal Mine Modification Environmental Assessment as required in the Tarrawonga Coal Mine Modification (DA 88-4-2005 MOD 1).

Figure 1-1 Regional Location

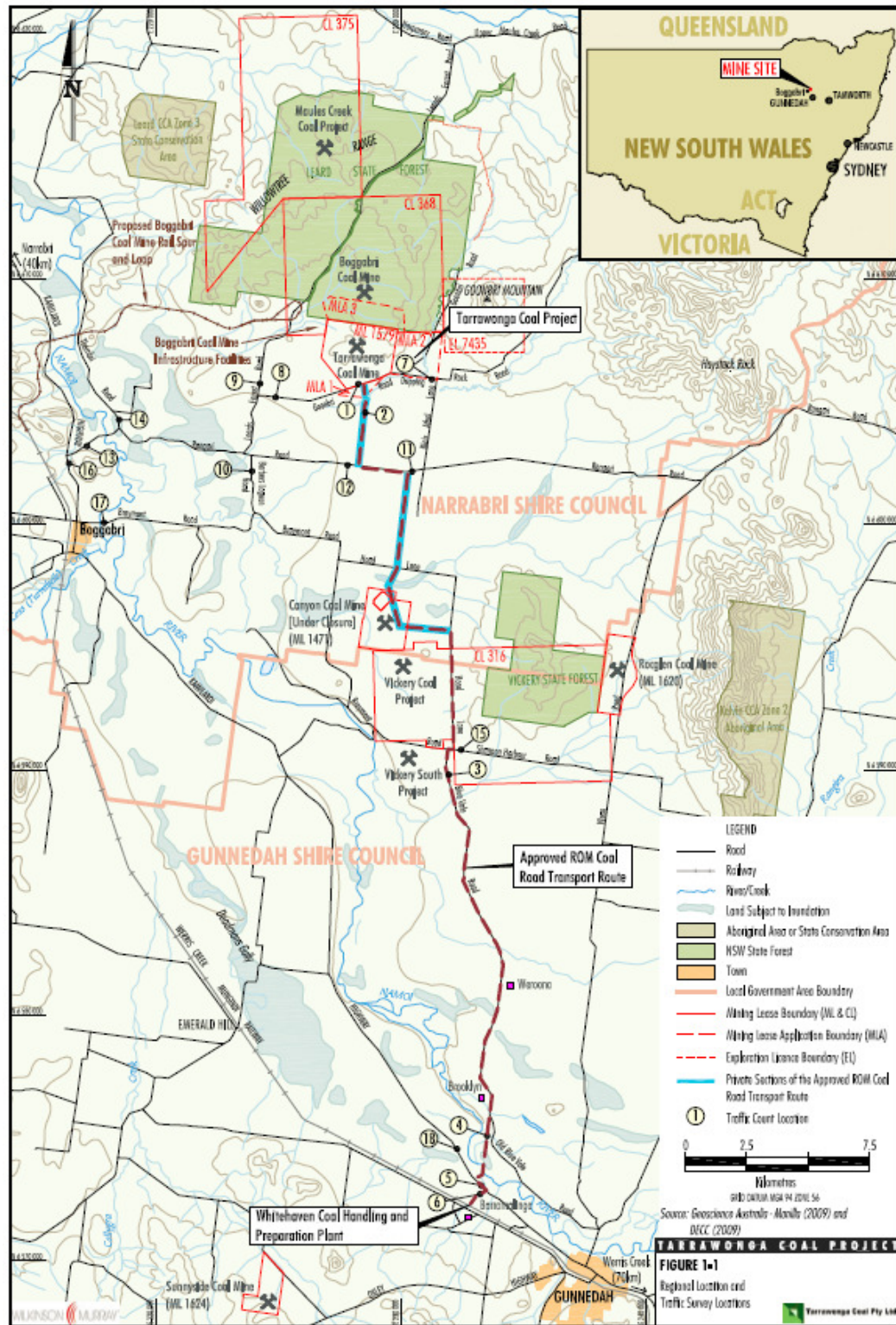
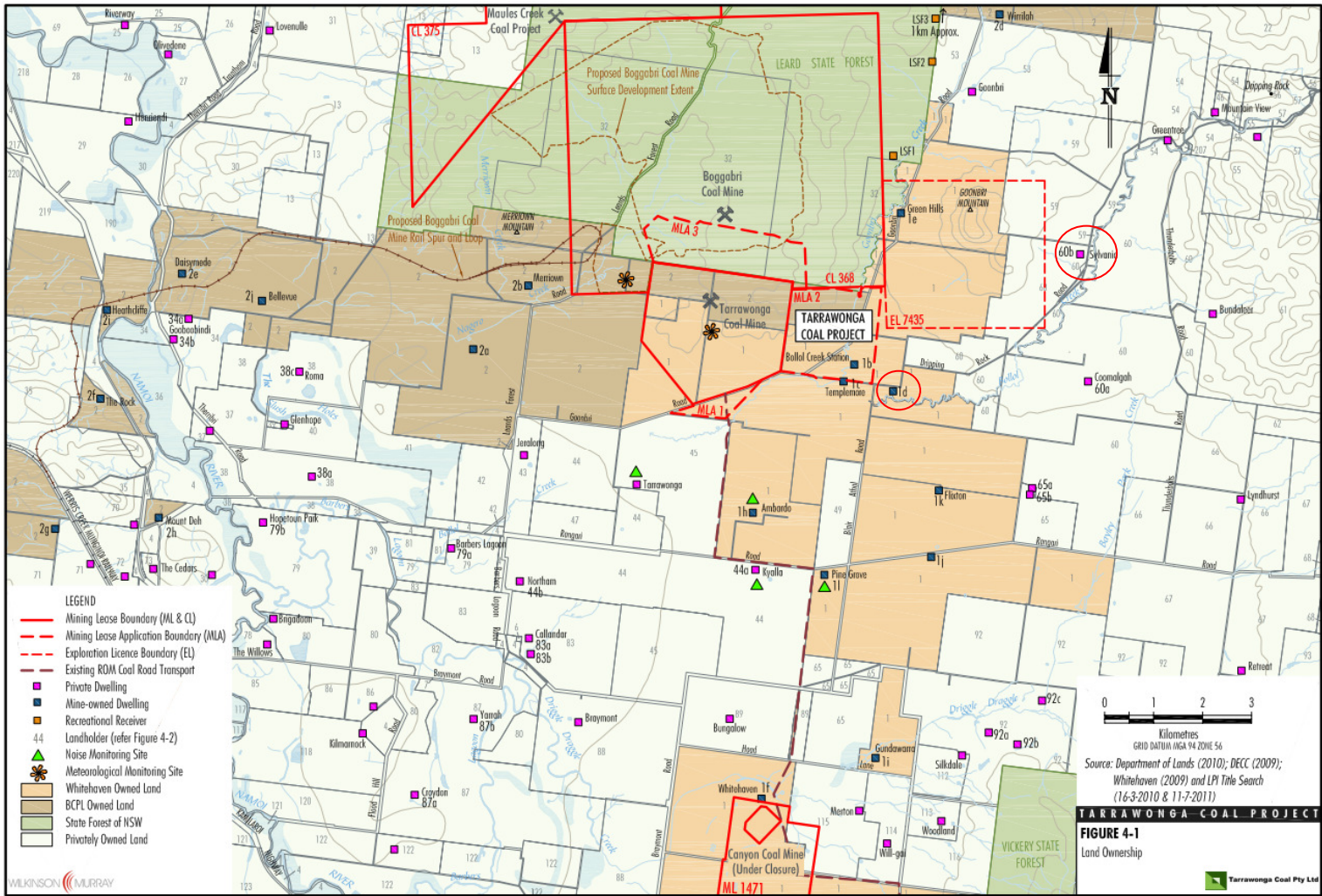


Figure 1-2 Monitoring Location



2 TENTH PERCENTILE METHODOLOGY

The INP generally directs the use of a single set of adverse meteorological data in the assessment of noise impacts (EPA, 2000). However, for noise modelling for the Tarrawonga Coal Mine Modification, Noise and Blasting Assessment April 2010 (Wilkinson Murray, 2010), Wilkinson Murray adopted a more rigorous approach where noise levels at nearby receivers were calculated under a varied set of existing meteorological conditions, using meteorological data obtained from the locality.

Data from the TCM meteorological station for 2007 were used for the proposed Modification. Measured statistical occurrences of these meteorological conditions were then applied to the noise results, and a 10th percentile exceedance noise level calculated (i.e. the level that is exceeded 10% of the time).

This alternative assessment procedure involves significantly greater computational complexity than the use of a single set of meteorological conditions. However, it is believed it provides a more rigorous method of assessing noise exposure, and one that is more easily understood by the community. The approach of using the 10th percentile calculated noise level as a measure of noise impacts had been considered acceptable by the EPA for other similar mining project assessments.

Recorded meteorological data from the TCM station for 2007 was used in the noise model. The data for wind direction and wind speed are classified into eight directional intervals and four speed intervals. Data on the standard deviation of wind direction (sigma-theta) is used to estimate temperature inversion strength using procedures outlined in the INP (EPA, 2000).

The above procedure considers all meteorological conditions at all receivers, and the conditions which determine the 10th percentile value would differ between receivers. For receivers to the south of the TCM, worst-case night-time meteorological conditions include temperature inversions of up to 3 degrees Celsius (°C)/100 m along with winds from the north of a strength of up to 3 m/s. Additionally and in accordance with the EPA's (2006) Application notes - NSW Industrial Noise Policy, consideration of potential noise levels at sensitive receivers under calm conditions was also undertaken.

The predicted worst-case $L_{Aeq,15min}$ operational noise level for Year 2012 operations at the two receivers where noise monitoring was conducted is presented in **Table 2-1** (Wilkinson Murray, 2010). Results are presented for both calm meteorological conditions and $L_{Aeq,15min}$ 10th percentile exceedance noise levels.

Figure 2-1 Predicted worst-case $L_{Aeq,15min}$ operational noise level for Year 2012 operations (Wilkinson Murray, 2010)

Receiver #	Receiver Name	Predicted L_{Aeq} , 10 th percentile, noise level (dBA)			Predicted calm $L_{Aeq,15min}$ Noise Level (dBA)
		Day	Evening	Night	
		7am to 6pm	6pm to 10pm	10pm to 7am	
1d	Blair Athol	42	41	41	37
60b	Sylvania	32	31	30	21

3 CONSENT NOISE CONDITIONS

The Project Development Consent for Tarrawonga Coal Mine Modification (DA 88-4-2005 MOD 1) has specific noise conditions which are presented below:

Noise Criteria

- Except for the land referred to in Table 1, the Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	<i>L_{Aeq} (15 min)</i>	<i>L_{Aeq} (15 min)</i>	<i>L_{Aeq} (15 min)</i>	<i>L_{A1} (1 min)</i>
15- Kyalla	37	37	37	45
All privately-owned land	35	35	35	45

Notes:

- To identify the locations referred to in Table 2, see the figure in Appendix 3; and
- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Noise Acquisition Criteria

- If the noise generated by the development exceeds the criteria in Table 3 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Applicant shall acquire the land in accordance with the procedures in Conditions 6 - 7 of Schedule 4.

Table 3: Land acquisition criteria dB(A) *L_{Aeq} (15min)*

Location	Day	Evening	Night
All privately-owned land	40	40	40

Notes:

- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.
- For this condition to apply, the exceedances of the criteria must be systemic.

Additionally the Development Consent for Tarrawonga Coal Mine Modification (DA 88-4-2005 MOD 1) required in Condition 8(c) that the Noise Management Plan include a noise monitoring program that:

- includes a program for validating the accuracy of the tenth percentile methodology used to predict the potential noise impacts of the development.

The existing TCM Noise Management Plan stated:

"In accordance with the requirements of the consent, TCM will seek validation of the tenth percentile methodology used in the noise impact assessment for the Tarrawonga modification. This will be completed on an annual basis by the provision of a report from an appropriately qualified acoustical consultant, utilising the data obtained over a 12 month period from the monitoring program and providing a comparative assessment against the modelled predictions from the tenth percentile methodology. The outcomes of this review will be reported in the AEMR."

Therefore as required by the Consent, noise data obtained from the unattended noise surveys conducted by TCM at Blair Athol (1d) and Sylvania (60b) were analysed and compared with previous noise predictions (10th percentile noise predictions) presented in the Tarrawonga Coal Mine Modification Environmental Assessment (Resource Strategies, 2010).

4 UNATTENDED NOISE MONITORING DATA

4.1 Equipment

Tarrawonga Coal Mine has a mobile Sentinex continuous noise monitor. The monitor was located at the following locations and at the following times:

- Blair Athol (1d) - 19/11/2010 to 24/11/2010; and
- Sylvania (60b) – Spring 01/09/2011 to 24/11/2011 and Summer 02/01/2012 to 13/02/2012.

Sentinex noise monitoring units are self contained, free standing noise recording/monitoring units that can provide continuous monitoring of environmental noise levels. Sentinex noise monitoring units record 15 min statistical data and 1/3 octave data continuously each day. In order to coincide with the 2011/12 AEMR period, only data measured between 1 May 2011 to 30 April 2012 were considered in this analysis.

4.2 Calculation Procedure

Noise levels experienced by a receiver at relatively large distances (at least several hundred metres) from a source can vary considerably under different meteorological conditions, particularly in the evening and at night. Prevailing wind and air temperature gradients will change over the course of the night time period and hence noise levels at receivers will change, even when the noise source level is constant. Therefore a statistical approach is adopted and a 10th percentile exceedance noise level is calculated from all the measured $L_{Aeq,15minute}$ levels attributable to the source.

Studies have indicated that mine noise at distances greater than approximately 1000 metres are dominated by lower frequency noise and as such higher frequency noise which would mainly come from insect noise, etc can be eliminated. The $L_{Aeq,15minute}$ levels attributable to the source has been taken to be the A-weighted 10 percentile levels for the following frequency ranges:

- 12.5 - 200Hz;
- 12.5 - 630Hz; and
- 12.5 - 1000Hz.

The A-weighted 630Hz low pass band filter noise levels is typically used to evaluate mining noise. The other low pass band filter noise levels have been plotted to track trends.

This approach acknowledges that there can be exceedances of a noise limit due to extreme meteorological events that can not be designed for.

10% exceedance noise levels from the measured noise levels were calculated for the night time period only as this would reduce the likelihood of extraneous noise influencing the measurements.

To determine whether meteorological conditions were suitable for noise measurement, meteorological data was sourced from the on-site meteorological station located within the Tarrawonga Coal Mine Site.

The noise data was processed to exclude the following meteorological conditions:

- Rain periods; and
- wind speed of greater than 5 metres per second (m/s).

A comprehensive summary of the night time 10 percentile samples analysed for the monitoring sites are presented in Appendix A and B.

Table 4-1 presents a summary of the night time 10 percentile noise levels.

Table 4-1 Measured 10 percentile noise levels.

Location	Measured L_{AeqT} 10 percentile, noise level 12.5 to 630Hz	
	Monitoring period	Night
		10pm to 7am
Blair Athol (1d)	19/11/2010 to 24/11/2010	31
	Spring - 01/09/2011 to 24/11/2011	31
Sylvania (60b)	Summer 02/01/2012 to 13/02/2012	32

5 VALIDATION OF THE TENTH PERCENTILE METHODOLOGY

Table 5-1 presents a comparison of night time unattended noise monitoring at Blair Athol (1d) and Sylvania (60b) with previous 10th percentile noise predictions presented in the Tarrawonga Coal Mine Modification Environmental Assessment (Resource Strategies, 2010).

Table 5-1 Comparison of night time measured and predicted 10th percentile noise levels.

Location	Monitoring period	Measured L _{Aeq} , 10 percentile, noise level 12.5 to 630Hz	Predicted L _{Aeq} , 10 percentile, noise level (dBA)	Predicted calm L _{Aeq} ,15min Noise Level (dBA)
		Night 10pm to 7am	Night 10pm to 7am	Night 10pm to 7am
Blair Athol (1d)	19/11/2010 to 24/11/2010	31	41	37
Sylvania (60b)	Spring - 01/09/2011 to 24/11/2011	31	30	21
	Summer 02/01/2012 to 13/02/2012	32		

At Blair Athol the measured night time 10th percentile noise levels indicate an estimated overall noise level from mining of 31 dBA. The predicted 10th percentile noise level was reported to be 41 dBA. The limited noise monitoring data at Blair Athol (6 days) indicates that the predicted 10th percentile noise levels are higher than the measured noise levels.

The Sylvania measured 10 percentile noise levels indicate an estimated overall noise level from mining in Spring at night of 31 dBA and 32 at night in summer. The predicted 10th percentile noise level at Sylvania was 30dBA. The noise monitoring data at Sylvania is potentially higher than the predicted 10th percentile noise by 1 dB in spring and 2 dB in summer. Given the calculation procedure undertaken (Section 4.2), the measured 10th percentile is an estimate only (ie the noise levels may incorporate other extraneous sources). Audio files may assist to more accurately quantify the amount of mine noise.

6 CONCLUSION

Wilkinson Murray has conducted an analysis of noise data obtained from unattended TCM noise surveys conducted at Blair Athol (1d) and Sylvania (60b) and compared the monitored data with previous noise 10th percentile noise predictions presented in the Tarrawonga Coal Mine Modification Environmental Assessment (Resource Strategies, 2010).

The results of the comparisons were:

- The noise monitoring data at Blair Athol is lower than the predicted 10th percentile noise by 10dB; and
- The noise monitoring data at Sylvania is higher than the predicted 10th percentile noise by 1 dB in spring and 2 dB in summer.

With regard to Blair Athol, there is not enough monitoring data available for a statistically robust conclusion with regard to the accuracy of the 10th noise level prediction. For Blair Athol the predicted 10th percentile measured noise levels was based on 6 days worth of data. Typically this type of assessment should be based on a season's worth of data.

For Sylvania the comparison between the predicted 10th percentile noise levels and the measured 10th percentile noise levels indicate a good accuracy. That is, the predicted 10th percentile noise presented in the Tarrawonga Coal Mine Modification Environmental Assessment (Resource Strategies, 2010) shows a good indication of noise impact for the mine.

As the results for Blair Athol are inconclusive it is recommended that further noise monitoring be conducted and that these results be compared with the predicted 10th percentile noise levels in the environmental assessment. Typically this type of assessment should be based on a season's worth of data. In addition, audio files may assist with the identification of mine noise over other extraneous noise sources.

7 REFERENCES

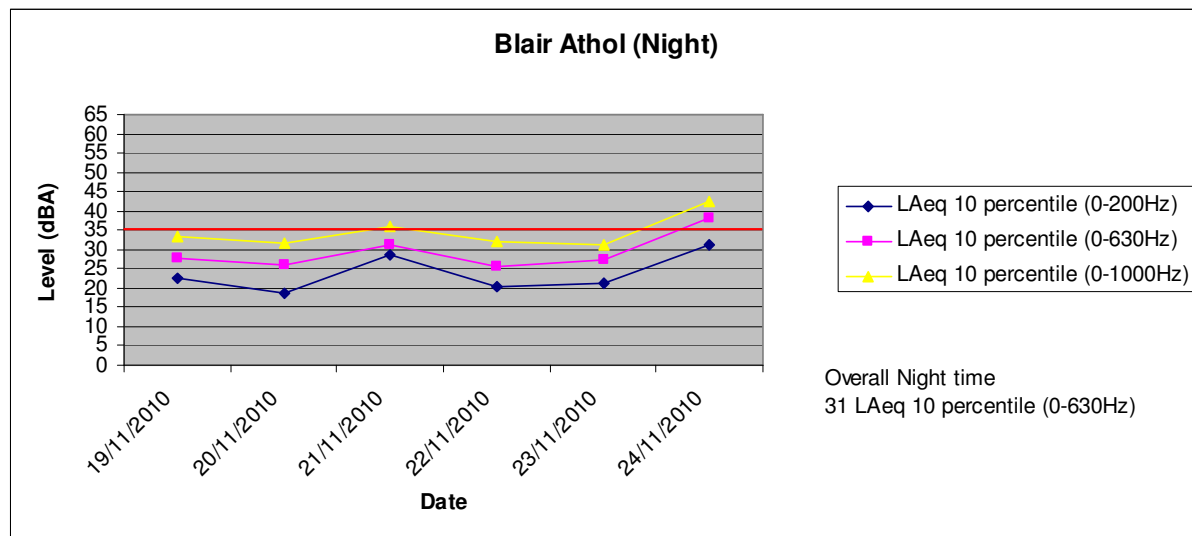
Environment Protection Authority (2000) NSW Industrial Noise Policy.

Wilkinson Murray (2010) Tarrawonga Coal Mine Modification, Noise and Blasting Assessment.

Resource Strategies (2010) Tarrawonga Coal Mine Modification Environmental Assessment.

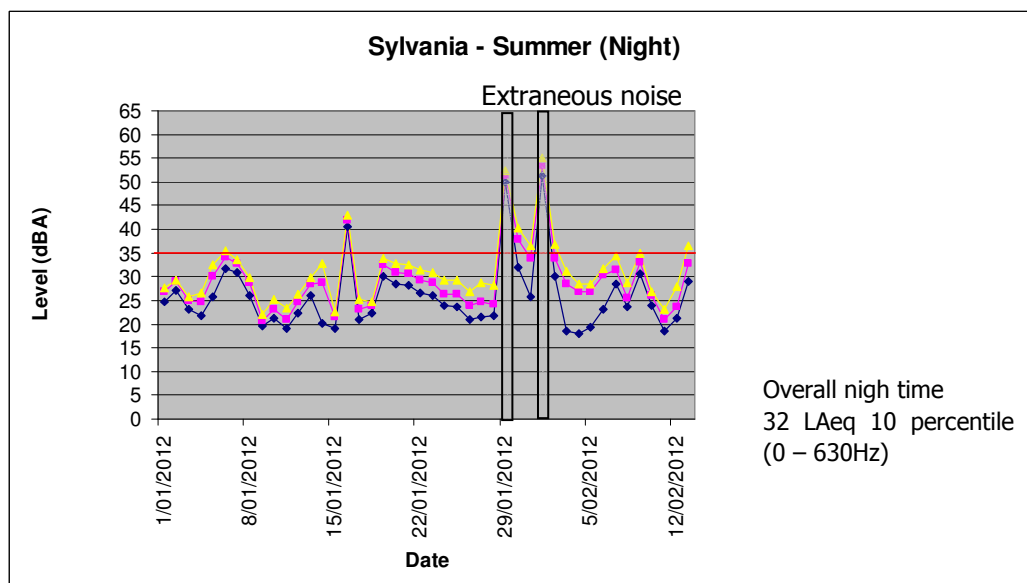
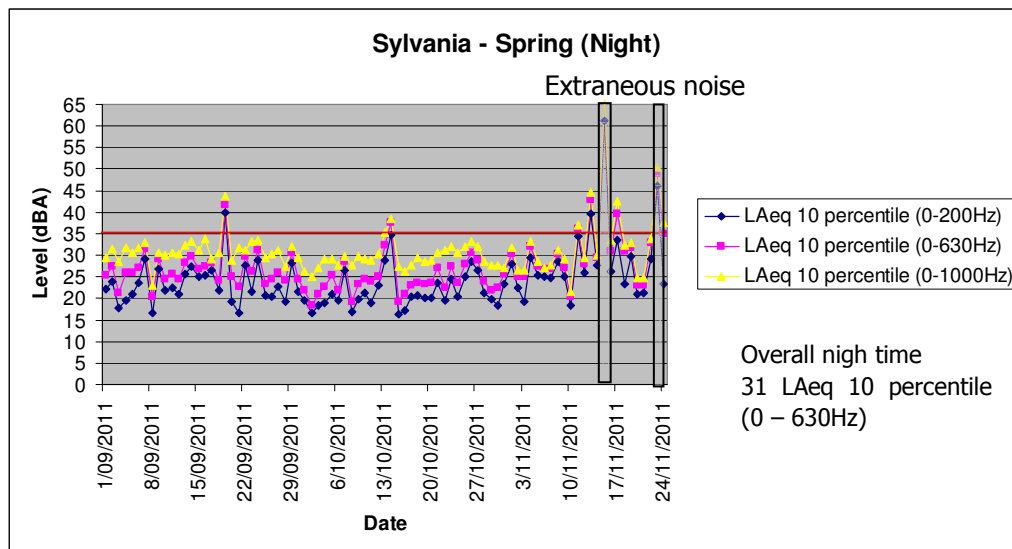
APPENDIX A

Noise Monitoring Blair Athol



APPENDIX B

Noise Monitoring Sylvania



Appendix 10

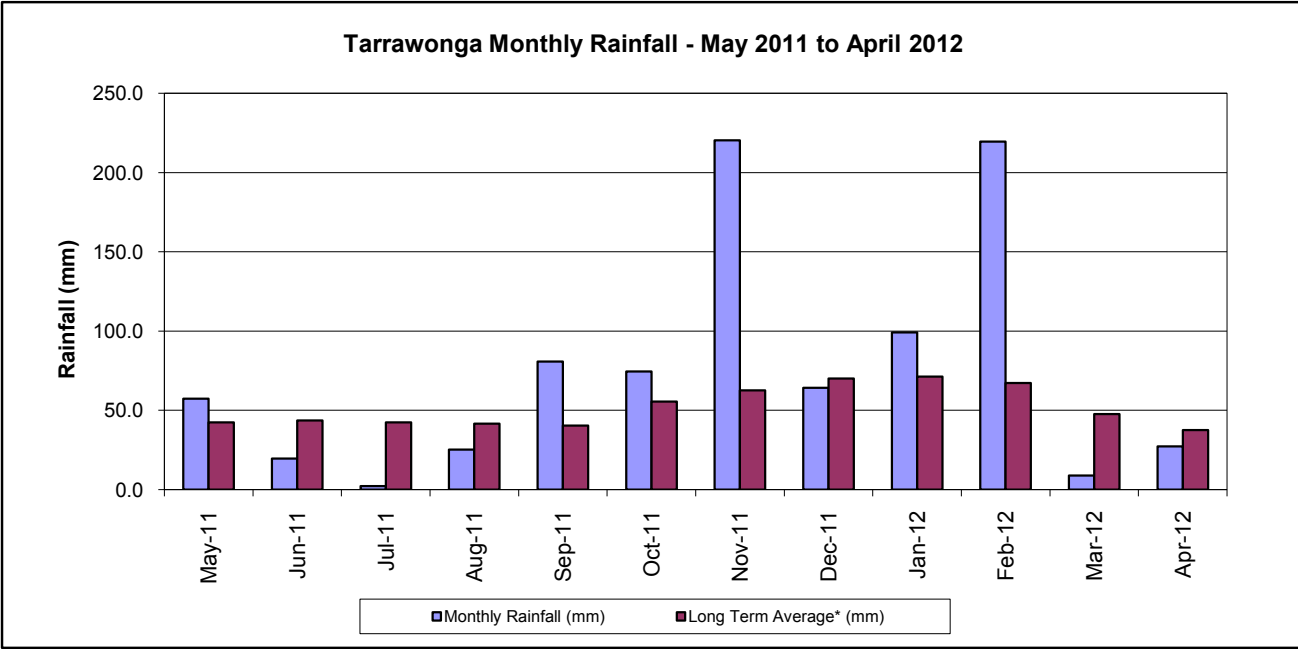
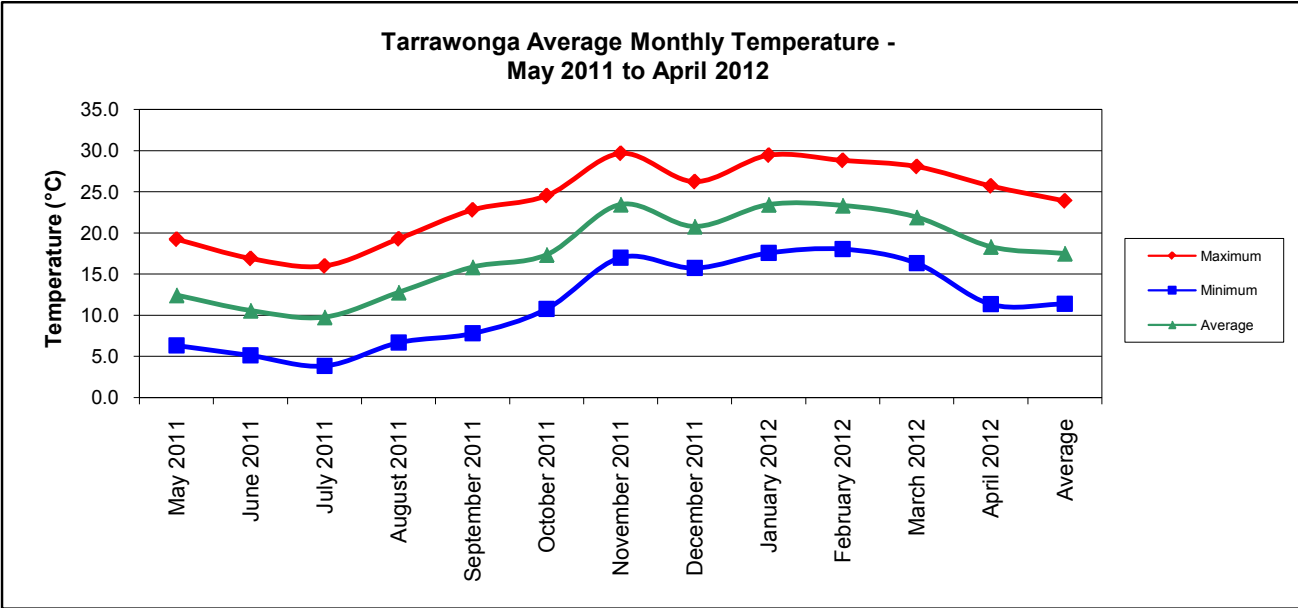
METEOROLOGICAL DATA

Tarrawonga Coal Mine Average Monthly Results

Month	Minimum Air Temp (°C)	Average Air Temp (°C)	Maximum Air Temp (°C)	Minimum Relative Humidity (%)	Average Relative Humidity(%)	Maximum Relative Humidity (%)	Minimum Wind Speed (m/s)	Average Wind Speed (m/s)	Maximum Wind Speed (m/s)
May 2011	6.3	12.5	19.3	42.0	64.2	83.5	0.0	1.1	3.7
June 2011	5.1	10.6	16.9	51.7	74.9	89.9	0.0	1.5	4.4
July 2011	3.9	9.8	16.0	46.1	67.9	86.4	0.0	1.2	3.6
August 2011	6.7	12.8	19.3	43.4	66.8	86.6	0.0	1.5	4.3
September 2011	7.8	15.9	22.8	32.8	54.0	77.5	0.0	1.8	4.7
October 2011	10.8	17.4	24.5	42.9	65.7	85.8	0.2	1.8	5.1
November 2011	17.0	23.5	29.7	32.4	46.9	60.8	0.0	0.8	3.2
December 2011	15.7	20.8	26.2	34.4	48.2	59.3	0.1	1.6	4.6
January 2012	17.6	23.5	29.5	32.0	47.9	59.4	0.0	1.8	5.0
February 2012	18.0	23.4	28.8	24.4	38.4	50.2	0.0	1.3	4.4
March 2012	16.3	21.9	28.1	31.8	44.5	54.5	0.1	1.4	4.5
April 2012	11.4	18.3	25.7	38.9	66.6	90.9	0.0	1.3	4.9
Average	11.4	17.5	23.9	37.7	57.2	73.7	0.0	1.4	4.4
Minimum	3.9	9.8	16.0	24.4	38.4	50.2	0.0	0.8	3.2
Maximum	18.0	23.5	29.7	51.7	74.9	90.9	0.2	1.8	5.1
Total									

Month	Monthly Rainfall (mm)	Long Term Average* (mm)	Cumulative Rainfall (mm)	Number of Rain Days (>1mm)
May 2011	57.4	42.5	57.4	5
June 2011	19.6	43.6	77	5
July 2011	2.2	42.4	79.2	0
August 2011	25.2	41.5	104.4	5
September 2011	80.8	40.3	185.2	4
October 2011	74.6	55.5	259.8	7
November 2011	220.4	62.6	480.2	11
December 2011	64.2	70.1	544.4	7
January 2012	99.2	71.3	643.6	12
February 2012	219.6	67.3	863.2	10
March 2012	8.8	47.7	872.0	2
April 2012	27.2	37.5	899.2	4
Total	899.2	622.3	899.2	72

* Long term average is from Gunnedah Pool (Station 055023) 1877 - 2012



Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/May/11	9.9	16.1	23.2	37	65	91	0.0	0.0	1.1	4.5
02/May/11	9.5	15.7	22.4	41	63	86	0.0	0.0	0.5	2.2
03/May/11	9.8	14.8	20.2	45	66	84	0.0	0.0	0.5	1.8
04/May/11	7.9	14.7	22.5	34	66	93	0.0	0.0	1.3	4.5
05/May/11	6.4	14.0	21.1	39	62	88	0.0	0.0	1.6	5.4
06/May/11	5.7	13.2	19.8	38	61	87	0.0	0.0	1.2	4.5
07/May/11	4.5	12.6	21.3	25	55	89	0.0	0.0	0.6	2.2
08/May/11	6.7	13.7	22.1	28	47	65	0.0	0.0	0.8	3.1
09/May/11	6.4	14.0	21.7	31	53	72	0.0	0.0	1.7	5.8
10/May/11	6	11.6	18.1	36	63	88	0.0	0.0	1.4	5.4
11/May/11	4.9	11.0	17.7	30	54	69	0.0	0.0	1.8	4
12/May/11	7.5	11.0	16.1	37	58	68	0.0	0.0	2.3	6.3
13/May/11	8.8	13.0	16.8	52	64	77	0.0	0.0	1.4	2.7
14/May/11	4.2	11.5	17.2	27	54	82	0.0	0.0	2.4	6.3
15/May/11	-0.4	8.3	17.9	23	53	84	0.0	0.0	1.1	3.6
16/May/11	-0.6	9.8	21.3	19	46	76	0.0	0.0	0.9	2.7
17/May/11	0.8	10.4	21.6	18	41	68	0.0	0.0	0.6	2.2
18/May/11	3.5	12.3	22.2	24	46	68	0.0	0.0	0.6	2.2
19/May/11	6.4	13.4	21.7	41	60	77	0.0	0.0	0.6	2.7
20/May/11	7.3	14.5	22.5	35	60	82	0.0	0.0	0.6	3.1
21/May/11	9	15.3	21.9	44	59	75	0.0	0.0	0.4	2.2
22/May/11	7.2	15.8	23.7	37	64	86	0.0	0.0	1.0	4
23/May/11	13.6	16.3	20.4	60	79	94	34.6	0.0	2.7	4.5
24/May/11	10.3	11.5	13.4	75	84	88	2.4	0.4	1.7	3.6
25/May/11	7.7	11.1	15.2	61	79	89	0.2	0.0	1.0	4.5
26/May/11	4	9.9	15.8	58	77	92	0.0	0.0	1.1	4.5
27/May/11	4.7	10.0	17.8	38	73	92	0.2	0.0	0.9	2.7
28/May/11	2.2	9.1	17.8	47	76	93	0.0	0.0	0.8	2.7
29/May/11	5.3	10.8	16.8	61	81	92	5.2	0.0	0.7	3.6
30/May/11	8.8	10.0	11.4	89	92	98	8.6	0.0	0.5	2.2
31/May/11	8.4	10.7	15.2	73	90	96	6.2	0.0	0.9	4
Average	6.3	12.5	19.3	42	64	84	X	0.0	1.1	3.7
Maximum	13.6	16.3	23.7	89	92	98	34.6	0.4	2.7	6.3
Minimum	-0.6	8.3	11.4	18	41	65	0.0	0.0	0.4	1.8
Total	X	X	X	X	X	X	57.4	X	X	X

Daily Summary

June 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Jun/11	6.8	12.9	18.2	66	81	95	0.2	0.0	3.8	9.4
02/Jun/11	8.8	13.9	19.6	55	77	91	0.0	0.0	1.7	5.4
03/Jun/11	5.8	11.6	18.9	49	79	94	0.2	0.0	0.8	2.2
04/Jun/11	5.4	12.3	20.4	49	76	93	0.0	0.0	1.2	3.1
05/Jun/11	7.7	13.5	20.7	46	72	92	0.0	0.0	0.9	4.0
06/Jun/11	6.2	11.1	17.1	45	72	91	0.0	0.0	0.7	2.7
07/Jun/11	3.6	9.2	16.9	45	73	92	0.2	0.0	0.8	3.6
08/Jun/11	1.6	8.8	14.8	36	60	76	0.0	0.0	1.5	4.5
09/Jun/11	1.1	6.0	13.3	42	68	82	0.0	0.0	1.1	3.6
10/Jun/11	3.7	8.2	14.6	49	71	84	0.0	0.0	1.1	2.7
11/Jun/11	2.6	8.9	15.8	60	80	91	1.0	0.0	1.9	6.3
12/Jun/11	9.6	11.6	13.9	77	86	91	3.0	0.0	2.2	6.3
13/Jun/11	9.9	12.1	15.2	65	82	91	0.8	0.0	3.7	7.6
14/Jun/11	9.7	11.9	13.5	81	86	94	3.6	0.0	3.2	7.2
15/Jun/11	8.4	12.4	15.0	79	86	92	7.6	0.0	3.4	6.7
16/Jun/11	7.1	11.5	17.7	51	80	94	0.2	0.0	1.1	5.4
17/Jun/11	5.8	11.5	17.1	42	66	91	0.2	0.0	1.6	4.9
18/Jun/11	5.4	10.2	15.7	47	65	80	0.0	0.0	1.8	5.8
19/Jun/11	5.1	10.0	16.6	47	72	90	0.0	0.0	0.8	3.1
20/Jun/11	3.1	9.2	16.0	50	75	91	0.0	0.0	1.0	2.2
21/Jun/11	3.9	11.5	18.7	40	69	91	2.0	0.0	2.6	5.8
22/Jun/11	2.8	7.1	13.2	51	80	95	0.2	0.0	1.3	3.6
23/Jun/11	3.3	8.8	15.2	56	75	89	0.0	0.0	1.0	3.1
24/Jun/11	0.3	7.9	17.1	52	81	94	0.2	0.0	0.5	1.8
25/Jun/11	0.5	11.6	19.4	44	70	94	0.0	0.0	0.4	2.2
26/Jun/11	1.9	7.0	19.5	47	82	93	0.2	0.0	0.2	1.8
27/Jun/11	4.4	9.1	17.9	45	79	92	0.0	0.0	0.5	2.7
28/Jun/11	6.1	13.3	19.7	45	65	82	0.0	0.0	1.7	4.5
29/Jun/11	8.4	12.9	18.2	46	68	81	0.0	0.0	1.8	4.9
30/Jun/11	4.6	11.4	17.6	44	69	92	0.0	0.0	1.5	4.5
Average	5.1	10.6	16.9	52	75	90		0.0	1.5	4.4
Maximum	9.9	13.9	20.7	81	86	95	7.6	0.0	3.8	9.4
Minimum	0.3	6.0	13.2	36	60	76	0.0	0.0	0.2	1.8
Total							19.6			

Daily Summary

July 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Jul/11	3.2	9.5	17.1	56	77	92	0.0	0.0	0.9	4.5
02/Jul/11	2.9	9.8	18.3	42	75	93	0.2	0.0	0.5	2.2
03/Jul/11	3.3	10.7	17.8	46	70	89	0.0	0.0	0.8	3.6
04/Jul/11	6.3	13.7	19.9	50	67	84	0.0	0.0	1.6	4.5
05/Jul/11	8.1	11.7	15.7	38	54	71	0.0	0.4	2.2	5.4
06/Jul/11	7.4	10.9	15.4	39	53	64	0.0	0.4	1.7	3.6
07/Jul/11	5.1	10.4	15.8	44	60	83	0.0	0.0	1.8	4
08/Jul/11	1.5	7.1	14.4	42	68	89	0.0	0.0	0.9	2.7
09/Jul/11	1.1	5.6	12.1	47	70	85	0.0	0.0	1.2	3.1
10/Jul/11	3.4	9.2	14.1	44	60	79	0.0	0.0	1.3	3.1
11/Jul/11	3.6	10.0	15.6	42	58	75	0.0	0.0	0.9	3.6
12/Jul/11	0.8	7.5	16.1	37	65	86	0.0	0.0	1.2	3.6
13/Jul/11	3.9	7.5	11.7	56	74	90	0.6	0.0	0.3	1.3
14/Jul/11	5.2	7.9	11.7	59	80	93	0.2	0.0	0.6	3.1
15/Jul/11	2.7	9.7	15.9	44	64	82	0.0	0.0	1.7	4.5
16/Jul/11	9.3	11.6	15.8	52	70	90	0.4	0.0	1.0	3.1
17/Jul/11	7.7	11.0	14.7	73	86	93	0.0	0.0	0.4	1.8
18/Jul/11	5.2	9.5	15	69	87	95	0.4	0.0	0.6	2.7
19/Jul/11	2.6	7.8	12.5	50	74	92	0.4	0.0	2.1	5.8
20/Jul/11	6.2	11.6	17.3	51	71	88	0.0	0.0	1.8	6.7
21/Jul/11	4.2	11.0	17.2	49	72	91	0.0	0.0	1.4	4.9
22/Jul/11	5.9	11.5	15.8	55	73	90	0.0	0.0	3.0	6.7
23/Jul/11	4.7	10.2	15.4	50	71	90	0.0	0.0	2.3	6.7
24/Jul/11	1.2	8.2	16.4	38	70	92	0.0	0.0	0.5	2.2
25/Jul/11	3	10.5	17.4	40	64	83	0.0	0.0	1.5	4.5
26/Jul/11	4.6	11.2	16.8	40	64	89	0.0	0.0	0.8	3.1
27/Jul/11	2.3	8.5	15.4	33	62	88	0.0	0.0	0.6	2.7
28/Jul/11	-0.1	8.8	18.3	35	63	89	0.0	0.0	0.5	2.2
29/Jul/11	0.6	9.4	18.2	34	60	85	0.0	0.0	0.6	2.2
30/Jul/11	0.9	9.7	18.9	37	61	83	0.0	0.0	0.5	1.8
31/Jul/11	2.6	11.0	19.4	36	60	86	0.0	0.0	0.7	2.7
Average	3.9	9.8	16.0	46	68	86		0.0	1.2	3.6
Maximum	9.3	13.7	19.9	73	87	95	0.6	0.4	3.0	6.7
Minimum	-0.1	5.6	11.7	33	53	64	0.0	0.0	0.3	1.3
Total							2.2			

Daily Summary

August 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Aug/11	3.8	12.7	22.2	33	57	81	0.0	0.0	0.6	2.2
02/Aug/11	5.3	13.5	23.6	24	55	81	0.0	0.0	0.8	2.7
03/Aug/11	4.9	13.1	22.7	31	55	78	0.0	0.0	0.6	2.7
04/Aug/11	4.3	13.6	22.8	33	56	83	0.0	0.0	0.7	4
05/Aug/11	9.6	16.2	21.4	35	51	75	0.0	0.0	2.4	4.9
06/Aug/11	14	17.4	21.4	37	56	69	0.0	0.0	2.6	4.9
07/Aug/11	10.6	13.6	17.8	60	78	92	8.8	0.0	2.0	5.8
08/Aug/11	8.2	11.4	15.7	46	66	84	0.0	0.4	2.4	4.5
09/Aug/11	8.5	10.5	14.3	46	65	80	0.0	0.0	1.6	4.9
10/Aug/11	6.3	10.3	13.2	51	66	83	0.0	0.0	1.3	4
11/Aug/11	7.2	9.8	13.9	66	84	94	3.2	0.0	1.1	3.6
12/Aug/11	4.6	10.1	15.7	58	79	92	0.2	0.0	1.2	5.8
13/Aug/11	3.1	10.6	18.2	41	70	92	0.0	0.0	0.4	3.1
14/Aug/11	4.4	11.4	19.9	46	70	87	0.0	0.0	1.0	4
15/Aug/11	4.1	11.6	19	40	68	92	0.0	0.0	0.4	2.7
16/Aug/11	5.7	13.6	21.2	36	60	87	0.0	0.0	0.5	1.8
17/Aug/11	10.7	15.9	19.3	54	61	76	1.2	0.0	4.0	9.4
18/Aug/11	9.1	10.8	13.8	52	75	90	7.0	0.0	2.2	5.8
19/Aug/11	7.8	10.9	15	60	74	85	0.2	0.0	1.0	2.7
20/Aug/11	6.8	12.3	17.9	51	74	91	0.2	0.0	3.7	8.5
21/Aug/11	6.5	12.2	18.4	47	71	87	0.0	0.0	2.6	6.3
22/Aug/11	7	12.3	17.8	57	73	88	0.0	0.0	3.8	8
23/Aug/11	5.4	13.4	21.3	42	67	89	0.0	0.0	1.4	4.9
24/Aug/11	5.1	13.1	21.1	34	65	91	0.0	0.0	1.3	4
25/Aug/11	4.3	13.2	22.8	32	64	90	0.0	0.0	0.8	2.7
26/Aug/11	4.3	14.0	23.3	28	55	89	0.0	0.0	0.9	3.1
27/Aug/11	8.6	12.6	14.8	51	78	94	4.2	0.0	0.5	3.1
28/Aug/11	6.3	12.2	20.7	40	80	98	0.2	0.0	0.6	2.7
29/Aug/11	6.2	14.4	23.3	39	68	90	0.0	0.0	1.1	3.6
30/Aug/11	8.4	14.9	23.3	40	67	86	0.0	0.0	0.9	4
31/Aug/11	6.1	14.4	22.4	35	64	92	0.0	0.0	1.0	2.7
Average	6.7	12.8	19.3	43	67	87		0.0	1.5	4.3
Maximum	14.0	17.4	23.6	66	84	98	8.8	0.4	4.0	9.4
Minimum	3.1	9.8	13.2	24	51	69	0.0	0.0	0.4	1.8
Total							25.2			

Daily Summary

September 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Sep/11	5.9	14.6	22.9	27	54	83	0.0	0.0	1.0	2.7
02/Sep/11	8.1	15.6	22.3	29	56	80	0.0	0.0	2.5	5.8
03/Sep/11	5.6	14.6	22.3	29	52	81	0.0	0.0	1.3	4
04/Sep/11	5.3	14.1	21.9	33	55	82	0.0	0.0	0.7	2.7
05/Sep/11	5.7	15.1	23.2	34	56	84	0.0	0.0	0.9	3.1
06/Sep/11	7.1	16.1	23.1	33	53	82	0.0	0.0	1.7	4.5
07/Sep/11	8.7	17.3	25.2	34	51	72	0.0	0.0	1.5	4.9
08/Sep/11	10.8	15.1	19.7	54	70	92	18.6	0.0	1.5	4.9
09/Sep/11	7	10.4	13.3	59	86	94	20.6	0.0	1.8	5.4
10/Sep/11	4.8	9.0	14.8	47	67	86	0.2	0.0	2.1	4.9
11/Sep/11	5.9	10.6	15.1	41	63	83	0.0	0.0	1.6	4
12/Sep/11	4.1	10.4	16.7	45	71	91	0.2	0.0	1.3	4
13/Sep/11	3.3	12.3	20.3	32	61	89	0.0	0.0	1.4	3.6
14/Sep/11	5.2	15.3	23.2	24	45	77	0.0	0.0	2.0	3.6
15/Sep/11	6.2	16.7	25.4	22	40	66	0.0	0.0	1.9	5.4
16/Sep/11	7.5	18.4	27.9	20	40	67	0.0	0.0	1.7	4
17/Sep/11	11.2	21.0	28.8	18	34	59	0.0	0.0	1.8	4
18/Sep/11	14.8	23.4	28.6	23	30	40	0.0	0.0	2.5	4.5
19/Sep/11	9.8	20.9	29.3	20	38	70	0.0	0.0	1.9	4.5
20/Sep/11	10.6	21.8	26.8	23	33	52	0.0	0.0	4.1	8
21/Sep/11	5.7	14.0	21.6	20	42	68	0.0	0.0	1.1	4
22/Sep/11	4.7	16.6	26.7	29	47	72	0.0	0.0	0.9	2.7
23/Sep/11	9.6	19.3	27.6	33	54	76	0.0	0.0	1.3	4
24/Sep/11	8.4	20.3	30.1	17	50	84	0.0	0.0	1.4	4.5
25/Sep/11	10.4	16.3	23.4	33	65	84	0.0	0.0	3.6	10.3
26/Sep/11	6.4	15.1	21.8	38	59	86	0.0	0.0	2.6	5.8
27/Sep/11	9.1	17.2	24.2	33	51	72	0.0	0.0	1.1	4.9
28/Sep/11	11.4	15.1	19.6	56	71	89	2.6	0.0	1.4	5.8
29/Sep/11	12	15.0	19	41	71	91	38.6	0.0	4.0	7.6
30/Sep/11	8.8	14.3	19.6	37	55	74	0.0	0.0	2.0	4
Average	7.8	15.9	22.8	33	54	78		0.0	1.8	4.7
Maximum	14.8	23.4	30.1	59	86	94	38.6	0.0	4.1	10.3
Minimum	3.3	9.0	13.3	17	30	40	0.0	0.0	0.7	2.7
Total							80.8			

Daily Summary

October 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Oct/11	5.6	8.8	14.5	72	87	92	15.8	0.0	0.9	7.6
02/Oct/11	7.7	11.2	15.6	61	76	89	0.0	0.0	2.7	8
03/Oct/11	8.3	13.1	18.9	45	66	85	0.0	0.0	3.3	6.3
04/Oct/11	5.8	13.7	20.2	43	64	87	0.0	0.0	2.9	5.4
05/Oct/11	9.2	14.1	18.2	56	69	87	0.2	0.0	0.7	3.1
06/Oct/11	11.7	13.9	16.6	81	88	92	10.2	0.0	0.3	1.8
07/Oct/11	11.8	17.1	24.1	50	76	93	0.0	0.0	0.2	1.8
08/Oct/11	12.2	17.5	24.6	42	71	91	1.2	0.0	1.3	5.4
09/Oct/11	8.2	15.9	24.7	37	66	92	0.0	0.0	1.7	7.2
10/Oct/11	9.6	15.7	23.7	34	64	88	0.0	0.0	1.0	6.3
11/Oct/11	7.2	16.3	23.2	30	51	84	0.0	0.0	2.0	4.9
12/Oct/11	3.6	15.0	24.8	30	58	90	0.0	0.0	0.8	2.7
13/Oct/11	12.6	19.2	27.8	38	62	76	0.0	0.0	2.2	5.8
14/Oct/11	13.3	20.6	27.9	44	63	82	0.2	0.0	1.3	4
15/Oct/11	14.5	19.0	25.4	48	75	91	13.8	0.0	0.9	3.6
16/Oct/11	11.3	18.8	25.3	36	59	92	0.0	0.0	3.1	8
17/Oct/11	13.2	18.1	24.3	37	57	75	0.0	1.3	4.1	6.3
18/Oct/11	10.4	16.2	23.6	33	56	72	0.0	0.0	2.6	5.4
19/Oct/11	11	17.9	25.8	30	57	77	0.0	0.0	0.9	2.7
20/Oct/11	9.1	18.6	28.5	26	56	85	0.0	0.0	0.5	2.2
21/Oct/11	9.6	19.0	28.4	28	58	87	0.0	0.0	0.6	2.2
22/Oct/11	10.4	20.4	30.5	27	57	83	0.0	0.0	0.6	2.2
23/Oct/11	12.3	20.2	28.9	33	61	84	0.0	0.0	0.6	2.7
24/Oct/11	10.7	20.8	29.7	37	60	88	0.0	0.0	2.2	6.7
25/Oct/11	13.4	20.8	31.3	38	68	90	18.4	0.0	1.6	7.6
26/Oct/11	14.5	17.7	22.2	60	71	85	0.6	3.6	5.9	8.9
27/Oct/11	13.3	19.2	26.3	49	65	78	0.0	0.0	3.4	5.8
28/Oct/11	13.8	20.9	29.3	44	67	87	0.0	0.0	0.7	3.6
29/Oct/11	15.3	19.9	24.9	67	83	92	11.8	0.0	0.4	4.9
30/Oct/11	13.7	20.1	25.9	42	71	93	2.4	0.0	2.0	7.2
31/Oct/11	10.8	18.7	25.8	33	53	72	0.0	0.0	3.3	6.7
Average	10.8	17.4	24.5	43	66	86	X	0.2	1.8	5.1
Maximum	15.3	20.9	31.3	81	88	93	18.4	3.6	5.9	8.9
Minimum	3.6	8.8	14.5	26	51	72	0.0	0.0	0.2	1.8
Total	X	X	X	X	X	X	74.6	X	X	X

Daily Summary

November 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Nov/11	11	19.6	27.2	37	56	70	0.0	0.0	0.7	2.7
02/Nov/11	15.8	22.6	29.8	26	46	67	0.0	0.0	1.4	4
03/Nov/11	12.3	20.4	27.6	32	49	69	0.0	0.0	1.6	7.2
04/Nov/11	10.8	20.9	29.4	26	48	68	0.0	0.0	1.1	4.5
05/Nov/11	14.8	23.1	29.4	35	54	67	0.0	0.0	1.1	2.7
06/Nov/11	18.1	21.7	24.6	39	57	66	3.2	0.0	1.1	3.6
07/Nov/11	15.7	23.4	31.3	32	42	59	0.2	0.0	1.1	3.6
08/Nov/11	17.6	26.8	33.5	30	45	61	0.0	0.0	2.0	7.2
09/Nov/11	20.7	27.7	33.4	29	45	61	0.0	0.0	2.2	4.9
10/Nov/11	20.3	25.6	28.3	38	50	62	0.4	0.0	1.8	5.4
11/Nov/11	13.4	24.2	33.6	28	49	63	0.0	0.0	1.1	4
12/Nov/11	16.7	25.2	31.2	34	49	61	0.0	0.0	1.8	4.9
13/Nov/11	18.3	22.5	31.6	35	53	62	34.0	0.0	1.8	6.3
14/Nov/11	16.3	25.9	34.6	27	46	62	0.0	0.0	1.9	5.4
15/Nov/11	20.3	30.0	38.2	20	41	60	11.0	0.0	1.8	7.2
16/Nov/11	19.1	25.8	29.9	47	54	59	11.0	0.0	2.2	7.6
17/Nov/11	17.2	20.9	26.3	33	47	59	6.4	0.0	0.1	1.8
18/Nov/11	17.8	22.1	27.9	32	45	58	10.2	0.0	0.0	2.7
19/Nov/11	18.1	25.5	32.1	34	44	58	0.0	0.0	0.0	0
20/Nov/11	20.9	26.5	32.8	32	46	58	0.6	0.0	0.0	0
21/Nov/11	19.7	23.0	26.6	34	51	58	0.0	0.0	0.0	0
22/Nov/11	17.9	24.5	30.7	35	43	58	0.0	0.0	0.0	0
23/Nov/11	15.7	18.2	24	29	34	56	41.4	0.0	0.5	5.8
24/Nov/11	15.8	19.2	24.9	37	47	59	2.0	0.0	0.0	0
25/Nov/11	15.6	18.1	20.6	30	32	41	62.6	0.0	0.0	0
26/Nov/11	18.3	22.3	27.3	30	42	60	35.0	0.0	0.0	0
27/Nov/11	16.8	23.1	29.5	29	50	63	0.0	0.0	0.0	0
28/Nov/11	15.2	24.1	32.1	32	47	60	0.0	0.0	0.0	0
29/Nov/11	20.3	27.0	32.7	39	50	60	0.0	0.0	0.0	0
30/Nov/11	20	24.5	29.3	32	48	59	2.4	0.0	0.2	3.1
Average	17.0	23.5	29.7	32	47	61		0.0	0.8	3.2
Maximum	20.9	30.0	38.2	47	57	70	62.6	0.0	2.2	7.6
Minimum	10.8	18.1	20.6	20	32	41	0.0	0.0	0.0	0.0
Total							220.4			

Daily Summary

December 2011

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Dec/11	16.9	19.9	22.9	31	47	62	0.2	0.0	3.5	6.7
02/Dec/11	10.2	17.5	23.8	34	53	63	0.0	0.0	3.5	7.6
03/Dec/11	11.3	19.1	26	37	51	63	0.0	0.4	1.8	4
04/Dec/11	12.6	21.2	29.2	30	50	62	0.0	0.0	1.7	8.5
05/Dec/11	12.3	18.8	25.9	38	53	62	0.0	1.3	4.3	6.7
06/Dec/11	14.7	18.4	23.4	48	56	60	0.0	0.0	2.6	4.5
07/Dec/11	12.7	15.7	18.5	32	45	62	18.6	0.4	2.1	3.6
08/Dec/11	15	18.2	23.6	28	35	55	4.2	0.0	1.7	4.5
09/Dec/11	16.8	21.2	25.9	28	48	56	0.0	0.0	0.6	2.2
10/Dec/11	17.9	19.6	21.8	28	33	51	17.4	0.0	0.6	2.2
11/Dec/11	16.1	20.1	27.8	27	36	56	3.4	0.0	1.2	6.7
12/Dec/11	17.6	20.5	24.3	29	43	57	0.0	0.0	2.0	7.2
13/Dec/11	14.1	19.7	27.2	30	43	58	0.0	0.0	0.5	4
14/Dec/11	13.1	20.0	26.6	32	46	60	0.0	0.0	1.1	3.6
15/Dec/11	15.8	21.7	26.6	46	54	59	0.0	0.0	1.9	4.5
16/Dec/11	16.3	20.8	27.3	28	51	58	0.0	0.0	0.3	2.7
17/Dec/11	15	21.0	26.1	35	51	60	0.0	0.0	0.0	0
18/Dec/11	18.2	21.5	25.9	49	56	60	0.0	0.0	0.0	0
19/Dec/11	18.5	21.4	23.4	30	52	59	7.2	0.0	0.0	0.4
20/Dec/11	17.7	22.2	29.2	29	41	57	0.0	0.0	0.5	3.1
21/Dec/11	18	22.1	27.1	36	52	58	0.2	0.0	0.7	3.6
22/Dec/11	17.6	22.0	28.2	39	50	58	0.2	0.0	1.1	7.6
23/Dec/11	18.7	21.5	25.5	30	44	58	11.4	0.0	1.3	6.3
24/Dec/11	17.7	22.6	29.6	35	47	59	0.2	0.0	1.7	4.5
25/Dec/11	17.3	23.7	29.9	37	52	60	0.0	0.0	1.5	3.6
26/Dec/11	17.6	22.7	26.8	46	56	60	1.2	0.0	0.7	3.1
27/Dec/11	19.3	24.5	27.7	43	52	60	0.0	0.0	2.8	7.6
28/Dec/11	14.7	21.3	28.3	33	50	61	0.0	0.0	2.8	5.8
29/Dec/11	14.5	21.7	28.3	37	51	61	0.0	0.4	3.3	6.7
30/Dec/11	15.6	21.7	27.9	33	49	62	0.0	0.9	2.9	5.4
31/Dec/11	14.2	22.3	28.9	29	49	62	0.0	0.4	2.2	4.5
Average	15.7	20.8	26.2	34	48	59		0.1	1.6	4.6
Maximum	19.3	24.5	29.9	49	56	63	18.6	1.3	4.3	8.5
Minimum	10.2	15.7	18.5	27	33	51	0.0	0.0	0.0	0.0
Total							64.2			

Daily Summary

January 2012

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Jan/12	13.9	23.0	30.5	24	46	60	0.0	0.0	1.1	3.1
02/Jan/12	13.5	23.6	31.9	25	44	62	0.0	0.0	0.7	2.2
03/Jan/12	16.3	24.9	32.6	28	47	61	0.0	0.0	0.8	3.1
04/Jan/12	19.6	26.6	33.2	38	50	60	0.0	0.0	1.3	4.0
05/Jan/12	20.3	26.2	34.2	30	49	59	5.4	0.0	2.0	7.2
06/Jan/12	17.8	24.5	30.4	30	47	58	3.2	0.0	1.8	5.8
07/Jan/12	16.1	24.7	33.5	35	49	58	0.0	0.0	1.3	3.1
08/Jan/12	21.8	29.0	35.3	28	49	58	13.6	0.0	1.6	4.9
09/Jan/12	20.9	25.7	32.2	27	39	57	0.0	0.0	1.5	4.5
10/Jan/12	14.3	22.5	30.0	26	46	61	0.0	0.0	1.0	3.6
11/Jan/12	17.6	22.8	29.2	23	44	60	0.0	0.0	2.3	6.3
12/Jan/12	9.9	19.3	26.6	20	39	64	0.0	0.0	1.8	4.0
13/Jan/12	12.2	22.7	28.9	29	44	60	0.0	0.0	0.9	3.1
14/Jan/12	17.3	22.3	27.9	42	54	61	5.6	0.0	1.8	5.4
15/Jan/12	16.6	18.3	23.2	33	45	61	6.6	0.0	1.5	3.6
16/Jan/12	16.3	19.7	25.6	36	46	61	2.0	0.0	1.8	5.4
17/Jan/12	14.3	22.5	29.8	40	54	61	0.0	0.0	2.5	5.4
18/Jan/12	16.3	25.2	32.5	29	48	60	0.0	0.0	2.1	4.9
19/Jan/12	16.3	24.9	34.1	25	46	60	0.0	0.0	1.5	5.8
20/Jan/12	19.3	25.8	32.7	28	47	61	0.0	0.0	1.9	4.9
21/Jan/12	19.3	24.9	30.7	23	49	60	0.0	0.0	2.6	7.6
22/Jan/12	18.5	23.9	29.6	40	54	61	0.0	0.9	3.9	9.4
23/Jan/12	17.9	23.5	29.6	39	50	61	0.0	0.4	4.2	6.3
24/Jan/12	17.4	21.2	25.7	36	48	60	5.6	0.0	1.4	4.0
25/Jan/12	19.6	20.9	22.7	31	44	58	7.6	0.0	2.8	5.4
26/Jan/12	20.1	23.3	29.3	38	54	61	1.2	0.0	1.9	6.3
27/Jan/12	19.9	24.0	28.7	50	57	61	0.2	0.0	2.2	5.8
28/Jan/12	19.2	21.4	23.5	42	56	62	3.2	0.0	1.3	3.1
29/Jan/12	19.3	21.8	23.4	39	55	62	0.6	0.0	1.3	6.3
30/Jan/12	21.9	25.5	30.9	33	59	62	9.2	0.0	3.3	7.2
31/Jan/12	21.3	22.5	24.7	24	26	30	35.2	0.0	0.4	4.0
Average	17.6	23.5	29.5	32.0	47.9	59.4		0.0	1.8	5.0
Maximum	21.9	29.0	35.3	50.0	58.6	64.0	35.2	0.9	4.2	9.4
Minimum	9.9	18.3	22.7	20.0	26.0	30.0	0.0	0.0	0.4	2.2
Total							99.2			

Daily Summary

February 2012

Tarrawonga Weather Station

Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Feb/12	17.6	18.3	21.0	26	27	28	103.4	0.0	2.7	4.5
02/Feb/12	17.4	18.3	19.2	26	27	28	37.0	0.0	2.0	4.9
03/Feb/12	17.1	19.1	21.2	25	27	28	8.6	0.0	1.0	4.0
04/Feb/12	17.7	22.4	29.2	25	37	54	0.2	0.0	0.4	3.1
05/Feb/12	18.8	26.1	31.5	24	41	57	0.0	0.0	0.5	2.2
06/Feb/12	19.5	26.0	33.3	24	42	53	1.8	0.0	1.0	6.7
07/Feb/12	18.7	23.9	29.8	23	40	57	0.0	0.0	1.0	3.6
08/Feb/12	18.6	25.1	28.7	25	46	55	0.0	0.0	0.9	4.5
09/Feb/12	18.2	23.6	28.5	31	46	55	0.0	0.0	0.9	2.2
10/Feb/12	18.9	24.2	30.3	28	47	59	0.0	0.0	1.5	4.0
11/Feb/12	17.4	23.4	30.2	27	45	59	0.0	0.0	1.2	4.0
12/Feb/12	14.6	22.5	30.1	27	41	59	0.0	0.0	0.6	2.7
13/Feb/12	14.8	23.3	31.2	28	41	59	0.0	0.0	1.0	4.0
14/Feb/12	16.0	23.3	30.4	32	45	59	0.0	0.0	2.0	4.5
15/Feb/12	17.3	23.8	29.6	26	47	59	0.0	0.4	1.6	3.6
16/Feb/12	17.1	23.6	30.3	34	46	57	0.0	0.0	1.0	3.1
17/Feb/12	13.8	23.4	33.2	24	44	56	5.0	0.0	1.2	9.8
18/Feb/12	19.6	22.8	28.4	17	31	46	16.6	0.0	1.2	4.9
19/Feb/12	19.6	24.8	33.2	17	35	52	21.6	0.0	1.6	9.8
20/Feb/12	20.4	27.3	33.2	24	40	52	21.4	0.0	2.1	9.8
21/Feb/12	19.6	23.0	28.4	17	31	46	0.2	0.0	1.6	5.8
22/Feb/12	17.3	21.3	25.2	18	28	40	0.0	0.0	2.0	4.9
23/Feb/12	17.4	23.7	29.9	19	34	54	0.0	0.0	1.8	4.0
24/Feb/12	16.2	24.4	31.2	20	37	54	0.0	0.0	1.8	4.5
25/Feb/12	18.8	21.3	24.1	18	41	55	2.2	0.0	1.0	4.0
26/Feb/12	20.3	21.1	21.8	19	19	21	1.6	0.0	0.0	0.4
27/Feb/12	21.3	25.7	29.7	36	43	50	0.0	0.0	0.4	3.1
28/Feb/12	19.5	25.3	30.7	22	41	52	0.0	0.0	0.7	2.7
29/Feb/12	19.9	26.3	32.4	26	44	52	0.0	0.0	1.7	3.6
Average	18.0	23.4	28.8	24.4	38.4	50.2		0.0	1.3	4.4
Maximum	21.3	27.3	33.3	36.0	47.1	59.0	103.4	0.4	2.7	9.8
Minimum	13.8	18.3	19.2	17.0	19.4	21.0	0.0	0.0	0.0	0.4
Total							219.6			

Daily Summary

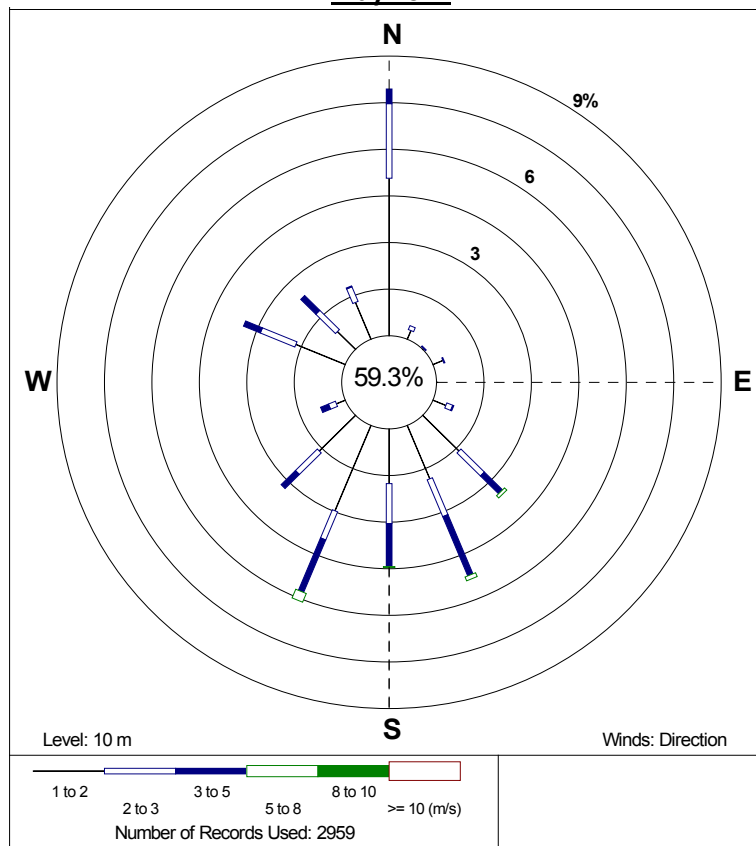
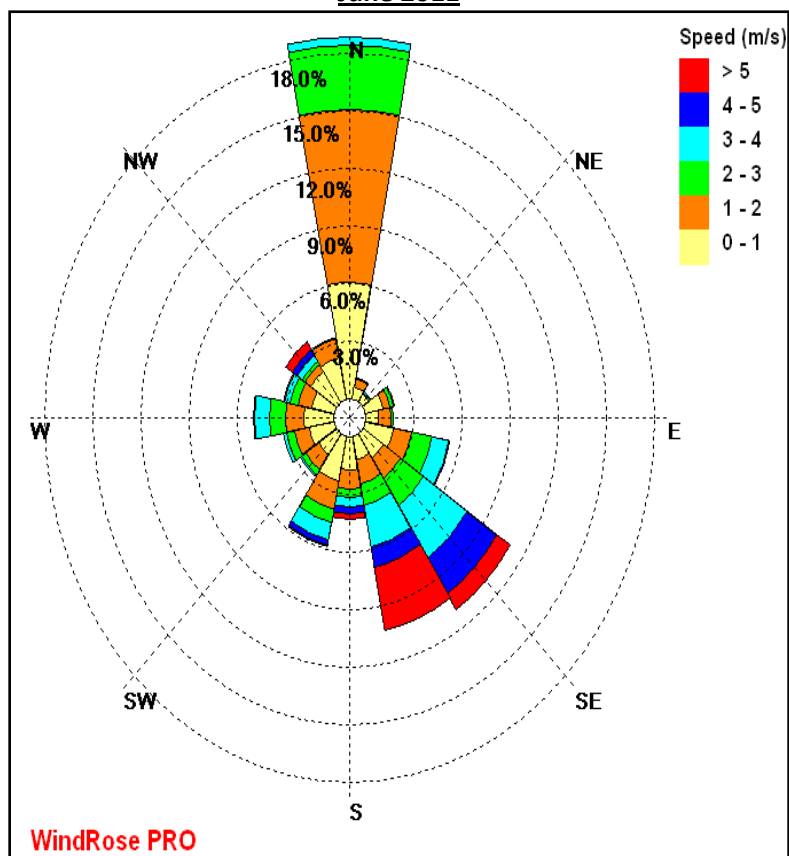
March 2012

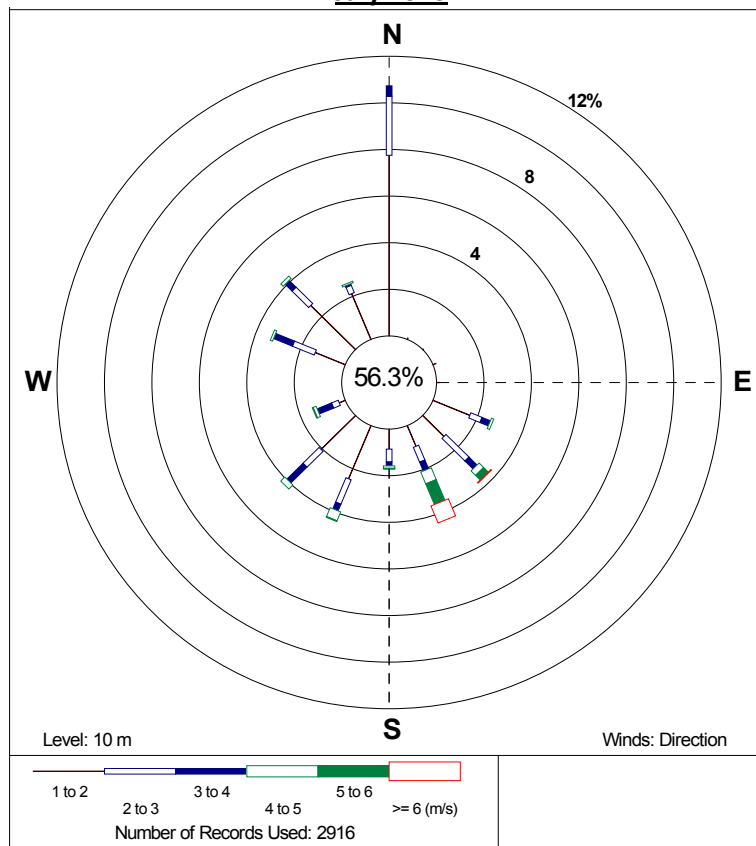
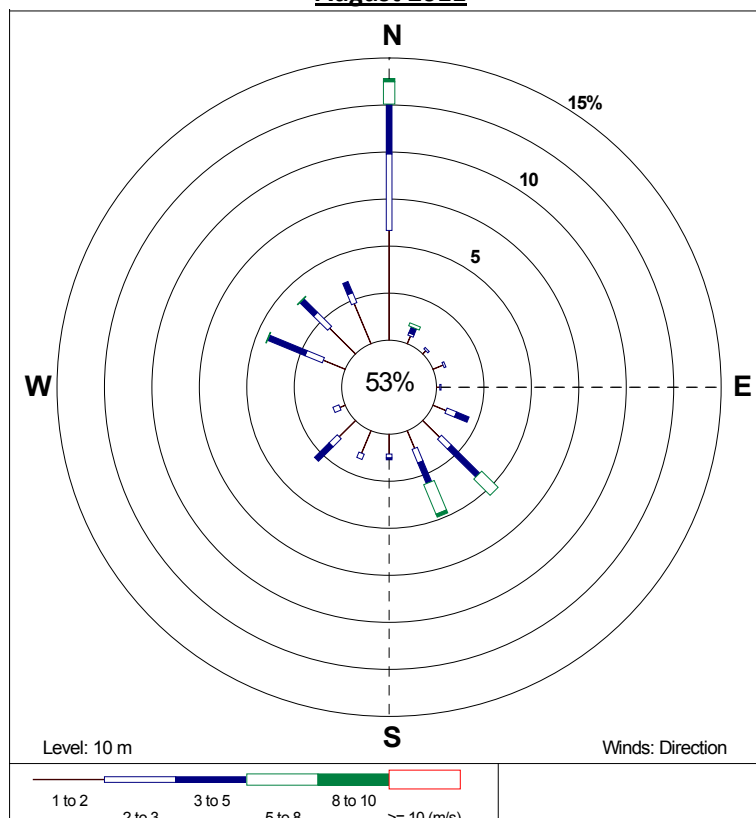
Tarrawonga Weather Station

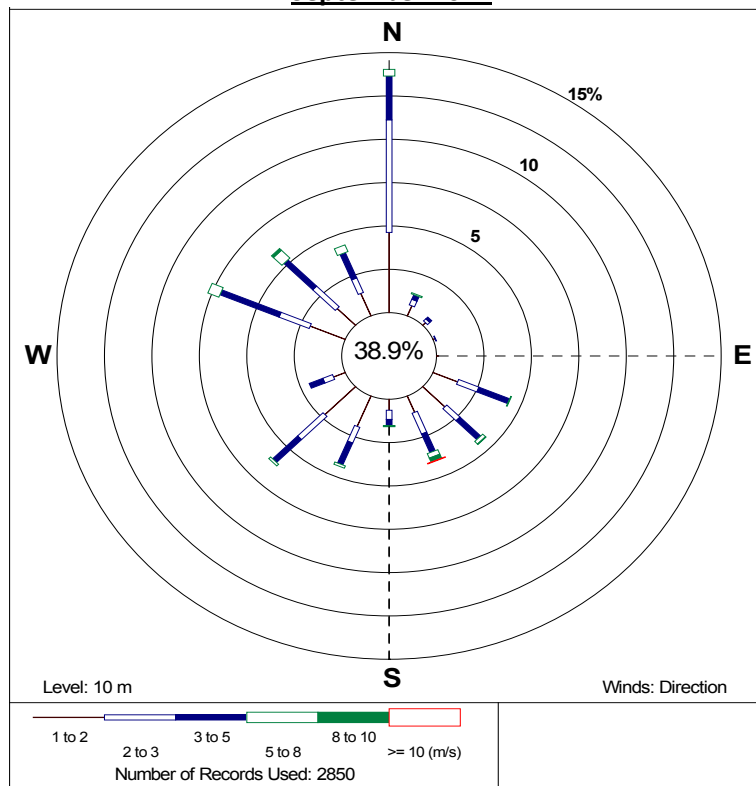
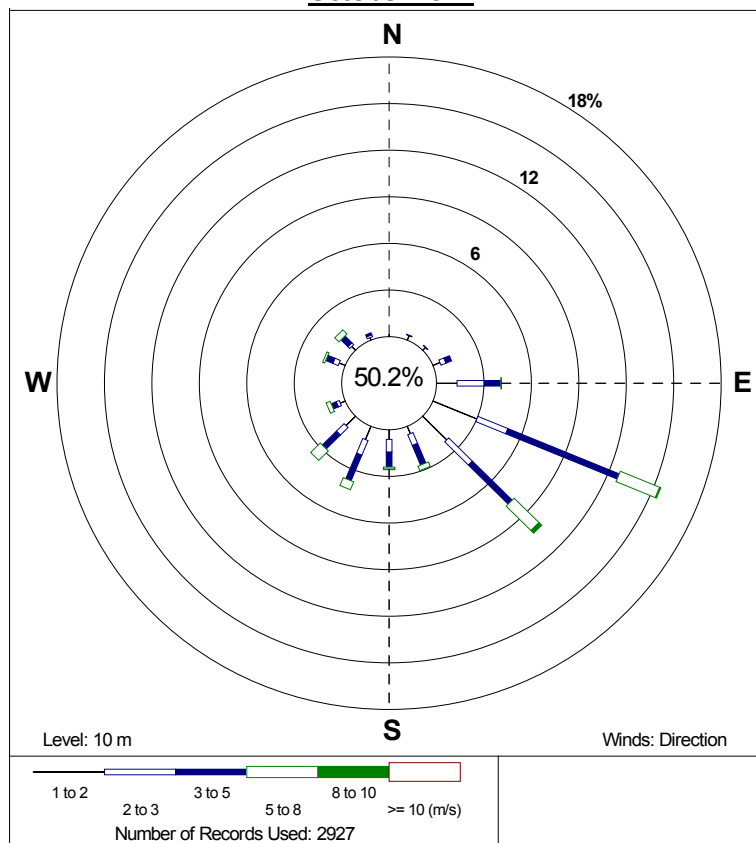
Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Mar/12	22.4	27.3	32.2	37	47	53	0.0	0.0	2.5	5.4
02/Mar/12	21.8	24.4	28.6	22	37	50	0.0	0.0	2.0	5.8
03/Mar/12	18.3	23.6	29.4	23	37	51	6.8	0.0	1.7	4.9
04/Mar/12	22.4	26.6	32.3	44	49	52	0.0	0.0	2.4	6.3
05/Mar/12	21.1	23.4	26.7	23	32	50	2.0	0.0	1.0	5.4
06/Mar/12	17.3	21.3	27.4	25	41	53	0.0	0.0	3.1	6.7
07/Mar/12	-	-	-	-	-	-	-	-	-	-
08/Mar/12	-	-	-	-	-	-	-	-	-	-
09/Mar/12	-	-	-	-	-	-	-	-	-	-
10/Mar/12	-	-	-	-	-	-	-	-	-	-
11/Mar/12	-	-	-	-	-	-	-	-	-	-
12/Mar/12	-	-	-	-	-	-	-	-	-	-
13/Mar/12	-	-	-	-	-	-	-	-	-	-
14/Mar/12	-	-	-	-	-	-	-	-	-	-
15/Mar/12	-	-	-	-	-	-	-	-	-	-
16/Mar/12	-	-	-	-	-	-	-	-	-	-
17/Mar/12	-	-	-	-	-	-	-	-	-	-
18/Mar/12	-	-	-	-	-	-	-	-	-	-
19/Mar/12	-	-	-	-	-	-	-	-	-	-
20/Mar/12	20.9	22.2	24.1	47	50	54	0.0	1.3	1.9	2.7
21/Mar/12	16.7	22.6	28.8	29	45	55	0.0	0.0	0.9	2.2
22/Mar/12	18.2	22.1	29.2	36	48	55	0.0	0.0	0.8	3.6
23/Mar/12	14.1	21.4	27.8	30	44	58	0.0	0.0	1.5	4.9
24/Mar/12	7.9	16.2	25.2	27	46	58	0.0	0.0	1.7	4.9
25/Mar/12	8.0	18.6	27.8	34	49	57	0.0	0.0	0.9	3.1
26/Mar/12	16.7	21.4	27.4	40	51	56	0.0	0.0	0.9	2.7
27/Mar/12	13.4	20.5	26.5	33	49	56	0.0	0.0	0.6	3.6
28/Mar/12	16.1	21.8	27.9	34	48	56	0.0	0.0	0.7	4.0
29/Mar/12	13.9	21.0	28.0	36	48	56	0.0	0.0	0.9	6.3
30/Mar/12	12.4	20.1	28.4	27	41	57	0.0	0.0	0.7	3.1
31/Mar/12	12.4	20.3	27.7	25	40	54	0.0	0.0	1.3	4.9
Average	16.3	21.9	28.1	32	44	55		0.1	1.4	4.5
Maximum	22.4	27.3	32.3	47	51	58	6.8	1.3	3.1	6.7
Minimum	7.9	16.2	24.1	22	32	50	0.0	0.0	0.6	2.2
Total							8.8			

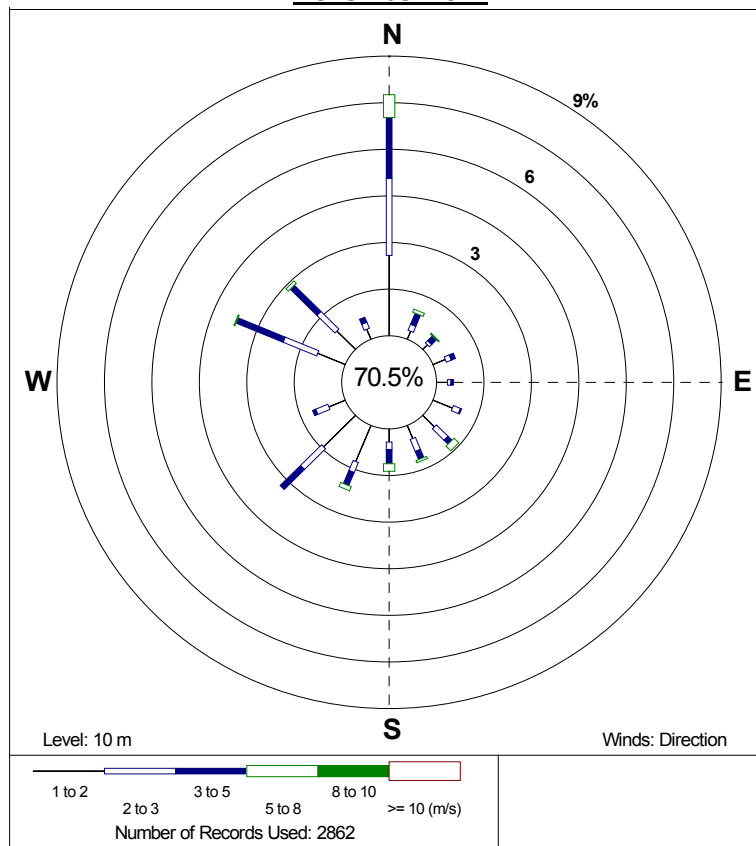
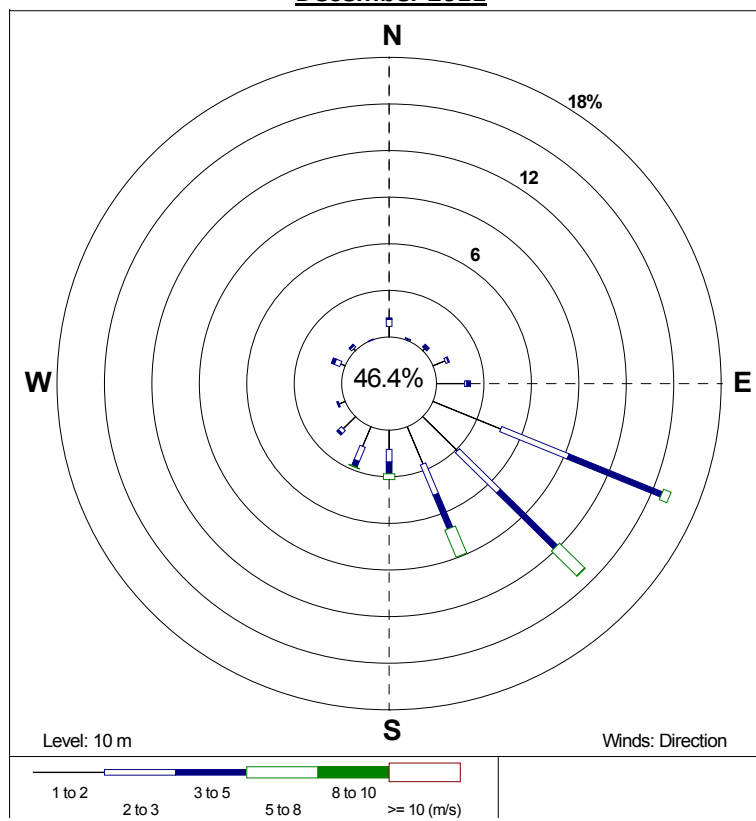
Daily Summary April 2012 Rocglen Weather Station

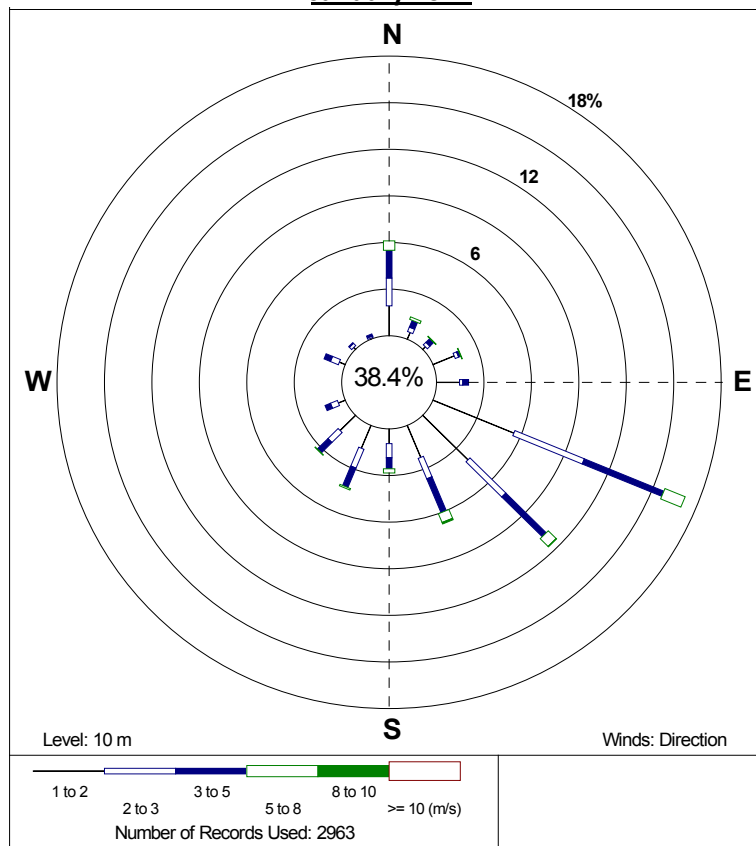
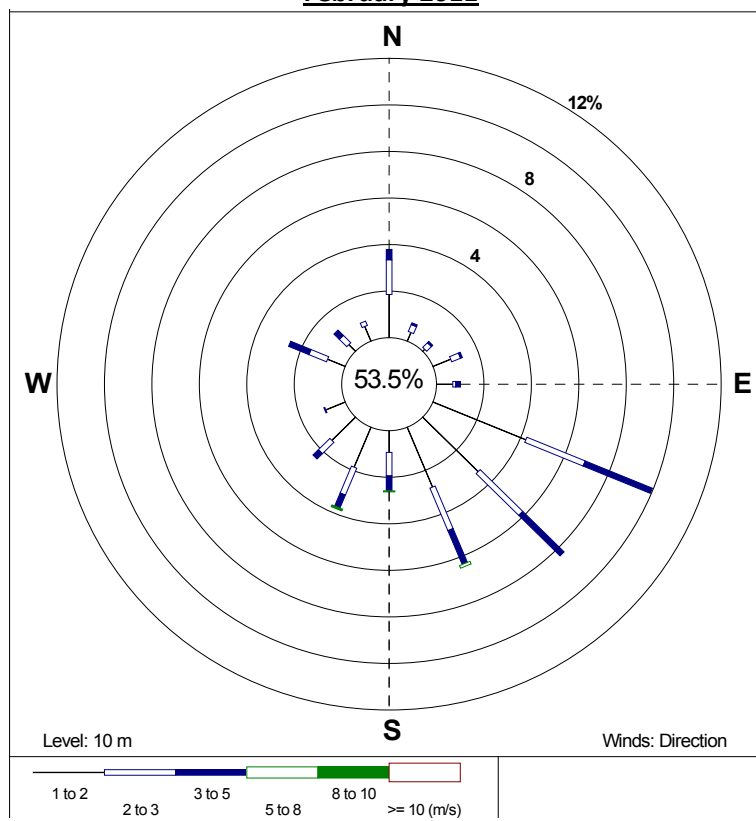
Date	Min Temp (°C)	Ave Temp (°C)	Max Temp (°C)	Min RH (%)	Ave RH (%)	Max RH (%)	Rain (mm)	Min WS (m/s)	Ave WS (m/s)	Max WS (m/s)
01/Apr/12	8.6	20.3	29.4	23	53	95	0.0	0.0	1.5	4.9
02/Apr/12	14.7	21.6	30.4	29	55	77	0.0	0.0	1.2	5.4
03/Apr/12	10.8	20.9	31.1	22	57	94	0.0	0.0	0.6	3.1
04/Apr/12	12.5	23.4	32.7	30	51	86	0.0	0.0	1.0	6.3
05/Apr/12	15.7	23.6	30.7	34	55	83	0.0	0.0	1.0	4.9
06/Apr/12	15.9	22.4	29.2	40	59	81	0.0	0.0	0.8	4
07/Apr/12	13.9	21.2	30.1	40	67	91	0.0	0.0	0.4	2.7
08/Apr/12	16.7	24.0	32.4	27	62	91	7.0	0.0	1.8	5.4
09/Apr/12	9.9	17.1	23.7	27	66	93	0.2	0.0	1.0	4.9
10/Apr/12	6.2	13.4	19.8	26	57	90	0.0	0.0	3.7	8
11/Apr/12	8.1	15.0	22.4	38	58	75	0.0	0.9	4.1	8.9
12/Apr/12	7.1	16.6	24.6	34	62	93	0.0	0.0	2.8	6.7
13/Apr/12	11.8	19.1	25.8	29	55	81	0.0	0.0	1.9	5.8
14/Apr/12	11.1	19.8	26.5	38	59	92	0.0	0.0	1.0	5.4
15/Apr/12	15.7	20.9	26.1	49	66	80	0.0	0.0	1.2	4
16/Apr/12	14.9	19.7	25.2	57	76	94	0.0	0.0	1.4	6.7
17/Apr/12	15.7	17.2	19.6	73	85	92	0.8	0.0	1.8	5.4
18/Apr/12	14.3	18.9	25.8	49	78	94	2.8	0.0	0.6	3.1
19/Apr/12	12.6	19.1	27.1	43	74	97	0.2	0.0	0.3	2.7
20/Apr/12	11.2	18.4	28.1	35	71	97	0.0	0.0	0.3	1.8
21/Apr/12	10.1	18.6	28.6	31	66	97	0.0	0.0	0.4	1.8
22/Apr/12	10.2	19.8	29	33	61	95	0.0	0.0	0.6	4.9
23/Apr/12	16.4	18.3	24.1	42	86	95	13.2	0.0	0.6	4
24/Apr/12	9.1	17.5	23.5	42	77	96	0.0	0.0	1.7	5.8
25/Apr/12	3.9	10.3	17.2	45	72	97	0.0	0.0	1.3	4.9
26/Apr/12	4.3	11.8	20.9	44	73	96	0.0	0.0	0.6	3.1
27/Apr/12	7.4	13.7	21.7	49	78	96	0.0	0.0	0.4	4
28/Apr/12	12.8	15.1	19.1	67	87	95	3.0	0.0	1.0	3.6
29/Apr/12	8.1	15.5	23.9	31	74	98	0.0	0.0	2.5	7.2
30/Apr/12	10.8	17.1	23	39	61	87	0.0	0.0	2.2	7.2
Average	11.4	18.3	25.7	39	67	91		0.0	1.3	4.9
Maximum	16.7	24.0	32.7	73	87	98	13.2	0.9	4.1	8.9
Minimum	3.9	10.3	17.2	22	51	75	0.0	0.0	0.3	1.8
Total							27.2			

May 2011June 2011

July 2010August 2011

September 2011October 2011

November 2011**December 2011**

January 2011February 2011

March 2012