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 and PA 11_0047)

for the

Tarrawonga Coal Mine

1 May 2012 – 30 April 2013

Tarrawonga Coal Pty Ltd

Annual Environmental Management Report (ML 1579) and Annual Review (DA 88-4-2005 MOD 1 and PA 11_0047) for the Tarrawonga Coal Mine

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- NSW Office of Water
- Gunnedah Shire Council
- Narrabri Shire Council
- Tarrawonga Coal Mine Community Consultative Committee

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Appendix 2 Environment Protection Licence 12365

Appendix 3 Compliance Review

- DA 88-4-2005 MOD 1 (Table A3-1)
- Environment Protection Licence 12365 (Table A3-2)
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Appendix 4 Dust Monitoring Results

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Appendix 10 Meteorological Data

ACRONYMS USED THROUGHOUT THIS DOCUMENT

AEMR	-	Annual Environmental Management Review
AQGHGA	-	Air Quality and Greenhouse Gas 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
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
TCM	-	Tarrawonga Coal Mine
TCPL	-	Tarrawonga Coal Pty Ltd
TSP	-	Total Suspended Particles
TSS	-	Total Suspended Solids
WCL	-	Whitehaven Coal Limited
WCMPL	-	Whitehaven Coal Mining Pty Ltd

1 INTRODUCTION AND OBJECTIVES

1.1 Scope

1.1.1 Introduction and Period of Reporting

This is the seventh 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), Condition 3 (Schedule 5) of DA 88-4-2005 MOD 1 and Condition 4 (Schedule 5) of PA 11_0047. 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 4 (Schedule 5) of PA 11_0047 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 2012 to 30th April 2013 (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 2013 to 30th April 2014, or beyond.

1.1.2 The Company

The Tarrawonga Coal Mine (TCM) is located approximately 15km northeast of Boggabri, 10km north of the former Canyon Coal Mine (in closure) and south of, and adjacent to, the Boggabri Coal Mine (Figure 1). The mine site is contained within Mining Lease (ML) 1579, Mining Lease Applications (MLA) 1, 2 and 3 and Coal Lease (CL) 368 as shown in Figure 1. The mine is being developed by Tarrawonga Coal Pty Ltd (TCPL), a joint venture between Whitehaven Coal Mining Pty Ltd (WCMPL) (70%) and Idemitsu Boggabri Coal Pty Ltd (IBC) (30%), and operates under Environment Protection Licence (EPL) 12365 and Project Approval (PA) 11_0047. 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.

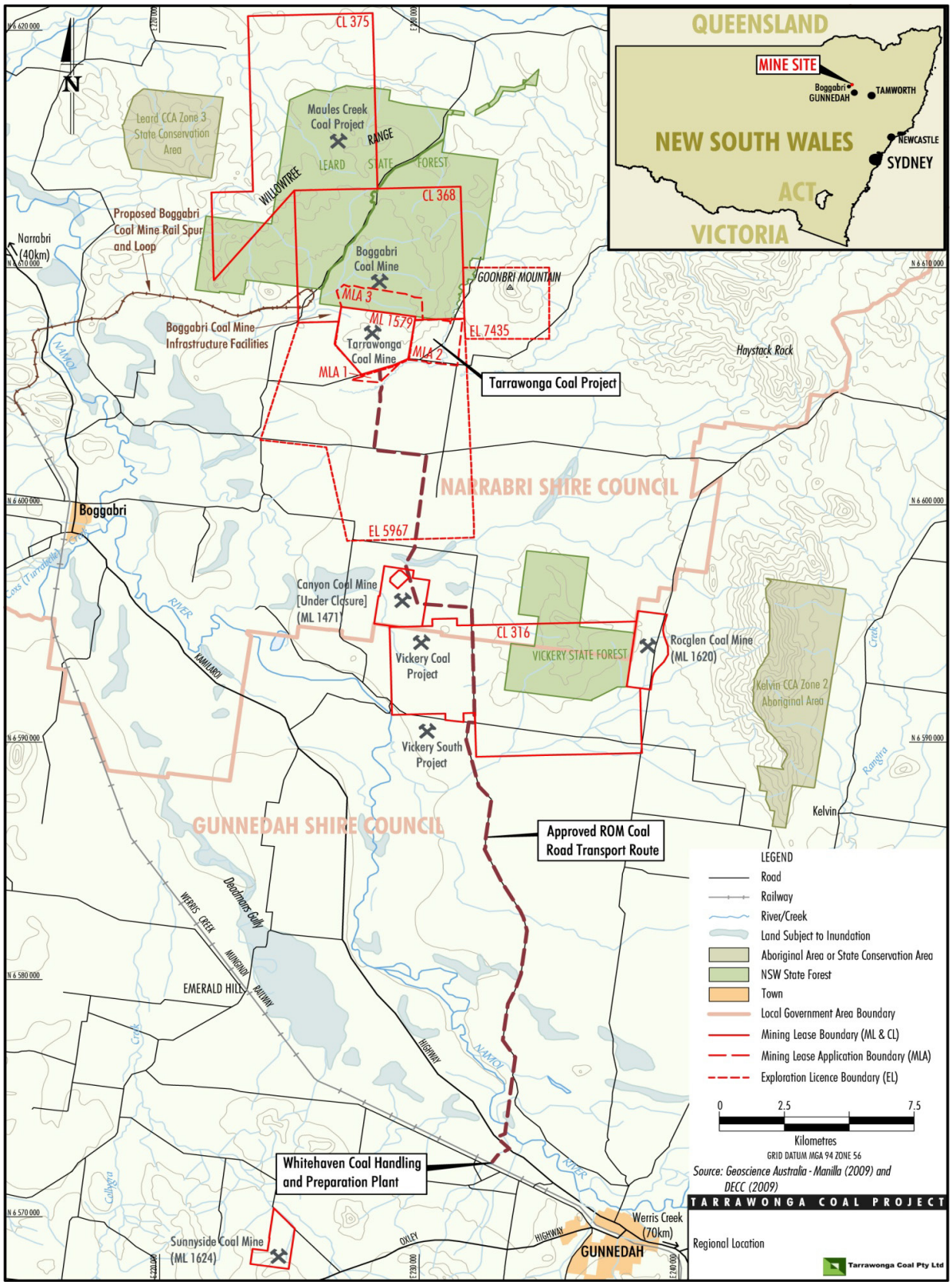

Figure 1 - Regional Location

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, however at the time of writing, production at Sunnyside had been suspended and placed in care and maintenance;
- 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 and adjacent deposits, with the environmental assessment for the Vickery Project completed currently pending determination;
- 75% ownership of the Maules Creek Project, via the Aston Resources/Whitehaven merger, with joint venture partners ITOCHU (15%) and J-Power (10%). The Maules Creek Project has conditional approval with construction work commencing in the near future.
- 100% ownership of Dingo, Sienna and Monto projects (QLD) and Ferndale and Oaklands projects (NSW) via the Whitehaven/Coalworks merger.
- 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).

In 2011, TCPL sought approval under the now repealed Part 3A, Section 75J of the EP&A Act for a continuation and extension of operations. The potential environmental impacts associated with the extension were assessed in the *Tarrawonga Coal Project Environmental Assessment* (Whitehaven Coal Pty Ltd, 2012). The extension project would allow continued development of the mining operations to facilitate a run-of-mine (ROM) coal production rate of up to 3 million tonnes per annum and life of mine to 2030. PA 11_0047 was granted on 22nd January 2013 by the Planning Assessment Commission as the delegated approval authority and received conditional federal approval on the 11th March 2013.

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.

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 Matthew Page, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6743 4000.
- Mr Peter Wilkinson, General Manager, Open Cut Operations - oversees open cut operations for the Whitehaven Group. Contact: (02) 6741 9303.
- Mr Danny Young, Environmental Manager - oversees environmental and rehabilitation performance for all Whitehaven sites. Contact: (02) 6741 9316 or mobile: 0427 497 710.
- Mr Matt Sparkes, Operations Manager – oversees day to day operational performance of the Tarrawonga Mine. Contact: (02) 6743 4000.
- Mr Mitch Palmer, Environmental Officer – oversees day to day environmental compliance and performance at the Tarrawonga Mine. 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;
- GSS Environmental; and
- Countrywide Ecological Services.

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, Project Approval 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 and PA 11_0047 (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:

- Project Approval 11_0047 was issued by the Planning Assessment Commission on 22nd January 2013. This approval relates to the Tarrawonga Extension Project as assessed via the *Tarrawonga Coal Project Environmental Assessment* completed in January 2012. The Tarrawonga Extension Project comprises an extension of mining at the Tarrawonga site to 2030, with pit extensions to the north and east of the original development footprint.
- EPBC Approval 2011/5923 was granted on 11th March 2013 in relation to matters of National Environmental Significance as assessed under the Tarrawonga Extension Project.
- EPL 12365 – a licence variation application was submitted to the EPA in June 2012 with the following variations:

  - Removal of monitoring point 4, Storage Dam 20 from the licence as it had been mined through;

  - Modification of the location of the site weather station to the "Templemore" property;

The variation was subsequently approved with the issue of a variation notice dated 21st March 2013. This notice also comprised revisions to the licence whereby condition U1 Coal Mine Particulate Matter Control Best Practice was removed in acknowledgement of satisfactory completion. Additional Pollution Reduction Programs were added at U1, U2 and U3.

- Biodiversity Offset approval. In February 2013, the DoPI provided advice confirming that the establishment of the Whitehaven Biobank site (Site ID 43), and the retirement of credits in the Biobank, satisfied the requirements of the biodiversity offset requirements for Tarrawonga, as applicable under DA-88-4-2005 and DA-88-4-2005 MOD 1.
- MOP – In June 2012, DRE approved a MOP amendment which aligned the Tarrawonga MOP plans extraction area with the extraction area approved under DA-88-4-2005 MOD 1. A new MOP has since been prepared relating to the Tarrawonga Extension area and is currently awaiting approval.

Table 1 - Tenements, Licences and Approvals

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	Application for renewal with the Department
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 Dec 11, Mar 13.
Department of Water and Energy (DWE)[*4]	90BL253276 90BL253278 90BL253279 90BL253280 90BL254253 90BL254254 90BL254255 90BL254221 90BL254214	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	Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity Perpetuity	Monitoring bores

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
	90BL255766 90BL254692	19/08/2012 12/05/2009	Perpetuity 11/05/2014	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	Nominal 30/06/2013. Extension granted to 30/10/2013 pending new MOP approval	Current for a term of 3 years
Department of Planning and Infrastructure (DoPI)	Project Approval PA 11_0047	22/01/2013	31/12/2030	Project Approval for LOM Extension Project. Expires December 2030
Department of Sustainability, Environment, Water, Population and Communities (SEWPaC)	EPBC 2011/5923	11/03/2013	31/12/2053	Conditional Federal Project Approval for LOM
Division of Resource and Energy (DRE)	Mining Operations Plan (MOP)	01/07/2013	30/06/2015	Pending approval from DRE

*[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)

1.3 Actions Requested at Previous AEMR Review

The annual environmental meeting for the 2011/2012 AEMR for the Tarrawonga Coal Mine was undertaken by DRE on the 4th December 2012. General discussion topics included blast dust and the dust PRP, improved survey of soil stockpiles and noise exceedance levels and relationship to the "Tarrawonga" property acquisition zone. Discussions with DRE resulted in provision of a revised rehabilitation plan for the subsequent AEMR period issuing on 13th November 2012, and a revised rehabilitation table on 15th February 2013. At the time of preparing this AEMR/Annual Review, DRE had not provided any formal or written advice on the 2011/12 AEMR/Annual Review.

2 SUMMARY OF OPERATIONS

2.1 Exploration, Resources / Reserves and Mine Life

2.1.1 Exploration

No exploration was undertaken during the reporting period.

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. With the approval of the Tarrawonga Mine Extension, it is estimated that the coal resource remaining within the Tarrawonga Deposit will be exhausted by 2030.

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 14.5 ha comprising the White Cypress Pine – Narrow-leaved Ironbark Shrub/Grass Open Forest of the Western Nandewar Bioregion vegetation type.
- 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 87,912 m^3 topsoil, subsoil and friable overburden was stripped. Existing stockpile locations are shown on Plan 3.

Table 2 shows that at the end of the reporting period, a total of 111,096 m^3 subsoil and topsoil had been replaced on reshaped areas of the final landform. A further 872,489 m^3 of topsoil and subsoil remains stockpiled within the mining lease. This stockpiled volume represents a slight increase in the previously reported stockpiled volumes (2011/12 FY – 799,797 m^3).

During the reporting period, the mine advanced approximately 80m to the south and east. This comprises the actual working pit area and stripping in advance of the open cut.

Table 2 - Production and Waste Summary

	Cumulative Production			
	Start of Reporting Period (up to 30/4/12)	**During Reporting Period (1/5/12 to 30/4/13)**	**Cumulative Total at End of Reporting Period**	**End of next Reporting Period (estimated)**
Soil Stripped (m^3)	1,154,125	87,912	1,242,037	1,310,000
Soil Used/spread (m^3)	324,529	111,096	435,625	458,479
Waste Rock (m^3)	80,234,424	19,121,062	99,355,486	116,000,000
ROM Coal (t)	8,336,010	1,945,365	10,281,375	12,300,000
Product (t)	7,385,140	1,792,927	9,178,067	11,113,148
Domestic Product (t)	98,263	56,549	154,812	204,812

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 construction of water storage facilities for improved sediment detention and dirty water storage capacity, namely SB24A, SB23A, SB16B (Figure 2) and an additional

large pit water storage within the open cut footprint, known as the "Boxcut Dam" (Figure 3).

Figure 2 – SB16B Adjacent to Seeded Rehabilitation on the Southern Emplacement

Figure 3 - Boxcut Dam (constructed during 2012/13 reporting period)

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 19,121,062 bcm friable and competent overburden was removed to produce 1,945,365t ROM coal at an average overburden:coal stripping ratio of 9.8:1 (See Table 2). The lower strip ratio comparative to the previous reporting period is a result of mining to the south, avoiding the hill located within the ML, and minimising the extent of overburden removal required to access coal.

Plan 4 presents the status of mine and infrastructure development as of 30th April 2013. 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 3 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 3 - Mining Equipment

ITEM	NUMBER IN OPERATION	FUNCTION
O & K RH170 Excavator	3	Overburden excavation and loading
Hitachi EX1900 Excavator	1	Overburden / interburden / coal loading
CAT 785 Dump Trucks	11	
CAT 789 Dump Trucks	5	
Terex SKF Drill	1	Blasthole Drilling
Terex SKSW Drill	1	Blasthole Drilling
Cubex 1320 Drill	1 (p/t)	Blasthole Drilling
CAT D11R Dozer	3	interburden / coal ripping / pushing; dump maintenance
CAT D10T Dozer	3	interburden / coal ripping / pushing; dump maintenance
Water Cart	3	Dust Suppression
CAT 16M Grader	2	Road maintenance
Service Truck	2	Machinery servicing
Cummins Genset	2	Power for site offices, workshop and coal loader
Mobile Crusher	1	Crushing
IT38G Loader	2	Loading
Lighting Plant	15	Lighting
CAT 988H Loader	2	Coal Pad

2.4.4 Hours of Operations

PA 11_0047 permits 24 hour operation of mining activities and allows for changes to coal transportation following the commissioning of the Boggabri Rail Spur Line and Boggabri CHPP. At this stage, mining operations have not been undertaken on a 24 hour basis, nor is the Boggabri rail spur or CHPP commissioned. TCPL has made some minor changes to operating times to accommodate changes in the working roster for improved production and economic stability.

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, up until 15th April 2013.

From 15th April 2013, open cut mining activities, including processing of coal, occurred between the hours of 6:30am and midnight Monday to Friday, between midnight and 3.00am Tuesday to Saturday, and 6:30am to 5.00pm Saturdays.

Coal transportation from the mine site has continued 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.

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 Project Area.

Figure 4 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 1,792,927 tonnes of coal was transported from the Tarrawonga site to the CHPP. 868,303 tonnes was direct bypass coal (i.e. crushed product coal not requiring washing) whilst 996,211 tonnes was directed through the washery, producing 811,084 tonnes of washed product (average yield of 85%). Coal from the CHPP was despatched via rail to domestic and export markets (Figure 4).

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.

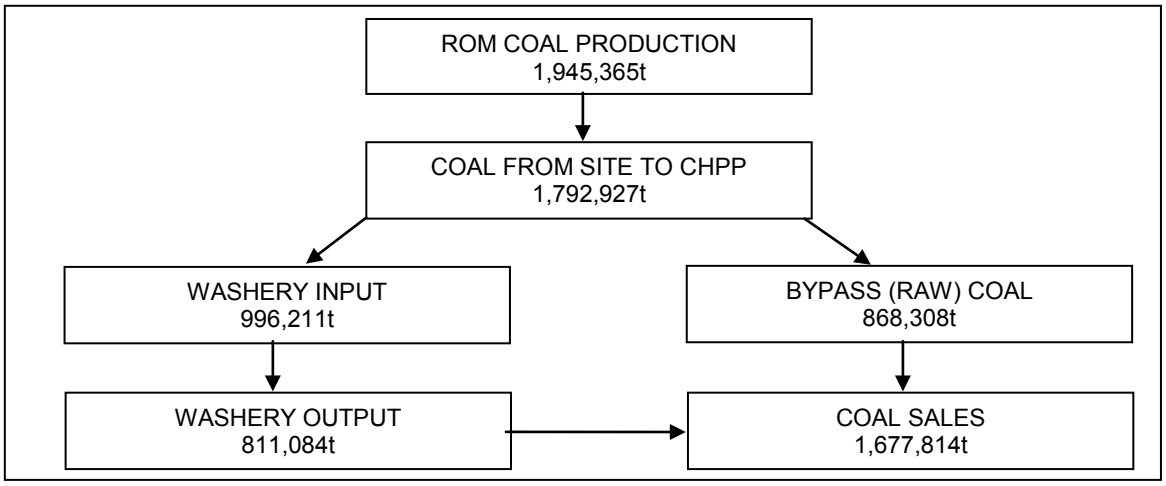

Figure 4 - Coal Movement and Production Summary
(2012/2013 Reporting Period)

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 weekly 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 bunded 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 350,665 tonnes of coarse reject has been disposed at the site during the reporting period.

Fine Reject – Pumped to a series of ten fine reject ponds within the Whitehaven CHPP balloon loop and adjacent to the Whitehaven CHPP for consolidation. 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. Average stockpile volume during the reporting period was 79,629 tonnes, with volumes ranging from 13,372 tonnes to 181,101 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.

There are seven wet weather discharge points nominated in the current EPL 12365. These are SD17, SD16, SD9, SB14, SB22, SB23 and SB18 (Plan 4). SB18 has recently been identified as an error as the relevant licence variation submitted by TCPL requested inclusion of SB24, not SB18. This error will be rectified early in the next reporting period when a variation application is submitted for the extension project.

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 project approval 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

Wet weather discharges that occurred during the reporting period are discussed in Section 3.3.2.

2.8.4 Water Sources, Demand and Use

Within the Project Approval 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 Project Approval 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 605 ML was used for mine site and processing facility dust suppression purposes, with the majority sourced within the Project Approval area. A small amount of water was alternatively sourced through a pipeline from Boggabri Coal during a lengthy dry period when Tarrawonga water stocks became low. The volumes obtained are as follows:

- 548.5 ML from groundwater/surface water inflows to the open cut (majority being surface water inflows); and
- 55.2 ML from surface flows to sediment basins and storage dams within the Project Approval area.
- 1.26 ML pumped from Boggabri Coal into storage dams within the Tarrawonga Approval area.

During the reporting period, Tarrawonga established a pipeline from Boggabri Coal's storage dam (to hold water pumped from licensed allocations) to Tarrawonga's pit water storage dam (PW3). The establishment of the pipeline was undertaken to sure up supply in the event that water supplies at Tarrawonga declined to unsustainable

levels. This was undertaken on the basis of a commercial agreement with Boggabri Coal to access their pumping infrastructure from the Namoi River. Tarrawonga also came to terms with Whitehaven's Maules Creek Project to access water under its high security Namoi River water licence. Prior to requiring to physically pump water under these terms, rainfall in the area generated adequate supply for ongoing operations, so the only water pumped to site was from the Boggabri Coal storage dam as part of a pump commissioning process. The pipeline established will provide the infrastructure needed in the event of a similar circumstance arising in the future.

A significantly higher amount of water was used during this reporting period in comparison to the total of 369ML used in the last reporting period. This is due to higher than average rainfall in the earlier months of the reporting period which led to increased levels of pit water (from surface runoff) and high storage dam levels. This necessitated additional usage of water across the site in order to reduce water storage levels and maintain adequate storage availability for future rainfall events. In the subsequent months, a lengthy period of dry weather also required substantial use of site water resources to minimise dust generation from site.

As required in PA 11_0047, an updated Water Management Plan was developed during the reporting period and submitted for review to the DoPI. URS Australia Pty Ltd was engaged to complete the Plan to a standard which addresses the requirements in the Project Approval and it is expected that the updated Plan will be approved in the early months of the next reporting period.

2.8.5 Stored Water

Table 4 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 4 - 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)	63,060	38,432	110,053
Dirty Water (in Sediment Basins)	76,563	93,908	174,507
Controlled Discharge Water (salinity trading schemes)	N/A*	N/A*	N/A*
Pit Water	21,850	110,654	174,033
* 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 549.8ML was pumped from the open cut sump(s). This water comprised mostly surface runoff (from the previously mentioned extremely wet months in early-mid 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 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 1,792,927 tonnes of coal was transported from the mine over the reporting period in approximately 46,891 truckloads. This equated to an average of 152 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 5, Figure 6 and Figure 7. 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 Condition 18, Tables 6, 7 & 8 (Appendix 1). This criterion is replicated in PA 11_0047 Schedule 3 Condition 24, Tables 6, 7 & 8 (Appendix 1) which is summarised below:

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

Monitoring continues at all sites but exceedances on project-related properties are not reportable to the EPA and monitoring results are not reportable via the Annual Return.

Throughout the reporting period, real time PM_{10} TEOM (air quality monitoring) was conducted with a permanent monitoring station located at the nearby "Flixton" property (Figure 3). Data is generated every 15 minutes and correlated against current weather conditions, with alarms notifying site personnel of elevated PM_{10} results when wind conditions and direction is indicative of mining influence on the monitor. Average data for the reporting period is provided in Table 5.

Table 5 – Real Time PM_{10} Monitoring Data

Month	Average PM_{10} Per Month ($\mu g/m^3$)	Rolling Average Over Reporting Period ($\mu g/m^3$)
May-12	N/A	N/A
Jun-12	6.8	6.8
Jul-12	8.3	7.6
Aug-12	13.6	9.6
Sep-12	16.7	11.4
Oct-12	17.5	12.6
Nov-12	22.0	14.2
Dec-12	20.2	15.0
Jan-13	15.7	15.1
Feb-13	15.7	15.2
Mar-13	13.5	15.0
Apr-13	23.1	15.7

Elevated readings were received during the months of October and November 2012 due to dry conditions, with background PM_{10} levels elevated throughout the North West Slopes. This was confirmed by consulting data from the North West Slopes (Tamworth) Daily Regional Air Quality Index (RAQI) for October. Exceedances of the 24 hour average PM_{10} were received over the 19th and 20th April 2013. Upon investigation, the elevated average results were attributed to dust generation off the nearby Boggabri-Manilla Road during peak travel times of 6-8am and 5-7pm.

Although other peak results were identified outside of these times on the 19th and 20th April 2013, a temperature inversion layer did not allow dust to disperse and contributed to the exceedance. Investigations at a site level were not able to identify any specific site equipment generating excessive dust, with no further action required other than continued monitoring of adverse weather conditions and confirmation that dust generation continues to be related predominantly to nearby unsealed roads.

WHC is currently in discussions with NSC in regards to the sealing of a section of Boggabri-Manilla Road as part of the Maules Creek Project in accordance with conditional requirements for that project. Refer to Section 3.1.3 for further information on dust monitoring.

Schedule 3, Condition 29 of PA 11_0047 requires the updating of the existing Air Quality and Greenhouse Gas Management Plan. This Plan has been developed during the reporting period with correspondence and approval expected in the early months of the next reporting period. A requirement of the approval, which is addressed in the Management Plan, is the development of a proactive and reactive air quality management system that includes $PM_{2.5}$ monitoring. A real time $PM_{2.5}$

TEOM is located at the “Will-gai” property south of Tarrawonga, but as this is a new requirement, with limited data currently available, this will be discussed in the next AEMR/Annual Review.

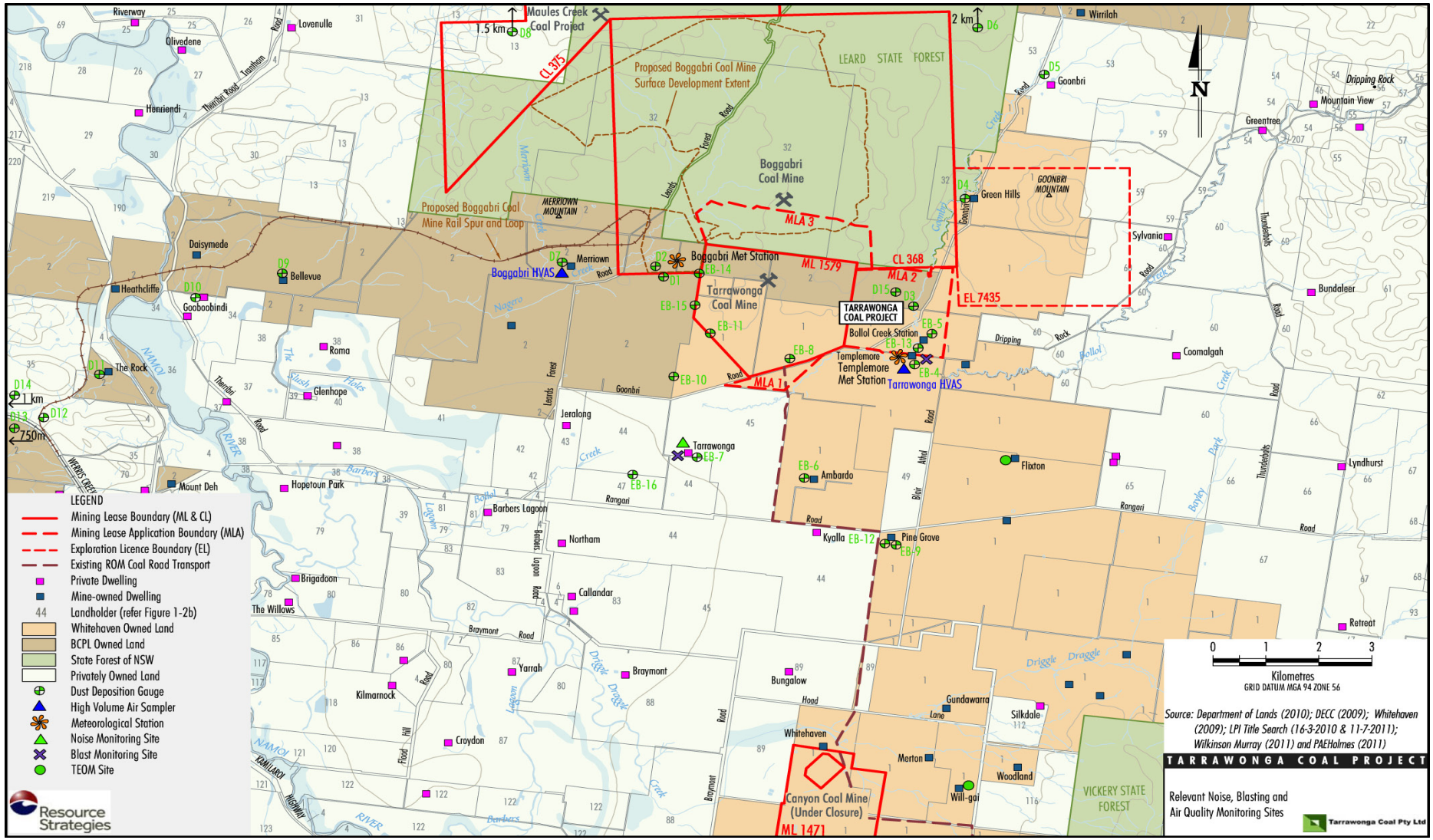

Figure 5 - Environmental Monitoring Locations

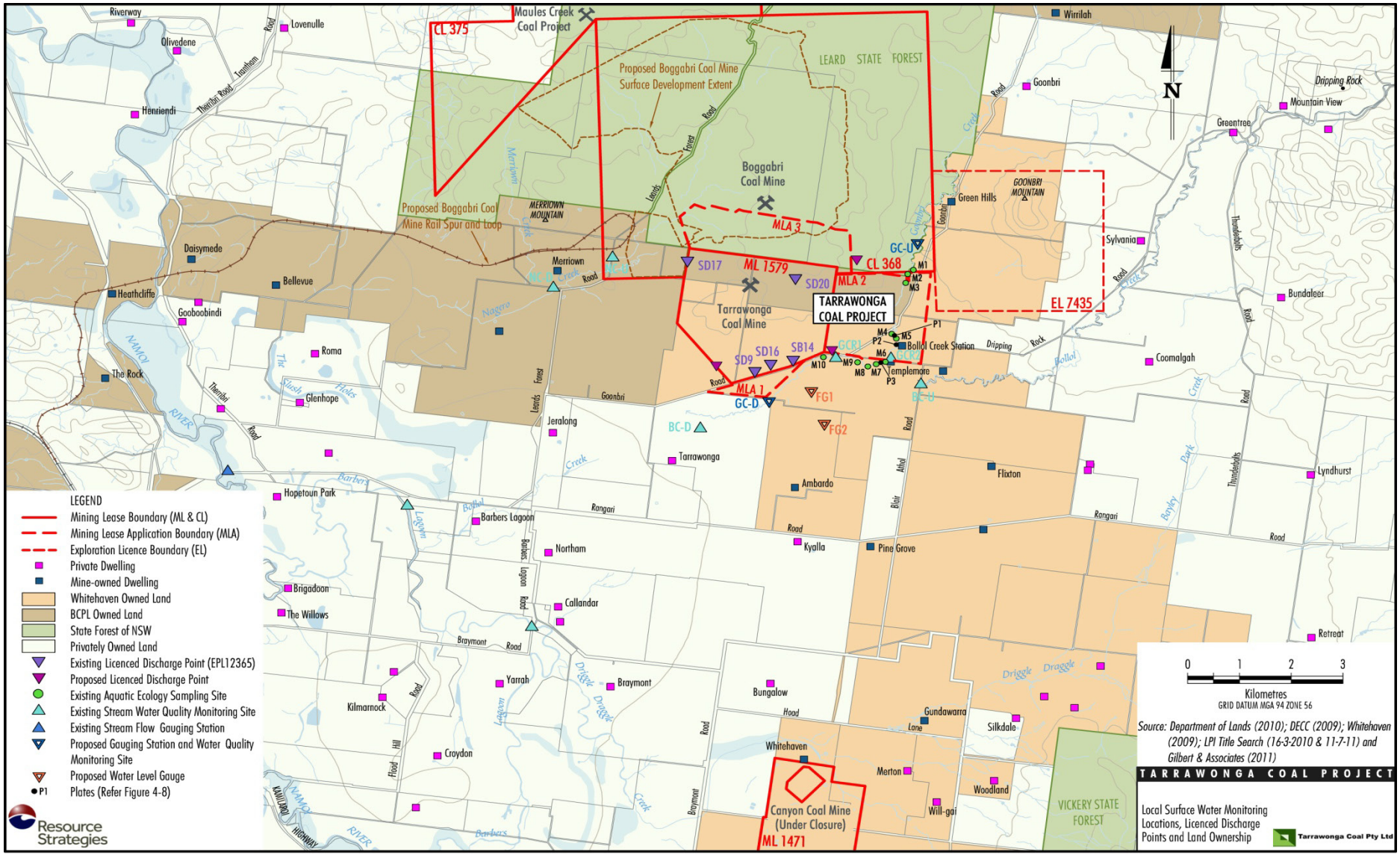

Figure 6 – Surface Water Monitoring Locations

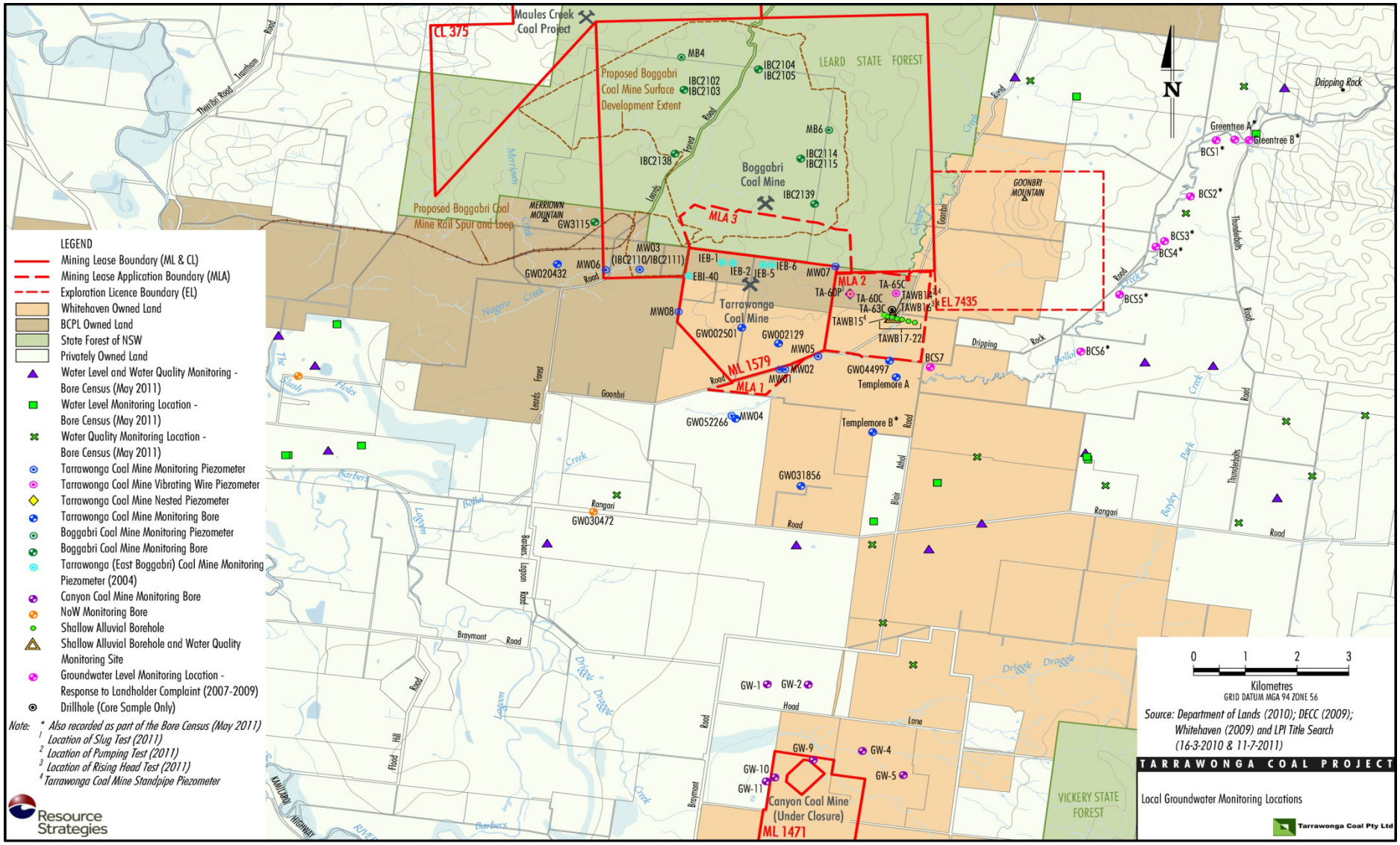

Figure 7 - Groundwater Monitoring Locations

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, a Pollution Reduction Program (PRP) including a monitoring program designed in line with new conditions of EPL 12365, was completed and implemented for the best practice measures to reduce particle emissions from coal mines. Monitoring programs for wheel generated dust and overburden dust generation are currently awaiting approval by the EPA with the winter monitoring campaign to commence in July 2013. A summer monitoring campaign will also be conducted with results for both programs to be supplied in the next reporting period. Tarrawonga Coal has also partnered with PAE Holmes as part of an approved ACARP study, whereby Tarrawonga will be used as a sampling site for determination of Australian specific dust emission factors for coal mines. This work will include use of a specially designed monitoring unit to measure dust emissions from active haul roads. The outcomes of this work will be discussed in the next reporting period.

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/m^2/month recorded in October 2009 at D-15 Forest View has also been excluded from the long term average.

Figure 5 identifies the locations of the various deposited dust gauges maintained during the reporting period.

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*3 (g/m2/month)	Mean Ash*1 (g/m^2/month)	Long Term Mean Total Insoluble Solids (g/m^2/month)
EB-4	TEMPLEMORE	2.0	3.2	1.1	2.4
EB-5	BOLLOL CREEK STATION	2.5	3.7	2.1	2.6
EB-6	AMBARDO	1.0	2.2	0.7	1.1
EB-7	TARRAWONGA	0.9	2.1	0.8	1.1
EB-8	THUIN	2.7	3.9	2.1	2.5
EB-9	PINE GROVE	1.3	2.5	1.1	1.0
EB-10	TARRAWONGA MINE	8.1	9.3	2.3	3.4
EB-11	TARRAWONGA MINE	1.1	2.3	0.8	1.8
EB-14	WESTERN BOUNDARY OF ML	2.1	3.3	1.5	3.0
EB-15	WESTERN BOUNDARY OF ML	5.0	6.2	4.0	4.5
D-2*2	NAGERO	11.8	13.0	-	5.4
D-3*2	FOREST VIEW	7.8	9.0	-	6.5
D-4*2	GREEN HILLS	6.4	7.6	-	4.0
D-7*2	MERRIOWN	1.0	2.2	-	1.2
D-15*2	FOREST VIEW	1.5	2.7	-	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-10 “Mine”, EB-15 “Western Boundary”, D2 “Nagero”, D-3 “Forest View” and D-4 “Green Hills”. All sites where the mean annual deposited dust criteria exceeded the 4g/m^2/month criteria are on project related property. It should be noted that the Total Insoluble Matter value can be significantly impacted by other sources. When compared to the Ash component (that proportion retained after combustion), the values are substantially reduced and are generally reflective of a significant vegetative component in the sample.

- EB-15 is located on the western boundary of the mining lease, in close proximity to Boggabri Coal infrastructure and facilities most likely leading to anomalous results when Boggabri Coal construction works are being undertaken.
- D-2 is located west of Tarrawonga, in close proximity to the Boggabri Coal infrastructure area. Elevated results are most likely due to construction works being undertaken at the Boggabri Coal facility.
- 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 (PM_{10}) located at the property "Templemore", to the south-east of the mine site. There is another PM_{10} 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.

During the reporting period, the PM_{10} results at the "Templemore" monitor have exceeded compliance with the 24 hour criteria on three occasions, twice in October 2012 and once in January 2013. This was primarily due to particularly dry weather conditions during these periods and therefore increased dust generation from nearby unsealed roads with elevated results through November and December 2012 also prevalent without exceeding. As the "Templemore" monitor is located on project related property, and is unoccupied, the 24 hour PM_{10} criteria do not apply at this property. Despite the exceedances in the 24 hour criteria, the "Templemore" monitor remains within the annual average compliance criteria of 30 $\mu g/m^3$, with an annual average at the end of April 2013 of 19.62 $\mu g/m^3$ (Figure 8). The results for PM_{10} at "Templemore" generally correlate well with the rainfall received, with higher PM_{10} levels recorded during the drier periods.

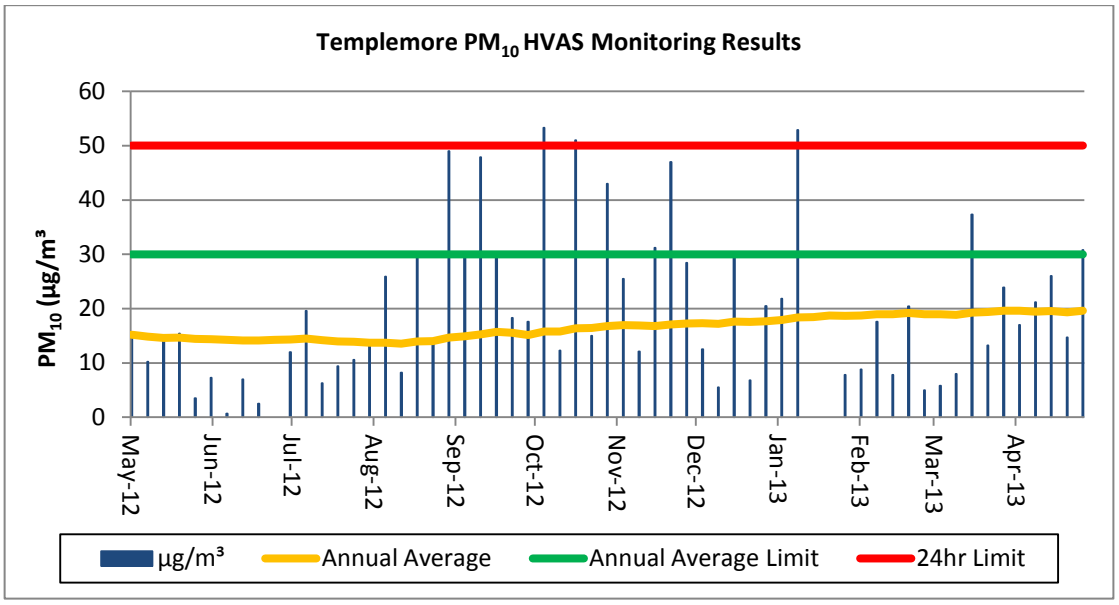

Figure 8 - Templemore HVAS PM_{10} Data
May 2012 – April 2013

Throughout the reporting period, the PM_{10} results at the "Merriown" monitor have indicated compliance with the 24 hour criteria. The "Merriown" monitor remains within the annual average compliance criteria of 30 µg/m^3, with the running annual average of 17.99 µg/m^3 at the end of the reporting period (Figure 9).

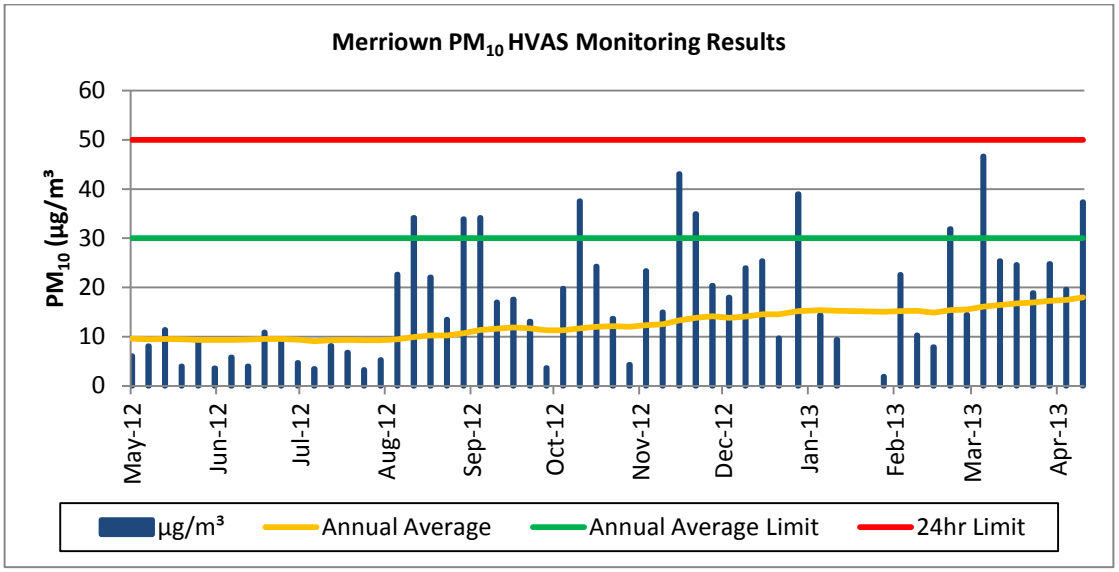

Figure 9 - Merriown HVAS PM_{10} Data
May 2012 – April 2013

The full data set for the PM_{10} monitoring over the life of the mine, including graphs of long term data records, is contained within Appendix 4.

Tarrawonga has continued to receive a number of complaints about dust despite significantly improving dust management practices over the reporting period through both increased water application on haul roads, and the use of Dustex on haul roads to improve dust mitigation. Dust impacts are further complicated by cumulative impacts from Tarrawonga and Boggabri Coal, with complainants not necessarily able to distinguish dust sources from Tarrawonga, Boggabri or the local gravel roads. As Tarrawonga mine is the operation most visible to complainants, it tends to be associated with the dust complaints. This is despite photographic evidence from the site camera located on the northern emplacement which has generally supported Tarrawonga claims that dust generation is minimised with no specific dust source associated with operating equipment being able to be identified.

A major contributing factor 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 PM_{10} units located at the "Flixton" and "Tarrawonga" properties, with spikes in PM_{10} 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 and Greenhouse Gas Assessment (AQGHGA) was undertaken by PAEHolmes Pty Ltd as part of the Tarrawonga Coal Project mine extension (*Tarrawonga Coal Project Environmental Assessment, Appendix D, 2012*). The predicted levels and comparisons with actual monitoring data are included below for both dust deposition and PM_{10}.

Dust Deposition

The AQGHGA predicted that the annual average dust deposition levels at all receptors surrounding the Project Area would be below the relevant criteria of 4g/m^2/month for cumulative dust deposition when using a background dust deposition level of 1.2g/m^2/month.

The reporting period average for "Tarrawonga" (the only privately owned property surrounding the mine) was 0.9g/m^2/month. Combined with the background dust deposition level, this monitor matches the Tarrawonga Coal Project EA prediction of not exceeding 4g/m^2/month. All monitoring locations where exceedances have occurred are on project-related properties.

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 exceedance at EB-15 is not unexpected as this monitor is located between Boggabri Coal's ROM pad and Tarrawonga operations. This is also the case of D-2 "Nagero" to the west of the mine.

PM_{10}

The AQGHGA predicted that cumulative impacts from the extension of the Tarrawonga mine and background levels would not exceed the annual average PM_{10} limit of 30 µg/m^3 at any receiver or the 24 hour PM_{10} concentration limit of 50 µg/m^3 at any privately-owned receiver. The highest 24 hour concentration recorded during the reporting period was 53.3 µg/m^3 at "Templemore" and 46 µg/m^3 at "Merriown". The highest annual average during the reporting period was 19.62 µg/m^3 at "Templemore" and 17.99 µg/m^3 at "Merriown". Although the annual averages of both monitors were well below the annual average criteria, exceedances of the 24 hour concentration limit occurred at "Templemore" in October 2012 and January 2013. As previously mentioned, this site is project related and therefore the criterion does not apply.

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 Erosion and Sediment Control Plan 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. Water usage for dust suppression 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 McKenzie Soil Management; 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, TCPL 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.

During late January 2013, after an extensive dry weather period, approximately 120mm of rain fell over a 24 hour period. This rainfall caused extensive pooling of water on top of the southern emplacement which ultimately overflowed down the rehabilitated area causing extensive washouts and silting of contour drains. Repairs and maintenance were completed on the southern emplacement soon after to clear contour drains of excessive silt and to fill washout areas. The cause of the pooling of water was rectified with drains put in place to divert water off the top of the emplacement around the rehabilitated areas. Sediment drains to site discharge dams were also damaged with significant washouts and loss of sediment control measures such as hay bales. Repairs were conducted with further measures put in place to slow water down in case of similar rain events in the future. It is noted that no wet weather discharge occurred during this event.

Additional sediment control structures were installed during the reporting period, including sediment sumps on the western boundary of the soil stockpiling area, SB23B at the southern end of the soil stockpiling area, and SB24a at the eastern extent of the mine site.

3.2.3 Comparison with EA Measures

The Tarrawonga Coal Project 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. 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.

During the reporting period, two sediment dams were de-silted to allow a return to full capacity. With the higher than normal volumes of water stored, remaining dams that require any cleanouts have not been able to completed during the reporting period. This will be continually monitored throughout the next reporting period with work undertaken at the next available opportunity.

Progressive construction of water management on rehabilitated areas has occurred as required. For example, extension of the rock lined waterway on the western face of the northern emplacement has been completed.

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

TCPL 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). Two (2) instances of wet weather discharge and three (3) controlled discharges occurred during the reporting period. On all occasions, 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.

23rd May 2012 - *Controlled discharge*

A sample was taken on the 11th May 2012 from SB23 for the purpose of a controlled discharge. Results received on the 23rd May 2012 indicated a pH of 8.2, Total Suspended Solids (TSS) of 18 mg/L and Oil and Grease of <5mg/L. These results are within the EPL criteria limits therefore a controlled discharge took place on the 23rd May 2012. This discharge effectively made capacity for the 30.8 mm of rain received between the 24th and 26th May 2012.

12th July 2012 - *Wet weather discharge*

Wet weather discharge occurred from 3 separate dams on the 12th July 2012. The discharges occurred from SB14, SD9 and SB23 following 43.8 mm in the preceding 5 days. Water quality from these discharges complied with all parameters except TSS for SB 14 (932 mg/L) and SB23 (910 mg/L). As the amount of rainfall exceeded the 5 day 90%ile design criteria, these discharges were not reported as non-compliances. Both Goonbri Creek (upstream and downstream) and Bollol Creek (downstream only) were able to be sampled at the time with TSS results of 388 mg/L, 79mg/L and 122 mg/l respectively, indicating that discharge waters did not have a significant impact on creek flow water quality.

18th and 20th July 2012 - *Controlled discharge*

As a response to wet weather discharge on the 12th July 2012, flocculation efforts were undertaken at SB23 and SB14 on the 18th and 20th July 2012 respectively. The flocculation successfully brought TSS levels below the EPL criteria with approximately 2.4ML pumped out of SB23 to free up capacity. A fill point was installed at SB14 to allow water carts to extract water for dust suppression purposes with the dam significantly lowered during this time.

21st February 2013 - *Controlled discharge*

Following extensive rain events in late January and early February 2013, a controlled discharge was undertaken from SD9. A hand held TSS monitor was used to determine the initial TSS and confirm if flocculation was required. The hand held result was confirmed by the laboratory prior to the discharge, which indicated a TSS of 18mg/L. Approximately 1ML was pumped offsite to free up SD9 capacity.

3rd March 2013 - *Wet weather discharge*

Rainfall totalling 55.8mm on the 2nd March resulted in discharge from SB23 on the 3rd March 2013. A sample was taken on the 4th March 2013 with results compliant with all criteria except TSS (752mg/L). This discharge was not reportable due to exceeding the 5 day 90%ile rainfall depth of 38.4mm.

3.3.2.2 Conclusion

Significant improvements have been made in regards to managing wet weather discharge issues, with the successful trial and implementation of liquid flocculant into storage dams when required, as well as constructing additional dams for increased storage capacity and improved water management. Signage indicating dam names and purpose as well as level indicators has been installed to allow for easy identification of necessary storage capacities. In addition to this, URS Australia Pty Ltd developed a Water Management Plan required by DA 88-4-2005 MOD 1. This

Plan was updated to comply with PA 11_0047 at the end of the reporting period, with correspondence and approval expected early in the next reporting period.

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.

EC levels in various storages have shown to be variable, and have been the subject of previous discussions during AEMR reviews. Results presented over the last 12 months continue to identify fluctuating EC levels. The EC levels will be closely monitored over the next 6-12 months to confirm if the EC results are indicative of any significant trend in longer term EC levels.

The assessment of sediment load during these quarterly water monitoring events also provides an indication of the capacity for those storages to meet water quality criteria should a wet weather discharge occur, and if additional treatment methods would be warranted to minimise potential for a non-compliant discharge.

3.3.3 Comparison with EA predictions

The 2010 Modification EA and Tarrawonga Coal Project 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.

SB16B, SB23A, SB24A, and the large boxcut dam have all been constructed during the reporting period. As per the Modification EA and Tarrawonga Coal Project EA, off-site creek monitoring locations have not changed and SD20 has been mined through. Assessment of Arsenic, Molybdenum and Selenium have continued in accordance with water management plan requirements, with no suggested trend of enrichment of these minerals in surface waters adjacent to the overburden emplacements.

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 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 7.

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 reporting period. Unlike previous years, GW031856 has shown a relatively consistent SWL whilst Templemore B continues to show fluctuations which is understood to be associated with farming activity. 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. Two vibrating wire piezometers were installed into exploration boreholes drilled in 2011 (TA60c and TA65c). Similar to MW7, these have shown evidence of depressurisation.

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.
- Water level loggers in MW1 and MW2 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, together with a chart outlining standing water level over the period. Logger data continues to demonstrate a consistent trend of no perceptible drawdown as a consequence of mining operations, with water levels remaining relatively constant and generally within a range of 20cm over the reporting period.

3.4.3 Comparison with EA predictions

The Tarrawonga Coal Project EA identified that there would be negligible drawdown effect on alluvial and porous rock systems and 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 only 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 wet weather periods. Vibrating Wire Piezometers installed to the east of the current mining operations continue to demonstrate depressurisation as predicted in the Tarrawonga Coal Project EA as the mine moves toward the east.

3.5 Contaminated or Polluted Land

Prior to mining, the project 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 project area.

Areas identified of potential land contamination during the Life of Mine Extension Environmental Assessment have not been disturbed during this reporting period and are several years from disturbance based on current mine planning.

3.6 Threatened Flora

Investigations undertaken by Geoff Cunningham Natural Resource Consultants Pty Ltd as part of the original 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 were identified in the Flora and Fauna Management Plan for the site 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. During the reporting period, vegetation monitoring was conducted during December 2012 through Eco Logical Australia Pty Ltd. This monitoring comprised of:

- Remote sensing on the 30th September 2012;
- Terrestrial fauna and habitat survey on the 18th December 2012; and
- Woodland surveys of five plots from rehabilitated woodland and five plots from control areas, including vegetation surveys on the 18th December 2012 comprising a suite of parameters that relate to woodland vegetation health and habitat value.

As rehabilitation of pasture areas had only recently been undertaken, monitoring of the rehabilitated pasture will take place and be reported to during the next reporting period.

The key outcomes from the 2012 monitoring identified that Multi-Spectral imagery analysis indicated an overall reduction in photosynthetically active biomass (PAB) than the previous reporting period, indicative of a reduced rainfall period preceding the image capture and reduced groundcover response. Rehabilitated woodland zones therefore have not yet reached a PAB level comparable to control plots. Some assessment zones did show significant increase in PAB levels, which were consistent with newly created rehabilitation zones and subsequent cover crop establishment. Bird species diversity was also found to be down on the previous year, most likely due to drier conditions and reduced resource availability. Key weeds identified for

additional control included the African Boxthorn and Prickly Pear. A copy of the 2012 report is included in Appendix 7.

During the reporting period, on the 28th June 2012, the Whitehaven Regional Biobank site was formally established under Biobank Agreement 43. This Biobank site now accounts for Tarrawonga offset requirements associated with the original Tarrawonga development and the 2010 modification. The biobank credits required to be retired for these approvals occurred on the 17th April 2013, and the area is now subject to active management in accordance with the Management Plan for the Regional Biobank site. The Environment Trust Fund is due to make first payment for active management during the next reporting period. Progress against management plan requirements will be reported in the next AEMR/Annual Review.

The offset area associated with the Tarrawonga Extension approval PA 11_0047 has been approved as Willeroi West, with a management plan for this offset site recently prepared and currently awaiting approval. It is expected this will occur during the next reporting period.

3.6.1 Comparisons with EA Measures

The Biodiversity Assessment undertaken as part of the Tarrawonga Coal Project EA outlines the approved areas of disturbance. Approximately 14.5 ha were cleared in advance of the pit during the reporting period. Flora and fauna monitoring has occurred as identified in the Tarrawonga Coal Project EA (see Appendix 7 for reports), with pre-start clearance surveys completed by recognised ecologists prior to clearing activity. During the reporting period there were flora species identified in addition to those identified and assessed during the ecological assessment for the extension project.

3.7 Threatened Fauna

Investigations into the occurrence of threatened fauna within the Project 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 was developed to monitor possible 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, 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.

During the reporting period, as part of PA 11_0047 requirements, a Biodiversity Management Plan was developed. Once approved (anticipated during the early stages of the next reporting period), this Biodiversity Management Plan will replace the existing Flora and Fauna Management plan with updated procedures, policies and management strategies for the site itself and for the Willeroi Offset area.

The annual fauna monitoring program was undertaken in September 2012 by CES. Additionally, Eco Logical Australia Pty Ltd undertook terrestrial fauna and habitat monitoring as part of their Rehabilitation Monitoring Report in December 2012. Both reports are provided in Appendix 7 and include 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 56 bird species were recorded across all monitoring sites by ELA, with most species being recorded in the woodland control plots. However, there was a significant increase of species identified on rehabilitation survey plots compared to last year's reporting period. Four species (Little Eagle, Varied Sittella, Brown Treecreeper and Speckled Warbler) listed as vulnerable under the TSC Act were recorded during the survey, most of which occurred in control plots. The Eastern Grey Kangaroo and Common Wallaroo were recorded at all fauna sites, with the Red Necked Wallaby and Swamp Wallaby recorded at control site 4.

3.7.1 Comparison with EA Measures

The Tarrawonga Coal Project 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 and Fauna Monitoring undertaken by Countrywide Ecological Services. Rehabilitation is discussed in Section 5.

3.8 Weeds

3.8.1 Management

Weed management within the Project 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 in the waste emplacement rehabilitation and around SB5A);
- Removal of Silverleaf Nightshade and spraying of Mother-of-Millions along roadsides and within the ML;
- 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;
- Introduction of Cactoblastis and Cochineal to eradicate Prickly Pear plants; and
- Spraying of grasses along rip lines and mounded areas to reduce competition with planted tubestock in rehabilitation areas.

Key recommendations from the ELA report relating to weed control include targeted control of African Boxthorn and Prickly Pear across Plots 2, 4 and 8, which will be undertaken during the next reporting period. The ELA report also recommends consideration of options to reduce the prevalence of Rhodes Grass across rehabilitation zone 2 in order to encourage other groundcover species. Works to address Rhodes Grass dominance in this zone will be undertaken during the next reporting period, including seeking specialist advice as to the best control methods whilst limiting impact on other species.

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 PA 11_0047 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.

- A maximum of one (1) blast per day; unless an additional blast is required following a blast misfire and a maximum of 4 blasts per week averaged over a calendar year for the project:
- 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.

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 70 blasts were initiated (all of which were monitored).

There was only one instance of monitoring results exceeding 115 dBL during the reporting period, occurring at the project-related "Templemore" and shown in Table 7. This exceedance falls within the allowable 5% of blasts in a 12 month period over 115 dBL but not greater than 120 dBL. There were no instances of blast results exceeding 120 dBL during this reporting period.

Table 7 - Airblast Overpressure Exceedances

Blast #	Date	Property	Ground Vibration (mm/s)	Airblast Overpressure (dBL)
421	21/3/2013	Templemore	0.5	115.7

The maximum recorded ground vibration during the reporting period was 2.57 mm/s recorded at "Templemore" on the 8th August 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 C of the Tarrawonga Coal Project 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 the blast of the 21st March 2013 which recorded an overpressure level of 115.7dBL is not considered a non-compliance.

The Blast Management Plan was updated to comply with requirements in PA 11_0047 during the reporting period and is subject to approval by DoPI, with approval expected early in the next reporting period. An additional requirement of the Blast Management Plan was the development of a Road Closure Management Plan in preparation for the mine moving further to the East, impacting on Goonbri Road. Approval of this plan is expected early in the next reporting period.

3.10 Operational Noise

3.10.1 Criteria

For the purpose of monitoring noise performance throughout the reporting period following the granting of PA 11_0047, the criteria adopted for compliance is that of PA 11_0047 which is specified as follows:

Noise Criteria dB(A)

Location	***Day, Evening & Night $L_{Aeq\ (15\ min)}$***	***Night $L_{A!\ (1\ min)}$***
All other privately-owned residences	*35*	*45*

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

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

This differs from the criteria specified in the current EPL which specifies an ($L_{Aeq(15\ min)}$ limit of 35 dB(A) for all residences during the day, evening and night with the

exception of the "Kyalla" property which has a limit of 37 dB(A). A licence variation application will be submitted requesting that the EPL be amended to align with the consent in the near future. As Whitehaven has recently agreed to terms on the acquisition of the "Kyalla" property, the noise criteria at "Kyalla" is now redundant.

A number of other specific conditions (ie. acquisition, monitoring protocols and cumulative impacts) are listed in PA 11_0047 (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

In order to indicate to mine management the need, or otherwise further address noise related matters, 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 5. 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 public sections of the coal haulage route in accordance with the Tarrawonga and Rocglen Road Noise Management Plans. This monitoring occurs at the privately owned residences on the "Weroona" property and "Brooklyn" property located off Blue Vale Road. The results of this noise monitoring is also contained within Appendix 9.

In accordance with the requirements of PA 11_0047 and EPL 12365, TCPL undertook real time noise monitoring during the reporting period. Monitoring was confined to the "Northam" and "Kyalla" properties as well as project related properties "Templemore" and 'Blair Athol". During this period, Tarrawonga Coal has refined its procedures in relation to the real time noise monitoring, including the application of alarms to site when noise levels approach the noise criteria, the completion of a checklist by the OCE in response to any noise alarms, and the identification of responses to alarms where it has been identified that the noise is related to mining activities. The establishment of this process has been critical in terms of preparations for application of cumulative noise impact monitoring with Boggabri Coal and Maules Creek once the cumulative impact plans receive relevant approvals.

The following sub-sections present a summary of the outcomes of attended noise monitoring over the reporting period.

3.10.3.2 June 2012 Noise Monitoring - Attended

Noise monitoring was undertaken from the 25th to 27th June 2012. Monitoring was undertaken at "Bollol Creek Station" (N2), "Pine Grove", "Tarrawonga" (N3) and "Ambardo" (N4) properties. TCM did not exceed the operational noise criterion at either of the "Bollol Creek/Templemore", "Ambardo" or "Pine Grove" monitoring locations during the survey. However, TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the evening and night of both June 26th and June 27th. Atmospheric conditions at the times of the monitoring were calm and cold and there is high likelihood of a moderate to strong temperature inversion being in place. As such the elevated noise levels were most likely the result of noise enhancement due to the temperature inversion and, therefore, would have occurred under non-compliant atmospheric conditions.

Noise from TCM was 1 dB(A) over the sleep disturbance criterion at the "Tarrawonga" monitoring location on the night of June 26th. As the exceedance was

only minor, and to avoid undue disturbance to the tenants at the house further measurements at 1 m from a bedroom façade were not made.

In accordance with the relevant approval documents DA-88-4-2005 MOD 1 and PA 11_0047, the "Tarrawonga" property retains acquisition rights. On this basis, the noise criteria do not apply at the property. The monitoring conducted at "Tarrawonga" during June identified noise levels generally in accordance with those predicted in the relevant noise assessments undertaken for the project.

3.10.3.3 September 2012 Noise Monitoring – Road Noise

Road noise monitoring was conducted at the "Brooklyn" (2 residences) and "Weroona" properties on the 24th September 2012, with the following observations and results:

- 35 truck movements were recorded during the measurement period for Residence 1 at "Brooklyn" (10:44am to 11:44am). Residence 2 at "Brooklyn" was monitored between 11:06am and 12:16am. The calculated contribution at Residence 1 from mine-related vehicles was 53 dB(A),$L_{eq\ (1\ hour)}$. The calculated contribution from mine-related vehicles at Residence 2 was 41 dB(A),Leq (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 36 coal truck movements related to Tarrawonga and Rocglen. The total measured contribution from mine-related vehicles at "Werona" was 49 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 2012 Noise Monitoring – Attended

Noise monitoring was undertaken from the 24th to 27th September 2012. TCM were in excess of the operational noise criterion at the "Tarrawonga" monitoring location during the early hours of September 27th. Atmospheric conditions at the times of the monitoring were calm and cool and there is a likelihood of a temperature inversion being in place. During the time of the exceedance on the 27th September the Tarrawonga weather station recorded a temperature inversion with the 10m sensor recording 11.1°C and 2m sensor recording 8°C. As such the elevated noise levels were most likely the result of noise enhancement due to the temperature inversion and, therefore, would have occurred under non-compliant atmospheric conditions. Sleep disturbance criterion was also exceeded on the 27th September, but as mentioned above, the elevated results was most likely due to the temperature inversion.

In accordance with the relevant approval documents DA-88-4-2005 MOD 1 and PA 11_0047, the "Tarrawonga" property retains acquisition rights. On this basis, the noise criteria do not apply at the property. The monitoring conducted at "Tarrawonga" during September identified noise levels generally in accordance with those predicted in the relevant noise assessments undertaken for the project.

3.10.3.5 December 2012 Noise Monitoring – Attended

Noise monitoring was undertaken from the 11th to 14th December 2012. Noise emissions from TCM were higher than the operational noise criterion at the Tarrawonga monitoring location during the evening of December 12th. Atmospheric conditions at the time indicated a 3.9m/s wind from the east, and as such elevated noise levels occurred under non-compliant atmospheric conditions.

TCM did not exceed the sleep disturbance criterion during the monitoring period.

In accordance with the relevant approval documents DA-88-4-2005 MOD 1 and PA 11_0047, the "Tarrawonga" property retains acquisition rights. On this basis, the noise criteria do not apply at the property. The monitoring conducted at "Tarrawonga" during December identified noise levels generally in accordance with those predicted in the relevant noise assessments undertaken for the project.

3.10.3.6 March 2013 Noise Monitoring – Attended

Noise monitoring was undertaken from the 18th to 20th March 2013. Noise emissions from TCM were higher than the operational noise criterion at the Tarrawonga property monitoring location during the night of 18/19 and 20/21 March 2013.

Atmospheric conditions at the time of the monitoring indicated that on 18/19 March the wind was at 3.4 m/s from the east south east and on 20/21 March the wind was at 6.5 m/s from a north easterly direction. As such the elevated noise levels occurred under non-compliant atmospheric conditions. TCM exceeded the sleep disturbance criterion during the night time monitoring periods on March 19 and 21 (i.e. at approximately 1 am). However, as mentioned above, operational noise measurements were made under non-compliant atmospheric conditions.

In accordance with the relevant approval documents DA-88-4-2005 MOD 1 and PA 11_0047, the "Tarrawonga" property retains acquisition rights. On this basis, the noise criteria do not apply at the property. The monitoring conducted at "Tarrawonga" during March identified noise levels generally in accordance with those predicted in the relevant noise assessments undertaken for the project.

3.10.3.7 March 2013 Noise Monitoring – Road Noise

Road noise monitoring was due to be undertaken in March 2013 but due to a lack of truck movements along the haul road from Tarrawonga and inclement weather at the time monitoring was to be undertaken, it was postponed until June 2013 and will be reported during the next reporting period.

3.10.4 Comparison with EA predictions

During the reporting period it was identified that noise levels measured at the "Tarrawonga" property were generally in accordance with predictions made in the 2010 modification EA and the 2011 Extension EA, with noise levels up to 5dB above the standard 35dB criteria. As "Tarrawonga" retains acquisition rights under the Tarrawonga approval, the noise criteria does not apply at this property.

Wilkinson Murray has been engaged to undertake a validation of the tenth percentile methodology used in the noise modelling for Tarrawonga. This work was ongoing at the time of the Annual Report being released. The results will issue separately to the DoPI and EPA when available.

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. TCM is aware of the visual impact this emplacement has created, and with the granting of PA

11_0047, will fast-track rehabilitation of the southern emplacement as much as possible.

One complaint was received in July 2012 during the reporting period in relation to lighting, with further information provided in Section 4.1. 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 and Tarrawonga Coal Project EA provided simulations from neighbouring properties as well as predictions for general visual impacts created by the mine.

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. In the event that complaints are received in relation to lighting, immediate action is taken on site to reduce the lighting impact wherever possible.

The Tarrawonga Coal Project 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 NASO2 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.

A Cultural Heritage Assessment was completed in September 2011 as part of the Tarrawonga Coal Project EA by Kayandel Archaeological Services. A total of 57 sites (21 open artefacts, 11 scarred trees and 21 isolated artefacts) were located during the surveys of the Project Area. An updated Heritage Management Plan was developed, as required in PA 11_0047, during the reporting period, to manage and reduce impacts by incorporating updated procedures for assessment and recovery of culturally significant objects as the mine progresses. An additional requirement of PA 11_0047 includes the development of an Aboriginal Conservation Strategy in conjunction with the Boggabri and Maules Creek Projects, which will be developed and reported on during the next reporting period.

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.

An updated Heritage Management Plan was developed during the reporting period and sent to registered Aboriginal groups in relation to requirements in PA 11_0047. New procedures have been proposed to manage a significantly larger number of registered Aboriginal groups identified through the Tarrawonga Coal Project EA. Details of the new procedures will be provided during the next reporting period after approval to the plan is received.

3.12.3 Comparison with EA Measures

Management measures for Aboriginal Heritage items are detailed in the Tarrawonga Coal Project 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 Project 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 2013, as required by Condition 59 of Schedule 3 of PA 11_0047. The plan identifies policies, procedures, responsibilities, equipment and equipment maintenance schedules, emergency response procedures and contact details in place for the Tarrawonga Coal Mine. The Plan was issued to both the Rural Fire Service and Narrabri Shire Council for reference 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 Project Area during the 2012/2013 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 Project Approval.

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 19,003,363 litres of diesel fuel was used on site for mining related activity, which is an increase of approximately 2.13 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 CO_2 and non CO_2 gases are shown in Table 8.

Table 8 - GHG Emissions - Diesel Fuel

	Diesel Fuel Usage kL	Emission Factor T $CO_{2\text{-}e}$/kL	Equivalent Tonnes
GHG 2012/13	19,003	2.7	51,308

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 11,458 tonnes of explosives was used at Tarrawonga Coal Mine, which is a decrease of approximately 2,197 tonnes from last year. Assuming a conversion factor of 0.1778, it is estimated that blasting at the mine yielded 2,037 equivalent tonnes of CO_2.

Fugitive Emissions

Fugitive emissions from ROM coal production are reported via Whitehaven's National Greenhouse and Energy Report, as required by the *National Greenhouse and Energy Reporting Act 2007*. Emissions for Tarrawonga are determined from borehole samples taken at the mine and gas sampling analysed by external consultants. The actual gas content from each gas bearing strata is then applied to the mass of the gas bearing strata which is under the extraction area of the mine during the relevant financial year. The 2011/2012 National Greenhouse and Energy Report for the Whitehaven Group identified emissions from Tarrawonga of 1,628 total tonnes CO2-e carbon dioxide equivalent.

Summary

A summary of calculated total CO_2 equivalent tonnes/year for the reporting period is provided in Table 9.

Table 9 - GHG Emissions Summary

Source	Calculated Total CO_2 Equivalent tonnes/year
Diesel	51,308
Explosives	2,037
Fugitive Emissions	1,628
TOTAL	**54,973**

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. Up until March 2013, Tarrawonga Coal had operated a fleet of Terex dump trucks (electric drive) which had proven to burn less diesel fuel as compared to a standard mechanical drive fleet. However, with the WHC cost reduction process undertaken in March 2013 as a means of addressing ongoing economic viability, these trucks were stood down due to modifications to the mining plan to improve economic efficiency. The change in the mining plan, installation of larger CAT 789 trucks and maintenance of a production rate of 2Mtpa has, to some

extent, offset any impacts associated with cessation of the electric drive fleet. Additionally, the biodiversity offset area at the Willeroi Property and the Regional Biobank site would assist with reducing the TCM carbon footprint, in particular the regeneration of areas previously cleared for agricultural purposes and the conservation commitment in place with the offsets to be maintained in perpetuity.

The fuel burn rate has increased over the last 12 months with an average rate of 9.8 litres/tonne of ROM coal. This compares to 9.7 litres/tonne ROM coal in 2011/2012 reporting period, 8.3 litres/tonne of ROM coal in the 2010/2011 AEMR period, 5.7 litres/tonne ROM coal in the 2009/2010 AEMR reporting period and 5.4 litres/tonne ROM coal in the 2008/2009 AEMR reporting period. The slight increase since last year is likely attributable to the longer haul distances, higher overburden:coal strip ratio (up to 10:1) and an increase in the use of ancillary equipment not specifically related to coal production (ie. water carts) as a means of addressing other environmental matters (ie dust mitigation).

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. The second public report under this program was published in December 2012, and is also available on the Whitehaven website. The public report identifies that the Tarrawonga project implemented six EEO opportunities over the period equating to estimated energy savings of 8327 GJ/annum, with a further 8 opportunities still under investigation or for implementation equating to additional potential energy savings of 41,992 GJ/annum. The projects implemented during the reporting period to achieve the 8327 GJ savings comprised:

- Use of high efficiency motors >45kW;
- Use of alternate dust suppression methods (Dustex);
- Fitment of timers to lighting towers;
- Replacement of diesel lighting plant at ROM pad;
- Installation of timers/sensors on lighting at the workshop and office.

3.17.4 Comparison with EA Predictions

Greenhouse gas emissions associated with the mine were assessed in Appendix D of the Tarrawonga Coal Project EA. The total direct (Scope 1) emissions were estimated

to be approximately 0.2 million tonnes of carbon-dioxide equivalent (Mt CO_2-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 55,000 tonnes (or 0.055 Mt), which is significantly lower than the predicted emissions. This is expected as PAE Holmes identified in Appendix D of the Tarrawonga Coal Project EA that their estimation was expected to be a significant overestimate as it was based on the standard National Greenhouse Accounts factor which at the time was identified to be approximately 45 times greater than the factor measured for the same coal seams for a nearby mining project. This assumption was confirmed during 2012 drilling at Tarrawonga and subsequent NGERS reporting.

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 generally effective throughout the reporting period. However, anti coal activists have on numerous occasions bypassed locked gates and ignored mine area safety signage to access areas of the mine site. This included draping an anti mining sign down the high wall and photographing this demonstration. This presents a serious safety risk to those conducting the

demonstration. During March 2013, activists attempted to prevent entry into the mine for one day. On this occasion, mine workers could access the site by another entry point but coal haulage was halted by the demonstration. Police were called to remove the activist and allow haulage activities to continue.

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.

During the reporting period, a fox baiting program was implemented from the 6th to 17th August 2012. A total of twenty 1080 baits were used and upon completion of the program, fourteen were remaining which were recovered and disposed of. The program was a moderate success, with a reduced number of foxes observed for a considerable period following the program.

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 Project Area will, in the main, be returned to a classification similar to that prior to mining.

3.22 Meteorological Monitoring

3.22.1 Introduction

A weather station was previously located at the mine site office, but as of April 2012, a new station has been installed at the project-related "Templemore" property. This reporting period consists of data from this station with the EPL licence varied to reflect the new location.

3.22.2 Rainfall

Rainfall data for the reporting period recorded from the "Templemore" meteorological station is presented in Table 10 and Figure 10. Full station data is presented in Appendix 10.

Table 10 - Rainfall Data
(1 May 2012 – 30 April 2013)

Month	Monthly Rainfall (mm)	Long Term Average* (mm)	Cumulative Rainfall (mm)	Number of Rain Days (≥1mm)
May 2012	50.2	42.3	50.2	4
June 2012	5.6	43.6	55.8	2
July 2012	65.8	42.7	121.6	4
August 2012	6.8	41.3	128.4	1
September 2012	20.6	40.3	149	2
October 2012	15.6	55.1	164.6	3
November 2012	13.0	62.2	177.6	2
December 2012	39.0	70.0	216.6	4
January 2013	138.2	71.7	354.8	5
February 2013	51.0	67.3	405.8	4
March 2013	77.6	47.8	483.4	3
April 2013	0.0	37.2	483.4	0
Total	**483.4**	**621.5**	**483.4**	**34**

* Long term average is from Gunnedah Pool (Station 055023) 1877 - 2013

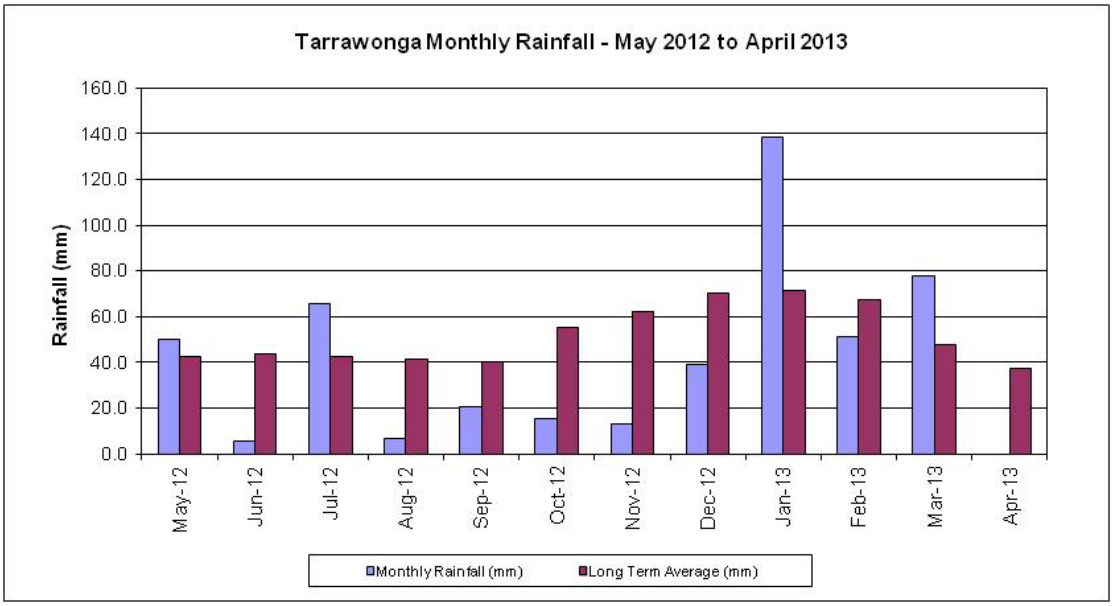

Figure 10 - Monthly Rainfall Data

A review of Table 10 and Figure 10 shows that the total rainfall at the mine during the reporting period was 483.4mm. The total rainfall at the site was 138.3mm less

than the annual average rainfall for Gunnedah and 415.8mm less than the mine's total rainfall for the 2011/2012 AEMR/Annual Review reporting period. Below average rainfall was experienced in August through to December 2012 as well as April 2013 resulting in elevated dust results. Above average rainfall was received in January 2013 and March 2013.

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 - Average Monthly Temperatures
(May 2012 – April 2013)

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 055023 (Gunnedah Pool)* (°C)	
	Min	Max	Min	Max
May 2012	1.9	21.4	7.1	21.3
June 2012	2.1	17.7	4.3	17.6
July 2012	1.8	16.7	3.0	16.9
August 2012	0.7	18.7	4.2	18.9
September 2012	2.6	23.5	7.0	22.8
October 2012	6.4	27.1	10.8	26.7
November 2012	14	32.4	14.2	30.3
December 2012	16.6	34.2	16.8	32.9
January 2013	20.2	36.0	18.4	34.0
February 2013	15.5	29.6	18.1	32.9
March 2013	13.9	28.7	15.8	30.7
April 2013	7.1	26.4	11.4	26.4
Annual Average	**8.6**	**26.0**	**10.9**	**26.0**

* Averages from 1876-2013

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 south east and north (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 Tarrawonga Project Approval EA and the owner of this property has compulsory acquisition rights under PA 11_0047. As of July 2013, TCM will have access to data from a 60m tower with temperature sensors located at Boggabri Coal, as part of cumulative management of air quality and noise. This data will provide more detailed information on inversion layers throughout the winter and impacts will be reported during the next reporting period.

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".

Fifty five (55) 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 (24 recorded in the 2011/2012 AEMR period and 10 recorded during the 2010/2011 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 dust generation on the unsealed sections of nearby roads), blasting and noise. Anonymous complaints received via the EPA totalled 38% of the complaints whilst complaints from the three most prominent complainants also totalled 38% (registering 22%, 11% and 5% individually). The remaining 24% of complaints were from individuals or groups or registered either one or two complaints during the reporting period.

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

Table 12 - Complaints Summary (2012/2013 Reporting Period)

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
Phone call to Tarrawonga Complaints Line	9/05/2012 8:44am	Complaint in relation to dust from the mine. Complainant was unable to identify if dust was only from Tarrawonga. He said that he knew the dust was being generated at night when the water carts aren't utilised at the same rate as daytime operations.	Environmental Officer contacted the site to determine source of dust. The onsite Environmental Officer viewed the pit from the east (Bollol Creek Station) and took photos at this location. He also spoke with the Manager Mining Engineering who was in the pit at around 9:30am taking photos of a clear inversion layer. He commented that dust in the pit was fairly minimal but a haze could be seen due to a clear inversion layer. The OCE also commented that dust from the pit was minimal. Water carts could be observed running in the pit and on the scraper circuit. The OCE confirmed that the water cart had being running the previous night and drills were using water injection.	No further action required.
EPA on behalf of anonymous landholders – email to Environmental Manager	9/05/2012 1:35pm	Complaint in relation to dust from Tarrawonga and Boggabri Mines. Very thick dust in the air this morning right across the valley and coming from the mines.	Investigation undertaken to confirm operations occurring at Tarrawonga and extent of dust suppression undertaken. Confirmed normal operations with 835,000L of water used for dust suppression on night shift up to 2:30am Wednesday morning. Tarrawonga shut down between 2:30am and 7:00am. Photographic evidence taken on the Thursday morning prior to pit start up identifying substantial dust in the area, but no dust identified above the Tarrawonga site. This is indicative of other dust sources contributing to dust levels first thing in the morning. Review of the Real Time PM10 at Flixton property confirms dust levels well within compliance limits. A report has been issued to the EPA in response to the complaints.	No further action required.
EPA on behalf of anonymous landholder – email to Environmental Manager	10/05/2012 11:18am	Complaint in relation to dust from Tarrawonga Mine. Very thick dust in the air this morning with black smog over Tarrawonga site.	Investigation undertaken to confirm operations occurring at Tarrawonga and extent of dust suppression undertaken. Confirmed normal operations with 928,000L of water used for dust suppression on night shift up to 2:30am Thursday morning. Tarrawonga shut down between 2:30am and 7:00am. Photographic evidence taken on the Thursday morning prior to pit start up identified substantial dust in the area, but no dust identified above the Tarrawonga site. This is indicative of other dust sources contributing to dust levels first thing in the morning. Review of the Real Time PM_{10} at Flixton confirms dust levels well within compliance limits. A report has been issued to the EPA in response to the complaints.	No further action required.
EPA on behalf of anonymous landholder – email to Environmental Manager	11/05/2012 9:48am	Complaint in relation to noise from the mines last night, and dust this morning being so thick you can't see the hills.	Investigation undertaken to confirm operations occurring at Tarrawonga and extent of dust suppression undertaken. Confirmed normal operations with 960,000L of water used for dust suppression on night shift up to 2:30am Friday morning. Tarrawonga shut down between 2:30am and 7:00am. Photographic evidence taken on the Friday morning prior to pit start up identified substantial dust in the area, but no dust identified above the Tarrawonga site. This is indicative of other dust sources contributing to dust levels first thing in the morning. With regard to the noise complaint, Tarrawonga site shuts down between 2:30am and 7:00am thereby minimizing potential for noise impacts from site over this period. The real time noise monitor was in Gunnedah at the time of the complaint however is being re-tasked to site to measure noise levels. Review of the Real Time PM_{10} at Flixton confirms dust levels well within compliance limits. A report has been issued to the EPA in response to the complaints.	No further action required.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
Phone call to Environmental Manager	11/05/2012 10:30am	Complaint received in relation to dust from the mine and gravel trucks causing dust on Manilla Road. Complainant believes she had seen gravel trucks running on Manilla Road in the morning without a water cart.	Both Council and Narrabri Coal have been informed of the need for a water cart to be operational on Manilla Road during gravel haulage on several occasions. A phone call was made to Narrabri Coal at 2.30 p.m. to discuss the movements of Narrabri Coal gravel trucks. They confirmed that two trucks (White Kenworth and Blue Kenworth) were doing 3 loads per day from the quarry and had been clearly instructed not to use Manilla road, if this was the case serious action was to be taken. Narrabri Coal immediately rang the truck drivers and told them to pull up for the day. The truck drivers confirmed they had been using the sealed Whitehaven haul road instead of Manilla Road. Tony Williams from Narrabri Shire Council was then called at 3.30 p.m. Tony confirmed that Council had not been using the quarry for 3 weeks and that on the day of the complaint there was a Rostered Day Off so no council trucks were operating. Further investigation found that a third gravel truck was operating on the day. A meeting was held with the Environmental Officer, Project Manager and Peter Harris (who is currently running the quarry) on Monday 14th May at 8.30 a.m. Peter was also asked to confirm where the third gravel truck is travelling to so it can be assured it is not using Manilla Road. Monitoring of trucks using the Manilla Road will continue over the following weeks by the Project Manager and Environmental Officer. In relation to dust from the mine, an inspection was conducted that morning from 6.30 a.m. Water carts were observed from the beginning of morning shift. Dust was being created by a drill rig from around 7.00 am. The Project Manager was informed and both the Project Manager and Environmental Officer met with the drill rig operator to confirm that water injection was being used and dust aprons were down (of which both actions were already in place). The operator was also told by the Project Manager to keep dust in mind.	The complainant was contacted via phone at 4.00 pm by the Environmental Officer. She was informed that Narrabri Coal, Narrabri Shire Council and Peter Harris had been contacted in regard to the matter and investigations were underway. She was instructed to call and try to provide specific details on any gravel trucks seen using Manilla Road without a water cart in future so that Whitehaven can narrow down who is responsible and take necessary action. She said she could see two gravel trucks on the morning but couldn't provide more detail. She was also informed that the pit was being monitored in an attempt to keep dust to a minimum and that the Project Manager and OCE's are aware that dust is an issue and are working to minimise it.
EPA on behalf of anonymous landholder – phone call to Environmental Manager	15/05/2012 10:30am	Complaint in relation to noise from the mines last night, from around midnight through to 9am this morning	Investigation undertaken to confirm operations occurring at Tarrawonga. Confirmed normal operations with three dumps active, being on the western out of pit emplacement (RL 358m), central dump in pit (RL 322m) and southern emplacement (RL 307m). Tarrawonga shut down between 2:30am and 7:00am. As a consequence, Tarrawonga operations could have only contributed to noise impacts for a small component of the timeframe nominated by the complainant. The real time noise monitor was in Gunnedah at the time of the complaint however is being re-tasked to site to measure noise levels. Arrangements will be made to position the monitor at the complainant's residence to verify noise levels. A letter report has been issued to the EPA on this basis.	Real time monitor relocated to complainant's property – 18/5/2012.
Phone call to Environmental Manager	17/05/2012 9:30am	Complaint in relation to a blast from Tarrawonga yesterday which shook his house. Concerns that they felt this blast but don't normally feel them and if the mine continues to expand – what will the implications be from blasting	Reviewed the blast information which confirmed the shot was of an average size and performed to expectations. Review of monitoring results confirmed the blast was well within compliance limits at closer monitoring points, recording levels of 1.77mm/s vibration and 105.3 dBL overpressure at the "Templemore" property and not triggering at the "Tarrawonga" property. A blast the following day on the same bench of similar size was undertaken and Environmental Officers travelled up to the complainant's property for the	A letter was issued to the complainants in relation to the blast and observed conditions, with an offer to have blast monitors placed for a period to define blast impacts.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
		impacts.	blast. It was reported that the blast was hardly audible with negligible vibration noticeable.	
Phone call to Community Liaison Officer	23/05/2012 12:15pm	Complaint in relation to blast from Tarrawonga at around 12:01pm that shook the complainant's house. The complainant is concerned that this is the third blast from Tarrawonga that he has felt at his property, and at such a distance (~21km), the impacts should not be experienced at his property.	An investigation is being undertaken in relation to the blast and likely causes as to why it was felt at the complainant's property. Blast monitor results from monitors in much closer proximity to the Tarrawonga site confirmed compliance at all monitoring locations. The complainant was advised a written response would be issued in relation to the investigation and that arrangements would be made to further discuss the issue with him with both Whitehaven and Orica personnel.	Follow up communications with the complainant confirmed that he did not wish to have monitors placed at his property. No further action required.
Phone call to Environmental Manager	24/05/2012 12:30pm	Complaint in relation to blast on 24th May that shook the complainant's house. Felt like a large blast.	Orica was called at 3.30pm on the 24th May to discuss the blast. They advised that the blast was not in any way different to previous blasts apart from it being a high blast and an overcast day. Overcast days can have the tendency of spreading noise from blasting activities. The monitoring results received by Orica the following morning indicated that both locations (Tarrawonga and Templemore) conformed to environmental parameters. The site Environmental Officer monitored the blast from the road outside the "Sylvania" property to the east and reported that no overpressure or vibrations were present or could be noticed from this location. The complaint was in regard to air blast overpressure as the complainant reported that she could hear the blast and it rattled her windows, although she couldn't feel any vibrations. This was discussed with Orica in the weekly production meeting on 29th May 2012, of which Orica again reinforced the potential impact of an overcast day.	The complainant was left a phone message on the afternoon of the 24th May 2012 indicating that the complaint was being investigated and a response would be delivered in due time. A follow up phone call was made from the Environmental Officer at 9.00am on the 29th May 2012. The complainant confirmed that the issue with the blast was overpressure rattling windows and noise from the blast. She indicted that no vibrations could be felt. She was advised that this information would be provided to Orica to further investigate the complaint. As the blast was within required parameters, and performed to expectations, no further reasoning for impacts at the complainants property could be identified.
Phone call to Environmental Manager	25/05/2012 8:30am	Complaint in relation to a rotten egg gas smell persisting in the area – not sure of the source but has contacted Whitehaven to check if the source is related to Whitehaven operations.	Tarrawonga and Rocglen Project Manager's checked their respective sites with no identification of any spontaneous combustion. Contact was made with Boggabri Coal who also confirmed no spontaneous combustion was present at their site. Site personnel were instructed to visit the Canyon site to confirm no spontaneous combustion from the reject emplacement area. The Geology team was also instructed to confirm no gas was emanating from exploration holes located on surrounding properties. Orica was contacted who also confirmed no odour emanating from their site. Orica personnel could also notice the smell, but described it as not being a sulphurous smell. It was suggested that perhaps there had been an application of a fertilizer product on an adjacent farming enterprise.	Whitehaven was unable to get in contact with the complainant despite many phone calls.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
Phone call to Environmental Manager	25/05/2012 8:45am	Complaint in relation to a rotten egg gas smell persisting in the area – not sure of the source but has contacted Whitehaven to check if the source is related to Whitehaven operations.	Tarrawonga and Rocglen Project Manager's checked their respective sites with no identification of any spontaneous combustion. Contact was made with Boggabri Coal who also confirmed no spontaneous combustion was present at their site. Site personnel were instructed to visit the Canyon site to confirm no spontaneous combustion from the reject emplacement area. The Geology team was also instructed to confirm no gas was emanating from exploration holes located on surrounding properties. Orica was contacted who also confirmed no odour emanating from their site. Orica personnel could also notice the smell, but described it as not being a sulphurous smell. It was suggested that perhaps there had been an application of a fertilizer product on an adjacent farming enterprise.	Follow up phone call with complainant to advise that the smell was not found to be related to any of Whitehaven's or Orica's activities.
Phone call to Tarrawonga Complaints Line	26/05/2012 8:00am	Complaint in relation to excessive noise from the mines all night and into the morning. She knows they've had noise monitoring but the noise the night prior to the complaint and the morning of the complaint was very, very loud. The complainant finds it hard to believe that the noise contours for the next 16 years of mining do not include the complainant's property.	Phone message left with complainant on Tuesday 29th May. No response received to date.	No further action required.
Phone call to Environmental Manager	28/05/2012 9:00am	Complaint in relation to the local Rural Fire Brigade in attending a fire at the "Pine Grove" property, reported issues with Toll coal haulage trucks not moving sufficiently out of the way to enable immediate access to the property. No specific truck numbers could be provided. Incident occurred at around 8pm on Wednesday night 23 May 2012.	Toll was contacted to discuss this issue and ensure that all operators are made aware of their responsibility in terms of avoiding any impediment to operating fire trucks when in attendance of a fire. Toll confirmed that a driver hauling from Tarrawonga noted that the fire truck was already at the Pine Grove residence when he travelled on Manilla Road at approximately 7:15pm. The fire truck was still at the residence when all trucks completed their final haul back to Gunnedah.	No further action required.
Text message to Environmental Manager	29/05/2012 3:57pm	Complaint in relation to a Toll truck attempting to overtake the complainant's father, who was travelling at 100km/hr. Also questioned if WHC had spoken to Toll in relation to changed bus drivers on the school bus run to ensure communication protocols between Toll trucks and the bus were understood. Complainant indicated that unless these issues were sorted	A response was sent to the complainant confirming that he is within his rights to take the matters up direct with the Police if he believes there are activities occurring outside legal road rules. The complainant was also asked to provide any details in relation to the truck involved in the overtaking incident including truck number and time so it could be thoroughly investigated. No additional information had been received by the time of preparing this complaint record. Contact was made with Toll who refuted suggestions that a Toll truck attempted to overtake a vehicle travelling at 100km/hr. This was on the basis that the trucks are speed limited to 98km/hr and that any speed infringement would result in immediate notification to the RTA and Toll due to the system in place for Toll operations. Toll also confirmed communications had been held with the alternate drivers on the bus run and all	No further action required.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
		out with Toll, he would be contacting the Police.	were comfortable with communication protocols between trucks and the school bus.	
Phone call to Environmental Manager	30/05/2012 9:20am	Complaint in relation to the blast held at Tarrawonga on Thursday 24th May just after 12pm. Complainant felt the blast in his shed. The complainant's property is located south east of the Rocglen mine, so to be feeling blasts from Tarrawonga is indicative of something not going right with the blasts.	The complainant was advised that an investigation is being undertaken in relation to the blast to confirm if the blast performed to expectations and verify if there was anything related to the shot that may have exacerbated blast impacts at far field sites. A letter report has been issued to all complainants confirming blast monitors were within compliance limits and offering further discussions with the complainants and Orica.	No further action required.
Phone call to Environmental Manager	8/06/2012 9:50pm	Complaint in relation to vibration felt at complainant's property and suggestion that it was caused by Tarrawonga Coal Mine operations.	The complainant was advised that there had been an earth tremor and the vibration was felt at the Environmental Manager's property in Tamworth, and as a consequence was not related to mining activities. Complainant did not accept this response and remained adamant that the vibration was a consequence of Tarrawonga mine and wanted the complaint recorded. Subsequent news reports the following morning confirmed an earth tremor had occurred to the west of Manilla, with the vibration felt in many centres in the north-west. As a consequence, no further action taken in relation to the complaint.	No further action required.
Text message to Environmental Manager	9/6/2012 4:59pm	Complaint in relation to a Service Vehicle travelling out to Tarrawonga nearly colliding with the complainant.	The complainant was asked if he could provide any details of the vehicle involved as without detail there was little that could be done in terms of finding the offending driver. The complainant indicated that he did not get any details due to being shaken up as a consequence of the incident and it happening so fast. The only detail provided was that the vehicle had a crane on the back of the truck. As a consequence of the limited information available, the offending vehicle or driver could not be tracked down for further action.	No further action required.
EPA on behalf of anonymous complainant	20/06/2012 7:30am	Complaint in relation to dust in the area in the early morning and assumption that it was related to Tarrawonga, Boggabri and Rocglen Coal Mines.	A response was issued to the EPA identifying the extent of dust mitigation undertaken from water application, as well as daily reports from the Real Time TEOM located at the "Flixton" property. It was also identified that a thick fog was present around the mine until 9:30am that morning. The development of cumulative impact strategies with Boggabri Coal was also provided in the response.	No further action required.
EPA on behalf of anonymous complainant	25/06/2012 4:00am	Complaint in relation to noise from Tarrawonga and Boggabri operations from 4am through until 10am that morning.	A response was issued to the EPA identifying the Tarrawonga operation was not running at 4am. Site commencement was from 7am. Daily reports from the real time noise monitor located at "Templemore" were also provided identifying the noise levels at the time of the complaint. From 4am, noise levels were well within compliance limits. The monitor did identify mining noise during the morning, however could not be used for compliance as it is currently based at "Templemore" which is project related and in much closer proximity to operations. A temperature inversion was prevalent throughout the night and early morning. The EPA was advised of the developing cumulative impact strategies between Boggabri and Tarrawonga to address noise impacts.	No further action required.

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Phone call to Open Cut Examiner (shift supervisor)	27/06/2012 10:00pm	Complaint received in relation to noise from the mine. Boggabri Coal also received the same complaint. The complainant subsequently contacted the Environmental Manager the following morning to discuss their concerns.	The OCE on shift immediately went for a drive to assess noise from the east and the west. From the west it was noted that noise could be heard from both Tarrawonga and Boggabri sites. At the time Tarrawonga was dumping on the top level of the western emplacement. The OCE turned the trucks around to start dumping to the eastern side of the western emplacement, of which after a second inspection from the west it was noted to be quieter. The OCE noted the need to dump lower in the pit after 10pm. The Environmental Officer and Project Manager were advised the morning of the 28th June 2012 subsequent operations that night were aligned for dumping lower in the pit after 10pm despite space constraints. It was also noted that Boggabri Coal have placed a real time noise monitor at the property as of 28th June 2012 to obtain relevant noise data. The complainants also advised the Environmental Manager that after 2:30am, once Tarrawonga operations had ceased, the mining noise was still prevalent. The complainants identified that the majority of the noise source appeared to be from Boggabri Coal operations given the noise level remaining after Tarrawonga shut down. It was identified that there was a minor reduction in noise at this time, but was still of significant concern to the complainants.	No further follow up necessary at this time. Complainant was advised that Tarrawonga would be prepared to locate its real time monitor at their property if Boggabri Coal needed to relocate their unit.
Phone call to Environmental Manager	10/07/2012 12:05pm	Complaint received in relation to a blast held at Tarrawonga at 12:02pm Blast shook the complainant's house.	Complainant indicated that every time there are overcast conditions, it seems to cause the blast to impact on her property. Complainant was advised that Tarrawonga would look into the blast monitor results to identify the monitor levels and provide that information to the complainant.	Written advice was issued to the complainant advising that the blast was compliant. An offer was made to place a blast monitor at the complainant's property when similar weather conditions are present.
Phone call to Environmental Manager	16/07/2012 7:40am	Complaint in relation to runoff from the mine causing increased flooding at the complainant's property.	Complainant indicated rainfall over the weekend had resulted in excess runoff causing increased flooding on his property. This follows previous complaints on the same issue from November 2011 and February 2012. The issue is subject to an investigation by Lindsay Gilbert to determine impacts of the mine on flooding downstream.	Investigation by Lindsay Gilbert did not support the assumption that increased flooding was due to mine operations. A report was prepared and provided to the complainants.
In person complaint to Project Manager	24/07/2012 3:55pm	Toll truck T21 on the road at approximately 2.30 pm today with what appeared to be a split tarp at the rear of the B trailer and coal spilling over the back of the truck.	The Environmental Officer contacted Toll's Mining Services Manage to discuss the issue. He advised that following notification of the complaint, Toll's Leading Hand inspected T21 after it loaded at the Tarrawonga bin and found both tarps to be fully intact front to rear. The only explanation that Toll could provide is that the B trailer was loaded high at the rear and the tarp had cut through the coal load, depositing a small amount of coal on top of the tarp which was then able to fall off the truck. Toll has counselled the driver regarding inspecting the load whilst loading to ensure even placement of the load.	No further action required.
Text message to Environmental Manager	30/07/2012 7:55pm	Lights from the Tarrawonga dump were shining direct to the complainant's property.	Environmental Manager contacted the night shift OCE at Tarrawonga and requested that he review the lighting plant location and re-align the lighting plants to avoid impact on complainant's property. OCE contacted Environmental Manager upon completion of re-alignment to confirm it had been done. OCE provided with complainant contact number to confirm the issue had been resolved. OCE was also to advise complainant of cattle out on the road.	No further action required.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
Phone call to Environmental Manager	2/08/2012 8:02am	Dust from Tarrawonga and Boggabri Coal hanging in the valley. Unacceptable dust levels and something needs to be done to reduce dust impacts.	Investigation undertaken into dust suppression activities undertaken at site. Records indicate 1,024,000L of water was used in dust suppression on the night shift of 6th August. Dayshift used 1,493,000L. Personnel at site reported a general dust haze in the area during the morning, however there was no specific dust generation activity identified at site that could be the cause of the dust haze. The 'Flixton" PM_{10} did not identify any elevated dust levels during the early morning of the 7th August, with the predominant spike in dust levels coinciding with shift change between 5-8pm. The running 24hr average PM_{10} was at 12.3ug/m^3.	The Environmental Manager left a phone message on the complainant's message bank with an indication that a meeting could be arranged to discuss this and other matters.
Phone call to EPA	7/08/2012 7.45am	Dust plume in the air coming from the Boggabri and Tarrawonga coal mines. Caller advised the dust is thicker than usual.	Investigation undertaken to determine dust suppression activities undertaken at the time. It was confirmed that 1,024,000L of water was used for dust suppression during night shift of the 6th August. This followed application of 1,248,000L of water during day shift. Review of data from the EPA camera did not pin-point any specific dust generating activities during the early morning with water carts actively in use. Review of the real time PM_{10} data at Flixton identified a peak in PM_{10} levels between 8am and 11am, and again between 5 and 8pm. Wind direction was from the North East and wind speed was around 0.8m/s.	Response provided to the EPA. Project Manager informed of complaint via Environmental Officer. Complaints highlighted in weekly production meeting and monthly GM's meeting.
Phone call to Environmental Manager	7/08/2012 11:11am	Gravel truck identified as travelling along Manilla Road. Truck had Robson marked on its trailer.	Investigation undertaken to determine who the truck was operating for. Robson was operating for Narrabri Coal, and all drivers had been instructed to travel the haul route to Gunnedah and stay on the tar. A new driver was operating who may not have been given this specific instruction. The matter was referred to Narrabri Coal to ensure all drivers understood the protocol.	Narrabri Coal has spoken with Robson and the driver has been given a first and final letter. The complainant was advised of the outcomes of the investigation.
Phone call to Environmental Manager	8/08/2012 8:30am	General dust in the valley from the coal mines. Dust levels unacceptable and something needs to be done to reduce dust impacts.	Investigation undertaken to determine dust suppression activities undertaken at the time. It was confirmed that 928,000L of water was used for dust suppression during night shift of the 7th August. This followed application of 1,368,000L of water during day shift. Review of data from the EPA camera did not pin-point any specific dust generating activities during the early morning with water carts actively in use. Review of the real time PM_{10} data at Flixton identified a peak in PM_{10} levels between 8am and 11am, and again between 5 and 8pm. Wind direction was generally from the south west and north west which may have caused dust to drift towards the complainant's property.	A phone message was left with the complainant. In addition, the Environmental Officer had discussed several issues with the complainant over the subsequent days.
Phone call to Environmental Manager	8/08/2012 12:10pm	Dust travelled down to complainant's property following a blast at Tarrawonga.	Investigation undertaken which identified the blast was a near surface shot and as a consequence was not afforded the protection from the pit as usually occurs. At the time of the shot conditions were very still which result in the dust from the shot not dispersing as would normally occur. The shot did not result in any obvious peak in PM_{10} levels at the "Flixton" monitor at the time of the shot.	A phone message was left with the complainant confirming that a meeting could be arranged to further discuss blasting protocols and impacts on properties.
Phone call to Environmental Manager	9/08/2012 10:48am	Noise from both Tarrawonga and Boggabri Coal unbearable this morning and we need to do something to reduce the noise impacts.	Discussions held between the complainant Tarrawonga Environmental Officer as to noise. The complainant indicated it was their belief that noise from the Boggabri Mine was the main source of impact at their house, however, believed noise from Tarrawonga was the main source at their other residence. The use of the mobile noise monitor was again explained, however the complainant was not of the view that the noise monitoring was accurate. The noise monitor was placed out to the east within the public road reserve for a period of time to obtain additional noise monitoring results. In terms of active noise mitigation, operations are	Discussions were held with the complainant in relation to the noise however the matter remains unresolved. Data from the real time unit will be reviewed to identify noise levels.

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			currently using the western dump RL375m during the day and relocating to the eastern dump RL 347m during the night to reduce noise impacts.	
Phone call to the EPA	21/08/2012 No specific time	Dreadful dust for the last few days and nights from unsealed section of local road. Council and the two local mines have been arguing about who will pay to seal the road but no agreement has been reached. Caller states the road is watered from time to time but not sure of the legal position of whether the mine or council should deploy water trucks. Caller states the traffic is almost entirely mine staff. Caller asks for EPA intervention and/or advice on what should be done and whether Council is legally responsible for the situation.	Complaint is clearly in relation to Manilla Road. Whitehaven Coal had an agreement with Council and Narrabri Coal to supply a water cart if gravel trucks leaving Tarrawonga were to be using Manilla Road. Narrabri Coal decided only to use sealed haul roads when carting gravel. For the last 2 months to avoid Manilla Road council trucks have been using Goonbri Road to access Tarrawonga. They supply a water cart and water Goonbri Road for the duration that the gravel trucks are running. Tarrawonga coal has no registered water carts and therefore it is illegal for Tarrawonga to water public roads	Response provided to the EPA. Project Manager informed of complaint via Environmental Officer. Complaints highlighted in weekly production meeting and monthly GM's meeting. Issue of dust from gravel trucks reiterated with Pete Harris (Gravel Manager) and Council and both parties are fully aware of their obligations.
Phone call to the EPA	3/09/2012 7.45 am	Caller reports dense dust from the mine. The site reportedly has cameras on their own site to alert them to high levels of dust and this also is a lead to them shutting down operations to correct the matter. Caller relates that the cameras cannot be working given the volumes of dust travelling down their valley this morning.	Rm-Cam was not intended to be used specifically to shut down operations. The EPA has requested that Tarrawonga informs of blast times for viewing, since installation there have been no other requests from the EPA received. Investigation to determine dust suppression activities confirmed that 1.720.000L of water was used for dust suppression during day shift of the 3rd September. This followed application of 1,088,000L of water during night shift. No water was applied on the previous night of the 2nd September as this was a Sunday. Review of data from the EPA camera did show thick dust in the air at 8.00am in the morning. Given the first dig at Tarrawonga doesn't occur until around 7.30am and Tarrawonga was not operating the previous night, the volume of dust in the air would be expected to be generated by surrounding operations.	Response provided to the EPA. Project Manager informed of complaint via Environmental Officer. Complaints highlighted in weekly production meeting and monthly GM's meeting.
Phone call to the EPA	3/09/2012 8.25 am	Large amount of dust in the air from the Tarrawonga Coal Mine	Investigation to determine dust suppression activities confirmed that 1.720.000L of water was used for dust suppression during day shift of the 3rd September. This followed application of 1,088,000L of water during night shift. No water was applied on the previous night of the 2nd September as this was a Sunday. Review of data from the EPA camera did show thick dust in the air at 8.00am in the morning. Given the first dig at Tarrawonga doesn't occur until around 7.30am and Tarrawonga was not operating the previous night, the volume of dust in the air would be expected to be generated by surrounding operations.	Response provided to the EPA. Project Manager informed of complaint via Environmental Officer. Complaints highlighted in weekly production meeting and monthly GM's meeting.
Phone call to Environmental Manager (left message) and Tarrawonga site	12/9/2012 12:30pm	B-double truck travelled on unsealed section of Manilla Road and turned left onto Tarrawonga haul road. A description of the truck, including its trailer registration number, was provided.	The Environmental Officer and Tarrawonga Operations Manager contacted the complainant to discuss the issue. The Operations Manager advised that the truck is a sub-contractor to a domestic coal haulage contractor and committed to counselling the driver. The complainant further advised that he had reported the incident to the police. He suggested that Tarrawonga notify all contractors of restricted B-double routes. Following the commitment to counsel the driver, it was determined that the truck was a 19m B-double with bogey axles which means it is legally permitted to drive on all roads unless	Whitehaven emailed the complainant a copy of the RTA information sheet on B-doubles on the 13th September 2012.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
			there is a road sign specifying a load limit. The complainant was contacted again to advise him of the situation. He said it's not that he didn't believe what he'd been told but he would be seeking clarification from the RTA as to what constitutes a B-double.	
Phone call to Environmental Manager	8/10/2012 8:03am	Dust coming off the mine site this morning and over the last few days.	The Environmental Officer was contacted and asked to do a site review to verify extent of dust generation on site. Environmental Manager accessed the site camera and reviewed real time vision of the site, as well as snapshot photographs from the camera over the course of the morning. The real time vision and photographs did not identify any significant dust source from the active pit or haul roads. Upon completion of the site review the Environmental Officer confirmed that all haul roads were well watered as was the scraper route. The only identified dust source was from the dig face and dumping of loads into haul trucks for which there is no practical solution, albeit this dust source was minor and unlikely to be visible outside the pit. Photographs were taken of the pit to verify limited dust generation.	No further action required.
Phone call to Environmental Officer	17/10/2012 12:10pm	Large amount of dust in the air from a blast at Tarrawonga Coal Mine	The OCE advised the Production Superintendent of the wind speed and wind direction at around 10 am being 6m/s WNW. The wind was taken into consideration however there was no option to delay the blast due to an urgent need to move an excavator the following day. The wind direction was also blowing towards Whitehaven owned land. The wind speed and direction during the time of blasting was 6.4m/s WNW (301 degrees). The Environmental Officer inspected the blast from Goonbri Road and noted that dust was present but no fume rising from the shot. The dust was swept to the South East towards "Flixton" and "Templemore" (both Whitehaven owned properties).	Environmental Officer discussed complaint with Production Superintendent and Operations Manager. Complaint brought up in weekly production meeting. Operations Manager and Environmental Officer are reviewing the pre-blast assessment process.
Phone call to EPA	17/10/2012 12:10pm	Complainant advised that it was quite windy and that following the blast a "huge cloud of dust" was coming over the valley.	The OCE advised the Production Superintendent of the wind speed and wind direction at around 10 am being 6m/s WNW. The wind was taken into consideration however there was no option to delay the blast due to an urgent need to move an excavator the following day. The wind direction was also blowing towards Whitehaven owned land. The wind speed and direction during the time of blasting was 6.4m/s WNW (301 degrees). The Environmental Officer inspected the blast from Goonbri Road and noted that dust was present but no fume rising from the shot. The dust was swept to the South East towards "Flixton" and "Templemore" (both Whitehaven owned properties).	Response provided to the EPA. Environmental Officer discussed complaint with Production Superintendent and Operations Manager. Complaint brought up in weekly production meeting. Operations Manager and Environmental Officer are reviewing the pre-blast assessment process.
Text message from unknown number to Environmental Manager	24/10/2012 ~9:00am	Photo showing one Toll truck overtaking another. Text said "T27 overtaking t02 700 metres before turn not on".	The matter was referred to Toll. The Toll Mining Services Manager spoke with both drivers, viewed the scene of the photo, and interrogated the relevant GPS tracking data and rejected the complainant's claim for the following reasons: • The full overtaking manoeuvre was completed well before 500m before the corner – some 20 B Double lengths before the corner • Both drivers had clear view past the corner along Hoads Lane, and to the approaching left entry road for at least another 500m (from truck driver viewing position) • Truck T02 was loaded with chitter and slowing for the corner, slowed further and called T27 around, foreseeing that he would impede his progress up the hill towards	No further action required.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
			the Canyon weighbridge • The call from T02, the response from T27 and the ok to return to lane by T02 was heard by all vehicles in the vicinity • Single dotted lines are in place on the roadway • At no stage where any other vehicles in danger, or required to make unplanned movement Toll's Mining Services Manager also noted that it appeared the complainant had taken the photo on their mobile phone whilst driving, which is illegal.	
Email from EPA to Environmental Manager on behalf of local landholder	1/11/2012 12:14pm	Complaint in relation to the extent of dust generated following a blast at Tarrawonga in windy conditions. Suggestions made that the blast should have been delayed for more favourable conditions.	On investigation of the complaint it was found that: - moderate wind speeds were forecast for the 1st November from the NW and WNW - The wind was monitored during the morning of the blast and varied between 4.4m/s up to 6m/s which would be considered as a gentle to moderate breeze as defined by the BOM. - At the time of the blast wind speed was measured as 5.7m/s from the North West. - The dust from the blast was directed across Whitehaven owned property. - The blast was viewed by the Environmental Officer from Blair Athol Lane and it was noted that the dust travelled across towards the Templemore property (Whitehaven owned) before dispersing. - A check of the Real Time PM_{10} at "Flixton" identified no peak in dust levels around the time of the blast.	No further action required. A response to the complaint was provided to the EPA.
Phone call to Environmental Officer	23/11/2012 ~9:00am	Thick cloud of dust from Tarrawonga and Boggabri Coal from about 7:00pm or 7:30pm when the wind changed from an easterly to a strong southerly. The complainant said he is not normally affected but this was the worst he had seen it.	The property was identified as being about 13km north east of Tarrawonga, with Boggabri Coal in between. Tarrawonga's Environmental Officer conducted an investigation and found that during the time of the complaint haul trucks were dumping on the eastern face of RL 357 on the northern emplacement and also on the southern emplacement. Wind was predominately from the south east and average wind speed was 6.04m/s as supported by the weather station wind-rose (wind-rose from 7.00pm -8.00pm). Water carts on day shift used approx 1,481,000 L of water and 928,000 L during night shift. The night shift OCE and the Operations Manager were both advised of the complaint.	No further action required. The complainant said he did not require a return call.
Text message to Environmental Manager from unknown complainant	23/11/2012 5:38pm	Complaint relating to a cracked windscreen, with note that it had only been replaced the previous week.	No name was attached to the text message. Whitehaven is not liable for damage to windscreens on public roads. It was not identified if the windscreen damage was related to coal haulage, albeit this was assumed – the complainant would need to follow this up with the source of the damage if known.	No further action taken.
Email to Environmental Manager from	26/11/2012 2:51pm	Dust along haul roads coming off southern emplacement. Suggested that water carts were not in use. Also	Dust is monitored on a daily basis and managed with water carts at all times. As the complaint did not specify a specific time it is impossible to quantify the extent of works undertaken to mitigate dust lift off from site that could correlate to the complainant's issue. In terms of the	EPA discussed the issue of dust at a meeting onsite on the 4th December 2012.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
EPA on behalf of anonymous complainant		complaint in relation to the amount of litter along public roads.	extent of litter along the public roads, this is an issue for the wider community, and not just Tarrawonga Coal. Operators have been given toolbox talks on several occasions in relation to littering and doing the right thing. It is not something that can be specifically policed by Tarrawonga, especially given the public and other traffic that utilise the public roads.	
Email to Environmental Manager	29/11/2012 2:45pm	Complaint relating to dust generated from a blast earlier today impacting on the complainant's property. Suggestion that with technology available for predicting weather conditions, the mines should be in a position to not blast when impacts like this are likely to occur.	The Gunnedah weather forecast was taken into consideration preceding the blast. The forecast indicated calm wind speeds of 7km/h (1.9 m/s) from the NNW on the day of the blast. The forecast indicated higher wind speeds for the rest of the week ranging from 12km/h to 28km/h. The Environmental Officer discussed this information with the Operations Manager on the morning of the blast and it was concluded that based on the forecast, Thursday the 29th was an appropriate day to fire. The OCE monitored wind speeds and direction the morning of the blast and noted 1.6m/s ESE at 9.33am and 0.7m/s SSE at 10.40am on the OCE Blast checklist. Given the gentle wind speeds, the blast was considered appropriate to fire. The wind speed and direction at 12.00pm was 2.7m/s WNW (288°). The Environmental Officer inspected the blast from Manilla Road to the South of Tarrawonga and noted that dust was present but no fume was rising from the shot. The dust was swept in an ESE direction towards Bollol Creek Station (Whitehaven owned) and dissipated SW of Goonbri Mountain (from the line of sight observed). Photographs of the shot were taken from Manilla Road showing the dissipation of the dust as it travelled east. They identify a dust cloud generated as a consequence of the blast, but that it has dissipated well before reaching Goonbri Mountain to the east, and still over WHC owned land.	No further action taken.
Email to Environmental Manager from EPA on behalf of anonymous complainant	29/11/2012 3:15pm	Complaint relating to dust generated from a blast at 12:08pm which created a lot of dust. There was a slight breeze from the north which carried the dust southwards.	As per complaint 54.	No further action taken.
EPA on behalf of anonymous complainant	1/12/2012 ~8:40am	Complaint relating to dust generated from southern emplacement at Tarrawonga during dumping operations.	Investigation initiated thorough the Environmental Officer at Tarrawonga to review operations at the time of complaint. Investigations confirmed operations occurring as per normal with haul roads adequately water by operating water carts. Wind conditions at the time of the complaint were from the north west at an average speed of 1.4m/s. Without additional specific detail as to the nature of the complaint, it is difficult to provide any further quantification of dust conditions other than advise the EPA to review the available imagery from the site camera.	No further action taken.
EPA on behalf of anonymous complainant	5/12/2012 6:59am	Complaint relating to dust generated from vehicles using gravel roads to access both Tarrawonga and Boggabri	Tarrawonga has no legal capacity to undertake dust suppression activities on public roads. The vast majority of employees at the Tarrawonga mine access the site via the sealed haul roads. As part of the VPA for the Tarrawonga Extension, additional tar sealing of unsealed roads is expected subject to the Tarrawonga Extension being approved. This may assist in	No further action taken.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
		Mines.	reducing dust lift off from traffic on these roads.	
EPA on behalf of anonymous complainant	7/12/2012 ~8:20am	Complaint relating to excessive dust in the air around Tarrawonga mine at approximately 8:20am and complaint relating to a Toll haulage truck T19 losing coal from a covered load between Boggabri and Gunnedah. The truck was travelling at normal speed and the load appeared covered however coal was observed coming from the vehicle.	An investigation was undertaken and confirmed the following:- • This particular morning was very hazy and could have been impacted by what appeared to be smoke haze as verified from imagery from the site camera. All water carts were operating on night shift of the 6th December with 1,000,056L of water used on dust suppression, with a further 1,741,000L used on the day shift of 7th December. To aid dust suppression Tarrawonga is currently involved in a trial of Dustex product on the southern haul road. • With regard to the Toll Truck, the matter was referred to Toll for investigation. The outcome of the investigation was that T19 loaded at the Tarrawonga bin at 8am and carried a compliant load of 41t. The driver was an experienced operator and reported no abnormality with the loading or tarping process. T7 followed T19 into the CHPP with the driver not identifying any coal spilled onto the roadway. Based on the GPS tracking system, T19 was between the Old Bluevale Road intersection and the Kamilaroi Highway intersection at 8:30am some 35km from the mine site and on this basis very unlikely that coal would be spilling from the vehicle.	No further action taken.
EPA on behalf of anonymous complainant	13/12/2012 1:14pm	Complaint relating to excessive dust in the air around Tarrawonga mine for the period 11am-1pm.	The Environmental Manager was at site at the time of the complaint and had been undertaking visual inspections of the site to verify dust management was occurring. During these inspections all measures were being undertaken to minimise dust with haul roads well watered and the Dustex trial still occurring. Dust was being generated from dumping activities however this was localised and dispersing relatively quickly. As no specific detail was provided as to the source, general location or timing of the dust, no further information could be provided in response. The EPA was subsequently advised that unless more specific details relating to the complaint could be provided, no additional investigation into the dust source could be undertaken.	No further action taken.
EPA on behalf of anonymous complainant	17/12/2012 5:02pm	Complaint relating to excessive dust in the air around 5pm from the three mines.	As little information was provided with the complaint, there was limited capacity to investigate the matter. Dust control included the use of 3,926,000L of water through the water carts over the period of day and afternoon shift for the 17th December. Snapshots were taken from the site camera around the time of the complaint and provided to the EPA. These photographs demonstrated no specific source of unmitigated dust from the Tarrawonga site.	No further action taken.
EPA on behalf of anonymous complainant	9/01/2013 5:27pm	Complaint relating to excessive dust from Tarrawonga mine this morning.	The 9th January was a very dry and windy day causing significant dust generation from all sources in the area. During the morning, the Environmental Manager had discussions with the Engineering Surveyor, the Open Cut Examiner and the Operations Manager to identify options to reduce the dust lift off associated with the Tarrawonga operation. As a consequence of these discussions, the following actions were implemented: • Scraper Crew parked at 9:30am • Daracon Coal Crusher parked at 10am	Email advice issued to EPA confirming actions taken.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
			• Toll Trucks reduced to 10km/hr on ROM circuit • Dozer 822 re-tasked from priority work that was generating dust at Ramp 4 at 9:30am • Excavator 530 relocated from Ramp 6 to Ramp 4 to replace Excavator 2500 which was parked at 10:15am • Excavator 532 relocated from priority dig face that was generating dust at 9:50am • Additional water cart mobilised Environmental Manager reviewed dust levels from locations surrounding the mine from 11:30am and found dust levels to be minimal and that the actions taken were effective. Advice was issued to the EPA to this effect.	
EPA on behalf of anonymous complainant	10/01/2013 6:00am	Complaint relating to excessive noise from Tarrawonga mine this morning. Sounded like dozer was in complainant's front yard.	Advice issued to the EPA that Tarrawonga was not operating between 2:30am and 7am on the morning of the complaint, and that to our knowledge, Boggabri Coal was also not operating a production shift. Review of noise files from the real time noise monitor at around 6am did not identify any low frequency or equipment related noise. EPA then responded indicating that the complainant now thought it may have been from the period 7am to 9am. Review of the data from the noise monitor indicated low levels of low frequency noise throughout this period, with wind speeds generally in the normal range <3m/s and from the west/northwest. Review of noise files between 7am and 9am again could not identify any significant equipment and/or dozer noise. This advice was issued to the EPA, together with copies of noise files and the noise data chart for the 10th January.	Email advice issued to EPA outlining noise conditions at the time of the complaint and a copy of noise files and noise chart identifying no excessive operational noise. The EPA agreed via a follow up phone conversation that the mine may not have contributed to the noise heard at the complainant's property at the time of the complaint.
EPA on behalf of FLAC. Downer EDI complaint to Operations manager	13/02/2013 1:32pm	Complaint relating to blast fume and dust, as well has rotten egg smell and metallic taste drifting across Downer EDI workshop and protester camp in Leard State Forest.	Environmental Manager requested details from site in relation to the blast, including timing weather conditions, and in particular wind speed and direction. The Environmental Officer and Operations Manager had reviewed the weather forecast for the next 7 days which indicated conditions for blasting on Wednesday 13/02 were suitable for the blast. Wind speed and direction was monitored throughout the morning, and at the time of the blast, wind was from the east-south-east at 3.9m/s which is equivalent to a moderate breeze but still well under the >6m/s wind speed cut off. The blast video was reviewed and indicated no visible blast fume and photographs and forecast conditions supplied in response to the EPA.	Orica ICAM investigation complete. Email advice issued to EPA outlining blast photographs and forecast conditions. EPA responded that sufficient evidence had been provided and no further action required.
Email message to Environmental Manager	18/02/2013 4:46pm	Complaint relating to dust drifting across their property from a blast held at 12:00 that day, impacting on their health and lifestyle. Requested that blasting impacts be retained within the boundary of the Tarrawonga mine.	Environmental Manager requested details from site in relation to the blast, including timing, weather conditions, and in particular wind speed and direction. The site Environmental Officer provided details of the blast and weather conditions. The Environmental Officer and Operations Manager had reviewed the weather forecast for the next 7 days which indicated conditions for blasting would deteriorate throughout the week, and that Monday was the most suitable day for the blast. Wind speed and direction was monitored throughout the morning, and at the time of the blast, wind was from the east-south-east at 2.3m/s which is equivalent to a light breeze. With the wind from this direction, any dust plume from the blast would have been carried in north-north-west direction, predominantly to Leard State Forest. The site sentries for the blast confirmed that the dust	No further contact undertaken.

Method	Date/Time of Complaint	Nature of Complaint	Investigation	Action Taken/Follow Up
			associated with the blast dispersed in a northerly direction, and not towards the east. This advice was issued to the complainant in an email response.	
EPA on behalf of anonymous complainant. Email message to Environmental Manager	22/04/2013 7:00-7:30am	Complaint relating to dust from both Tarrawonga and Boggabri Coal Mines and from the Manilla-Boggabri Road as a consequence of excess truck movements.	Environmental Manager requested details from site in relation to conditions and provided the following advice: Tarrawonga did not operate on Sunday 21st April, and only commenced operations from 6:40am on Monday morning. Water carts were active on the Monday morning from 6am prior to equipment starting. It was noted that there was dust trapped in an inversion layer early that morning prior to work commencing, with a significant proportion from adjacent gravel roads. On checking truck movements from Tarrawonga, there were no trucks received at site until 8:50am that morning for domestic coal, and this truck travelled the Tarrawonga haul route. During the day, the site was monitored for dust, with a dust check completed by the Environmental Officer at 2:25pm that afternoon due to increase in wind speed. The dust check found operations were minimising dust lift off with no significant individual dust sources from within pit operations. Tarrawonga recognises the issue of temperature inversions impacting on the capacity for dust to disperse. To minimise dust lift off at site start up, the water carts, which are activated in advance of the remaining fleet will remain in pit during the pre-start meetings to ensure adequate dust control is in place, and will catch up with the OCE's later in the shift/	Advice was issued to the EPA in an email response.
Phone call to Environmental Officer	23/04/2013 8:30am	Complainant was concerned with the amount of dust around the area from Tarrawonga. He asked if we were still using the full water cart capacity as he believed with recent cut backs, the water carts may have been underused.	At the time of the phone call, the Operations Manager and Environmental Officer were inspecting dust levels and discussing measures to reduce dust. Dust was elevated due to a temperature inversion up until 8am. All water carts were in use during the morning from 6am. Equipment was monitored throughout the morning as were the weather conditions. At the start of day shift, water carts will continue to water haul and access roads in the pit 30 minutes prior to commencement of the shift to limit dust emissions.	Monitor water cart usage and dust emissions from nearby gravel roads between 5 and 9am.

Table 13 - Yearly Complaints Comparison

AEMR/Annual Review 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	Lights	Surface Water or Ground-water	Other	
2006-2007				1		1				1		3
2007-2008	4		2	2	2			2		2		14
2008-2009			5					4	1		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
2012-2013	23	6	3	12	1	4	1		1	1	3	55

4.2 Employment Status, Demography and Socio-Economic Contributions

4.2.1 Employment Status and Demography

During the reporting period, the mine had an average of 88 Tarrawonga personnel and 15 contractors. This is a decrease of approximately 2 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.

During March 2013, Whitehaven Coal implemented a cost reduction process which involved changes to the mine plan, which in turn, reduced costs in the current market conditions. This included standing down one excavator and associated equipment servicing that excavator and therefore, resulted in the redundancy of 14 personnel from the Tarrawonga Mine. This reduction ensures the Tarrawonga can continue to operate in the current difficult market conditions.

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 7 of Schedule 5 of PA 11_0047, a Community Consultative Committee (CCC) continues to meet on regular basis, meeting 4 times per year. The committee comprises representatives of Narrabri and Gunnedah Shire Councils, Tarrawonga Coal and the community and was chaired by Clr Ken Bates up to and including the August 2012 meeting, at which time he advised of his impending resignation as a Narrabri Shire Councillor and that he would also resign from the

CCC. Subsequent meetings during the reporting period were chaired by community members, with a new chair to commence in the next reporting period.

During the reporting period meetings were held on the 23rd May 2012, 8th August 2012, 14th November 2012 and 13th February 2013.

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.

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

5 REHABILITATION

5.1 Buildings

There was no removal of buildings or rehabilitation of building sites during the reporting period.

5.2 Rehabilitation of Disturbed Land

5.2.1 Objectives

Tarrawonga Coal's rehabilitation / land use objectives for the Project approval area, (ie. the area within the boundary of ML 1579 and MLA's 1, 2 and 3) 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.

5.2.2 Achievements During the Reporting Period

Rehabilitation achievements at the mine have been impacted by extension works, however active rehabilitation has progressed on those areas no longer required for production purposes. A total of 9.1ha was shaped, topsoiled and seeded during the reporting period, predominantly located on the southern emplacement. In addition to seeding of 9.1ha, revegetation activities during the reporting period comprised planting of native tubestock across 1.4ha of the southern emplacement in March/April 2013 as outlined in Table 14 and shown in Figure 11 and Figure 12. During the next reporting period it is planned to plant tubestock over approximately 7ha on both the northern and southern emplacements. Final shaping and seeding of a further 6ha was in the planning stage at the release of this AEMR, and will be completed in the early stages of the next reporting period.

Figure 11 - Cover Crop Establishment on Southern Emplacement

Figure 12 - *Eucalyptus Melliodora* Tubestock (Southern Emplacement), March 2013

Table 14 – Understorey Species

Date	Location	Species	Total
25-27 March 2013	1.4ha on the bottom tier of the Western face of the Southern emplacement.	*Acacia decora*	100
		Eucalyptus melliodora	60
		Eucalyptus albens	60
		Swainsona galegifolia	40
		Senna artemisioides	80
		Hardenbergia violacea	40
		Dodonaea viscosa	60
		Eucalyptus populnea	50
		Eucalyptus pilligaensis	50
		Total	**540**

Existing rehabilitation on the northern and western faces of the northern emplacement continues to progress well.

G&B Ward Earthmoving commenced maintenance and continuation of water management structures (contour banks etc) during February and March 2013 on both the northern and southern emplacements. Other works undertaken during the reporting period included:

- Topsoiling and seeding of dams;

- Shaping and seeding of soil stockpiles;
- Shaping, topsoiling, installing contour banks and seeding of the western face of the southern waste emplacement; and
- Completion of the rock waterway on the western face of the northern emplacement, topsoiling, installation of contour banks and seeding.

Table 15 - Rehabilitation Summary

		Area Affected (hectares)			
		This Report Period (as of 30.04.13)	**Last Report Period (as of 30.04.12)**	**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)	29.7	21.6	29.7	
B2:	**Active Mining Area** (excluding items B3 - B5 below)	98.4	113.3	148.5	
B3	**Waste emplacements**, (active/unshaped/in or out-of-pit)	187.0	149.9	212.0	
B4	**Tailings emplacements,** (active/unshaped/uncapped)	4.5	4.25	4.5	
B5	**Shaped waste emplacement** (awaits final vegetation)	7.6	4.85	11.5	
ALL DISTURBED AREAS		322.8	284.9	329.7	F1
C	**REHABILITATION PROGRESS**				
C1	**Total Rehabilitated area*** (except for maintenance)	46	36.9	50	F2
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**	18.5	9.4	22.5	
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 tubestock are considered to be “native forest/ecosystem”. “Pasture and Grasses” also includes areas with recently planted tube stock that are not yet established. C1 – Total Rehabilitated Area includes all rehabilitation regardless of progress.

Table 16 - Maintenance Activities on Rehabilitated Land

NATURE OF TREATMENT	Area Treated (ha)		
	Report period	Next period	Comment/control strategies/ treatment detail
Additional erosion control works (drains re-contouring, rock protection**)**	1	Nil	De-silting of contours on southern emplacement, repair of washouts and replacement of sediment control measures (hay bales) on western side of ML
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 good in terms of the minimal erosion experienced over prolonged periods of wet weather. However, heavy rainfall in January (>120mm over a 2 day period) caused a build up of silt in contour drains on the southern emplacement which was rectified soon after. Additionally, planted seedlings continue to develop well, on the northern emplacement. Tubestock and grass cover establishment continues to be slow on the Southern Emplacement, with ongoing monitoring continuing by site personnel. Sections 3.6 and 3.7 and Appendix 7 provide details on the rehabilitation monitoring undertaken by Eco Logical Australia in late 2012.

Figure 13 shows Mallee Ringneck Parrots frequenting the rehabilitated slopes of the Northern Emplacement.

Figure 13 - Mallee Ringneck Parrots on Northern Emplacement Rehabilitation, April 2013

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 Project Approval.

6.2 Achievements to Date

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

- Approval of PA 11_0047 and conditional Federal approval for the Tarrawonga extension;
- Completion of management plans required for PA 11_0047;
- Significant improvements in the management of site water;
- Implementation of a full time onsite Environmental Officer;
- 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 2013 / 2014 reporting period include:

- Completion and implementation of additional Management Plans required for Federal approval;
- Continual improvements in site rehabilitation;
- Continued community liaison, support and involvement / education in the mines activities;
- Compliance with all relevant conditions of the lease, licences and consents;
- Rehabilitation of the most exposed faces of the waste emplacements to reduce visual impact as soon as practically possible;

- Implementation of management actions within the Regional Biobank site, pertinent to Tarrawonga offset requirements;
- Establishment of "Willeroi" west as offset zone for Tarrawonga extension, and subsequent implementation of management requirements.

TARRAWONGA COAL PTY LTD

REDUCTION RATIO 1:6000 @ A0

LEGEND

- Proposed Soil Stripping Area (2013/2014 AEMR)
- Soil Stripping Area (to 30/4/12)
- Soil Stripping Area (2012/2013 AEMR)
- Stockpile Areas
- Infrastructure Areas
- Sediment Basin (Dirty)
- Storage Dam (Clean)
- P8 Soil Test Pit Site
- 15cm Soil Stripping Depth
- Mining Lease Boundary
- Pending Mining Lease Boundary
- Limit of Open Cut
- Recommended Stripping Depths
- TS^{10} Topsoil (depth stripped to)
- SS^{10} Subsoil (depth stripped to)
- ③ Vegetation Monitoring Quadrat
- Aboriginal Site

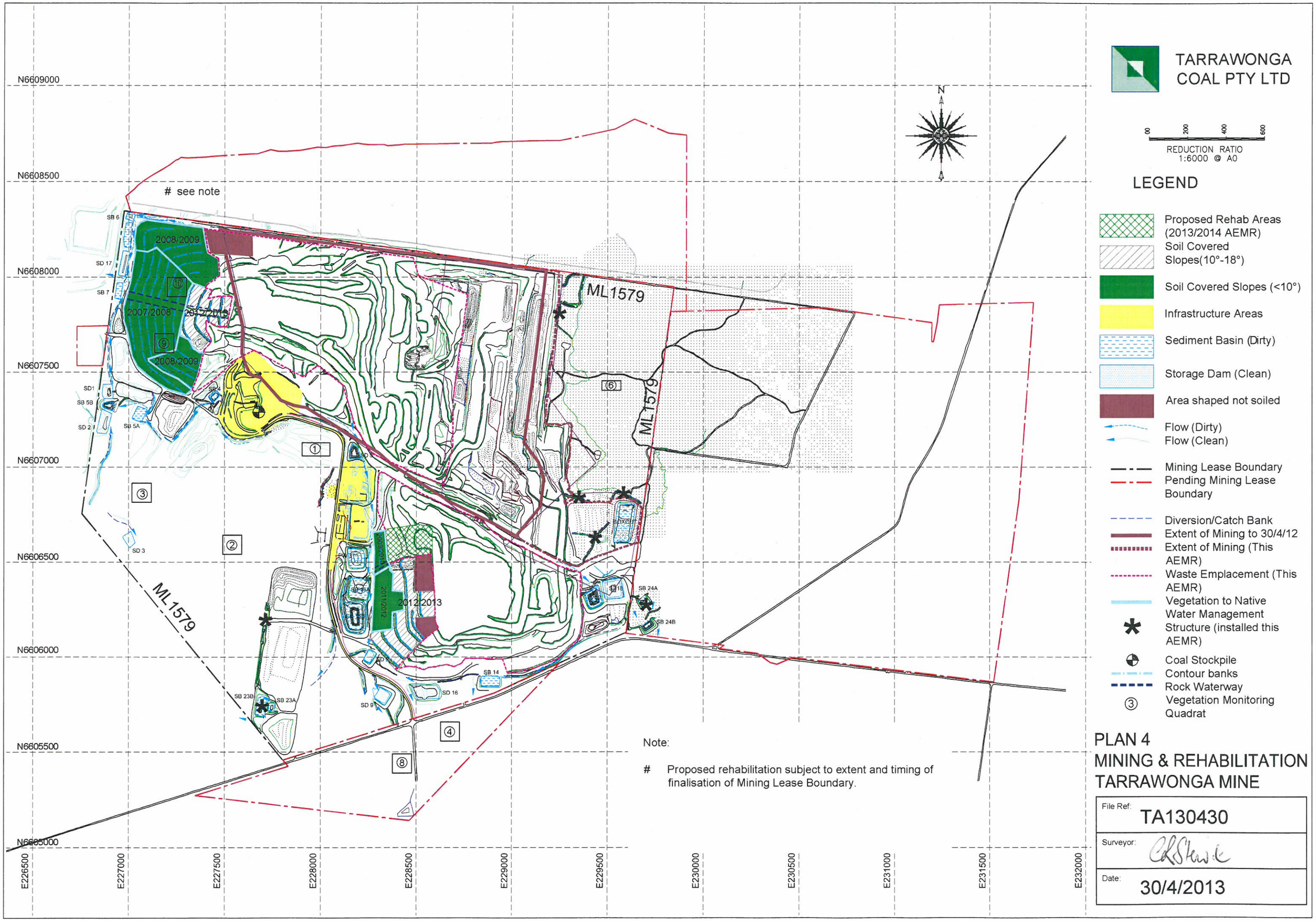
Notes:

\# Proposed soil stripping subject to extent and timing of finalisation of Mining Lease Boundary.

* TS^{45} stockpiles refer to topsoil stripped between 0 - 15cm. SS^{45} refers to stripping between 15 - 45cm.

PLAN 3
LAND PREPARATION
TARRAWONGA MINE

File Ref:	TA130430
Surveyor:	C.R. Stewart
Date:	30/4/2013



TARRAWONGA COAL PTY LTD

0 200 400 600

REDUCTION RATIO 1:6000 @ A0

LEGEND

- Proposed Rehab Areas (2013/2014 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
- Pending Mining Lease Boundary
- Diversion/Catch Bank
- Extent of Mining to 30/4/12
- Extent of Mining (This AEMR)
- Waste Emplacement (This AEMR)
- Vegetation to Native
- Water Management Structure (installed this AEMR)
- Coal Stockpile
- Contour banks
- Rock Waterway
- ③ Vegetation Monitoring Quadrat

Note:

\# Proposed rehabilitation subject to extent and timing of finalisation of Mining Lease Boundary.

PLAN 4
MINING & REHABILITATION
TARRAWONGA MINE

File Ref:	TA130430
Surveyor:	
Date:	30/4/2013

Appendix 1

DA 88-4-2005 MOD 1, PA 11_0047 and EPBC Approval

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 *Tarrawonga Coal Mine Environmental Assessment*, dated April 2010, and associated *Tarrawonga Coal Mine - Response to Submissions*, dated 25 June 2010
EIS	The environmental impact statement titled *Proposed East Boggabri Coal Mine* and *Specialist Consultant Studies Compendium*, dated May 2005
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
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	*Protection of the Environment Operations Act 1997*
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***	
	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
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) $L_{Aeq\ (15min)}$

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.*

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 $L_{Aeq\ (15\ minute)}$ 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:
    (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.

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***	***[d]Criterion***
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***	***[d]Criterion***
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***	***[d]Criterion***
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***	***[d]Criterion***
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:
    (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.

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:
    (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.

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 Draggle 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	

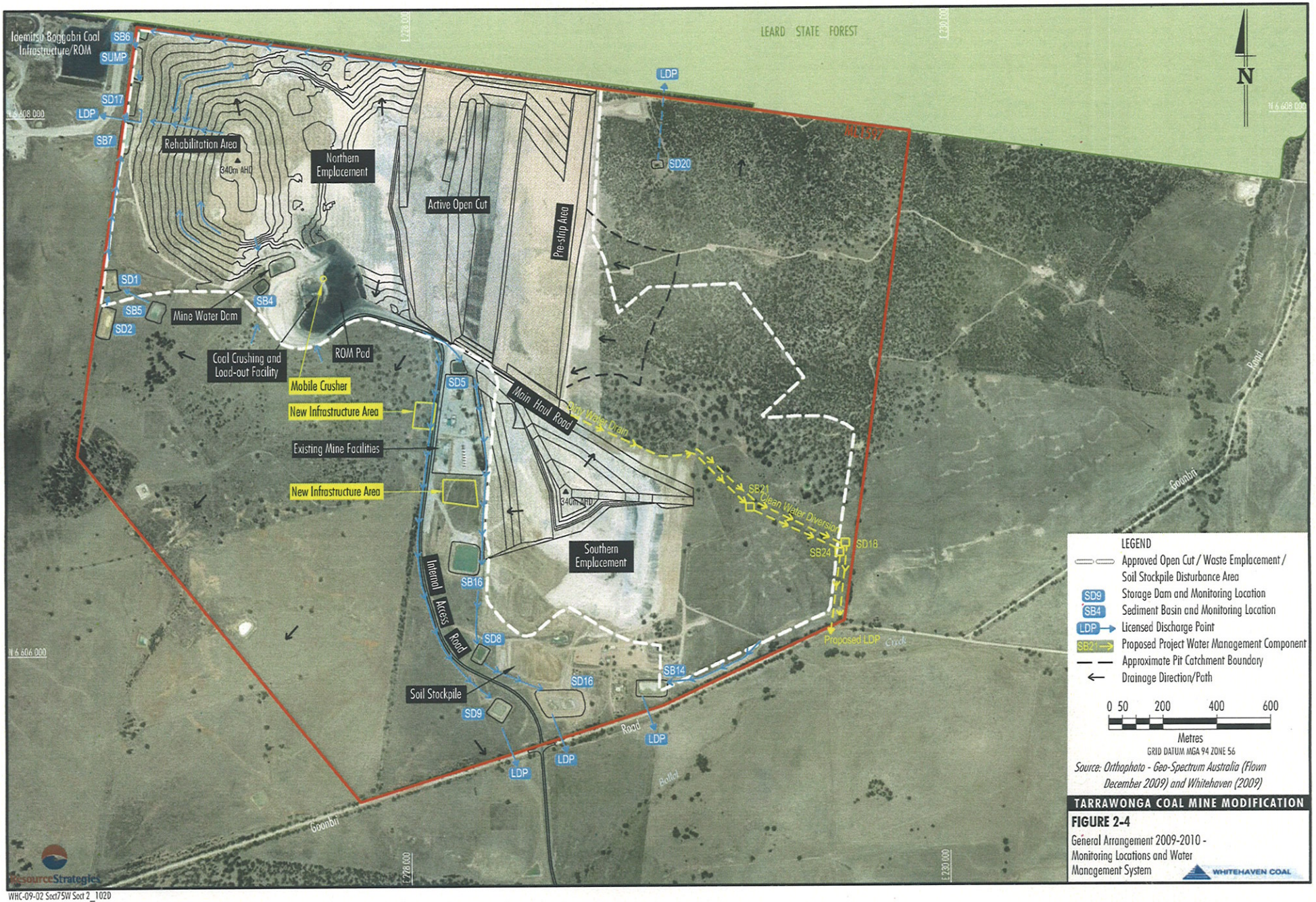
Transport Route (Northern Section)

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	

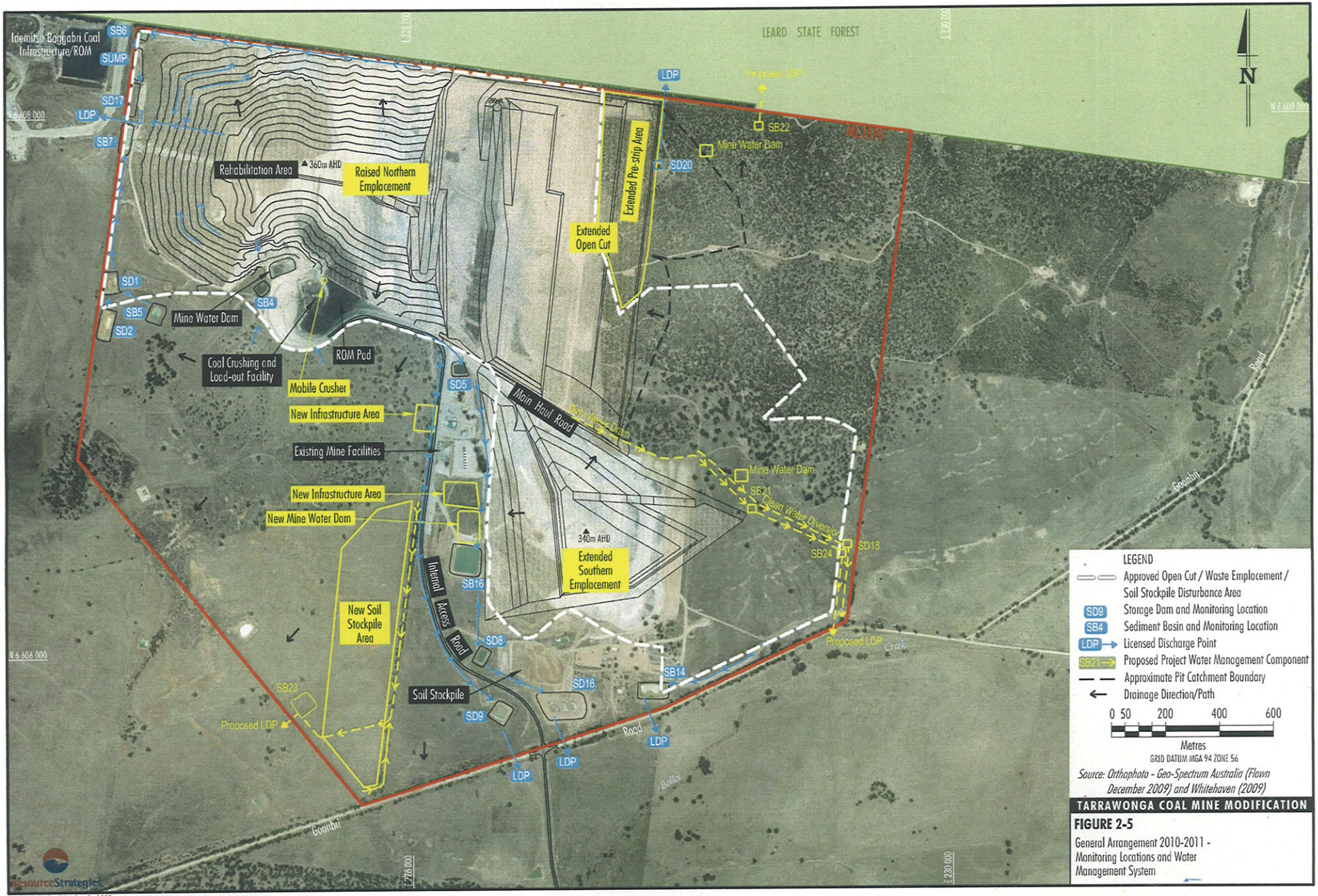
Transport Route (Southern Section)

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



WHC-09-02 Sect75W Sect 2_102D



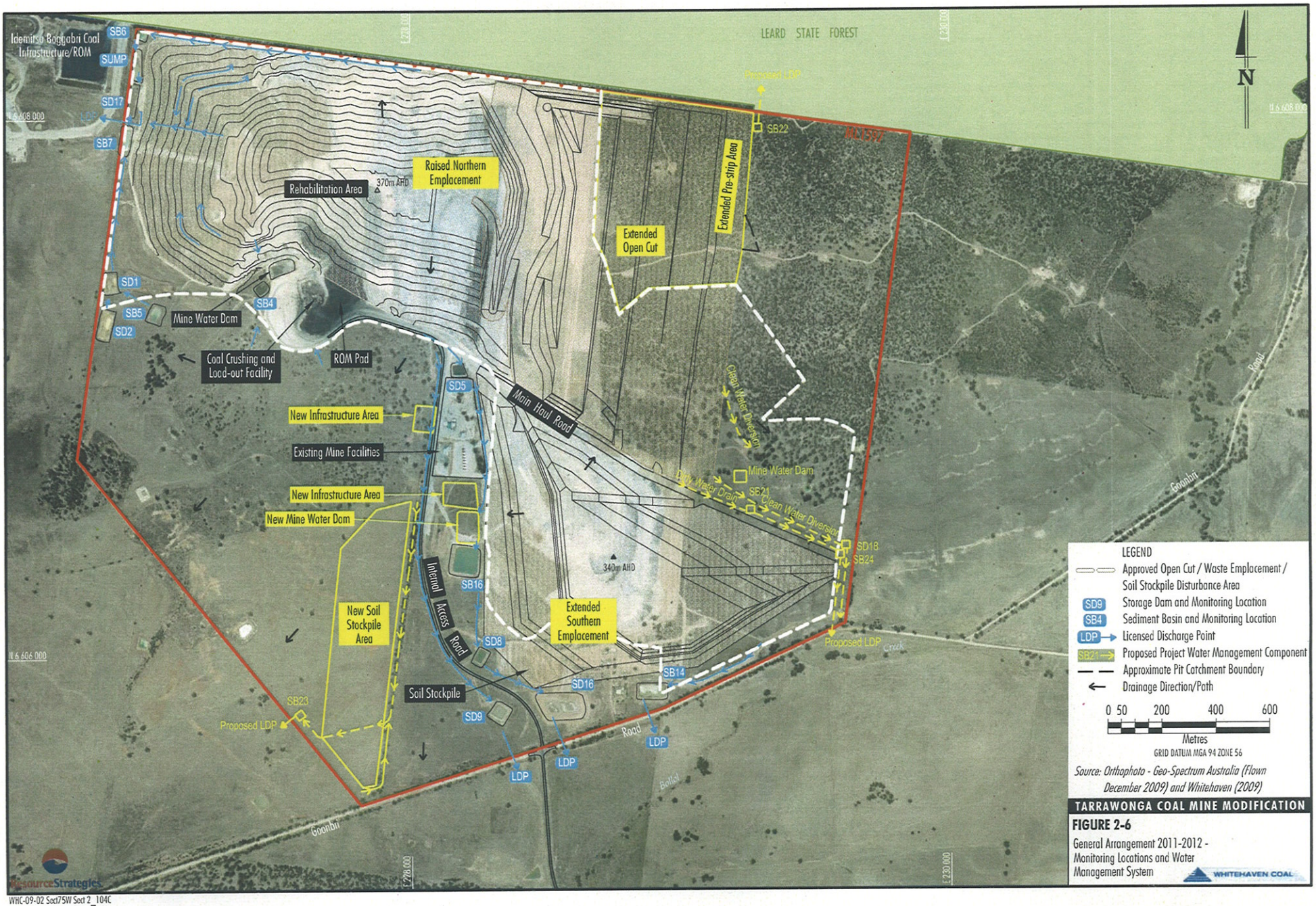
TARRAWONGA COAL MINE MODIFICATION

FIGURE 2-5

General Arrangement 2010-2011 - Monitoring Locations and Water Management System

ResourceStrategies

WHC-09-02 Sect75W Sect 2_103D



TARRAWONGA COAL MINE MODIFICATION

FIGURE 2-6

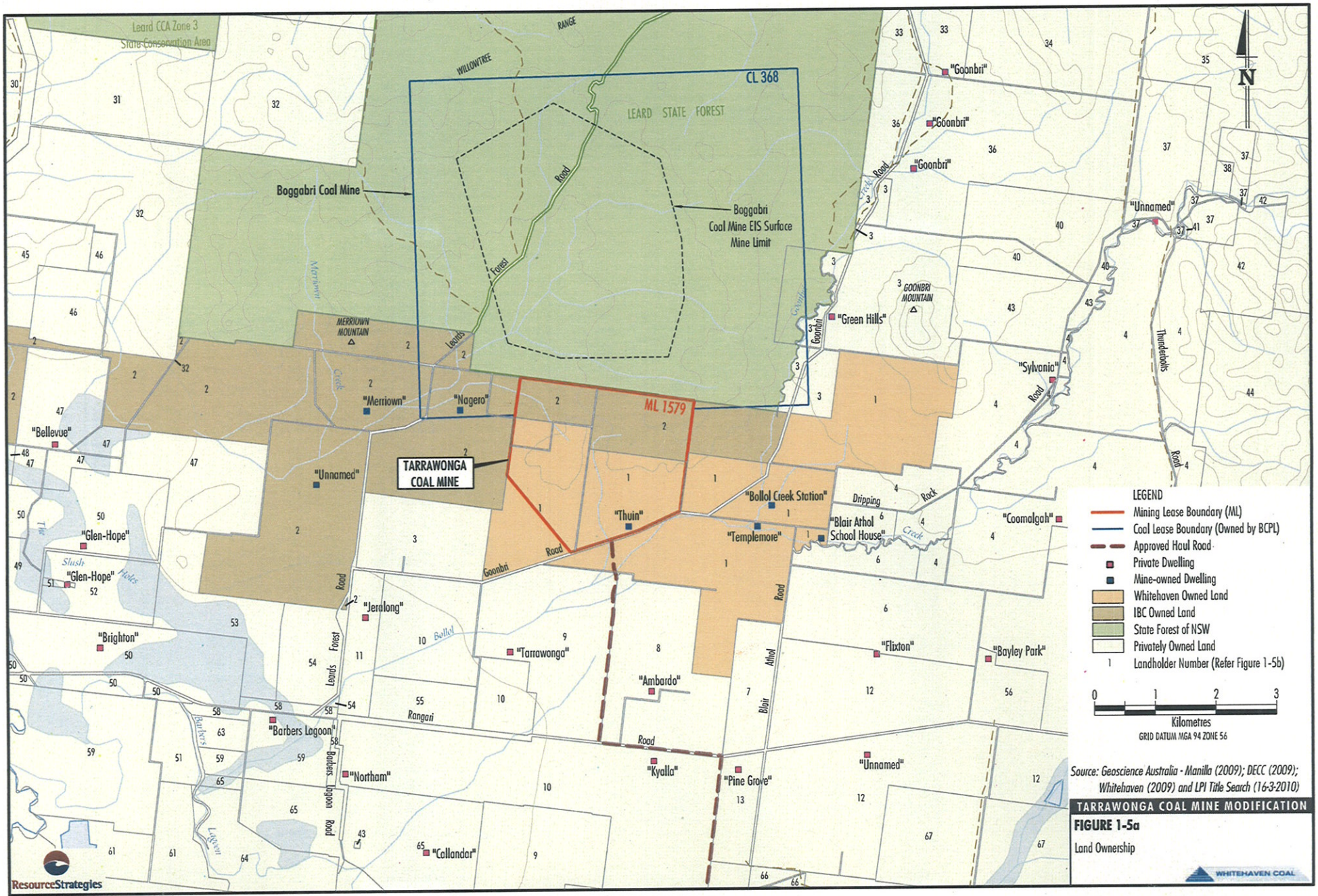
General Arrangement 2011-2012 - Monitoring Locations and Water Management System

WHITEHAVEN COAL

ResourceStrategies

WHC-09-02 Sect75W Sect 2_104C

APPENDIX 3
LAND OWNERSHIP PLANS



Source: Geoscience Australia - Manilla (2009); DECC (2009); Whitehaven (2009) and LPI Title Search (16-3-2010)

TARRAWONGA COAL MINE MODIFICATION

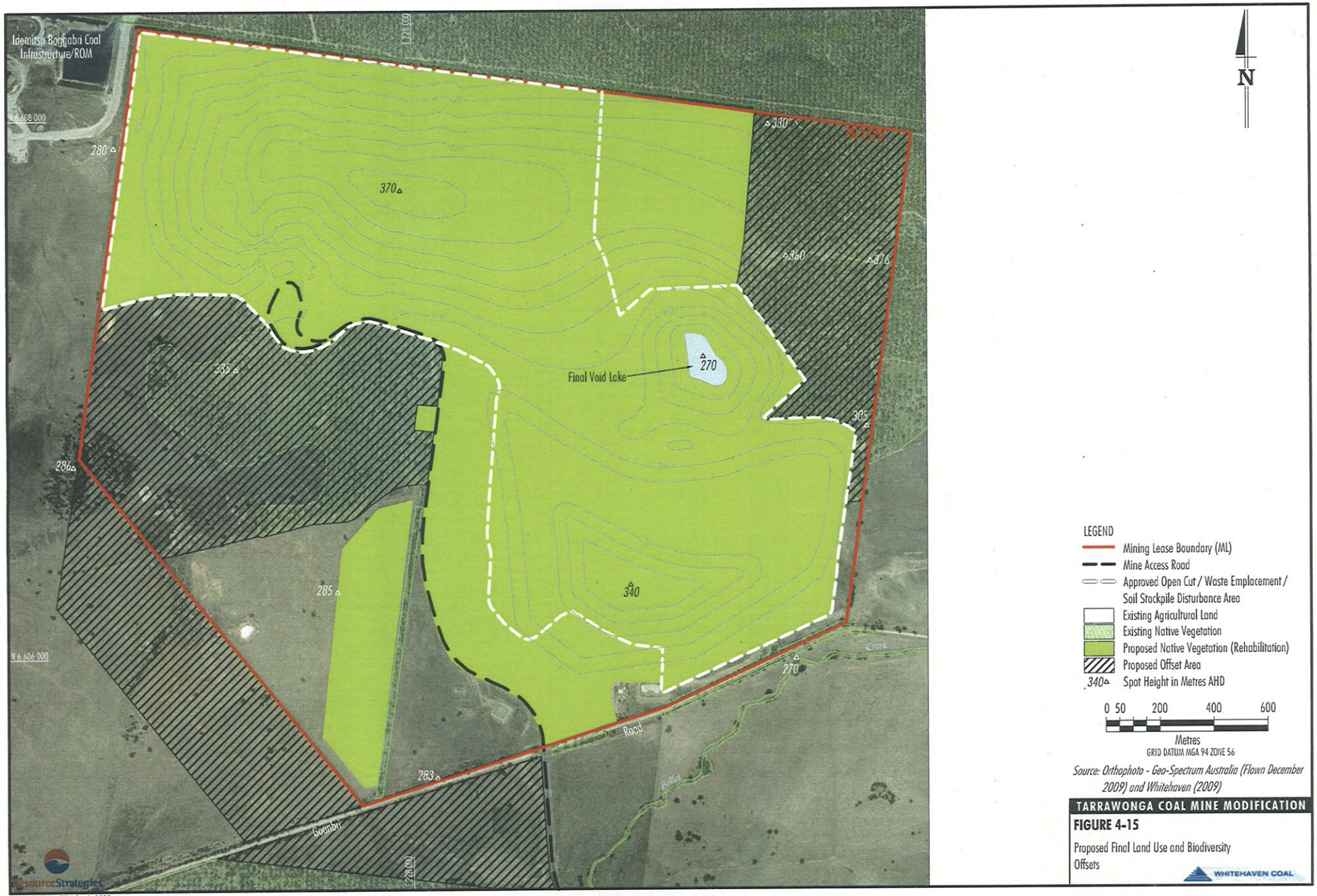
FIGURE 1-5a

Land Ownership

ResourceStrategies

WHC-09-02 Soa75W Soa1_10SC

APPENDIX 4
PROPOSED NATIVE VEGETATION REHABILITATION & OFFSET AREAS


Idemitsu Baggabri Coal Infrastructure/ROM
N 6 608 000
N 6 606 000
E 728 000
E 726 000
280
370
330
360
316
335
Final Void Lake
270
305
286
285
340
283
270
Road
Goondiri
Creek
Ballot
N
LEGEND
Mining Lease Boundary (ML)
Mine Access Road
Approved Open Cut / Waste Emplacement / Soil Stockpile Disturbance Area
Existing Agricultural Land
Existing Native Vegetation
Proposed Native Vegetation (Rehabilitation)
Proposed Offset Area
340 Spot Height in Metres AHD
0 50 200 400 600
Metres
GRID DATUM MGA 94 ZONE 56
Source: Orthophoto - Geo-Spectrum Australia (Flown December 2009) and Whitehaven (2009)
TARRAWONGA COAL MINE MODIFICATION
FIGURE 4-15
Proposed Final Land Use and Biodiversity Offsets
WHITEHAVEN COAL
ResourceStrategies
WHC-09-02 Sect75W Sect4_103C

Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning and Infrastructure, the Planning Assessment Commission of NSW approves the project application referred to in schedule 1, subject to the conditions in schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Gabrielle Kibble AO **Member of the Commission**	Brian Gilligan **Member of the Commission**	Joe Woodward PSM **Member of the Commission**

Sydney 22 January 2013

SCHEDULE 1

Application Number:	11_0047
Proponent:	Tarrawonga Coal Pty Limited
Approval Authority:	Minister for Planning and Infrastructure
Land:	See Appendix 1
Project:	Tarrawonga Coal Project

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DEFINITIONS

Annual review	The review required by condition 4 of schedule 5
BCA	Building Code of Australia
Biodiversity offset strategy	The biodiversity conservation and enhancement strategy described in the EA, required by condition 40 and 42 of schedule 3 of this approval and depicted conceptually in the figure in Appendix 7
Blast misfire	The failure of one or more holes in a blast pattern to initiate
Boggabri rail spur line	The railway line between the Narrabri-Werris Creek railway line and the Boggabri coal mine
CCC	Community Consultative Committee
CEEC	Critically endangered ecological community, as defined under the TSC Act or EPBC Act
CHPP	Coal Handling and Preparation Plant
Conditions of this approval	Conditions contained in schedules 1 to 5 inclusive
Council	Narrabri Shire Council
Day	The period from 7am to 6pm Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
Dedicated haulage route	The approved route used to transport coal from the site to the Whitehaven CHPP, which includes a combination of private and public roads, including Rangari Road, Hoad Lane, Blue Vale Road and the Kamilaroi Highway (see figure in Appendix 2)
Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department, or delegate
DPI	Department of Primary Industries
DRE	Division of Resources and Energy (within the Department of Trade and Investment, Regional Infrastructure and Services)
EA	Environmental Assessment titled *Tarrawonga Coal Project Environmental Assessment* dated January 2012; associated response to submissions titled *Tarrawonga Coal Project Environmental Assessment - Response to Submissions (A and B)* dated May 2012; and the *Preferred Project Report* dated September 2012
EEC	Endangered ecological community, as defined under the TSC Act or EPBC Act
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence issued under the POEO Act
Evening	The period from 6pm to 10pm
Executive Director Mineral Resources	The Executive Director of Mineral Resources within DRE, or equivalent position
Feasible	Feasible relates to engineering considerations and what is practical to build or carry out
Heritage item	An item as defined under the *Heritage Act 1977* and/or an Aboriginal Object or Aboriginal Place as defined under the *National Parks and Wildlife Act 1974*
Incident	A set of circumstances that: • causes, or threatens to cause, material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this approval
Land	As defined in the EP&A Act, except where the term is used in the noise and air quality conditions in schedules 3 and 4 of this approval, where it is defined as the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Leard Forest mining precinct	The area incorporating the existing and proposed coal mining operations centred around Leard Community Conservation Area (CCA) 4 including the Tarrawonga coal mine, Boggabri coal mine and Maules Creek coal mine
LPB	Low permeability barrier to be constructed between the mine and Goonbri Creek
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mine water	Water that accumulates within, or drains from, active mining areas, emplacements, stockpiles, tailings dams and infrastructure areas, synonymous with dirty water
Mining operations	Includes the removal of overburden and extraction, processing,

	handling, storage and transportation of coal on site
Minister	Minister for Planning and Infrastructure, or delegate
Mitigation	Activities associated with reducing the impacts of the project
Namoi CMA	Namoi Catchment Management Authority
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water, within the Department of Primary Industries
OEH	Office of Environment and Heritage, within the Department of Premier and Cabinet
PAC	Planning Assessment Commission
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency or a mining company (or its subsidiary)
Project	The project as described in the EA
Proponent	Tarrawonga Coal Pty Limited, or any person who seeks carry out the approved project under this approval
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
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 restoration of land disturbed by the project to a good condition and for the purpose of establishing a safe, stable and non-polluting environment
RMS	Roads and Maritime Services
ROM coal	Run-of-mine coal
SEWPaC	Commonwealth Department of Sustainability, Environment, Water, Populations and Communities.
Site	The land described in Appendix 1
Statement of commitments	The Proponent's commitments in Appendix 4
TSC Act	*Threatened Species Conservation Act 1995*
VPA	Voluntary Planning Agreement

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project generally in accordance with the:
   (a) EA;
   (b) statement of commitments; and
   (c) conditions of this approval.

   Notes:
   - *The general layout of the project is shown in Appendix 2; and*
   - *The statement of commitments is reproduced in Appendix 4.*

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 approval shall prevail to the extent of any inconsistency.

4. The Proponent 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 this approval; and
   (b) the implementation of any actions or measures contained in these documents.

LIMITS ON APPROVAL

Mining Operations

5. The Proponent may carry out mining operations on the site until the end of December 2030.

   Note: Under this approval, the Proponent is required to rehabilitate the site and carry out additional undertakings to the satisfaction of both the Director-General and the Executive Director Mineral Resources. Consequently, this approval 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.

Coal Extraction

6. The Proponent shall not extract more than 3 million tonnes of ROM coal from the site in any calendar year.

Coal Transport – Before Commissioning of the Boggabri Rail Spur Line & Boggabri CHPP

7. For the period until up to 3 months after the commissioning of the Boggabri Rail Spur Line and Boggabri CHPP, the Proponent may transport up to:
   (a) 2 million tonnes of ROM coal from the site to the Whitehaven CHPP along the dedicated haulage route in any calendar year; and
   (b) 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway.

   Note: For the avoidance of doubt, the total amount of coal permitted to be transported from the site by road in any calendar year is 2 million tonnes.

8. During this period, the Proponent shall only transport coal from the site or receive coal reject from the Whitehaven CHPP 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 Sundays or public holidays.

Coal Transport – After Commissioning of the Boggabri Rail Spur Line & Boggabri CHPP

9. For the period commencing 3 months after the commissioning of the Boggabri Rail Spur Line & Boggabri CHPP, the Proponent:
   (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year;
   (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway; and
   (c) shall transport all other coal from the site via the Boggabri rail spur line.

10. During this period, the Proponent shall only transport coal from the site by truck (excluding coal transport to the Boggabri coal mine for subsequent despatch via the Boggabri rail spur line) between 7 am and 6 pm Monday to Saturday.

Gravel Extraction and Transport

11. The Proponent shall not extract more than 90,000m^3 of gravel from the site for distribution off-site in any calendar year.

12. The Proponent may transport up to 90,000m^3 of gravel from the site by truck in any calendar year. This gravel is to be transported from the site to the Kamilaroi Highway via the dedicated haulage route.

13. The Proponent shall only transport gravel from the site by truck between 7 am and 6 pm Monday to Saturday.

SURRENDER OF EXISTING DEVELOPMENT CONSENT

14. By the end of December 2013, or as otherwise agreed by the Director-General, the Proponent shall surrender the existing development consent (DA-88-4-2005) for the Tarrawonga Coal Mine in accordance with Section 104A of the EP&A Act.

    Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the development consent.

STRUCTURAL ADEQUACY

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

    Notes:
    - *Under Part 4A of the EP&A Act, the Proponent 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 the project.*

DEMOLITION

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

PROTECTION OF PUBLIC INFRASTRUCTURE

17. Unless the Proponent and the applicable authority agree otherwise, the Proponent shall:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
    (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

OPERATION OF PLANT AND EQUIPMENT

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

STAGED SUBMISSION OF STRATEGIES, PLANS AND PROGRAMS

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

    Notes:
    - *While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.*
    - *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

20. Until they are replaced by an equivalent strategy, plan or program approved under this approval, the Proponent shall implement the existing strategies, plans or programs for the site that have been approved under DA-88-4-2005.

COMMUNITY ENHANCEMENT

21. By the end of March 2013, unless otherwise agreed by the Director-General, the Proponent shall enter into a planning agreement with Council in accordance with:
    (a) Division 6 of Part 4 of the EP&A Act; and
    (b) the terms of the Proponent's offer provided in Appendix 3.

SCHEDULE 3
ENVIRONMENTAL PERFORMANCE CONDITIONS

ACQUISITION ON REQUEST

1. Upon receiving a written request for acquisition from an owner of the privately-owned land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.

Table 1: Land subject to acquisition upon request

Acquisition Basis	Property ID
Noise & Air	44, 45, 49
Noise	43, 47

Notes:

- *To interpret the locations referred to in Table 1 see the applicable figure(s) in Appendix 5.*
- *Properties 43, 44 and 45 also have acquisition rights under the approval for the Boggabri coal mine, and/or the existing consent (DA 88-4-2005) for the Tarrawonga mine. The Proponent may acquire these properties on an equitable basis with the owner of the Boggabri mine.*
- *For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be included as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Director-General for resolution. The Director-General's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.*

ADDITIONAL NOISE AND/OR AIR QUALITY MITIGATION ON REQUEST

2. Upon receiving a written request from the owner of any residence on the land listed in Table 1, the Proponent shall implement additional noise and/or air quality mitigation measures (such as double glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible and directed towards reducing the noise and/or air quality impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent 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.

NOISE AND VIBRATION

Noise Criteria

3. Except for the noise-affected land in Table 1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2: Noise criteria dB(A)

Land	Day, Evening & Night $L_{Aeq(15\ min)}$	Night $L_{A1\ (1\ min)}$
All other privately-owned residences	35	45

Notes:

- *Operational noise includes noise from the mining operations and the use of private roads and rail spurs.*
- *Noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions (also see condition 13)), of the NSW Industrial Noise Policy.*

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Acquisition Requirements - Residences

4. If the owner(s) of a privately-owned residence, that is not listed in Table 1, have reason to believe that operational noise from the project is causing the criteria in Table 2 to be exceeded at the residence, the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

If the noise impact assessment determines that the noise generated by the project causes sustained exceedances, or is likely to cause sustained exceedances, of the criteria in Table 2, the owner(s) can make a written request to the Proponent for one of the following:

(a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request from the owner(s), the Proponent and owner(s) 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; or

(b) acquisition of the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.

Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).

However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Notes:

1. *For the purposes of this condition a privately-owned residence is defined as a residence not owned by a mining company that: is regularly occupied; or is an existing residence that is not regularly occupied but for which a valid development consent exists; or is a proposed residence for which a development application has been lodged with the relevant authority prior to the date of this approval.*
2. *For the purposes of acquisition under this condition, parcels of land that are in close proximity and operated as a single agricultural enterprise should be included as part of the land to be acquired. Where the Proponent and the owner(s) cannot agree on whether non-contiguous parcels of land should be included, either party may refer the matter to the Director-General for resolution. The Director-General's decision as to the lands to be included for acquisition under the procedures in conditions 8 and 9 of Schedule 4 shall be final.*
3. *The noise assessment must be undertaken by a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General and include either:*
    a. *sufficient monitoring at the affected residence to allow for assessment of the impacts under a range of meteorological conditions (including adverse conditions) likely to be experienced at the residence; or*
    b. *sufficient monitoring to allow reliable prediction of the likely impacts under the range of meteorological conditions (including adverse conditions) likely to be experienced at the residence.*
4. *Monitoring should be conducted in accordance with the requirements of the NSW Industrial Noise Policy.*
5. *Where predictions of likely impacts is to be used, either in substitution for, or in conjunction with, direct measurement of noise impacts at the residence, it must be based on sufficient monitoring data to provide a reliable estimate of the impacts (including under adverse meteorological conditions) and be derived using standard noise modelling techniques accepted by the EPA.*
6. *The Proponent shall ensure that the requested noise impact assessment is submitted to the Director-General within 3 months of the Director-General's decision that the assessment was warranted. The Proponent shall also provide a copy of the assessment to the owner(s) of the residence at the same time it is submitted to the Director-General.*

Noise Acquisition Requirements - Land

5. If the owner(s) of land containing a privately owned residence, which is not listed in Table 1, have reason to believe that operational noise from the project is causing noise levels to exceed 40 dB(A) $L_{Aeq(15\ min)}$ over more than 25% of that land, the owner(s) can request an independent noise impact assessment for the land. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

If the noise impact assessment determines that the noise generated by the project causes sustained exceedances, or is likely to cause sustained exceedances, of the 40 dBA criteria, the owner(s) can make a written request to the Proponent for acquisition of the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.

Upon receiving a written request from the owner(s), the Proponent must purchase the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.

However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Note: The notes to condition 4 of this Schedule also apply to this condition.

Cumulative Noise Criteria

6. Except for the land listed in Table 1, the Proponent shall ensure that the operational noise generated by the project combined with the noise generated by other mines does not exceed the criteria in Table 3 at any residence on privately-owned land.

Table 3: Cumulative noise criteria dB(A) $L_{Aeq\ (period)}$

Land	Day/Evening/Night $L_{Aeq\ (period)}$
All privately-owned land	40

Notes:

- *Cumulative noise is to be measured in accordance with the relevant requirements, and exemptions (including certain meteorological conditions(also see condition 13)), of the NSW Industrial Noise Policy.*
- *Operational noise includes noise from the mining operations and the use of private roads and rail spurs.*

Cumulative Noise Acquisition Requirements

7. If the owner(s) of a privately-owned residence, which is not listed in Table 1, reasonably believes that the noise limits in Table 3 are being exceeded at the residence and that the exceedance is caused by operational noise from the project and one or more other mines (including use of private roads or rail spurs), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment.

Where the noise impact assessment determines that the cumulative noise generated by the project combined with the noise from the other mine(s) causes, or is likely to cause, sustained exceedances of the criteria in Table 3, then the owner(s) can make a written request to the Proponent for one of the following:

(a) mitigation (such as double glazing, insulation and air conditioning) at the residence in consultation with the owner(s). These measures must be reasonable and feasible and directed towards reducing the noise impacts of the project on the residence. If within 3 months of receiving this request from the owner(s), the Proponent and owner(s) 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; or

(b) acquisition of the residence and land in accordance with the procedures in conditions 8 and 9 of Schedule 4.

Upon receiving a written request from the owner(s), the Proponent must undertake whichever option has been requested by the owner(s).

However, this condition does not apply if the Proponent has an agreement with the owner(s) of the relevant residence to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

The Proponent may seek to recover an equitable share of the costs incurred from the other mines contributing to the cumulative impact. Unless otherwise agreed between the mines, the proportional contributions should be based on expert analysis of the monitoring results to assess relative contribution to the impact. In the event of a dispute between the mines the Proponent, or one of the contributing mines, may submit the matter to the Director-General for resolution. The Director-General's decision shall be final.

Notes:

1. *The notes to condition 4 of this Schedule also apply to this condition.*
2. *The noise impact assessment shall include assessment of the relative contribution of the mines to the impact at the residence.*

Road Traffic Noise Criteria

8. The Proponent shall ensure that the noise generated by the project on public roads does not exceed the criteria in Table 4 at any existing residence on privately-owned land.

Table 4: Road traffic noise criteria dB(A)

Land	Day $L_{Aeq\ (period)}$	Evening $L_{Aeq\ (period)}$	Night $L_{Aeq\ (period)}$
All privately-owned residences	60	60	55

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

Attenuation of Plant

9. The Proponent shall:

(a) ensure that:

- all trucks, dozers, drills and excavators purchased for used on the site after the date of this approval are commissioned as noise suppressed (or attenuated) units;

- all equipment and noise control measures deliver sound power levels that are equal to, or less than, the sound power levels identified in the EA, and correspond to best practice, or the application of best available economically achievable technology;
- improvements are made to existing noise suppression equipment as improved technology becomes available where reasonable and feasible; and

(b) monitor and report on the implementation of these requirements annually on its website.

10. The Proponent shall:
    (a) conduct an annual testing program of the plant on site;
    (b) restore the effectiveness of any attenuation if it is found to be defective; and
    (c) report on the results of any testing and/or attenuation work within the Annual Review.

Operating Conditions

11. The Proponent shall:
    (a) implement best management practice to minimise all operational, low frequency, road and rail traffic noise levels associated with the project;
    (b) operate a comprehensive on-site noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
    (c) maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not operationally used until fully repaired;
    (d) ensure that noise attenuated plant is deployed preferentially in locations near to sensitive receivers;
    (e) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply (see condition 13);
    (f) ensure that project related trains on the Boggabri spur line only use locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142);
    (g) use its best endeavours to ensure that project-related rolling stock supplied by service providers on the Boggabri rail spur line is designed, constructed and maintained to minimise noise; and
    (h) co-ordinate the noise management on site with the noise management at other mines within the Leard Forest Mining Precinct, to minimise the cumulative noise impacts of these mines,

    to the satisfaction of the Director-General.

Noise Management Plan

12. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with the EPA, and be submitted to the Director-General for approval by the end of May 2013;
    (b) describe the measures that would be implemented to ensure:
        - best management practice is being employed;
        - the noise impacts of the project are minimised during meteorological conditions under which the noise limits in this approval do not apply; and
        - compliance with the relevant conditions of this approval;
    (c) describe the proposed noise management system in detail;
    (d) include a risk/response matrix to codify operational responses to varying levels of risk resulting from weather conditions and specific mining activities;
    (e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from noise monitoring;
    (f) include a monitoring program that:
        - uses attended monitoring to evaluate the performance of the project, including a minimum of four days attended monitoring per quarter at locations agreed to by the Director-General, or more regularly where required;
        - uses real-time monitoring to support the proactive and reactive noise management system on site;
        - includes monitoring of inversion strength at an appropriate sampling rate to determine compliance with noise limits;
        - evaluates and reports on the effectiveness of the noise management system on site;
        - provides for the annual validation of the noise model for the project (including the tenth percentile methodology); and
    (g) includes a Leard Forest Mining Precinct Noise Management Strategy, that has been prepared in consultation with other coal mines in the Precinct, to minimise the cumulative noise impacts of all mines within the Precinct, and includes:
        - a description of the measures that would be implemented to ensure that the noise management of the mines is properly co-ordinated to ensure compliance with the relevant noise criteria;
        - a suitable monitoring network for the precinct;
        - protocols for data sharing; and

- procedures for identifying and apportioning the source/s and contribution/s to cumulative noise impacts for the operating mines and other sources, using the noise and meteorological monitoring network and appropriate investigative tools.

Note: The Leard Forest Mining Precinct Noise Management Strategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination and commencement of other mining projects in the area.

Noise Measurement

13. Where conditions in this approval refer to measurement of noise within the context of the NSW Industrial Noise Policy the inversion class to be applied to the project is Class G.

However, the Proponent may undertake an investigation to determine whether a proposal for change in this classification could be considered for approval by the Director-General. Any such investigation must be conducted in consultation with the EPA and be conducted by a suitably qualified person whose appointment has been endorsed by the EPA and approved by the Director-General. The report and recommendation must be submitted to the EPA for endorsement prior to submission to the Director-General. If the Director-General is satisfied that the recommendation is reasonable, then the Director-General may amend the inversion class applying to the project under this approval.

BLASTING

Blasting Criteria

14. The Proponent shall ensure that blasting does not cause any exceedence of the criteria in Table 5.

Table 5: Blasting criteria

Location	***Airblast overpressure (dB(Lin Peak))***	***Ground vibration (mm/s)***	***Allowable exceedence***
Residence on privately-owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 *(or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, to the satisfaction of the Director-General)*	0%

However, these criteria do not apply if the Proponent has a written agreement with the relevant owner or infrastructure provider/owner to exceed the limits in Table 5, and the Proponent has advised the Department in writing of the terms of this agreement.

Blasting Hours

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

Blasting Frequency

16. The Proponent may carry out a maximum of:
(a) 1 blast a day; unless an additional blast is required following a blast misfire; and
(b) 4 blasts a week, averaged over a calendar year,
for the project.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Property Inspections

17. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open-cut pit on site, for a property inspection to establish the baseline condition of any buildings and/or structures on his/her 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 is acceptable to both parties, to:
    (b) establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and
    (c) identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
    (d) give the landowner a copy of the new or updated property inspection report.

    If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General for resolution.

Property Investigations

18. If any owner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, 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 in writing from the landowner, the Proponent shall:
    (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, 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 Proponent shall repair the damages to the satisfaction of the Director-General.

    If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General for resolution.

Operating Conditions

19. During mining operations on site, the Proponent shall:
    (a) implement best practice blasting management to:
        - protect the safety of people and livestock in the surrounding area;
        - protect public or private infrastructure/property in the surrounding area from any damage;
        - minimise the dust and fume emissions of any blasting; and
        - minimise blasting impacts on heritage items in the vicinity of the site;
    (b) co-ordinate the timing of blasting on site with the timing of blasting at other mines within the Leard Forest Mining Precinct 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 on site,

    to the satisfaction of the Director-General.

20. The Proponent shall not undertake blasting on-site within 500 metres of:
    (a) any public road without the approval of Council; or
    (b) any land outside of the site not owned by the Proponent, unless:
        - the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement; or
        - the Proponent has:
            - demonstrated that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and
            - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land,

    to the satisfaction of the Director-General.

Blast Management Plan

21. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be submitted to the Director-General for approval by the end of May 2013;

(b) be prepared in consultation with the EPA and interested members of the local community who would potentially be affected by blasting;
(c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site;
(d) describe the measures that would be implemented to ensure:
- best management practice is being employed; and
- compliance with the relevant conditions of this approval;

(e) include a road closure protocol for blasting within 500 metres of a public road, that has been prepared in consultation with Council;
(f) include a specific blast fume management protocol to demonstrate how emissions will be minimised, including risk management strategies if blast fumes are generated;
(g) include a monitoring program for evaluating blasting performance, which includes:
- compliance with the applicable criteria; and
- minimising blast fume emissions; and

(h) include a Leard Forest Mining Precinct Blast Management Strategy, that has been prepared in consultation with other mines within the Leard Forest Mining Precinct, to minimise cumulative blasting impacts.

Note: The Leard Forest Mining Precinct Blast Management Strategy can be developed in stages, and will need to be subject to ongoing review dependent upon the determination of and commencement of other mining projects in the area.

AIR QUALITY & GREENHOUSE GAS

Odour

22. Unless otherwise authorised by an EPL, the Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.

Greenhouse Gas Emissions

23. The Proponent 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 Criteria

24. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 6, Table 7and Table 8 at any residence-on privately-owned land or on more than 25 percent of any privately-owned land.

The assessment acknowledges that it may not be reasonable and feasible to prevent exceedance of the PM_{10} criteria in Table 6 at property 45 and exceedance of the criteria in Table 7 in year 16 at property 49. (To interpret the property locations referred to see the applicable figure(s) in Appendix 5.)

Table 6: Long-term criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
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 criteria for particulate matter

Pollutant	***Averaging Period***	***[d] Criterion***
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***
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Table 6, Table 7 and Table 8:

[a] Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to all other sources);

[b] *Incremental impact (ie 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.*

[d] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Director-General.*

"Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 28 and 29 to develop and implement a real-time air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Mine-Specific Air Quality Criteria

25. The Proponent shall ensure that particulate matter emissions generated by the project do not exceed the criteria listed in Table 9 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, except on property 49 in year 16.

Table 9: Short-term criteria for particulate matter

Pollutant	***Averaging Period***	***Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	50 µg/m^3

Note:
As provided by the EP&A Act, the criterion in Table 9 may be amended to a more stringent criterion in an EPL, after the first review of the EPL under section 78 of the POEO Act.

Air Quality Acquisition Criteria

26. If particulate matter emissions generated by the project exceed the criteria, or contribute to an exceedance of the relevant cumulative criteria, in Table 10, Table 11or Table 12, 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 Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.

Table 10: Long term land acquisition criteria for particulate matter

Pollutant	***Averaging period***	***[d] Criterion***
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 11: Short term land acquisition criteria for particulate matter

Pollutant	***Averaging period***	***[d] Criterion***
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 150 µg/m^3
Particulate matter < 10 µm (PM_{10})	24 hour	[b] 50 µg/m^3

Table 12: Long term land 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 to Table 10, Table 11 and Table 12:

[a] *Total impact (ie incremental increase in concentrations due to the project plus background concentrations due to all other sources);*

[b] *Incremental impact (ie 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;*

[d] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, or any other activity agreed by the Director-General.*

Mine-owned Land

27. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not exceed the criteria in

Table 6, Table 7and Table 8 at any occupied residence on any mine-owned land (including land owned by adjacent mines), unless:

(a) the tenant and/or landowner has been notified of any health risks in accordance with the notification requirements under schedule 4 of this approval;

(b) the tenant on project-related land can terminate the tenancy agreement without penalty, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;

(c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Proponent);

(d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and

(e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property,

to the satisfaction of the Director-General.

Operating Conditions

28. The Proponent shall:

(a) implement best practice management to minimise the off-site odour, fume and dust emissions of the project;

(b) operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;

(c) manage $PM_{2.5}$ levels in accordance with any requirements of an EPL;

(d) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 8);

(e) minimise any visible off-site air pollution;

(f) minimise the surface disturbance of the site generated by the project; and

(g) co-ordinate the air quality management on site with the air quality management at other mines within the Leard Forest Mining Precinct to minimise the cumulative air quality impacts of the mines,

to the satisfaction of the Director-General.

Air Quality and Greenhouse Gas Management Plan

29. The Proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with the EPA and be submitted to the Director-General for approval by the end of May 2013;

(b) describe the measures that would be implemented to ensure:
- best practice management is being employed;
- the air quality impacts of the project are minimised during adverse meteorological conditions and extraordinary events; and
- compliance with the relevant conditions of this approval;

(c) describe the proposed air quality management system;

(d) include a risk/response matrix to codify mine operational responses to varying levels of risk resulting from weather conditions and specific mining activities;

(e) include commitments to provide summary reports and specific briefings at CCC meetings on issues arising from air quality monitoring;

(f) include an air quality monitoring program that:
- uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the project;
- adequately supports the proactive and reactive air quality management system;
- includes $PM_{2.5}$ monitoring;
- includes monitoring of occupied mine-owned residences and residences on the air quality affected land in Table 1, subject to the agreement of the tenant and/or landowner;
- evaluates and reports on the effectiveness of the air quality management system;
- includes sufficient random audits of operating responses to real time air quality management systems to determine the ongoing effectiveness of these responses in maintaining the project within the relevant criteria in this Schedule and the requirements of conditions 24 and 25, above;
- includes a protocol for determining any exceedences of the relevant conditions in this approval; and

(g) includes a Leard Forest Mining Precinct Air Quality Management Strategy that has been prepared in consultation with other coal mines in the Precinct to minimise the cumulative air quality impacts of all mines within the Precinct, that includes:
- systems and processes to ensure that all mines are managed to achieve their air quality criteria;

- a shared environmental monitoring network and data sharing protocol;
- control monitoring site(s) to provide real time data on background air quality levels (ie not influenced by mining in the Leard Forest Mining Precinct and representative of regional air quality);
- a shared predictive and real time air dispersion model covering the Leard Forest Mining Precinct to be used for assessment of cumulative impacts, optimising location of the shared real time monitoring network, validation of air predictions and optimising mitigation measures; and
- procedures for identifying and apportioning the source/s and contribution/s to cumulative air impacts for both mines and other sources, using the air quality and meteorological monitoring network and appropriate investigative tools such as modelling of post incident plume dispersion, dual synchronised monitors and chemical methods of source apportionment (where possible).

Notes:

- *The requirement for regionally based control sites can be further reviewed if a regional air monitoring network is implemented and operated by the EPA as recommended in the draft Strategic Regional Land Use Plan for New England North West.*
- *The Leard Forest Mining Precinct Air Quality Management Strategy can be developed in stages and will need to be subject to ongoing review dependent upon the determination of and commencement of other mining projects in the area.*
- *The management plan should be consistent with the EPA's guidance on Best Management Practice reporting and Reactive Particulate Management Strategies.*

METEOROLOGICAL MONITORING

30. For the life of the project, the Proponent shall ensure that there is a meteorological station 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*, unless a suitable alternative is approved by the Director-General following consultation with the EPA.

SOIL AND WATER

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.

Water Supply

31. The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations on site to match its available water supply, to the satisfaction of the Director-General.

Compensatory Water Supply

32. The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely and directly impacted (other than a negligible impact) as a result of the project, 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 project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified.

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

Surface Water Discharges

33. The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.

Goonbri Creek Diversion and Low Permeability Barrier – Performance Objectives

34. The Proponent shall ensure that the project has no greater environmental consequences than predicted in the EA and complies with the performance objectives in Table 13, to the satisfaction of the Director-General.

Table 13: Goonbri Creek and alluvial aquifer performance objectives

Feature	Objective
Goonbri Creek and the Upper Namoi alluvial aquifer	No more than negligible environmental consequences to the alluvial aquifer, including: • negligible change in groundwater levels; • negligible leakage through low permeability barrier; • negligible change in groundwater quality; and • negligible impact to other groundwater users.
Goonbri Creek diversion	Hydraulically and geomorphologically stable (including the low permeability barrier) Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity) Riparian vegetation, habitat, energy management and dissipation, bedload transport, biophysical maintenance and pool holding capacity that is the same or better than existed prior to mining Revegetation of the riparian zone focused on establishment of self-sustaining vegetation characteristic of the Bracteate Honeymyrtle community (as proposed in the EA)
Low permeability barrier, including associated flood bund	Hydraulically and geomorphologically stable The effectiveness of the Low Permeability Barrier shall be at least 10^{-8} metres/second Negligible change to off-site flooding characteristics (including flood levels, velocities and flood storage capacity) Provides suitable protection for flood events up to and including the Probable Maximum Flood.

Goonbri Creek Diversion and Flood Bund Concept Design Plan

35. The Proponent shall prepare and implement a Goonbri Creek Diversion and Flood Bund Concept Design Plan, to the satisfaction of the Director-General. The plan must:
    (a) be prepared in consultation with NOW, OEH and the Namoi CMA;
    (b) be submitted to the Director-General for approval by December 2016;
    (c) set out the vision statement for the creek diversion;
    (d) assess the surface water and groundwater quality, ecology, hydrological (including flooding) and geomorphic baseline conditions within the creek;
    (e) set out the construction program for the creek diversion and LPB, describing how the work would be staged, and integrated with mining operations;
    (f) describe the revegetation program for the creek diversion and the use of a range of suitable native species;
    (g) establish the water quality, ecology, hydrological (including flooding) and geomorphic performance and completion criteria for the creek diversion and LPB based on the assessment of baseline conditions; and
    (h) be revised in consultation with NOW, OEH and the Namoi CMA, and resubmitted for approval by the Director-General in response to the findings of the detailed technical design required in condition 36 and the Monitoring and Management Plan in condition 38.

Goonbri Creek Diversion and Low Permeability Barrier – Design and Construction

36. The Proponent shall design the Goonbri Creek diversion and LPB to the satisfaction of NOW and the Director-General. The detailed designs must:
    (a) be designed by a suitably qualified and experienced expert/s;
    (b) be endorsed by NOW and approved by the Director-General prior to the commencement of any works or construction on the Goonbri Creek diversion and LPB;
    (c) be generally in accordance with the conceptual designs in the EA (and depicted in Appendix 6), and applicable Australian Standards (including AS 3798–2007);
    (d) include detailed design, construction and engineering specifications, performance criteria and completion criteria;

(e) demonstrate that the design would achieve the relevant performance objectives and criteria; and
(f) demonstrate the LPB design would remain effective over an appropriate lifespan and would withstand mining operations, geological and weather events, decay and corrosive attack – including biological attack.

37. The Proponent shall:
(a) construct the Goonbri Creek diversion and LPB prior to undertaking any mining operations within 200 metres of the Goonbri Creek alluvium, and at least 5 years prior to the planned mining in the alluvium; and
(b) within 2 months of the construction of the Goonbri Creek diversion and LPB, submit an as-executed report to the Director-General and NOW, certified by a practising engineer, confirming that the diversion and barrier have been constructed:
- in accordance with the concept design in the EA, applicable Australian Standards (including AS 3798-2007) and the approved design (see condition 36 above); and
- in a manner that achieves the performance objectives in Table 13.

Notes:
- *The Goonbri Creek alluvium, diversion, conceptual low permeability barrier and flood bunds are shown in Appendix 6.*
- *The diversion and low permeability barrier may be constructed on a staged basis. In this case, the reports required under conditions 36 and 37 shall be submitted for each stage.*

Goonbri Creek Diversion and Low Permeability Barrier – Monitoring and Management Plan

38. The Proponent shall prepare and implement a Goonbri Creek Diversion and Low Permeability Barrier Monitoring and Management Plan to the satisfaction of the NOW and the Director-General. The plan must:
(a) be prepared by a suitably qualified and experienced expert/s;
(b) be endorsed by the NOW and approved to the Director-General prior to commencement of any works or construction on the Goonbri Creek diversion and LPB;
(c) describe the monitoring and maintenance procedures to be implemented and the scheduling of these procedures;
(d) demonstrate the monitoring system would be capable of timely detection of any failure or deficiency in the LPB and any impacts on Goonbri Creek and its associated alluvium;
(e) describe the contingency measures that would be implemented in the event of a failure or deficiency in the LPB, or other impact on Goonbri Creek and its associated alluvium; and
(f) identify the entity that would take responsibility for the future liabilities and costs associated with the long-term monitoring and maintenance of the LPB, flood bund, void and pit lake, and demonstrate that this entity's security and finances would be assured in the long term.

Water Management Plan

39. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must:
(a) be prepared in consultation with OEH, NOW and Namoi CMA, by suitably qualified and experienced person/s whose appointment has been approved by the Director-General,
(b) be submitted to the Director-General for approval by the end of May 2013; and
(c) in addition to the standard requirements for management plans (see condition 3 of schedule 5), include a:
(i) Site Water Balance, that includes:
- details of:
  - sources and security of water supply, including contingency for future reporting periods;
  - water use and management on site;
  - any off-site water discharges;
  - reporting procedures, including the preparation of a site water balance for each calendar year;
- a program to validate the surface water model, including monitoring discharge volumes from the site and comparison of monitoring results with modelled predictions; and
- describes the measures that would be implemented to minimise clean water use on site;

(ii) Surface Water Management Plan, that includes:
- detailed baseline data on surface water flows and quality in the water-bodies that could potentially be affected by the project;
- detailed baseline data on soils within the irrigation area;
- detailed baseline data on hydrology across the downstream drainage system of the Namoi River floodplain from the mine site to the Namoi River, including Barbers Lagoon and The Slush Holes;
- a detailed description of the water management system on site, including the:
  - clean water diversion systems;

- erosion and sediment controls (mine water system);
- mine water management systems including irrigation areas;
- discharge limits in accordance with EPL requirements; and
- water storages;

- detailed plans, including design objectives and performance criteria for:
  - design and management of final voids;
  - design and management for the emplacement of reject materials, sodic and dispersible soils and acid or sulphate generating materials;
  - the Goonbri Creek diversion and low permeability barrier;
  - reinstatement of drainage lines on the rehabilitated areas of the site; and
  - control of any potential water pollution from the rehabilitated areas of the site;
- performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project:
  - the water management system;
  - soils within the irrigation area;
  - downstream surface water quality;
  - downstream flooding impacts, including flood impacts due to the flood bunds required for the project; and
  - stream and riparian vegetation health, including the Namoi River and its tributaries including Barbers Lagoon and The Slush Holes;
- a program to monitor and assess:
  - the effectiveness of the water management system;
  - soils within the irrigation area;
  - the effectiveness of the Goonbri Creek diversion and flood bunds (see conditions 34-38);
  - surface water flows and quality in the watercourses that could be affected by the project; and
  - downstream flooding impacts;
- reporting procedures for the results of the monitoring program; and
- a plan to respond to any exceedences of the performance criteria, and mitigate and/or offset any adverse surface water impacts of the project;

(iii) Groundwater Management Plan, that includes:

- detailed baseline data of groundwater levels, yield and quality in the region, and privately-owned groundwater bores including a detailed survey/schedule of groundwater dependent ecosystems (including stygo-fauna), that could be affected by the project;
- detailed plans, including design objectives and performance criteria, for the design and management of:
  - the proposed final void; and
  - coal reject and potential acid forming material emplacement;
- groundwater assessment criteria including trigger levels for investigating any potentially adverse groundwater impacts;
- a program to monitor and assess:
  - groundwater inflows to the open cut mining operations;
  - the effectiveness of the LPB;
  - the seepage/leachate from the LPB, water storages, emplacements and the final void;
  - interconnectivity between the alluvial and bedrock aquifers;
  - background changes in groundwater yield/quality against mine-induced changes;
  - the impacts of the project on:
    - regional and local (including alluvial) aquifers;
    - groundwater supply of potentially affected landowners;
    - groundwater dependent ecosystems (including potential impacts on stygo-fauna) and riparian vegetation;
- a program to validate the groundwater model for the project, including an independent review of the model every 3 years, and comparison of monitoring results with modelled predictions; and
- a plan to respond to any exceedences of the performance criteria; and

(iv) Leard Forest Mining Precinct Water Management Strategy, that has been prepared in consultation with other mines within the precinct to:

- minimise the cumulative water quality impacts of the mines;
- review opportunities for water sharing/water transfers between mines;
- co-ordinate water quality monitoring programs as far as practicable;
- undertake joint investigations/studies in relation to complaints/exceedences of trigger levels where cumulative impacts are considered likely; and
- co-ordinate modelling programs for validation, re-calibration and re-running of the groundwater and surface water models using approved mine operation plans.

Note: The Leard Forest Mining Precinct Water Management Strategy can be developed in stages and will need to be subject to ongoing review, dependent upon the determination of and commencement of other mining projects in the area.

BIODIVERSITY

Biodiversity Offset Strategy

40. The Proponent shall implement the biodiversity offset strategy described in the EA, summarised in Table 14 and shown conceptually in Appendix 7, to the satisfaction of the Director-General.

Table 14: Summary of the biodiversity offset strategy

Area	Offset Type	Minimum Size (hectares)
Willeroi Offset Area	Existing native vegetation to be enhanced, and additional native vegetation to be established with the restoration of at least 193 ha of Box Gum Woodland EEC, as listed under the TSC Act	1,660
Rehabilitation Area	Native woodland vegetation communities to be re-established, focused on Box Gum Woodland EEC	752

Note: For the purposes of this approval Box Gum Woodland refers to the EEC listed as White Box Yellow Box Blakely's Red Gum Woodland under the TSC Act, and the CEEC listed as White Box Yellow Box Blakely's Red Gum Grassy Woodland and Derived Native Grasslands under the EPBC Act, or similar EEC as may be updated from time to time.

Leard Forest Mining Precinct Regional Biodiversity Strategy

41. The Proponent shall contribute to the funding and preparation of the Leard Forest Mining Precinct Regional Biodiversity Strategy, as required under the approvals for the Boggabri coal mine and Maules Creek coal mine, to the satisfaction of the Director-General.

Notes:

- *The approvals for the Boggabri coal mine and Maules Creek coal mine require the proponents of the mines in the Leard Forest mining precinct to prepare the regional biodiversity strategy in 3 stages, including:*
  - *Stage 1 Scoping Stage, by the end of January 2013;*
  - *Stage 2 Strategy Development Stage, by the end of January 2014; and*
  - *Stage 3 Strategy Review Stage, by the end of December 2018.*
- *The strategy is required to be prepared in collaboration with a working group comprising relevant government agencies and the Leard Forest mining precinct mines, and chaired by an independent person.*
- *Funding of the strategy should be based on predicted clearing of native vegetation for the three projects within the Leard Forest Mining Precinct. Based on the predicted clearing for the projects, the funding split would equate to total contributions of 36% from Boggabri (clearing of 1,385 ha), 54% from Maules Creek (clearing of 2,078ha) and 10% from Tarrawonga (clearing of 397 ha). This funding arrangement can be further refined in the Stage 1 Scoping Stage.*

Revised Biodiversity Offset Strategy

42. Within 6 months of the approval of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy the Proponent shall review, and if necessary revise, the biodiversity offset strategy for the project to the satisfaction of the Director-General. The review/revision must:
    (a) be prepared in consultation with OEH, Namoi CMA, Forests NSW, the CCC, DPI Catchments and Lands and SEWPaC;
    (b) not reduce the size or quality of the offset area; and
    (c) be consistent (as far as is possible) with the recommendations and objectives of the Leard Forest Mining Precinct Regional Biodiversity Strategy.

Threatened Species

43. For the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland Endangered Ecological Community the Proponent shall:
    (a) ensure that the Biodiversity Offset Strategy and site Rehabilitation Strategy is focused on protection rehabilitation, re-establishment and long-term maintenance of viable stands of this community;
    (b) investigate in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term restoration of degraded remnants of this EEC in offset areas or regeneration of this EEC on disturbed areas (both offset areas and the site);
    (c) within 24 months of the date of this approval (and if possible in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to maximise the prospects for rehabilitation and regeneration of this EEC on the offset areas and the site, for approval by the Director-General; and
    (d) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition48.

44. For all threatened species on site, the Proponent shall ensure that the Biodiversity Offset Strategy and Rehabilitation Strategy are focused on protection, rehabilitation and long-term maintenance of viable stands of suitable habitat for these species.

45. The Proponent shall:
    (a) investigate, in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term provision of suitable habitat(s) for the following species: Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Owl, Yellow-bellied Sheath Tail Bat and Squirrel Glider;
    (b) within 12 months of the date of this approval (and if possible, in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to ensure delivery of suitable areas of viable habitat for the species included in (a) above, for approval by the Director-General; and
    (c) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.

Long Term Security of Offset

46. The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas:
    (a) for the Willeroi Offset Area the long-term security shall be provided by way of:
        - the Proponent entering into a conservation agreement or agreements pursuant to section 69B of the *National Parks and Wildlife Act 1974*, recording the obligations assumed by the Proponent under the conditions of this approval in relation to these offset areas, and registering the agreement(s) pursuant to section 69F of the *National Parks and Wildlife Act 1974* ; or
        - a tenure of higher conservation status such as a National Park, or Nature Reserve, under the *National Parks and Wildlife Act 1974*,

          The conservation agreement(s) must be registered by the end of December 2013 unless agreed otherwise by the Director-General after consultation with OEH. The conservation agreements must remain in force in perpetuity; and
    (b) by the end of December 2030 unless otherwise agreed by the Director-General, for the woodland to be established in the Rehabilitation Area, as identified in Table 14,

    to the satisfaction of the Director-General.

    Note: The Department acknowledges that the Proponent is investigating the potential to transfer part or all of the Willeroi Offset Area directly to the national park estate, and accepts that interim conservation measures may be implemented prior to this transfer.

Biodiversity Management Plan

47. The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Director-General. This plan must:
    (a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA, and be submitted to the Director-General for approval by the end of May 2013;
    (b) describe the short, medium, and long term measures that would be implemented to:
        - manage the remnant vegetation and habitat on the site and in the offset area; and
        - implement the biodiversity offset strategy, including detailed performance and completion criteria;
    (c) include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy, and triggering remedial action (if necessary);
    (d) include a detailed description of the measures that would be implemented for:
        - enhancing the quality of existing vegetation and fauna habitat;
        - restoring native vegetation and fauna habitat on the biodiversity offset area and rehabilitation area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features;
        - maximising the salvage of resources within the approved disturbance area – including vegetative, top and sub soils and cultural heritage resources – for beneficial reuse in the enhancement of the biodiversity offset area or rehabilitation area;
        - collecting and propagating seed;
        - minimising the impacts on fauna on site, including undertaking pre-clearance surveys;
        - managing any potential conflicts between the proposed restoration works in the biodiversity offset area and any Aboriginal heritage values (both cultural and archaeological);
        - managing salinity;
        - controlling weeds and feral pests;
        - controlling erosion;
        - controlling access; and
        - managing bushfire risk;
    (e) include a seasonally-based program to monitor and report on the effectiveness of these measures,

and progress against the detailed performance and completion criteria;

(f) identify the potential risks to the successful implementation of the biodiversity offset strategy, and include a description of the contingency measures that would be implemented to mitigate against these risks; and

(g) include details of who would be responsible for monitoring, reviewing, and implementing the plan.

Note: The Biodiversity Management Plan and Rehabilitation Management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.

48. The Proponent shall review and if necessary revise the Biodiversity Management Plan within 6 months of the completion of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy, to the satisfaction of the Director-General. The review/revision must:

(a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA;

(b) be consistent with the findings of Leard Forest Mining Precinct Regional Biodiversity Strategy; and

(c) include any implementation plans arising from the studies required under conditions 434543 and 45 of this approval.

Conservation Bond

49. By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity 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 biodiversity offset strategy (other than land acquisition costs); and

(b) employing a suitably qualified quantity surveyor to verify the calculated costs,

to the satisfaction of the Director-General.

If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Director-General, the Director-General will release the bond.

If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, 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 rehabilitation security deposit administered by DRE.

Notes:

- *Alternative funding arrangements for long term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond.*
- *The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.*

Independent Biodiversity Audit

50. By the end of June 2014 and every 3 years thereafter, unless both the Director-General and OEH agree to a different timeframe, the Proponent shall commission suitably qualified, experienced and independent person/s, whose appointment has been approved by the Director-General, to undertake an audit of the revegetation of the rehabilitation area and management and restoration within the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This audit must:

(a) include consultation with OEH, Namoi CMA, DPI Catchments and Lands, SEWPaC, CCC and DRE;

(b) assess the performance of the revegetation in the rehabilitation area completed to date (and the Goonbri Creek Diversion, once commenced) against the completion criteria in the Rehabilitation Management Plan;

(c) assess the performance of management and restoration in the off-site Biodiversity Offset Strategy areas completed to date against the completion criteria in the Biodiversity Management Plan;

(d) identify any measures that should be implemented to improve the performance of rehabilitation, management and restoration within the rehabilitation and biodiversity offset areas; and

(d) identify any additional measures that should be applied in the establishment of native vegetation, including riparian vegetation around the realigned Goonbri Creek, both before and after the realignment is undertaken;

(e) if the completion criteria have not been met, or are not adequately trending towards being met, determine the likely ecological value of the rehabilitation and restoration once completed, and recommend additional measures to augment the Biodiversity Offset Strategy to ensure that it adequately offsets the project's impacts on biodiversity.

If the audit recommends the implementation of additional measures to augment the Biodiversity Offset Strategy in accordance with (e) above, then within 6 months of the completion of the audit the Proponent

shall revise the Biodiversity Offset Strategy, in consultation with the Department, OEH and SEWPaC, and to the satisfaction of the Director-General.

HERITAGE

Aboriginal Heritage Conservation Strategy

51. The Proponent shall prepare and implement an Aboriginal Heritage Conservation Strategy for the project and the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This Strategy must enhance and conserve the Aboriginal cultural heritage values (both cultural and archaeological) and provide for their long-term protection and management. The Strategy must:
   (a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Director-General;
   (b) be prepared in consultation with OEH, the local Aboriginal community and other mines within the Leard Forest Mining Precinct, and submitted to the Director-General for approval within 12 months from the date of project approval;
   (c) identify the Aboriginal cultural heritage values of the Biodiversity Offset Strategy areas;
   (d) identify areas of high Aboriginal cultural heritage significance within both the site and the Leard Forest Mining Precinct;
   (e) identify a range of options for enhancing and conserving Aboriginal cultural heritage values, with specific consideration of the potential for the long-term protection and management of significant sites within either the site, the Biodiversity Offset Strategy areas or other lands within the Leard Forest Mining Precinct identified as having high cultural heritage significance to the Aboriginal community; and
   (f) consider cumulative impacts and potential for developing joint initiatives with other mines within the Leard Forest Mining Precinct for enhancing and conserving Aboriginal cultural heritage values.

Heritage Management Plan

52. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. This plan must:
   (a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Director-General;
   (b) be prepared in consultation with OEH and local Aboriginal stakeholders (in relation to the management of Aboriginal heritage values);
   (c) be submitted to the Director-General for approval prior to undertaking any activities that may impact heritage items or sites, unless the Director-General agrees otherwise;
   (d) include the following for the management of Aboriginal cultural heritage:
      - a detailed archaeological salvage program for Aboriginal sites/objects within the project disturbance area, including methodology and procedures/protocols for:
         - sub-surface testing;
         - staged salvage, based on anticipated mine planning;
         - pre-disturbance monitoring;
         - site assessment and reporting;
         - research objectives to inform knowledge of Aboriginal occupation;
         - protection, storage and management of salvaged Aboriginal objects;
         - addressing relevant statutory requirements under the *National Parks and Wildlife Act 1974*; and
         - long term protection of salvaged Aboriginal objects;
      - a description of the measures that would be implemented for:
         - protecting, monitoring and managing Aboriginal sites outside the project disturbance area;
         - maintaining and managing reasonable access for Aboriginal stakeholders to cultural heritage items on site and in the biodiversity offset area;
         - managing the discovery of any human remains or previously unidentified Aboriginal objects on site, including (in the case of human remains) stop work provisions and notification protocols;
         - ongoing consultation with the local Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on-site and in the biodiversity offset area;
         - ensuring any workers on site receive suitable heritage inductions prior to carrying out any activities which may disturb Aboriginal sites, and that suitable records are kept of these inductions;
   (e) include the following for the management of historic heritage:
      - a description of the measures that would be implemented for:
         - managing the discovery of human remains or previously unidentified historic heritage items at the site, including (in the case of human remains) stop work provisions and notification protocols; and
         - ensuring workers on site receive suitable heritage inductions prior to carrying out any development on site, and ensure that suitable records of these inductions are kept.

Note: The Department acknowledges that the initial Heritage Management Plan may not include a detailed plan for the implementation of the Aboriginal Heritage Conservation Strategy. If this occurs, the Proponent will be required to update the plan as soon as practicable following the Director-General's approval of the Aboriginal Heritage Conservation Strategy.

TRANSPORT

Roadworks

53. The Proponent shall:
    (a) construct the Goonbri Road realignments and associated mine access road intersection, Goonbri Road/private coal haulage road intersection and the Goonbri Road/Dripping Rock Road/Blair Athol Lane intersection as shown conceptually in the EA; and
    (b) install appropriate advance warning signs and lighting on Goonbri Road, the private coal haulage road at the intersection of the Northern Site Access Road,

    to the satisfaction of Council.

    The road realignments and associated intersection upgrades shall be undertaken:
    - to a bitumen sealed standard, unless otherwise agreed by Council; and
    - prior to any project works occurring within 25 metres of the existing Goonbri Road alignment, or on the southern/eastern side of the existing road alignment.

    Note: The road upgrade works may be undertaken in stages, with the agreement of Council.

Coal Transport

54. Whilst coal transport by road is permitted under this approval, the Proponent shall ensure that:
    (a) trucks travelling to and from the site do not exceed 40 kilometres per hour in the vicinity of the school bus when it is operating on Hoad Lane, unless an alternative protocol is agreed by the Director-General; and
    (b) spillage from coal haulage vehicles is minimised and promptly managed.

Road Maintenance

55. During mining operations, the Proponent shall continue to implement road maintenance agreements with Narrabri Shire Council and Gunnedah Shire Council for the maintenance of the public roads affected by the project to the satisfaction of the respective Council. If there is any dispute in relation to these agreements, then any of the parties may refer the matter to the Director-General for resolution.

Monitoring of Coal and Gravel Transport

56. The Proponent shall:
    (a) keep records of the:
        - amount of coal and gravel transported from the site (on a monthly basis); and
        - date and time of each train movement on the Boggabri rail spur line generated by the project; and
    (b) make these records available on its website at the end of each calendar year.

VISUAL

Operating Conditions

57. The Proponent shall:
    (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project;
    (b) ensure no outdoor lights shine above the horizontal;
    (c) wherever possible, ensure that mobile equipment is appropriately designed and/or retrofitted to prevent light being directed above the horizontal;
    (d) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting* or its latest version;
    (e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding:
        - along the realigned Goonbri Road and access road to the mine site;
        - along the services corridor to the Boggabri Coal Mine;
        - around the water storage dams; and
        - at other areas identified as necessary for the maintenance of satisfactory visual amenity; and
    (f) ensure that the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape,

    to the satisfaction of the Director-General.

Additional Visual Impact Mitigation

58. Upon receiving a written request from the owner of any residence on privately-owned land which has, or would have, significant direct views of the mining operations and infrastructure on-site during the project, the Proponent shall implement additional visual impact mitigation measures (such as landscaping treatments or vegetation screens) to reduce the visibility of the mining operations and infrastructure from the residences on the privately-owned land.

These mitigation measures must be reasonable and feasible, and must be implemented within a reasonable timeframe.

If the Proponent 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.

Notes:

- *The additional visual impact mitigation measures must be aimed at reducing the visibility of the mining operations on site from affected residences, and do not require measures to reduce the visibility of the mining operations from other locations on the affected properties.*
- *The additional visual impact mitigation measures do not necessarily have to include the implementation of measures on the affected property itself (ie. the additional measures could involve the implementation of measures outside the affected property boundary that provide an effective reduction in visual impacts).*
- *Except in exceptional circumstances, the Director-General will not require additional visual impact mitigation to be undertaken for residences that are more than 5 kilometres from the mining operations.*

BUSHFIRE MANAGEMENT

59. The Proponent shall:
    (a) implement all reasonable and feasible measures to manage bushfire risks, including the suspension of activities that may have the potential to ignite a fire, during adverse conditions;
    (b) ensure that the project is suitably equipped to respond to any fires on site; and
    (c) assist the Rural Fire Service, Forests NSW, emergency services and National Parks and Wildlife Services as much as possible if there is a fire in the surrounding area.

WASTE

60. The Proponent shall:
    (a) implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project;
    (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; and
    (c) monitor and report on the effectiveness of waste minimisation and management measures in the Annual Review.

REHABILITATION

Rehabilitation Objectives

61. The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed Rehabilitation Strategy described in the EA (and depicted conceptually in Appendix 8) and comply with the objectives in Table 15.

Table 15: Rehabilitation objectives

Feature	***Objective***
Mine site (as a whole)	Safe, stable and non-polluting Constructed landforms drain to the natural environment Landforms fully integrated with the final landform for the Boggabri coal mine
Final void	Minimise the size and depth of the final void as far as is reasonable and feasible Minimise the drainage catchment of the final void as far as is reasonable and feasible Negligible high wall instability risk Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level
Surface infrastructure	To be decommissioned and removed, unless the Executive Director, Mineral Resources agrees otherwise
Agricultural land	Establish a minimum of 210 hectares of Class 3 agricultural suitability land, including 160 hectares with

Feature	Objective
	cropping capability
All land – excluding the 210 ha of agricultural land and the final void	Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: • local native plant species (particularly Box Gum Woodland EEC); and • a landform consistent with the surrounding environment
Goonbri Creek diversion and LPB	See Table 13
Community	Ensure public safety Minimise the adverse socio-economic effects associated with mine closure

Operating Conditions

62. The Proponent shall, in consultation with the Namoi CMA:
    (a) develop a detailed soil management protocol that identifies procedures for:
        - comprehensive soil surveys prior to soil stripping;
        - assessment of top-soil and sub-soil suitability for mine rehabilitation; and
        - annual soil balances to manage soil handling including direct respreading and stockpiling;
    (b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and
    (c) ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.

Progressive Rehabilitation

63. The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.

    Note: It is accepted that the parts of the site that are progressively rehabilitated may be subject to further disturbance in future.

Rehabilitation Management Plan

64. The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources. This plan must:
    (a) be prepared in consultation with the Department, Forests NSW, NOW, OEH, Namoi CMA and Council;
    (b) be submitted to the Executive Director, Mineral Resources for approval by the end of May 2013;
    (c) be prepared in accordance with any relevant DRE guideline;
    (d) describe how the rehabilitation of the site would be integrated with:
        - the implementation of the biodiversity offset strategy; and
        - the final landform for the Boggabri coal mine;
    (e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);
    (f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform and final land use;
    (g) include interim rehabilitation where necessary to minimise the area exposed for dust generation;
    (h) include a program to monitor, independently audit and report on the effectiveness of the rehabilitation measures, and progress against the detailed performance and completion criteria; and
    (i) build to the maximum extent practicable on the other management plans required under this approval.

    Note: The Biodiversity Management Plan and Rehabilitation Management Plan require substantial integration to achieve biodiversity objectives for the rehabilitated mine site.

Final Void Design and Closure

65. The Proponent shall prepare and implement an updated Final Void and Mine Closure Plan (as a component of the overall Rehabilitation Management Plan required under condition 64 of schedule 3) to the satisfaction of the Executive Director Mineral Resources, following consultation with the Director-General. A draft plan must be prepared and submitted to the Executive Director Mineral Resources by the

end of December 2019, and a final plan must be prepared and submitted to the Executive Director Mineral Resources by the end of December 2024. Each version of the plan must:

(a) be subject to independent review and verification by suitably qualified, experienced and independent person/s (including a groundwater expert) whose appointment has been approved by the Director-General;

(b) identify and consider:
- options for continued mining beyond current project life;
- interactions with the final landform of adjoining mines (including any direct or indirect interaction between final voids);
- opportunities for integrated mine planning with adjoining mines to minimise environmental impacts of the mines' final landforms;
- all reasonable and feasible landform options for the final void (including filling);
- predicted stability of the proposed landforms; and
- predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality);

(c) include a detailed proposed landform design; and

(d) demonstrate that the proposed final landform:
- satisfies the relevant objectives in Table 15;
- minimises the extent of any resulting pit lake;
- avoids salt scalding;
- maximises the capacity of emplaced spoil to drain to the natural environment; and
- ensures that drained waters do not adversely affect the downstream environment.

AGRICULTURE

66. The Proponent shall use its best endeavours to ensure that the agricultural productivity and production of non-operational project-related land is maintained or enhanced.

Note: This includes properties primarily used for agriculture that are acquired by the Proponent due to noise and/or air quality impacts. However, it does not include land where disturbance is permitted under the conditions of this approval or land that forms part of the biodiversity offset area.

SCHEDULE 4
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS/TENANTS

1. Within 3 months of the date of this approval, the Proponent shall:
   (a) notify in writing the owners of:
      - the land listed in Table 1 of schedule 3 that they have the right to require the Proponent to acquire their land in accordance with the procedures in conditions 8 and 9 below at any stage during the project;
      - any residence on the land listed in Table 1 of schedule 3 that they have the right to request the Proponent to ask for additional noise and/or air quality mitigation measures to be installed at their residence at any stage during the project; and
      - any privately-owned land within 2 kilometres of the approved open-cut mining pit/s that they are entitled to ask for a property inspection, to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated;
   (b) notify the tenants of any mine-owned land of their rights under this approval; and
   (c) send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the project.

2. Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedences of the recommended dust and/or noise criteria, or for any of the land listed in Table 1 that is subsequently purchased by the Proponent, the Proponent shall:
   (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time);
   (b) advise the prospective tenants of the rights they would have under this approval; and
   (c) request the prospective tenants consult their medical practitioner to discuss the air quality monitoring data and predictions and health impacts arising from this information,

   to the satisfaction of the Director-General.

3. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedence of the relevant criteria in schedule 3, the Proponent shall notify the affected landowner in writing of the exceedence, and provide regular monitoring results to the landowner until the project is complying with the relevant criteria again; and
   (b) an exceedance of the relevant air quality criteria schedule 3, the Proponent shall send to the affected landowners and/or existing tenants of the land (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); and
      - the monitoring data, in an appropriate format so that a medical practitioner can assist the resident in making an informed decision on the health risks associated with occupation of the property.

INDEPENDENT REVIEW

4. If an owner of privately-owned land considers the project to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Director-General in writing for an independent review of the impacts of the project 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 Proponent shall:
   (a) commission a suitably qualified, experienced and independent expert, 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 project is complying with the relevant impact assessment criteria in schedule 3; and
      - if the project is not complying with the relevant criteria, then:
         - determine if the more than one mine is responsible for the exceedence, 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.

5. If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General.

If the independent review determines that the project is not complying with the relevant criteria, and that the project is primarily responsible for this non-compliance, then the Proponent shall:

(a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, 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 project is not complying with the relevant acquisition criteria, and that the project is primarily responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent shall acquire all or part of the landowner's land in accordance with the procedures in conditions 8 and 9 below.

6. If the independent review determines that the relevant criteria are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Proponent shall:

(a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until there is compliance with the relevant criteria; or

(b) secure a written agreement with the landowner and other relevant mine/s to allow exceedances of the relevant impact assessment criteria,

to the satisfaction of the Director-General.

If the independent review determines that the project is not complying with the relevant acquisition criteria in schedule 3, but that more than one mine is responsible for this non-compliance, then upon receiving a written request from the landowner, the Proponent 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 8 and 9 below.

Biodiversity & Heritage

7. If a person has good reason to believe the Proponent is not implementing the biodiversity and/or heritage conditions in schedule 3 satisfactorily, then he/she may ask the Director-General in writing for an independent review of the matter.

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

(a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to:

- consult with the person and/or any relevant agencies;
- investigate the person's complaints/claims;
- review the environmental performance of the Proponent;
- determine whether the Proponent s performance is satisfactory or not; and if necessary
- recommend measures to improve the Proponent s performance; and

(b) give the Director-General and complainant a copy of the independent review.

LAND ACQUISITION

8. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent 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 the written request, as if the land was unaffected by the project, 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 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 the additional mitigation measures required under condition 2 of schedule 3;

(b) the reasonable costs associated with:

- relocating within the Tamworth, Narrabri, Gunnedah or Moree local government areas, or to any other local government area as agreed 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 the Proponent 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 shall 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 Proponent 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 of the party that disputes the independent valuer's determination and any other relevant submissions.

Within 14 days of this determination, the Proponent 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 Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Director-General determines otherwise.

9. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 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 Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. The strategy must:
   (a) be submitted to the Director-General for approval by the end of May 2013;
   (b) provide the strategic framework for environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (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 project;
      - receive, record, handle, and respond to complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance;
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring to be carried out in relation to the project.

Adaptive Management

2. The Proponent must assess and manage project-related risks to ensure that there are no exceedences of the criteria and/or performance measures in schedule 3. Any exceedence of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

   Where any exceedence of these criteria and/or performance measures has occurred, the Proponent must at the earliest opportunity:
   (a) take all reasonable and feasible steps to ensure that the exceedence ceases and does not reoccur;
   (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other courses of action; and
   (c) implement remediation measures as directed by the Director-General,
   to the satisfaction of the Director-General.

Management Plan Requirements

3. The Proponent 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 project;
      - 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 project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedences of the impact assessment criteria and/or performance criteria; and
   (h) a protocol for periodic review of the plan.

Annual Review

4. By the end of June each year (or as otherwise agreed by the Director-General), the Proponent shall review the environmental performance of the project for the previous calendar year to the satisfaction of the Director-General. This review must:
   (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year;
   (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the:
      - relevant statutory requirements, limits or performance measures/criteria;
      - monitoring results of previous years; and
      - relevant predictions in the EA;
   (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 project;
   (e) identify any discrepancies between the predicted and actual impacts of the project, 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 project.

Revision of Strategies, Plans and Programs

5. Within 3 months of the submission of an:
   (a) annual review under condition 4 above;
   (b) incident report under condition 8 below;
   (c) audit under condition 10 below; or
   (d) any modification to the conditions of this approval,

   the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval 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.

Management of Cumulative Impacts

6. In conjunction with the owners of the nearby mines in the Leard Forest Mining Precinct, the Proponent shall use its best endeavours to minimise the cumulative impacts of the project on the surrounding area, to the satisfaction of the Director-General.

Community Consultative Committee

7. The Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General. This CCC must be 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), and be operating by the end of May 2013.

   The CCC must seek to include joint membership with CCCs for other operating coal mines within the Leard Forest Mining Precinct, unless otherwise agreed by the Director-General.

   Notes:
   - *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval.*
   - *In accordance with the Department's guideline, the CCC should be comprised on an independent chair and appropriate representation from the Proponent, Council and the local community.*

REPORTING

Incident Reporting

8. The Proponent shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Director-General and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

9. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

AUDITING

Independent Environmental Audit

10. By the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. 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 project and assess whether it is complying with the requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease/s (including any assessment, plan or program required under these approvals);
    (d) assess whether the Proponent is implementing best noise, blasting and air quality management practice;
    (e) investigate and report on the measures taken to minimise the noise and air quality impacts of the project during meteorological conditions and/or extraordinary events when the relevant noise and air quality limits in this approval do not apply, including:
        - the effectiveness of these measures in maintaining impacts within the relevant criteria in this approval and/or the limits in the relevant EPL; and
        - any additional measures available to mitigate impacts under such conditions;
    (f) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and
    (g) recommend measures or actions to improve the environmental performance of the project 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, air quality, water, ecology, and any other fields specified by the Director-General.

11. Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Proponent 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

12. The Proponent shall:
    (a) within 3 months of the date of this approval, make the following information publicly available on its website:
        - the EA;
        - all current statutory approvals for the project;
        - approved strategies, plans and programs required under the conditions of this approval;
        - a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;
        - a complaints register, which is to be updated on a monthly basis;
        - minutes of CCC meetings;
        - the last five annual reviews;
        - any independent environmental audit, and the Proponent's response to the recommendations in any audit;
        - any other matter required by the Director-General; and

    (b) keep this information up to date,

    to the satisfaction of the Director-General.

On-line Communication of Onsite Activities and Monitoring of Noise and Air Quality

13. The Proponent shall, within 3 months of the date of this approval:
    (a) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form:
        - daily weather forecasts for the coming week;
        - proposed operational responses to these weather forecasts;
        - real-time noise and air quality monitoring data (subject to any necessary caveats); and
        - any operational responses that were taken in response to the noise and air quality monitoring data, and

    (b) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information,

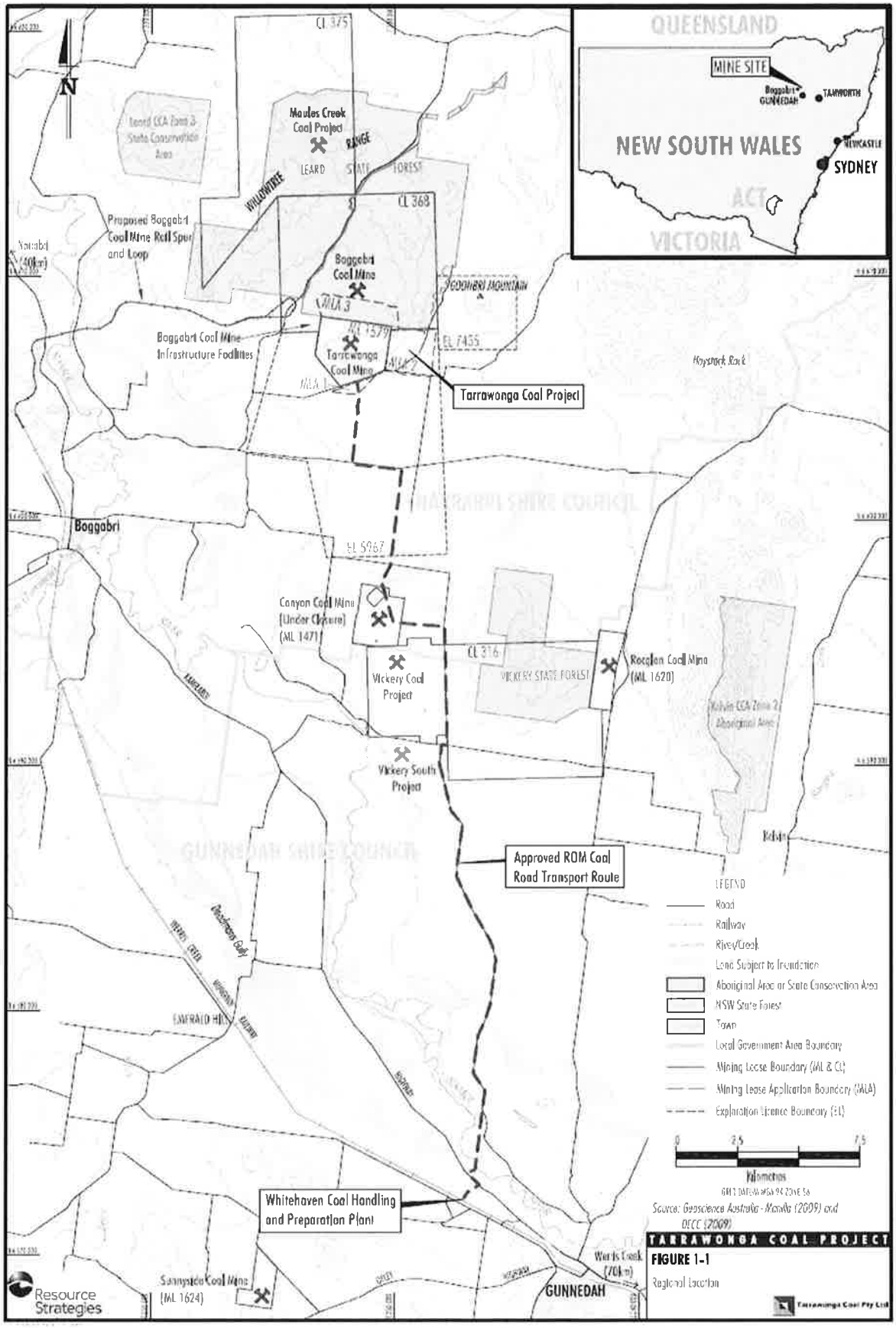
    to the satisfaction of the Director-General.

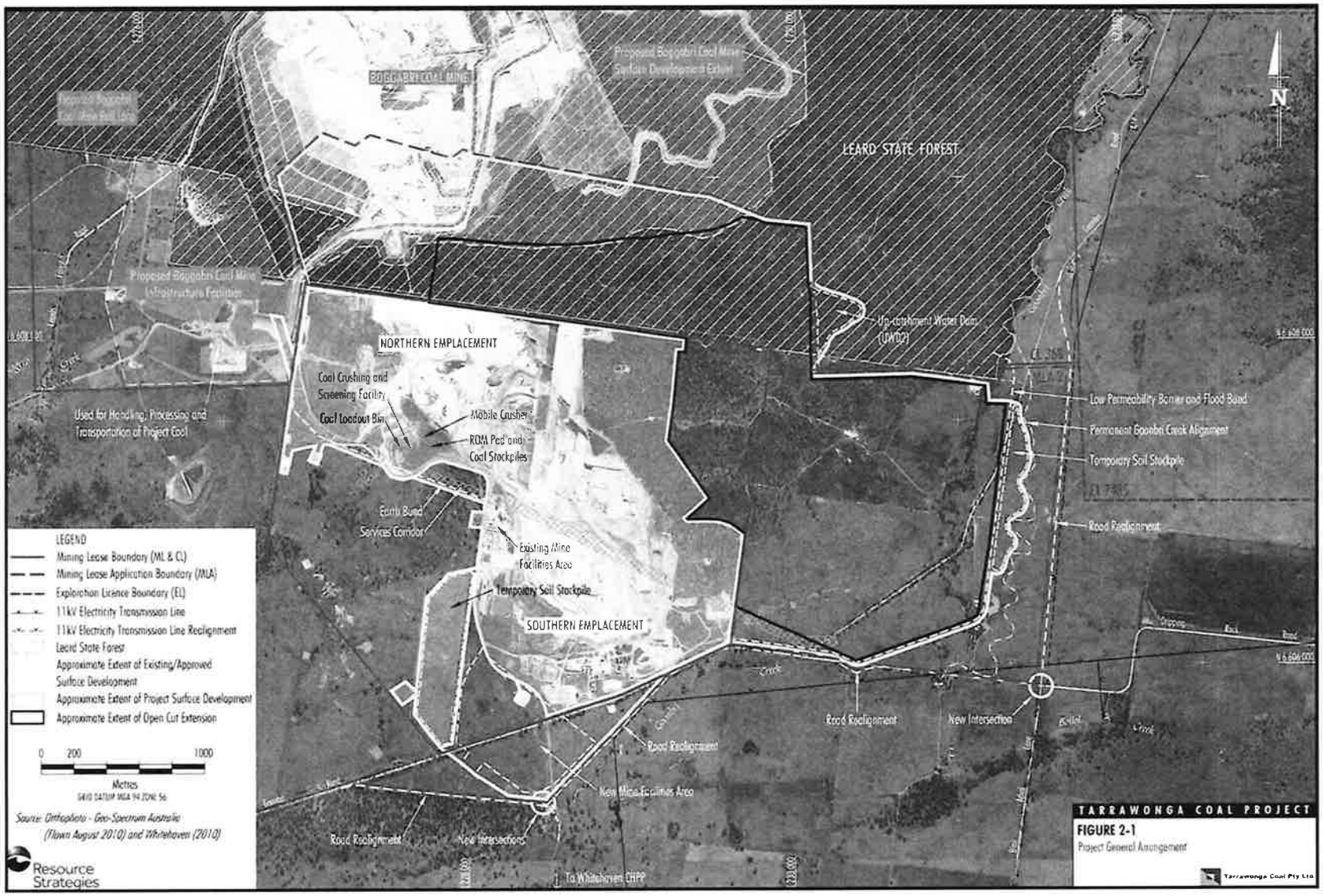
APPENDIX 1
SCHEDULE OF LAND

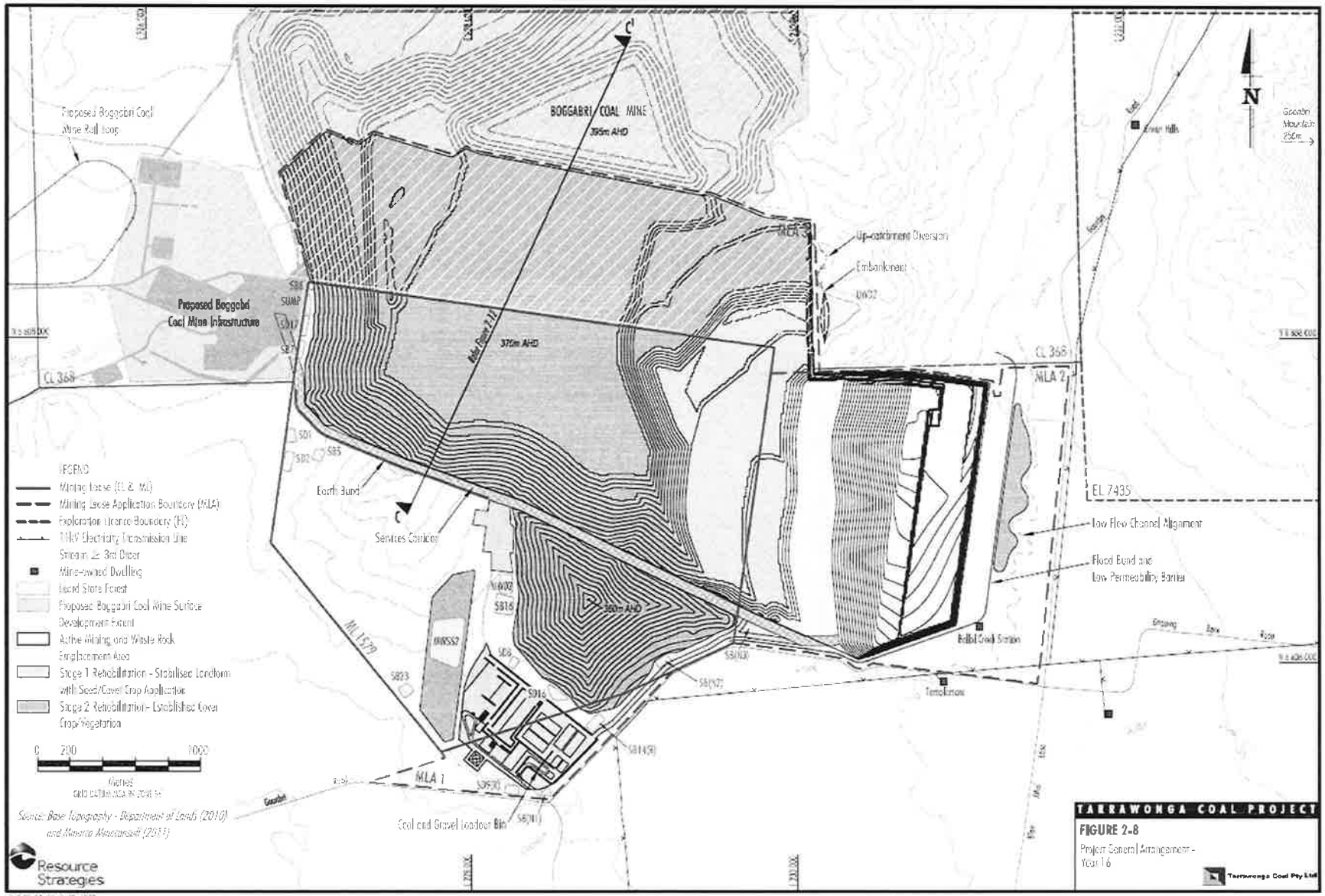
Tenure Type	Lot Number	Deposited Plan Number
Freehold	A	367991
Freehold	156	455004
Freehold	1	622375
Freehold	1	748046
Freehold	2	748046
Freehold	3	748046
Freehold	5	754940
Freehold	6	754940
Freehold	10	754940
Freehold	11	754940
Freehold	12	754940
Freehold	15	754940
Freehold	16	754940
Freehold	17	754940
Freehold	21	754940
Freehold	22	754940
Freehold	24	754940
Freehold	25	754940
Freehold	26	754940
Freehold	27	754940
Freehold	28	754940
Freehold	29	754940
State Forests of NSW	30	754940
Freehold	31	754940
Freehold	37	754940
State Forests of NSW	38	754940
Freehold	44	754940
Freehold	59	754948
Freehold	60	754948
Freehold	18	754953
Freehold	33	754953
Freehold	68	754953
Freehold	69	754953
Freehold	80	754953
Freehold	83	754953
Freehold	88	754953
Freehold	105	755470
Perpetual Lease	159	755475
Freehold	203	755475
Freehold	262	755475
State of NSW	263	755475
Freehold	1	970060
Freehold	1	1015797
Freehold	5	1018347
Freehold	2	1038308
Freehold	3	1038308

Tenure Type	Lot Number	Deposited Plan Number
Freehold	1	1131282
Freehold	3	1131282
Freehold	5	1131282
Freehold	3	1145592
Freehold	4	1145592
Narrabri Shire Council	Goonbri Road	N/A
Narrabri Shire Council	Dripping Rock Road	N/A
Narrabri Shire Council	Athol Lane	N/A
Narrabri Shire Council	Bollol Creek Corridor	N/A
Narrabri Shire Council or Department of Lands (Crown)	Other roads located within, between or adjacent to the above parcels of land	N/A
Part NSW State Forest (Leard State Forest)	N/A	N/A

APPENDIX 2
PROJECT LAYOUT PLANS




BOGGABRI COAL MINE
Proposed Boggabri Coal Mine Surface Development Extent
LEARD STATE FOREST
Proposed Boggabri Coal Mine Infrastructure Facilities
NORTHERN EMPLACEMENT
Coal Crushing and Screening Facility
Coal Loadout Bin
Mobile Crusher
ROM Pad and Coal Stockpiles
Used for Handling, Processing and Transportation of Project Coal
Earth Bund
Services Corridor
Existing Mine Facilities Area
Temporary Soil Stockpile
SOUTHERN EMPLACEMENT
Up-catchment Water Dam (UWD2)
Low Permeability Barrier and Flood Bund
Permanent Goonbri Creek Alignment
Temporary Soil Stockpile
Road Realignment
Road Realignment
New Intersection
Road Realignment
New Mine Facilities Area
Road Realignment
New Intersections
To Whitehaven CHPP
N
LEGEND
Mining Lease Boundary (ML & CL)
Mining Lease Application Boundary (MLA)
Exploration Licence Boundary (EL)
11kV Electricity Transmission Line
11kV Electricity Transmission Line Realignment
Leard State Forest
Approximate Extent of Existing/Approved Surface Development
Approximate Extent of Project Surface Development
Approximate Extent of Open Cut Extension
0 200 1000
Metres
GRID DATUM MGA 94 ZONE 56
Source: Orthophoto - Geo-Spectrum Australia (Flown August 2010) and Whitehaven (2010)
Resource Strategies
TARRAWONGA COAL PROJECT
FIGURE 2-1
Project General Arrangement
Tarrawonga Coal Pty Ltd


BOGGABRI COAL MINE
395m AHD
Proposed Boggabri Coal Mine Rail Loop
Proposed Boggabri Coal Mine Infrastructure
SUMP
CL 368
MLA 2
EL 7435
MLA 1
ML 1579
Up-catchment Diversion
Embankment
Mike River
375m AHD
360m AHD
Earth Bund
Services Corridor
Low Flow Channel Alignment
Flood Bund and Low Permeability Barrier
Belbid Creek Station
Tomalimon
Coal and Gravel Loadout Bin
Spicers Mountain 250m
Ulah
Emerald Hills
N
LEGEND
Mining lease (ML & ML)
Mining Lease Application Boundaries (MLA)
Exploration Licence Boundary (EL)
Stream 2e 3rd Order
Mine-owned Dwelling
Leard State Forest
Proposed Boggabri Coal Mine Surface Development Extent
Active Mining and Waste Rock Emplacement Area
Stage 1 Rehabilitation - Stabilised landform with Seed/Cover Crop Application
Stage 2 Rehabilitation - Established Cover Crop/Vegetation
0
200
1000
Metres
Source: Base Topography - Department of Lands (2010) and Minerva Measurement (2011)
Resource Strategies
TARRAWONGA COAL PROJECT
FIGURE 2-8
Project General Arrangement - Year 16
Tarrawonga Coal Pty Ltd

APPENDIX 3
GENERAL TERMS OF PLANNING AGREEMENT

Amount	*Timeline for Payment*	*Description*
$1,400,000	$1,000,000 to be payable on approval of the Extension Project $400,000 to be payable on the first anniversary of the Approval of the Extension Project	Funds to be utilised for the construction of sealed roads around the Tarrawonga mine site with an emphasis on sealing Manila Road for the benefit of local residents. Unallocated funds to be spent at the discretion of NSC. Tarrawonga Coal will make available to NSC the opportunity for these road works, to the value of the Amount, to be undertaken by Tarrawonga Mine to councils specification with preliminary works to commence at the time of grant of the Development Consent.
$100,000	Payable on the formation of an Environmental Trust associated with the Leard Forest Mining Industry Cluster but not before approval of the Extension Project.	Funds to be held in trust for Environmental Projects to be administered by NSC with expenditure recommended by the Community Consultative Committee (CCC) in consultation with similar funds set up by mines within the Leard Forest Mining Industry Cluster The NSC will supplement this Fund by annually adding to it, 1.5% of the annual increased amount which NSC receives from Tarrawonga as a result of the CPI Increase to the payment for saleable tonnes of coal. NSC will administer the fund with expenditure on projects agreed between NSC, Tarrawonga Coal and the other members of the CCC.
$0.075 per saleable tonne	On Commencement of the movement of Tarrawonga Coal through the Boggabri Coal CHPP and only for tonnage moved through the Boggabri Coal CHPP Paid Monthly	The payment per tonne to be paid only on tonnes sold by Tarrawonga Coal and will mirror the calculation made in relation to Royalties to the NSW State Government CPI adjustment to be based on index published by the Australian Bureau of Statistics (ABS) CPI based on the weighted average of eight capital cities for the previous 12 months (based on closest applicable quarterly figure) with the start date for calculation being from the start of coal moving through the Boggabri Coal facility. The first review to be undertaken will be 12 months after the first coal has been moved through the Boggabri Coal facility

APPENDIX 4
STATEMENT OF COMMITMENTS

SOC1 STATEMENT OF COMMITMENTS

In accordance with the Director-General's Environmental Assessment Requirements, this section provides a statement of Tarrawonga Coal Pty Ltd's (TCPL's) commitments in relation to the Tarrawonga Coal Project (the Project).

SOC1.1 PROPOSED PROJECT ENVIRONMENTAL MANAGEMENT, MONITORING AND REPORTING

Section 4 of this Environmental Assessment (EA) outlines proposed environmental management and offset measures for the Project.

These include measures relating to land resources, agricultural production, groundwater, surface water, noise, blasting, air quality, greenhouse gas emissions, ecology, road transport, visual character, Aboriginal heritage, non-Aboriginal heritage, socio-economics and hazard and risk. Where relevant, Project specific environmental monitoring programs are also proposed in Section 4.

Section 5 of this EA describes how the Project would be progressively rehabilitated and integrated into the adjoining landscapes.

TCPL will review and revise the existing Tarrawonga Coal Mine management and monitoring plans listed in Table SOC-1. Table SOC-1 also lists new management and monitoring plans that are proposed to be prepared for the Project.

The existing monitoring program at the Tarrawonga Coal Mine will be augmented to address additional Project disturbance areas and the open cut extensions. Figure SOC-1 shows the location of environmental monitoring sites proposed to be maintained or added for the Project.

It is recognised that changes to the Project environmental management, monitoring and reporting proposals contained in this EA may be considered necessary during government agency assessment of this EA.

Environmental management, monitoring and reporting will be conducted in accordance with finalised Project Approval conditions, with the final monitoring details (locations, parameters and frequencies) to be provided in the relevant management plans/monitoring programs.

SOC1.2 SPECIFIC ENVIRONMENTAL COMMITMENTS

Environmental management and offset measures to be implemented for the Project are described in Section 4. Key commitments include:

- design and construction of an engineered low permeability barrier to the east and south-east of the open cut;
- design, construction and implementation of a permanent Goonbri Creek alignment and associated flood bund;
- integration of key aspects of the Project with the adjoining Boggabri Coal Mine (i.e. Northern Emplacement, coal processing and loading of Project product coal onto trains);
- cessation of sized run-of-mine (ROM) coal road transport to the Whitehaven Coal Handling and Preparation Plant (once suitable approvals and upgrades are in place);
- management and mitigation of operational noise;
- rehabilitation of Project disturbance areas, including the reinstatement of key agricultural and ecological values;
- provision of biodiversity offset measures for the Project;
- management of the Project final void to minimise potential long-term impacts on water resources; and
- participation in joint air quality, operational noise and regional groundwater monitoring schemes with the adjoining Boggabri Coal Mine and the Maules Creek Coal Project.

These are described further below.

Low Permeability Barrier

A low permeability barrier will be constructed in the alluvium to the east and south-east of the open cut. Construction of the low permeability barrier will be completed before the Project open cut intersects the alluvium (approximately Year 12).

The design objectives of the low permeability barrier include minimising the potential for drainage of alluvial groundwater into the open cut during operations and post-mining, and maintaining the hydraulic character of Goonbri Creek.

Table SOC-1
Summary of Project Management, Monitoring and Reporting

Proposed Management, Monitoring and Reporting	Key EA Sections and Appendices
Management and Monitoring	
Environmental Management Strategy	Section 2.1.8
Water Management Plan	Sections 4.4, 4.5 and Appendices A and B
• Site Water Balance	Section 4.5 and Appendix B
• Erosion and Sediment Control Plan	Sections 4.3, 4.5 and 5 and Appendix B
• Surface Water Monitoring Program	Section 4.5 and Appendix B
• Groundwater Monitoring Program	Section 4.4 and Appendix A
• Surface and Groundwater Response Plan	Sections 4.4 and 4.5 and Appendices A and B
Goonbri Creek Management Plan[#]	Section 4.5
Noise Management Plan	Section 4.6 and Appendix C
Blast Management Plan	Section 4.6 and Appendix C
Air Quality and Greenhouse Gas Management Plan	Section 4.7 and Appendix D
Biodiversity Offset Strategy	Sections 4.9 and 4.10 and Appendices E and F
Biodiversity Management Plan[#]	Sections 4.9 and 4.10
Offset Area Management Plan[#]	Sections 4.9 and 4.10 and Appendix E
Farm Management Plan[#]	Sections 4.3, 4.10 and Appendices E and I
Aboriginal Heritage Management Plan	Section 4.13 and Appendix K
Waste Management Plan	Section 4.3
Rehabilitation Strategy	Appendix I
Rehabilitation Management Plan	Sections 4.9, 4.10, 5 and Appendix I
Bushfire Management Plan	Sections 4.3, 4.9 and 4.10
Reporting Requirements	
Annual Environmental Management Report and Mining Operations Plan or Rehabilitation and Environmental Management Plan	Section 6.4.1
Licences and Approvals	Section 6.4.1
Greenhouse Gas Reporting	Sections 4.8.2 and 4.8.3

[#] New management plan to be prepared.

TCPL Commitment

TCPL commits to construction of the low permeability barrier to meet the following design objectives:

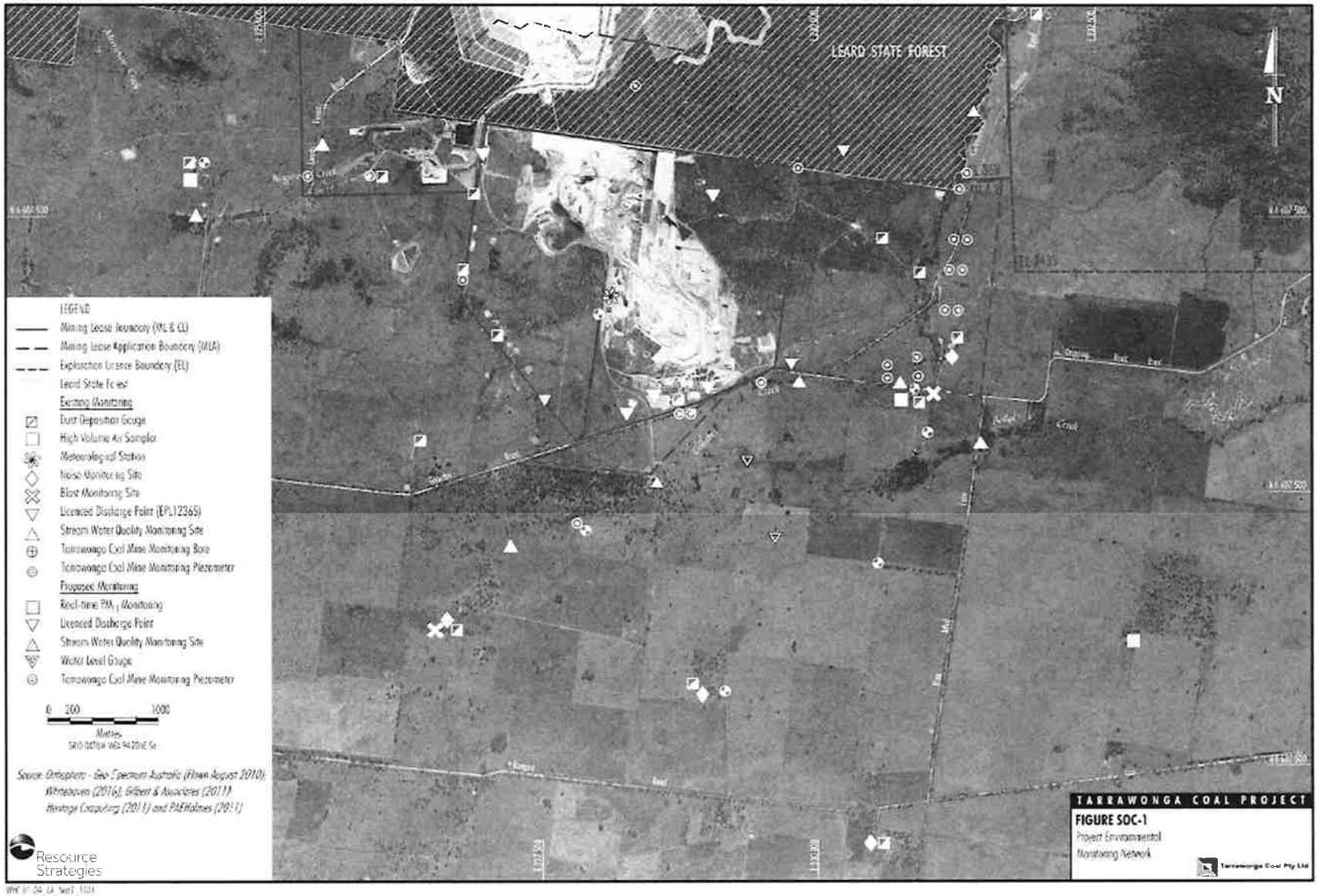
- minimise the potential for local drainage of alluvial groundwater into the open cut during operations and post-mining;
- minimise the potential for future instability of the open cut batters formed in the alluvium;
- maintain the hydraulic character of Goonbri Creek by minimising the potential loss of baseflow; and
- maintain the value of alluvial groundwater, by minimising potential interactions with the mine final void, post-mining.

In addition, TCPL will augment the existing piezometer network with additional sites to validate the performance of the low permeability barrier.

Permanent Goonbri Creek Alignment and Associated Flood Bund

In approximately Year 15, open cut mining would remove a 3 kilometre (km) section of Goonbri Creek. Prior to the open cut advancing into this section of the creek, the permanent Goonbri Creek alignment will be established.

A permanent flood bund will also be constructed to prevent inundation of the open cut during operations and post-mining. The permanent flood bund will generally coincide with the alignment of the low permeability barrier.


LEARD STATE FOREST
N
LEGEND
Mining Lease Boundary (ML & CL)
Mining Lease Application Boundary (MLA)
Exploration Licence Boundary (EL)
Leard State Forest
Existing Monitoring
Dust Deposition Gauge
High Volume Air Sampler
Meteorological Station
Noise Monitoring Site
Blast Monitoring Site
Licenced Discharge Point (EPL12365)
Stream Water Quality Monitoring Site
Tarrawonga Coal Mine Monitoring Bore
Tarrawonga Coal Mine Monitoring Piezometer
Proposed Monitoring
Real-time PM10 Monitoring
Licenced Discharge Point
Stream Water Quality Monitoring Site
Water Level Gauge
Tarrawonga Coal Mine Monitoring Piezometer
0 200 1000
Metres
Source: Orthophoto - Geo Spectrum Australia (Flown August 2010); Whitehaven (2016), Gilbert & Associates (2011) Heritage Computing (2011) and PAEHolmes (2011)
Resource Strategies
TARRAWONGA COAL PROJECT
FIGURE SOC-1
Project Environmental Monitoring Network
Tarrawonga Coal Pty Ltd

TCPL Commitment

TCPL commits to the design, construction and implementation of the permanent Goonbri Creek alignment to meet the following design objectives:

- construct a low flow channel that approximates the existing section of Goonbri Creek upstream of the Project in terms of stream geometry, hydrology and geomorphology;
- mimic the meandering path of the existing alignment of Goonbri Creek, such that the length of the permanent Goonbri Creek alignment is approximately the same length as the section of Goonbri Creek being removed;
- minimise the disturbance to the reaches of Goonbri Creek upstream of the permanent Goonbri Creek alignment; and
- provide a stable transition back to the existing Goonbri Creek alignment which results in no detectable change to the hydraulic conditions in the reaches of Goonbri Creek or the Bollol Creek floodplain area downstream.

In addition, TCPL commits to the design and construction of the permanent flood bund to a height that will provide protection against the peak flood height associated with a Probable Maximum Precipitation rainfall event.

TCPL will develop and implement a Goonbri Creek Management Plan prior to the commencement of construction activities associated with the low permeability barrier, permanent Goonbri Creek alignment and flood bund.

The Goonbri Creek Management Plan will describe:

- the design and construction details of the permanent Goonbri Creek alignment and flood bund;
- revegetation objectives and activities;
- water quality, ecological, hydrological and geomorphic performance and completion criteria for the permanent Goonbri Creek alignment based on baseline conditions; and
- a monitoring/maintenance program for water quality, ecological, hydrological and geomorphic integrity of the permanent Goonbri Creek alignment.

Integration with the Boggabri Coal Mine

Whitehaven Coal Mining Pty Ltd (Whitehaven) and Boggabri Coal Pty Limited have entered into an agreement that enables the handling, processing and transportation of Project coal at the upgraded Boggabri Coal Mine Infrastructure Facilities and private rail spur.

Under this agreement Boggabri Coal Pty Limited will handle and process Project ROM coal at the upgraded Boggabri Coal Mine Infrastructure Facilities on a campaign basis.

In addition, the Project Northern Emplacement will be integrated with the southern extent of the Boggabri Coal Mine waste rock emplacement to facilitate an integrated waste emplacement landform, avoiding the formation of a new valley between the two mine landforms and reducing the Project disturbance area.

Cessation of Sized ROM Coal Haulage to Whitehaven Coal Handling and Preparation Plant

Once approvals and upgrades are in place for the transfer of Project ROM coal to the Boggabri Coal Mine Infrastructure Facilities, Project sized ROM coal will no longer be trucked to the Whitehaven Coal Handling and Preparation Plant for train loading and associated processing.

Management of Operational Noise

Due to the extensions to the open cut, increased mobile fleet and alteration to operating hours (i.e. change from 20.5 to 24 hours per day) the Project has the potential to result in additional noise emissions at nearby privately-owned residences.

A number of iterative steps were undertaken to develop noise mitigation measures for the Project, including preliminary noise modelling, evaluation of potential noise management and mitigation measures and assessment of their effectiveness and feasibility by TCPL.

TCPL Commitment

TCPL will implement the following noise management and mitigation measures to appreciably reduce noise emissions associated with the Project:

- installation of an earth bund on the southern side of exposed sections of the services corridor (i.e. ROM coal haul road to the Boggabri Coal Mine);
- modified alignment of haul routes to reduce their exposure relative to nearby receivers; and
- a reduction in the number of mobile fleet items operating during the evening and night-time periods.

Rehabilitation Objectives and Final Landform

The Project would require the progressive removal of approximately 334 hectares (ha) of woodland and forest habitat and approximately 223 ha of grassland habitat.

This includes approximately 145 ha of native vegetation in the Leard State Forest, and approximately 13 ha of Box-Gum Woodland, which is an endangered ecological community.

The Project Northern Emplacement will be integrated with the southern extent of the Boggabri Coal Mine waste rock emplacement.

TCPL Commitment

The Project final landform and revegetation program will provide for a combination of approximately 752 ha of native woodland/forest and some 210 ha of Class 3 agricultural suitability land.

The agricultural land will be capable of being used for pasture production for grazing and occasional cropping. Revegetation of woodland/forest areas will include the planting of species characteristic of the local vegetation communities, including species from the Box-Gum Woodland endangered ecological community.

In addition, TCPL commits to a riparian vegetation enhancement program on a 3.2 km section of Goonbri Creek downstream of the Project open cut, through measures such as revegetation and stock exclusion.

A Rehabilitation Management Plan will be developed and implemented for the Project, including a rehabilitation monitoring program designed to track the progress of rehabilitation and revegetation.

Biodiversity Offset Measures

TCPL Commitment

TCPL commits to the provision of an area to offset the residual impacts of the Project on flora and fauna and maintain or improve the biodiversity values of the region in the medium to long-term.

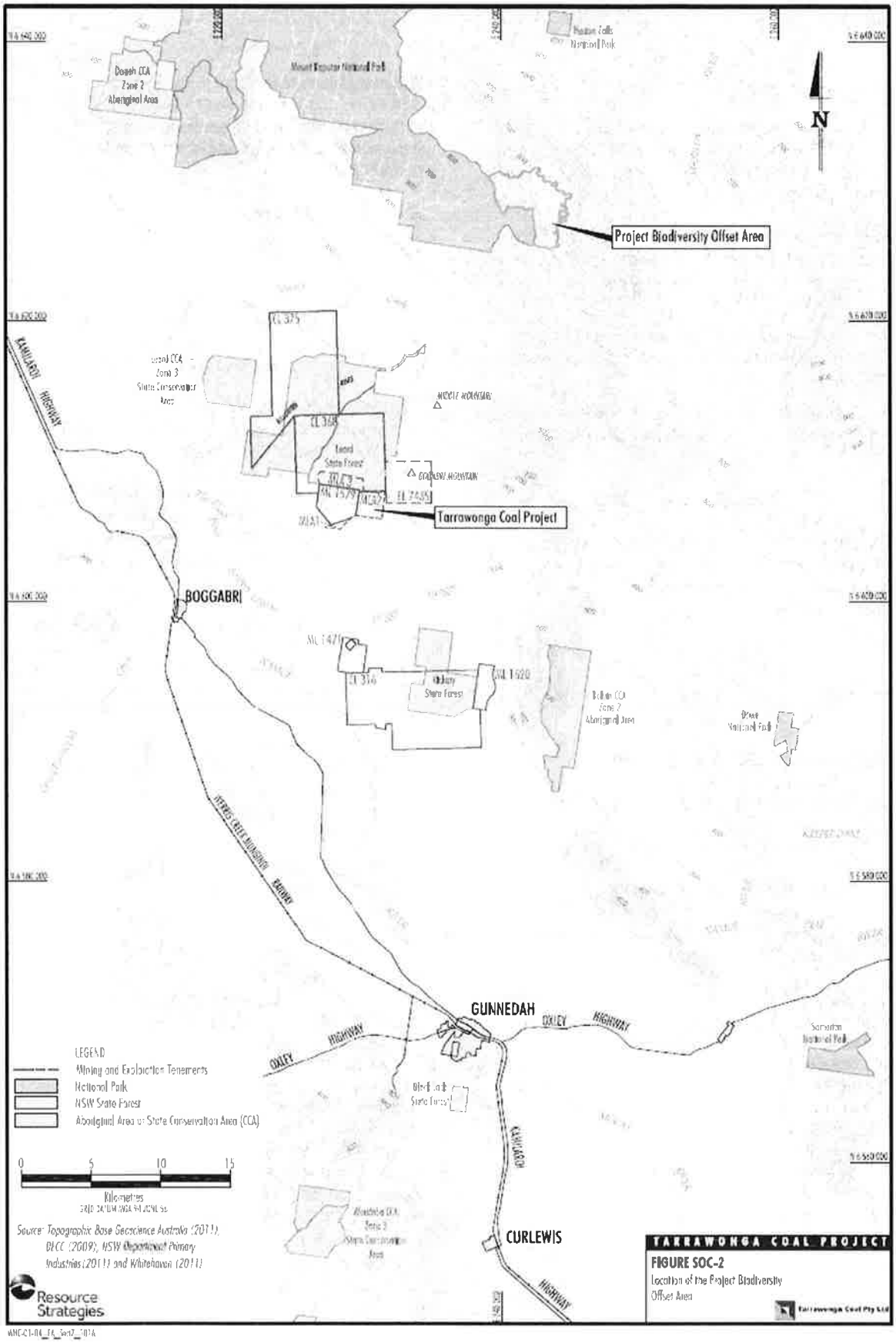
The biodiversity offset for the Project comprises approximately 1,600 ha of freehold land that has been purchased by Whitehaven.

The offset is situated approximately 20 km to the north-east of the Project and adjoins Mount Kaputar National Park (Figure SOC-2). Prior to its recent purchase by Whitehaven the offset area was part of a larger agricultural property.

Ecological gains from the biodiversity offset include:

- Similar vegetation communities/fauna habitats, compared to the Project area, will be conserved/enhanced in the biodiversity offset area.
- The biodiversity offset area is suitably located to benefit flora and fauna populations (biodiversity values) potentially impacted by the Project.
- The biodiversity offset area is located adjacent to Mount Kaputar National Park.
- Ephemeral creeks occur within the biodiversity offset area, providing a diversity of habitats.
- Substantial areas of Box-Gum Woodland (232 ha) occur in the biodiversity offset area.

Through active management, particularly of areas previously cleared for agriculture, the ecological values of the biodiversity offset area can be further improved. TCPL commits to a number of management measures to enhance the offset area's flora and fauna values. These measures will be detailed in the Offset Area Management Plan to be prepared for the Project.


Project Biodiversity Offset Area
Tarrawonga Coal Project
BOGGABRI
GUNNEDAH
CURLEWIS
KAMILAROI HIGHWAY
OXLEY HIGHWAY
N
LEGEND
Mining and Exploration Tenements
National Park
NSW State Forest
Aboriginal Area or State Conservation Area (CCA)
0 5 10 15
Kilometres
Source: Topographic Base Geoscience Australia (2011), DECC (2009), NSW Department Primary Industries (2011) and Whitehaven (2011)
Resource Strategies
TARRAWONGA COAL PROJECT
FIGURE SOC-2
Location of the Project Biodiversity Offset Area

The Offset Area Management Plan will also include a program to monitor and audit the effectiveness of the management measures and to evaluate performance against specified completion criteria.

TCPL intends to reach an agreement with the New South Wales (NSW) Government so that the biodiversity offset area can be permanently added to the adjoining Mount Kaputar National Park.

In the interim, TCPL will enter into a conservation arrangement with the NSW Government to ensure the protection and management of the offset area (e.g. a voluntary conservation agreement with the NSW Minister for the Environment).

Management of the Project Final Void

At the cessation of mining, a final void would remain at the eastern extent of the open cut.

One of the rehabilitation and mine closure goals for the Project is to minimise the long-term drawdown and potential water quality effects on local groundwater aquifers, so that their beneficial use is not adversely impacted.

TCPL Commitment

TCPL commits to installing permanent perimeter bunds and/or diversion channels to limit the catchment area of the final void.

In addition, TCPL will design and construct the final void to minimise the long-term drawdown and potential water quality effects on local groundwater aquifers. This will be achieved by adjusting the final void batter angles and/or placing additional waste rock backfill in the final void such that a permanent waterbody will form and reach an equilibrium level close to, but below, the local pre-mining groundwater level in the coal measures.

TCPL will adopt an adaptive management approach to the final void design and mine closure planning for the Project. Final void design and mine planning will be undertaken by TCPL in consultation with relevant government agencies as a component of the Rehabilitation Management Plan.

Participation in Joint Air Quality, Operational Noise and Regional Groundwater Monitoring

The Air Quality and Greenhouse Gas Management Plan will be revised and updated to address the construction and operation of the Project, including additional best-practice dust suppression measures on Project haul roads (i.e. additional haul road watering and/or the use of chemical dust suppressants).

The Noise Management Plan will be revised to include details of the mitigation and management measures for noise and methodology for measuring temperature inversions.

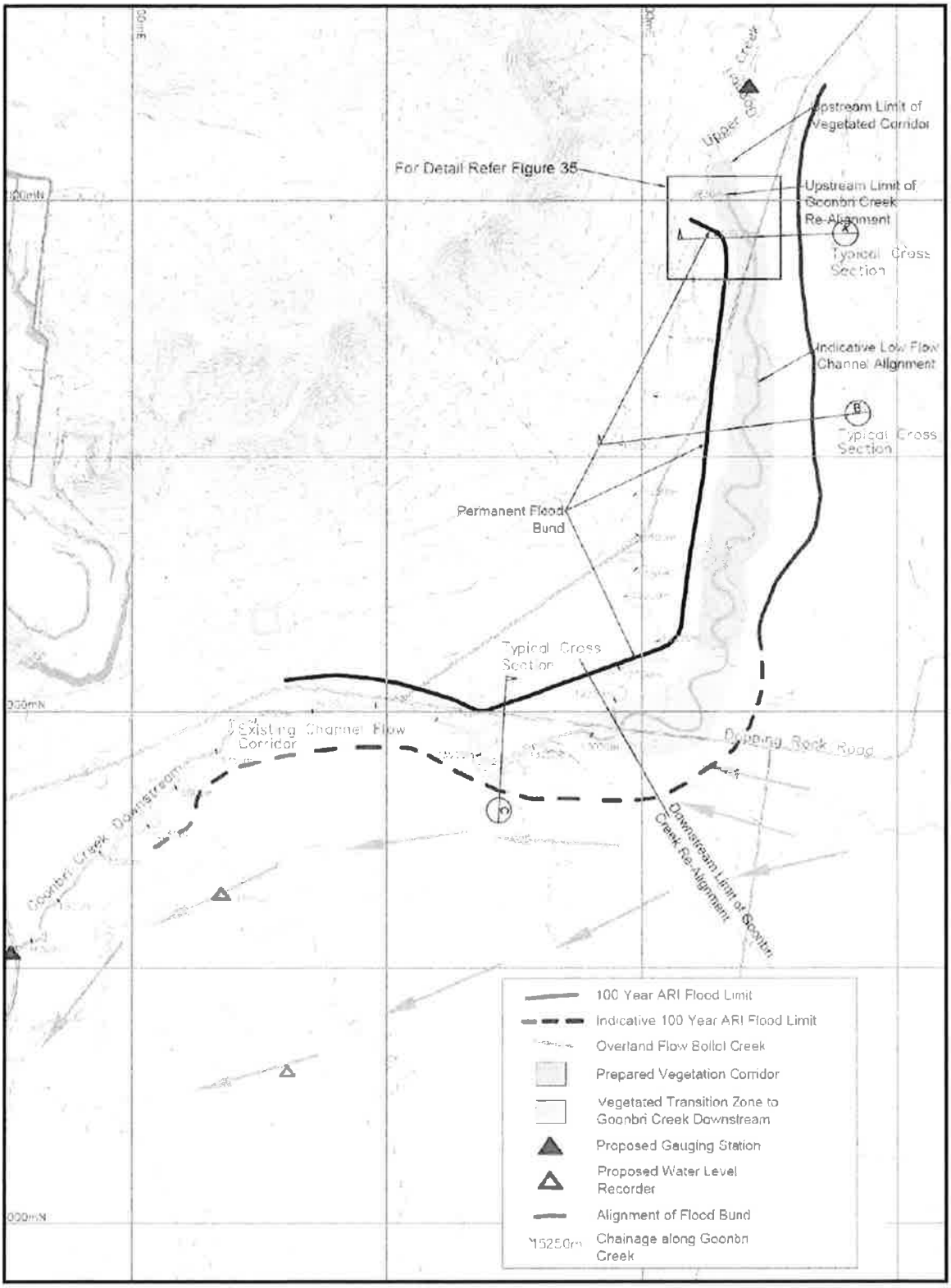
The Groundwater Monitoring Program (which is included in the Water Management Plan) will be updated to address the Project and associated extensions to the piezometer network.

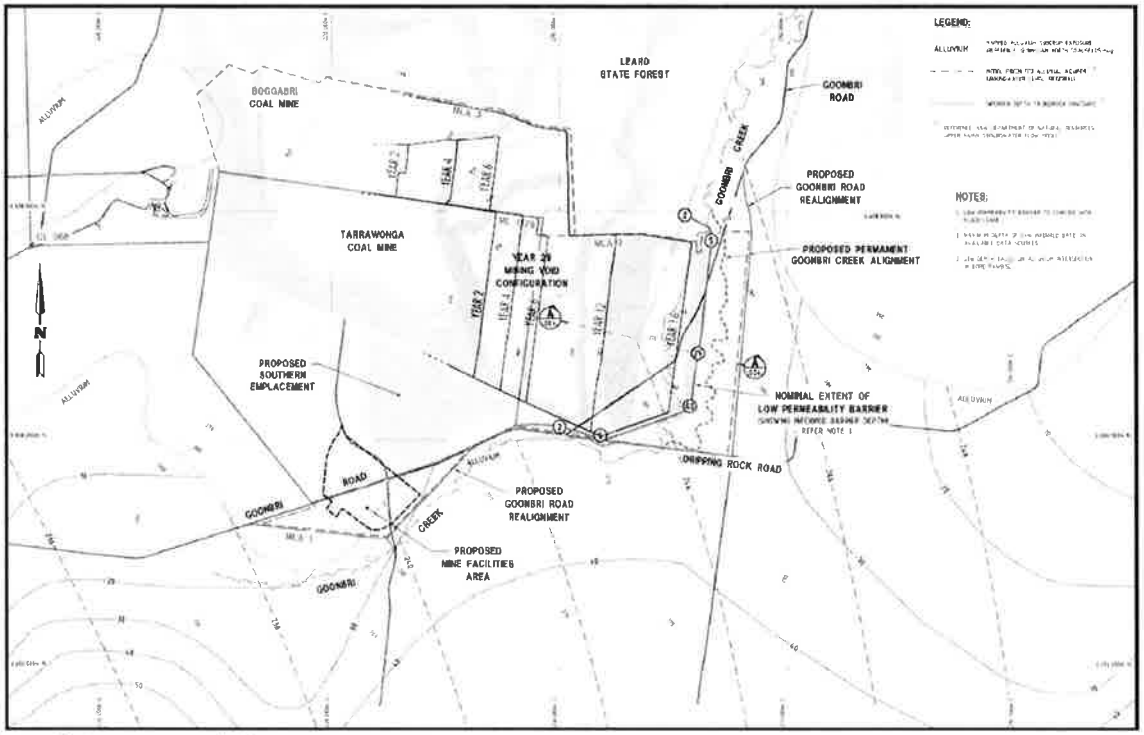
TCPL Commitment

TCPL will work with the proponents of the Boggabri Coal Mine and Maules Creek Coal Project to develop and implement a joint network of real-time particulate matter monitors, operational noise monitors and regional groundwater monitoring in the vicinity of the Project. The details of the joint network will be provided in the revised Air Quality and Greenhouse Gas Management Plan, Noise Management Plan and Water Management Plan.

APPENDIX 5
LAND OWNERSHIP PLAN

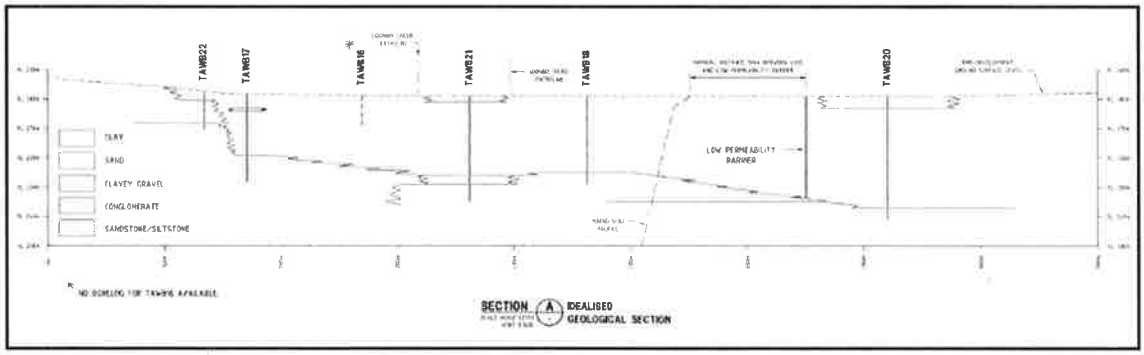
APPENDIX 6
GOONBRI CREEK REALIGNMENT CONCEPT





Source: Drawing 003 in Allan Watson Associates, 2011 (Appendix R of the EA)

Upper Namoi Alluvium - Plan View



Source: Drawing A1 in Allan Watson Associates, 2011 (Appendix R of the EA)

Upper Namoi Alluvium - Section

Resource Strategies

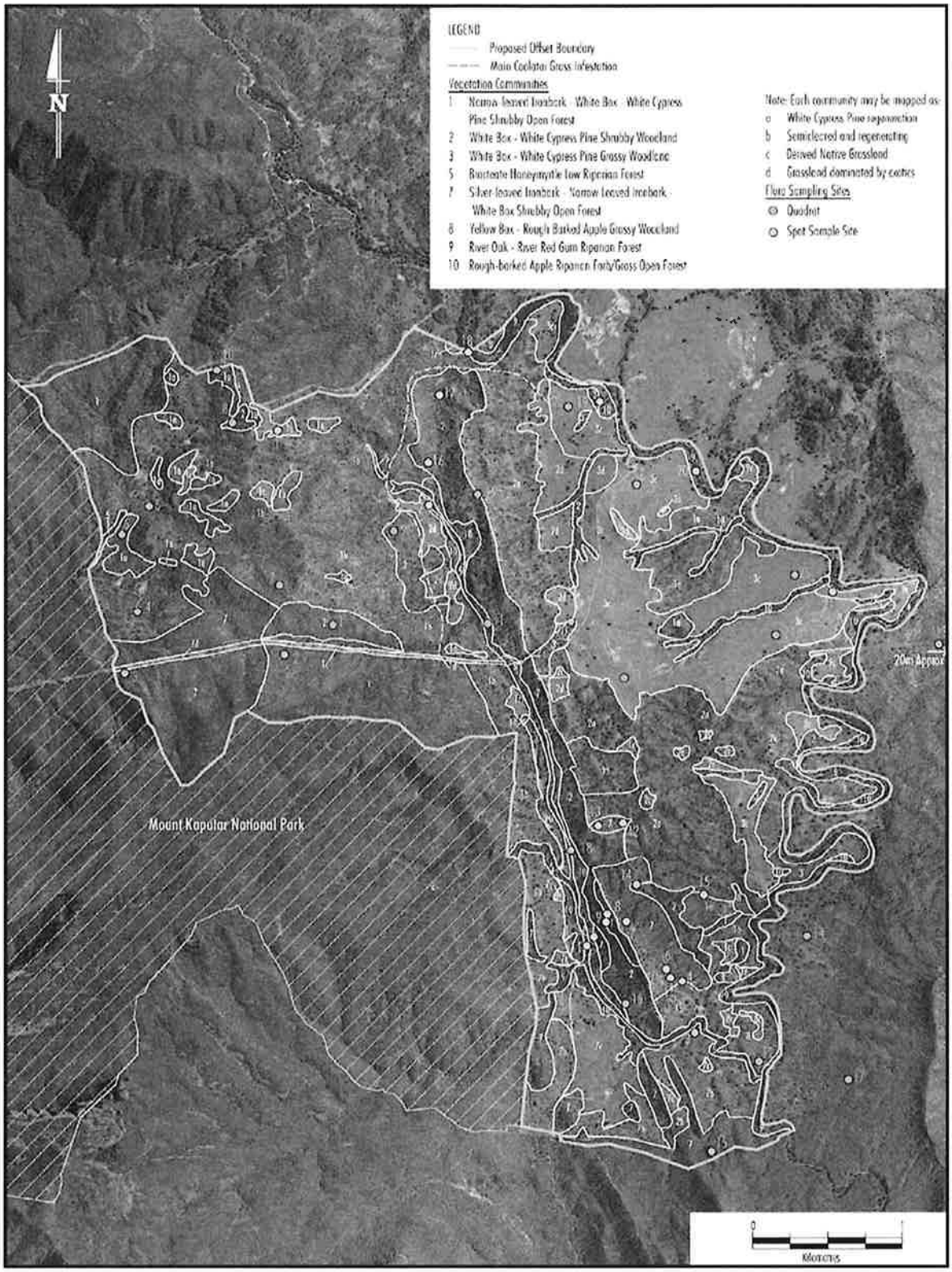
TARRAWONGA COAL PROJECT

FIGURE 4-5

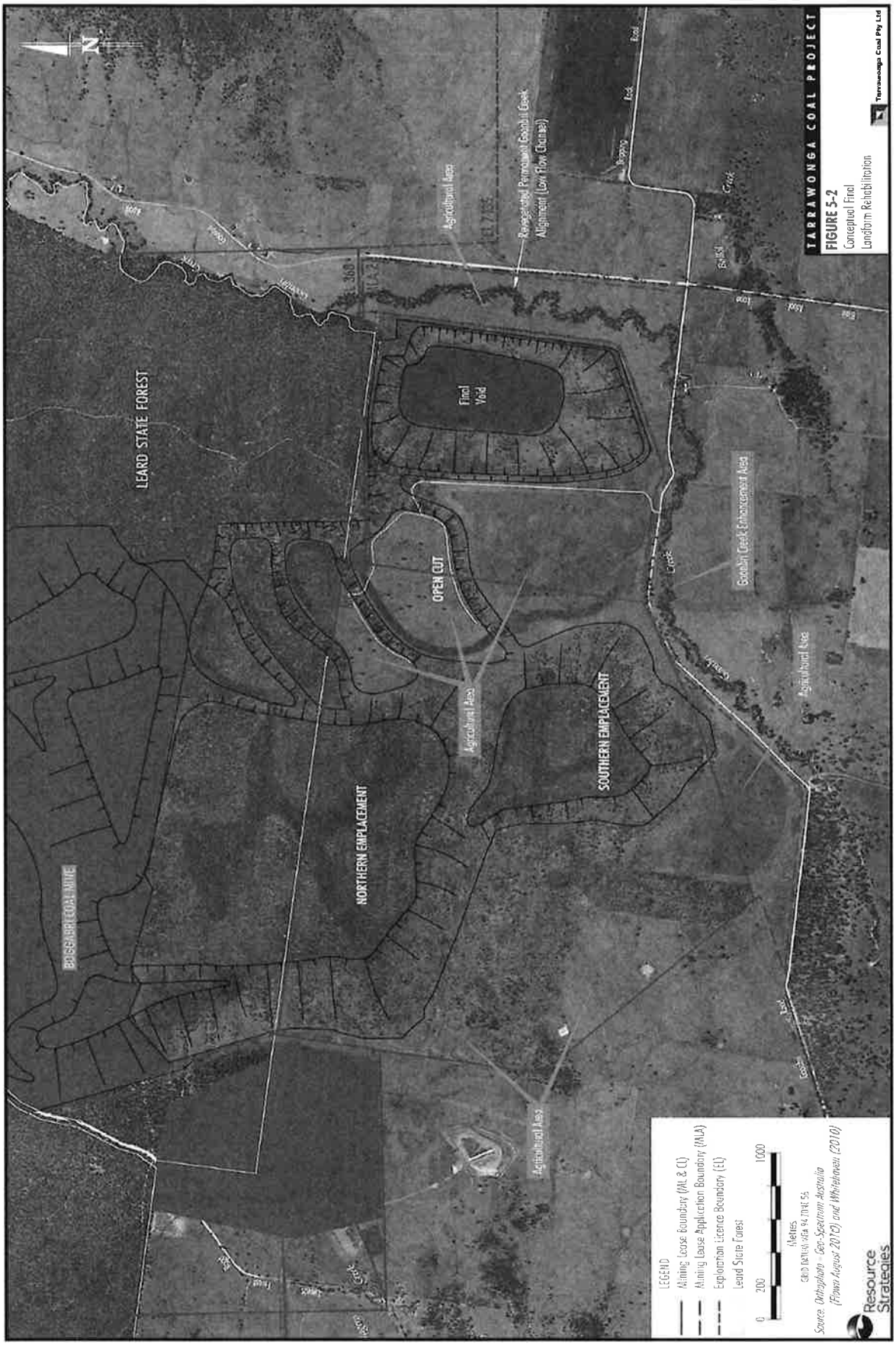
Extent of Upper Namoi Alluvium

Tarrawonga Coal Pty Ltd

APPENDIX 7
BIODIVERSITY OFFSET STRATEGY



APPENDIX 8
CONCEPTUAL FINAL LANDFORM



Approval

Tarrawonga Coal Mine Extension (EPBC 2011/5923)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

person to whom the approval is granted	Tarrawonga Coal Pty Ltd
proponent's ABN	73 100 742 185
proposed action	To extend and operate an open cut coal mine 15 km north-east of the township of Boggabri in New South Wales, including associated infrastructure [See EPBC Act referral **2011/5923**].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved
Listed migratory species (sections 20 & 20A)	Approved

conditions of approval

This approval is subject to the conditions specified below.

expiry date of approval

This approval has effect until 31 December 2053

Decision-maker

name and position	James Tregurtha Assistant Secretary Environment Assessment Branch
signature	
date of decision	11 **March 2013**

Conditions attached to the approval

Disturbance areas

1. The person taking the action must not clear more than 13 hectares (ha) of the EPBC listed White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland critically endangered ecological community within the Tarrawonga Coal Extension **project area**, as identified in Attachment A of these conditions.
2. The person taking the action must not clear more than:
    a. 279 ha of **habitat** for the regent honeyeater (*Anthochaera phrygia: formerly Xanthomyza phrygia*);
    b. 54 ha of **habitat** for the swift parrot (*Lathamus discolor*); and
    c. 334 ha of **habitat** for the greater long-eared bat (*Nyctophilus corbeni*),

    within the Tarrawonga Coal Extension **project area**.
3. The person taking the action must submit to the **Minister** for approval within three months of **commencement of construction,** an approach that:
    a. limits the maximum disturbance (in hectares) specified for each of the years 5, 10, 15 and 17 from the date of this approval of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the habitat or potential habitat for the regent honeyeater, swift parrot and greater long-eared bat;
    b. incorporates an analysis, undertaken by independent ecological experts approved by the **Department**, that demonstrates the maximum disturbance limits which will minimise any impacts on relevant matters of national environmental significance;
    c. demonstrates collaboration with the person taking the action to develop and operate the Boggabri Coal Project (EPBC 2009/5256) and the person taking the action to develop and operate the Maules Creek Coal Project (EPBC 2010/5566), in order to minimise progressive **project area** disturbance limits across all three sites. The progressive disturbance limits are to be reflected in the development of the Leard Forest Mining Precinct Biodiversity Strategy.
4. The person taking the action must not clear more than the maximum **project area** disturbance limits specified for each of the years 5, 10, 15 and 17 as described in condition 3, unless otherwise approved by the **Minister.**
5. The person taking the action must publish the analysis under condition 3 on their website.

Direct Offsets

6. The person taking the action must register a legally binding conservation covenant over **offset areas** of no less than:
    a. 1055 ha of an equivalent or better quality of habitat for the regent honeyeater;
    b. 397 ha of an equivalent or better quality of habitat for the swift parrot;

c. 1355 ha of an equivalent or better quality of habitat for the greater long-eared bat; and

d. 232 ha of an equivalent or better quality of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

Note: Offset areas described in condition 6 do not necessarily need to be separate if the same areas can meet the listing criteria for the EPBC listed threatened species or communities as defined in the EPBC listing advice for that threatened species or community and meet the requirements of condition 6.

7. The person taking the action must verify through **independent review** the quantity and **condition class** of White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and the quantity and quality of habitat for the regent honeyeater, swift parrot and greater long-eared bat within all proposed **offset areas** including those proposed in the **Environmental Assessment** and any additional offsets as required at condition 8. Details of all independently verified **offset areas** must be submitted to the **Minister** for approval by 31 January 2014. The findings of the independent review must be published on the proponent's website.

8. If the **independent review** finds that the **offset areas** do not meet the requirements of conditions 6, 7 and 9 then additional areas must be included in the offset areas until all relevant criteria under these conditions are met.

9. The **offset areas** must be of an overall equivalent or better quality than the areas being cleared. This means:

    a. for White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, **offset areas** must meet the definition of the ecological community described in the listing advice, and must be of an overall equivalent or better **condition class** than the areas being cleared, based on the proportion of each **condition class** represented and other relevant ecological attributes;

    b. for the threatened species, the quality of the habitat for the species, taking account of its ecological requirements, must be equivalent to or better than the areas being cleared.

10. The mechanism/s for registering a legally binding covenant must provide protection for the offset areas in perpetuity and be registered within 5 years of the date of this approval.

11. If the person taking the action proposes to undertake any action within areas secured under condition 6, other than those management activities related to managing the offset areas or as set out in the conditions of approval, then approval to undertake that action must be obtained in writing from the **Minister**. In seeking the **Minister's** approval, the person undertaking the action must provide a detailed assessment of the area where the action is proposed to take place and an assessment of all associated adverse impacts on **matters of national environmental significance**. If the **Minister** agrees to the action within the offset areas, the area identified for the action must be excised from the **offset area** and alternative offsets secured by the person taking the action at a ratio of at least 20:1 in relation to the impact on **matters of national environmental significance**.

Offset management plan

12. The person taking the action must submit to the **Minister** for approval an *Offset management plan* for all of the **offset areas**, specified in condition 6, within 12 months of the date of this approval. The approved O*ffset management plan* must be implemented.

Note: for consistency, the proponent may develop a Biodiversity Management plan that includes the requirements set for managing offsets and set out in these conditions, to align with the requirements of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047) and this approval.

13. The *Offset management plan* must include, but not be limited to, the following:

    a) a text description and map which clearly defines the location and boundaries of the **offset areas**. This must be accompanied by the **offset attributes** and **shapefiles**;

    b) a description of the methodology and results of surveys measuring the baseline ecological conditions in the **offset areas**. This must be consistent with the **State and Transition Model** and include but not be limited to:

        i. the extent and condition of all vegetation communities, including a description of the structure, floristics and tree age class representation of each community;

        ii. the extent and **condition class** of all areas of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community;

        iii. surveys targeting the regent honeyeater, swift parrot and greater long-eared bat;

        iv. the extent and quality of all areas of habitat for the regent honeyeater, swift parrot and greater long-eared bat;

        v. the location of all survey sites (including co-ordinates);

        vi. photo reference points at survey sites.

    c) clearly defined ecological management objectives for the **offset areas**;

    d) detailed description of all ecological management activities proposed to be undertaken, including maps and/or diagrams showing areas to be managed and the timing of the proposed activities;

    e) details of ongoing ecological monitoring programs, performance criteria, targets and provisions for adaptive management, including but not limited to:

        i. a set of measurable ecological indicators for detecting changes to the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including those that may be ascribed to ongoing water stress;

        ii. a monitoring plan to assess the success of the management activities measured against the baseline condition. The monitoring must be statistically robust and able to quantify change in the condition of the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat.

This should include the use of control sites and periodic ecological surveys to be undertaken by a qualified ecologist;

iii. a list of performance criteria based on the ecological management objectives for the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community and habitat for the regent honeyeater, swift parrot and greater long-eared bat;

iv. measures to exclude weeds from all **offset areas** for the period covered by this approval;

v. a description of the potential risks to successful management against the performance criteria, and a description of the contingency measures that would be implemented to mitigate against these risks;

vi. a process by which to report to the department the progress of management activities undertaken in the offset areas and the outcome of those activities, including identifying any need for improved management and activities to undertake such improvement.

f) details of all parties responsible for management, monitoring and implementing the management activities, including their position or status as a separate contractor.

g) details of the funding requirements for the ongoing management activities, including an estimate of the costs of the activities and details of the parties responsible for funding the activities.

14. Unless otherwise agreed to in writing by the **department,** the baseline surveys for threatened species must be conducted in accordance with the department's *Survey Guidelines for Australia's Threatened Birds* and the *Survey Guidelines for Australia's Threatened Bats*. Subsequent monitoring must be carried out annually at the same time of year as the baseline surveys, unless otherwise agreed to in writing by the **department**.

Surface and groundwater management plans

15. The person taking the action must provide by the 31 May 2013, to the **Minister** for approval, the *surface and groundwater management plans* as identified in condition 39 of the NSW state government Project Approval dated 22 January 2013 (application number 11_0047).

16. The *surface and groundwater management plans* must be consistent with the **National Water Quality Management Strategy**.

17. The person taking the action must, within six months of this approval, in collaboration with the proponent to develop and operate the Boggabri Extension (EPBC 2009/5256) and the proponent to develop and operate the Maules Creek Mine (EPBC 2010/5566), provide written advice to the Minister demonstrating how the NSW government approved *surface and groundwater management plans*, address the cumulative impact of groundwater drawdown as a result of mining and how this may impact on the consequent health of the remnant native vegetation in the Leard State Forest, the Leard State Conservation Area and surrounding areas. In particular the advice must address the following matters:

a. maximum amount of allowable drawdown in the alluvial aquifer

b. drawdown in hard rock

c. trigger levels pertaining to drawdown in the alluvial aquifer when corrective actions will be required to be undertaken

d. identify the depth of root zone of the native vegetation

e. monitoring to assess the ongoing quality and quantity of both surface and groundwater to identify impacts on the native vegetation.

18. The person taking the action must within 6 months of the date of this approval, or such other timeframe specified by the **Minister**, provide to the **Minister** a report on:

    a. any updated modelling of surface and groundwater impacts that has been undertaken in preparing the *surface and groundwater management plans*

    b. how the *surface and groundwater management plans* addressed groundwater and surface water impacts on matters of national environmental significance.

Goonbri Creek Diversion and Low Permeability Barrier

19. The person taking the action must provide to the **Minister** for approval, before **commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier**, a *Goonbri Creek Diversion and Flood Bund Concept Design Plan*. This approved *Goonbri Creek Diversion and Flood Bund Concept Design Plan* must be implemented.

20. The *Goonbri Creek Diversion and Flood Bund Concept Design Plan* must include:

    a. an assessment of the surface water and groundwater quality, ecology, hydrological and geomorphic baseline conditions within the creek;

    b. a description of how restoration of the re-aligned riparian zone will be undertaken to best replicate the habitat of the existing creek, including plant species and fauna habitat features;

    c. water quality, ecology, hydrological and geomorphic performance and completion criteria for the creek diversion and low permeability barrier based on the assessment of the baseline conditions identified in condition 20 (a); and

    d. a risk assessment of the environmental consequences of the proposed low permeability barrier and the proposed Goonbri Creek realignment including the potential for impacts on groundwater and surface discharge. The risk assessment must be peer-reviewed.

    e. details for ongoing monitoring and management of downstream impacts on the adjacent floodplains and Namoi River floodplain.

21. The person taking the action must ensure that dispersed waters downstream of the Goonbri Creek re-alignment do not adversely affect the downstream environment and avoid any impacts on matters of national environmental significance.

Leard Forest Mining Precinct Regional Biodiversity Strategy

22. The person taking the action must implement the regional biodiversity strategy as required under condition 41 of the NSW state government project approval dated 22 January 2013 (application number 11_0047). The required scoping report for the development of the strategy must be submitted to the **Minister** for approval on or before 31 July 2013. The approved strategy must be implemented.

Mine site rehabilitation

23. To mitigate the impacts to the White Box-Yellow Box –Blakely's Red Gum Grassy Woodland and Derived Native Grassland and the habitat of the regent honeyeater, swift parrot and greater long-eared bat, the person taking the action must, within 12 months of the commencement of construction, submit to the **Minister** for approval a *mine site rehabilitation plan* for the progressive rehabilitation and revegetation of no less than 752 ha of native forest and woodland in the **project area** including 13 ha using species consistent with a White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland Ecological Community. This approved *mine site rehabilitation plan* must be implemented.

24. The person taking the action must rehabilitate the site to be consistent with the proposed rehabilitation strategy as provided in the **Environmental Assessment** and, as required under the NSW State Government approval dated 22 January 2013 (Application 11_0047).

25. The *mine site rehabilitation plan* must include, at a minimum, the following information:
    a. targets and performance indicators to achieve effective restoration of potential habitat for the regent honeyeater, swift parrot and greater long-eared bat and White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community, including weed management;
    b. details of the vegetation communities to be rehabilitated and the timing of progressive rehabilitation (commencing as soon as practicable following disturbance);
    c. detailed soil depth surveys and analysis to inform the effective placement and restoration of soils underlying the proposed rehabilitation sites; including mapping of soils across the disturbance sites and soil sampling at no less than one sample point per 20 ha of each soil type identified. Sampling must identify; type, depth, water holding capacity, structure and physio-chemical properties of each of the soil and subsoil layers;
    d. processes and methodologies for the removal, storage and re-layering of the top soil and sub soil layers underlying the disturbed sites being prepared for rehabilitation. These processes and methodologies must ensure the replacement of top soil and sub soil layers as provided in the Environment Assessment.

e. a process to report annually to the department the rehabilitation management actions undertaken and the outcome of those actions, and the mechanisms to be used to identify the need for improved management;

f. a description of the potential risks to successful management and rehabilitation on the project site, including weed invasion, and a description of the contingency measures that would be implemented to mitigate these risks;

g. details of long-term management and protection of the mine site, including details of the commitment of funds to achieve this.

26. The *mine site rehabilitation plan* must be subject to an **independent review** by a qualified ecologist prior to being submitted to the **Minister** for approval. The findings of the **independent review** must be published on the proponent's website.

Note: for consistency, the person taking the action may develop a single mine rehabilitation plan to align with the requirements, including timing of reporting, of the NSW State Government approval dated 22 January 2013 (Application 11_0047) and this approval. The Offset Management Plan and the Rehabilitation management Plan need to be substantially integrated for achieving biodiversity objectives for the rehabilitated mine-site.

Conservation Bond

27. The person taking the action is required to submit a Conservation and Biodiversity Bond under condition 49 of the New South Wales state government project approval dated 22 January 2013 (application 11_0047). It is noted that this bond may be combined with the rehabilitation security deposit as required under the New South Wales *Mining Act 1992.* The person taking the action must submit details of this bond and the rehabilitation security deposit, to the **Minister**, within six months of this approval. If the **Minister** is not satisfied that the bond and rehabilitation security deposit lodged by the person taking the action is adequate to provide for the requirements referred to under conditions 19, 20, 22, 23 and 24, the **Minister** may require the person taking the action establish an additional bond or equivalent financial instrument in trust, under conditions approved in writing by the **Minister**.

Final Landform

28. The person taking the action must undertake rehabilitation to ensure the final landform provides the optimum opportunity for the successful restoration of native forest and woodland including the critically endangered White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community.

29. The person taking the action must undertake rehabilitation to ensure the final void and landform minimises the extent of any resulting pit lake, avoids salt scalding and ensures that drained waters do not adversely affect the downstream environment and avoids any impacts on **matters of national environmental significance**.

Note: the State approval conditions for project 11_0047 require the preparation and implementation of a Final Void and Mine Closure Plan that considers interactions with the adjoining mines, including interaction between final voids, opportunities for integrated mine planning with adjoining mines to minimise environmental impacts, all reasonable and feasible landform options for the final void (including filling) and predicted hydrochemistry and hydrogeology (including long-term groundwater recovery and void groundwater quality).

Survey data

30. All survey data collected for the project must be recorded so as to conform to data standards notified from time to time by the **department**. When requested by the **department**, the proponent must provide to the **department** all species and ecological survey data and related survey information from ecological surveys undertaken for matters of national environmental significance. This survey data must be provided within 30 business days of request, or in a timeframe agreed to by the **departmen**t in writing. The **department** may use the survey data for other purposes.

In the event that any additional **matters of national environmental significance** are recorded within the **project area** and a significant impact on the matter/s is likely, the **department** must be notified in writing within 14 days of the matter/s being recorded. In accordance with condition 36, the Minister may request that the person taking the action revise any relevant plans to ensure better protection of the relevant matter/s.

Reporting and auditing

31. Within 14 days after the **commencement of construction**, the person taking the action must advise the **department** in writing of the actual date of **commencement of construction.**

32. By the end of March of each year after the commencement of the action, the person taking the action must publish a report on their website addressing compliance with the conditions of this approval over the previous 12 months, including implementation of any management plans as specified in the conditions. Non-compliance with any of the conditions of this approval must be reported to the **department** at the same time as the compliance report is published.

33. Upon the direction of the **Minister**, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.

34. If the person taking the action wishes to carry out any activity otherwise than in accordance with the plans, as specified in the conditions, the person taking the action must submit to the **department** for the **Minister's** written approval a revised version of that plan. The varied activity shall not commence until the Minister has approved the revised plan in writing. The **Minister** will not approve a revised plan, unless the revised plan would result in an equivalent or improved environmental outcome. If the **Minister** approves the revised plan that plan must be implemented in place of the plan originally approved.

35. If the **Minister** believes that it is necessary or convenient for the better protection of listed threatened species and communities or listed migratory species to do so, the **Minister** may request that the person taking the action make specified revisions to the management plan specified in the conditions and submit the revised plan for the **Minister's** written approval. The person taking the action must comply with any such request. The revised approved

plan must be implemented. Unless the **Minister** has approved the revised plan then the person taking the action must continue to implement the originally approved plan, as specified in the conditions.

36. If, at any time after 5 years from the date of this approval, the person taking the action has not **substantially commenced the action**, then the person taking the action must not substantially commence the action without the written agreement of the **Minister**.

Publication of plans

37. The person taking the action must maintain accurate records substantiating all activities and outcomes associated with or relevant to the above conditions of approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the **department**. Such records may be subject to audit by the **department** or an independent auditor in accordance with section 458 of the *Environment Protection and Biodiversity Conservation Act 1999*, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the **department's** website. The results of audits may also be publicised through the general media.

38. Unless otherwise agreed to in writing by the **Minister**, the person taking the action must publish all management plans referred to in these conditions of approval on their website. Each management plan must be published on the website within 1 month of being approved.

Definitions

Commencement of construction – the commencement of any activities within the project area which are included in this approval.

Commencement of the construction of the permanent Goonbri Creek alignment, permanent flood bund and low permeability barrier – the commencement of any activities in relation to the permanent Goonbri Creek alignment, permanent flood bund and/or low permeability barrier.

Condition class – One of three states in which the White Box—Yellow Box—Blakely's Red Gum Grassy Woodland and Derived Native Grassland ecological community may exist, as defined within the Commonwealth listing advice for the listing of this ecological community as critically endangered under the EPBC Act.

Department - the Australian Government Department responsible for the *Environment Protection and Biodiversity Conservation Act 1999.*

Environmental Assessment – The Maules Creek Coal Project Environmental Assessment July 2011, prepared by Hansen Bailey for Aston Coal 2 Pty Ltd, and submitted as part of the approval documents for the Maules Creek Coal Project.

Habitat – areas in which a species or community is known to occur or is thought to have the potential to occur based on the biophysical conditions prevailing in the area and the ecological requirements of the species or community.

Independent review – an investigation conducted by an independent expert ecologist who has

been approved by the department.

Minister - the Minister administering the *Environment Protection and Biodiversity Conservation Act 1999* and includes a delegate of the Minister.

Matters of national environmental significance – all matters listed under Part 3 of the EPBC Act

Offset areas – areas that are proposed to meet the criteria set out in conditions 6, 7 and 8 of the approval, to offset the impacts of the action on matters of national environmental significance.

Offset attributes -means an '.xls' file capturing relevant attributes of the Offset Area, including the EPBC reference ID number, the physical address of the offset site, coordinates of the boundary points in decimal degrees, the EPBC protected matters that the offset compensates for, any additional EPBC protected matters that are benefiting from the offset, and the size of the offset in hectares.

Project area – the area defined by the Tarrawonga Coal Mine Extension Project EPBC Act referral (EPBC Act reference 2011/5923) as lying within the Project Application Boundary.

Shapefiles -means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes of the Offset Area, including the shape, EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format. A geographically referenced raster 'img' file/s must be provided to provide context for the shapefiles.

State and Transition Model – Section 3.2 of *A Guide to Managing Box Gum Grassy Woodlands* (Caring for our Country Environmental Stewardship, 2010), depicts the different condition states (as reflected by disturbance, inputs and altered land use) in which a given vegetation can exist. This publication can be found at: http://www.nrm.gov.au/resources/publications/stewardship/bggw-handbook.html

Substantially commence the action – means the extraction of coal from the Tarrawonga Coal Mine Project for the purpose of commercial production. Substantial commencement does not include test extraction or extraction of coal samples for quality assurance.

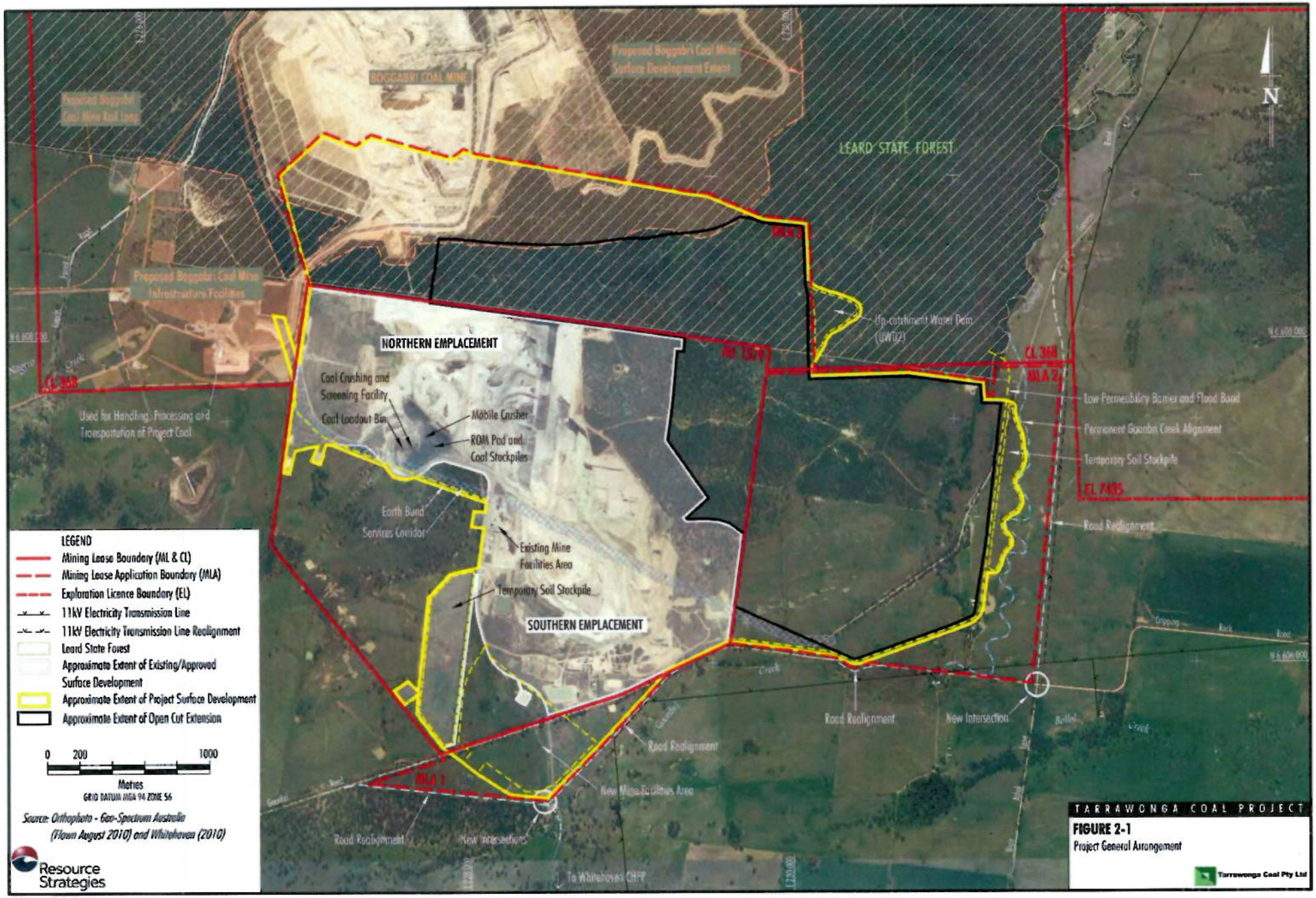


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FIGURE 2

Appendix 2

ENVIRONMENT PROTECTION LICENCE 12365

Section 58(5) Protection of the Environment Operations Act 1997

Licence Variation

Licence - 12365

TARRAWONGA COAL PTY LTD

ABN 73 100 742 185

PO BOX 600

GUNNEDAH NSW 2380

Attention: Danny Young

Notice Number	1510429
File Number	251464
Date	21-Mar-2013

NOTICE OF VARIATION OF LICENCE NO. 12365

BACKGROUND

A. TARRAWONGA COAL PTY LTD ("the licensee") is the holder of Environment Protection Licence No. 12365 ("the licence") issued under the *Protection of the Environment Operations Act 1997* ("the Act"). The licence authorises the carrying out of activities at 469 Goonbri Road , BOGGABRI, NSW, 2382 ("the premises").

B. On 4 July 2012 the Environment Protection Authority (EPA) received the report titled "*Tarrawonga Coal Mine- Particulate Matter Control Best Practice Pollution Reduction Program"* (the Report) dated 29 June 2012. The EPA has undertaken a detailed review of the Report and found it to be generally compliant with the requirements of Condition U1 Coal Mine Particulate Matter Control Best Practice of the Licence.

C. The EPA has developed a set of Pollution Reduction Programs (PRPs) requiring the implementation of a number of best practice measures to address wheel-generated dust and the handling of overburden.

D. This variation does not authorise a significant increase in environmental impact of the activity authorised or controlled by the licence.

E. The PRP titled *Coal Mine Particulate Matter Control Best Practice* has been removed following its satisfactory completion.

VARIATION OF LICENCE NO. 12365

1. By this notice the EPA varies licence No. 12365. The attached licence document contains all variations that are made to the licence by this notice.
2. The following variations have been made to the licence:

Licence Variation

- Removal of PRP titled *Coal Mine Particulate Matter Control Best Practice* at Condition U1 due to its satisfactory completion.
- Addition of Pollution Reduction Programs at Conditions U1, U2 and U3.

.....

Michael Lewis

Acting Head

North - Armidale

(by Delegation)

INFORMATION ABOUT THIS NOTICE

- This notice is issued under section 58(5) of the Act.
- Details provided in this notice, along with an updated version of the licence, will be available on the EPA's Public Register (http://www.environment.nsw.gov.au/prpoeo/index.htm) in accordance with section 308 of the Act.

Appeals against this decision

- You can appeal to the Land and Environment Court against this decision. The deadline for lodging the appeal is 21 days after you were given notice of this decision.

When this notice begins to operate

- The variations to the licence specified in this notice begin to operate immediately from the date of this notice, unless another date is specified in this notice.
- If an appeal is made against this decision to vary the licence and the Land and Environment Court directs that the decision is stayed the decision does not operate until the stay ceases to have effect or the Land and Environment Court confirms the decision or the appeal is withdrawn (whichever occurs first).

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 - 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

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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

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.

Environment Protection Licence

Licence - 12365

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
PART LOT 10 DP 754940, PART LOT 11 DP 754940, PART LOT 15 DP 754940, PART LOT 16 DP 754940, PART LOT 24 DP 754940, PART LOT 25 DP 754940, PART LOT 29 DP 754940, PART 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:
a) 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
b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

Environment Protection 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.

Air

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.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	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.
2	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	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.
3	Wet weather discharge Discharge water quality monitoring	Wet weather discharge Discharge water quality monitoring	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.

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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 Dischagre water quality monitoring	Wet weather discharge Dischagre 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 18 located on northern side of premises labelled "SB18" 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

W1	Weather analysis	Weather station located on "Templemore" labelled "Templemore- Project Related" on Figure submitted with licence variation application form received by EPA on 12 June 2012 (DOC12/23618).

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\s 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\s.

L2.4 Water and/or Land Concentration Limits

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

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, 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
(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 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.

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.

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

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

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
Total suspended solids	milligrams per litre	Special Frequency 1	Grab sample

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

M2.4 For the pruposes 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, 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:
a) any methodology which is required by or under the Act to be used for the testing of the concentration of the pollutant; or
b) 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
c) 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
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

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

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.

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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 '"Tarrawonga"
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.

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 all relevant authorities of incidents causing or threatening material harm to the environment immediately 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 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 Particulate Matter Control Best Practice Implementation – Wheel Generated Dust

U1.1 The Licensee must achieve and maintain a dust control efficiency of 80% or more on all active haul roads by 17 May 2013.

Control efficiency is calculated as:

$$CE = \frac{E\ (uncontrolled) - E\ (controlled)}{E\ (uncontrolled)} \times 100$$

Where E = the emission rate of the activity

U1.2 The Licensee must prepare a Monitoring Program to assess its compliance with Condition U1.1 under varying meteorological conditions. The Monitoring Program must detail the following:
the parameters to be monitored;

- methods to be used to monitor each parameter;
- locations where each parameter will be monitored;
- frequency at which each parameter will be monitored;
- Key Performance Indicators that will be used to determine compliance with Condition U1.1; and
- detailed justification for each parameter and Key Performance Indicator selected.

As a guide, the EPA anticipates that the following parameters will be monitored:
- moisture and silt contents of haul roads;
- frequency, duration, rate and quantity of water applied to haul roads;
- frequency, duration, rate and quantity of suppressant applied to haul roads in comparison to manufacturer's specifications;
- vehicle kilometres travelled;
- haul truck weight;
- haul truck speed;
- number of vehicle movements;
- meteorological conditions; and
- dust levels on haul roads.

The Monitoring Program must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 31 May 2013.
The EPA intends to require the licensee to implement the Monitoring Program once it is approved by the EPA.

U1.3 The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must include an assessment of the dust control effectiveness, dust levels and the Licensee's compliance with Condition U1.1. The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 15 August 2014.

U2 Particulate Matter Control Best Practice Implementation – Disturbing and Handling Overburden under Adverse Weather Conditions

U2.1 The licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013.

U2.2 The Licensee must prepare a Monitoring Program to assess its compliance with Condition U2.1. The Monitoring Program must detail the following:

- parameters to be monitored;
- methods to be used to monitor each parameter;
- locations where each parameter will be monitored;
- frequency at which each parameter will be monitored;
- way in which changes to operational activities will be documented;
- Key Performance Indicators that will be used to determine compliance with Condition U2.1; and
- detailed justification for each parameter and Key Performance Indicator selected.

As a guide, the EPA anticipates that the following parameters will be monitored:

- wind speed and direction;
- temperature;
- rainfall/humidity;
- evaporation rate;
- solar radiation;
- operational activities; and
- dust levels.

The Monitoring Program must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 31 May 2013.
The EPA intends to require the licensee to implement the Monitoring Program once it is approved by the EPA.

U2.3 The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must detail the following:

- weather conditions during which activities were ceased or altered;
- changes made to operational activities as a result of adverse weather; and
- resultant dust levels when activities were altered or ceased.

The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 15 August 2014.

U3 Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden

U3.1 The Licensee must submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden. Best practice measures may include, but should not be limited to, the following:

- use of foggers;
- use of water sprays; and
- reduction of drop heights.

The report must document the investigation and trial of each best practice measure. It must quantify the particulate matter control effectiveness and discuss the practicability of each best practice measure.

The report must be submitted by the Licensee to the Environment Protection Authority Regional Manager Armidale, at PO Box 494, ARMIDALE by 14 April 2014.

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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 *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
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 *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.
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 Environmen t 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 describe d 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 mo nths. 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 *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

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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
6	Licence varied by notice 1506685 issued on 27-Nov-2012

Appendix 3

COMPLIANCE REVIEWS

- DA 88-4-2005 MOD 1 &
  PA 11_0047 (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.	Yes	As per condition.
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.	Yes	Prior non compliances noted in previous AEMR/Annual Reviews.
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	ROM coal production in 2012/2013 reporting period = 1,792,927 t.
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 *Australian Standard AS 2601-2001: The Demolition of Structures,* or its latest version.	Not applicable	No demolition of buildings during reporting period.
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.
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	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
	any development on site.		
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.	Yes	Exceedances at "Tarrawonga" which is listed in Table 1. 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 LAeq (15 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.	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.
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	Yes	Noise Management Plan

Cond.	Conditional Requirement	Compliance	Comments
	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.		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 for PA 11_0047 prepared and submitted.
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.	Yes	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.	Yes	See Section 3.9.2 and Appendix 8 for details.
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:	Not Yet Applicable	No claims made during reporting period.

Cond.	Conditional Requirement	Compliance	Comments
	(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.		
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.	Yes	As per condition.
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. Blast Management Plan for PA 11_0047 submitted for DG approval.
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.	Yes	As per condition.
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	Not Yet Applicable	Written request not received to date.

Cond.	Conditional Requirement	Compliance	Comments
	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.		
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.	Yes	Real time air quality monitoring in place. Cumulative impact discussions ongoing with Boggabri Coal and Maules Creek.
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. AQGGMP submitted for PA 11_0047 and awaiting approval.
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.	Yes	Meteorological station operational.
23.	The Applicant shall obtain the necessary water licences for the development on site under the *Water Act 1912* or *Water Management Act 2000*.	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	Not Yet Applicable	No compensatory water supply required to date.

Cond.	Conditional Requirement	Compliance	Comments
	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.		
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.	Yes	See Section 3.3.2 for details.
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. Whilst a revised plan was prepared by URS and is actively implemented at site, it was not referred to the DG on the basis that a new plan was being prepared relevant to PA 11_0047, currently with the DG for approval.
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,	No	As per Condition 26.

Cond.	Conditional Requirement	Compliance	Comments
	in the creeks and other water bodies that could be affected by the development on site, including the Bollol and Driggle Draggle 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.	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.	Yes	The DoPI acknowledged in its approval to the strategy that long term security of the offset would be achieved upon the registration of the Biobank site with OEH. Once the site was registered with OEH, DoPI were suitably informed of this outcome.
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	Yes	The DoPI acknowledged that on registration of the Biobank, the management requirements under that scheme would form the basis of the management plan required under the consent.

Cond.	Conditional Requirement	Compliance	Comments
	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.		
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.	Yes	The DoPI acknowledged that registration of the Biobank, and retirement of credits would satisfy the requirement of a conservation bond required under the terms of this condition.
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. A revised plan has now been referred to agencies and stakeholders in accordance with the requirements of PA 11_0047.
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,	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
	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.		
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.
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	Yes	Fire fighting equipment available

Cond.	Conditional Requirement	Compliance	Comments
	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.		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 1st September 2011 and final Plan issued to NSC, RFS and DoPI on the 2nd 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	
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, but acknowledged difficulties in view of pending extension project. Draft strategy was prepared and endorsed by DRE. Formal response not received by DoPI. A Rehabilitation Strategy is not required under PA 11_0047.
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. A revised Rehabilitation Management Plan has been prepared and submitted under PA 11_0047.
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	Not applicable	Prior non compliance noted in previous AEMR/Annual Review.

Cond.	Conditional Requirement	Compliance	Comments
	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).	Yes	Residents notified as required.
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	Not Yet Applicable	

Cond.	Conditional Requirement	Compliance	Comments
	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.	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	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
	carried out under this consent.		
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.*	Yes	Plans prepared in accordance with this condition, where relevant.
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	Yes	Confirmation provided from DoPI that Annual Review can be combined with AEMR and submitted according to existing AEMR schedule.

Cond.	Conditional Requirement	Compliance	Comments
	(f) describe what measures will be implemented over the next year to improve the environmental performance of the development.		
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.*	No	Management plans updates required by Independent Audit not completed within 3 months of submission of audit report. PA 11_0047 necessitated new plans which have been prepared in accordance with approval requirements.
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).	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.	Not applicable	No notifiable incidents during reporting period.
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.
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.*	Not applicable	Audit not required during reporting period.
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.	Not applicable	Audit not required during reporting period.

Cond.	Conditional Requirement	Compliance	Comments
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 A3.1

Compliance Review – PA 11_0047

Cond.	Conditional Requirement	Compliance	Comments
Schedule 2 – Administration Conditions			
1.	In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.	Yes	As per condition.
2.	The Proponent shall carry out the project generally in accordance with the: (a) EA; (b) statement of commitments; and (c) conditions of this approval.	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. However, the conditions of this approval shall prevail to the extent of any inconsistency.	Not applicable	
4.	The Proponent 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 this approval; and (b) the implementation of any actions or measures contained in these documents.	Yes	As per condition.
5.	The Proponent may carry out mining operations on the site until the end of December 2030.	Not yet applicable	
6.	The Proponent shall not extract more than 3 million tonnes of ROM coal from the site in any calendar year.	Not yet applicable	Project Approval has not been in place for a full calendar year however site is currently operating at production rate of no more than 2 Mtpa.
7.	For the period until up to 3 months after the commissioning of the Boggabri Rail Spur Line and Boggabri CHPP, the Proponent may transport up to: (a) 2 million tonnes of ROM coal from the site to the Whitehaven CHPP along the dedicated haulage route in any calendar year; and (b) 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway.	Not yet applicable	Project Approval has not been in place for a full calendar year however site is currently operating at production rate of no more than 2 Mtpa and therefore trucking rates are compliant.
8.	During this period, the Proponent shall only transport coal from the site or receive coal reject from the Whitehaven CHPP 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 Sundays or public holidays.	Yes	As per condition.
9.	For the period commencing 3 months after the commissioning of the Boggabri Rail Spur Line & Boggabri CHPP, the Proponent: (a) shall not transport more than 3 million tonnes of ROM coal from the site in any calendar year; (b) may transport up to 150,000 tonnes of this ROM coal from the site in any calendar year for direct distribution to domestic markets via the dedicated haulage route to the Kamilaroi Highway; and (c) shall transport all other coal from the site via the Boggabri rail spur line.	Not yet applicable	

Cond.	Conditional Requirement	Compliance	Comments
10.	During this period, the Proponent shall only transport coal from the site by truck (excluding coal transport to the Boggabri coal mine for subsequent despatch via the Boggabri rail spur line) between 7 am and 6 pm Monday to Saturday.	Not yet applicable	
11.	The Proponent shall not extract more than 90,000m3 of gravel from the site for distribution off-site in any calendar year.	Not yet applicable	Calendar year not yet complete. <90,000m^3 transported from site to date.
12.	The Proponent may transport up to 90,000m3 of gravel from the site by truck in any calendar year. This gravel is to be transported from the site to the Kamilaroi Highway via the dedicated haulage route.	Yes	All gravel transport is via the dedicated haulage route.
13.	The Proponent shall only transport gravel from the site by truck between 7 am and 6 pm Monday to Saturday.	Yes	Gravel transport occurs only between 7am to 6pm Monday to Saturday.
14.	By the end of December 2013, or as otherwise agreed by the Director-General, the Proponent shall surrender the existing development consent (DA-88-4-2005) for the Tarrawonga Coal Mine in accordance with Section 104A of the EP&A Act. Prior to the surrender of this development consent, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the development consent.	Not yet applicable	
15.	The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Yes	All buildings meet relevant requirements.
16.	The Proponent shall ensure that all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Not applicable	No demolition of buildings during reporting period.
17.	Unless the Proponent and the applicable authority agree otherwise, the Proponent shall: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.	Not applicable	No relocation or damage of public infrastructure during reporting period.
18.	The Proponent shall ensure that all the plant and equipment used on site, or to transport coal from the site, 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.
19.	With the approval of the Director-General, the Proponent may submit any strategy, plan or program required by this approval on a progressive basis.	Not Yet Applicable	No requests for progressive submission of plans. All plans have been submitted within the required timeframes.
20.	Until they are replaced by an equivalent strategy, plan or program approved under this approval, the Proponent shall implement the existing strategies, plans or programs for the site that have been approved under DA-88-4-2005.	Yes	As per condition.
21.	By the end of March 2013, unless otherwise agreed by the Director-General, the Proponent shall enter into a planning agreement with Council in accordance with: (a) Division 6 of Part 4 of the EP&A Act; and (b) the terms of the Proponent's offer provided in Appendix 3.	Yes	Planning agreement in place.
Schedule 3 – Environmental Performance Conditions			
1.	Upon receiving a written request for acquisition from an owner of the privately-owned land listed in Table 1, the Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.	Not yet applicable	No written requests received to date.
2.	Upon receiving a written request from the owner of any residence	Not yet	No written requests received to

Cond.	Conditional Requirement	Compliance	Comments
	on the land listed in Table 1, the Proponent shall implement additional noise and/or air quality mitigation measures (such as double glazing, insulation, air filters, a first flush roof water drainage system and/or air conditioning) at the residence in consultation with the owner. These measures must be reasonable and feasible and directed towards reducing the noise and/or air quality impacts of the project on the residence. If within 3 months of receiving this request from the owner, the Proponent 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.	applicable	date.
3.	Except for the noise-affected land in Table 1, the Proponent shall ensure that operational noise generated by the project does not exceed the criteria in Table 2 (35dB(A) $L_{Aeq(15min)}$ at all properties during day, evening and night and 45$L_{Aeq\ (1\ min}$) at night) at any residence on privately-owned land. However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.	Yes	Exceedances at "Tarrawonga" which is listed in Table 1. See Section 3.10.3 for details.
4.	If the owner(s) of a privately-owned residence, that is not listed in Table 1, have reason to believe that operational noise from the project is causing the criteria in Table 2 to be exceeded at the residence, the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment. *(further details in condition)*	Not yet applicable	No written requests received to date.
5.	If the owner(s) of land containing a privately owned residence, which is not listed in Table 1, have reason to believe that operational noise from the project is causing noise levels to exceed 40 dB(A) LAeq(15 min) over more than 25% of that land, the owner(s) can request an independent noise impact assessment for the land. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment. *(further details in condition)*	Not yet applicable	No written requests received to date.
6.	Except for the land listed in Table 1, the Proponent shall ensure that the operational noise generated by the project combined with the noise generated by other mines does not exceed the criteria in Table 3 (40dB(A) $L_{Aeq(period)}$ at all properties during day, evening and night) at any residence on privately-owned land.	Yes	No exceedances recorded at privately owned residences that are not listed in Table 1.
7.	If the owner(s) of a privately-owned residence, which is not listed in Table 1, reasonably believes that the noise limits in Table 3 are being exceeded at the residence and that the exceedance is caused by operational noise from the project and one or more other mines (including use of private roads or rail spurs), the owner(s) can request an independent noise impact assessment for the residence. The request shall be made in writing to the Director-General. If the Director-General considers that a noise impact assessment is warranted, then the Proponent shall commission the assessment. *(further details in condition)*	Not yet applicable	No written requests received to date.
8.	The Proponent shall ensure that the noise generated by the project on public roads does not exceed the criteria in Table 4 (60dB(A) $L_{Aeq\ (1\ hour)}$ during the day and evening and 55dB(A) $L_{Aeq\ (1\ hour)}$ during the night) at any existing residence on privately-owned land.	Yes	No recorded exceedances in road noise criteria.
9.	The Proponent shall: (a) ensure that: • all trucks, dozers, drills and excavators purchased for	Yes	No additional equipment purchases made specific for Tarrawonga Extension. Site

Cond.	Conditional Requirement	Compliance	Comments
	used on the site after the date of this approval are commissioned as noise suppressed (or attenuated) units; • all equipment and noise control measures deliver sound power levels that are equal to, or less than, the sound power levels identified in the EA, and correspond to best practice, or the application of best available economically achievable technology; • improvements are made to existing noise suppression equipment as improved technology becomes available where reasonable and feasible; and (b) monitor and report on the implementation of these requirements annually on its website.		continues to operate at production levels in place pre-approval. Sound power testing on existing equipment to be re-assessed during next reporting period.
10.	The Proponent shall: (a) conduct an annual testing program of the plant on site; (b) restore the effectiveness of any attenuation if it is found to be defective; and (c) report on the results of any testing and/or attenuation work within the Annual Review.	Not yet applicable	PA 11_0047 received in January 2013. Annual testing program to occur during next reporting period.
11.	The Proponent shall: (a) implement best management practice to minimise all operational, low frequency, road and rail traffic noise levels associated with the project; (b) operate a comprehensive on-site noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval; (c) maintain the effectiveness of noise suppression equipment on plant at all times and ensure defective plant is not operationally used until fully repaired; (d) ensure that noise attenuated plant is deployed preferentially in locations near to sensitive receivers; (e) minimise the noise impacts of the project during meteorological conditions under which the noise limits in this approval do not apply (see condition 13); (f) ensure that project related trains on the Boggabri spur line only use locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL (No. 3142); (g) use its best endeavours to ensure that project-related rolling stock supplied by service providers on the Boggabri rail spur line is designed, constructed and maintained to minimise noise; and (h) co-ordinate the noise management on site with the noise management at other mines within the Leard Forest Mining Precinct, to minimise the cumulative noise impacts of these mines, to the satisfaction of the Director-General.	Yes	As per condition.
12.	The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with the EPA, and be submitted to the Director-General for approval by the end of May 2013; *(further details in condition)*	Yes	Noise Management Plan prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. No advice received from DG to date.
13.	Where conditions in this approval refer to measurement of noise within the context of the NSW Industrial Noise Policy the inversion	Yes	Class G applied.

Cond.	Conditional Requirement	Compliance	Comments
	class to be applied to the project is Class G. However, the Proponent may undertake an investigation to determine whether a proposal for change in this classification could be considered for approval by the Director-General. Any such investigation must be conducted in consultation with the EPA and be conducted by a suitably qualified person whose appointment has been endorsed by the EPA and approved by the Director-General. The report and recommendation must be submitted to the EPA for endorsement prior to submission to the Director-General. If the Director-General is satisfied that the recommendation is reasonable, then the Director-General may amend the inversion class applying to the project under this approval.		
14.	The Proponent shall ensure that blasting does not cause any exceedance of the criteria in Table 5. **Residence on privately owned land** • 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. **All public infrastructure** • 50 mm/s at any time	Yes	See Section 3.9.2 and Appendix 8 for details.
15.	The Proponent shall only carry out blasting on the site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Director-General.	Yes	As per condition.
16.	The Proponent may carry out a maximum of: (a) 1 blast a day; unless an additional blast is required following a blast misfire; and (b) 4 blasts a week, averaged over a calendar year, for the project. This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, or to blasts required to ensure the safety of the mine or its workers.	Yes	See Section 3.9.2 and Appendix 8 for details.
17.	If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of the approved open-cut pit on site, for a property inspection to establish the baseline condition of any buildings and/or structures on his/her 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 is acceptable to both parties, to: (b) establish the baseline condition of any buildings and/or structures on the land, or update the previous property inspection report; and (c) identify any measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and (d) give the landowner a copy of the new or updated property inspection report. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General for resolution.	Not yet applicable	No written requests received to date.

Cond.	Conditional Requirement	Compliance	Comments
18.	If any owner of privately-owned land within 2 kilometres of blasting operations, or any other landowner nominated by the Director-General, 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 in writing from the landowner, the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties, 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 Proponent shall repair the damages to the satisfaction of the Director-General. If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or landowner disagrees with the findings of the independent property investigation, either party may refer the matter to the Director-General for resolution.	Not yet applicable	No claims made during reporting period.
19.	During mining operations on site, the Proponent shall: (a) implement best practice blasting management to: • protect the safety of people and livestock in the surrounding area; • protect public or private infrastructure/property in the surrounding area from any damage; • minimise the dust and fume emissions of any blasting; and • minimise blasting impacts on heritage items in the vicinity of the site; (b) co-ordinate the timing of blasting on site with the timing of blasting at other mines within the Leard Forest Mining Precinct 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 on site, to the satisfaction of the Director-General.	Yes	As per condition.
20.	The Proponent shall not undertake blasting on-site within 500 metres of: (a) any public road without the approval of Council; or (b) any land outside of the site not owned by the Proponent, unless: • the Proponent has a written agreement with the relevant landowner to allow blasting to be carried out closer to the land, and the Proponent has advised the Department in writing of the terms of this agreement; or • the Proponent has: o demonstrated that the blasting can be carried out closer to the land without compromising the safety of the people or livestock on the land, or damaging the buildings and/or structures on the land; and o updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the land, to the satisfaction of the Director-General.	Not yet applicable	No blasting undertaking within 500m of any public road or land outside of the site not owned by Whitehaven.
21.	The Proponent shall prepare and implement a Blast Management	Yes	Blast Management Plan

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>Plan for the project to the satisfaction of the Director-General. This plan must:
(a) be submitted to the Director-General for approval by the end of May 2013;
(further details in condition)</td><td></td><td>prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. No advice received from DG to date.</td></tr>
<tr><td>22.</td><td>Unless otherwise authorised by an EPL, the Proponent shall ensure that no offensive odours are emitted from the site, as defined under the POEO Act.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>23.</td><td>The Proponent 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.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>24.</td><td>The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not cause exceedances of the criteria in Table 6, Table 7 and Table 8 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.
The assessment acknowledges that it may not be reasonable and feasible to prevent exceedance of the PM10 criteria in Table 6 at property 45 and exceedance of the criteria in Table 7 in year 16 at property 49. (To interpret the property locations referred to see the applicable figure(s) in Appendix 5.)
Table 6: Long-term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 7: Short-term criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 50 µg/m^3</td></tr>
</table>
Table 8: Long-term criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging Period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table></td><td>Yes</td><td>No exceedances recorded on privately owned land.</td></tr>
<tr><td>25.</td><td>The Proponent shall ensure that particulate matter emissions generated by the project do not exceed the criteria listed in Table 9 (24 hr PM_{10}: 50µg/m^3) at any residence on privately-owned land or on more than 25 percent of any privately-owned land, except on property 49 in year 16.</td><td>Yes</td><td>As per condition.</td></tr>
<tr><td>26.</td><td>If particulate matter emissions generated by the project exceed the criteria, or contribute to an exceedance of the relevant cumulative criteria, in Table 10, Table 11 or Table 12, 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 Proponent shall acquire the land in accordance with the procedures in conditions 8 and 9 of schedule 4.
Table 10: Long term land acquisition criteria for particulate matter
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Total suspended particulate (TSP) matter</td><td>Annual</td><td>[a] 90 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>Annual</td><td>[a] 30 µg/m^3</td></tr>
</table>
Table 11: Short term land acquisition criteria for particulate matter</td><td>Not yet applicable</td><td>No written requests received to date.</td></tr>
</table>

<table>
<tr><th>Cond.</th><th>Conditional Requirement</th><th>Compliance</th><th>Comments</th></tr>
<tr><td></td><td>
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>[d] Criterion</th></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[a] 150 µg/m^3</td></tr>
<tr><td>Particulate matter < 10 µm (PM_{10})</td><td>24 hour</td><td>[b] 50 µg/m^3</td></tr>
</table>
Table 12: Long term land acquisition criteria for deposited dust
<table>
<tr><th>Pollutant</th><th>Averaging period</th><th>Maximum increase in deposited dust level</th><th>Maximum total deposited dust level</th></tr>
<tr><td>[c] Deposited dust</td><td>Annual</td><td>[b] 2 g/m^2/month</td><td>[a] 4 g/m^2/month</td></tr>
</table>
</td><td></td><td></td></tr>
<tr><td>27.</td><td>The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the project do not exceed the criteria in Table 6, Table 7 and Table 8 at any occupied residence on any mine-owned land (including land owned by adjacent mines), unless:
(a) the tenant and/or landowner has been notified of any health risks in accordance with the notification requirements under schedule 4 of this approval;
(b) the tenant on project-related land can terminate the tenancy agreement without penalty, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;
(c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (where owned by another mine other than the Proponent);
(d) particulate matter air quality monitoring is undertaken to inform the tenant and landowner of potential health risks; and
(e) monitoring data is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making an informed decision on the health risks associated with occupying the property,
to the satisfaction of the Director-General.</td><td>Yes</td><td>Notifications made as required.</td></tr>
<tr><td>28.</td><td>The Proponent shall:
(a) implement best practice management to minimise the off-site odour, fume and dust emissions of the project;
(b) operate a comprehensive air quality management system on site that uses a combination of predictive meteorological forecasting, predictive and real time air dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;
(c) manage PM2.5 levels in accordance with any requirements of an EPL;
(d) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see note d under Table 8);
(e) minimise any visible off-site air pollution;
(f) minimise the surface disturbance of the site generated by the project; and
(g) co-ordinate the air quality management on site with the air quality management at other mines within the Leard Forest Mining Precinct to minimise the cumulative air quality impacts of the mines,
to the satisfaction of the Director-General.</td><td>Yes</td><td>As per condition.</td></tr>
</table>

Cond.	Conditional Requirement	Compliance	Comments
29.	The Proponent shall prepare and implement an Air Quality and Greenhouse Gas Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with the EPA and be submitted to the Director-General for approval by the end of May 2013; *(further details in condition)*		AQGGMP prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. No advice received from DG to date.
30.	For the life of the project, the Proponent shall ensure that there is a meteorological station 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, unless a suitable alternative is approved by the Director-General following consultation with the EPA.	Yes	As per condition.
31.	The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of mining operations on site to match its available water supply, to the satisfaction of the Director-General.	Yes	As per condition.
32.	The Proponent shall provide a compensatory water supply to any owner of privately-owned land whose water supply is adversely and directly impacted (other than a negligible impact) as a result of the project, 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 project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified. If the Proponent 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 Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Director-General.	Not yet applicable	No compensatory water supply required to date.
33.	The Proponent shall ensure that all surface water discharges from the site comply with the discharge limits (both volume and quality) set for the project in any EPL.	Yes	See Section 3.3.2 for details.
34 - 38	Conditions relating to Goonbri Creek Diversion and Low Permeability Barrier.	Not yet applicable	Not proposed until later in the mine life.
39.	The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, NOW and Namoi CMA, by suitably qualified and experienced person/s whose appointment has been approved by the Director-General, (b) be submitted to the Director-General for approval by the end of May 2013; *(further details in condition)*	Yes	WMP prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. No advice received from DG to date.
40.	The Proponent shall implement the biodiversity offset strategy described in the EA, summarised in Table 14 and shown conceptually in Appendix 7, to the satisfaction of the Director-General. *Table 1: Summary of the biodiversity offset strategy* ***Area*** / ***Offset Type*** / ***Minimum Size (hectares)*** Willeroi Offset Area / Existing native vegetation to be enhanced, and additional native vegetation to be established with / 1,660	Not Yet Applicable	Currently awaiting approval to the Management Plan to enable active implementation of the strategy as defined in the EA.

Cond.	Conditional Requirement	Compliance	Comments

	the restoration of at least 193 ha of Box Gum Woodland EEC, as listed under the TSC Act	
Rehabilitation Area	Native woodland vegetation communities to be re-established, focused on Box Gum Woodland EEC	752

41.	The Proponent shall contribute to the funding and preparation of the Leard Forest Mining Precinct Regional Biodiversity Strategy, as required under the approvals for the Boggabri coal mine and Maules Creek coal mine, to the satisfaction of the Director-General. *(further details in condition)*	Not Yet Applicable	Preparation has commenced on development of the strategy, and Tarrawonga contributes as required.
42.	Within 6 months of the approval of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy the Proponent shall review, and if necessary revise, the biodiversity offset strategy for the project to the satisfaction of the Director-General. The review/revision must: (a) be prepared in consultation with OEH, Namoi CMA, Forests NSW, the CCC, DPI Catchments and Lands and SEWPaC; (b) not reduce the size or quality of the offset area; and (c) be consistent (as far as is possible) with the recommendations and objectives of the Leard Forest Mining Precinct Regional Biodiversity Strategy.	Not yet applicable	
43.	For the White Box – Yellow Box – Blakely's Red Gum Grassy Woodland Endangered Ecological Community the Proponent shall: (a) ensure that the Biodiversity Offset Strategy and site Rehabilitation Strategy is focused on protection rehabilitation, re-establishment and long-term maintenance of viable stands of this community; (b) investigate in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term restoration of degraded remnants of this EEC in offset areas or regeneration of this EEC on disturbed areas (both offset areas and the site); (c) within 24 months of the date of this approval (and if possible in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to maximise the prospects for rehabilitation and regeneration of this EEC on the offset areas and the site, for approval by the Director-General; and (d) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.	Not yet Applicable	
44.	For all threatened species on site, the Proponent shall ensure that the Biodiversity Offset Strategy and Rehabilitation Strategy are focused on protection, rehabilitation and long-term maintenance of viable stands of suitable habitat for these species.	Not Yet Applicable	Awaiting approval of Strategies to enable implementation to commence.
45.	The Proponent shall: (a) investigate, in consultation with OEH and the Namoi CMA, all factors likely to enhance or impede the effective long term provision of suitable habitat(s) for the following species: Speckled Warbler, Brown Treecreeper, Grey-crowned Babbler, Hooded Robin, Varied Sittella, Turquoise Parrot, Masked Owl, Yellow-bellied Sheath Tail Bat and Squirrel Glider; (b) within 12 months of the date of this approval (and if possible, in conjunction with Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy), submit a report of this investigation and provide an implementation plan to ensure delivery of suitable areas of viable habitat for the species included in (a) above, for approval by the Director-General; and	Not Yet Applicable	

Cond.	Conditional Requirement	Compliance	Comments
	(c) incorporate the approved implementation plan into the revised Biodiversity Management Plan, required under condition 48.		
46.	The Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas: (a) for the Willeroi Offset Area the long-term security shall be provided by way of: • the Proponent entering into a conservation agreement or agreements pursuant to section 69B of the National Parks and Wildlife Act 1974, recording the obligations assumed by the Proponent under the conditions of this approval in relation to these offset areas, and registering the agreement(s) pursuant to section 69F of the National Parks and Wildlife Act 1974 ; or • a tenure of higher conservation status such as a National Park, or Nature Reserve, under the National Parks and Wildlife Act 1974, • The conservation agreement(s) must be registered by the end of December 2013 unless agreed otherwise by the Director-General after consultation with OEH. The conservation agreements must remain in force in perpetuity; and (b) by the end of December 2030 unless otherwise agreed by the Director-General, for the woodland to be established in the Rehabilitation Area, as identified in Table 14, to the satisfaction of the Director-General.	Not Yet Applicable	
47.	The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Director-General. This plan must: (a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA, and be submitted to the Director-General for approval by the end of May 2013; *(further details in condition)*	Yes	Biodiversity Management Plan prepared in accordance with all requirements of this condition and submitted for approval prior to the end of May 2013. No advice received from DG to date.
48.	The Proponent shall review and if necessary revise the Biodiversity Management Plan within 6 months of the completion of Stage 2 of the Leard Forest Mining Precinct Regional Biodiversity Strategy, to the satisfaction of the Director-General. The review/revision must: (a) be prepared in consultation with OEH, SEWPaC, Forests NSW, the CCC, DPI Catchments and Lands and the Namoi CMA; (b) be consistent with the findings of Leard Forest Mining Precinct Regional Biodiversity Strategy; and (c) include any implementation plans arising from the studies required under conditions 43 and 45 of this approval.	Not Yet Applicable	
49.	By the end of May 2013, the Proponent shall lodge a Conservation and Biodiversity 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 biodiversity offset strategy (other than land acquisition costs); and (b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Director-General. If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Director-General, the Director-General will release the bond. If the offset strategy is not completed generally in accordance with	No	Bond not yet lodged on basis that the management plan has not been approved. Once the management plan is approved, it can be relevantly costed and arrangements made for lodgement of a bond.

Cond.	Conditional Requirement	Compliance	Comments
	the completion criteria in the Biodiversity Management Plan, 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 rehabilitation security deposit administered by DRE.		
50.	By the end of June 2014 and every 3 years thereafter, unless both the Director-General and OEH agree to a different timeframe, the Proponent shall commission suitably qualified, experienced and independent person/s, whose appointment has been approved by the Director-General, to undertake an audit of the revegetation of the rehabilitation area and management and restoration within the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. *(condition details what audit must involve)*	Not yet applicable	
51.	The Proponent shall prepare and implement an Aboriginal Heritage Conservation Strategy for the project and the Biodiversity Offset Strategy areas to the satisfaction of the Director-General. This Strategy must enhance and conserve the Aboriginal cultural heritage values (both cultural and archaeological) and provide for their long-term protection and management. *(condition details what strategy must involve)*	Not Yet Applicable	
52.	The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Director-General. *(further details in condition)*	Yes	Heritage Management Plan prepared in accordance with all requirements of this condition. No advice received from DG to date.
53.	The Proponent shall: (a) construct the Goonbri Road realignments and associated mine access road intersection, Goonbri Road/private coal haulage road intersection and the Goonbri Road/Dripping Rock Road/Blair Athol Lane intersection as shown conceptually in the EA; and (b) install appropriate advance warning signs and lighting on Goonbri Road, the private coal haulage road at the intersection of the Northern Site Access Road, to the satisfaction of Council.	Not yet applicable	Road realignments not yet required.
54.	Whilst coal transport by road is permitted under this approval, the Proponent shall ensure that: (a) trucks travelling to and from the site do not exceed 40 kilometres per hour in the vicinity of the school bus when it is operating on Hoad Lane, unless an alternative protocol is agreed by the Director-General; and (b) spillage from coal haulage vehicles is minimised and promptly managed.	Yes	As per condition.
55.	During mining operations, the Proponent shall continue to implement road maintenance agreements with Narrabri Shire Council and Gunnedah Shire Council for the maintenance of the public roads affected by the project to the satisfaction of the respective Council. If there is any dispute in relation to these agreements, then any of the parties may refer the matter to the Director-General for resolution.	Yes	Road maintenance agreements in place.
56.	The Proponent shall: (a) keep records of the: • amount of coal and gravel transported from the site (on a monthly basis); and • date and time of each train movement on the Boggabri rail spur line generated by the project; and (b) make these records available on its website at the end of each calendar year.	Yes	Records kept and made available on the website at the end of each calendar year.

Cond.	Conditional Requirement	Compliance	Comments
57.	The Proponent shall: (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project; (b) ensure no outdoor lights shine above the horizontal; (c) wherever possible, ensure that mobile equipment is appropriately designed and/or retrofitted to prevent light being directed above the horizontal; (d) ensure that all external lighting associated with the project complies with Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting or its latest version; (e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding: • along the realigned Goonbri Road and access road to the mine site; • along the services corridor to the Boggabri Coal Mine; • around the water storage dams; and • at other areas identified as necessary for the maintenance of satisfactory visual amenity; and (f) ensure that the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape, to the satisfaction of the Director-General.	Yes	As per condition.
58.	Upon receiving a written request from the owner of any residence on privately-owned land which has, or would have, significant direct views of the mining operations and infrastructure on-site during the project, the Proponent shall implement additional visual impact mitigation measures (such as landscaping treatments or vegetation screens) to reduce the visibility of the mining operations and infrastructure from the residences on the privately-owned land. These mitigation measures must be reasonable and feasible, and must be implemented within a reasonable timeframe. If the Proponent 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 to date.
59.	The Proponent shall: (a) implement all reasonable and feasible measures to manage bushfire risks, including the suspension of activities that may have the potential to ignite a fire, during adverse conditions; (b) ensure that the project is suitably equipped to respond to any fires on site; and (c) assist the Rural Fire Service, Forests NSW, emergency services and National Parks and Wildlife Services as much as possible if there is a fire in the surrounding area.	Yes	As per condition.
60.	The Proponent shall: (a) implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project; (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; and (c) monitor and report on the effectiveness of waste minimisation and management measures in the Annual Review.	Yes	As per condition.
61.	The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed Rehabilitation Strategy described in the EA (and depicted conceptually in Appendix 8) and comply with the objectives in Table 15.	Not yet applicable	

Cond.	Conditional Requirement	Compliance	Comments
	(*see condition for Table 15*)		
62.	The Proponent shall, in consultation with the Namoi CMA: (a) develop a detailed soil management protocol that identifies procedures for: • comprehensive soil surveys prior to soil stripping; • assessment of top-soil and sub-soil suitability for mine rehabilitation; and • annual soil balances to manage soil handling including direct respreading and stockpiling; (b) maximise the salvage of suitable top-soils and sub-soils and biodiversity habitat components such as bush rocks, tree hollows and fallen timber for rehabilitation of disturbed areas within the site and for enhancement of biodiversity offset areas; and (c) ensure that coal reject, or any potentially acid forming interburden materials, are not emplaced at elevations in the pit shell where they may promote acid or sulphate species generation and migration beyond the pit shell.	Not Yet Applicable	Tarrawonga will liaise with the Namoi CMA in relation to soil management requirements upon approval of the Rehabilitation Management Plan.
63.	The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.	Yes	As per condition.
64.	The Proponent shall prepare and implement a Rehabilitation Management Plan to the satisfaction of the Executive Director, Mineral Resources. *(condition details what plan must include)*	Yes	Rehabilitation Management Plan prepared in accordance with all requirements of this condition and submitted by end of May 2013. No advice received from DG to date.
65.	The Proponent shall prepare and implement an updated Final Void and Mine Closure Plan (as a component of the overall Rehabilitation Management Plan required under condition 64 of schedule 3) to the satisfaction of the Executive Director Mineral Resources, following consultation with the Director-General. A draft plan must be prepared and submitted to the Executive Director Mineral Resources by the end of December 2019, and a final plan must be prepared and submitted to the Executive Director Mineral Resources by the end of December 2024. *(condition details what plan must include)*	Not yet applicable	
66.	The Proponent shall use its best endeavours to ensure that the agricultural productivity and production of non-operational project-related land is maintained or enhanced.	Not Yet Applicable	To be addressed in establishment of Farm Management Plan.
Schedule 4 – Additional procedures			
1.	Within 3 months of the date of this approval, the Proponent shall: (a) notify in writing the owners of: • the land listed in Table 1 of schedule 3 that they have the right to require the Proponent to acquire their land in accordance with the procedures in conditions 8 and 9 below at any stage during the project; • any residence on the land listed in Table 1 of schedule 3 that they have the right to request the Proponent to ask for additional noise and/or air quality mitigation measures to be installed at their residence at any stage during the project; and • any privately-owned land within 2 kilometres of the approved open-cut mining pit/s that they are entitled to ask for a property inspection, to establish the baseline	Yes	Notifications made as required.

Cond.	Conditional Requirement	Compliance	Comments
	condition of any buildings or structures on their land, or to have a previous property inspection report updated; (b) notify the tenants of any mine-owned land of their rights under this approval; and (c) send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in schedule 3 at any time during the life of the project.		
2.	Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 1 that is subsequently purchased by the Proponent, the Proponent shall: (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); (b) advise the prospective tenants of the rights they would have under this approval; and (c) request the prospective tenants consult their medical practitioner to discuss the air quality monitoring data and predictions and health impacts arising from this information, to the satisfaction of the Director-General.	Yes	Notifications made as required.
3.	As soon as practicable after obtaining monitoring results showing: (a) an exceedence of the relevant criteria in schedule 3, the Proponent shall notify the affected landowner in writing of the exceedence, and provide regular monitoring results to the landowner until the project is complying with the relevant criteria again; and (b) (b)an exceedance of the relevant air quality criteria schedule 3, the Proponent shall send to the affected landowners and/or existing tenants of the land (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); and • the monitoring data, in an appropriate format so that a medical practitioner can assist the resident in making an informed decision on the health risks associated with occupation of the property.	Not Yet Applicable	No exceedances identified during period.
4.	If an owner of privately-owned land considers the project to be exceeding the criteria in schedule 3 at his/her land, then he/she may ask the Director-General in writing for an independent review of the impacts of the project on his/her land. *(further details in condition)*	Not yet applicable	No requests received to date.
5.	If the independent review determines that the project is complying with the relevant criteria in schedule 3, then the Proponent may discontinue the independent review with the approval of the Director-General. *(further details in condition)*	Not yet applicable	No independent reviews to date.
6.	If the independent review determines that the relevant criteria are being exceeded, but that more than one mine is responsible for this exceedance, then together with the relevant mine/s the Proponent shall: (a) implement all reasonable and feasible mitigation measures, in consultation with the landowner and appointed independent expert, and conduct further monitoring until there is compliance with the relevant criteria; or	Not yet applicable	No independent reviews to date.

Cond.	Conditional Requirement	Compliance	Comments
	(b) secure a written agreement with the landowner and other relevant mine/s to allow exceedances of the relevant impact assessment criteria, to the satisfaction of the Director-General. *(further details in condition)*		
7.	If a person has good reason to believe the Proponent is not implementing the biodiversity and/or heritage conditions in schedule 3 satisfactorily, then he/she may ask the Director-General in writing for an independent review of the matter. If the Director-General is satisfied that an independent review is warranted, then within 2 months of the Director-General's decision, the Proponent shall: (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Director-General, to: • consult with the person and/or any relevant agencies; • investigate the person's complaints/claims; • review the environmental performance of the Proponent; • determine whether the Proponent s performance is satisfactory or not; and if necessary • recommend measures to improve the Proponent s performance; and (b) give the Director-General and complainant a copy of the independent review.	Not yet applicable	No requests received to date.
8.	Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent 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 the written request, as if the land was unaffected by the project, 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 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 the additional mitigation measures required under condition 2 of schedule 3; (b) the reasonable costs associated with: • relocating within the Tamworth, Narrabri, Gunnedah or Moree local government areas, or to any other local government area as agreed 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. *(further details in condition)*	Not yet applicable	No requests received to date.
9.	The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 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	No requests received to date.
Schedule 5 – Environmental Management, Reporting and Auditing			

Cond.	Conditional Requirement	Compliance	Comments
1.	The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Director-General. *(condition details what strategy must include)*	Yes	Environmental Management Strategy prepared in accordance with all requirements of this condition and submitted by end of May 2013. No advice received from DG to date.
2.	The Proponent must assess and manage project-related risks to ensure that there are no exceedences of the criteria and/or performance measures in schedule 3. Any exceedence of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedence of these criteria and/or performance measures has occurred, the Proponent must at the earliest opportunity: (a) take all reasonable and feasible steps to ensure that the exceedence ceases and does not reoccur; (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other courses of action; and (c) implement remediation measures as directed by the Director-General, to the satisfaction of the Director-General.	Yes	As per condition.
3.	The Proponent 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 project; • 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 project over time; (g) a protocol for managing and reporting any: • incidents; • complaints; • non-compliances with statutory requirements; and • exceedences of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.	Yes	As per condition.
4.	By the end of June each year (or as otherwise agreed by the Director-General), the Proponent shall review the environmental performance of the project for the previous calendar year to the	Yes	As per condition.

Cond.	Conditional Requirement	Compliance	Comments
	satisfaction of the Director-General. This review must: (a) describe the development (including any rehabilitation) that was carried out in the past calendar year, and the development that is proposed to be carried out over the current calendar year; (b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the: • relevant statutory requirements, limits or performance measures/criteria; • monitoring results of previous years; and • relevant predictions in the EA; (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 project; (e) identify any discrepancies between the predicted and actual impacts of the project, 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 project.		
5.	Within 3 months of the submission of an: (a) annual review under condition 4 above; (b) incident report under condition 8 below; (c) audit under condition 10 below; or (d) any modification to the conditions of this approval, the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.	Not yet applicable	
6.	In conjunction with the owners of the nearby mines in the Leard Forest Mining Precinct, the Proponent shall use its best endeavours to minimise the cumulative impacts of the project on the surrounding area, to the satisfaction of the Director-General.	Yes	Cumulative monitoring programs being developed to minimise impacts on surrounding area.
7.	The Proponent shall establish and operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Director-General. This CCC must be 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), and be operating by the end of May 2013. The CCC must seek to include joint membership with CCCs for other operating coal mines within the Leard Forest Mining Precinct, unless otherwise agreed by the Director-General.	Yes	CCC has been operating since 2006. Independent chair appointed for all three mines and some members are on more than one CCC.
8.	The Proponent shall notify, at the earliest opportunity, the Director-General and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Director-General and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Director-General and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Not applicable	No notifiable incidents during the reporting period.
9.	The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.	Yes	Website updated at least monthly.

Cond.	Conditional Requirement	Compliance	Comments
10.	By the end of June 2014 and every 3 years thereafter, unless the Director-General directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. *(condition details what audit must involve)*	Not yet applicable	
11.	Within 3 months of commissioning this audit, or as otherwise agreed by the Director-General, the Proponent shall submit a copy of the audit report to the Director-General, together with its response to any recommendations contained in the audit report.	Not yet applicable	
12.	The Proponent shall: (a) within 3 months of the date of this approval, make the following information publicly available on its website: • the EA; • all current statutory approvals for the project; • approved strategies, plans and programs required under the conditions of this approval; • a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval; • a complaints register, which is to be updated on a monthly basis; • minutes of CCC meetings; • the last five annual reviews; • any independent environmental audit, and the Proponent's response to the recommendations in any audit; • any other matter required by the Director-General; and (b) keep this information up to date, to the satisfaction of the Director-General.	Yes	As per condition.
13.	The Proponent shall, within 3 months of the date of this approval: (c) make the following information for the project publicly available on its website, on a daily basis and in a clearly understandable form: • daily weather forecasts for the coming week; • proposed operational responses to these weather forecasts; • real-time noise and air quality monitoring data (subject to any necessary caveats); and • any operational responses that were taken in response to the noise and air quality monitoring data, and (d) make provision on its website for the provision of on-line and/or email comments by members of the community regarding this information, 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 2012/2013 reporting period = 1,792,927 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).	Yes	As per condition.
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.	Yes	See Section 3.3.2.
L3	Ensure no waste receival 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) $L_{A1(1\ min)}$ criterion of 45dB(A) at night.	No	Exceedances at "Tarrawonga". See Section 3.10.3. As property has acquisition rights – noise criteria does not apply.
L4.3	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.	Yes	As per condition. See Appendix 8.
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	As per condition. See Appendix 8.
L5.5	Blasting operations on the premises must only be carried out between the hours of 9am to 5pm, Monday to Saturday, inclusive.	Yes	As per condition. 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.	Yes	As per condition. See Appendix 8.
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.	Yes	As per condition.

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.	Yes	As per condition.
03.2	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	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.	Yes	As per condition.
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	No harmful incidents requiring notification during the reporting period.
R2.2	Provide written details of the incident to EPA within 7 days of incident.	Yes	No harmful incidents requiring notification during the reporting period.
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 Applicable	No requests received by Tarrawonga Coal during reporting period.
R3.2	Tarrawonga Coal make inquiries in relation to the event and supply the report to the EPA within the time specified.	Not Applicable	No requests received by Tarrawonga Coal during reporting period.
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 Applicable	No requests received by Tarrawonga Coal during reporting period.
R3.4	EPA may request further details – must be supplied within specified time.	Not Applicable	No requests received by Tarrawonga Coal during reporting period.
R4.1	A noise compliance assessment must be submitted to the EPA within 30 days of the completion of quarterly noise monitoring.	Yes	Monitoring reports submitted within 30 days of being received by the noise consultants.

Condition	Conditional Requirement	Compliance	Comments
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 produce the licence upon request.
G1.3	Make licence available for inspection by any employee or agent of licencee working at premises.	Yes	Licence is located in Tarrawonga Coal Site Office if required. Tarrawonga personnel would produce the licence upon request.
U1.1	The licensee must achieve and maintain a dust control efficiency of 80% or more on all active haul roads by 17 May 2013. Control efficiency calculation provided.	Not Yet Applicable	Mechanism to test dust control efficiency attached to monitoring program currently pending final approval by EPA.
U1.2	The Licensee must prepare a Monitoring Program to assess its compliance with Condition U1.1 under varying meteorological conditions. Monitoring Program details specified in condition. Must be submitted by 31 May 2013.	Not Yet Applicable	Subject to monitoring plan approval currently with EPA.
U1.3	The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must include an assessment of the dust control effectiveness, dust levels and the Licensee's compliance with Condition U1.1. The report must be submitted by 15 August 2014.	Not Yet Applicable	
U2.1	The Licensee must alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013.	Yes	No identification of adverse weather conditions impacting on dust generation on overburden during reporting period.
	The Licensee must prepare a Monitoring Program to assess its compliance with Condition U2.1. Monitoring Program details specified in condition. Must be submitted by 31 May 2013.	Not Yet Applicable	Pending approval of Monitoring Program.

Condition	Conditional Requirement	Compliance	Comments
U2.3	The Licensee must submit a written report to the EPA providing the results of the Monitoring Program. The report must detail the following: weather conditions during which activities were ceased or altered; changes made to operational activities as a result of adverse weather; and resultant dust levels when activities were altered or ceased. Must be submitted by 15 August 2014.	Not Yet Applicable	
U3.1	The Licensee must submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden. Best practice measures defined in condition. Report must be submitted by 14 April 2014.	Not Yet Applicable	

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 9th May 2006. MOP amendment for Section 75W extension approved in October 2010. Revised MOP for Tarrawonga Extension area lodged May 2013.
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 that $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.	Yes	See Appendix 8. No exceedances recorded.
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.	Yes	See Section 3.3.2 for details.
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 PM_{10} HIGH VOLUME AIR SAMPLER

Site	Site Id	Datum	Zone	Easting	Northing
Templemore	EB4	MGA	56	230706	6605640

Date	mg/paper	µg/m³	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	

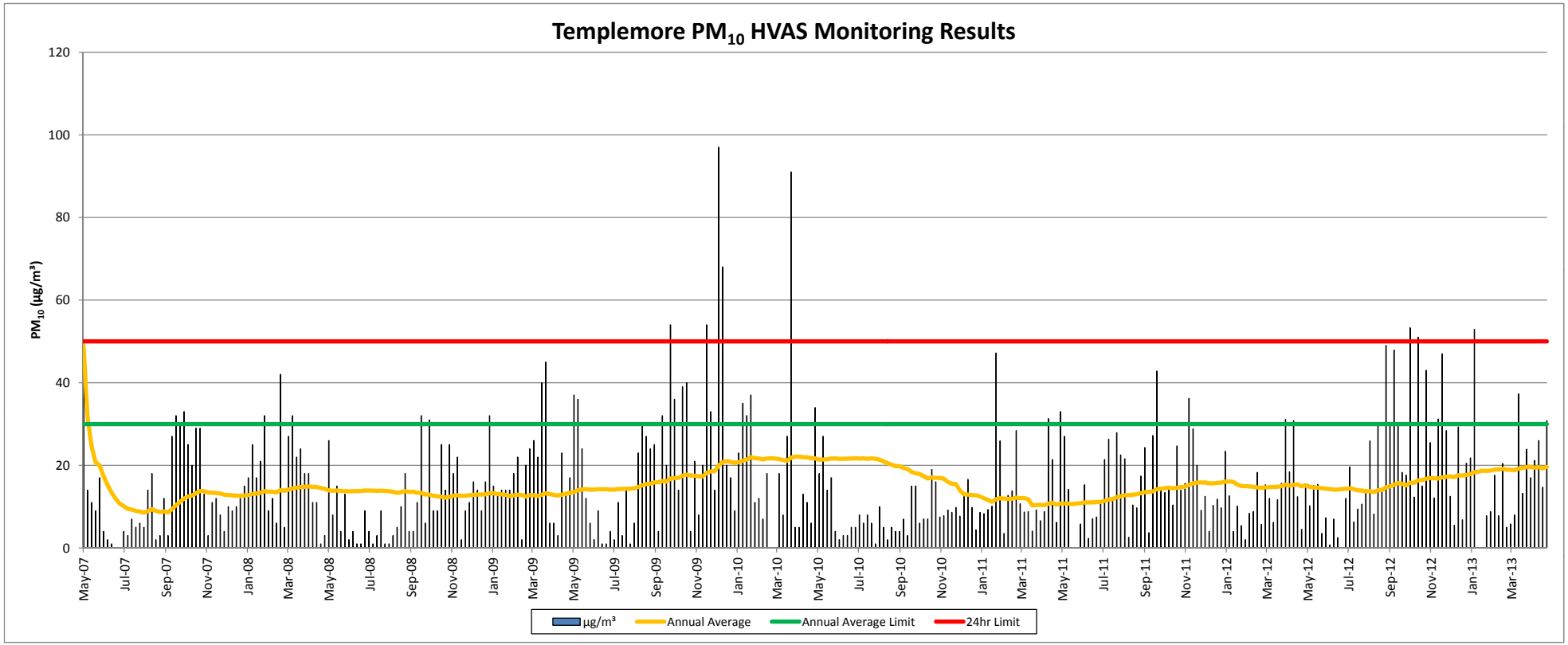
Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
23/04/2008	1.9	1	14.52	30	50	
29/04/2008	4.9	3	14.33	30	50	
5/05/2008	41.3	26	13.95	30	50	
11/05/2008	12.8	8	13.85	30	50	
17/05/2008	22.5	15	13.92	30	50	
23/05/2008	5.9	4	13.84	30	50	
29/05/2008	20.6	13	13.77	30	50	
4/06/2008	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	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
6/05/2009	57.6	37	13.52	30	50	
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	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
19/05/2010	22.4	14	21.47	30	50	
25/05/2010	26.5	17	21.66	30	50	
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	
8/05/2011	44.1	27	10.75	30	50	
14/05/2011	23.1	14.2	10.75	30	50	
20/05/2011			10.64	30	50	Power Outage
26/05/2011			10.76	30	50	Power Outage

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
1/06/2011	9.4	5.8	10.82	30	50	
7/06/2011	25	15.3	11.04	30	50	
13/06/2011	3.7	2.3	11.02	30	50	
19/06/2011	11.6	7.1	11.06	30	50	
25/06/2011	12.3	7.5	11.10	30	50	
1/07/2011	17.9	11	11.16	30	50	
7/07/2011	34.9	21.4	11.42	30	50	
13/07/2011	42.9	26.3	11.74	30	50	
19/07/2011	18.7	11.5	11.83	30	50	
25/07/2011	45.5	27.9	12.29	30	50	
31/07/2011	36.7	22.5	12.51	30	50	
6/08/2011	35.2	21.6	12.80	30	50	
12/08/2011	4.2	2.6	12.81	30	50	
18/08/2011	16.9	10.4	12.90	30	50	
24/08/2011	15.8	9.7	13.00	30	50	
30/08/2011	28.4	17.4	13.23	30	50	
5/09/2011	39.6	24.3	13.53	30	50	
11/09/2011	6.1	3.7	13.54	30	50	
17/09/2011	44.3	27.2	13.75	30	50	
23/09/2011	69.8	42.8	14.23	30	50	
29/09/2011	22.5	13.8	14.36	30	50	
5/10/2011	21.9	13.4	14.47	30	50	
11/10/2011	23.2	14.2	14.60	30	50	
17/10/2011	17	10.4	14.45	30	50	
23/10/2011	40.3	24.7	14.60	30	50	
29/10/2011	22.9	14	14.71	30	50	
4/11/2011	25.4	15.6	14.85	30	50	
10/11/2011	59.1	36.2	15.31	30	50	
16/11/2011	46.9	28.8	15.66	30	50	
22/11/2011	32.7	20	15.84	30	50	
28/11/2011	14.8	9.1	15.86	30	50	
4/12/2011	20.4	12.5	15.86	30	50	
10/12/2011	6.6	4	15.64	30	50	
16/12/2011	16.8	10.3	15.65	30	50	
22/12/2011	19.2	11.8	15.77	30	50	
28/12/2011	15.9	9.7	15.79	30	50	
3/01/2012	38.2	23.4	16.05	30	50	
9/01/2012	20.6	12.6	16.11	30	50	
15/01/2012	6.5	4	16.01	30	50	
21/01/2012	16.5	10.1	15.37	30	50	
27/01/2012	8.9	5.4	15.01	30	50	
2/02/2012	3.2	2	14.99	30	50	
8/02/2012	13.7	8.4	14.91	30	50	
14/02/2012	14.4	8.8	14.83	30	50	
20/02/2012	29.9	18.3	14.65	30	50	
26/02/2012	9.3	5.7	14.57	30	50	
3/03/2012	25	15.3	14.68	30	50	
9/03/2012	19.5	12	14.73	30	50	
15/03/2012	10.2	6.2	14.77	30	50	
21/03/2012	19.1	11.7	14.81	30	50	
27/03/2012	25.4	15.6	14.97	30	50	
2/04/2012	50.8	31.1	15.35	30	50	
8/04/2012	30	18.4	15.13	30	50	
14/04/2012	50.2	30.8	15.29	30	50	
20/04/2012	20.2	12.4	15.40	30	50	
26/04/2012	7.4	4.5	14.91	30	50	
2/05/2012	23.6	14.5	15.20	30	50	
8/05/2012	16.7	10.2	14.82	30	50	
14/05/2012	24.7	15.1	14.63	30	50	
20/05/2012	25.1	15.4	14.65	30	50	
26/05/2012	5.7	3.5	14.46	30	50	
1/06/2012	11.9	7.3	14.35	30	50	
7/06/2012	1.1	0.7	14.26	30	50	

Date	mg/paper	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
13/06/2012	11.5	7	14.13	30	50	
19/06/2012	4.1	2.5	14.13	30	50	
25/06/2012			14.25	30	50	Runtime error
1/07/2012	19.7	12	14.32	30	50	
7/07/2012	32	19.6	14.46	30	50	
13/07/2012	10.3	6.3	14.22	30	50	
19/07/2012	15.4	9.4	13.94	30	50	
25/07/2012	17.3	10.6	13.92	30	50	
31/07/2012	23	14.1	13.70	30	50	
6/08/2012	42.3	25.9	13.75	30	50	
12/08/2012	13.4	8.2	13.53	30	50	
18/08/2012	49.2	30.2	13.99	30	50	
24/08/2012	23.4	14.3	14.05	30	50	
30/08/2012	30	49	14.70	30	50	
5/09/2012	36.6	29.7	14.90	30	50	
11/09/2012	77.9	47.9	15.28	30	50	
17/09/2012	49	30.1	15.72	30	50	
23/09/2012	29.7	18.3	15.57	30	50	
29/09/2012	28.6	17.6	15.16	30	50	
5/10/2012	86.9	53.3	15.80	30	50	
11/10/2012	15.2	12.3	15.79	30	50	
17/10/2012	83.3	51	16.39	30	50	
23/10/2012	24.5	15	16.47	30	50	
29/10/2012	70.2	43	16.77	30	50	
4/11/2012	41.6	25.5	16.95	30	50	
10/11/2012	19.8	12.1	16.90	30	50	
16/11/2012	50.8	31.2	16.81	30	50	
22/11/2012	76.6	47	17.11	30	50	
28/11/2012	46.3	28.4	17.25	30	50	
4/12/2012	21	12.5	17.31	30	50	
10/12/2012	9.3	5.5	17.19	30	50	
16/12/2012	48.4	29.3	17.61	30	50	
22/12/2012	11.1	6.8	17.55	30	50	
28/12/2012	33.4	20.5	17.69	30	50	
3/01/2013	35.5	21.8	17.89	30	50	
9/01/2013	86.3	52.9	18.37	30	50	
15/01/2013			18.47	30	50	No power
21/01/2013			18.72	30	50	No power
27/01/2013	12.8	7.8	18.68	30	50	
2/02/2013	14.4	8.8	18.73	30	50	
8/02/2013	28.7	17.6	19.00	30	50	
14/02/2013	12.7	7.8	18.99	30	50	
20/02/2013	28.8	20.4	19.18	30	50	
26/02/2013	8.1	5	18.96	30	50	
4/03/2013	9.4	5.8	18.96	30	50	
10/03/2013	13	8	18.84	30	50	
16/03/2013	60.8	37.3	19.27	30	50	
22/03/2013	21.6	13.2	19.38	30	50	
28/03/2013	39	23.9	19.59	30	50	
3/04/2013	27.8	17	19.62	30	50	
9/04/2013	34.5	21.2	19.45	30	50	
15/04/2013	42.5	26	19.58	30	50	
21/04/2013	24	14.7	19.30	30	50	
27/04/2013	50.3	30.8	19.62	30	50	


Templemore PM10 HVAS Monitoring Results
PM10 (µg/m³)
120
100
80
60
40
20
0
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
Nov-12
Jan-13
Mar-13
µg/m³
Annual Average
Annual Average Limit
24hr Limit

MERRIOWN PM_{10} HIGH VOLUME AIR SAMPLER

Site	Site Id
Merriown	D7

Note: This site is monitored by Idemitsu Boggabri Coal

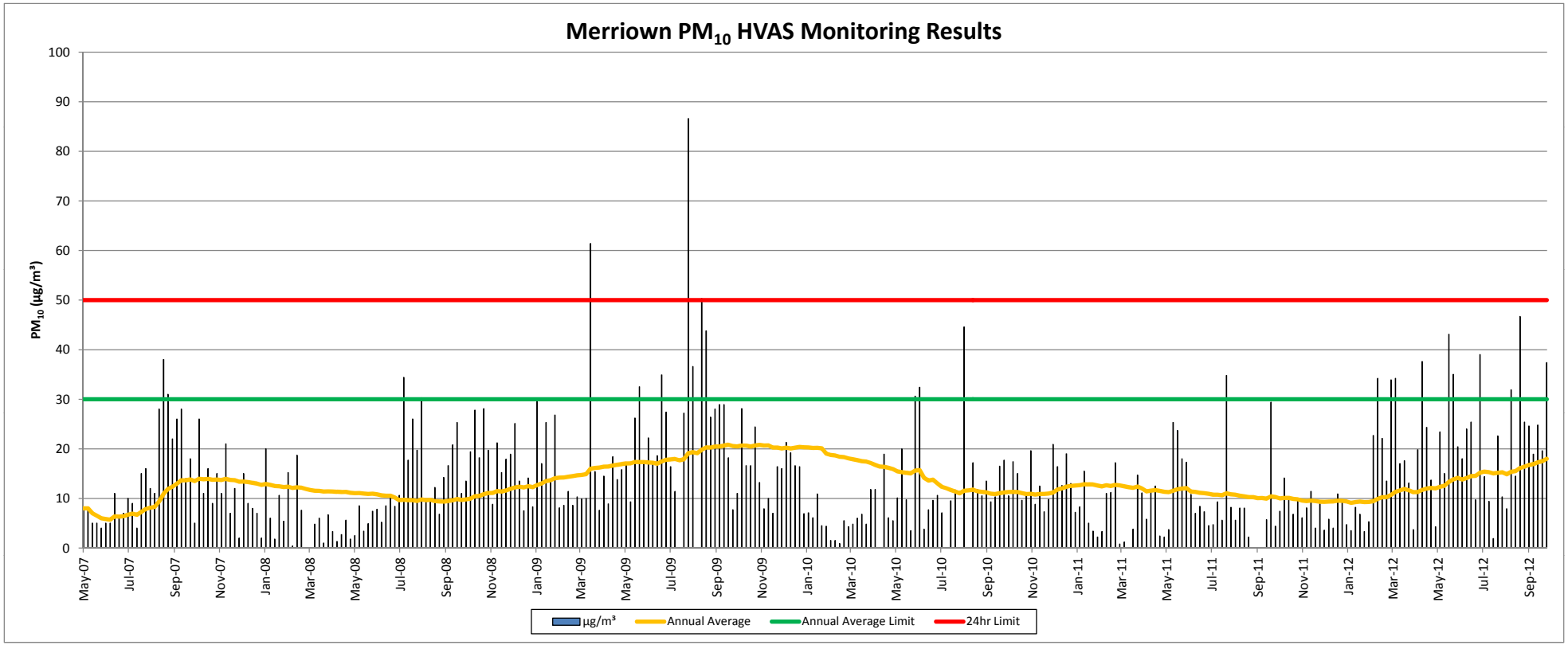
Date	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
28/04/2007	8	8.00	30	50	
22/05/2007	8	8.00	30	50	
28/05/2007	5	7.00	30	50	
3/06/2007	5	6.50	30	50	
9/06/2007	4	6.00	30	50	
16/06/2007	5	5.83	30	50	
21/06/2007	5	5.71	30	50	
27/06/2007	11	6.38	30	50	
4/07/2007	6	6.33	30	50	
10/07/2007	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	

Date	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
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	
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	

Date	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
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	
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	

Date	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
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	
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	

Date	µg/m³	Annual Average	Annual Average Limit	24hr Limit	Comments
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	
2/05/2012	6.1	9.57	30	50	
8/05/2012	8.1	9.47	30	50	
14/05/2012	11.4	9.56	30	50	
20/05/2012	4	9.47	30	50	
26/05/2012	8.9	9.34	30	50	
1/06/2012	3.6	9.31	30	50	
7/06/2012	5.8	9.36	30	50	
13/06/2012	4	9.39	30	50	
19/06/2012	10.9	9.55	30	50	
25/06/2012	9.5	9.52	30	50	
1/07/2012	4.7	9.39	30	50	
7/07/2012	3.5	9.11	30	50	
13/07/2012	8.2	9.26	30	50	
19/07/2012	6.8	9.37	30	50	
25/07/2012	3.3	9.25	30	50	
31/07/2012	5.3	9.28	30	50	
6/08/2012	22.7	9.44	30	50	
12/08/2012	34.2	9.90	30	50	
18/08/2012	22.1	10.23	30	50	
24/08/2012	13.5	10.27	30	50	
30/08/2012	33.9	10.70	30	50	
5/09/2012	34.2	11.33	30	50	
11/09/2012	17	11.63	30	50	
17/09/2012	17.6	11.91	30	50	
23/09/2012	13.1	11.66	30	50	
29/09/2012	3.7	11.26	30	50	
5/10/2012	19.8	11.30	30	50	
11/10/2012	37.6	11.71	30	50	
17/10/2012	24.3	11.98	30	50	
23/10/2012	13.7	12.11	30	50	
29/10/2012	4.3	12.03	30	50	
4/11/2012	23.4	12.35	30	50	
10/11/2012	15	12.56	30	50	
16/11/2012	43.1	13.33	30	50	
22/11/2012	35	13.84	30	50	
28/11/2012	20.4	14.14	30	50	
4/12/2012	18	13.80	30	50	
10/12/2012	24	14.12	30	50	
16/12/2012	25.4	14.51	30	50	
22/12/2012	9.7	14.55	30	50	
29/12/2012	39	15.17	30	50	
6/01/2013	14.4	15.41	30	50	
12/01/2013	9.4	15.29	30	50	
29/01/2013	1.9	15.03	30	50	
4/02/2013	22.6	15.18	30	50	
10/02/2013	10.3	15.26	30	50	
16/02/2013	7.9	14.86	30	50	
22/02/2013	31.9	15.38	30	50	
28/02/2013	14.5	15.51	30	50	
6/03/2013	46.7	16.13	30	50	
12/03/2013	25.4	16.42	30	50	
18/03/2013	24.6	16.75	30	50	
24/03/2013	18.9	16.93	30	50	
30/03/2013	24.8	17.28	30	50	
5/04/2013	19.6	17.50	30	50	
11/04/2013	37.4	17.99	30	50	

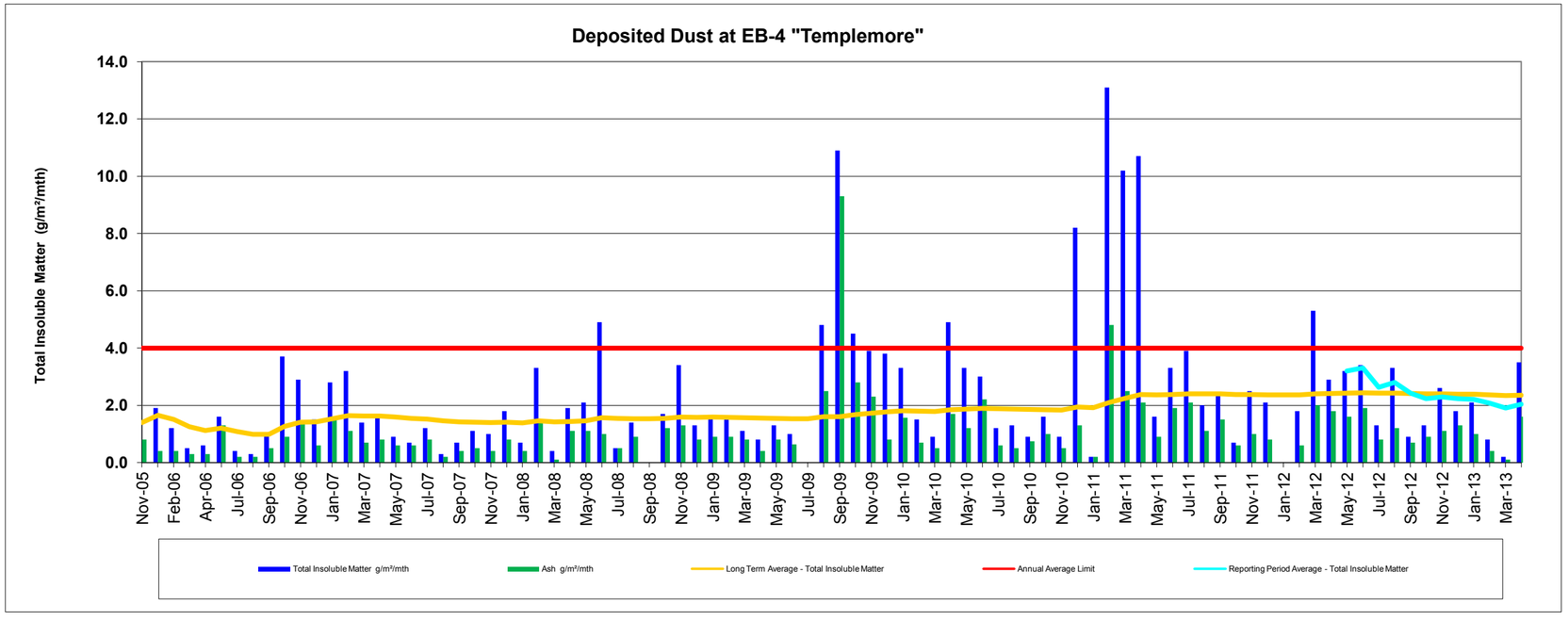

Merriown PM10 HVAS Monitoring Results
PM10 (µg/m³)
100
90
80
70
60
50
40
30
20
10
0
May-07
Jul-07
Sep-07
Nov-07
Jan-08
Mar-08
May-08
Jul-08
Sep-08
Nov-08
Jan-09
Mar-09
May-09
Jul-09
Sep-09
Nov-09
Jan-10
Mar-10
May-10
Jul-10
Sep-10
Nov-10
Jan-11
Mar-11
May-11
Jul-11
Sep-11
Nov-11
Jan-12
Mar-12
May-12
Jul-12
Sep-12
µg/m³
Annual Average
Annual Average Limit
24hr Limit

Deposited Dust EB-4 "Templemore"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	0.6		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	3.2		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
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

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		2.4	4.0	0.9	
EN1101700-001	EB-4	04-Jul-11	Jun-11	Merton Past. Co.	0850		3.3		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		2.4	4.0	2.1	Mining Activity
EN1102639-001	EB-4	05-Sep-11	Aug-11	Merton Past. Co.	1130		2.0		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		2.4	4.0	1.5	
EN1103410-001	EB-4	05-Nov-11	Oct-11	Merton Past. Co.	1050	1050	0.7		2.4	4.0	0.6	
EN1104053-001	EB-4	05-Dec-11	Nov-11	Merton Past. Co.	0945		2.5		2.4	4.0	1.0	
EN1200212-002	EB-4	06-Jan-11	Dec-11	Merton Past. Co.	1730		2.1		2.4	4.0	0.8	Funnel fully blocked
EN1200212-002	EB-4	06-Jan-11	Jan-12	Merton Past. Co.					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		2.4	4.0	0.6	
EN1201376-001	EB-4	02-Apr-12	Mar-12	Merton Past. Co.	1500		5.3		2.4	4.0	2.0	
EN1201718-001	EB-4	04-May-12	Apr-12	Merton Past. Co.	1020		2.9		2.4	4.0	1.8	
EN1202179-001	EB-4	09-Jun-12	May-12	Merton Past. Co.	1210		3.2	3.2	2.4	4.0	1.6	
EN1202527-001	EB-4	03-Jul-12	Jun-12	Merton Past. Co.	1145		3.4	3.3	2.4	4.0	1.9	
EN1202939-001	EB-4	04-Aug-12	Jul-12	Merton Past. Co.	1540		1.3	2.6	2.4	4.0	0.8	
EN1203413-001	EB-4	02-Sep-12	Aug-12	Merton Past. Co.	1555		3.3	2.8	2.4	4.0	1.2	
EN1203939-001	EB-4	06-Oct-12	Sep-12	Merton Past. Co.	0930		0.9	2.4	2.4	4.0	0.7	
EN1204272-001	EB-4	06-Nov-12	Oct-12	Merton Past. Co.	1830		1.3	2.2	2.4	4.0	0.9	
EN1204642-001	EB-4	03-Dec-12	Nov-12	Merton Past. Co.	1145		2.6	2.3	2.4	4.0	1.1	
EN1300140-001	EB-4	05-Jan-13	Dec-12	Merton Past. Co.	0920		1.8	2.2	2.4	4.0	1.3	
EN1300548-001	EB-4	07-Feb-13	Jan-13	Merton Past. Co.	0915		2.1	2.2	2.4	4.0	1	
EN1301077-009	EB-4	18-Mar-13	Feb-13	ALS Acirl	1130	300	0.8	2.1	2.4	4.0	0.4	
EN1301077-009	EB-4	17-Apr-13	Mar-13	ALS Acirl	1000	200	0.2	1.9	2.3	4.0	0.1	
EN1301832-009	EB-4	16-May-13	Apr-13	ALS Acirl	1115	200	3.5	2.0	2.4	4.0	1.6	Insects, plant material

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

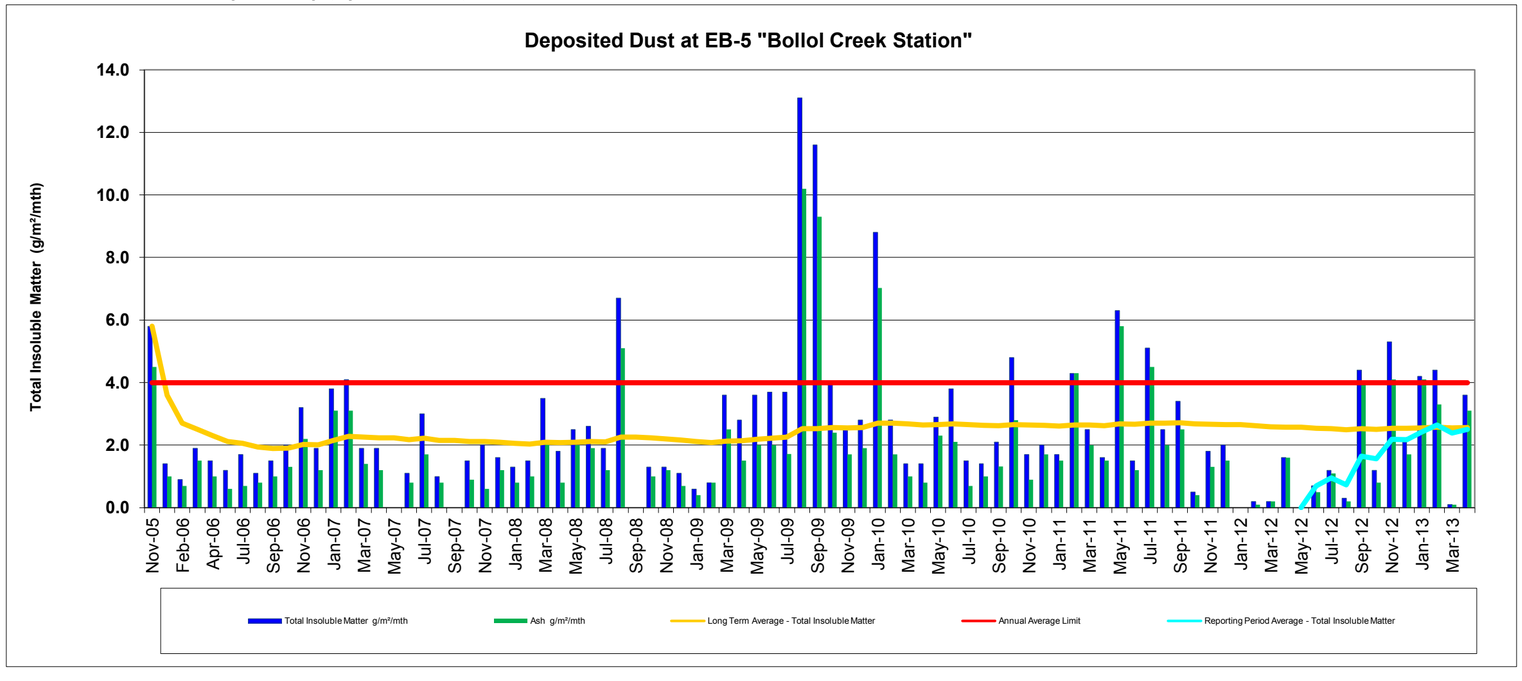


Deposited Dust EB-5 "Bollol Creek Station"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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
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

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		2.7	4.0	5.8	Funnel Smashed
EN1101700-002	EB-5	04-Jul-11	Jun-11	TCPL	0840		1.5		2.7	4.0	1.2	Grazing activity, mining activity
EN1102064-002	EB-5	03-Aug-11	Jul-11	TCPL	1000		5.1		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		2.7	4.0	2.0	Grazing activity, mining activity
EN1103081-002	EB-5	03-Oct-11	Sep-11	TCPL	1520		3.4		2.7	4.0	2.5	Broken funnel
EN1103410-002	EB-5	05-Nov-11	Oct-11	TCPL	1100	1100	0.5		2.7	4.0	0.4	
EN1104053-002	EB-5	05-Dec-11	Nov-11	TCPL	0955		1.8		2.7	4.0	1.3	Funnel broken
EN1200212-003	EB-5	06-Jan-11	Dec-11	TCPL	1740		2		2.7	4.0	1.5	
EN1200212-003	EB-5	06-Jan-11	Jan-12	TCPL					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	4.0	0.1	
EN1201376-002	EB-5	02-Apr-12	Mar-12	TCPL	1500		0.2		2.6	4.0	0.2	Site damaged by cattle
EN1201718-002	EB-5	04-May-12	Apr-12	TCPL	1030		1.6		2.6	4.0	1.6	Broken funnel again
	EB-5	09-Jun-12	May-12	Merton Past. Co.				0.0	2.6	4.0		
EN1202527-002	EB-5	03-Jul-12	Jun-12	Merton Past. Co.	1155		0.7	0.7	2.5	4.0	0.5	
EN1202939-002	EB-5	04-Aug-12	Jul-12	Merton Past. Co.	1550		1.2	1.0	2.5	4.0	1.1	
EN1203413-002	EB-5	02-Sep-12	Aug-12	Merton Past. Co.	1605		0.3	0.7	2.5	4.0	0.2	
EN1203939-002	EB-5	06-Oct-12	Sep-12	Merton Past. Co.	0940		4.4	1.7	2.5	4.0	4	
EN1204272-002	EB-5	06-Nov-12	Oct-12	Merton Past. Co.	1850		1.2	1.6	2.5	4.0	0.8	
EN1204642-002	EB-5	03-Dec-12	Nov-12	Merton Past. Co.	1155		5.3	2.2	2.5	4.0	4.1	
EN1300140-002	EB-5	05-Jan-13	Dec-12	Merton Past. Co.	0930		2.1	2.2	2.5	4.0	1.7	
EN1300548-002	EB-5	07-Feb-13	Jan-13	Merton Past. Co.	0930		4.2	2.4	2.6	4.0	4.1	
EN1301077-010	EB-5	18-Mar-13	Feb-13	ALS Acirl	1105	300	4.4	2.6	2.6	4.0	3.3	
EN1301077-010	EB-5	17-Apr-13	Mar-13	ALS Acirl	1015	200	0.1	2.4	2.5	4.0	0.1	
EN1301832-010	EB-5	16-May-13	Apr-13	ALS Acirl	1050	200	3.6	2.5	2.6	4.0	3.1	Insects, plant material

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

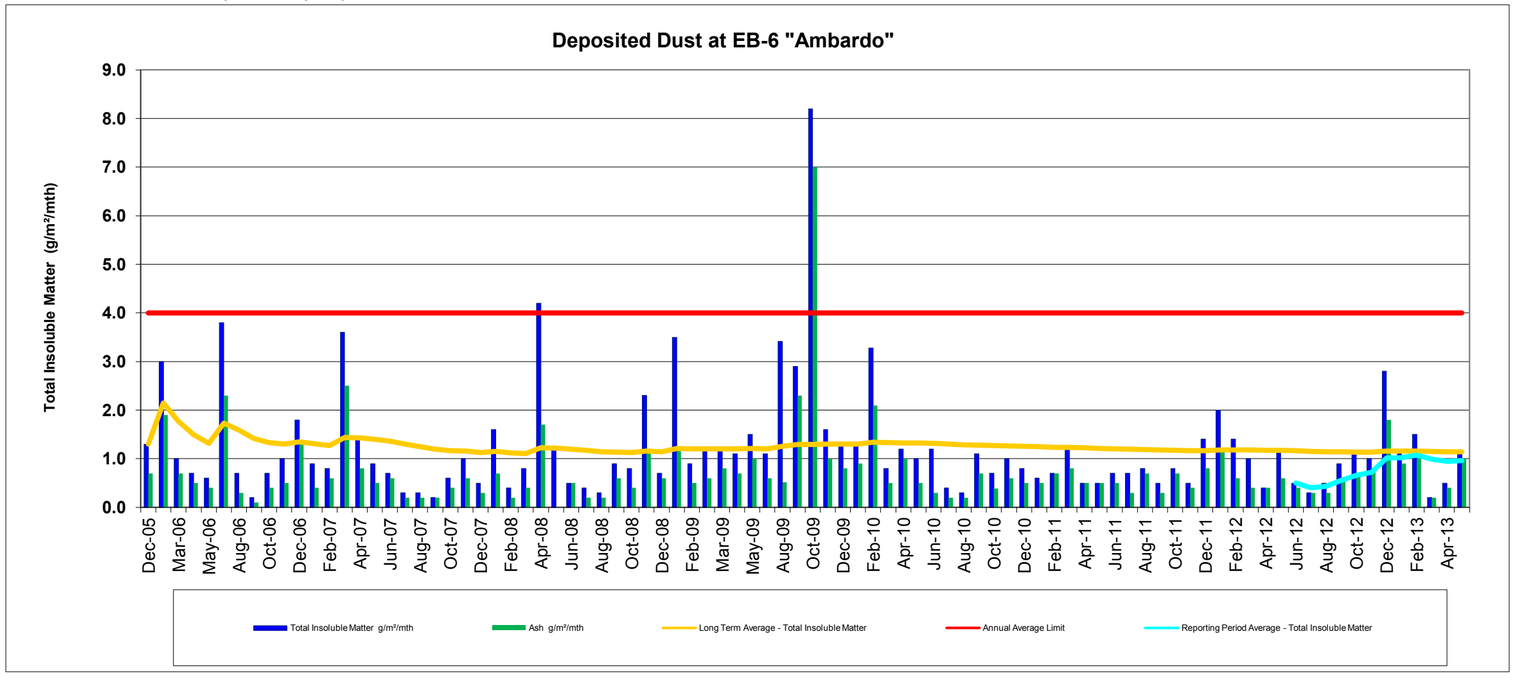


Deposited Dust EB-6 "Ambardo"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	1275	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
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

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		1.2	4.0	0.5	
EN1101700-003	EB-6	04-Jul-11	Jun-11	TCPL	0935		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		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		1.2	4.0	0.3	Grazing activity, mining activity
EN1103081-003	EB-6	03-Oct-11	Sep-11	TCPL	1435		0.8		1.2	4.0	0.7	
EN1103410-003	EB-6	05-Nov-11	Oct-11	TCPL	1015	1015	0.5		1.2	4.0	0.4	
EN1104053-003	EB-6	05-Dec-11	Nov-11	TCPL	0915		1.4		1.2	4.0	0.8	Full
EN1200212-004	EB-6	06-Jan-11	Dec-11	TCPL	1700		2.0		1.2	4.0	1.2	
EN1200627-001	EB-6	08-Feb-12	Jan-12	TCPL	1555		1.4		1.2	4.0	0.6	Grazing activity, mining activity-near workshop
EN1201033-003	EB-6	04-Mar-12	Feb-12	TCPL	115		1		1.2	4.0	0.4	
EN1201376-003	EB-6	02-Apr-12	Mar-12	TCPL	1500		0.4		1.2	4.0	0.4	
EN1201718-003	EB-6	04-May-12	Apr-12	TCPL	0945		1.2		1.2	4.0	0.6	Spider web
EN1202179-002	EB-6	09-Jun-12	May-12	TCPL	1130		0.5	0.5	1.2	4.0	0.4	
EN1202527-003	EB-6	03-Jul-12	Jun-12	TCPL	1110		0.3	0.4	1.2	4.0	0.3	
EN1202939-003	EB-6	04-Aug-12	Jul-12	TCPL	1500		0.5	0.4	1.1	4.0	0.3	
EN1203413-003	EB-6	02-Sep-12	Aug-12	TCPL	1530		0.9	0.6	1.1	4.0	0.6	
EN1203939-003	EB-6	06-Oct-12	Sep-12	TCPL	0900		1.1	0.7	1.1	4.0	0.7	
EN1204272-003	EB-6	06-Nov-12	Oct-12	TCPL	1740		1.0	0.7	1.1	4.0	0.8	
EN1204642-003	EB-6	03-Dec-12	Nov-12	TCPL	1115		2.8	1.0	1.2	4.0	1.8	
EN1300140-003	EB-6	05-Jan-13	Dec-12	TCPL	0845		1.1	1.0	1.2	4.0	0.9	
EN1300548-003	EB-6	07-Feb-13	Jan-13	TCPL	0830		1.5	1.1	1.2	4.0	1.1	
EN1301077-011	EB-6	18-Mar-13	Feb-13	ALS Acirl	0850	400	0.2	1.0	1.1	4.0	0.2	Insects, plant material-broken funnel
EN1301077-011	EB-6	17-Apr-13	Mar-13	ALS Acirl	0905	200	0.5	0.9	1.1	4.0	0.4	Insects, plant material
EN1301832-011	EB-6	16-May-13	Apr-13	ALS Acirl	0850	200	1.1	1.0	1.1	4.0	1.0	Insects, plant material

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

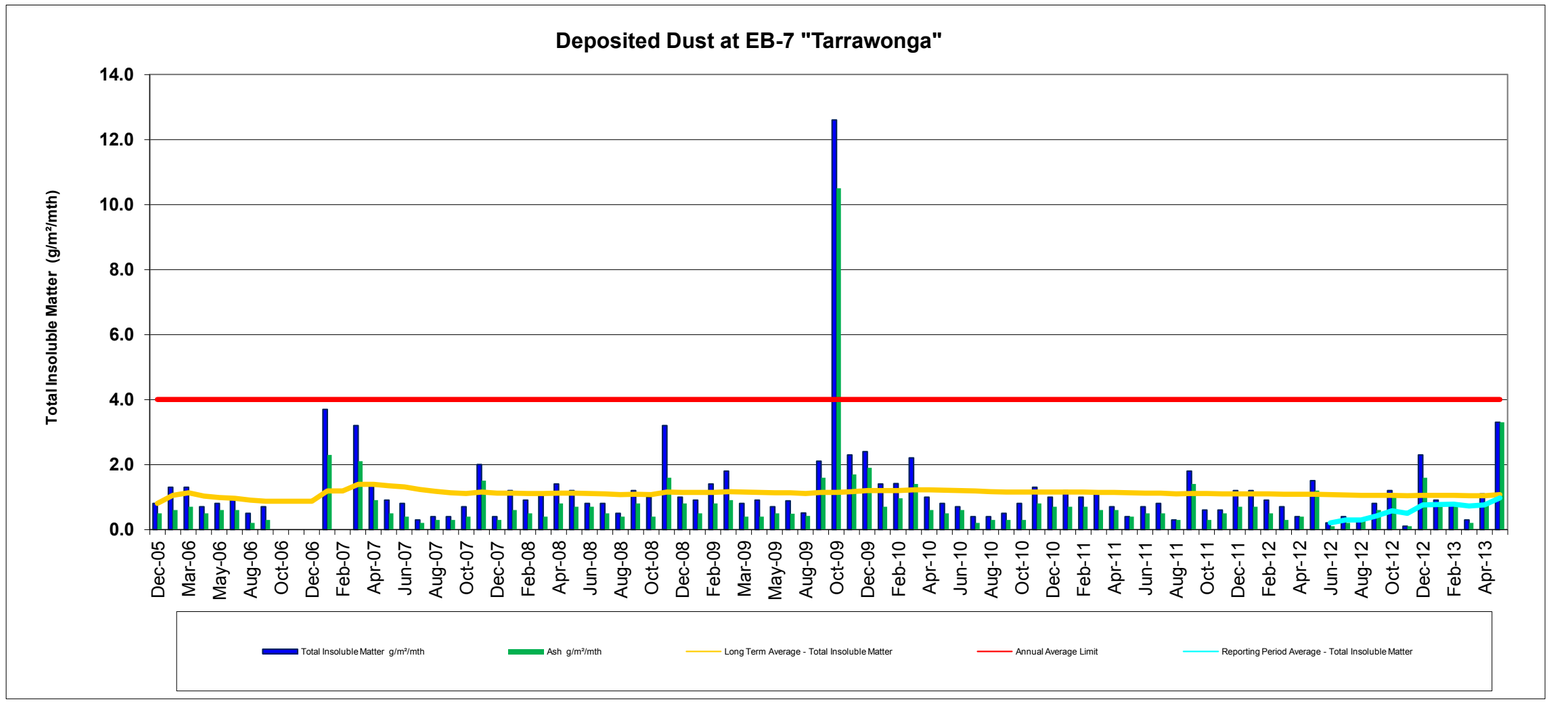


Deposited Dust EB-7 "Tarrawonga"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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
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	

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		1.1	4.0	0.5	Spider Webs. Next to Workshop.
EN1101700-004	EB-7	04-Jul-11	Jun-11	TCPL	0915		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		1.1	4.0	0.3	Grazing Activity, Mining acticity
EN1102639-004	EB-7	05-Sep-11	Aug-11	TCPL	1115		1.8		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		1.1	4.0	0.3	
EN1103410-004	EB-7	05-Nov-11	Oct-11	TCPL	1030	1030	0.6		1.1	4.0	0.5	
EN1104053-004	EB-7	05-Dec-11	Nov-11	TCPL	0930		1.2		1.1	4.0	0.7	Bird droppings
EN1200212-005	EB-7	06-Jan-11	Dec-11	TCPL	1715		1.2		1.1	4.0	0.7	
EN1200627-002	EB-7	08-Feb-12	Jan-12	TCPL	1620		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		1.1	4.0	0.3	
EN1201376-004	EB-7	02-Apr-12	Mar-12	TCPL	1500		0.4		1.1	4.0	0.4	Next to workshop
EN1201718-004	EB-7	04-May-12	Apr-12	TCPL	1005		1.5		1.1	4.0	1.2	Broken funnel again
EN1202179-003	EB-7	09-Jun-12	May-12	TCPL	1145		0.2	0.2	1.1	4.0	0.1	No funnel since last check
EN1202527-004	EB-7	03-Jul-12	Jun-12	TCPL	1125		0.4	0.3	1.1	4.0	0.2	Next to workshop
EN1202939-004	EB-7	04-Aug-12	Jul-12	TCPL	1515		0.3	0.3	1.1	4.0	0.3	
EN1203413-004	EB-7	02-Sep-12	Aug-12	TCPL	1545		0.8	0.4	1.1	4.0	0.6	
EN1203939-004	EB-7	06-Oct-12	Sep-12	TCPL	0915		1.2	0.6	1.1	4.0	1.0	Broken funnel
EN1204272-004	EB-7	06-Nov-12	Oct-12	TCPL	1750		0.1	0.5	1.0	4.0	0.1	
EN1204642-004	EB-7	03-Dec-12	Nov-12	TCPL	1135		2.3	0.8	1.1	4.0	1.6	Funnel blocked spider webs
EN1300140-004	EB-7	05-Jan-13	Dec-12	TCPL	0900		0.9	0.8	1.1	4.0	0.7	Next to workshop
EN1300548-004	EB-7	07-Feb-13	Jan-13	TCPL	0900		0.8	0.8	1.1	4.0	0.8	
EN1301077-012	EB-7	18-Mar-13	Feb-13	ALS Acirl	0910	400	0.3	0.7	1.0	4.0	0.2	Insects, plant material-spider in bottle
EN1301077-012	EB-7	17-Apr-13	Mar-13	ALS Acirl	0930	200	1.1	0.8	1.0	4.0	0.8	Insects, plant material
EN1301832-012	EB-7	16-May-13	Apr-13	ALS Acirl	0920	150	3.3	1.0	1.1	4.0	3.3	Insects, plant material-broken funnel in bottle

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

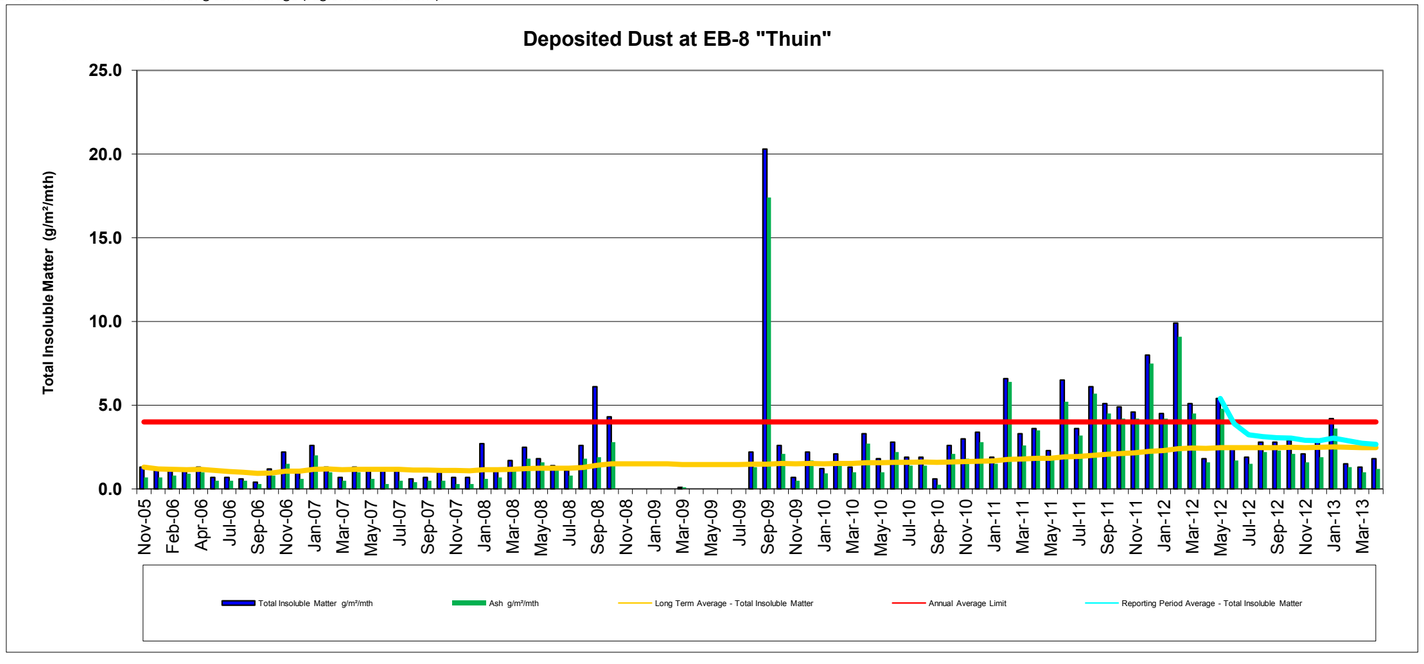


Deposited Dust EB-8 "Thuin"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	340	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
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	

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		1.8	4.0	1.9	Insects
EN1101448-001	EB-8	20-Jun-11	Jun-11	ALS Acirl	1000	1500	6.5		1.9	4.0	5.2	Insects/Plant Material
EN1101812-001	EB-8	19-Jul-11	Jul-11	ALS Acirl	1110	100	3.6		1.9	4.0	3.2	Insects, plant material
EN1102301-001	EB-8	17-Aug-11	Aug-11	ALS Acirl	1010	80	6.1		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		2.1	4.0	4.5	Plant material
EN1103124-001	EB-8	17-Oct-11	Oct-11	ALS Acirl	1050	1400	4.9		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		2.2	4.0	4.2	Insects, Plant material
EN1104232-001	EB-8	15-Dec-11	Dec-11	ALS Acirl	1100	2500	8		2.2	4.0	7.5	Insects, Plant material
EN1200242-001	EB-8	13-Jan-12	Jan-12	ALS Acirl	1100	300	4.5		2.3	4.0	4.2	Insects, Plant material
EN1200606-001	EB-8	13-Feb-12	Feb-12	ALS Acirl	1100	2500	9.9		2.4	4.0	9.1	Insects, Plant material
EN1201026-001	EB-8	15-Mar-12	Mar-12	ALS Acirl	1030	500	5.1		2.4	4.0	4.5	Insects, Plant material
EN1201453-001	EB-8	16-Apr-12	Apr-12	ALS Acirl	1010	<100	1.8		2.4	4.0	1.6	Insects, Plant material
EN1201862-001	EB-8	17-May-12	May-12	ALS Acirl	1015	300	5.4	5.4	2.5	4.0	4.80	Insects-sediment in bottom of bottle
EN1202258-001	EB-8	18-Jun-12	Jun-12	ALS Acirl	1130	300	2.4	3.9	2.5	4.0	1.70	Insects, Bird droppings
EN1202679-001	EB-8	18-Jul-12	Jul-12	ALS Acirl	1135	1400	1.9	3.2	2.5	4.0	1.50	Insects
EN1203136-001	EB-8	17-Aug-12	Aug-12	ALS Acirl	1100	100	2.8	3.1	2.5	4.0	2.20	Insects, Bird droppings, Plant material
EN1203585-001	EB-8	18-Sep-12	Sep-12	ALS Acirl	1040	100	2.8	3.1	2.5	4.0	2.30	Insects
EN1203993-001	EB-8	18-Oct-12	Oct-12	ALS Acirl	1120	200	2.9	3.0	2.5	4.0	2.10	Insects, Bird Droppings
EN1204413-001	EB-8	19-Nov-12	Nov-12	ALS Acirl	1030	50	2.1	2.9	2.5	4.0	1.60	Insects
EN1204841-001	EB-8	19-Dec-12	Dec-12	ALS Acirl	1000	50	2.8	2.9	2.5	4.0	1.90	Plant material
EN1300226-001	EB-8	17-Jan-13	Jan-13	ALS Acirl	1010		4.2	3.0	2.5	4.0	3.60	
EN1300226-001	EB-8	18-Feb-13	Feb-13	ALS Acirl	1040	1700	1.5	2.9	2.5	4.0	1.30	Insects, plant material-close to scraper run
EN1301077-001	EB-8	18-Mar-13	Mar-13	ALS Acirl	1040	700	1.3	2.7	2.5	4.0	1.00	Insects, plant material
EN1301077-001	EB-8	17-Apr-13	Apr-13	ALS Acirl	1035	200	1.8	2.7	2.5	4.0	1.20	Insects, bird droppings, plant material

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

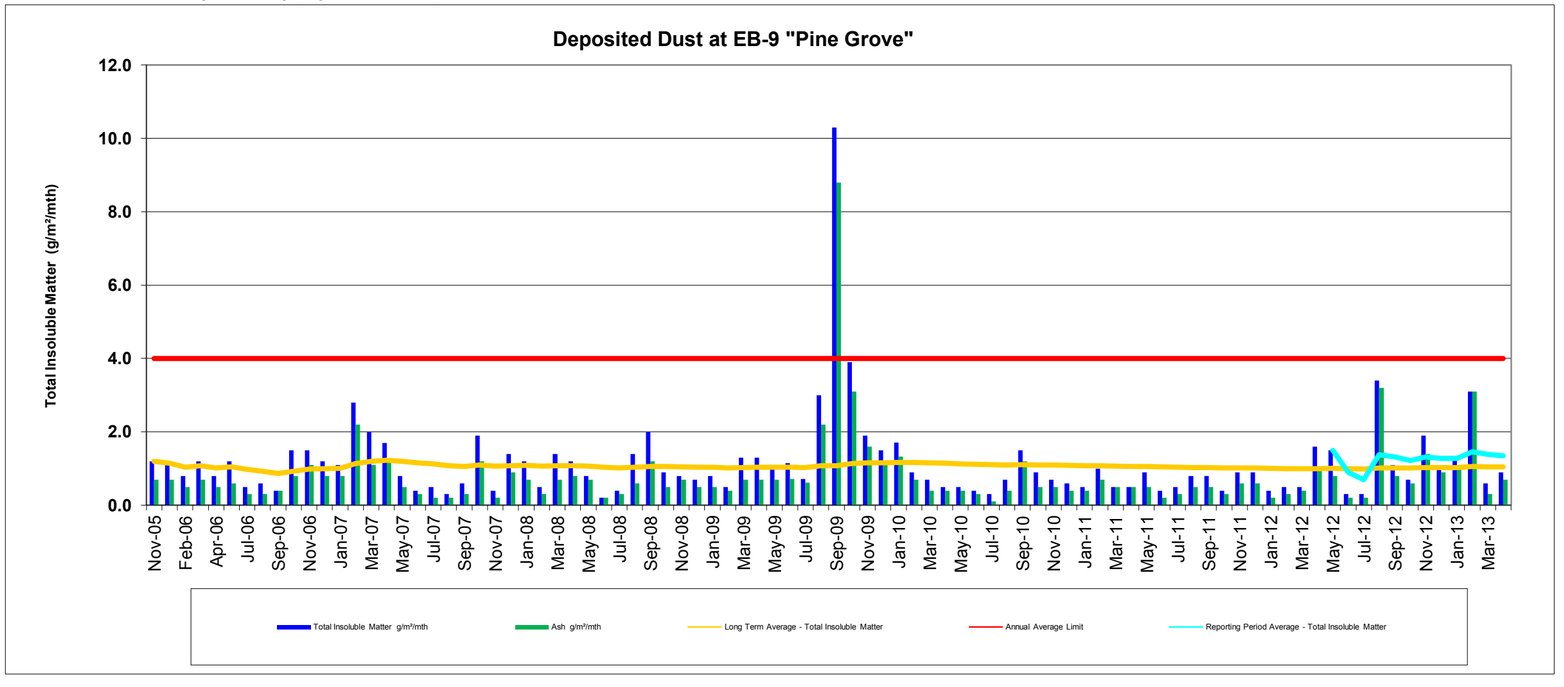


Deposited Dust EB-9 "Pine Grove"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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
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	

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
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		1.1	4.0	0.5	
EN1101700-005	EB-9	04-Jul-11	Jun-11	TCPL	0830		0.4		1.0	4.0	0.2	Grazing activity, mining activity
EN1102064-005	EB-9	03-Aug-11	Jul-11	TCPL	1030		0.5		1.0	4.0	0.3	Insects, grazing, mining acticity, light spider webs in funnel
EN1102639-005	EB-9	05-Sep-11	Aug-11	TCPL	1155		0.8		1.0	4.0	0.5	Grazing activity, mining activity
EN1103081-005	EB-9	03-Oct-11	Sep-11	TCPL	1545		0.8		1.0	4.0	0.5	
EN1103410-005	EB-9	05-Nov-11	Oct-11	TCPL	1120	1120	0.4		1.0	4.0	0.3	
EN1104053-005	EB-9	05-Dec-11	Nov-11	TCPL	1020		0.9		1.0	4.0	0.6	
EN1200212-006	EB-9	06-Jan-11	Dec-11	TCPL	1825		0.9		1.0	4.0	0.6	
EN1200627-003	EB-9	08-Feb-12	Jan-12	TCPL	1540		0.4		1.0	4.0	0.2	Mining activity
EN1201033-005	EB-9	04-Mar-12	Feb-12	TCPL	1115		0.5		1.0	4.0	0.3	
EN1201376-005	EB-9	02-Apr-12	Mar-12	TCPL	1500		0.5		1.0	4.0	0.4	
EN1201718-005	EB-9	04-May-12	Apr-12	TCPL	1050		1.6		1.0	4.0	1.0	
EN1202179-004	EB-9	09-Jun-12	May-12	TCPL	1300		1.5	1.5	1.0	4.0	0.8	Half blocked with webs and droppings
EN1202527-005	EB-9	03-Jul-12	Jun-12	TCPL	1215		0.3	0.9	1.0	4.0	0.2	
EN1202939-005	EB-9	04-Aug-12	Jul-12	TCPL	1620		0.3	0.7	1.0	4.0	0.2	
EN1203413-005	EB-9	02-Sep-12	Aug-12	TCPL	1630		3.4	1.4	1.0	4.0	3.2	
EN1203939-005	EB-9	06-Oct-12	Sep-12	TCPL	1000		1.1	1.3	1.0	4.0	0.8	
EN1204272-005	EB-9	06-Nov-12	Oct-12	TCPL	1730		0.7	1.2	1.0	4.0	0.6	
EN1204642-005	EB-9	03-Dec-12	Nov-12	TCPL	1220		1.9	1.3	1.0	4.0	1.4	
EN1300140-005	EB-9	05-Jan-13	Dec-12	TCPL	0950		1.0	1.3	1.0	4.0	0.9	
EN1300548-005	EB-9	07-Feb-13	Jan-13	TCPL	0955		1.3	1.3	1.0	4.0	1.1	
EN1301077-013	EB-9	18-Mar-13	Feb-13	ALS Acirl	0840	500	3.1	1.5	1.1	4.0	3.1	Insects, plant material-broken funnel
EN1301077-013	EB-9	17-Apr-13	Mar-13	ALS Acirl	0835	200	0.6	1.4	1.0	4.0	0.3	Insects, plant material
EN1301832-013	EB-9	16-May-13	Apr-13	ALS Acirl	0840	150	0.9	1.3	1.0	4.0	0.7	Insects, plant material-broken funnel in bottle

* 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/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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		1.9	4.0	0.4	
1003101-002	EB-10	22-Dec-10	Dec-10	ALS Acirl	1115		6.8		2.0	4.0	2.0	
1100199-002	EB-10	21-Jan-11	Jan-11	ALS Acirl	1215	300	2.6		2.0	4.0	1.0	
1100446-002	EB-10	22-Feb-11	Feb-11	ALS Acirl	1020	600	2.6		2.0	4.0	1.3	
1100695-002	EB-10	24-Mar-11	Mar-11	ALS Acirl	0940	500	2.4		2.0	4.0	1.4	
EN1100922-002	EB-10	20-Apr-11	Apr-11	ALS Acirl	0930	300	0.9		2.0	4.0	0.9	
EN1101205-002	EB-10	20-May-11	May-11	ALS Acirl	1030	Dry	1.6		2.0	4.0	0.7	Bird droppings
EN1101448-002	EB-10	20-Jun-11	Jun-11	ALS Acirl	0940	1100	0.6		2.0	4.0	0.6	Insects/Plant Material
EN1101812-002	EB-10	19-Jul-11	Jul-11	ALS Acirl	1025	50	4.2		2.0	4.0	1.3	Insects, bird droppings, plant material
EN1102301-002	EB-10	17-Aug-11	Aug-11	ALS Acirl	0940	80	4.0		2.1	4.0	1.7	Bird Droppings, Plant material
EN1102773-002	EB-10	16-Sep-11	Sep-11	ALS Acirl	1030	700	3.8		2.1	4.0	1.4	Insects, Bird Droppings, Plant material
EN1103124-002	EB-10	17-Oct-11	Oct-11	ALS Acirl	1015	1300	2.4		2.1	4.0	0.6	Insects, Plant material

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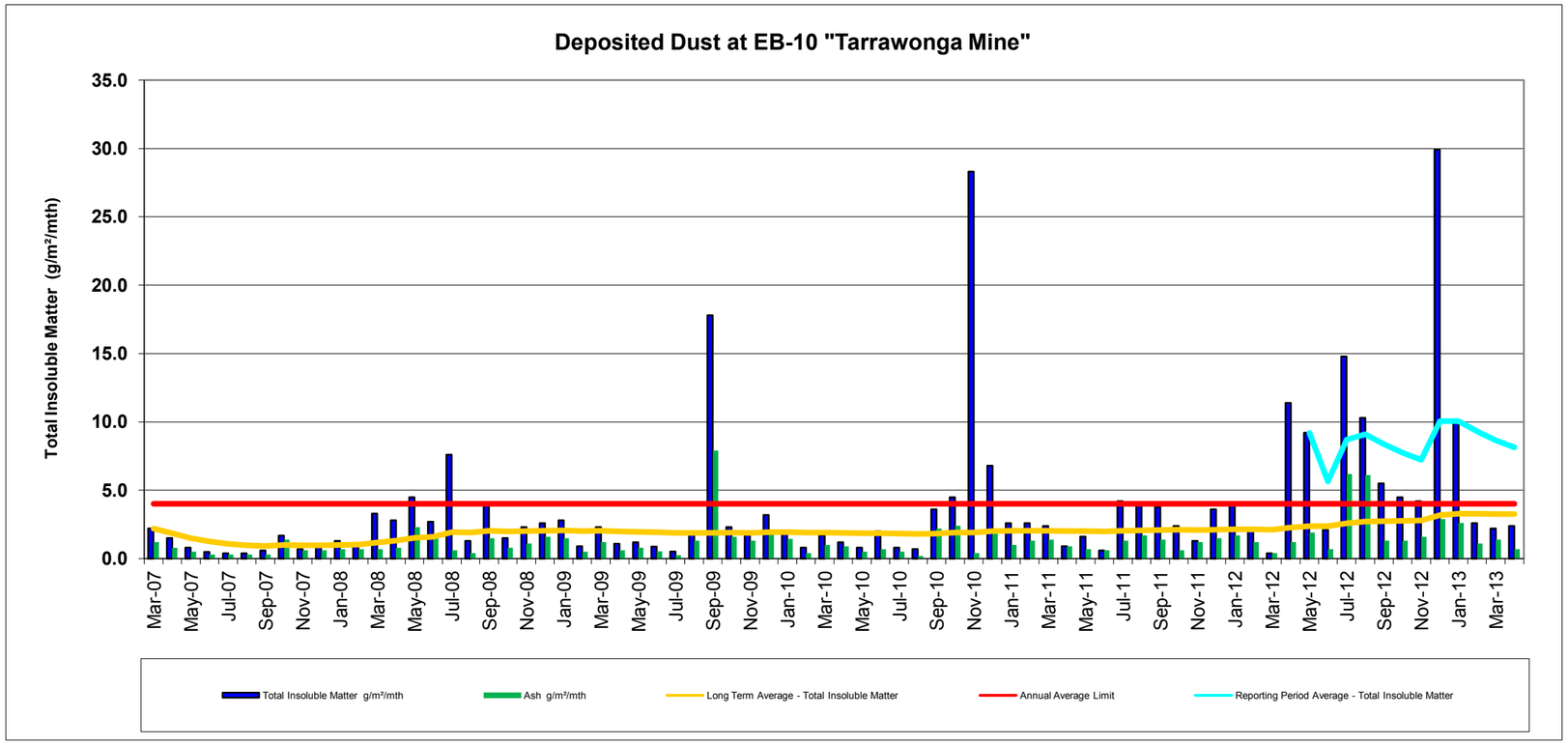
EN1103467-002	EB-10	15-Nov-11	Nov-11	ALS Acirl	1020	600	1.3		2.1	4.0	1.2	Insects
EN1104232-002	EB-10	15-Dec-11	Dec-11	ALS Acirl	1030	2500	3.6		2.1	4.0	1.5	Insects, Plant material
EN1200242-002	EB-10	13-Jan-12	Jan-12	ALS Acirl	0940	600	3.9		2.2	4.0	1.7	Insects, Plant material
EN1200606-002	EB-10	13-Feb-12	Feb-12	ALS Acirl	1115	2500	2.0		2.1	4.0	1.2	Insects, Plant material
EN1201026-002	EB-10	15-Mar-12	Mar-12	ALS Acirl	1000	500	0.4		2.1	4.0	0.4	Insects, Plant material
EN1201453-002	EB-10	16-Apr-12	Apr-12	ALS Acirl	0925	200	11.4		2.3	4.0	1.2	Insects, Bird droppings, Plant material
EN1201862-002	EB-10	17-May-12	May-12	ALS Acirl	1000	250	9.2	9.2	2.4	4.0	1.9	Insects, Bird droppings, Plant material
EN1202258-002	EB-10	18-Jun-12	Jun-12	ALS Acirl	1110	250	2.1	5.7	2.4	4.0	0.7	Bird Droppings
EN1202679-002	EB-10	18-Jul-12	Jul-12	ALS Acirl	1115	1400	14.8	8.7	2.6	4.0	6.2	Insects, Bird droppings, Plant material
EN1203136-002	EB-10	17-Aug-12	Aug-12	ALS Acirl	1030	100	10.3	9.1	2.7	4.0	6.1	Insects, Bird droppings, Plant material
EN1203585-002	EB-10	18-Sep-12	Sep-12	ALS Acirl	1030	10	5.5	8.4	2.7	4.0	1.3	Insects, Bird Droppings
EN1203993-002	EB-10	18-Oct-12	Oct-12	ALS Acirl	1100	200	4.5	7.7	2.8	4.0	1.3	Insects, Bird Droppings
EN1204413-002	EB-10	19-Nov-12	Nov-12	ALS Acirl	1010	50	4.2	7.2	2.8	4.0	1.6	Insects, Bird Droppings
EN1204841-002	EB-10	19-Dec-12	Dec-12	ALS Acirl	0945	50	29.9	10.1	3.2	4.0	2.9	Insects, bird droppings
EN1300226-002	EB-10	17-Jan-13	Jan-13	ALS Acirl	0950		9.9	10.0	3.3	4.0	2.6	
EN1300226-002	EB-10	18-Feb-13	Feb-13	ALS Acirl	1010	1800	2.6	9.3	3.3	4.0	1.1	Insects, bird droppings, plant material
EN1301077-002	EB-10	18-Mar-13	Mar-13	ALS Acirl	950	700	2.2	8.7	3.3	4.0	1.4	Insects, bird droppings, plant material
EN1301077-002	EB-10	17-Apr-13	Apr-13	ALS Acirl		200	2.4	8.1	3.3	4.0	0.7	Insects, plant material

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

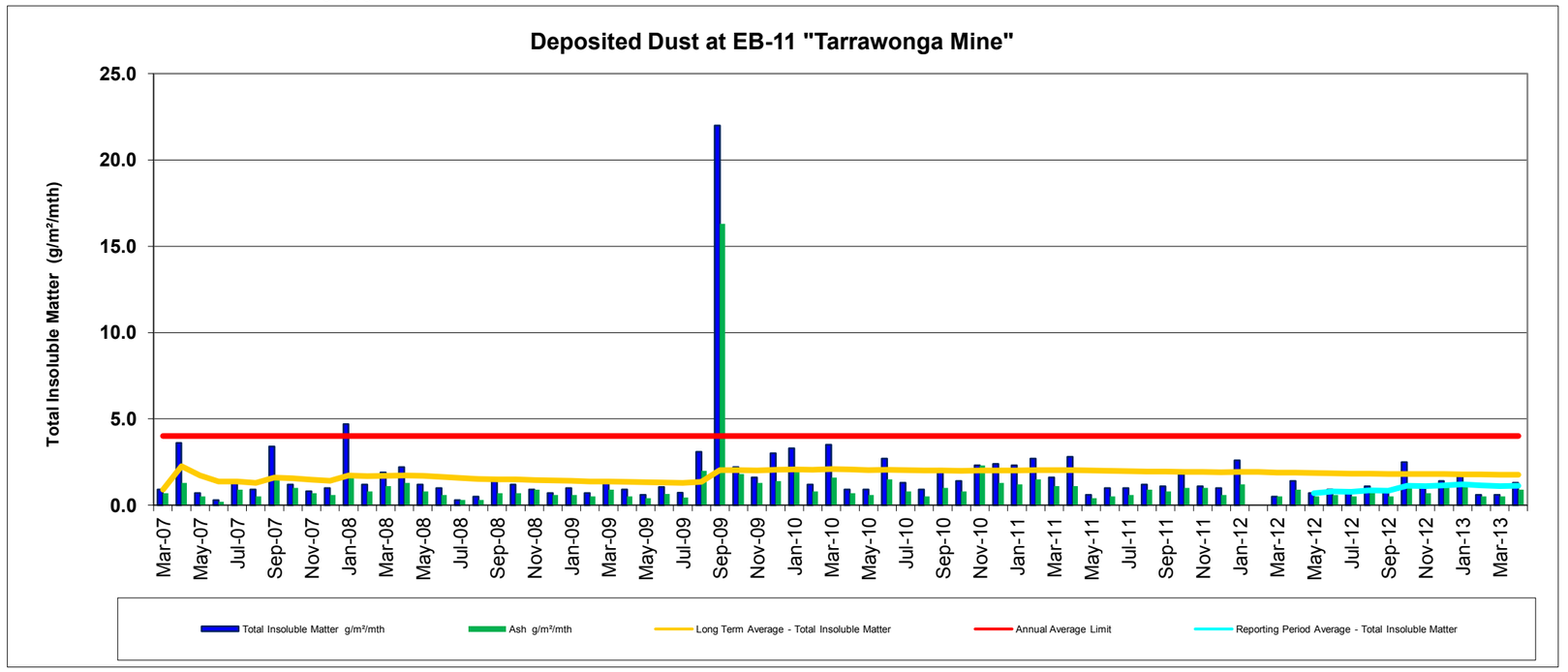


Deposited Dust EB-11 "Tarrawonga Mine"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	
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		2.0	4.0	0.4	Bird droppings
EN1101448-003	EB-11	20-Jun-11	Jun-11	ALS Acirl	0930	50	1.0		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		2.0	4.0	0.6	Insects, plant material
EN1102301-003	EB-11	17-Aug-11	Aug-11	ALS Acirl	0950	80	1.2		2.0	4.0	0.9	Insects

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1102773-003	EB-11	16-Sep-11	Sep-11	ALS Acirl	1040	800	1.1		1.9	4.0	0.8	
EN1103124-003	EB-11	17-Oct-11	Oct-11	ALS Acirl	1030	1500	1.8		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		1.9	4.0	1.0	Insects, Plant material
EN1104232-003	EB-11	15-Dec-11	Dec-11	ALS Acirl	1040	2500	1.0		1.9	4.0	0.6	Insects, Plant material
EN1200242-003	EB-11	13-Jan-12	Jan-12	ALS Acirl	0955	600	2.6		1.9	4.0	1.2	Insects, Plant material
EN1200606-003	EB-11	13-Feb-12	Feb-12	ALS Acirl					1.9	4.0		Broken upon arrival
EN1201026-003	EB-11	15-Mar-12	Mar-12	ALS Acirl	0950	500	0.5		1.9	4.0	0.5	Insects, Plant material
EN1201453-003	EB-11	16-Apr-12	Apr-12	ALS Acirl	0910	200	1.4		1.9	4.0	0.9	Insects, Plant material
EN1201862-003	EB-11	17-May-12	May-12	ALS Acirl	0945	300	0.7	0.7	1.9	4.0	0.5	Insects
EN1202258-003	EB-11	18-Jun-12	Jun-12	ALS Acirl	1120	300	0.9	0.8	1.8	4.0	0.6	Insects
EN1202679-003	EB-11	18-Jul-12	Jul-12	ALS Acirl	1040	1400	0.7	0.8	1.8	4.0	0.5	
EN1203136-003	EB-11	17-Aug-12	Aug-12	ALS Acirl	1045	100	1.1	0.9	1.8	4.0	0.7	Insects
EN1203585-003	EB-11	18-Sep-12	Sep-12	ALS Acirl	1000	100	0.8	0.8	1.8	4.0	0.5	Insects
EN1203993-003	EB-11	18-Oct-12	Oct-12	ALS Acirl	1110	250	2.5	1.1	1.8	4.0	1.2	Insects, Bird Droppings
EN1204413-003	EB-11	19-Nov-12	Nov-12	ALS Acirl	1020	50	1.1	1.1	1.8	4.0	0.7	Insects
EN1204841-003	EB-11	19-Dec-12	Dec-12	ALS Acirl	0930	50	1.4	1.2	1.8	4.0	1.2	Insects
EN1300226-003	EB-11	17-Jan-13	Jan-13	ALS Acirl	1000		1.7	1.2	1.8	4.0	1.2	
EN1300226-003	EB-11	18-Feb-13	Feb-13	ALS Acirl	1000	1900	0.6	1.2	1.8	4.0	0.5	Insects, plant material
EN1301077-003	EB-11	18-Mar-13	Mar-13	ALS Acirl	930	800	0.6	1.1	1.8	4.0	0.5	Insects, plant material
EN1301077-003	EB-11	17-Apr-13	Apr-13	ALS Acirl	1045	200	1.3	1.1	1.8	4.0	0.9	Insects, plant material

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

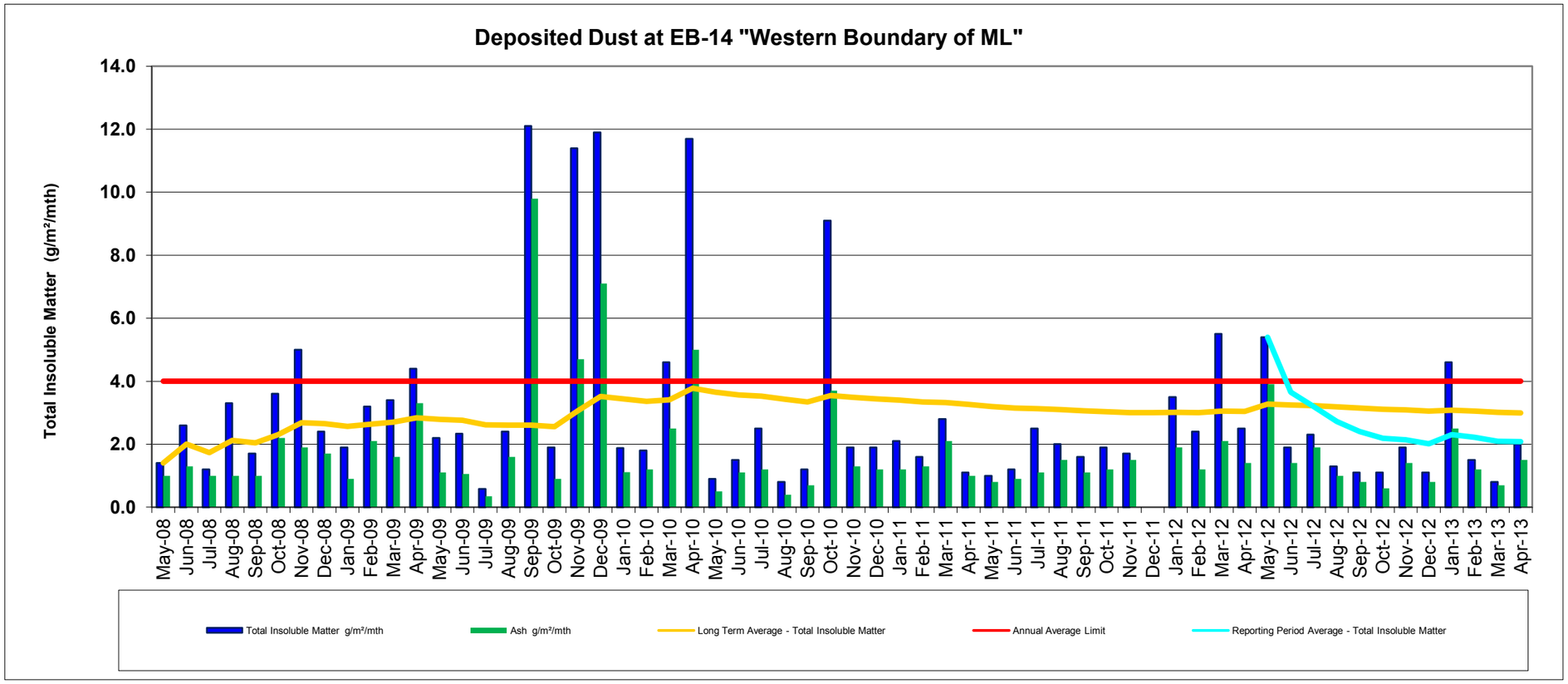


Deposited Dust EB-14 "Western Boundary of ML"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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		3.2	4.0	0.8	No field observations
EN1101448-006	EB-14	20-Jun-11	Jun-11	ALS Acirl	0915	1200	1.2		3.1	4.0	0.9	Plant Material
EN1101812-006	EB-14	19-Jul-11	Jul-11	ALS Acirl	1030	100	2.5		3.1	4.0	1.1	Insects, plant material
EN1102301-006	EB-14	17-Aug-11	Aug-11	ALS Acirl	0925	100	2.0		3.1	4.0	1.5	Insects, Plant material
EN1102773-006	EB-14	16-Sep-11	Sep-11	ALS Acirl	1010	700	1.6		3.1	4.0	1.1	Insects
EN1103124-006	EB-14	17-Oct-11	Oct-11	ALS Acirl	0955	1400	1.9		3.0	4.0	1.2	Insects, plant material
EN1103467-006	EB-14	15-Nov-11	Nov-11	ALS Acirl	1010	600	1.7		3.0	4.0	1.5	Insects, Plant material
EN1200212-001	EB-14	6-Jan-11	Dec-11	ALS Acirl					3.0	4.0		Bottle Broken
EN1200242-006	EB-14	13-Jan-12	Jan-12	ALS Acirl	1010	600	3.5		3.0	4.0	1.9	Insects, Plant material
EN1200606-006	EB-14	13-Feb-12	Feb-12	ALS Acirl	1230	2500	2.4		3.0	4.0	1.2	Insects, Plant material
EN1201026-006	EB-14	15-Mar-12	Mar-12	ALS Acirl	1010	500	5.5		3.1	4.0	2.1	Insects, Plant material

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1201453-006	EB-14	16-Apr-12	Apr-12	ALS Acirl	0940	100	2.5		3.0	4.0	1.4	Insects, Bird droppings, Plant material
EN1201862-006	EB-14	17-May-12	May-12	ALS Acirl	0930	300	5.4	5.4	3.3	4.0	3.9	Insects
EN1202258-006	EB-14	18-Jun-12	Jun-12	ALS Acirl	1100	300	1.9	3.7	3.2	4.0	1.4	Plant material
EN1202679-006	EB-14	18-Jul-12	Jul-12	ALS Acirl	1020	1400	2.3	3.2	3.2	4.0	1.9	Insects, Plant material
EN1203136-006	EB-14	17-Aug-12	Aug-12	ALS Acirl	1010	100	1.3	2.7	3.2	4.0	1.0	Insects, Plant material
EN1203585-006	EB-14	18-Sep-12	Sep-12	ALS Acirl	1020	100	1.1	2.4	3.1	4.0	0.8	Insects
EN1203993-006	EB-14	18-Oct-12	Oct-12	ALS Acirl	1045	200	1.1	2.2	3.1	4.0	0.6	Insects, Bird Droppings-lots of insects
EN1204413-006	EB-14	19-Nov-12	Nov-12	ALS Acirl	1000	100	1.9	2.1	3.1	4.0	1.4	Insects, Bird Droppings
EN1204841-006	EB-14	19-Dec-12	Dec-12	ALS Acirl	0920	50	1.1	2.0	3.0	4.0	0.8	Insects
EN1300226-006	EB-14	17-Jan-13	Jan-13	ALS Acirl	0940		4.6	2.3	3.1	4.0	2.5	
EN1300226-006	EB-14	18-Feb-13	Feb-13	ALS Acirl	1015	1800	1.5	2.2	3.0	4.0	1.2	Insects, plant material
EN1301077-006	EB-14	18-Mar-13	Mar-13	ALS Acirl	1010	600	0.8	2.1	3.0	4.0	0.7	Insects, plant material
EN1301077-006	EB-14	17-Apr-13	Apr-13	ALS Acirl	1115	200	2.0	2.1	3.0	4.0	1.5	Insects, plant material

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

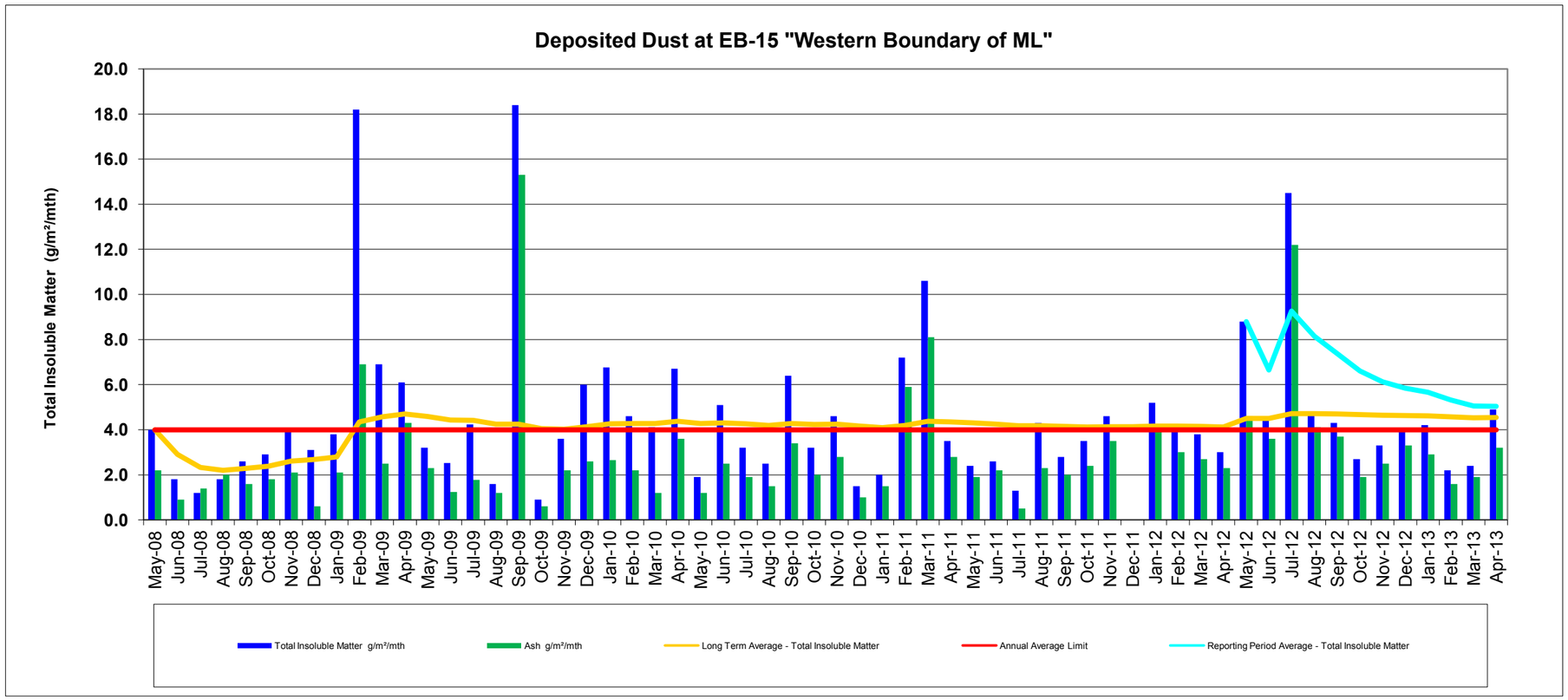


Deposited Dust EB-15 "Western Boundary of ML"

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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		4.3	4.0	1.9	
EN1101448-007	EB-15	20-Jun-11	Jun-11	ALS Acirl	0910	1200	2.6		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		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		4.2	4.0	2.3	Bird droppings
EN1102773-007	EB-15	16-Sep-11	Sep-11	ALS Acirl	0950	800	2.8		4.1	4.0	2.0	Insects, Plant material
EN1103124-007	EB-15	17-Oct-11	Oct-11	ALS Acirl	0940	1500	3.5		4.1	4.0	2.4	Insects, plant material
EN1103467-007	EB-15	15-Nov-11	Nov-11	ALS Acirl	1000	600	4.6		4.1	4.0	3.5	Insects, Plant material
EN1200212-002	EB-15	6-Jan-11	Dec-11	ALS Acirl					4.1	4.0		Bottle Broken in transit
EN1200242-007	EB-15	13-Jan-12	Jan-12	ALS Acirl	1030	600	5.2		4.2	4.0	3.9	Insects, Plant material
EN1200606-007	EB-15	13-Feb-12	Feb-12	ALS Acirl	1245	2500	4.0		4.2	4.0	3.0	Insects, Plant material
EN1201026-007	EB-15	15-Mar-12	Mar-12	ALS Acirl	0930	500	3.8		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		4.1	4.0	2.3	Insects, Bird droppings, Plant material
EN1201862-007	EB-15	17-May-12	May-12	ALS Acirl	0915	450	8.80	8.8	4.5	4.0	5	Insects, Bird droppings

Sample Number	Sample Location	Sample Date	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
EN1202258-007	EB-15	18-Jun-12	Jun-12	ALS Acirl	1045	450	4.50	6.7	4.5	4.0	4	Insects, Plant material
EN1202679-007	EB-15	18-Jul-12	Jul-12	ALS Acirl	0950	1400	14.50	9.3	4.7	4.0	12	Insects, Bird droppings
EN1203136-007	EB-15	17-Aug-12	Aug-12	ALS Acirl	0950	100	4.80	8.2	4.7	4.0	4	Plant material-IBC construction & digging near gauge
EN1203585-007	EB-15	18-Sep-12	Sep-12	ALS Acirl	0950	100	4.30	7.4	4.7	4.0	4	Insects
EN1203993-007	EB-15	18-Oct-12	Oct-12	ALS Acirl	1035	250	2.70	6.6	4.7	4.0	2	Insects-construction adjacent to gauge
EN1204413-007	EB-15	19-Nov-12	Nov-12	ALS Acirl	0940	100	3.30	6.1	4.6	4.0	3	Insects, Bird Droppings
EN1204841-007	EB-15	19-Dec-12	Dec-12	ALS Acirl	0915	50	3.90	5.9	4.6	4.0	3	Insects, plant material
EN1300226-007	EB-15	17-Jan-13	Jan-13	ALS Acirl	0920		4.20	5.7	4.6	4.0	3	
EN1300226-007	EB-15	18-Feb-13	Feb-13	ALS Acirl	1030	2000	2.20	5.3	4.6	4.0	2	Insects, plant material
EN1301077-007	EB-15	18-Mar-13	Mar-13	ALS Acirl	1020	800	2.40	5.1	4.5	4.0	2	Insects, plant material
EN1301077-007	EB-15	17-Apr-13	Apr-13	ALS Acirl	1130	200	4.90	5.0	4.5	4.0	3	Insects, bird droppings, plant material

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



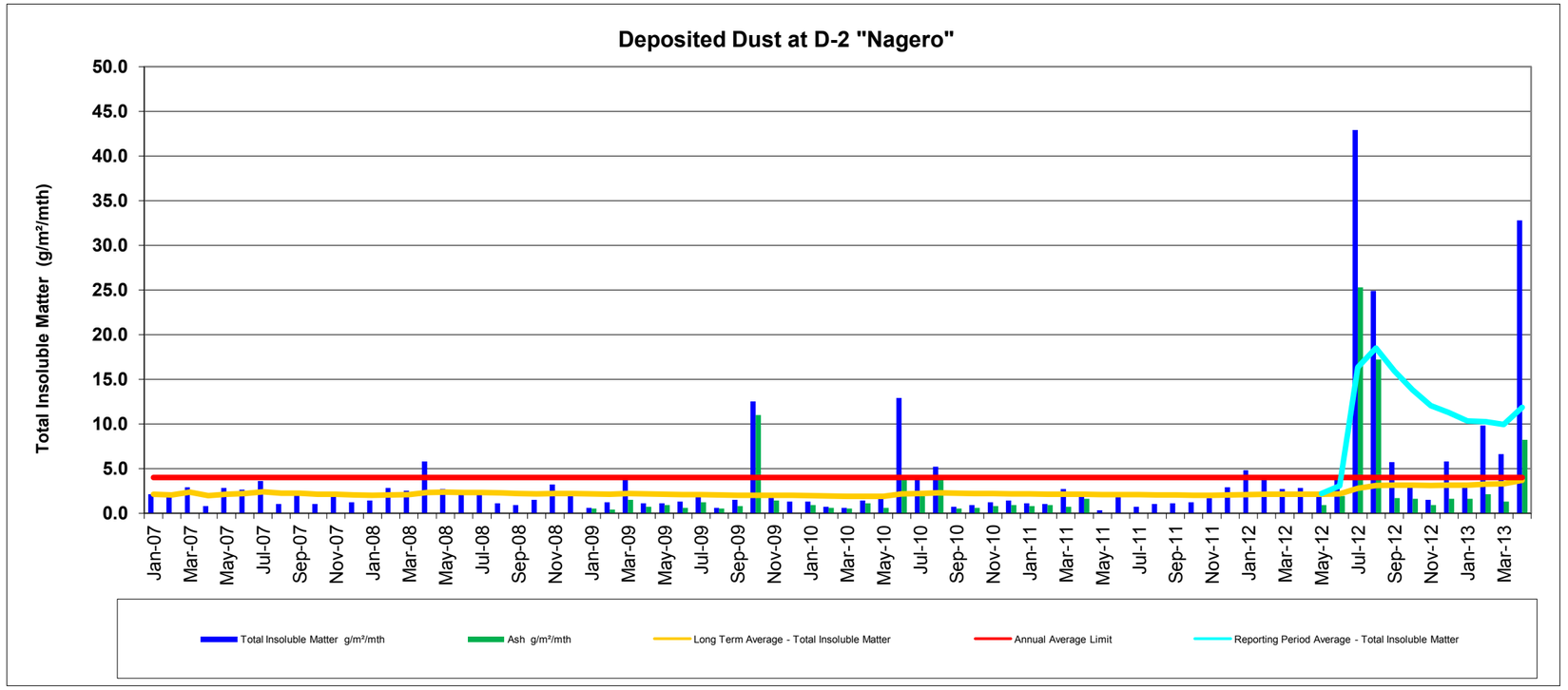
Deposited Dust D-2 "Nagero"

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/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	
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		2.1	4.0		
D-2	Jun-11	IBC			1.8		2.1	4.0		

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
D-2	Jul-11	IBC			0.7		2.1	4.0		
D-2	Aug-11	IBC			1		2.0	4.0		
D-2	Sep-11	IBC			1.1		2.0	4.0		
D-2	Oct-11	IBC			1.2		2.0	4.0		
D-2	Nov-11	IBC			1.7		2.0	4.0		
D-2	Dec-11	IBC			2.9		2.0	4.0		
D-2	Jan-12	IBC			4.8		2.1	4.0		
D-2	Feb-12	IBC			3.9		2.1	4.0		
D-2	Mar-12	IBC			2.7		2.1	4.0		
D-2	Apr-12	IBC			2.8		2.1	4.0		
D-2	May-12	IBC			2.2	2.2	2.1	4.0	0.9	
D-2	Jun-12	IBC			3.9	3.1	2.1	4.0	1.9	
D-2	Jul-12	IBC			42.9	16.3	2.8	4.0	25.3	
D-2	Aug-12	IBC			24.9	18.5	3.1	4.0	17.2	
D-2	Sep-12	IBC			5.7	15.9	3.1	4.0	1.7	
D-2	Oct-12	IBC			3.1	13.8	3.1	4.0	1.6	
D-2	Nov-12	IBC			1.5	12.0	3.1	4.0	0.9	
D-2	Dec-12	IBC			5.8	11.3	3.1	4.0	1.6	
D-2	Jan-13	IBC			2.8	10.3	3.1	4.0	1.6	
D-2	Feb-13	IBC			9.8	10.3	3.2	4.0	2.1	
D-2	Mar-13	IBC			6.6	9.9	3.3	4.0	1.3	
D-2	Apr-13	IBC			32.8	11.8	3.7	4.0	8.2	

* 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.

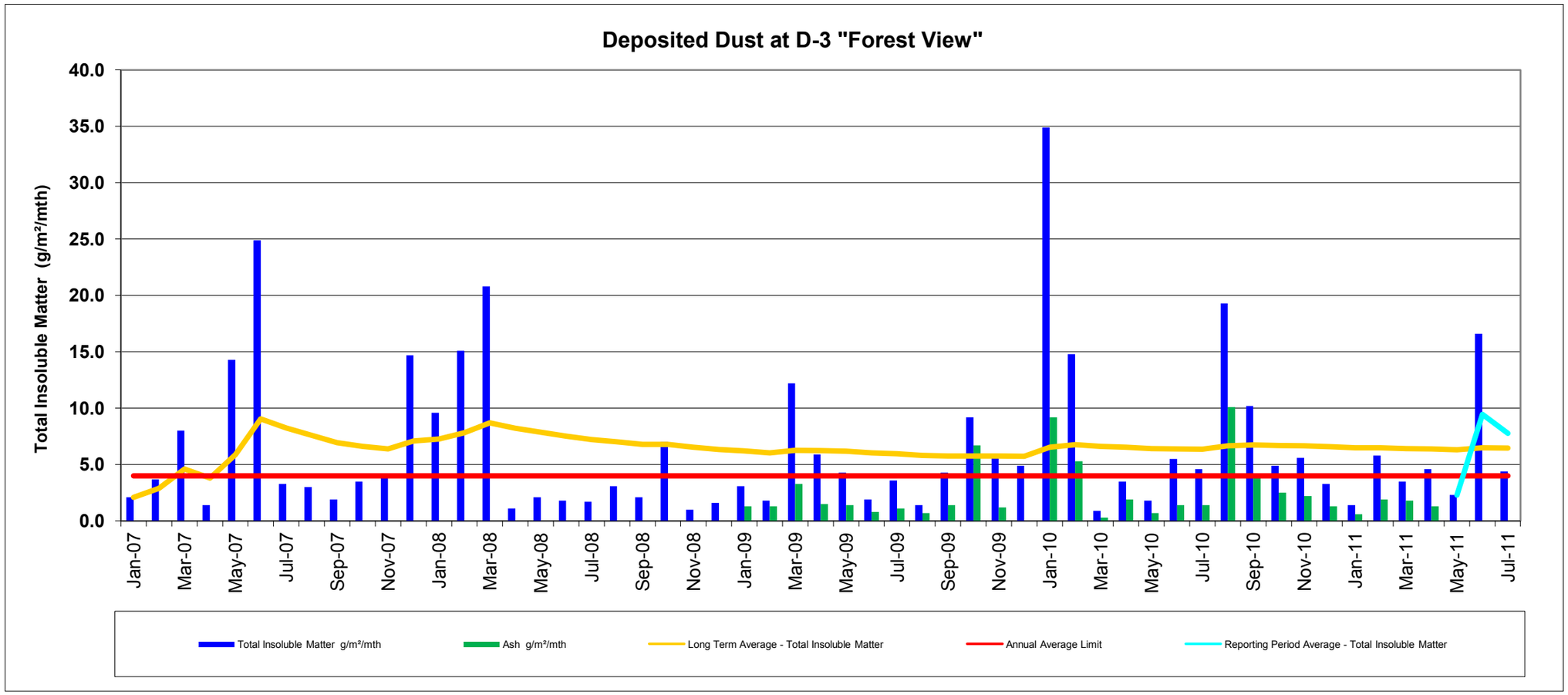
Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
D-3	Jan-07	IBC			2.1		2.1	4.0		
D-3	Feb-07	IBC			3.7		2.9	4.0		
D-3	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	

TARRAWONGA COAL PTY LTD

Deposited Dust Data - D-3

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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).



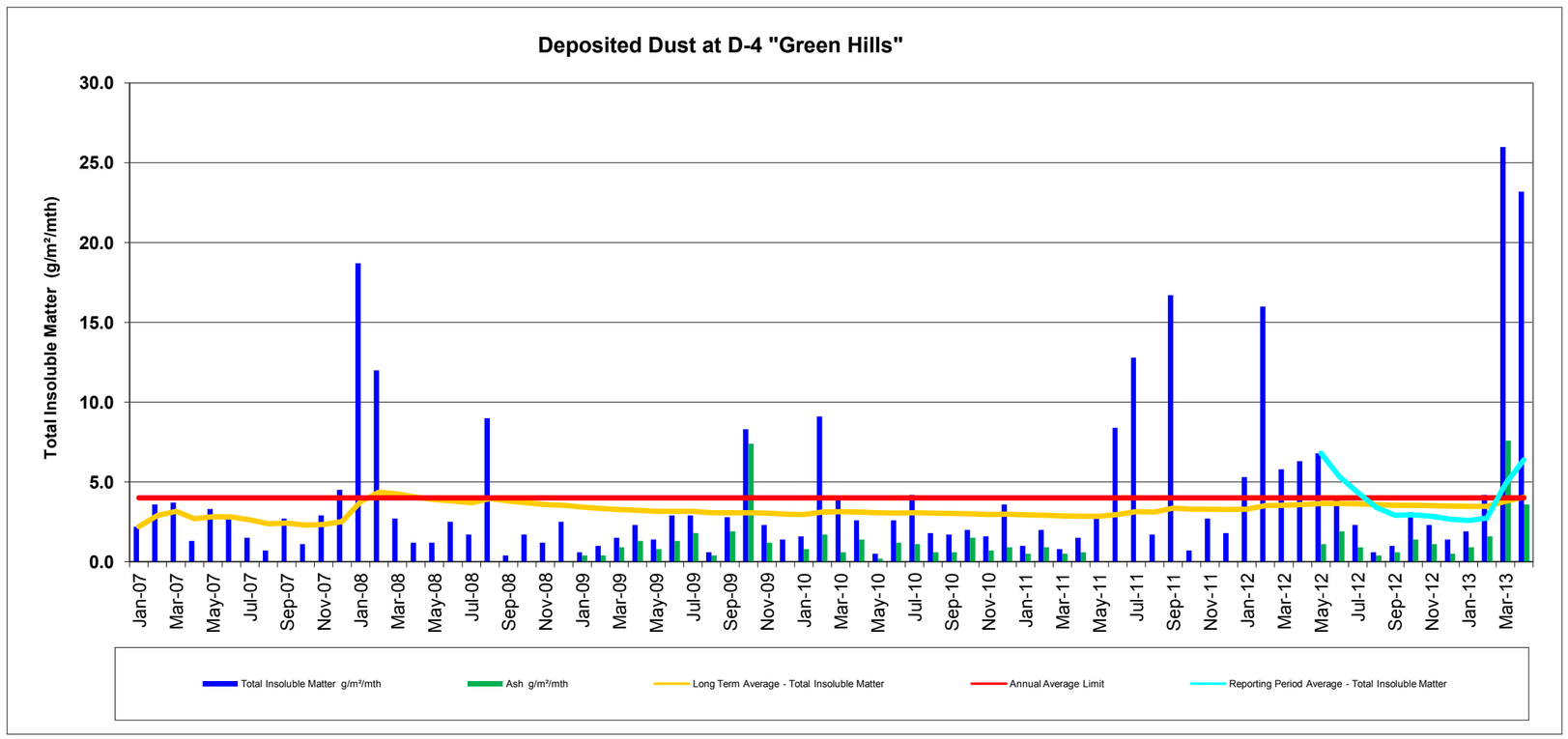
Deposited Dust D-4 "Green Hills"

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/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	
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	4.0		
D-4	Jun-11	IBC			8.4		3.0	4.0		
D-4	Jul-11	IBC			12.8		3.1	4.0		
D-4	Aug-11	IBC			1.7		3.1	4.0		

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
D-4	Sep-11	IBC			16.7		3.4	4.0		
D-4	Oct-11	IBC			0.7		3.3	4.0		
D-4	Nov-11	IBC			2.7		3.3	4.0		
D-4	Dec-11	IBC			1.8		3.3	4.0		
D-4	Jan-12	IBC			5.3		3.3	4.0		
D-4	Feb-12	IBC			16		3.5	4.0		
D-4	Mar-12	IBC			5.8		3.5	4.0		
D-4	Apr-12	IBC			6.3		3.6	4.0		
D-4	May-12	IBC			6.8	6.8	3.6	4.0	1.1	
D-4	Jun-12	IBC			3.9	5.4	3.6	4.0	1.9	
D-4	Jul-12	IBC			2.3	4.3	3.6	4.0	0.9	
D-4	Aug-12	IBC			0.6	3.4	3.6	4.0	0.4	
D-4	Sep-12	IBC			1	2.9	3.5	4.0	0.6	
D-4	Oct-12	IBC			3.1	3.0	3.5	4.0	1.4	
D-4	Nov-12	IBC			2.3	2.9	3.5	4.0	1.1	
D-4	Dec-12	IBC			1.4	2.7	3.5	4.0	0.5	
D-4	Jan-13	IBC			1.9	2.6	3.5	4.0	0.9	
D-4	Feb-13	IBC			4.2	2.8	3.5	4.0	1.6	
D-4	Mar-13	IBC			26	4.9	3.8	4.0	7.6	
D-4	Apr-13	IBC			23.2	6.4	4.0	4.0	3.6	

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



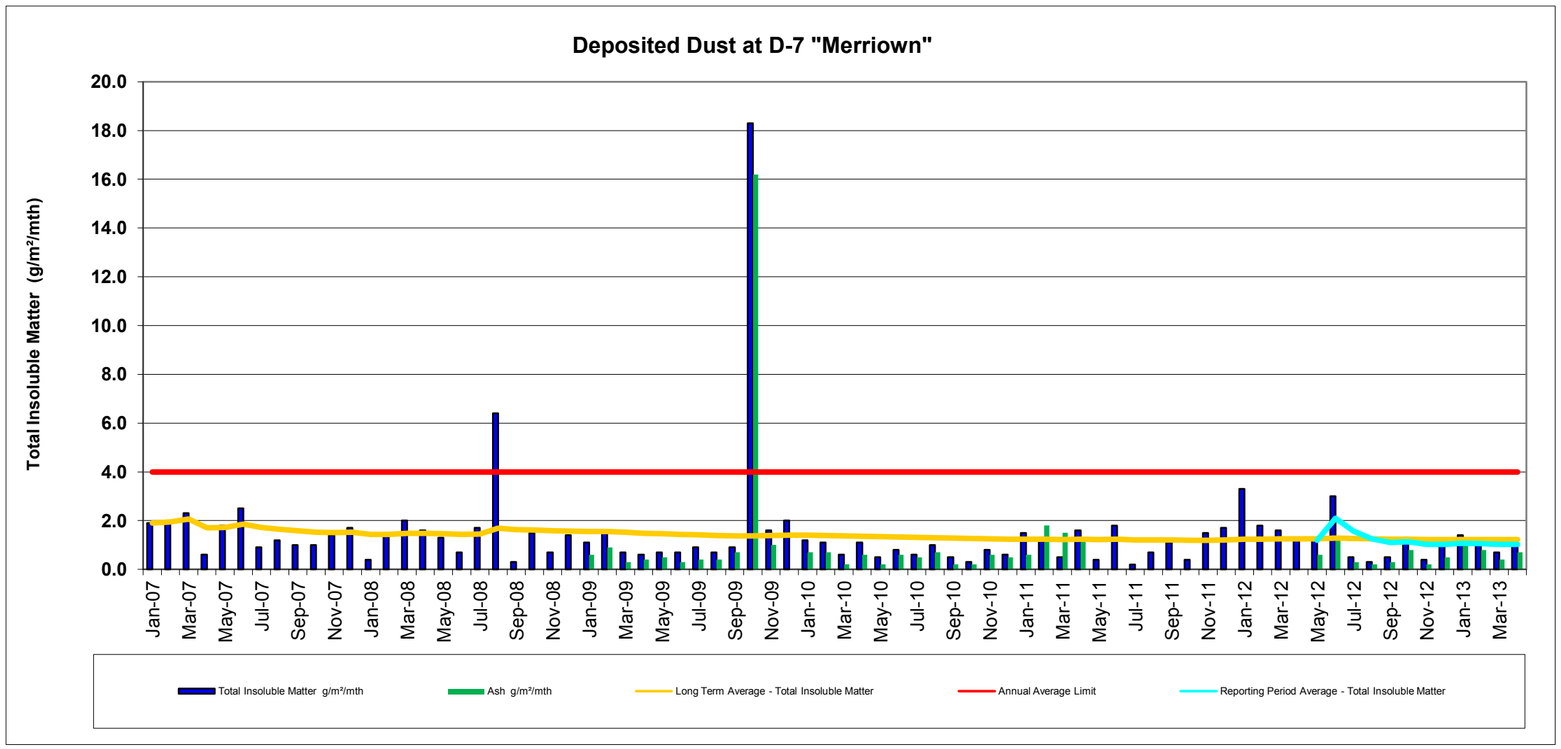
Deposited Dust D-7 "Merriown"

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/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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	
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		1.2	4.0		
D-7	Jun-11	IBC			1.8		1.2	4.0		
D-7	Jul-11	IBC			0.2		1.2	4.0		
D-7	Aug-11	IBC			0.7		1.2	4.0		

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
D-7	Sep-11	IBC			1.1		1.2	4.0		
D-7	Oct-11	IBC			0.4		1.2	4.0		
D-7	Nov-11	IBC			1.5		1.2	4.0		
D-7	Dec-11	IBC			1.7		1.2	4.0		
D-7	Jan-12	IBC			3.3		1.2	4.0		
D-7	Feb-12	IBC			1.8		1.2	4.0		
D-7	Mar-12	IBC			1.6		1.3	4.0		
D-7	Apr-12	IBC			1.2		1.3	4.0		
D-7	May-12	IBC			1.2	1.2	1.3	4.0	0.6	
D-7	Jun-12	IBC			3	2.1	1.3	4.0	1.3	
D-7	Jul-12	IBC			0.5	1.6	1.3	4.0	0.3	
D-7	Aug-12	IBC			0.3	1.3	1.3	4.0	0.2	
D-7	Sep-12	IBC			0.5	1.1	1.2	4.0	0.3	
D-7	Oct-12	IBC			1.3	1.1	1.2	4.0	0.8	
D-7	Nov-12	IBC			0.4	1.0	1.2	4.0	0.2	
D-7	Dec-12	IBC			1	1.0	1.2	4.0	0.5	
D-7	Jan-13	IBC			1.4	1.1	1.2	4.0	1.0	
D-7	Feb-13	IBC			1	1.1	1.2	4.0	0.8	
D-7	Mar-13	IBC			0.7	1.0	1.2	4.0	0.4	
D-7	Apr-13	IBC			1.1	1.0	1.2	4.0	0.7	

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



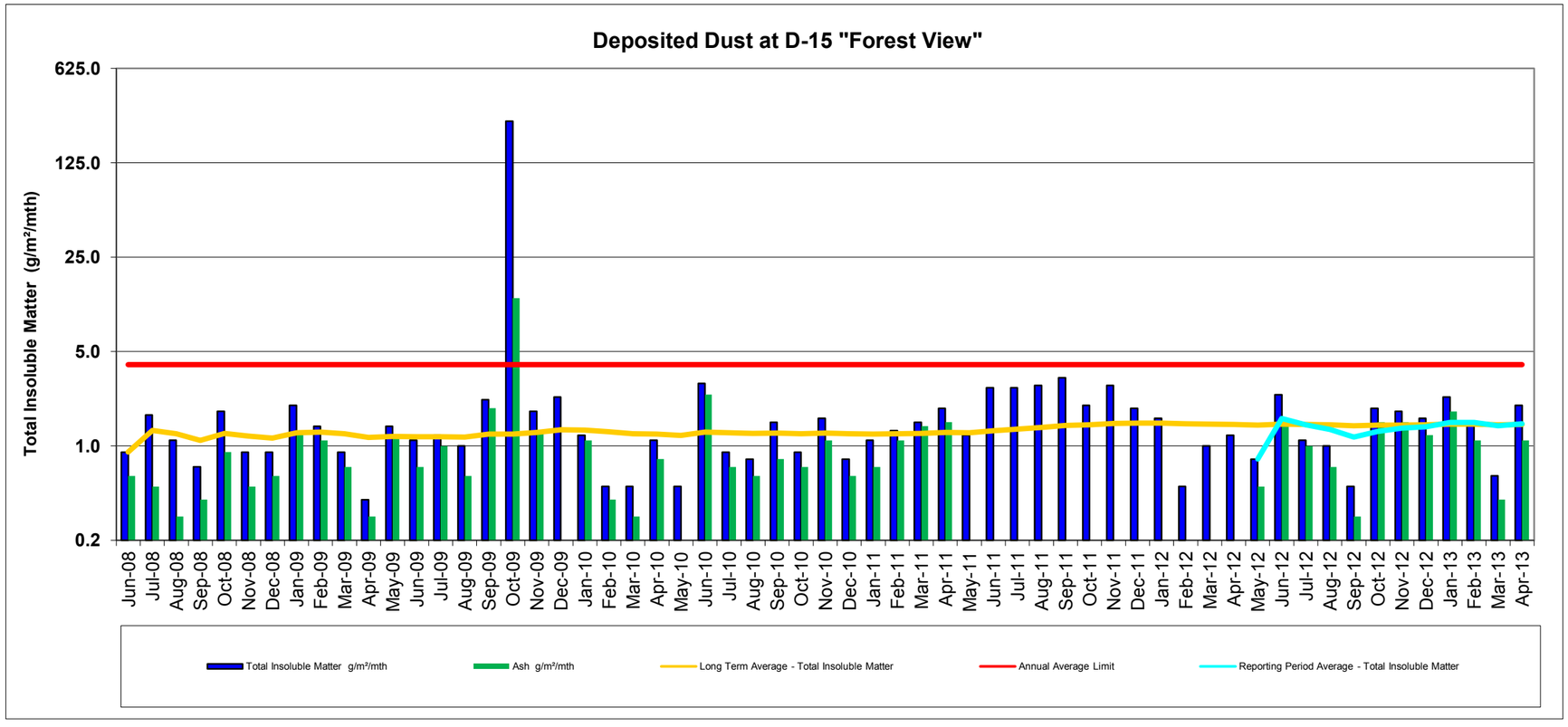
Deposited Dust D-15 "Forest View"

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/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/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		1.3	4.0		
D-15	Jun-11	IBC			2.7		1.3	4.0		
D-15	Jul-11	IBC			2.7		1.3	4.0		
D-15	Aug-11	IBC			2.8		1.4	4.0		
D-15	Sep-11	IBC			3.2		1.4	4.0		
D-15	Oct-11	IBC			2		1.4	4.0		
D-15	Nov-11	IBC			2.8		1.5	4.0		
D-15	Dec-11	IBC			1.9		1.5	4.0		
D-15	Jan-12	IBC			1.6		1.5	4.0		
D-15	Feb-12	IBC			0.5		1.5	4.0		
D-15	Mar-12	IBC			1		1.4	4.0		
D-15	Apr-12	IBC			1.2		1.4	4.0		

Sample Location	Sample Month	Sampler	Time: (d)	Volume Collected ml	Total Insoluble Matter g/m²/mth	Reporting Period Average - Total Insoluble Matter	Long Term Average - Total Insoluble Matter	Annual Average Limit	Ash g/m²/mth	Comment
D-15	May-12	IBC			0.8	0.8	1.4	4.0	0.5	
D-15	Jun-12	IBC			2.4	1.6	1.4	4.0	1.5	
D-15	Jul-12	IBC			1.1	1.4	1.4	4.0	1.0	
D-15	Aug-12	IBC			1	1.3	1.4	4.0	0.7	
D-15	Sep-12	IBC			0.5	1.2	1.4	4.0	0.3	
D-15	Oct-12	IBC			1.9	1.3	1.4	4.0	1.5	
D-15	Nov-12	IBC			1.8	1.4	1.4	4.0	1.5	
D-15	Dec-12	IBC			1.6	1.4	1.4	4.0	1.2	
D-15	Jan-13	IBC			2.3	1.5	1.4	4.0	1.8	
D-15	Feb-13	IBC			1.5	1.5	1.5	4.0	1.1	
D-15	Mar-13	IBC			0.6	1.4	1.4	4.0	0.4	
D-15	Apr-13	IBC			2	1.5	1.4	4.0	1.1	

* 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				
ES1003581-006	25 February 2010	1530	SD2	8.37	276	15	<5	<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
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		
ES1205971-001	9 March 2012	10:05	SB23 Pre-floc	7.84	148	70	4	<5				
ES1205971-002	10 March 2012	10:00	SB23 24hrs post floc	7.82	159	60	16	<5				
ES1205971-003	11 March 2012	9:30	SB23 48hrs post floc	7.75	158	61	16	<5				
ES1205277-001	2 March 2012	10:05	SD16 Pre-floc	8.17	351	16	2	<5				
ES1205277-002	2 March 2012	10:25	SB14 Pre-floc	8.13	452	50	5	<5				
ES1210729-001	2 May 2012	11:40	SD16	8.37	388	14	2	<5	<0.001	<0.001	0.008	<0.01
ES1210729-002	2 May 2012	12:00	SB14	9.08	1060	57	5	<5	<0.001	0.002	0.004	<0.01
ES1210729-003	2 May 2012	10:30	SD17	8.74	602	8	6	<5	<0.001	0.001	0.006	<0.01
ES1210729-004	2 May 2012	10:45	SB16	7.87	456	6	1	<5	0.001	0.001	0.013	<0.01
ES1210729-005	2 May 2012	10:00	VOID	8.26	2080	10	1	<5	0.002	0.009	0.048	<0.01
ES1210729-006	2 May 2012	11:15	GCR1	7.99	689	104	35	<5	<0.001	0.003	0.002	<0.01
ES1211990-001	11 May 2012	16:00	SB23		246	18	8	<5				
ES1212919-001	22 May 2012	1:50	SB24		373	42	11	<5				
ES1212919-002	22 May 2012	2:30	SB14		980	42	5	<5				
ES1212919-003	22 May 2012	2:55	SD16		400	35	2	<5				
ES1212919-004	22 May 2012	3:05	SD9		133	36	8	<5				
ES1212919-005	22 May 2012	3:25	SD17		618	20	6	<5				
ES1213239-001	28 May 2012	7:45	SD17	8.58	558	16	7	<5				
ES1213239-002	28 May 2012	8:05	SD9	7.97	136	37	8	<5				
ES1213239-003	28 May 2012	8:25	SB14	8.21	661	53	5	<5				
ES1213239-004	28 May 2012	8:40	SB24	8.21	351	42	11	<5				
ES1215160-001	18 June 2012	9:30	SB14	8.05	513	92	5	<5				
ES1215160-002	18 June 2012	9:30	SD16	8.13	445	25	4	<5				
ES1215160-003	18 June 2012	9:30	SD9	7.95	137	23	8	<5				
ES1215160-004	18 June 2012	9:30	SD17	8.54	533	14	6	<5				
ES1215160-005	18 June 2012	9:30	Canyon SD	8.13	304	87	9	<5				
ES1217223-001	11 July 2012	4:33	NCD	7.19	174	150	19	<5				
ES1218109-001	20 July 2012	11:30	SB23-After Floc	7.92	254	16	3	<5				
ES1218108-001	23 July 2012	11:00	SD16-Background info	8.02	450	25	3	<5				
ES1218108-002	23 July 2012	11:15	SD14-After floc	7.94	590	35	3	<5				
ES1219866-001	14 August 2012	10:40	SD16	8.1	454	<5	3	<5	<0.001	0.001	0.008	<0.01
ES1219866-002	14 August 2012	11:00	SB14	8.11	646	<5	7	<5	<0.001	0.002	0.007	<0.01
ES1219866-003	14 August 2012	10:00	SD17	8.08	465	<5	5	<5	<0.001	0.001	0.004	<0.01
ES1219866-004	14 August 2012	10:15	SB16	7.96	561	<5	2	<5	0.003	0.002	0.02	<0.01

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
ES1219866-005	14 August 2012	9:40	VOID	8.39	2220	<5	2	<5				
ES1219866-006	14 August 2012	11:40	GCR1	7.82	190	16	19	<5	<0.001	0.002	<0.001	<0.01
ES1219866-007	14 August 2012	11:20	GCR2	7.72	182	12	17	<5	<0.001	0.002	<0.001	<0.01
ES1227081-001	14 November 2012	11:10	SD16	9.84	679	100	6	<5	<0.001	0.004	0.01	<0.01
ES1227081-002	14 November 2012	10:40	SB14	8.85	890	24	3	<5	<0.001	<0.001	0.006	<0.01
ES1227081-003	14 November 2012	10:15	SD17	8.7	700	14	4	<5	<0.001	<0.001	0.006	<0.01
ES1227081-004	14 November 2012	10:00	SB16	8.69	707	76	1	<5	0.004	0.002	0.026	<0.01
ES1227081-005	14 November 2012	9:30	VOID	8.62	2870	10	<1	<5				
ES1302567-001	1 February 2013	15:10	SD9 pre floc	7.44	262	43	7	<5				
ES1302567-002	1 February 2013	13:10	SD9 post floc	7.39	267	82	8	<5				
ES1303969-001	20 February 2013	15:00	SD9-Pre Discharge	7.89	275	18	8	<5				
ES1305311-001	6 March 2013	10:40	SD16	7.69	252	288	5	<5	<0.001	0.005	0.001	<0.01
ES1305311-002	6 March 2013	11:00	SB14	7.81	378	99	4	<5	<0.001	0.001	0.002	<0.01
ES1305311-003	6 March 2013	10:20	SD17	8	229	91	4	<5	<0.001	<0.001	0.002	<0.01
ES1305311-004	6 March 2013	9:30	SB16A	8.01	365	240	4	<5	0.002	0.004	0.013	<0.01
ES1305311-005	6 March 2013	9:50	VOID	8.23	1620	16	2	<5				
ES1305311-006	6 March 2013	11:20	GCR1	7.43	126	106	5	<5	<0.001	<0.001	<0.001	<0.01
ES1305311-007	6 March 2013	11:40	GCR2	7.42	173	48	16	<5	<0.001	0.002	<0.001	<0.01

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	

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
ES1015611-001	BCD	3 August 2010	1115	8.03	101	32	<5	28	
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	

TARRAWONGA COAL PTY LTD

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
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 Feburary 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 Feburary 2012	1047	8.01	696	35	<5	11	
ES1204080-003	GCU	21 Feburary 2012	1100	7.59	401	12	<5	38	
ES1204080-004	SB14	21 Feburary 2012	1115	8.07	661	193	<5	7	
ES1204080-005	SD16	21 Feburary 2012	1125	7.64	339	59	<5	5	
ES1204080-006	SB23	21 Feburary 2012	1140	7.6	137	396	<5	15	
ES1204197-001	BCD	21 Feburary 2012	1400	7.7	471	5	<5	24	
ES1204197-002	NCD	21 Feburary 2012	1425	8.17	903	29	<5	11	
ES1204197-003	NCU	21 Feburary 2012	1500	7.79	379	<5	<5	23	
ES1214029-001	NCD	4 June 2012	1100	7.67	345	30	<5	14	No Discharge

TARRAWONGA COAL PTY LTD

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
ES1217574-001	GCD	12 July 2012	0520	7.56	166	79	<5	23	Not reportable - rainfall exceeded 38.4mm (45.4mm)
ES1217574-002	GCU	12 July 2012	0540	7.04	103	388	<5	24	
ES1217574-003	BCD	12 July 2012	0610	7.2	147	122	<5	25	
ES1217577-001	SD9	12 July 2012	1545	7.6	127	37	<5	10	
ES1217577-002	SB23	12 July 2012	1600	7.86	234	910	<5	7	
ES1217577-003	SB14	12 July 2012	1625	8.07	448	932	<5	5	
ES1302188-001	NCD	29 January 2013	1155	6.73	187	88	38	<5	No Discharge
ES1302188-002	NCU	29 January 2013	1211	6.9	158	7	40	<5	
ES1302188-003	BCD	29 January 2013	1225	6.68	167	45	78	<5	
ES1302188-004	GCD	29 January 2013	1240	7.01	143	116	21	<5	
ES1302188-005	GCU	29 January 2013	1252	6.9	112	32	19	<5	
ES1302188-006	BCU	29 January 2013	1312	6.99	188	72	26	<5	
ES1305146-001	SB23	4 March 2013	1130	7.92	174	752	<5	4	Not reportable - rainfall exceeded 38.4mm (60.4mm)

Appendix 6

GROUNDWATER MONITORING DATA

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**						**1500**	**400**		**4000**			
THUIN																																													
MW1	2-Jun-06		7.77	8.50	7.48				0.006															6330	92	138	1710	43		2680	424				772										
MW1	11-Jan-07		8.49	9.22	7.12				0.001			<0.0001	<0.005		<0.006		<0.001		0.026		0.11	<0.0001		2410	26	33	554	18		346	145				684										
MW1	18-Apr-07		6.77	7.50																																									
MW1	9-Jul-07		7.23	7.96	7.30	2440	17.4		<0.001			<0.0001	<0.005		0.0005		<0.001		0.008		0.09	<0.0001		2500	21	29	504	25		385	143				614						3.1	<20	380	
MW1	10-Jul-07		7.18	7.91																																								
MW1	18-Jul-07		7.18	7.91																																								
MW1	7-Aug-07	1250	7.01	7.74																																								
MW1	22-Aug-07	1355	6.93	7.66																																								
MW1	5-Sep-07	1005	6.97	7.70																																								
MW1	24-Sep-07	1320	6.93	7.66																																								
MW1	11-Oct-07	1110	6.91	7.64																																								
MW1	26-Nov-07	1400	6.89	7.62																																								
MW1	29-Jan-08	1430	6.82	7.55																																								
MW1	4-Mar-08	1210	6.87	7.60																																								
MW1	23-Apr-08	1240	6.94	7.67	7.30	3100	21.3		<0.001			<0.00005	<0.01		0.002		0.0036		0.01		0.007	0.0002		3120	46	50	614	29		567	247				665								<0.025	0.027	
MW1	21-Aug-08	1251	7.00	7.73																																								
MW1	29-Oct-08	1615	7.07	7.82	7.80	3430	21.6		0.001			0.00023	0.015		0.13		0.37		0.03		0.22	<0.0001		3500	44	51	670	32		680	210				690								<0.025	<0.100	
MW1	29-Jan-09	1030	7.08	7.73																																								
MW1	17-Jun-09			7.87	7.20	5470	19.8		0.001	0.091	<0.001	<0.0001	0.013	0.001	0.047	0.71	0.008	0.103	0.009	<0.01	0.019	<0.0001		3870	46	61	762	28	41.2	777	167	<1	<1	725	725	39.9	1.58	<0.01				2320			
MW1	11-Sep-09	1344	7.23	7.90																																								
MW1	14-Dec-09	1000	7.23	7.90	7.5	4670	17.5	<0.01	0.001				<0.005		0.014	<0.05	0.001	0.131	0.038		0.048	<0.0001	7.83	4510	70	95	875	28	50.1	882	234	<1	<1	780	780	45.3	4.99		<0.01	0.2	0.2				
MW1	25-Feb-10	1025	7.17	7.84																																								
MW1	11-May-10	1045	7.46	8.13	7.56	4330	22.6		0.001	0.075	<0.001	0.0001	0.002	0.002	0.011	0.88	0.005	0.204	0.009	<0.01	0.012	<0.0001		4090	43	60	779	26	41.7	795	229	<1	<1	694	694	41	0.75	0.16				1850			
MW1	30-Aug-10	1010	7.47	8.14	7.47	3890	21.5																																						
MW1	9-Nov-10	1050	7.45	8.12	7.06	3170	24.6																																						
MW1	10-Mar-11	1310	7.38	8.05	7.1	3280	23.7	0.04	0.002				0.003		0.063	0.3	0.006	0.035	0.006		0.016	<0.0001	7.26	3650	44	62	771	29	41.6	839	210	<1	<1	658	658	41.2	0.49		<0.01	0.09	0.09				
MW1	6-Jun-11	1110	7.20	7.87	7.2	3110	19.9																																						
MW1	6-Sep-11	1050	7.19	7.86	7.09	3200	22.5	0.1	0.003	0.057	<0.001	0.0001	0.002	0.002	0.019	0.99	0.01	0.193	0.005	<0.01	0.014	<0.0001	7.72	3990	41	56	739	26	39.5	774	246	<1	<1	620	620	39.3	0.12	<0.01	<0.01	0.04	0.04	2080			
MW1	7-Dec-11	1020	7.09	7.76	7.16	3150	20.1																																						
MW1	13-Mar-12	1100	6.90	7.57	7.44	3140	21.9	0.12	<0.001	0.067	<0.001	<0.0001	0.003	<0.001	0.081	0.23	0.001	0.028	0.009	<0.01	0.027	<0.0001	7.78	3590	44	58	758	30	40.7	748	232	<1	<1	629	629	38.5	2.76	<0.01	<0.01	0.12	0.12	2040			
MW1	13-Jun-12	1100	6.53	7.20	7.37	3730	20.3																																						
MW1	4-Sep-12	1220	6.41	7.08	7.44	3340	20.8	0.03	<0.001	0.069	<0.001	<0.0001	0.005	<0.001	0.09	0.2	0.003	0.067	0.007	<0.01	0.067	<0.0001	7.8	3570	39	55	662	26	35.9	676	212	<1	<1	681	681	37.1	1.62	<0.01	<0.01	0.06	0.06	2090			
MW1	27-Nov-12	1020	6.25	6.92	7.54	3140	20.8																																						
MW1	20-Mar-13	1055	6.15	6.82	7.52	3180	21.9	0.05	0.002	0.055	<0.001	<0.0001	0.007	<0.001	0.1	0.25	0.008	0.031	0.016	<0.01	0.125	<0.0001	7.65	3400	35	48	700	25	36.8	575	182	<1	<1	690	690	33.8	4.2	0.08	<0.01	0.1	0.1	1830			
THUIN																																													
MW2	2-Jun-06		3.63	4.40	7				<0.001															5440	132	106	1400	14		2230	475				432										
MW2	11-Jan-07		3.85	4.62	6.8				0.002			0.0001									0.09	<0.0001		511	1	<1	101	1		25.1	9				176										
MW2	18-Apr-07		2.83	3.60																																								
MW2	9-Jul-07		3.39	4.16	7.15	446	18.8		0.002			0.0002	<0.005		0.003		<0.001		0.002		0.233	<0.0001		496	<1	<1	99	1		27.2	11				175						7.89	<20	250	
MW2	10-Jul-07		3.45	4.22																																								
MW2	18-Jul-07		3.52	4.29																																								
MW2	7-Aug-07	1245	3.58	4.35																																								
MW2	22-Aug-07	1350	3.55	4.32																																								
MW2	5-Sep-07	1040	3.57	4.34																																								
MW2	24-Sep-07	1315	3.57	4.34																																								
MW2	11-Oct-07	1105	3.60	4.37																																								
MW2	26-Nov-07	1355	3.91	4.68																																								
MW2	29-Jan-08	1435	3.48	4.25																																								
MW2	4-Mar-08	1200	3.46	4.23																																								
MW2	23-Apr-08	1115	3.73	4.50	7.3	400	19.9		0.005			0.00018	0.11		0.13		0.14		0.15		0.37	0.0004		440	8.9	5.8	99	17		39	10				165								<0.025	<0.1	
MW2	21-Aug-08	1244	3.74	4.51																																								
MW2	29-Oct-08	1655	3.59	4.37	6.9	600	19.2		0.008			0.00007	0.026		0.027		0.061		0.031		0.17	0.0002		620	6.8	7.1	120	6.8		93	27				180								<0.025	<0.100	
MW2	29-Jan-09	1040	3.73	4.51																																								
MW2	17-Jun-09		3.69	4.53	7.7	660	19.1		0.006	0.311	0.004	0.0002	0.025	0.052	0.047	32.6	0.052	1.54	0.041	0.08	0.172	0.0005		602	1	1	128	2	5.76	59	<10	<1	<1	195	195	5.57	1.62	0.1				1540			
MW2	11-Sep-09	1348	4.01	4.8																																								
MW2	14-Dec-09	1100	3.72	4.51	7.7	691	18.3	<0.01	<0.001				<0.001		<0.001	<0.05	<0.001	0.018	<0.001		<0.005	<0.0001	7.5	640	2	1	134	2	6.07	55.3	12.8	<1	<1	202	202	5.86	1.73		<0.01	0.45	0.45				
MW2	25-Feb-10	1029	1.72	2.51																																								
MW2	11-May-10	1115	2.15	2.94	7.61	717	22.3		0.014	0.441	0.006	0.0002	0.071	0.058	0.073	88.3	0.071	1.06	0.094	0.13	0.3	0.0002		618	2	1	129	2	5.84	76.7	24.3	<1	<1	149	149	5.66	1.6	0.01				780			
MW2	30-Aug-10	1020	2.10	2.89	7.4	590	20.5																																						
MW2	9-Nov-10	1040	2.22	3.01	7.32	513	24.1																																						
MW2	10-Mar-11	1330	2.96	3.75	7.31	566	24.2	0.28	0.001				0.001		0.018	0.3	0.002	0.018	0.006		0.045	0.0001	7.23	457	2	2	124	2	5.69	69	24	<1	<1	156	156	5.57	1.02		<0.01	0.07	0.07				
MW2	6-Jun-11	1130	2.86	3.65	7.3	553	20.3																																						
MW2	6-Sep-11	1120	2.95	3.74	6.9	585	19.8	1.93	<0.001	0.016	<0.001	<0.0001	0.002	<0.001	0.005	1.76	0.001	0.028	0.003	<0.01	0.021	<0.0001	7.33	692	3	3	144	2	6.71	92	32	<1	<1	169	169	6.64	0.5	<0.01	<0.01	0.02	0.02	340			
MW2	7-Dec-11	1040	2.71	3.5	7.08	600	19.2																																						
MW2	13-Mar-12	1130	2.38	3.17	7.06	912	22	0.3	<0.001	0.012	<0.001	<0.0001	0.002	<0.001	0.002	0.28	<0.001	0.058	0.004	<0.01	0.01	<0.0001	7.41	1060	12	10	224	4	11.3	164	50	<1	<1	232	232	10.3	4.44	0.03	<0.01	0.05	0.05	640			
MW2	13-Jun-12	1120	3.13	3.92	7.02	1320	20																																						
MW2	4-Sep-12	1250	3.11	3.9	7.07	1260	19.7	3.48	0.001	0.034	<0.001	<0.0001	0.002	0.002	0.009	2.86	0.003	0.145	0.004	<0.01	0.075	0.0002	7.47	1310	20	17	252	5	13.5	221	68	<1	<1	319	319	14	1.99	<0.01	<0.01	0.06	0.06	802			
MW2	27-Nov-12	1035	3.42	4.21	7.29	905	19.1																																						
MW2	20-Mar-13	1115	2.82	3.61	7.39	670	22.7	1.3	0.002	0.022	<0.001	<0.0001	<0.001	0.004	0.036	0.88	0.006	0.293	0.005	<0.01	0.078	0.0002	6.9	686	3	3	150	3	7	95	26	<1	<1	179	179	6.8	1.41	0.04	<0.01	0.05	0.05	376			
NAGERO																																													
MW3	2-Jun-06		15.08		7.65		20		<0.001															1525	25	10	356	4		139	16				642										
MW3	15-Oct-06		15.71		7.85		23.1																	1534																					
MW3	11-Jan-07		15.89		7.66		24.9		<0.001				<0.001		0.006		<0.001		0.004					1600	19	7	381	4		127	4				696										
MW3	9-Jun-07		15.9		7.69		19.7		<0.001			<0.0001	<0.005		<0.001		<0.001		0.01		0.1			1028	15	5	389	3			3				673										
MW3	5-Oct-07		15.6		6.8		19.8																	1710																					
MW3	8-Jan-08		15.01		7.9		23.8																	1620																					
MW3	23-Apr-08		14.05		7.8		23.5																	1740																					
MW3	10-Jul-08		14.08		7.8		19																	1630																					

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
MW3	29-Oct-08		13.85		7.8		22.8																	1770																			
MW3	20-Jan-09		13.3		7.8		21.7																	1770																			
MW3	22-Apr-09		13.78		7.9		21.8																	1780																			
MW3	22-Jul-09		14.13		7.9		21.2																	1780																890			
MW3	12-Nov-10		14.65		8		23.1																	1800																890			
MW3	15-Feb-10		14.24		7.9	1440	21.5																	1440																720			
MW3	16-Apr-10		13.21		8	1440	23.3																	1440																720			
MW3	19-Jul-10		12.7		7.8	1700	20.3		0.002			<0.0001	<0.001		0.003	0.27	<0.001		0.003		0.013		7.93	1730	12	4	479	3	21.8	104	<1	<1	<1	871	871	20.3	3.56	0.17	<0.01	<0.01	<0.01		1020		
MW3	26-Oct-10		12.2		7.83	1730	21.7																																						
MW3	28-Jan-11		11.7		7.35	1750	26.1		0.001			<0.0001	<0.005		<0.001	0.16	<0.001		0.003		0.005		7.6	1740	10	4	436	3	19.8	108	<1	<1	<1	815	815	19.3	1.27	0.33	<0.01	<0.01	<0.01				
MW3	2-May-11		11.92		8.05	1760	22.2																																						
MW3	18-Jul-11		11.95		7.9	1760	20.8		<0.001			0.0001	0.003		<0.001	<0.005	<0.001		0.004		0.017		7.96	1840	11	4	3	454	20.7	104	<1	<1	<1	798	798	18.9	4.55	0.33	<0.01	0.02	0.02	1060			
MW3	24-Oct-11		12.1		8.08	1810	23.5																																						
MW3	18-Jan-12		11.25		6.86	1670	23.6		0.002			<0.0001	0.004		0.001	0.49	<0.001		0.007		0.02		7.63	1690	29	9	5	410	20.2	112	40	<1	<1	715	715	18.3	4.82	0.14	<0.01	<0.01	<0.01				
TARRAWONGA																																												
MW4	2-Jun-06		8.8	9.5	7				0.006															3290	157	118	614	19		905	155				1010									
MW4	9-Sep-06		8.6	9.3																																								
MW4	11-Jan-07		8.67	9.37	7.06				0.004			0.0003	<0.005		0.011		0.029		0.014		0.1	<0.0001		3430	152	103	594	17		787	143				1050									
MW4	9-Jul-07		9.13	9.83	6.82	5410	18.9		0.001			0.0004	<0.005		0.008		0.011		0.011		0.13	<0.0001		5400	211	166	829	16		1480	235				989							0.6	<20	330
MW4	18-Jul-07		9.18	9.88																																								
MW4	7-Aug-07	1305	9.17	9.87																																								
MW4	22-Aug-07	1340	9.17	9.87																																								
MW4	5-Sep-07	1000	9.21	9.91																																								
MW4	24-Sep-07	1310	9.03	9.73																																								
MW4	11-Oct-07	1055	8.97	9.67																																								
MW4	26-Nov-07	1350	9.06	9.76																																								
MW4	29-Jan-08	1425	9.1	9.8																																								
MW4	4-Mar-08	1150	9.17	9.87																																								
MW4	4-Apr-08	1220	9.15	9.85																																								
MW4	23-Apr-08	1015	9.18	9.88	7.1	5160	18		0.004			0.0015	0.042		0.29		0.44		0.16		0.62	0.001		4960	210	158	802	21		1240	317				995								<0.025	<0.1
MW4	21-Aug-08	1230	9.31	10.01																																								
MW4	29-Oct-08	1740	9.28	9.98	7	5740	22.2		0.001			0.00009	0.008		0.008		0.18		0.016		0.2	<0.0001		5800	220	170	840	23		1400	280				980								<0.025	<0.100
MW4	29-Jan-09	0900	9.29	9.96																																								
MW4	17-Jun-09		10.05	6.8	5400	21.5			0.007	1.16	0.003	0.0004	0.023	0.015	0.207	24.9	0.106	1.82	0.055	0.04	0.278	0.0004		4920	189	147	755	16	54.8	1160	156	<1	<1	977	977	55.6	0.8	<0.01				2980			
MW4	28-Aug-09	1215	9.48	10.1																																							
MW4	14-Dec-09	0900	9.52	10.14	6.94	5060	25.6	<0.01	0.001				<0.005		0.001	<0.05	<0.001	0.671	0.016		0.114	<0.0001	7.35	5040	187	149	746	16	54.5	64.1	31.6	<1	<1	783	783	45.3	3.41		0.02	0.45	0.48				
MW4	25-Feb-10	1330	9.68	10.3																																							
MW4	11-May-10	1000	9.66	10.28	7.58	5660	21.8		0.012	1.84	0.006	0.0006	0.033	0.03	0.17	25.3	0.138	1.26	0.096	0.08	0.238	0.0002		5210	149	115	821	14	53	1180	200	<1	<1	942	942	56.2	3.01	0.02				3120			
MW4	30-Aug-10	0940	9.69	10.31	7.33	4740	20																																					
MW4	9-Nov-10	0940	9.61	10.23	6.9	3810	24.4																																					
MW4	10-Mar-11	1130	9.31	9.93	7.18	3060	24.9	0.77	<0.001				0.005		0.084	1.08	0.15	0.188	0.014		0.801	<0.0001	7.37	3460	78	63	741	11	41.6	730	87	<1	<1	893	893	40.2	1.61		0.04	0.38	0.41				
MW4	6-Jun-11	1000	9.42	10.04	7.25	3080	18.7																																					
MW4	6-Sep-11	0950	9.46	10.08	7.12	3196	21	0.65	<0.001	0.146	<0.001	<0.0001	0.001	0.002	0.008	0.7	0.006	0.175	0.006	<0.01	0.418	<0.0001	7.77	3910	74	58	702	10	39.3	700	104	<1	<1	861	861	39.1	0.15	0.2	<0.01	0.43	0.43				
MW4	7-Dec-11	0940	9.35	9.97	7.1	3180	20.5																																					
MW4	13-Mar-12	0940	9.36	9.98	7.6	2580	22.1	0.16	<0.001	0.159	<0.001	<0.0001	<0.001	<0.001	0.01	0.3	<0.001	0.017	0.004	<0.01	0.27	<0.001	8.01	3690	90	64	759	13	43.1	700	103	<1	<1	898	898	39.8	3.92	<0.01	<0.01	0.85	0.85	2130			
MW4	13-Jun-12	0935	9.22	9.84	7.52	3850	20.6																																					
MW4	4-Sep-12	1120	9.11	9.73	7.72	3410	21.8	0.07	<0.001	0.167	<0.001	<0.0001	<0.001	<0.001	0.058	0.44	0.005	0.116	0.007	<0.01	0.513	<0.0001	7.98	3770	82	65	664	12	38.6	674	108	<1	<1	962	962	40.5	2.37	0.02	0.02	1.04	1.06	2170			
MW4	27-Nov-12	0920	8.94	9.56	7.74	3440	21.7																																					
MW4	20-Mar-13	0945	8.92	9.54	7.53	3420	21.6	0.27	0.001	0.156	<0.001	<0.0001	0.011	<0.001	0.05	0.4	0.006	0.158	0.01	<0.01	0.338	<0.0001	7.65	3730	104	73	672	12	40.7	652	49	<1	<1	880	880	37	4.78	0.02	<0.01	1.68	1.68	2020			
TEMPLEMORE																																												
MW5	2-Jun-06		2.78	3.4	6.9				0.006															1530	17	13	373	6		169	138				472									
MW5	9-Sep-06		2.98	3.6																																								
MW5	11-Jan-07		3.56	4.18	7.25				0.003			<0.0001	<0.001		<0.001		<0.001		0.013		0.09			4870	44	49	1070	13		1060	435				836									
MW5	18-Apr-07		2.98	3.6																																								
MW5	10-Jul-07		3.85	4.47	7.59	1360	19.7		0.002			<0.0001	<0.005		0.001		<0.001		0.009		0.111	<0.0001		1930	14	15	13	5		291	161				380							1.32	<20	3490
MW5	18-Jul-07		3.87	4.49																																								
MW5	7-Aug-07	1230	3.92	4.54																																								
MW5	22-Aug-07	1500	3.88	4.5																																								
MW5	5-Sep-07	1200	3.84	4.46																																								
MW5	24-Sep-07	1410	3.86	4.48																																								
MW5	11-Oct-07	1200	3.91	4.53																																								
MW5	26-Nov-07	1515	3.94	4.56																																								
MW5	29-Jan-08	1520	3.06	3.68																																								
MW5	4-Mar-08	1405	3.01	3.63																																								
MW5	4-Apr-08	1200	3.07	3.69																																								
MW5	23-Apr-08	1500	3.15	3.77	7.9	3550	19.9		0.012			0.00017	0.006		0.027		0.054		0.042		0.11	<0.0001		3260	29	33	696	13		553	332				630									
MW5	21-Aug-08	1305	3.10	3.72																																								
MW5	29-Oct-08	1840	2.97	3.59	7.3	3300	19.1		0.008			<0.00005	0.005		0.004		0.018		0.007		0.028	<0.0001		3400	21	24	640	11		560	290				680								<0.025	0.57
MW5	29-Jan-09	1050	3.12	3.73																																								
MW5	17-Jun-09		3.33	4.18	7.7	2390	19.6		0.012	0.054	<0.001	<0.0001	0.002	0.003	0.02	1.66	0.019	0.586	0.006	<0.01	0.105	<0.0001		2120	13	15	485	8	23.2	315	120	<1	<1	486	486	21.1	4.6	0.07				1370			
MW5	14-Sep-09	1314	3.52	4.32																																							
MW5	14-Dec-09	1200	3.76	4.56	7.21	6900	28.4	0.04	0.016				<0.001		0.002	0.19	<0.001	1.4	0.022		0.078	<0.0001	7.44	7460	9	106	1870	28	91	1720	678	<1	<1	1110	1110	84.9	3.44		<0.01	<0.01	<0.01				
MW5	25-Feb-10	1035	2.91	3.71																																							
MW5	11-May-10	1145	3	3.8	7.73	6590	22		0.032	0.426	0.001	0.009	0.024	0.032	0.07	23	0.068	1.59	0.071	0.05	0.277	<0.0001		5920	38	70	1210	17	60.5	1260	491	<1	<1	838	838	62.4	1.53	0.1				3630			
MW5	30-Aug-10	1210	2.6	3.4	7.85	1740	22.8																																					
MW5	9-Nov-10	1115	2.48	3.28	7.35	2620	24.1																																					
MW5	10-Mar-11	1400	2.51	3.31	7.39	1917	25.2	0.81	0.01				0.001		0.03	0.79	0.007	0.64	0.003		0.139	<0.0001	7.69	1980	11	13	474	8	22.4	396	150	<1	<1	416	416	22.6	0.49		<0.01	0.11	0.11				
MW5	6-Jun-11	1200	2.47	3.27	7.45	1032	20.8																																					
MW5	6-Sep-11	1240	2.7	3.5	7.39	1910	22.6	6.24	0.012	0.051	<0.001	<0.0001	0.004	0.001	0.006	4.1	0.004	0.081	0.005	<0.01	0.032	<0.0001	7.89	2310	10	11	501	7	23.4	385	177	<1	<1	427	427	23.1	0.6	0.11	<0.01	0.04	0.04	1360			

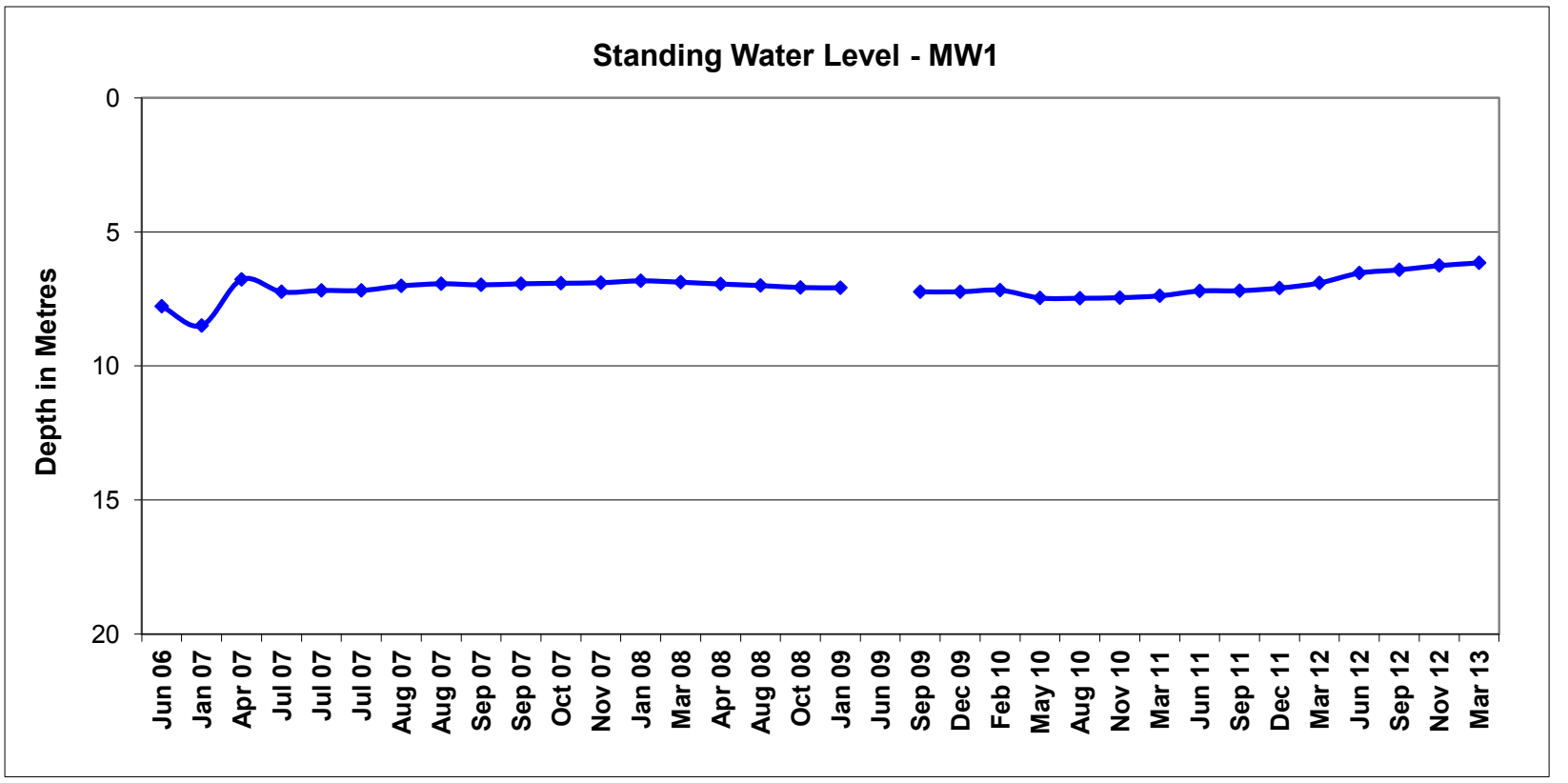
Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L											
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**			**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
MW5	7-Dec-11	1100	1.96	2.76	7.36	2275	20.5																																						
MW5	13-Mar-12	1320	1.28	2.08	7.52	1110	25.1	1.91	0.006	0.027	<0.001	<0.0001	0.002	<0.001	0.005	1.2	<0.001	0.122	0.003	0.01	0.02	<0.0001	7.78	1250	8	7	292	5	13.8	262	45	<1	<1	269	269	13.7	0.33	<0.01	<0.01	0.43	0.43	736			
MW5	13-Jun-12	1150	1.58	2.38	7.81	977	20.3																																						
MW5	4-Sep-12	1320	1.46	2.26	7.63	1980	20.1	7.89	0.016	0.056	<0.001	<0.0001	0.004	<0.001	0.014	5.13	0.007	0.073	0.004	<0.01	0.086	<0.0001	7.92	2120	9	11	473	8	22.1	380	146	<1	<1	439	439	22.5	0.93	<0.01	<0.01	<0.01	<0.01	1400			
MW5	27-Nov-12	1105	1.84	2.64	7.65	2650	22.5																																						
MW5	20-Mar-13	1300	1.94	2.74	7.54	1430	24.7	0.53	0.011	0.029	<0.001	<0.0001	0.002	<0.001	0.054	0.56	0.008	0.33	0.004	<0.01	0.158	<0.0001	7.61	1520	7	8	321	6	15.1	236	46	<1	<1	323	323	14.1	3.57	0.08	<0.01	0.06	0.06	956			
NAGERO																																														
MW6	2-Jun-06		8.34	9	7.3				<0.001															2030	59	29	440	8		308	55				720										
MW6	9-Sep-06		8.84	9.5																																									
MW6	11-Jan-07		9.15	9.81	6.89				<0.001			<0.0001	<0.005		<0.001		<0.001		0.011		0.08	<0.0001		2030	62	30	426	7		252	51				724										
MW6	10-Jul-07		9.37	10.03	7.5	2060	18.1		0.0005			0.00005	0.0025		0.001		0.0005		0.004		0.01	0.00005		2000	58	27	411	8		283	47				666								5.99		
MW6	18-Jul-07		9.35	10.01																																								
MW6	7-Aug-07	1105	9.32	9.98																																								
MW6	22-Aug-07	1320	9.29	9.95																																								
MW6	5-Sep-07	1110	9.31	9.97																																								
MW6	24-Sep-07	1250	9.07	9.73																																								
MW6	11-Oct-07	1035	9.16	9.82																																								
MW6	26-Nov-07	1325	9.17	9.83																																								
MW6	29-Jan-08	1400	9.06	9.72																																								
MW6	4-Mar-08	1125	8.815	9.475																																								
MW6	22-Apr-08	1700	8.62	9.28	7.1	2000	21.1		0.001			<0.00005	0.001		0.002		0.0031		0.006		0.005	<0.0001		2120	64	29	391	9.8		273	51				670									<0.025	<0.1
MW6	21-Aug-08	1051	8.545	9.205																																								
MW6	29-Oct-08	1530	8.48	9.15	7.1	2050	23.9		0.001			0.00005	0.003		0.003		0.077		0.004		0.034	<0.0001		2100	60	27	380	8.5		280	50				680									<0.025	0.18
MW6	29-Jan-09	1010	8.33	9.1																																								
MW6	14-Sep-09	1246	8.65	9.43																																								
MW6	14-Dec-09	1130	8.86	9.64	7.13	2112	23.4	<0.01	<0.001				<0.005		<0.001	<0.05	0.002	0.336	0.008		0.01	<0.0001	7.3	2100	56	26	385	8	21.9	252	39.4	<1	<1	652	652	21	2.24		0.02	0.53	0.55				
MW6	25-Feb-10	1010	8.84	9.62																																								
MW6	11-May-10	1515	8.3	9.08	7.56	2360	21.5		<0.001	0.193	<0.001	<0.0001	0.002	0.002	0.002	2.13	0.006	0.278	0.003	<0.01	0.008	<0.0001		2030	56	26	380	7	21.6	261	42.2	<1	<1	645	645	21.1	1.14	<0.01				1160			
MW6	30-Aug-10	1230	8	8.78	7.2	1927	23.8																																						
MW6	9-Nov-10	1015	7.72	8.5	7.03	1835	24.3																																						
MW6	10-Mar-11	1220	7.41	8.19	7.08	1783	24	0.15	<0.001				0.002		0.034	0.32	0.015	0.047	0.003		0.216	<0.0001	7.53	1790	55	27	406	9	22.9	293	42	<1	<1	627	627	21.7	2.61		0.03	0.97	1				
MW6	6-Jun-11	1040	7.44	8.22	7.15	1670	19.6																																						
MW6	6-Sep-11	1020	Piezo damaged																																										
MW6	7-Dec-11	1000	Piezo damaged																																										
MW6	13-Mar-12	1030	5.74	6.52	7.49	1840	23.4	0.15	<0.001	0.125	<0.001	<0.0001	0.002	<0.001	0.009	0.12	0.001	0.013	0.004	<0.01	0.071	<0.0001	7.68	1980	55	24	390	9	21.9	262	46	<1	<1	624	624	20.8	2.54	<0.01	<0.01	1.44	1.44	1150			
MW6	13-Jun-12	1025	5.87	6.65	7.45	2040	21.3																																						
MW6	4-Sep-12	1150	5.58	6.36	7.82	1840	22	0.09	<0.001	0.143	<0.001	<0.0001	<0.001	<0.001	0.012	0.18	0.003	0.013	0.003	<0.01	0.072	<0.0001	8.08	1990	53	25	381	8	21.5	276	39	<1	<1	681	681	22.2	1.69	<0.01	<0.01	1.13	1.13	1210			
MW6	27-Nov-12	0950	5.55	6.33	7.6	1817	21.1																																						
MW6	20-Mar-13	1025	5.75	6.53	7.46	343	22.8	0.49	0.001	0.037	<0.001	<0.0001	0.003	<0.001	0.081	0.56	0.009	0.095	0.006	0.02	0.402	<0.0001	7.43	351	12	3	49	8	3.18	16	28	<1	<1	106	106	3.15	0.44	0.23	0.1	0.6	0.7	252			
TARRAWONGA MINE																																													
MW7	2-Jun-06		73.47	74.3	7.2				0.002															2250	45	43	536	12		202	34				1100										
MW7	9-Sep-06		79.67	80.5																																									
MW7	11-Jan-07		76.17	77	7.32				<0.001			<0.0001	<0.005		<0.001		<0.001		0.005		0.05	<0.0001		1960	23	36	459	8		189	22				935										
MW7	18-Apr-07		76.07	76.9																																									
MW7	10-Jul-07		77.06	77.89	7.24	2250	18.7		<0.001			<0.0001	<0.005		0.001		<0.001		0.018		0.106	<0.0001		2270	35	36	458	10		170	23				998								4.38	<20	410
MW7	18-Jul-07		77.1	77.93																																									
MW7	7-Aug-07	1340	78.29	79.12																																								
MW7	22-Aug-07	1430	78.45	79.28																																								
MW7	5-Sep-07	1140	78.6	79.43																																								
MW7	24-Sep-07	1350	78.56	79.39																																								
MW7	11-Oct-07	1140	78.72	79.55																																								
MW7	26-Nov-07	1440	79.34	80.17																																								
MW7	29-Jan-08	1500	79.8	80.63																																								
MW7	4-Mar-08	1335	80.27	81.10																																								
MW7	22-Apr-08	1200	80.85	81.68	7.6	2440	21.9		<0.001			0.00014	0.004		0.033		0.25		0.017		0.12	<0.0001		2370	52	45	483	11		188	5				1050										
MW7	21-Aug-08	1526	83.74	84.57																																								
MW7	29-Oct-08	0915	85.99	86.81	7.4	2310	24.8		0.001			0.00006	0.005		0.014		0.088		0.009		0.099	<0.0001		2300	48	44	470	13		180	24				990									<0.025	0.3
MW7	28-Jan-09	1615	86.99	87.8																																								
MW7	17-Jun-09	0915	86.45	87.5	7.4	2440	20.7		<0.001	0.2	<0.001	<0.0001	0.001	<0.001	0.057	0.43	0.054	0.047	0.007	<0.01	0.13	<0.0001		2280	46	44	481	11	27.1	169	16	<1	<1	1050	1050	26.1	1.96	0.17				1430			
MW7	27-Aug-09	1225	89.99	91.04																																								
MW7	23-Dec-09	1355	89.53	90.58	7.55	2230	27.4	0.03	<0.001				<0.001		0.002	0.26	0.004	0.075	0.007		0.015	<0.0001	7.49	2240	5	46	556	9	28.5	182	17.1	<1	<1	1050	1050	26.5	3.58		<0.01	<0.01	<0.01				
MW7	25-Feb-10	1355	89.64	90.69																																								
MW7	11-May-10	1400	89.85	90.9	8.32	2950	23.9		<0.001	0.227	<0.001	<0.0001	<0.001	<0.001	0.009	1.5	0.046	0.11	0.017	<0.01	0.054	<0.0001		2330	42	41	478	9	26.5	182	15.9	<1	<1	1010	1010	25.6	1.72	0.45				1380			
MW7	30-Aug-10	1400	90.48	91.53	7.52	2385	24.7																																						
MW7	10-Nov-10	0900	90.38	91.43	7.47	2010	26																																						
MW7	14-Mar-11	1210	90.95	92	7.24	2075	26.2	0.2	<0.001				<0.001	0.094		0.74	0.036	0.155	0.01		0.274	<0.0001	7.57	2220	41	41	493	11	27.1	225	23	<1	<1	951	951	25.8	2.43		<0.01	0.07	0.07				
MW7	21-Jun-11	1400	91.31	92.36	7.55	2180	22.3																																						
MW7	8-Sep-11	0950	92.49	93.54	7.35	2160	22.5	0.09	0.001	0.18	<0.001	<0.0001	<0.001	<0.001	0.006	0.41	0.028	0.059	0.007	<0.01	0.047	<0.0001	7.84	2550	10	36	545	10	27.4	255	29	<1	<1	936	936	26.5	1.66	0.55	<0.01	0.02	0.02	1510			
MW7	9-Dec-11	1000	93.89	94.94	7.7	2200	26.8																																						
MW7	19-Mar-12	1345	95.05	96.10	7.25	2460	24.9	0.31	<0.001	0.186	<0.001	<0.0001	0.002	<0.001	0.032	0.61	0.065	0.059	0.009	<0.01	0.085	<0.0001	7.82	2650	35	34	622	11	31.9	321	45	<1	<1	991	991	29.8	3.34	0.52	<0.01	0.03	0.03	1590			
MW7	14-Jun-12	1040	97.70	98.75	7.6	2900	23.6																																						
MW7	6-Sep-12	1150	98.95	100.00	7.33	2730	25.2	0.52	0.002	0.205	<0.001	<0.0001	0.002	<0.001	0.088	2.84	0.114	0.057	0.005	<0.01	0.19	<0.0001	7.93	2840	18	21	678	8	32.3	342	50	<1	<1	1140	1140	33.5	1.79	0.61	<0.01	0.05	0.05	1760			
MW7	28-Nov-12	0945	101.99	103.04																																									
MW7	20-Mar-13	1200	102.49	103.54																																									
TARRAWONGA MINE																																													
MW8	2-Jun-06		13.06	13.8	6.7				<0.001															2240	161	48	298	9		426	46				588										
MW8	9-Sep-06		13.16	13.9																																									

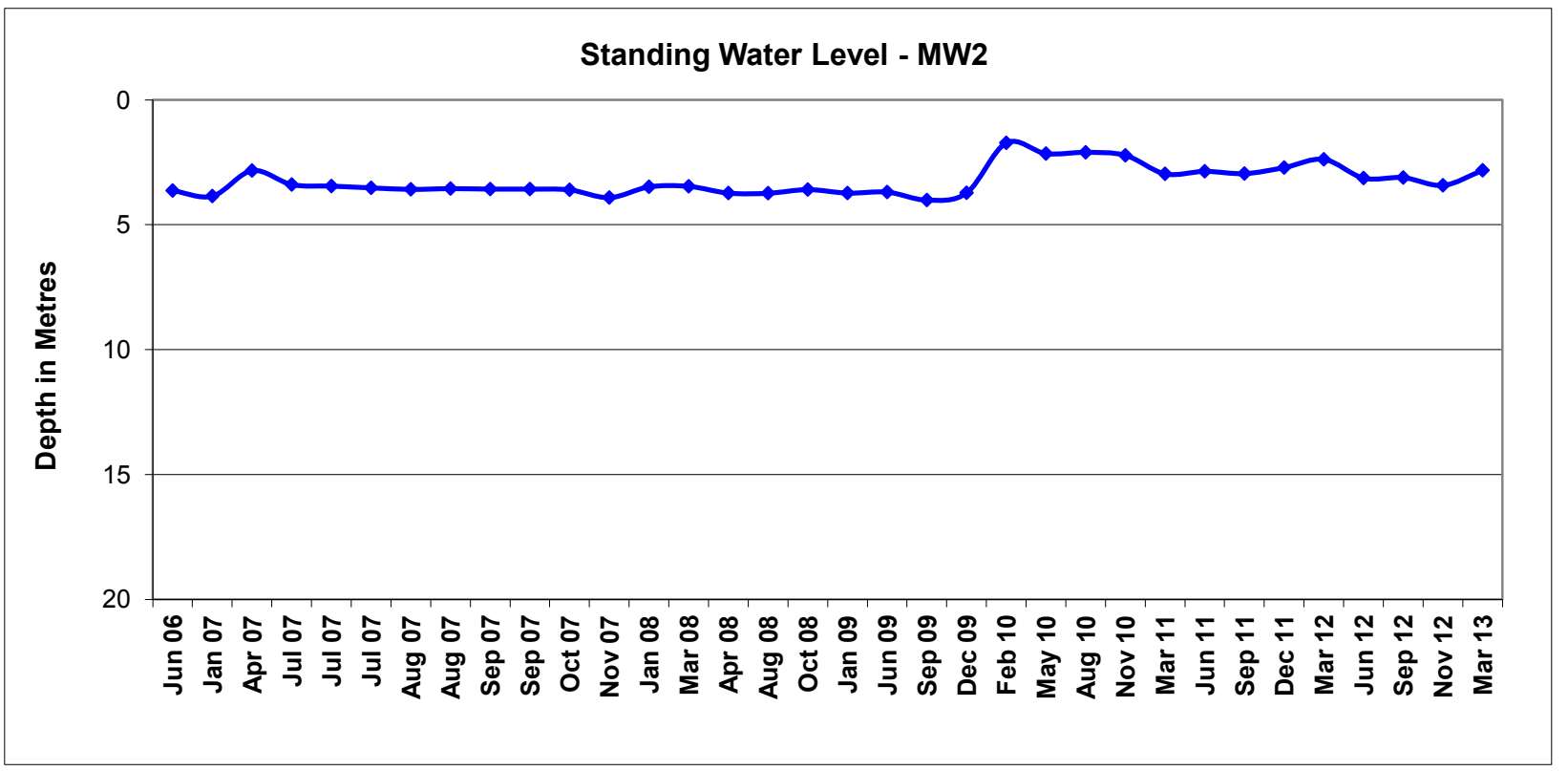
Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
MW8	11-Jan-07		13.41	14.15	6.7				<0.001			<0.0001	<0.005		0.002		0.001		0.007		0.16	<0.0001		2260	180	53	319	7		411	80				587										
MW8	18-Apr-07		12.86	13.6																																								
MW8	9-Jul-07		13.62	14.36	6.8	2530	18.9		<0.001			<0.0001	<0.005		0.005		0.004		0.006		0.102	<0.0001		2610	196	55	308	8		483	80				616								7.77	<20	250
MW8	18-Jul-07		13.67	14.41																																								
MW8	7-Aug-07	1325	13.66	14.4																																								
MW8	22-Aug-07	1415	13.66	14.4																																								
MW8	5-Sep-07	1130	13.72	14.46																																								
MW8	24-Sep-07	1340	13.64	14.38																																								
MW8	11-Oct-07	1120	13.63	14.37																																								
MW8	26-Nov-07	1410	13.69	14.43																																								
MW8	29-Jan-08	1445	13.54	14.28																																								
MW8	4-Mar-08	1220	13.56	14.3																																								
MW8	22-Apr-08				Bore blocked no sample																																								
MW8	21-Aug-08	1510	13.78	14.52																																								
MW8	29-Oct-08	1030	13.85	14.59	Bore blocked no sample																																							
MW8	28-Jan-09	1600	13.85	14.6																																								
MW8	17-Jun-09		14.02	14.77	Unable to sample - casing blocked																																								
MW8	27-Aug-09	1145	14.02	14.77																																								
MW8	23-Dec-09	1415	14.1	14.85	Unable to sample - casing blocked																																								
MW8	25-Feb-10	1520	13.8	14.55																																								
MW8	11-May-10	1440	13.72	14.47	Unable to sample - casing blocked																																								
MW8	30-Aug-10	1420	13.71	14.46	Unable to sample - casing blocked																																								
MW8	9-Nov-10	1255	13.74	14.49	Unable to sample - casing blocked																																								
MW8	14-Mar-11	1120	14.12	14.87	Unable to sample - casing blocked																																								
MW8	21-Jun-11	1420	13.62	14.37	Unable to sample - casing blocked																																								
MW8	8-Sep-11	1030	13.80	14.55	Unable to sample - casing blocked																																								
MW8	9-Dec-11	1040	13.24	13.99	Unable to sample - casing blocked																																								
MW8	14-Mar-12	1235	12.57	13.32	Unable to sample - casing blocked																																								
MW8	14-Jun-12	1115	12.76	13.51	Blocked 3.2 down pipe																																								
MW8	6-Sep-12	1220	12.63	13.38	Blocked 3.2 down pipe																																								
MW8	28-Nov-12	1005	12.79	13.54	Blocked about 3m down pipe																																								
MW8	20-Mar-13	1230	12.68	13.43	Blocked 3.2 down pipe																																								
THUIN																																														
GW002129	2-Jun-06		23.06	23.3																																									
GW002129	11-Jan-07		22.66	22.9	9.1				<0.001															1230	3	2	289	11		148	1				438										
GW002129	10-Jul-07		22.8	23.04	8.45	1130	19.5		<0.001			<0.0001	<0.005		0.018		<0.001		<0.001		0.028	<0.0001		1210	2	2	256	10		149	2				362								1.94	<20	250
GW002129	18-Jul-07		22.81	23.05																																									
GW002129	7-Aug-07	1240	22.87	23.11																																								
GW002129	22-Aug-07	1445	22.73	22.97																																								
GW002129	5-Sep-07	1350	22.82	23.06																																								
GW002129	24-Sep-07	1400	22.94	23.18																																								
GW002129	11-Oct-07	1155	22.71	22.95																																								
GW002129	26-Nov-07	1510	22.77	23.01																																								
GW002129	29-Jan-08	1515	22.72	22.96																																								
GW002129	4-Mar-08	1350	22.76	23																																								
GW002129	4-Apr-08	1205	22.73	22.97																																								
GW002129	23-Apr-08	1345	22.84	23.08	8.9	990	21.6		<0.001			0.0008	0.004		0.8		0.23		0.006		6.9	<0.0001		1000	10	4.5	225	11		152	3				315									<0.025	<0.1
GW002129	21-Aug-08	1258	22.29	22.53																																									
GW002129	29-Oct-08	1140		Unable to sample																																									
GW002129	28-Jan-09	1115	26.2	26.75																																								
TARRAWONGA MINE																																													
GW002501	2-Jun-06		27.5	27.9	6.6				<0.001															1460	71	41	104	62		347	33				182										
GW002501	11-Jan-07		27.69	28.09	6.15				<0.001			0.0001	<0.001		<0.001		<0.001		<0.001		0.06	<0.0001		3080	97	73	223	64		1180	63				1										
GW002501	10-Jul-07		28.23	28.63	6.33	6080	19.6		<0.001			<0.0001	<0.005		0.002		<0.001		0.001		0.076	<0.0001		5890	234	243	689	51		1680	405				355								1.25	<20	250
GW002501	18-Jul-07		28.19	28.59																																									
GW002501	7-Aug-07	1315	28.15	28.55																																								
GW002501	22-Aug-07	1450	28.13	28.53																																								
GW002501	5-Sep-07	1120	28.17	28.57																																								
GW002501	24-Sep-07	1330	28.02	28.42																																								
GW002501	11-Oct-07	1115	28.04	28.44																																								
GW002501	26-Nov-07	1405	28.02	28.42																																								
GW002501	29-Jan-08	1440	27.95	28.35																																								
GW002501	4-Mar-08	1215	27.8	28.2																																								
GW002501	22-Apr-08	1500	27.66	28.06	6.5	5400	22.2		<0.001			0.00007	<0.001		0.005		0.001		0.014		0.091	<0.0001		4760	226	215	611	54		1490	442				350									<0.025	0.23
GW002501	21-Aug-08	1500	27.71	28.11																																									
GW002501	29-Oct-08	1055	27.9	28.3	6.4	4500	25.3		<0.001			0.00011	0.006		0.013		0.0068		0.005		0.13	<0.0001		4500	160	120	270	56		1500	130				48									<0.025	<0.100
TEMPLEMORE																																														
GW044997	2-Jun-06		6.19	6.4	6.9				0.001															3000	112	102	544	4		758	170				768										
GW044997	11-Jan-07		6.62	6.83	6.95				0.009			<0.0001	<0.005		0.001		<0.001		0.002		0.04	<0.0001		1570	45	36	298	1		200	55				495										
GW044997	10-Jul-07		6.7	6.91	7.06	785	17.1		0.009			0.0002	<0.005		0.001		<0.001		0.001		0.088	<0.0001		1590	46	41	270	1		211	84				441								9	<20	740
GW044997	18-Jul-07		6.73	6.94																																									
GW044997	7-Aug-07	1130	6.79	7																																								
GW044997	22-Aug-07	1505	6.76	6.97																																								
GW044997	5-Sep-07	1205	6.83	7.04																																								
GW044997	24-Sep-07	1415	6.62	6.83																																								
GW044997	11-Oct-07	1210	6.73	6.94																																								
GW044997	26-Nov-07	1525	7.05	7.26																																								
GW044997	29-Jan-08	1525	6.44	6.65																																								

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
GW044997	4-Mar-08	1410	6.23	6.44																																							
GW044997	4-Apr-08	1140	6.295	6.505																																							
GW044997	22-Apr-08	1615	6.31	6.52	7	3370	21.8		0.007			<0.00005	<0.001		0.005		0.0003		0.012		0.008	<0.0001		3150	135	125	461	1.7		656	276				585								<0.025	<0.1
GW044997	21-Aug-08	1410	6.81	7.02																																							
GW044997	29-Oct-08	1815	6.86	7.06	Bore blocked, no sample																																							
GW044997	29-Jan-09	1130	7	7.2																																							
GW044997	17-Jun-09		7.52	7.77	7.1	3580	18.9		0.066	0.523	<0.001	0.0003	0.001	0.002	0.134	46.9	0.016	0.204	0.006	0.09	0.327	0.0001		3350	112	111	486	8	36	626	132	<1	<1	693	693	34.2	2.53	2.93				2020			
GW044997	28-Aug-09	1240	7.85	8.05																																							
GW044997	23-Dec-09	1130	7.97	8.17	6.95	3050	24.2	0.02	0.008				<0.001		0.005	0.07	<0.0010	0.021	0.004		0.065	<0.0001	6.87	3050	40	118	546	3	35.5	636	203	<1	<1	517	517	32.5	4.4		0.22	21	21.2				
GW044997	25-Feb-10	1040	7.81	8.01																																							
GW044997	11-May-10	1200	7.98	8.18	7.49	3720	22.7		0.018	0.258	<0.001	<0.0001	<0.001	<0.001	0.014	7.2	0.002	0.04	0.006	0.04	0.048	<0.0001		3480	114	119	434	2	34.4	640	192	<1	<1	593	593	33.9	0.66	2.03				1770			
GW044997	30-Aug-10	1120	7.91	8.11	6.82	3720	22.2																																						
GW044997	9-Nov-10	1140	7.8	8	6.8	3010	24.2																																						
GW044997	14-Mar-11	1040	7.25	7.45	6.83	1670	25.9	0.04	0.002				<0.001		0.013	<0.05	<0.001	0.004	<0.001		0.032	<0.0001	7.15	1620	131	67	160	2	19.1	333	87	<1	<1	410	410	19.4	0.84		<0.01	1.8	1.8				
GW044997	6-Jun-11	1320	8.02	8.22	7.3	1514	16.8																																						
GW044997	6-Sep-11	1220	8.73	8.93	6.98	1525	16.7	0.05	0.002	0.174	<0.001	<0.0001	<0.001	<0.001	0.01	<0.05	<0.001	0.007	<0.001	0.02	0.047	<0.0001	7.64	1830	122	58	174	2	18.5	308	110	<1	<1	400	400	19	1.31	0.51	<0.01	1.43	1.43	1000			
GW044997	7-Dec-11	1130	8.32	8.52	7.27	1545	20.6																																						
GW044997	13-Mar-12	1230	5.1	5.3	No sample - pump not operational																																								
GW044997	14-Jun-12	940	5.18	5.38																																								
GW044997	6-Sep-12	1100	4.8	5	7.95	1750	17.5	0.02	0.002	0.128	<0.001	<0.0001	<0.001	<0.001	0.011	0.07	<0.001	0.005	<0.001	0.01	0.027	<0.0001	7.69	1840	120	56	211	2	19.8	323	147	<1	<1	409	409	20.3	1.29	0.05	<0.01	5	5	1130			
GW044997	27-Nov-12	1145	5.04	5.24	7.61	1665	24.6																																						
GW044997	21-Mar-13	1230	5.78	5.98																																								
AMBARDO																																													
GW031856	2-Jun-06			16.4	7.3				<0.001			<0.0001	<0.001		0.036		0.001		0.001		0.126	<0.0001		1150	50	33	156	3		105	22				459								<20	<50
GW031856	11-Jan-07			19.74	7.27	910	23.1		<0.001			<0.0001	<0.005		0.005		<0.001		<0.001		<0.005	<0.0001		1080	47	30	164	3		75	18				457							3.37	<20	<50
GW031856	10-Jul-07			16.15	7.9	1080	13.5		<0.001			<0.0001	<0.005		0.008		0.0005		0.0005		2.29	0.00005		1180	48	34	162	3		94.8	20				440							3.11	10	25
GW031856	22-Apr-08	1650			7.4	1090	19.8		0.001			<0.00005	<0.001		0.008		0.0004		0.003		0.048	<0.0001		1060	50	33	145	3.6		106	18				480								<0.025	<0.1
GW031856	29-Oct-08	1225																																										
GW031856	10-Feb-09	0915	17.85	18.49	7.3	1090	26.9		0.002			<0.00005	0.003		0.009		0.0006		0.002		0.26	<0.0001		1100	51	30	150	2.8		81	19				440								<0.025	<0.025
GW031856	17-Jun-09	1005			7.4	1170	20.1		0.001	0.156	<0.001	<0.0001	<0.001	<0.001	0.004	0.06	<0.001	0.001	<0.001	<0.01	0.037	<0.0001		1110	51	33	149	3	11.8	92	15	<1	<1	453	453	12	0.52	<0.01				704			
GW031856	11-Sep-09	1330	15.51	16.28																																							
GW031856	23-Dec-09	1450	18.4		7.73	1029	29.3	0.01	0.001				<0.001		0.001	<0.05	0.001	0.012	0.001		0.205	<0.0001	7.45	1060	40	34	169	3	12.2	92.2	17.4	<1	<1	422	422	11.4	3.24		<0.01	0.14	0.14				
GW031856	25-Feb-10	1245	16.31	16.91	7.61	1240	25.3	<0.01	0.001				<0.005		0.002	<0.05	<0.001	0.001	<0.001		0.014	<0.0001	7.54	1110	47	34	160	3	12.2	90.8	17.6	<1	<1	436	436	11.6	2.42		<0.01	0.19	0.19				
GW031856	11-May-10	1310	16.58	17.18	8.2	1292	14.9		<0.001	0.15	<0.001	0.0002	<0.001	<0.001	0.116	<0.05	0.006	<0.001	<0.001	<0.01	0.51	<0.0001		1140	49	32	154	3	11.9	91.8	16.8	<1	<1	431	431	11.5	1.45	0.02				576			
GW031856	30-Aug-10	1310	15.35	15.95	7.35	1106	18.2	<0.01	<0.001				<0.001		0.008	<0.05	<0.001	0.009	<0.001		1.88	<0.0001	7.33	1140	49	33	159	3	12.2	98	20	<1	<1	426	426	11.7	1.99		<0.01	0.24	0.24				
GW031856	10-Nov-10	1310	15.52	16.12	7.08	990	27.8	<0.01	0.001				<0.005		0.014	<0.05	<0.001	0.004	<0.001		1.26	<0.0001	7.42	1160	22	33	163	3	11	103	18	<1	<1	440	440	12.1	4.84		<0.01	0.2	0.2				
GW031856	14-Mar-11	1250	19.71	20.31	7.19	945	26.5	<0.01	<0.001				0.001		0.004	<0.05	<0.001	<0.001	<0.001		0.015	<0.0001	7.46	887	45	30	151	3	11.4	92	20	<1	<1	414	414	11.3	0.4		<0.01	0.2	0.2				
GW031856	7-Jun-11	1430	16.08	16.68	7.35	929	19.2																																						
GW031856	9-Sep-11	1150	15.49	16.09	7.33	970	17	<0.01	<0.001	0.146	<0.001	<0.0001	<0.001	<0.001	0.005	<0.05	<0.001	<0.001	0.001	<0.01	1.25	<0.0001	7.71	1120	52	35	161	3	12.6	109	22	<1	<1	412	412	11.8	3.22	<0.01	<0.01	0.16	0.16	620			
GW031856	7-Dec-11	1230	15.65	16.25	7.64	940	20.9																																						
GW031856	19-Mar-12	1150	15.1	15.7	7.27	1070	24.3	0.02	0.002	0.161	<0.001	<0.0001	0.002	<0.001	0.012	0.06	<0.001	0.002	<0.001	0.02	0.034	<0.0001	7.82	1110	53	34	155	3	12.3	106	23	<1	<1	421	421	11.9	1.55	<0.01	<0.01	0.27	0.27	666			
GW031856	14-Jun-12	1210	16.04	16.64	7.57	1170	25.1																																						
GW031856	19-Sep-12	1040	16.6	17.2	7.39	1060	21.2	0.01	0.001	0.176	<0.001	<0.0001	<0.001	<0.001	0.012	0.29	0.002	0.004	<0.001	0.01	0.027	<0.0001	7.84	1160	48	33	158	4	12.1	115	21	<1	<1	410	410	11.9	0.86	<0.01	<0.01	0.17	0.17	670			
GW031856	27-Nov-12	1230	16	16.6	7.43	1048	25.4																																						
GW031856	21-Mar-13	1300	15.7	16.3	7.42	1020	24.2	<0.01	0.001	0.166	<0.001	<0.0001	0.003	<0.001	0.027	<0.05	0.006	0.005	<0.001	0.01	0.193	<0.0001	7.78	1100	49	32	157	3	12	90	21	<1	<1	435	435	11.7	1.31	<0.01	<0.01	0.22	0.22	640			
MERRIOWN																																													
GW020432	2-Jun-06			21.1	7.4				<0.001															2030	40	28	456	12		331	50				710										
GW020432	11-Jan-07				7.05				<0.001			<0.0001	<0.005		0.006		<0.001		<0.001		0.02	<0.0001		2200	40	28	444	13		297	43				706										
GW020432	22-Apr-08																																												
GW020432	29-Oct-08																																												
TARRAWONGA																																													
GW052266	2-Jun-06		7.67	8.1	7.9				<0.001															1360	17	13	301	5		134	65				488										
GW052266	11-Jan-07		8.94	9.37	7.58				<0.001			<0.0001	<0.005		<0.001		<0.001		<0.001		0.02	<0.0001		1950	45	29	389	8		362	126				457										
GW052266	10-Jul-07		7.92	8.35	8.01	1330	13.3		<0.001			<0.0001	<0.005		<0.001		<0.001		<0.001		0.01	<0.0001		1480	23	14	315	6		170	79				435							10.61	<20	250
GW052266	18-Jul-07		7.97	8.4																																								
GW052266	7-Aug-07	1300	7.94	8.37																																								
GW052266	22-Aug-07	1335	7.95	8.38																																								
GW052266	5-Sep-07	0955	8.02	8.45																																								
GW052266	24-Sep-07	1305	7.92	8.35																																								
GW052266	11-Oct-07	1050	7.9	8.33																																								
GW052266	26-Nov-07	1345	8	8.43																																								
GW052266	29-Jan-08	1420	8.01	8.44																																								
GW052266	4-Mar-08	1145	8.04	8.47																																								
GW052266	4-Apr-08	1210	8	8.43																																								
GW052266	22-Apr-08	0915	8.04	8.47	7.2	1230	20.6		<0.001			<0.00005	<0.001		<0.001		0.0002		0.006		<0.005	<0.0001		1250	94	48	110	4.5		131	19				465								<0.025	<0.1
GW052266	21-Aug-08	1225	5.86	6.29																																								
GW052266	29-Oct-08	1725			8.7	1600	28.4		<0.001			<0.00005	0.002		0.001		0.0003		<0.001		0.013	0.0006		1600	19	17	270	6.5		220	93				450								<0.025	<0.100
GW052266	28-Aug-09	1205		10.13																																								
GW052266	14-Dec-09	0840	11.3	11.35	7.4	922	23.3	<0.01	0.003				<0.001		0.003	<0.05	<0.001	0.006	0.003		0.018	<0.0001	7.51	838	55	16	84	<1	7.72	64.1	31.6	<1	<1	252	252	7.51	1.36		<0.01	6.09	6.09				
GW052266	25-Feb-10	1320	10.44	10.49																																								
GW052266	11-May-10	0940	10.43	10.48	8.23	954	18.6		0.002	0.078	<0.001	<0.0001	<0.001	<0.001	0.002	0.54	0.002	0.017	0.004	0.01	0.024	<0.0001		813	54	16	80	<1	7.52	68.3	34	<1	<1	241	241	7.46	0.42	0.05				446			
GW052266	16-Aug-10	1450	9.71	10.21	7.4	860	18.7																																						
GW052266	9-Nov-10	0900	10.53	10.58	6.98	817	24.1																																						
GW052266	10-Mar-11	1045	10.51	11.01	7.04	786	23.5	0.15	0.004				<0.001		0.024	1.28	0.002	0.034	0.001		0.103	<0.0001	7	640	53	17	94	1	8.2	72	34	<1	<1	262	262	7.98	1.34		0.34	4.32	4.66				
GW052266	6-Jun-11	0930	10.19	10.24	7.05	663	20.2																																						
GW052266	6-Sep-11	0920	10.51	10.56	6.94	714	20.2	0.96	0.003	0.106	<0.001	<0.0001	0.002	<0.001	0.009	2.63	0.002	0.085	0.008	0.02	0.061	<0.0001	7.48	823	57	16	90	<1	8.08	71	38	<1	<1	260	260	7.99	0.53	0.14	<0.01	6.35	6.35	464			

Sample Location	Date	Time	Depth to Ground - mbgl	Depth to Stand - mbtoc	Field Parameters			Total Metals															Mercury (Hg) - mg/L	pH - Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	Major Anions						Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N -mg/L	Nitrate as N - mg/L	Nitrite + Nitrate as N - mg/L	Total Dissolved Solids	Dissolved oxygen	TPH C6-C9	TPH C10-C36
					pH - Field	EC - Field - µs/cm	Temp - Field - °C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L				Calcium (Ca) - mg/L	Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L		Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L										
ANZECC Guideline - stock drinking water								**5**	**0.5**			**0.1**	**1**	**1**	**1**		**0.1**		**1**		**20**	**0.002**			**1000**						**1000**								**1500**	**400**		**4000**			
GW052266	7-Dec-11	0910	10.55	10.60	6.95	705	20.6																																						
GW052266	13-Mar-12	0900	9.18	9.23	7.04	784	21.6	0.03	0.002	0.086	<0.001	<0.0001	<0.001	<0.001	0.113	0.1	0.003	0.005	0.012	0.02	0.15	<0.0001	7.54	821	57	17	99	<1	8.55	68	37	<1	<1	267	267	8.44	0.65	<0.01	<0.01	5.92	5.92	498			
GW052266	13-Jun-12	900	8.38	8.43	7.05	837	20.4																																						
GW052266	4-Sep-12	1040	7.91	7.96	7.41	780	22.4	0.04	0.003	0.078	<0.001	<0.0001	<0.001	<0.001	0.018	0.92	0.002	0.03	<0.001	0.01	0.068	<0.0001	7.56	802	50	17	93	<1	7.94	76	32	<1	<1	260	260	8	0.42	0.07	0.01	5.53	5.54	562			
GW052266	27-Nov-12	0850	8.00	8.05	7.28	750	22																																						
GW052266	20-Mar-13	0915	9.24	9.29	7.18	740	21.4	0.02	0.004	0.072	<0.001	<0.0001	<0.001	<0.001	0.034	0.16	0.002	0.007	0.001	0.01	0.176	<0.0001	7.13	798	54	17	89	<1	7.97	80	28	<1	<1	244	244	7.71	1.58	0.02	<0.01	5.9	5.9	326			
TEMPLEMORE A																																													
Templemore A	18-Jul-07		8.61	9.07																																									
Templemore A	7-Aug-07	1135	11.33	11.79																																								
Templemore A	22-Aug-07	1515	12.08	12.54																																								
Templemore A	5-Sep-07	1208	12.09	12.55																																								
Templemore A	24-Sep-07	1420	12.22	12.68																																								
Templemore A	11-Oct-07	1215	12.08	12.54																																								
Templemore A	26-Nov-07	1530	12.09	12.55																																								
Templemore A	29-Jan-08	1540	12.05	12.51																																								
Templemore A	4-Mar-08	1420	12.07	12.53																																								
Templemore A	4-Apr-08	1145	9.16	9.62																																								
Templemore A	21-Aug-08	1325	8.68	9.14																																								
Templemore A	29-Jan-09	1118	7.84	8.3																																								
Templemore A	17-Jun-09		8.65	9.39	7.7	1640	19.7		0.003	0.132	<0.001	<0.0001	<0.001	<0.001	0.021		0.002	0.247	0.002	<0.01	0.02	<0.0001	0.16	1500	165	42	106	1	16.3	228	56	<1	<1	426	426	16.1	0.7	0.01				1000			
Templemore A	28-Aug-09	1242	8.92	9.4																																								
Templemore A	23-Dec-09	1110	10.1	10.58	7.2	1473	24	<0.01	0.002				<0.001		0.007	<0.05	<0.001	0.013	0.001		0.025	<0.0001	7.54	1400	72	41	125	1	12.4	246	79	<1	<1	241	241	13.6	4.61		0.07	3.25	3.32				
Templemore A	25-Feb-10	1055	9.16	9.64																																								
Templemore A	11-May-10	1230	9.12	9.6	7.92	1083	21.2		0.004	0.21	<0.001	0.0001	<0.001	<0.001	0.011	0.11	<0.001	1.9	0.006	0.01	0.019	<0.0001		1600	152	38	105	3	15.4	241	68.3	<1	<1	376	376	15.7	1.13	3.1				906			
Templemore A	30-Aug-10	1100	9.19	9.67	7.77	1590	22.1																																						
Templemore A	9-Nov-10	1130	9.24	9.72	7.67	1485	23.7																																						
Templemore A	14-Mar-11	1020	9.44	9.92	7.35	1486	24.8	0.02	0.003				<0.001		0.011	0.76	<0.001	3.31	0.005		0.079	<0.0001	7.56	1420	175	41	120	4	17.4	297	49	<1	<1	402	402	17.4	0.03		<0.01	0.09	0.09				
Templemore A	6-Jun-11	1255	9.36	9.84	7.45	1392	20.2																																						
Templemore A	6-Sep-11	1150	9.5	9.98	7.61	1395	21.8	0.08	0.004	0.266	<0.001	<0.0001	<0.001	<0.001	0.004	0.1	<0.001	1.81	0.004	<0.01	0.033	<0.0001	8.04	1670	169	41	120	3	17.1	285	62	<1	<1	405	405	17.4	0.9	1.37	0.12	0.46	0.58	790			
Templemore A	9-Dec-11	1120		No access to well - paddock flooded																																									
Templemore A	13-Mar-12	1200	2.7	3.18	7.62	960	22.9	0.1	0.003	0.093	<0.001	<0.0001	<0.001	<0.001	<0.001	0.11	<0.001	0.006	<0.001	<0.01	0.023	<0.0001	7.79	988	92	25	74	8	10.1	103	59	<1	<1	222	222	9.98	0.6	0.04	0.01	19.7	19.7	578			
Templemore A	13-Jun-12	1250	3.28	3.76	7.31	826	20.2																																						
Templemore A	6-Sep-12	1000	3.59	4.07	7.32	816	20.1	0.05	0.002	0.071	<0.001	<0.0001	<0.001	<0.001	0.017	0.09	<0.001	0.008	<0.001	<0.01	0.026	<0.0001	7.67	820	80	22	54	4	8.25	103	66	<1	<1	203	203	8.34	0.48	<0.01	<0.01	2.79	2.79	500			
Templemore A	27-Nov-12	1130	3.85	4.33	7.42	812	21.1																																						
Templemore A	21-Mar-13	1210	4.31	4.79	7.67	943	21.8	1.68	0.003	0.114	<0.001	0.0001	0.001	0.001	0.142	2.56	0.01	0.501	0.005	<0.01	0.279	<0.0001	7.75	1020	97	24	60	9	9.66	116	74	<1	<1	242	242	9.65	0.06	2.75	3.32	0.18	3.5	614			
TEMPLEMORE B																																													
Templemore B	18-Jul-07		9.89	9.89																																									
Templemore B	7-Aug-07	1145	8.14	8.14																																								
Templemore B	22-Aug-07	1525	8.31	8.31																																								
Templemore B	5-Sep-07	1211	8.17	8.17																																								
Templemore B	24-Sep-07	1425	8.05	8.05																																								
Templemore B	11-Oct-07	1220	8.09	8.09																																								
Templemore B	26-Nov-07	1535	7.9	7.9																																								
Templemore B	29-Jan-08	1545	8.13	8.13																																								
Templemore B	4-Mar-08	1425	8.44	8.44																																								
Templemore B	4-Apr-08	1150	8.42	8.42																																								
Templemore B	21-Aug-08	1329	10.55	10.55																																								
Templemore B	29-Jan-09	1145	15.5	15.5																																								
Templemore B	17-Jun-09		9.49	9.63	7.3	1810	19.5		0.002	0.145	<0.001	<0.0001	<0.001	<0.001	0.055	<0.05	<0.001	0.008	<0.001	0.01	0.052	<0.0001		1700	118	52	175	2	17.9	240	106	<1	<1	419	419	17.4	1.46	<0.01				1080			
Templemore B	28-Aug-09	1250	12.69	12.83																																								
Templemore B	23-Dec-09	1040	15.84	15.98	6.75	1491	24.4	<0.01	0.003				<0.001		0.022	<0.05	<0.001	0.003	0.002		0.068	<0.0001	7.44	1420	31	31	221	2	13.8	196	134	<1	<1	291	291	14.1	1.29		<0.01	0.74	0.74				
Templemore B	25-Feb-10	1112	9.36	9.5																																								
Templemore B	11-May-10	1250	10.52	10.66	8.01	1722	22.2		0.002	0.059	<0.001	<0.0001	<0.001	<0.001	0.007	0.11	<0.001	0.024	<0.001	0.01	0.02	<0.0001		1540	85	30	194	2	15.1	204	129	<1	<1	328	328	15	0.48	0.02				854			
Templemore B	30-Aug-10	1145	17.65	17.79	7.23	1532	23.8																																						
Templemore B	9-Nov-10	1215	9.94	10.08	7.19	1405	24.8																																						
Templemore B	14-Mar-11	0940	17.11	17.25	7.21	1460	24.7	0.28	0.002				<0.001		0.055	0.43	0.003	0.034	0.002		0.185	<0.0001	7.28	1400	97	37	200	2	16.6	264	136	<1	<1	339	339	17	1.3		<0.01	2.85	2.85				
Templemore B	6-Jun-11	1230	10.42	10.56	7.3	1370	21.5																																						
Templemore B	8-Sep-11	1100	13.56	13.7	7.12	1387	20.8	0.03	0.003	0.076	<0.001	<0.0001	<0.001	<0.001	0.015	<0.05	<0.001	0.005	<0.001	0.01	0.019	<0.0001	7.54	1630	62	38	202	2	15.1	254	137	<1	<1	325	325	16.5	4.62	0.03	<0.01	0.73	0.73	982			
Templemore B	7-Dec-11	1150	10.53	10.67	7.21	1360	21																																						
Templemore B	13-Mar-12	1250	9.58	9.72	7.28	1680	23	0.07	0.002	0.09	<0.001	<0.0001	<0.001	<0.001	0.013	0.1	<0.001	0.004	<0.001	0.02	0.036	<0.0001	7.7	1790	116	42	228	2	19.2	307	142	<1	<1	338	338	18.4	2.24	0.11	<0.01	3.37	3.37	1040			
Templemore B	13-Jun-12	1220	10.51	10.65	7.34	1704	20.8																																						
Templemore B	4-Sep-12	1350	8.28	8.42	7.3	1770	21.4	0.05	0.002	0.099	<0.001	<0.0001	<0.001	<0.001	0.01	0.1	<0.001	0.005	<0.001	0.01	0.072	<0.0001	7.63	1920	110	46	248	2	20.1	326	181	<1	<1	364	364	20.2	0.31	<0.01	<0.01	7.25	7.25	1200			
Templemore B	27-Nov-12	1200	7.65	7.79	7.37	1611	21.8																																						
Templemore B	20-Mar-13	1330	12.36	12.5	7.29	1570	22.4	0.04	0.004	0.069	<0.001	<0.0001	<0.001	<0.001	0.019	0.09	0.001	0.012	<0.001	0.01	0.064	<0.0001	7.51	1700	94	36	235	2	17.9	255	137	<1	<1	335	335	16.7	3.41	0.03	<0.01	4.44	4.44	886			

Denotes dissolved metals


Standing Water Level - MW1
Depth in Metres
0
5
10
15
20
Jun 06
Jan 07
Apr 07
Jul 07
Jul 07
Jul 07
Aug 07
Aug 07
Sep 07
Sep 07
Oct 07
Nov 07
Jan 08
Mar 08
Apr 08
Aug 08
Oct 08
Jan 09
Jun 09
Sep 09
Dec 09
Feb 10
May 10
Aug 10
Nov 10
Mar 11
Jun 11
Sep 11
Dec 11
Mar 12
Jun 12
Sep 12
Nov 12
Mar 13


Standing Water Level - MW2
Depth in Metres
0
5
10
15
20
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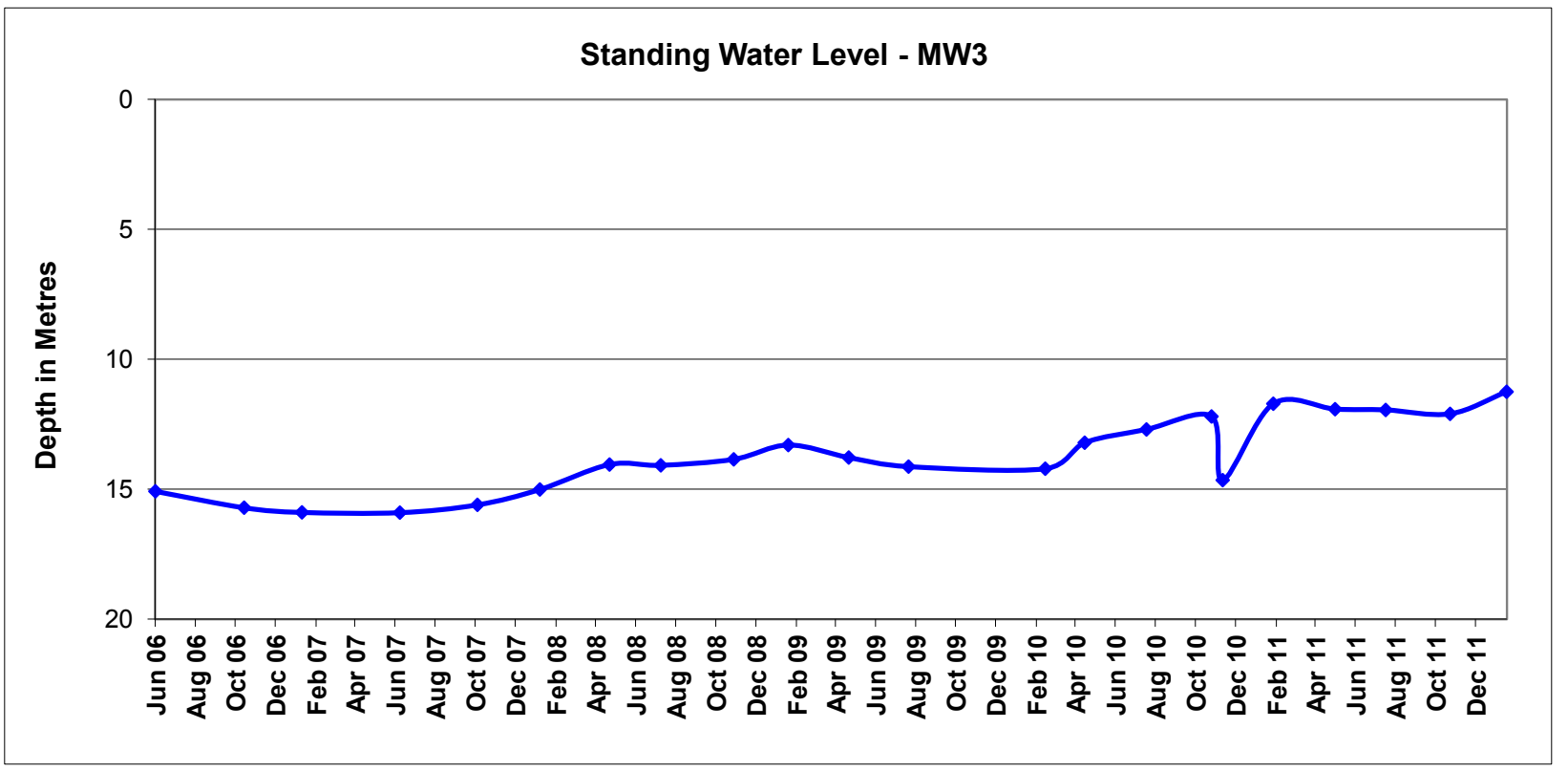
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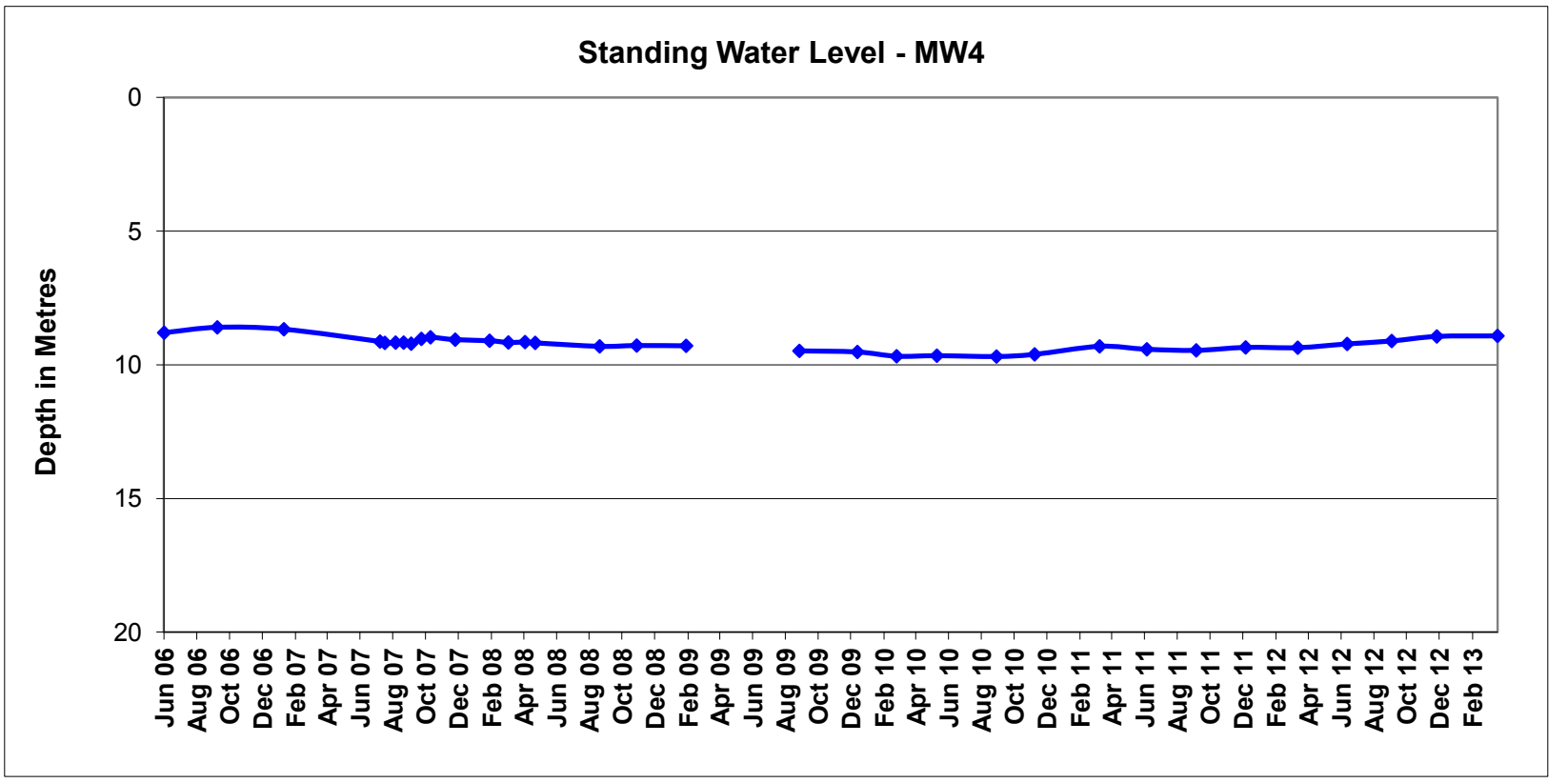
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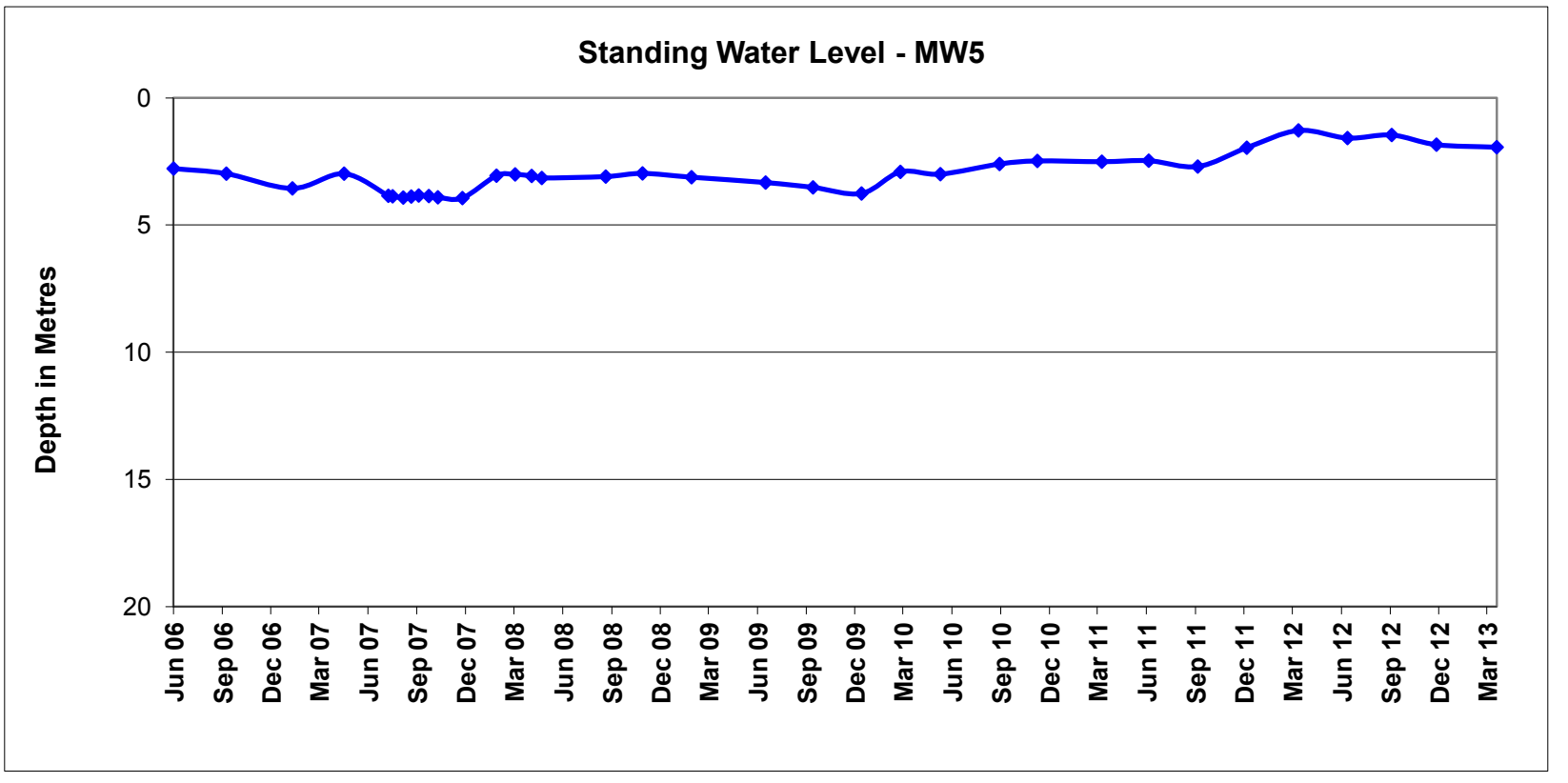
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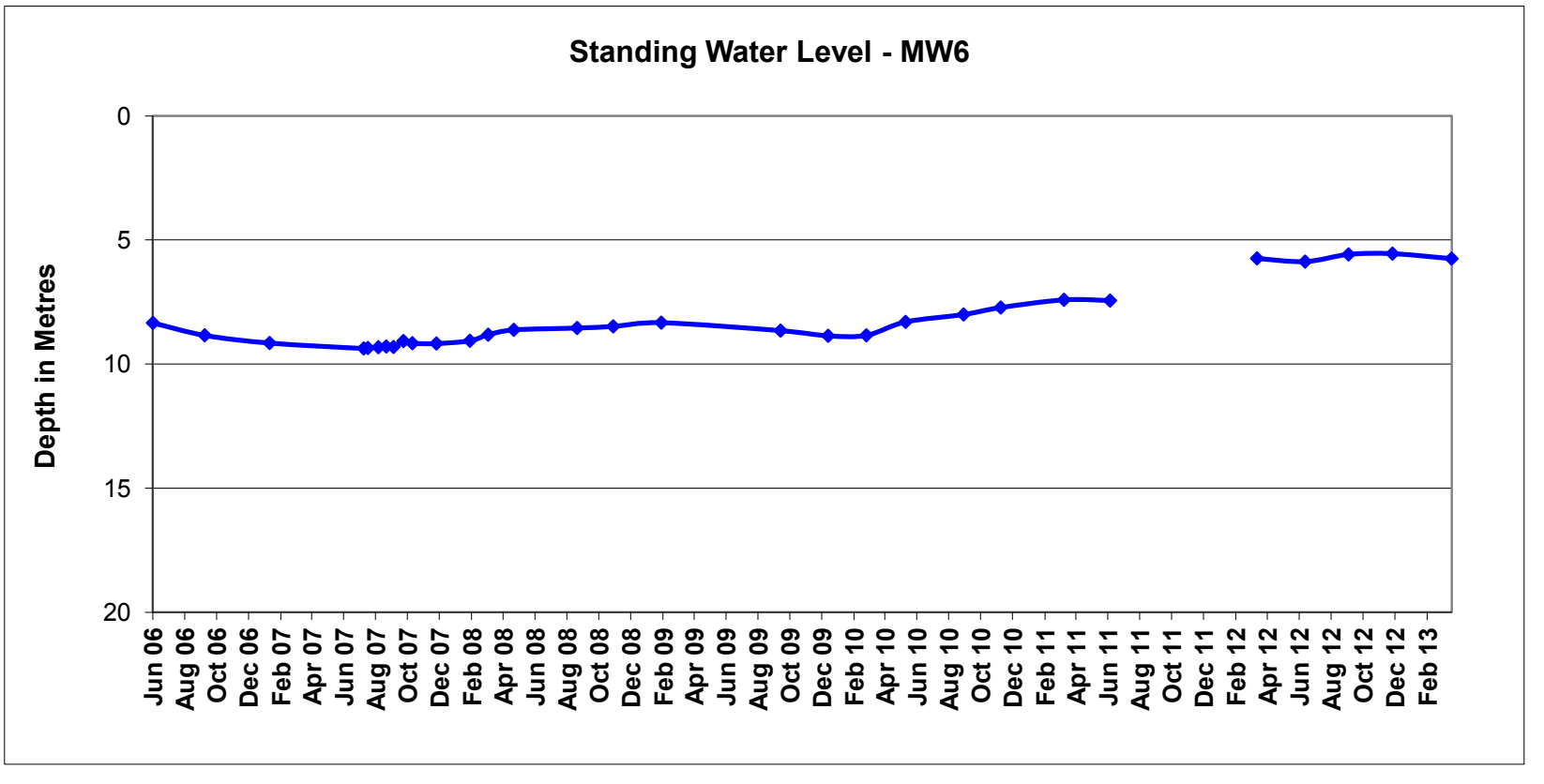
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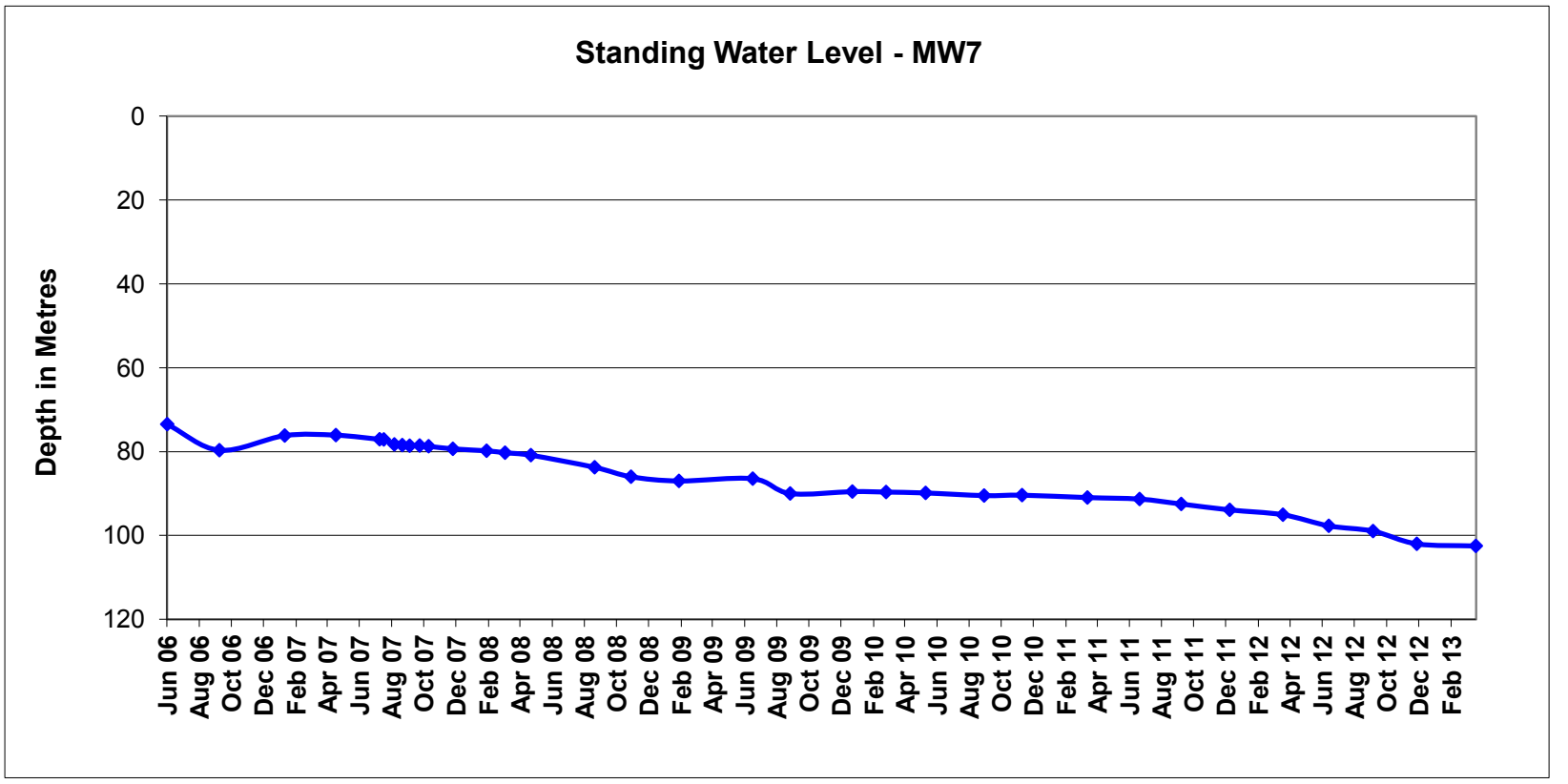
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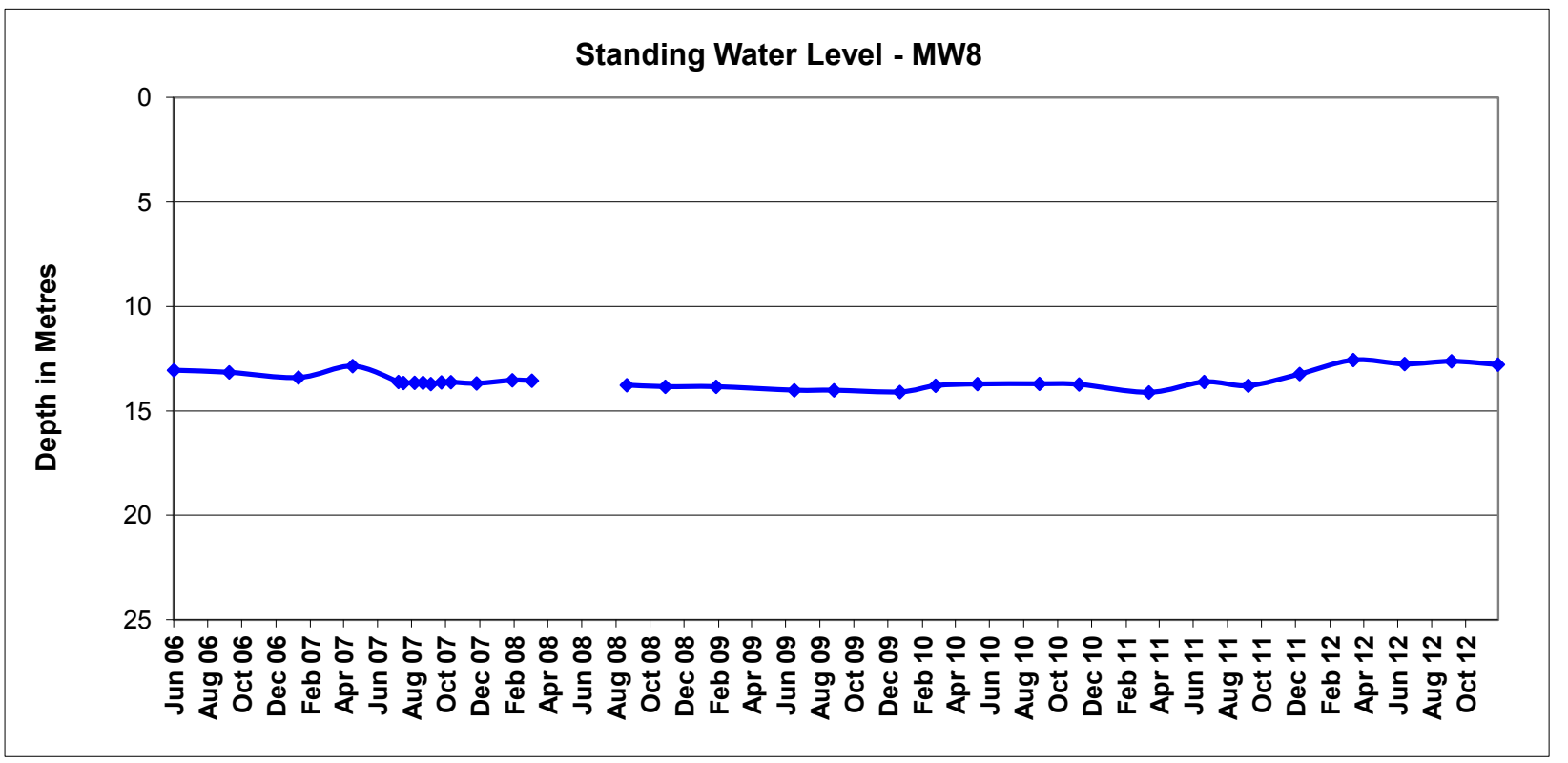
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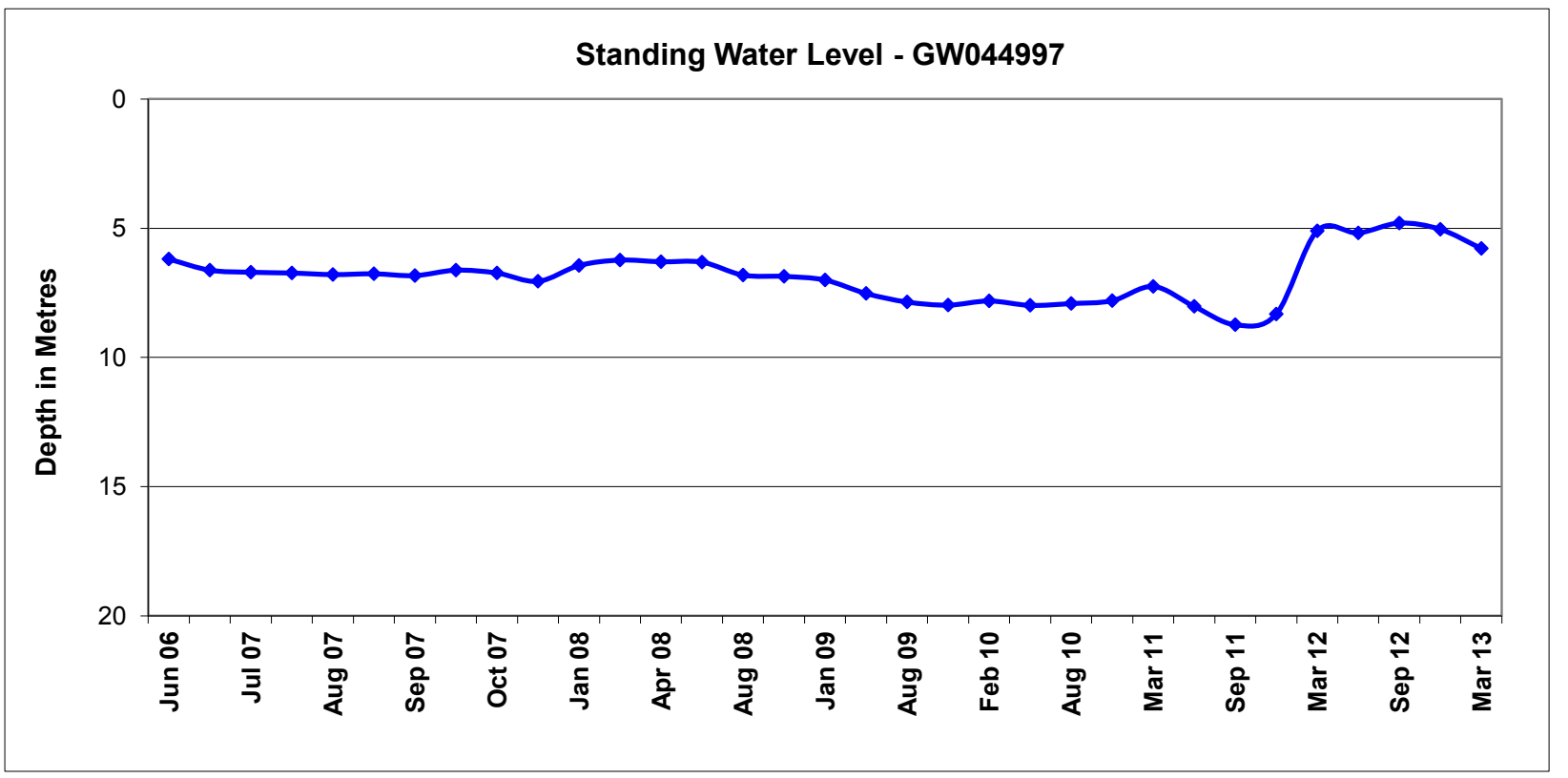
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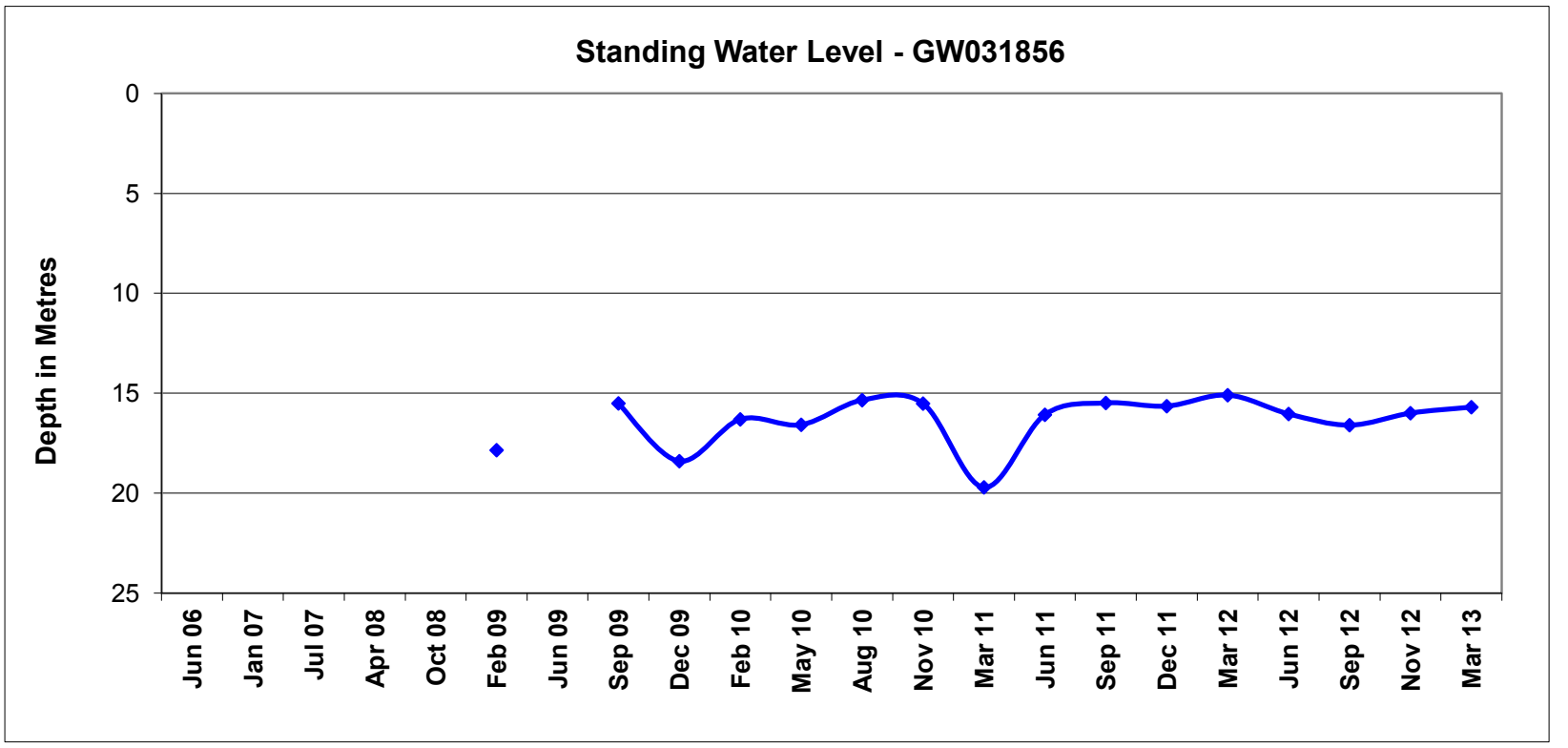
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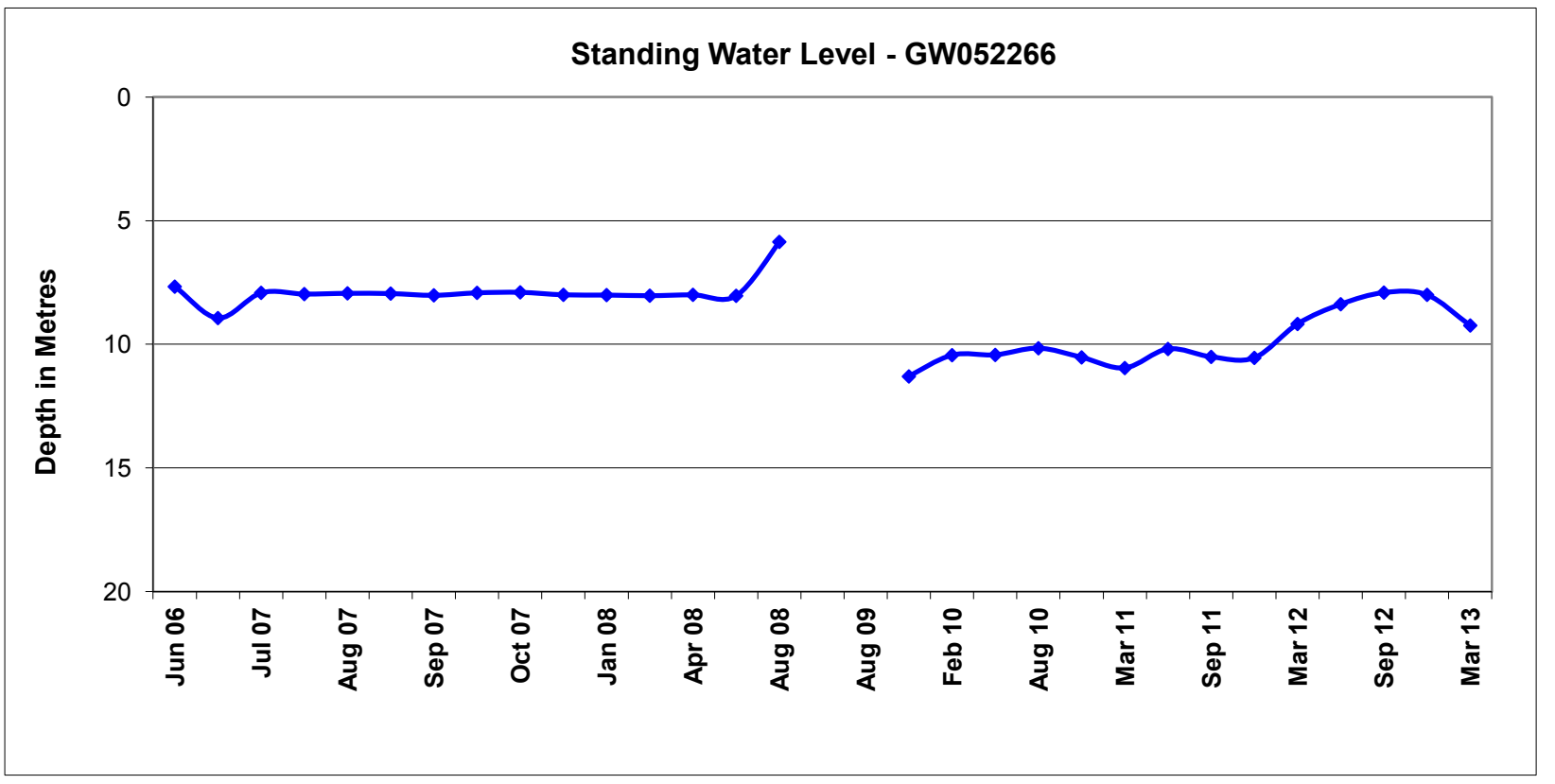
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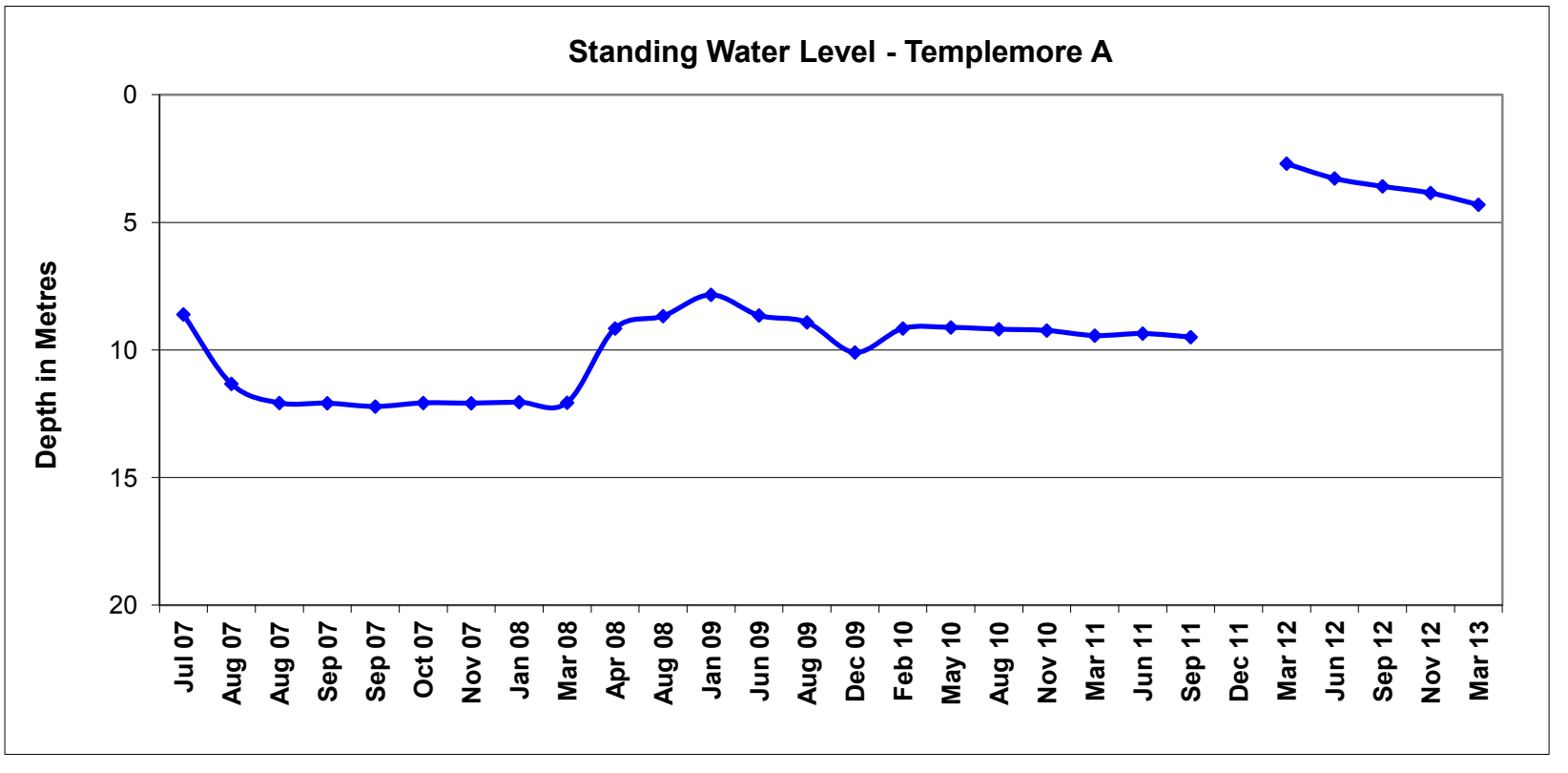
Standing Water Level - Templemore A
Depth in Metres
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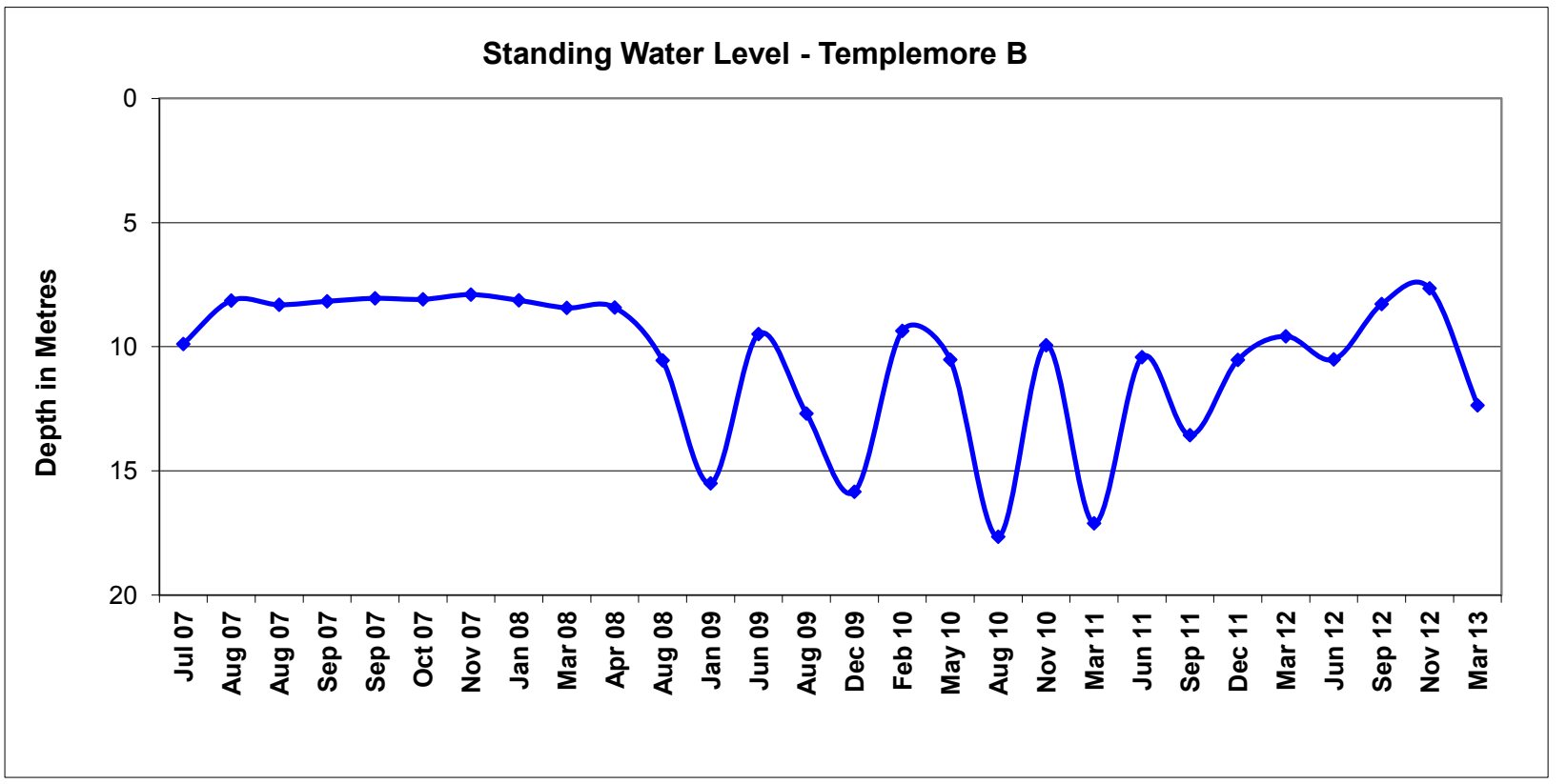
Standing Water Level - Templemore B
Depth in Metres
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Appendix 7

REHABILITATION MONITORING REPORT

COUNTRYWIDE ECOLOGICAL SERVICE *ABN 34003746530*

Environmental Planners and Wildlife Conservation Consultants

Mobile 0408-688-909

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e-mail: limway@bigpond.net.au

Tarrawonga Fauna Monitoring Spring 2012

1.0 Introduction

This monitoring event was planned as a late winter sample after heavy rain baulked any possibility of any successful 2011/12 spring or summer sample being achieved. A further subsequent delay in the scheduling resulted in the sampling being conducted in what is technically early spring between 6 and 8 September 2012.

The wet period started with above average rain falling in late spring of 2011, followed by a wet summer. An average autumn ensued and this was followed by a period of relatively dry late winter. There is still much ground cover from the previous years' good growing seasons. All the grasses have seeded and the ground cover remains dense and many of the Eucalypts and Acacias were in flower.

This year's monitoring samples were conducted in mostly clear weather conditions with mild days but winds increasing to 20-30km/hr in the afternoon and gusting to 60km/hr. The mornings were settled with light winds. Night temperatures were below 10˚C and it went down to almost freezing point on the second night following a cold change, in the late afternoon. This change was accompanied by rain squalls from an intense and abrupt local thunderstorm which skirted around this location to the west of the Tarrawonga Study Area.

However, it should be noted that Plot 5 has already been deleted from the sampling, having being subsumed in the expanded mining operation. Further mine operation activities have also started to the west of the remnant corridor; effectively further isolating this habitat corridor on both sides.

The Tarrawonga Study Area includes the original Tarrawonga Coal Mine proposal fauna survey area and the area to the east, now making up ML 1579 as well as the grassland areas south of this mining lease adjacent to the haulage road.

2.0 Methods

All the sampling procedures used for monitoring each fauna group in Tarrawonga Coal Mine are similar to those used in previous surveys, and bear no need for repetition here. However, due to the low ambient temperatures, no targeted amphibian or reptile searches were conducted outside the monitoring plots. The bat call recordings were, by the same token, constrained to the early evenings before the night temperatures fell significantly to single figures curtailing most aerial bat activities.

3.0 Results

The following is a summary of the results of the ten monitoring samples. Species present on the various plots are indicated with a dash " - ".

3.1 Birds

The bird species recorded during this monitoring survey are marked against the list of previously recorded species. All the native birds are protected with the listed vulnerable species marked with "V"; the only exotic species is marked with "#".

Common Name	Scientific Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Lease
1. Australian Wood Duck	*Chenonetta jubata*											-
2. Pacific Black Duck	*Anas supercilious*											
3. Grey Teal	*Anas graceless*											
4. Australasian Grebe	*Tachybaptus novaehollandiae*											
5. Pacific (White-necked) Heron	*Ardea pacifica*											-
6. White-faced Heron	*Ardea novaehollandiae*											
7. Yellow-billed Spoonbill	*Platalea flavipes*											
8. Great Cormorant	*Phalacrocorax carbo*											
9. Wedge-tailed Eagle	*Aquila audax*											
10. Australian Hobby	*Falco longipennis*											
11. Grey Falcon (V)	*Falco hypoleucos*											
12. Australian (Nankeen) Kestrel	*Falco cenchroides*								-	-	-	-
13. Crested Pigeon	*Ocyphaps lophotes*	-			-	-		-	-			
14. Peaceful Dove	*Geopelia striata*											-
15. Glossy Black-cockatoo (V)	*Calyptorhynchus lathami*											
16. Galah	*Cacatua roseicapilla*	-	-	-	-			-	-	-	-	-
17. Sulphur-crested Cockatoo	*Cacatua galerita*											

18.Little Lorikeet	*Glossopsitta pusilla*											
19.Australian King-Parrot	*Alisterus scapularis*											
20.Eastern Rosella	*Platycercus eximius*	-	-	-	-				-			
21.Mallee Ringneck	*Platycercus zonarius*											
22.Blue-bonnet Parrot	*Psephotus haematogaster*											-
23.Red-rumped Parrot	*Psephotus haematonotus*	-		-	-			-	-			
24.Mulga Parrot	*Psephotus varius*											
25.Blue-winged parrot	*Neophema chrysostoma*	-										-
26.Turquoise Parrot (V)	*Neophema pulchella*											
27.Cockatiel	*Nymphicus hollandicus*											
28.Fan-tailed Cuckoo	*Cuculus flabelliformis*											
29.Laughing Kookaburra	*Dacelo novaeguineae*											
30.Superb Blue Wren (Fairy-wren)	*Malurus cyaneus*		-									
31.Variegated Wren (Fairy-wren)	*Malurus assimilis*											
32.Yellow Thornbill	*Acanthiza nana*											
33.Striated Thornbill	*Acanthiza lineata*								-			
34.Brown Thornbill	*Acanthiza pusilla*						-					
35.White-Throated Treecreeper	*Climacteris leucophaeus*											
36.Little Friarbird	*Philemon citreogularis*											
37.Noisy Miner	*Manorina melanocehrla*	-	-		-	-	-	-	-			-
38.Lewin's Honeyeater	*Meliphaga lewinii*					-						
39.Singing Honeyeater	*Lichenostomus virescens*		-									-
40.White-eared Honeyeater	*Lichenostomus leucotis*											
41.White-plumed Honeyeater	*Lichenostomus penicillatus*											
42.Yellow-faced Honeyeater	*Lichenostomus chrysops*						-					
43.Striped Honeyeater	*Plectorhyncha lanceolata*											
44.Blue-faced Honeyeater	*Entomyzon cyanotis*											
45.Brown Honeyeater	*Lichmera indistincta*											
46.Jacky Winter	*Microeca leucophaea*											
47.Red-capped Robin	*Petroica goodenovii*											-
48.Hooded Robin (V)	*Melanodryas cucullata*											
49.Eastern Yellow Robin	*Eopsaltria australis*											
50.Grey-crowned Babbler (V)	*Pomatstomus temporalis*											
51.Golden Whistler	*Pachycephala pectoralis*						-					
52.Grey Shrike Thrush	*Colluricincla harmonica*											
53.Magpie-Lark (Pee Wee)	*Grallina cyanoleuca*											-
54.Grey Fantail	*Rhipidura fulginosa*								-			
55.Willy Wagtail	*Rhipidura lecophrys*		-	-	-		-	-				-
56.Black-faced Cuckoo-shrike	*Coracina novaehollandiae*	-		-	-				-			
57.Olive-backed Oriole	*Oriolus sagittatus*						-					
58.Grey Butcherbird	*Cracaticus torquatus*				-							
59. Pied Butcherbird	*Cracticus nigrogularis*					-			-			
60.Australian Magpie	*Gymnorhina tibicen*	-	-		-	-			-	-	-	-

61.Pied Currawong	*Strepera graculina*											
62.Australian Raven	*Corvus coronoides*	-		-	-		-	-				-
63.Apostlebird	*Struthidea cinerea*								-			-
64.Double-barred Finch	*Taeniopygia bichenovii*											-
65.Plum-headed Finch	*Neochmia modesta*											
66.Southern Boobook Owl	*Ninox novaeseelandiae*											
67.Common Starling #	*Sturunus vulgaris*											
68.Common Koel	*Eudynamus scolopacea*											
69.Rufous Whistler	*Pachycephala rufiventris*											
70.Little Raven	*Corvus mellon*											
71.Common Bronzewing Pigeon	*Phaps chacloptera*											-
72.Spotted Turtle-dove	*Streptopelia chinensis#*											
73. Spotted Bowerbird	*Chlamydera maculata*											
74. Brown Songlark	*Cinclorhamphus cruralis*											
75.Pallid Cuckoo	*Cuculus pallidus*											
76.Fork-tailed Swift	*Apus pacificus*											
77. Great Egret	*Ardea garzetta*											
78. Brown Treecreeper (V)	*Climacteris picumnus*											
79. Yellow-rumped Thornbill	*Acanthiza chrysorrhoa*							-				
80. Azure Kingfisher	*Caprimulgas gutttaus*											
81. White-winged Chough	*Corcorax melanorhamphos*											
82.Striated Pardalote	*Pardalotus striatus*											
83.Chestnut-rumped Heathwren	*Sericornis pyrrhopygius*											
84.Brown Quail	*Coturnix australis*											
85.Stubble Quail	*Coturnix pectoralis*		-	-								
86.Tawny Frogmouth	*Podargus strigoides*											
87.Black-shouldered Kite	*Elanus scriptus*	-						-				-
88.Barn Owl	*Tyto alba*											-
89.Richard's Pipit	*Anthus novaeseelandiae*			-								-
90.Peregrine Falcon	*Falco peregrinus*											
91.Rufous Songlark^	*Cinclorhamphus mathewsi*											
92.Dusky Woodswallow ^	*Artamus cyanopterus*				-							
93.Splendid Wren^	*Malurus splendens*											-
94.Welcome Swallow^	*Hirudo neoxena*											-
95.Tree Martin^	*Hirudo ariel*											
96.Little Corella^	*Cacatua pastinator*											-
97.Cattle Egret^	*Ardea Ibis*											-
98.Strew-necked Ibis^	*Threskiornis spinicollis*											-
99.Brown Falcon^	*Falco berigora*			-								
100. Little Grassbird^	*Megalurus gramineus*			-		-				-		
101. Pied Cormorant^	*Phalacrocorax varius*				-							
102. Noisy Friarbird^	*Philemon corniculatus*					-	-					
103. Grey-fronted Honeyeater^	*Lichenostomus plumulus*					-						

104. Brown-headed Honeyeater^	*Melithreptus brevirostris*					-						
105. White-winged Triller^	*Lalage tricolor*							-				
106. White-winged Wren^	*Malurus leucopterus*											-

^ = Species not recorded previously on the Tarrawonga Study Area.

Sixteen additional species of birds, all common and listed protected native species, were recorded on the Tarrawonga Study Site that had not been recorded here previously. The additional species recorded included waterbirds (a cormorant, an ibis, and an egret) that have been frequenting the surrounding areas since last spring and summer when the region recorded above average rainfall. It has resulted in the increased in abundance and widespread distribution of many water birds over the Naomi River floodplains and surrounding areas.

Some of the newly recorded species, like the honeyeaters, have obviously been attracted by the flowering of the Eucalypts and Acacias. The thick undergrowth has also encouraged the smaller birds, like the grass bird and wrens, which require thick understory habitats.

There were no Grey-crowned Babblers, *Pachycephala pectoralis*, recorded during this sampling trip in the Tarrawonga Study area, although numerous nests were noted along the adjoining roads. No recent activities were apparent in those nests.

A targeted search on the hill adjacent to Plots 1, 2, 3 and 9 failed to record the presence of any babblers or nests. This is the first time since the original Tarrawonga Coal Mine EIS survey that this species have not been recorded in the Tarrawonga Study Area.

3.2 Non-volant Mammals

These non-volant mammal species recorded during these monitoring samples are marked with a '-' against the list of previously recorded species.

Status: P = Protected, U = Unprotected, # = Exotic, + = Listed Threatened Process
^ = Species not recorded previously on the Tarrawonga Coal Mine and environs.

Common Name	Scientific Name	Status	Plot 1	Plot 2	Plot 3	Plot 4	Plot 6	Plot 7	Plot 8	Plot 9	Plot 10	Plot 11	Lease
1. Narrow-nosed Planigale^	*Planigale tenuirostris*	P											
2. Brush-tailed Possum	*Trichosurus vulpecula*	P					-						-
3. Swamp Wallaby	*Wallabia bicolor*	P											-
4. Eastern Grey Kangaroo	*Macropus giganteus*	P	-			-			-			-	-
5. Red-necked Wallaby	*Macropus rufogriseus*	P					-						-
6. House Mouse #	*Mus domesticus*	U				-							
7. European Rabbit #+	*Oryctolagus cuniculus*	U									-		-
8. European Red Fox #+	*Vulpes vulpes*	U	-										-
9. Feral Cat #+	*Felis cattus*	U								-			
10. Farm Dog #	*Canis lupus familiaris*	U											
11. Cattle #	*Bos Taurus*	U											
12. Echidna	*Tachyglossus aculeatus*	P											
13. Euro	*Macropus robustus*	P					-				-	-	-
14. Feral Pig #	*Sus scrofa*	U											
15. Brown Hare#	*Lepus europaeus*	U	-										-
16. Red Kangaroo	*Macropus rufus*	P											-

No signs of domestic stock were evident in the Tarrawonga Study Area. Other than the dusty condition, many of the habitats that have not been cleared in this mining operation have had their habitat patch quality generally improved since the stock were removed.

Other than the Euros taking to elevated areas of the mine workings and the presence of two fox carcasses on the other side of the road to the workshop, the non-volant mammalian fauna in and around Tarrawonga is as would be expected for this well-settled farming location.

3.3 Bats

The following bats were recorded in these monitoring samples. The species recorded are marked with a "-" against the list of previously recorded species.

Common Name	Scientific Name	Status	Ironbark	Corridor
			10.0hrs	0.7hrs
1. White-striped Mastiff-bat	*Nyctinomus (Tadarida) australis*	P		
2. Little Mastiff-bat	*Mormopterus 'planiceps' Complex (Undescribed sp 3 and sp 4.)*	P	-	-
3. Little Pied Bat	*Chalinolobus picatus*	V		
4. Chocolate Wattle Bat	*Chalinolobus morio*	P		

5. Long-eared Bats	*Nyctophilus spp* *(N. gouldii* and *N. geoffroyi)*	P	-	-
6. Gould's Wattle Bat	*Chalinolobus gouldii*	P	-	-
7. Little Forest Bat	*Vespadelus vulturnus*	P	-	-
8. Little Broad-nosed Bat	*Scotorepens greyii*	P	-	-
9. Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*	V		
10 .Western Broad-nosed Bat	*Scotorepens balstoni*	P		

All the microbats previously recorded in the previous samples, except the rarer species and the faster, above-canopy foragers, were recorded despite the low minimum night temperatures. The Yellow-bellied Sheathtail Bat, *Saccolaimus flaviventris,* despite its listed vulnerable status is quite a common species but not commonly recorded unless it is flying close to the ground between woodland remnants or when it is going in to water source for a drink. The activities of this species and the White-striped Mastiff-bat, *Tadarida australis,* are often curtailed during windy conditions as was apparent by their absence during this sampling period.

The bat activities were, however, confined to the warmer parts of the night. This is evident by the appearance of below-canopy foraging bats commencing to hunt just after sunset and few, if any, recorded calls after midnight.

3.4 Reptiles

The following reptiles, all protected species, were recorded on the various plots marked against a list of species that were recorded during the original Tarrawonga Coal Mine proposal baseline survey. The species within this mining lease but not in any of the monitoring plots are indicated with 'L'.

^ = Species not recorded previously on the Tarrawonga site during the original EIS survey but have been recorded during the last monitoring sample in 2010.
+ This taxa has probably previously been misidentified as *C. virgatus* (the eastern parapatric species) or *C. carnabyi* (the western parapatric species).

Common Name	**Scientific Name**	**Plot No.**
1. South-eastern Morethia Skink	*Morethia boulengeri*	
2. Tree-crevice Skink	*Egernia striolata*	
3. Lace Monitor	*Varanus varius*	
4. Dwarf Skink	*Menetia greyii*	
5. Prickly Gecko	*Heteronotia binoei*	
6. Thick-tailed Gecko^	*Underwoodisaurus milli*	
7. Nobbi Dragon	*Amphibolurus nobbi*	

8. Robust Skink	*Ctenotus robustus*	
9. Southern Rainbow Skink	*Carlia tetradactyla*	
10. Excitable Delma	*Delma tincta*	
11. Wall Skink	*Cryptoblepharus pulcher +*	P3
12. Eastern Bearded Dragon	*Pogona barbata*	
13. Bearded Dragon	*Pogona vitticeps*	
14. Basalt Snake-lizard	*Delma plebeia*	P3
15. Burton's Snake-lizard^	*Lialis burtonis*	
16. Spotted Lerista^	*Lerista punctativittata*	
17. Variegated (Common) Dtella	*Gehyra variegata*	
18. Common (Eastern) Bluetongue	*Tiliqua scincoides*	
19. Eastern Snake-necked Turtle	*Chelodina longicollis*	
20. Spotted Black Snake	*Pseudechis guttatus*	
21. Eastern Brown Snake	*Pseudonaja textilis*	L
22. Red-naped Snake^	*Furina diadema*	

Most of the reptiles being poikilothermic are sensitive to the cold and remain in repose in their winter refuges until the ground temperatures become a sufficiently warm. Only three species of reptiles were recorded during this sample, including an Eastern Brown Snake near the haul road adjacent to the Tarrawonga site office.

The only other two species of reptiles were found during this sample were in the grassland monitoring plot (P3) under the tiles that had been deployed to provide refuge for such species.

3.5 Amphibians

The frog species previously recorded on the Tarrawonga Coal Mine site are all protected native species as listed below.

Common Name	**Scientific Name**
1. Broad-palmed Frog	*Litoria latopalmata*
2. Green Tree Frog	*Litoria caerulea*
3. Peron's Tree Frog	*Litoria peronii*
4. Desert Tree Frog	*Litoria rubella*
5. Wrinkled Froglet	*Uperoleia rugosa*
6. Striped Marsh Frog	*Limnodynastes peronii*

No frogs were recorded on the Tarrawonga Study Site during this early spring sample when the days were relatively mild with daytime temperatures reaching over 25˚C. This is interesting as the frogs around the Whitehaven site were starting to congregate around the water holes the previous week before a cold change brought the night temperatures to below freezing point over the last few days. The

prevailing environmental temperatures are still also too low for these poikilotherms to commence their life cycle activities.

4.0 Comments

The progress of the mining operation that was anticipating to have subsumed Plot 6 and Plot 7 had not occurred and we were able to sample these control woodland plots. As indicted in the previous report, in order to maintain a full complement of control plots to cover the fauna habitat types, it would be necessary to replace control Plots 5, 6 and 7 in suitable Ironbark Woodland areas in the adjoining habitat buffer in Leard State Forest or in other suitable adjoining woodland.

The Tarrawonga Study Area used to abut a substantial area of woodland which was part of Leard State Forest. Much of this adjacent area has been cleared to accommodate a neighboring mining operation. What the cumulative impacts from this adjoining mine, and the recently approved extension of the Tarrawonga mine into the woodland to the east, will have on the ability of the fauna to rehabilitate in the Tarrawonga Study Area is uncertain. Cognizance should however be given to fact that the Tarrawonga property was operated as a mixed farm before the mine was established.

Dr Leong Lim December 2012

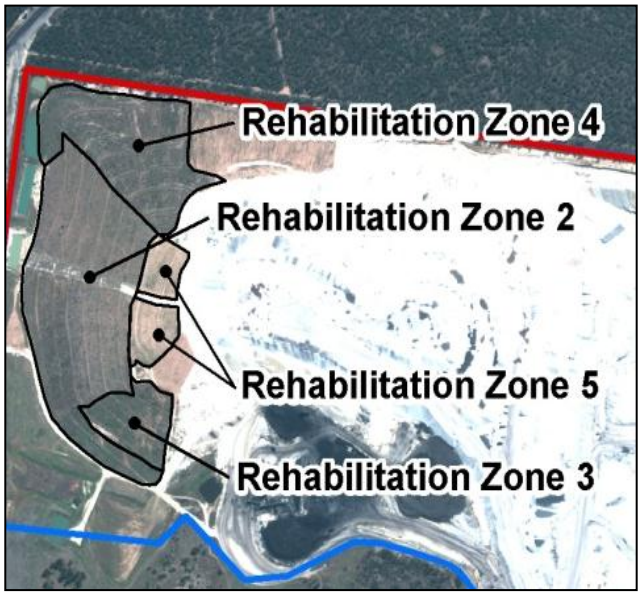
CES, Principal Ecologist

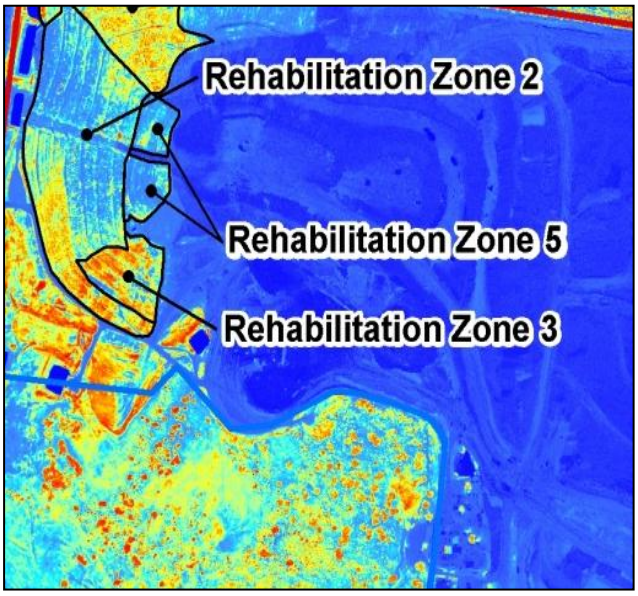
Tarrawonga Coal Mine – Rehabilitation Monitoring Report

Spring 2012

Prepared for
Whitehaven Coal Mining Limited

28 May 2013





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Abbreviations

ABBREVIATION	DESCRIPTION
ANOVA	Analysis of variance
CHM	Canopy height model
CL	Coal lease
CWD	Coarse woody debris
DoPI	NSW Department of Planning and Infrastructure
DPI	NSW Department of Primary Industries
EEC	Endangered ecological community
EL	Exploration lease
ELA	Eco Logical Australia
EMS	Environmental management system
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
ML	Mining lease
MOP	Mining operations plan
NDVI	Normalised difference vegetation index
OEH	NSW Office of Environment and Heritage
PAB	Photosynthetically active biomass
PCC	Projected canopy cover
PFC	Projected foliage cover
RMP	Rehabilitation monitoring program
TPFC	True projected foliage cover
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
WCML	Whitehaven Coal Mining Limited

Key Outcomes

Key outcomes from the 2012 rehabilitation monitoring program undertaken at the Tarrawonga Coal Mine are:

- In light of the proposed expansion of Tarrawonga, a review of rehabilitation zones should be undertaken prior to the next round of monitoring.
- Where necessary, additional monitoring plots should be established to capture data related to the progressive rehabilitation of the mine.
- Current vegetation monitoring control zones are likely to be disturbed by future mining operations. Suitable sites should be selected to establish permanent monitoring plots within representative vegetative communities.
- Multi-spectral imagery analysis (normalised difference vegetation index (NDVI) mapping) showed photosynthetically active biomass (PAB) was generally lower across the site than the previous monitoring period, reflecting reduced groundcover in response below average rainfall preceding the image capture (**Section 4.1**).
- Rehabilitated woodland zones have not yet reached a PAB level similar to that of the control zone. The oldest rehabilitation zone (2007/2008) showed the lowest PAB of all rehabilitation zones, most likely due to decreased groundcover.
- Change detection assessment (2012 versus 2011) highlighted significant changes in four zones. Significant gain in PAB in recently rehabilitated zones (zones 5 and 6, in 2012/2013) is due to increased groundcover associated with rehabilitation. Areas of change (increase and decrease) across the pasture zone are likely due to ongoing pasture management. PAB increase in rehabilitation zone 1 appears to be due to increased groundcover (possibly due to ongoing works in this area). This was confirmed by WCML after field inspection (i.e. no weed outbreak identified).
- The prevalence of *Chloris gayana* (Rhodes Grass) across rehabilitation zone 2 is noted. Management of Rhodes Grass should be considered to achieve the rehabilitation objectives of the mine.
- Suitable selection and use of groundcover species during rehabilitation will aid in the establishment of vegetation communities that are more representative of the surrounding landscape.
- Rhodes Grass and Phalaris should not be used for any future pasture mix species used for ongoing woodland rehabilitation.
- Should the existing control plot continue to be used for monitoring, the survey effort in the control woodland zone could be reduced for certain aspects of vegetation structure (e.g. DBH, canopy composition, etc), with detailed survey occurring every three years.
- Bird species diversity decreased from 2011 to 2012, most likely due to reduced resource availability associated with drier conditions in 2012. Bird feeding guild diversity increased across the same period.
- *Lycium ferocissimum* (African Boxthorn) and *Opuntia stricta* (Common Prickly Pear) were recorded (Plot 8, and Plots 2 and 4, respectively). As Class 4 Noxious Weeds, management of these species should be a priority.

1 Introduction

This Rehabilitation Monitoring Report has been prepared by Eco Logical Australia for Whitehaven Coal Mining Limited (WCML) in accordance with the *Rehabilitation Monitoring Program for Tarrawonga Coal Mine* (Eco Logical Australia 2011).

1.1 BACKGROUND

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. The 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). Conditional approval to this expansion was granted in January 2013.

The mine is managed by Whitehaven Coal Mining Limited (WCML) for Tarrawonga Joint Venture. Participants of the joint venture are WCML (70%) and Boggabri Coal Pty Limited (30%). Mining operations are undertaken by Tarrawonga Coal Pty Ltd (TCPL). The mine is situated approximately 16 km east of Boggabri 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.

1.2 PROJECT SCOPE

This rehabilitation monitoring report documents the spring 2012 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)
- Native vegetation and fauna surveys
- Analysis of results including statistical analysis.

1.3 AIMS & OBJECTIVES

The aim of this monitoring report is to document the spring 2012 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) and fauna 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.

1.4 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 to the south and east. TCPL aims to progressively rehabilitate in a manner that provides a sustainable balance between these existing land uses.

Woodland regeneration areas are to be incorporated into the rehabilitation program to link with remnant native vegetation and contribute to the local and regional habitat corridors. Where possible, agricultural land will be retained and rehabilitated, although the proposed final landscape for the site is predominately the return of native vegetation communities.

Greater detail regarding the final rehabilitated landform will be supplied 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 summarised in **Table 1-1**.

Table 1-1: Summary of rehabilitation objectives for Tarrawonga

TIMEFRAME	OBJECTIVE
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 areas
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.

1.5 REHABILITATION HISTORY

Tarrawonga is being progressively developed and rehabilitated in an easterly direction in approximately 60 m wide strips (WCL 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.

A conceptual landform rehabilitation plan that incorporates the proposed expansion is provided in the Tarrawonga Coal Project Environmental Assessment (Resource Strategies 2012).

A summary of rehabilitation works undertaken to date at Tarrawonga is provided in **Appendix A**.

For detailed site background refer to *Rehabilitation Monitoring Program for Tarrawonga Coal Mine* (ELA 2011).

1.6 MANAGEMENT TRIGGERS

A multi-scale, multi-data source monitoring approach has been adopted at Tarrawonga. Remote sensing has been used to monitor the entire target area including control areas while targeted field work was implemented for agricultural and native vegetation environments, with surveys directed into control and impact areas.

A two-tiered system of triggers for management was developed in the RMP as a response to any 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. The second tier of response is triggered if changes are confirmed or discovered on-ground. These triggers instigate the development of site specific management responses and remedial actions (**Appendix B**).

2 Methods

A multi-scale, multi-data source monitoring approach has been used, incorporating remote sensing to monitor the entire target area as well as targeted field work. Monitoring has been directed into control and impact areas for both agricultural and native vegetation environments.

Monitoring completed in spring 2012 was undertaken in accordance with the methodology prescribed in the RMP (ELA 2011) and is provided in **Appendix C**. There were no deviations from the methodology prescribed in the RMP.

As noted in the 2011 monitoring report, due to the proposed expansion at Tarrawonga it is likely that a number of the rehabilitation zones will be impacted. Consequently only one rehabilitation zone (rehabilitation zone 2) was monitored, and only one control zone was surveyed.

2.1 WEATHER

Temperatures in the three months preceding the monitoring period were mild to warm and consistent with historical averages. Below average rainfall occurred in the four months from September through to December, particularly during October and November. A total of 107 mm fell during the four months, less than half the long term average of 229 mm for the same period (**Table 2-1**). A total of 456 mm fell in 2011 over the same period, almost double the long term average.

Table 2-1: Weather conditions preceding and during the monitoring period (BoM 2012)

MONTH	ACTUAL MONTHLY MEAN*			HISTORICAL AVERAGES (1876-2011)#		
	MIN TEMP (ºC)	MAX TEMP (ºC)	RAINFALL (mm)	MIN TEMP (ºC)	MAX TEMP (ºC)	RAINFALL (mm)
Sept-12	4.3	24.0	30.6	7	22.8	40.3
Oct-12	7.7	27.7	2.8	10.8	26.7	55.5
Nov-12	14.3	32.8	11.0	14.2	30.3	62.6
Dec-12	16.8	34.4	62.2	16.8	32.9	70.1

* Gunnedah Airport Station number 055202

\# Gunnedah Pool Station number 055023

Temperatures during the field survey were warm to hot with only a 0.2 mm of rain on the second day of monitoring (**Table 2-2**). Climate data below were taken from the nearest weather station with daily observations available (Gunnedah Airport Station number 055202) (BoM 2013).

Table 2-2: Weather conditions during the spring 2012 field surveys

DATE	MIN (ºC)	MAX (ºC)	RAIN FALL (mm)	9 am TEMP (ºC)	9 am WIND SPEED (km/hr)	9 am WIND DIRECTION	3 pm TEMP (ºC)	3 pm WIND SPEED (km/hr)	3 pm WIND DIRECTION
13/12/2012	12.4	33.5	0	22.7	15	E	31.1	20	S
14/12/2012	14.4	35.9	0.2	23.8	11	WNW	34.7	11	S
15/12/2012	16.1	35.7	0	27.9	7	SSW	33.5	22	W
16/12/2012	17.8	38.5	0	26.6	11	SE	36.8	24	WNW
17/12/2012	17.6	39.2	0	29.2	20	SSE	37.2	26	WSW
18/12/2012	14.4	38.0	0	23.6	17	SE	34.9	11	SW
19/12/2012	20.8	39.7	0	30.1	11	ENE	38.1	24	WNW

3 Results & Discussion

3.1 REMOTE SENSING

Four-Band GeoEye-1 imagery of Tarrawonga was captured on 30 September 2012, assessed for quality and analysed to provide information for future change detection.

The combination of true colour, false colour and NDVI image visualisation products (**Figure 3-1**; **Figure 3-2**; **Figure 3-3**) gives an indication of the extent and condition of each land cover type in the area.

The NDVI image (**Figure 3-3**) shows variation in photosynthetically active biomass (PAB) (i.e. green vegetation) over the site with blue areas showing low or no vegetation (e.g. bare soil or water) and red areas showing the highest amounts of PAB.

The NDVI image shows that the oldest rehabilitation zone (zone 2 completed in 2007/2008) as having variable PAB, with low PAB in the northern portion of the zone (**Figure 3-3**). Comparison of the 2011 and 2012 true and false colour images for zone 2 indicates there has been a reduction in ground cover between the two years. Zones rehabilitated within the same period (zones 5 and 6 in 2012/2013) also show different amounts of PAB, with zone 6 in the south showing much higher PAB than zone 5 towards the north, comparable with that of zone 1 (rehabilitated in 2009/2010). These differences are apparent on both the true and false colour images. As expected, the control woodland zone shows the greatest amount of PAB (**Figure 3-3**).

Statistical analysis of 2012 NDVI values show that the average PAB varied between all zones (**Table 3-1**). Mean NDVI of the rehabilitation zones were both higher and lower than the mean of the Control Zone. The MDS plot of 2012 NDVI data indicates that rehabilitation zones 3 and 4 (both rehabilitated in 2008/2009) are more similar to the control zone in regards to PAB than the other remaining rehabilitation zones (**Figure 3-4**).

Biomass was generally lower in all zones in 2012 than in 2011 (**Table 3-2**), with the exception of the control woodland zone. The MDS plot of 2011 and 2012 NDVI data suggests that PAB levels for all zones (i.e. control and rehabilitation zones) are more similar within years than between years (**Figure 3-5**).

NDVI image change detection (**Figure 3-6**) showed small isolated areas of positive change most likely due to image shift and small areas of potential increase in biomass (**Table 3-3**). Areas of positive significant change (i.e. an area >0.1 ha with >$\pm$ 2 standard deviations from average) were identified in the recently rehabilitated zones 5 and 6 (2012/2013) which is the expected response given the recent rehabilitation works. An area of significant increase was also identified in rehabilitation zone 1 (2009/2010). Comparison of true colour images between years indicates that these changes are also due to rehabilitation works. Areas of both significant increase and decrease were identified in the pasture rehabilitation zone which is most likely due to an increase or decrease in groundcover (i.e. cropping/pasture management practices) between 2011 and 2012.

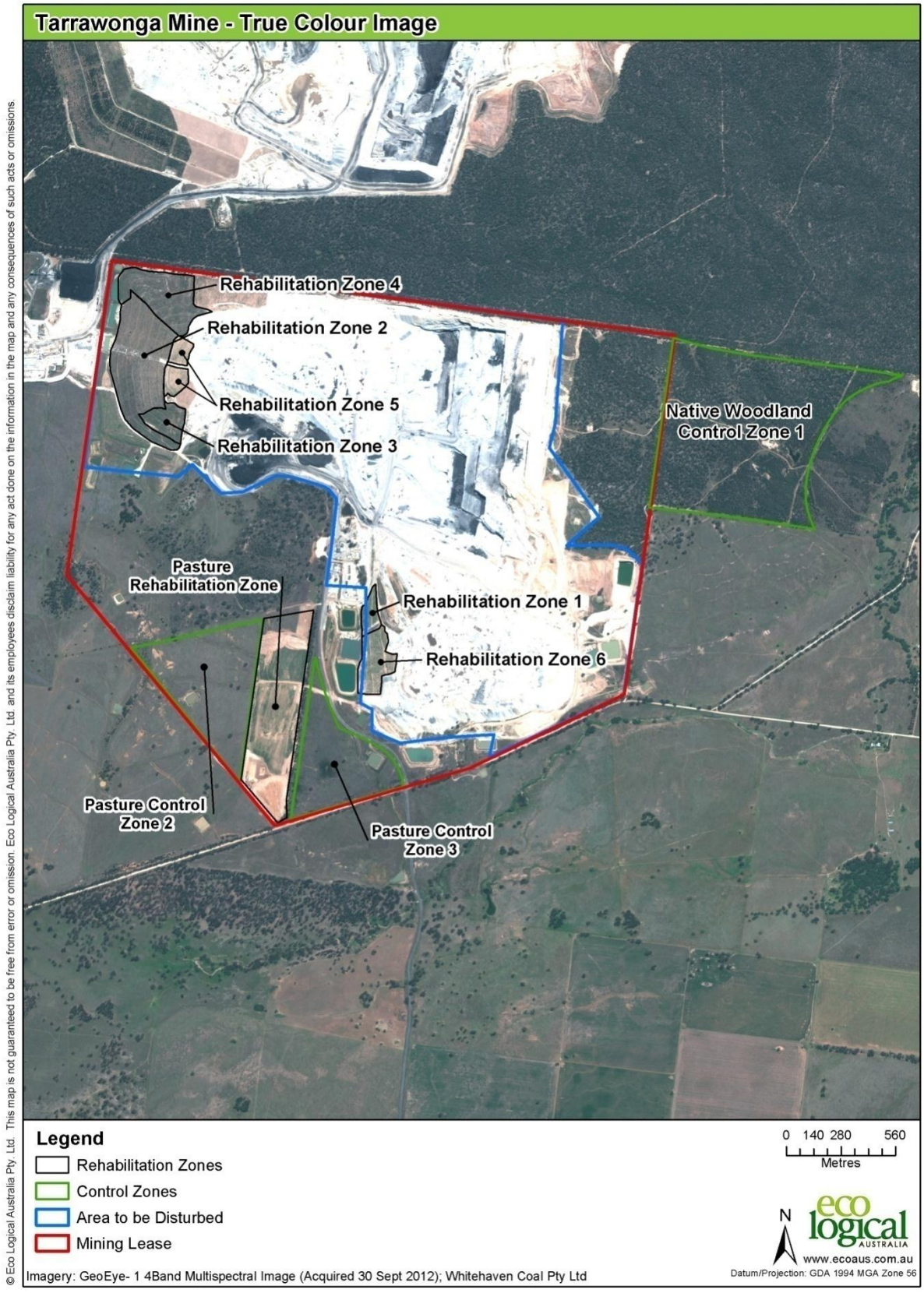

Figure 3-1: Tarrawonga Mine – True Colour Image (Sept 2012)

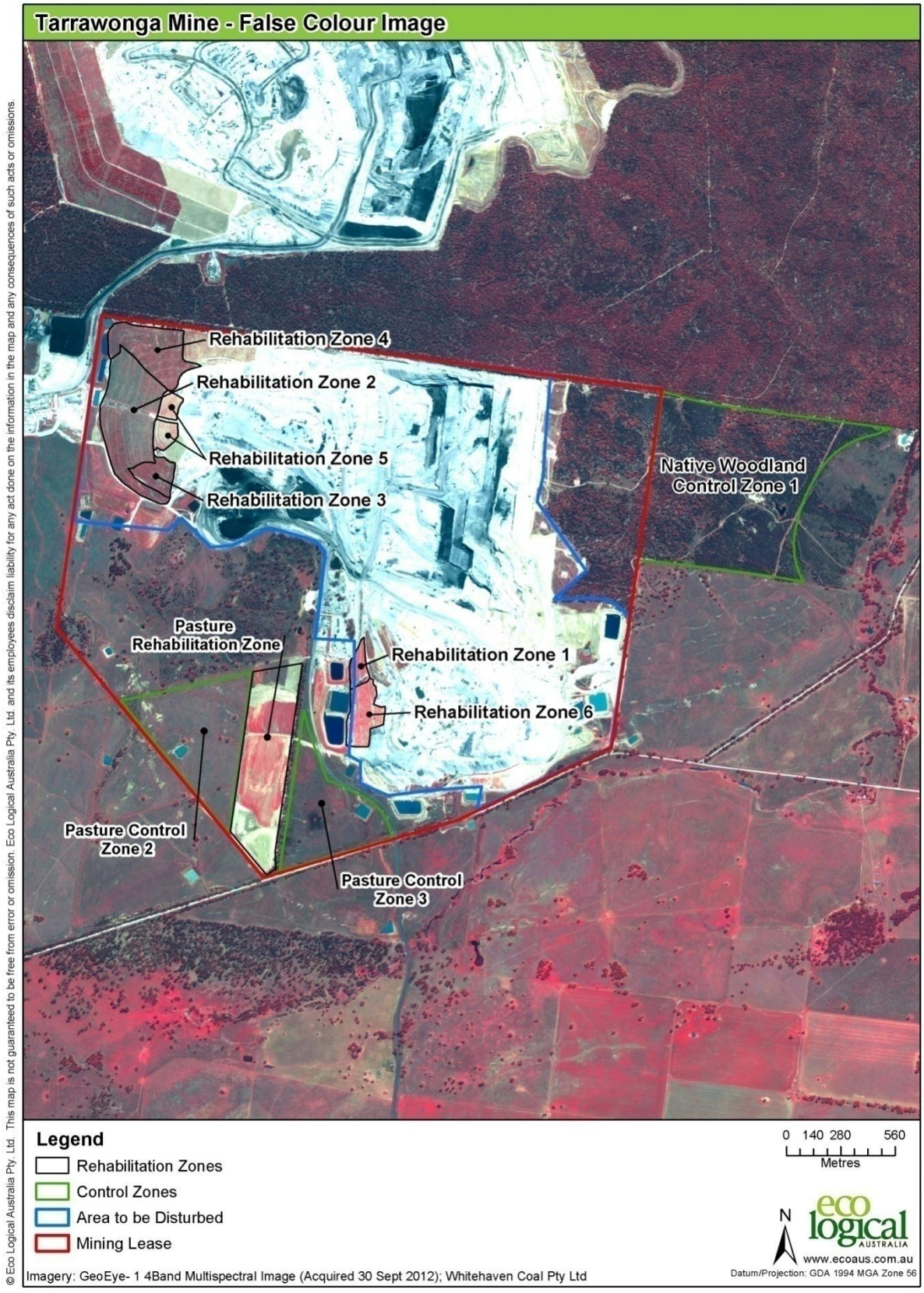

Figure 3-2: Tarrawonga Mine – False Colour Image (Sept 2012)

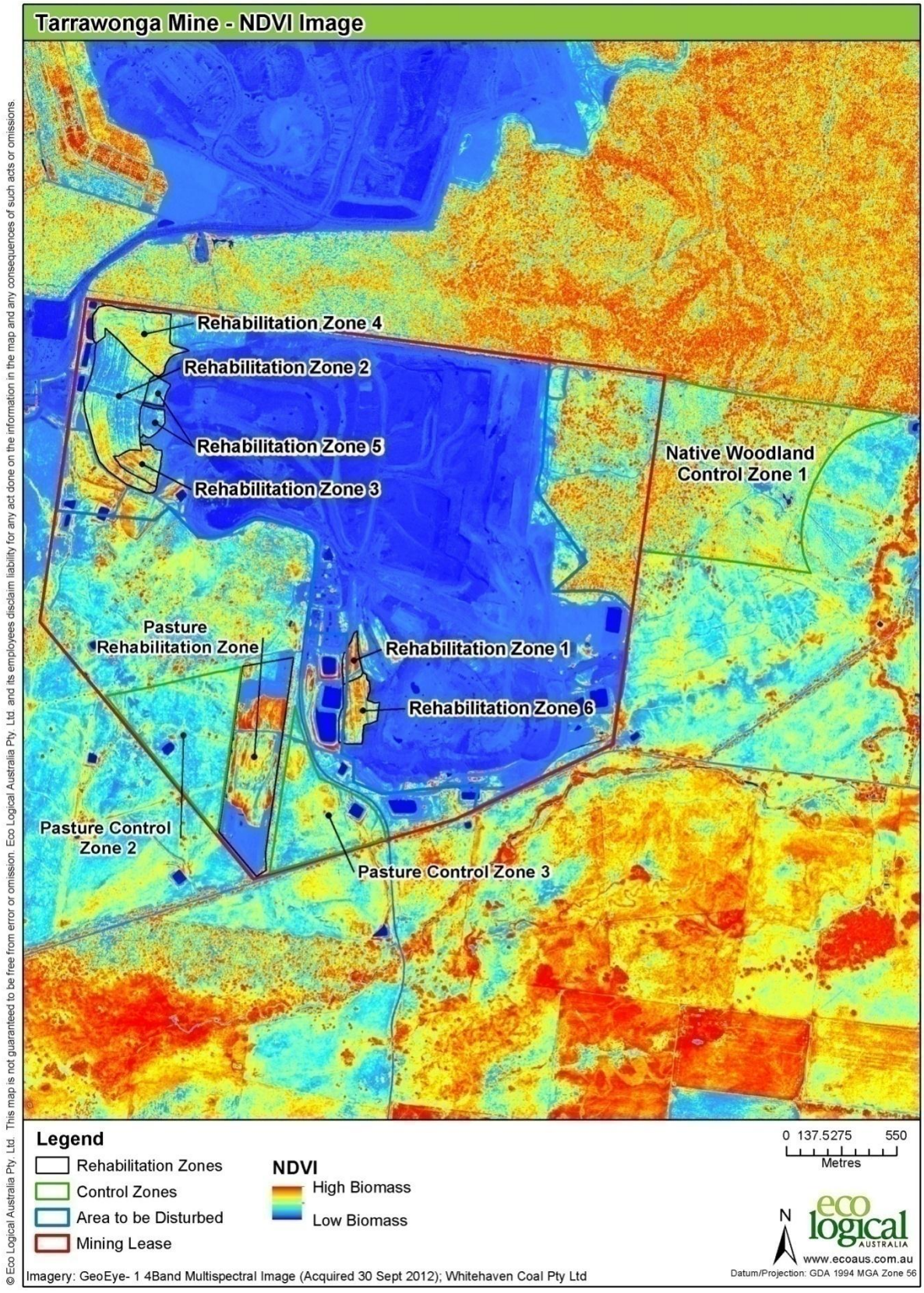

Figure 3-3: Tarrawonga Mine – NDVI (Sept 2012)

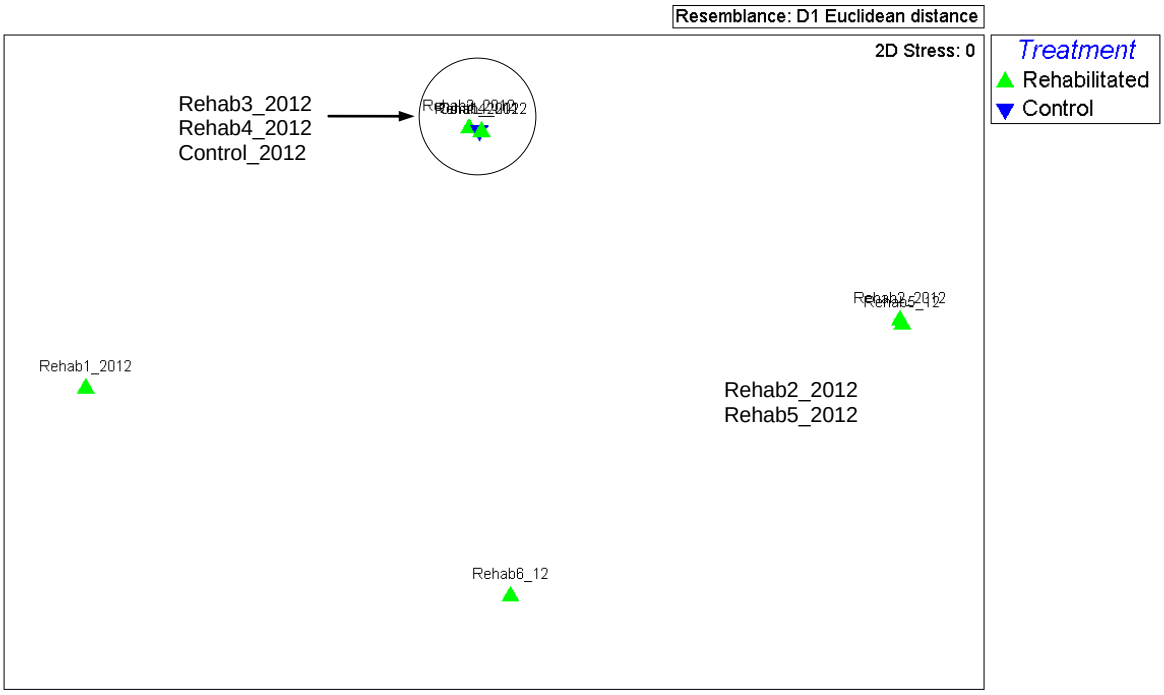

Figure 3-4: MDS plot of rehabilitation and control zones – 2012 NDVI data

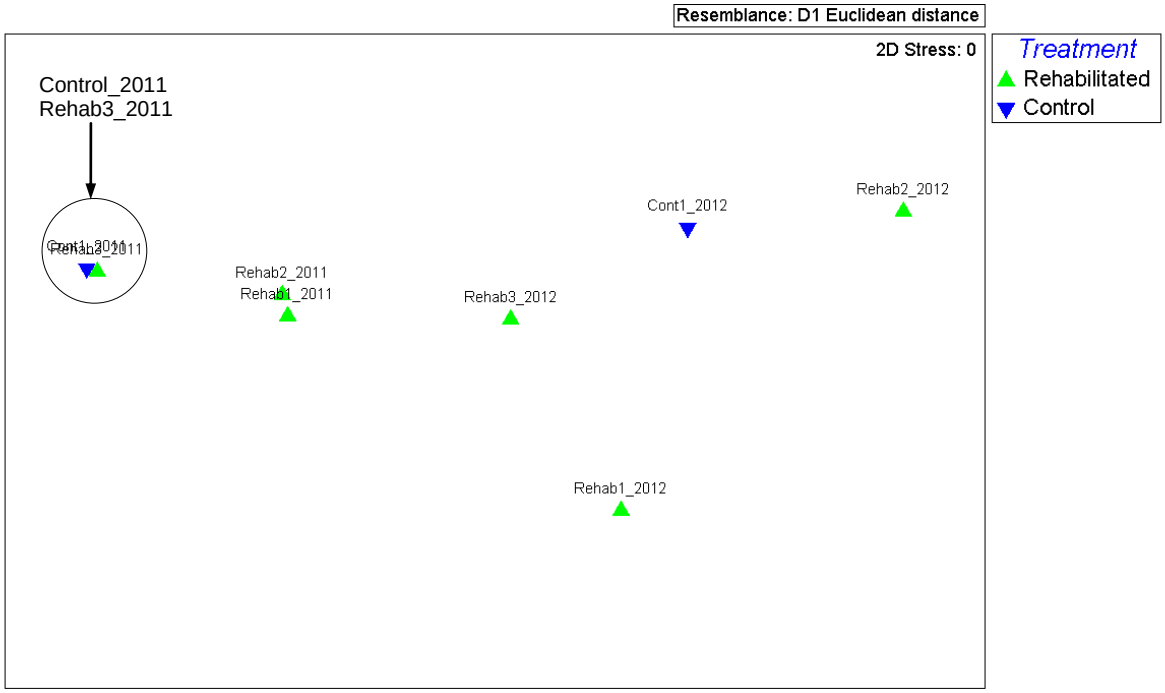

Figure 3-5: MDS plot of control and rehabilitation zones between 2011 and 2012 - NDVI data

Table 3-1: Summary of NDVI statistics between zones (Sept 2012 image capture)

NDVI ZONE	MEAN (Sept 2012)	SD	MODE	MEDIAN	HOMOGENEITY 2012 SITES*
Rehabilitation Zone 1	0.443	0.125	0.236	0.473	A
Rehabilitation Zone 2	0.284	0.064	0.286	0.287	B
Rehabilitation Zone 3	0.423	0.076	0.526	0.432	C
Rehabilitation Zone 4	0.365	0.075	0.385	0.385	D
Rehabilitation Zone 5	0.269	0.058	0.349	0.265	E
Rehabilitation Zone 6	0.402	0.117	0.5	0.429	F
Native Woodland Control Zone 1	0.377	0.079	0.333	0.363	G

* Zones with the same homogeneity letter are not statistically different

Table 3-2: Comparison of NDVI statistics (2011 and 2012)

NDVI ZONE	MEAN (Sept 2011)	MEAN (Sept 2012)	HOMOGENEITYBETWEEN 2011 AND 2012
Rehabilitation Zone 1	0.537	0.443	No
Rehabilitation Zone 2	0.546	0.284	No
Rehabilitation Zone 3	0.611	0.423	No
Native Woodland Control Zone 1	0.378	0.377	No

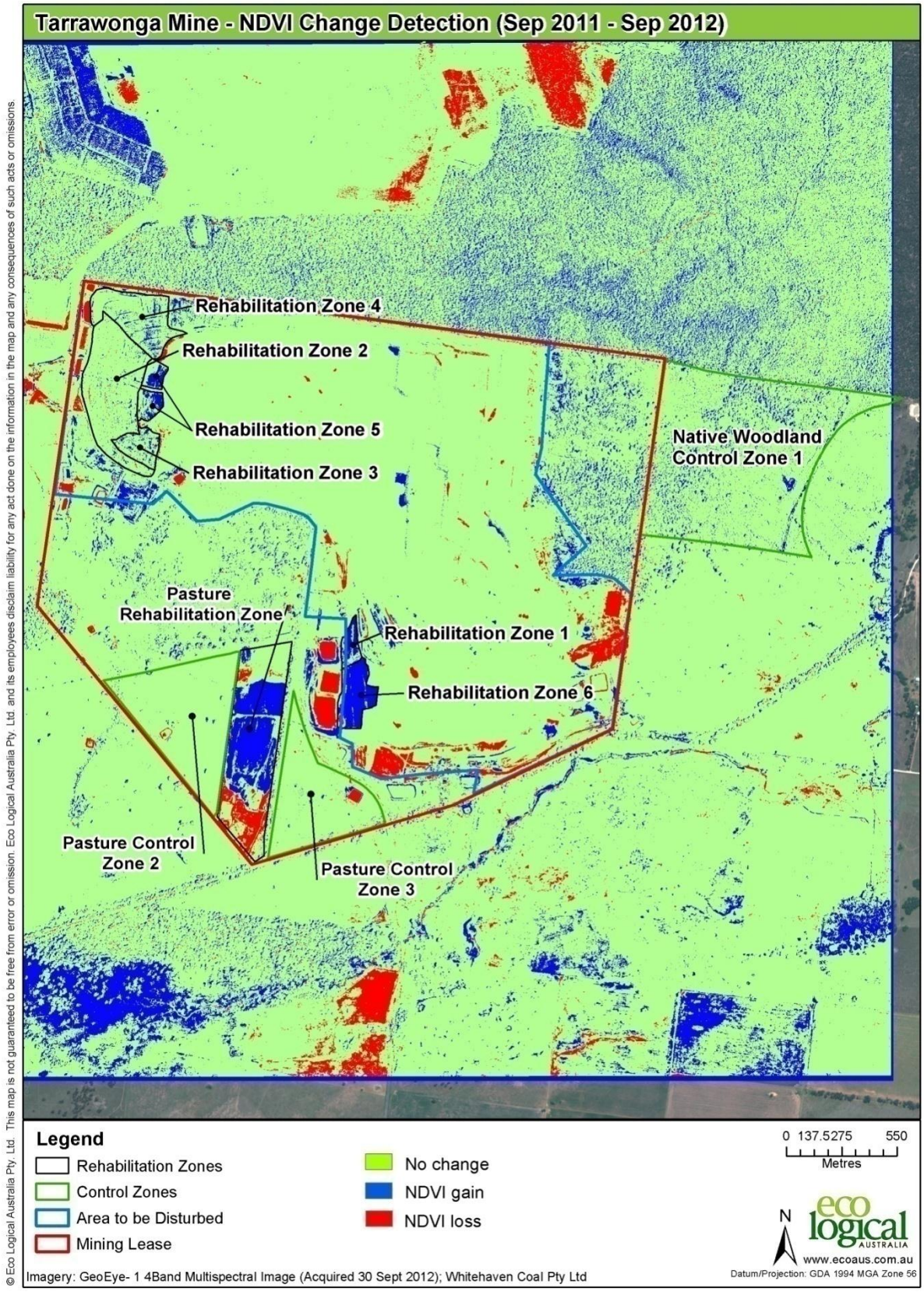

Figure 3-6: NDVI change detection image (Sept 2011 – Sept 2012)

Table 3-3: NDVI change detection image analysis (comparison of September 2011 and September 2012 images)

ZONE	YEAR REHABILITATED	COMMENT*
Rehabilitation Zone 1	2009/10	Significant positive change across almost entire zone, attributed to an increase in groundcover from ongoing rehabilitation.
Rehabilitation Zone 2	2007/2008	No significant change detected. Few small patches of positive change across the zone, attributed to image shift and possible small increase in groundcover.
Rehabilitation Zone 3	2008/2009	No significant change. Small areas of positive change across the zone, attributed to image shift and possible small increase in groundcover.
Rehabilitation Zone 4	2008/2009	No significant change detected. Small areas of positive change across the zone, attributed to image shift and possible small increase in biomass.
Rehabilitation Zone 5	2012/2013	Positive significant change across entire zone, attributed to recent rehabilitation (2012/2013).
Rehabilitation Zone 6	2012/2013	Positive significant change across entire zone, attributed to recent rehabilitation (2012/2013).
Native Woodland Control Zone 1	N/A	No significant change detected. Areas of positive change attributed to image shift.
Pasture Rehabilitation Zone	2012/2013	Positive and negative significant change across the site, attributed to pasture management practices.
Pasture Control Zone 2	N/A	No significant change detected.
Pasture Control Zone 3	N/A	No significant change detected.
General		No significant change. Increase in mine footprint, particularly towards the south. General increase in groundcover along a drainage channel towards the south of the image.

* Significant change determined by (areas >0.1 ha with >+/- 2 standard deviations from average)

3.2 WOODLAND SURVEYS

The full suite of results for woodland vegetation surveys is provided in **Appendix D**. Results for fauna surveys are in **Appendix E**.

3.2.1 Vegetation

Twenty two canopy and midstorey species (18 native midstorey species, one exotic midstorey species and three native overstorey species) were recorded across all vegetation monitoring plots, however, only plots 1 to 5 (Temporary Native Woodland Control Zone) recorded overstorey species. No canopy or midstorey species were recorded in plot 6 (Rehabilitation Zone 2). Plot 1 (Temporary Native Woodland Control Zone) recorded the highest number of midstorey and overstorey species (eight species), followed by plots 2, 3, 4, 5 (Temporary Native Woodland Control Zone), 8 and 9 (Rehabilitation Zone 2) which all recorded a species richness of five or six (**Figure 3-7**).

Canopy and midstorey species diversity was similar between years at Rehabilitation Zone 2. Plots 7 and 10 only decreased by one species from 2011 to 2012 and plots 8 and 9 maintained a species diversity of five for the same period. Temporary Native Woodland Control Zone plots 2, 3 and 5 also recorded a similar species diversity between years (+/- 1 species), while Plot 1 decreased by three species and plot 4 decreased by four species (**Figure 3-7**).

Lycium ferocissimum (African Boxthorn), recorded in plot 8 (Rehabilitation Zone 2), is listed as a Class 4 Noxious Weed for the Gunnedah Shire Council under the *Noxious Weeds Act 1993* (DPI 2013).

Although temporal variation in data may reflect actual on-ground change between years, it could also occur as a result of the actual plot position varying slightly between each survey. This is particularly apparent for sites located in vegetation with a sparse shrub and canopy layer.

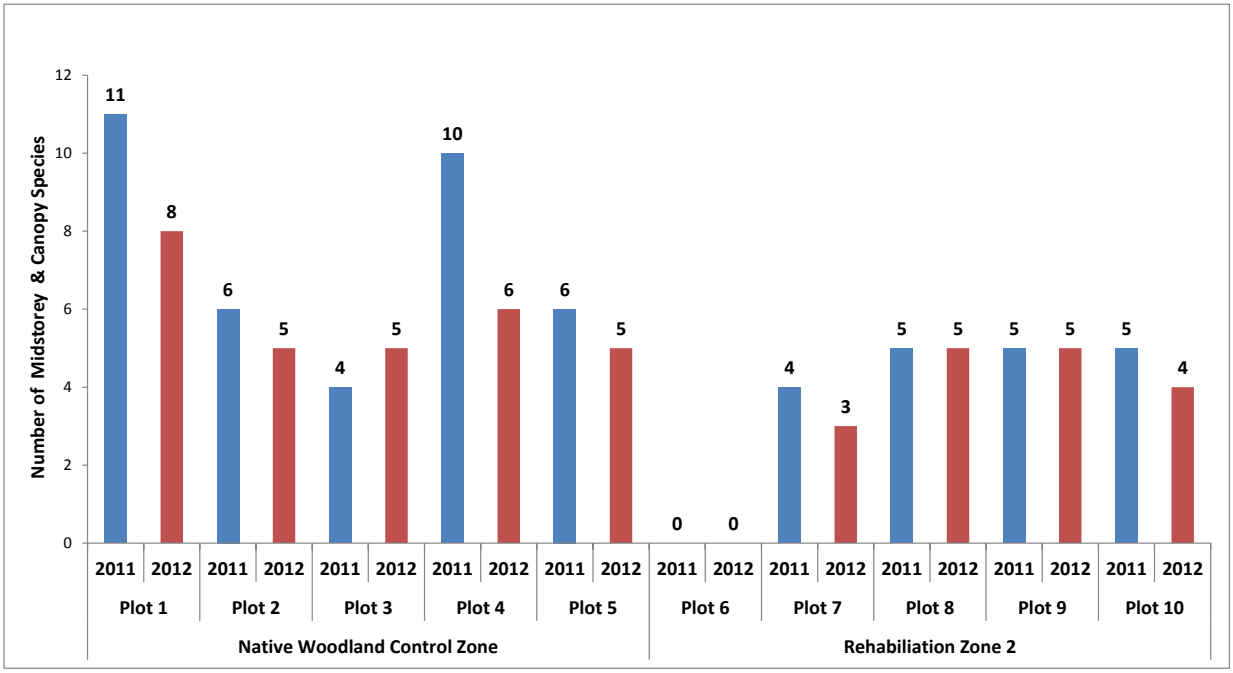

Figure 3-7: Comparison of the number of canopy and midstorey species recorded between years at each plot

Only plots within the Temporary Native Woodland Control Zone was canopy cover recorded. Canopy TPFC ranged from 2% to 5% in this zone (**Table 3-4**). There was minimal change in canopy TPFC between years for the native woodland control plots (**Table 3-4**). Canopy species planted within Rehabilitation Zone 2 (plots 6 to 10) are yet to reach the upper strata; for this round of monitoring they have been included as midstorey cover.

Midstorey cover was recorded in all plots, with the exception of plots 6 and 7. Midstorey TPFC within the rehabilitated plots ranged from was 1.2% (plot 10) and 1.6% (plot 9), while the highest midstorey TPFC within the control plot zone was 18% (plot 3).

Midstorey TPFC varied substantially between 2011 and 2012 at woodland control plots 2 and 3 (significant increase and decrease respectively). Midstorey TPFC was recorded in the rehabilitation control plots 9 and 10 for the first time (1.6% and 1.2%, respectively).

Canopy and midstorey PFC was estimated at plots 2 and 8, respectively, during the 2012 survey because cover over the established transect line was not representative of the plot. As this estimate was not done during the 2011 survey no inference should be made about PFC for these plots.

Table 3-4: True projected foliage cover recorded in vegetation monitoring plots (2011 and 2012)

ZONE	PLOT	CANOPY %		MIDSTOREY %[#]	
		2011	2012	2011	2012
Temporary Native Woodland Control Zone	1	5	2	0.7	2.8
	2	0	3*	10.5	1.9
	3	3	3	0.6	18
	4	8	5	2.8	5.1
	5	2	2	8.5	5.9
Rehabilitation Zone 6	6	0	0	0	0
	7	0	0	0	0
	8	0	0	0	5*
	9	0	0	0	1.6
	10	0	0	0	1.2

[#] 0% Canopy cover indicates that species yet to reach canopy height

* Denotes an estimation of PFC as cover over transect line was not representative of plot

In each 20 m by 20 m quadrat all tree and shrub species greater than 1 m in height were recorded. Comparisons between plot data in 2011 and 2012 showed that species diversity remained similar (plots 3, 5, 8 and 9) or decreased (all other plots) (**Figure 3-8**). Overall, 20 native species were recorded in 2011, and 16 in 2012. African Boxthorn was recorded in both years.

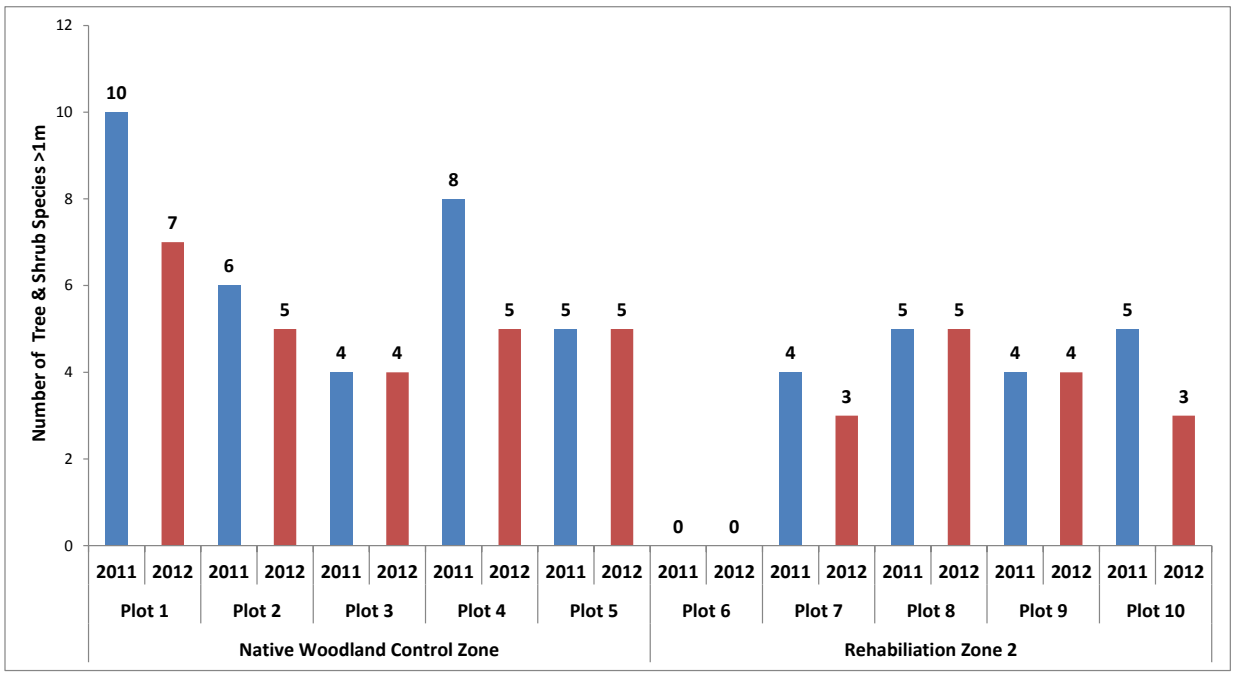

Figure 3-8: Comparison of the number of tree and shrub species >1 m recorded between years at each plot (20 x 20 m quadrat)

There was a reduction in the total number of groundcover species recorded between years; a total of 108 groundcover species (77 natives and 31 exotics) were recorded in 2011, while 70 species (47 natives and 23 exotics) were recorded in 2012. The Temporary Native Woodland Control Zone recorded a significant reduction in the total number of groundcover species between years (from 30 to 16) ($p<0.05$) (**Table 3-5**; **Figure 3-9**) while the rehabilitation zone dropped from a total of 23 to 15 groundcover species.

The mean number of exotic species decreased in the rehabilitation zone (from 10 to 5), but increased to 5 in the control zone. The number of exotic groundcover species decreased at each plot with the exception of plots 6 and 8. Native groundcover species decreased between years at all plots, with the exception of plot 6 which remained the same between years (**Figure 3-9**).

There was no significant difference in the total mean number of species recorded between the rehabilitation zone and the control zone in 2012 ($p>0.05$) (**Table 3-5**). Native groundcover species diversity was only marginally higher across the control zone (species diversity ranged between 10 and 16 across the plots) compared to the rehabilitation zone (species diversity ranged between 7 and 16 species across the plots). Mean exotic groundcover species diversity was similar between rehabilitation and control zones in 2012 (4.8 and 4.6) (**Figure 3-9**).

The MDS plot of native groundcover species recorded at both the control and rehabilitation zones in 2011 and 2012 shows that the rehabilitation zone plots differ from the control plots in both 2011 and 2012. The plot also suggests that groundcover species composition for rehabilitation plots and control plots were more similar within than between years (**Figure 3-10**).

Woodland monitoring conducted in 2012 shows that the number and composition of plant species has altered since the baseline survey in 2011, particularly for groundcover species. Total species diversity decreased across both the control zone and the rehabilitation zone, and exotic groundcover species decreased across the rehabilitation zone. The mean number of exotic groundcover species marginally increased at the Native Woodland Control zone.

The decrease in total species diversity recorded across both the control zone and the rehabilitation zone, and particularly for groundcover species, could be attributed to the dry conditions experienced during the months preceding the 2012 survey. Rainfall recorded in 2012 was less than half (107 mm of rainfall) of the long term average (229 mm rainfall); while in 2011 it was almost double (456 mm rainfall). Drier conditions can inhibit the growth of native ephemeral herbs and exotic species and promote the growth of native species more adapted to such conditions. Species diversity will fluctuate in response to seasonal variation through the years, although it is expected that species composition will be better understood when viewed as a long term average over the life of the mine and compared with the control sites and completion criteria.

Opuntia stricta (Common Prickly Pear), recorded in plots 2 and 4, is listed as a Class 4 Noxious Weed for the Gunnedah Shire Council under the *Noxious Weeds Act 1993* (DPI 2013). The control of noxious weeds on private land is the responsibility of the land owner or occupier and its growth must be managed in way that reduces its spread and incidence and continuously inhibits its reproduction. WCML should refer to the site MOP for weed management procedures. NSW Department of Primary Industries (DPI) also recommend suitable management methods (DPI 2012), including foliar herbicides and chipping.

Groundcover composition in terms of native species, exotic species, bare ground, cryptogams, rocks and leaf litter displayed a similar composition within zones (**Figure 3-11**).

Native species cover decreased from 2011 to 2012 in all plots in the rehabilitation zone, except for plot 8 where it increased by 40%. No native species groundcover was recorded in plot 10 for either year. Conversely, native species cover increased by a minimum of 18% in all plots within the control zone.

Exotic species cover in rehabilitation zone plots 6, 7 and 9 decreased by 30% and 6% at plots 8 and 10 (**Figure 3-11**). In the control zone plots, exotic species cover was only recorded in plot 3 (6%). Bare ground decreased at all monitoring plots from 2011 to 2012 (**Figure 3-11**).

Groundcover weeds were recorded in rehabilitation plots with the most common weeds being *Anagallis arvensis* (Scarlet Pimpernel), *Chloris gayana* (Rhodes Grass) and *Glandularia aristigera* (Mayne's Pest). It is noted that Rhodes Grass is listed in the pastures species list for cover crop established (**Table A-1**). Competition from Rhodes Grass can be a major threat to the establishment of native pastures and can tend towards a monoculture over time if not managed appropriately.

Table 3-5: Summary of groundcover species diversity for Rehabilitation Zone 2 and the Native Woodland Control Zone

SUMMARY STATISTICS	REHABILITATION ZONE 2		TEMPORARY WOODLAND CONTROL ZONE	
	2011	2012	2011	2012
Minimum total species	17	8	23	12
Maximum total species	29	23	34	22
Mean number of species	22.8	15.0	30.2	15.8
Mean number of native species	12.8	10.2	27.2	11.2
Mean number of exotic species	10.0	4.8	3	4.6
P-value of mean number of species (b/w years within zones)	0.073		0.0006	
P-value of mean number of species (b/w rehab and control zone in 2012)	0.8212			

*p>0.05 indicates no significant difference between means

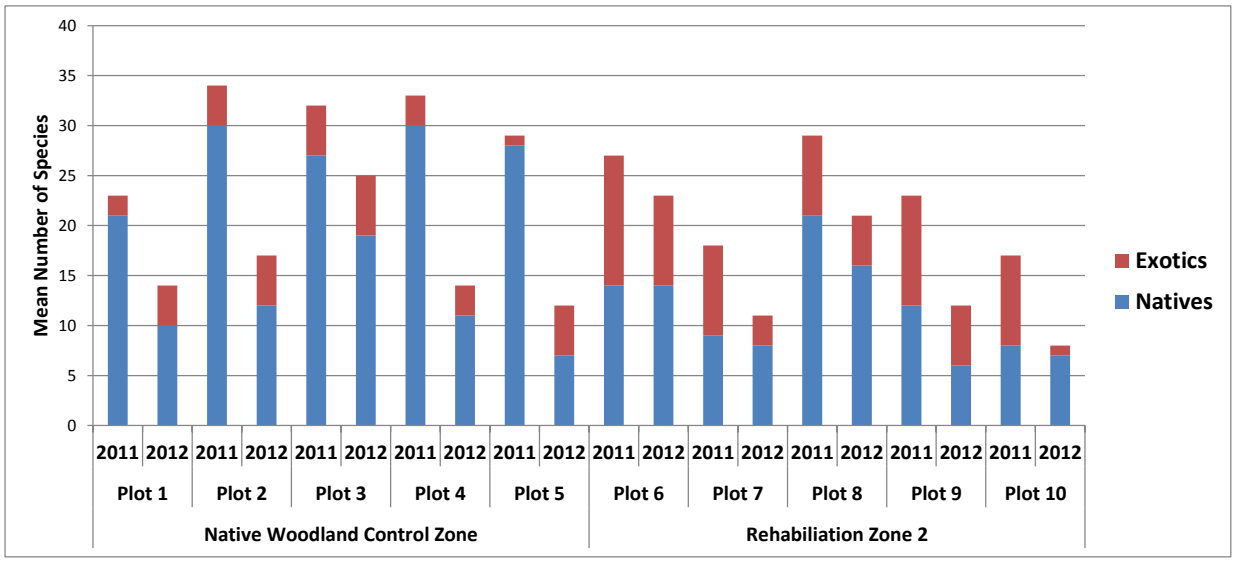

Figure 3-9: Comparison of the mean number of groundcover species between years at each plot

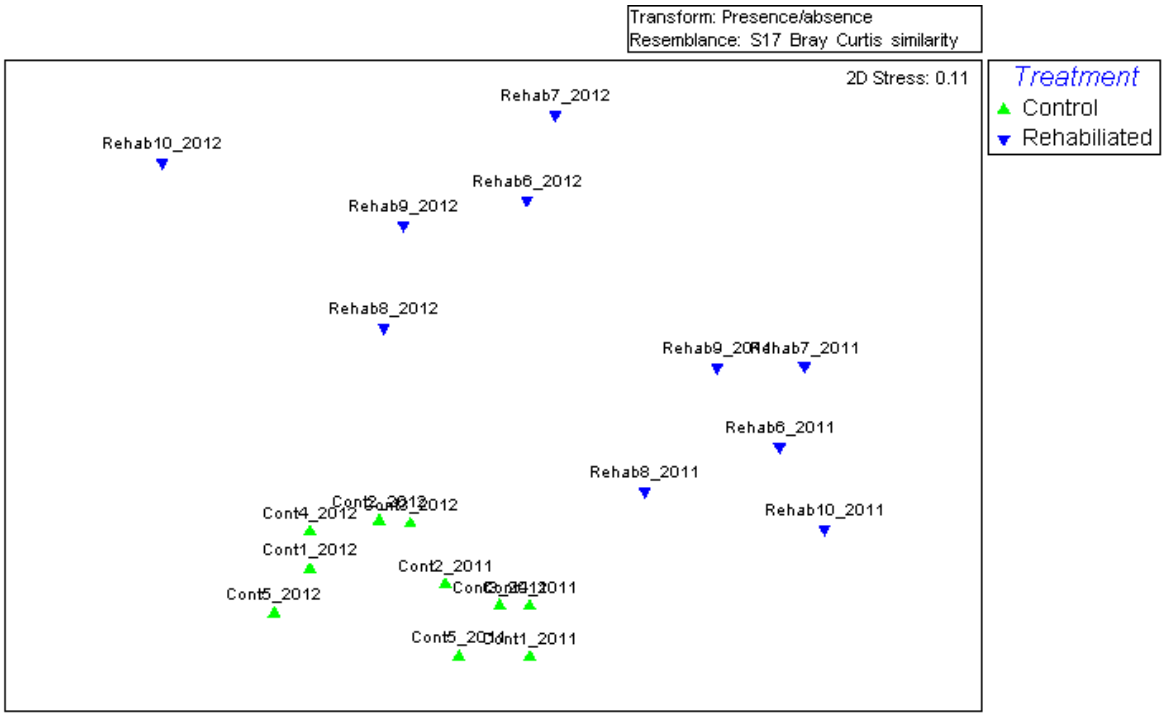

Figure 3-10: MDS of woodland control and rehabilitation zones in 2012 – native groundcover species

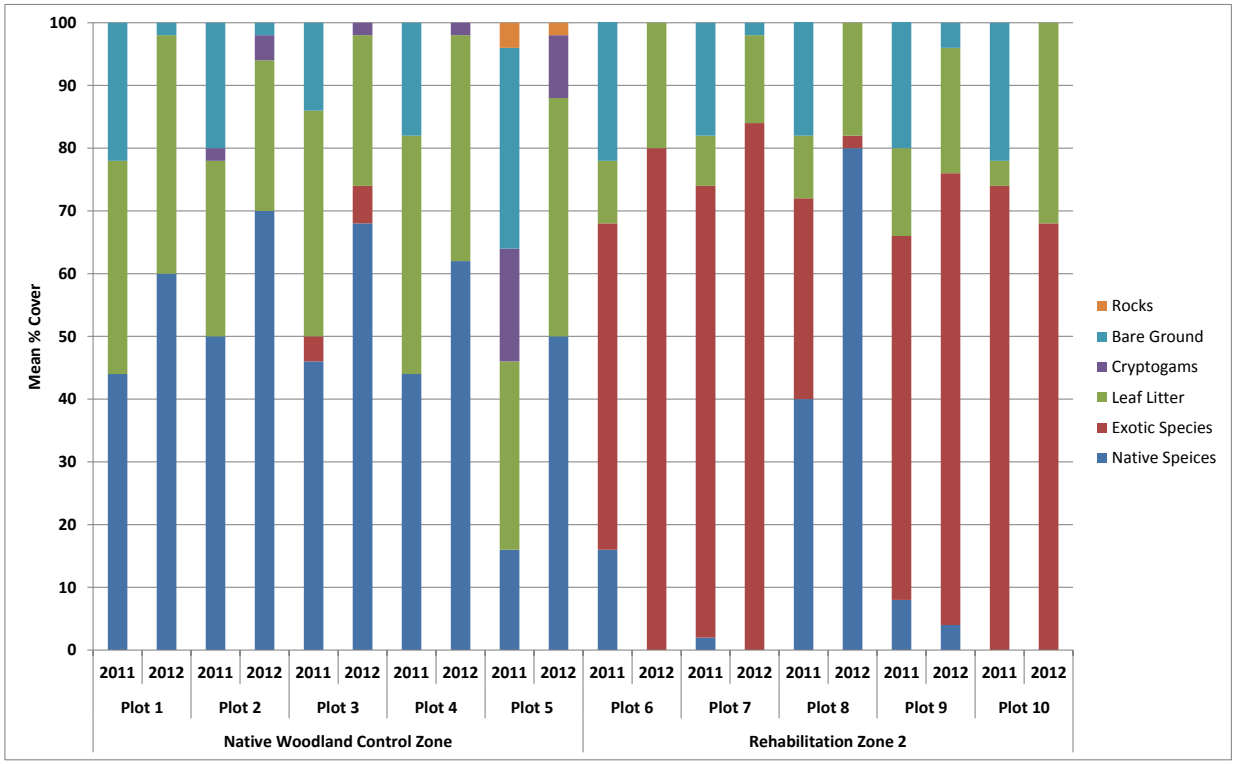

Figure 3-11: Mean percentage groundcover composition for each monitoring area (2011 and 2012)

A visual comparison of photo points from 2011 and 2012 (**Appendix D**) illustrates that the ground cover vegetation was much drier in 2012 than in 2011. This has possibly lead to more rapid senescence of winter annuals and poor germination of summer annuals at the time of survey, which is reflected in the overall abundance of flora per plot, particularly groundcover species. Maximum height of ground cover vegetation appears to be similar between years.

3.2.1 Terrestrial Fauna & Habitat

Fauna monitoring sites within Rehabilitation Zones 2 and 3 recorded fewer species of birds than the two control sites (**Figure 3-12**). The total number of bird species recorded during this sampling period was 56, whereas in 2011 the total was 70; 13 new species were recorded while 27 species recorded in 2011 did not appear in 2012. Fewer bird species were recorded at each control site during this survey period compared with 2011. Rehabilitation Zone 2 (2007/08) recorded 8 species on both survey occasions and Rehabilitation Zone 3 (2008/09) increased from 4 to 10 in 2012.

A number of species listed as vulnerable under the TSC Act were recorded during the 2012 monitoring period. A single *Hieraaetus morphnoides* (Little Eagle) and a pair of *Climacteris picumnus* (Brown Treecreeper) were recorded in Fauna Control Site 4; a pair or group of *Daphoenositta chrysoptera* (Varied Sittella) were recorded in Fauna Control Site 3; and, multiple groups of *Chthonicola sagittata* (Speckled Warbler) were recorded in both of the fauna control sites. Of these, the Little Eagle and the Brown Treecreeper were not recorded in the 2011 survey. The threatened species, *Circus assimilis* (Spotted Harrier), *Glossopsitta pusilla* (Little Lorikeet), *Neophema pulchella* (Turquoise Parrot) and *Hirundapus caudacutus* (White-throated Needletail) were recorded in 2011 and not in 2012.

For consideration of habitat use, avifauna was separated into the following guilds based on their primary foraging niche. Where species may occupy more than one niche, species were grouped according to their main foraging niche (**Table 3-6**).

Table 3-6: Avifauna guilds and their associated feeding niches

GUILD	FORAGING NICHE
Aerial foragers	Primarily feed on insects snatched from the air
Bird of prey	Hunt vertebrates and eat carrion
Canopy feeders	Feed on foliage, flowers, nectar, lerp or insects located in the canopy
Generalist	Omnivorous and feed in most habitats (i.e. on the ground, shrubs and canopy)
Generalist – carnivorous	Feed primarily on vertebrates and invertebrates
Generalist – insects	Feed primarily on insects on the ground
Generalist – plant based	Primarily feed on plant matter (seeds, nectar, fruit) in most habitats (i.e. on the ground, shrubs and canopy)
Ground forager – insects	Feed primarily on insects on the ground
Ground forager – omnivorous	Feed on both insects and seeds on the ground
Ground forager – plant based	Feed primarily on plant matter (seeds, nectar, fruit) on the ground
Bark prober	Feed on insects that live behind bark
Water bird	Those that typically inhabit water bodies

Although the number of bird species and guild diversity occurring in the rehabilitated areas is low relative to the control areas, there has been an increase in guild diversity at both rehabilitation sites from 2011 to 2012. The number of species between years has not changed significantly at Rehabilitation Zone 2 (2007/2008); rather there are fewer species from the “ground forager – insects” guild and a new presence of species that occupy the “canopy feeder”, “generalist” and “aerial forager” guilds. Guilds not recorded at Rehabilitation Zone 2 (2008/2009) in 2011 and present in 2012 include “generalists”, “ground foragers – plant based”, “birds of prey” and “aerial foragers” (**Figure 3-12**). Both control sites showed a decrease in the number of species within the “canopy feeder” guild. Water birds were the only foraging guild not observed.

Both rehabilitation monitoring sites showed an increase in bird feeding guild diversity from 2011 to 2012, indicating that habitat at the rehabilitation sites is possibly diversifying with the progression of the rehabilitation.

The total number of bird species recorded decreased from 2011 to 2012, most likely attributed to a reduction in resource availability associated with the drier conditions of 2012. Birds will migrate to areas of more suitable habitat in dry conditions.

Macropus giganteus (Eastern Grey Kangaroo) and *Macropus robustus* (Common Wallaroo) were recorded at all four fauna sites surveyed. *Macropus rufogriseus* (Red-necked Wallaby) was recorded at Fauna Control Site 4 only and *Wallabia bicolor* (Swamp Wallaby) was recorded at both of the fauna control sites.

No *Phascolarctos cinereus* (Koala) were recorded during the 2012 survey.

Reptiles recorded included Boulenger's Skink (*Morethia boulengeri*) and Lace Monitor (*Varanus varius*) at Fauna Control Site 4 and Eastern Bearded Dragon (*Pogona barbata*) at Fauna Control Site 3 (Temporary Native Woodland Control Zone). No amphibians were recorded in 2012.

The total number of fauna species reduced from 77 in 2011 to 63 in 2012 (**Figure 3-12**; **Figure 3-13**). The number of mammal species increased from three in 2011 to four in 2012; the native mammals, Red-necked Wallaby and Swamp Wallaby were not recorded in 2011, while the introduced *Oryctolagus cuniculus** (Rabbit) was not recorded in 2012. Reptiles increased from one in 2011 to three in 2012 with the addition of the Eastern Bearded Dragon and the Lace Monitor in 2012. Conversely, amphibian species diversity decreased from three species in 2011 to no species in 2012. Bird species diversity decreased from 70 species in 2011 to 56 in 2012 (**Figure 3-12**; **Figure 3-13**).

While no rabbits were recorded in 2012, a Rabbit warren was noted in the vicinity of Native Woodland Control Zone Plot 2.

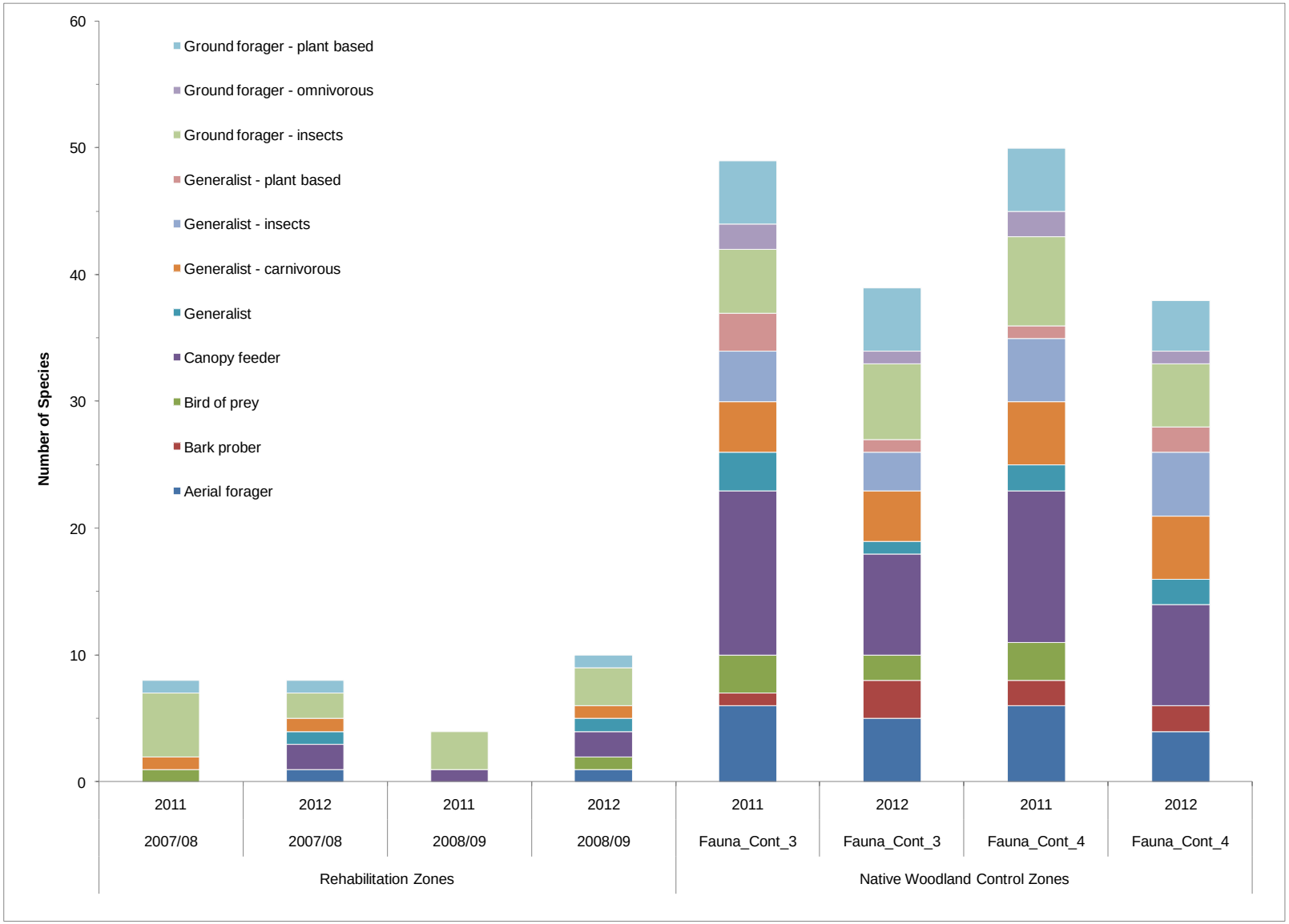

Figure 3-12: Bird species and their associated guilds recorded at Tarrawonga (2011-2012)

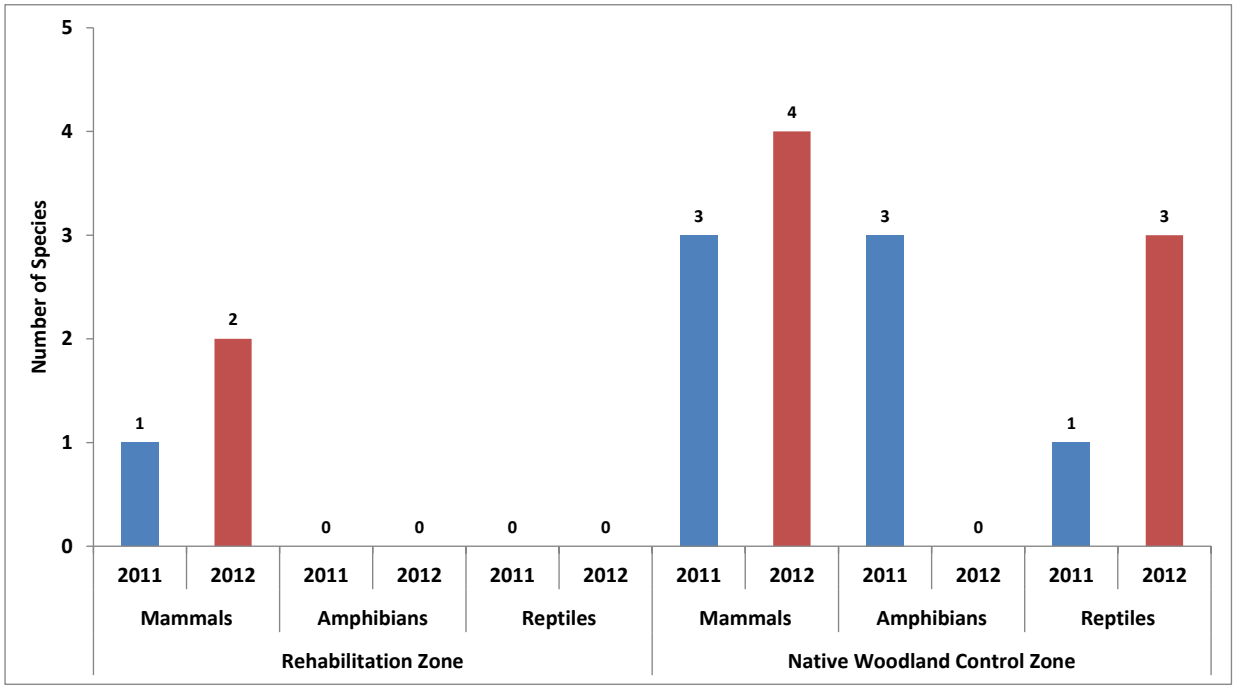

Figure 3-13: Number of mammal, amphibian and reptile species recorded within the fauna monitoring sites - 2011 and 2012

4 Recommendations & Conclusion

Limited rehabilitation works have been undertaken at Tarrawonga. A multi-scale, multi-date monitoring program has been implemented to quantify the performance of rehabilitation works undertaken to date against control areas.

4.1 REMOTE SENSING

Multi-spectral imagery provides information relating to land cover and condition across the entire site, including rehabilitated areas and control zones. Statistical analysis of NDVI data from each zone indicates that rehabilitated areas are yet to reach a PAB level similar to that of the control zone. One anomaly detected via remote sensing was the low PAB of the oldest rehabilitation zone. A review of true colour images between the two years indicates a reduction in groundcover is the likely cause. The more recently rehabilitated areas displayed higher levels of PAB as expected.

Generally PAB across the site was lower in 2012 than the previous monitoring period. This decrease is mostly attributed to reduced groundcover in response to drier conditions. 2011 image capture was undertaken after above average rainfall, while below average rainfall preceded the four months prior to the 2012 image capture.

Change detection assessment undertaken on the two NDVI images (September 2011 and September 2012) highlighted significant changes in four zones. (As specified in the RMP, an area of significant change was identified if a change gain/loss of two (or more) standard deviations from the mean occurred in area greater than 0.1 ha.) Significant gain in recently rehabilitated zones (zones 5 and 6, in 2012/2013) is most likely due to increased groundcover from plantings associated with rehabilitation, while areas of change (increase and decrease) across the pasture zone is likely due to ongoing pasture management. The increased change in rehabilitation zone 1 appears to be due to increased groundcover (possibly due to ongoing works in this area), however field inspection is warranted to ensure no weeds are present. It is recommended that image analysis is undertaken prior to completing field monitoring for vegetation so that any areas of change identified via remote sensing can be assessed in the field.

As recommended in the 2011 monitoring report, the assessment LiDAR data will provide high resolution information across the site for topography, tree canopy height and tree foliar density. The capture of LiDAR data will supplement the baseline data for this rehabilitation program and provide additional data for documenting these landscape scale changes throughout time.

4.2 WOODLAND SURVEYS

4.2.1 Vegetation

Woodland monitoring conducted in 2012 shows that the number and composition of plant species has altered since the baseline survey in 2011, particularly for groundcover species. Total species diversity decreased across both the control zone and the rehabilitation zone, and exotic groundcover species decreased across the rehabilitation zone. The mean number of exotic groundcover species marginally increased at the Native Woodland Control zone. These changes may be due to the dry conditions experienced during the months preceding the 2012 survey, especially when compared to both the long term average rainfall and the 2011 rainfall over the same period. Species composition will be better

understood when viewed as a long term average over the life of the mine and compared with the control sites and completion criteria.

Competition from Rhodes Grass can be a major threat to the establishment of native pastures and if not managed appropriately it may compromise the objectives of the woodland rehabilitation (i.e. to restore the biodiversity and ecological integrity of areas affected by mining). Additionally, species such as Rhodes Grass tend to from a monoculture over time. If it is not grazed repeatedly by stock it is of comparatively low nutritive value. The *Invasion of native plant communities by exotic perennial grasses* is listed as a Key Threatening Process in Schedule 3 of the Threatened Species Conservation Act. Rhodes Grass and Phalaris, both listed within the rehabilitation species list, are both specifically mentioned as exotic perennial grasses that invade smaller areas of native plant communities (OEH 2011). In light of this listing, WCML should remove both these species from their pasture species mix for future works.

To meet the long term objective of revegetating the majority of the post-mining landform to communities that emulate existing vegetative communities or those that occurred prior to agricultural related disturbance, WCML must develop a floristic profile of suitable ground cover, shrub and tree species per vegetation community type suitable for rehabilitation. The use of some exotic species may result in higher management costs in the long term.

For the purposes of this rehabilitation monitoring, change in vegetation condition for rehabilitated sites is measured against control sites; in this case control sites have been selected in adjacent and relatively undisturbed areas, representative of the native vegetation communities. However, it is likely that these sites will be disturbed by future mining activities. In light of the recent provisional approval given to the expansion of Tarrawonga, it is recommended that suitable control sites for woodland surveys are selected and established within areas that are representative of undisturbed vegetation communities in the area. Suitable sites may be found within the Leard State Forest and should be investigated further to determine their appropriateness for on-going monitoring, with consideration given to historical land management practices within Leard State Forest (e.g. logging, grazing etc). If suitable sites are found, discussions with the Forestry Corporation regarding access will be required and, pending access agreements, an application for *Special Purposes Permits for Research* will need to be submitted. As required under the conditions of this permit, results of any surveys undertaken within Leard State Forest will be provided to the Forestry Corporation.

Should the existing control plot continue to be used for monitoring, an abridged survey methodology could be adopted for structural attributes now that baseline data have been obtained. Attributes and parameters that do not vary significantly between years (e.g. number of large trees, DBH and height thresholds) should be measured every three years, as opposed to yearly.

Measurements for canopy and midstorey cover are taken as a percentage along a transect. Where trees have been planted in rows it has been found that canopy and midstorey cover measurements along the transect do not appear representative of the entire plot. Therefore, in addition to the transect cover measurements an experienced ecologist should provide an estimate of percentage cover for the plot.

4.2.2 Terrestrial Fauna & Habitat

The number and composition of mammals, amphibians, reptiles and birds recorded in 2011 and 2012 show that rehabilitated sites are yet to resemble control conditions.

Bird presence / absence data has included a breakdown of species grouping them into foraging guilds. However, to assess bird usage of the site, field observations should be broadened to note numbers of

birds (by species) and actual usage of the sites resources (e.g. foraging, roosting, breeding, flying through). This will provide greater detail into the use of control sites and help to set targets for bird use of rehabilitation sites.

In the absence of artificial habitat for monitoring reptile diversity on site, a revised reptile monitoring strategy should be developed. Monitoring should include both control and rehabilitation sites to determine if rehabilitation sites have been created to provided suitable reptile as intended.

When monitoring sites are established within permanent control zones, monitoring of mammals and reptiles should be included in the terrestrial fauna and habitat methodology to establish a baseline dataset. More detailed fauna surveys should be considered within rehabilitation zones when vegetation community structure and concomitant habitat becomes more complex to be able to provide suitable fauna habitat.

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Appendix A Rehabilitation History

A.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
- Inter burden 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 (WCL 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 were also intended to extend into the originally approved 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 has since been approved by the DoPI.

A.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 $\leq$ 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 A-1**. The mix generally incorporates a cover of Japanese Millet during spring/summer months and Rye Corn during the autumn/winter months.

Table A-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 A-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 to be given to direct seeding 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 A-2: Tree/shrub species

COMMON NAME	SCIENTIFIC NAME
Trees	
White Box	*Eucalyptus albens*
Blakely's Red Gum	*Eucalyptus blakelyi*
Yellow Box	*Eucalyptus melliodora*
Narrow-leaved Ironbark	*Eucalyptus crebra*
Bimble Box	*Eucalyptus populnea*
Tumbledown Gum	*Eucalyptus dealbata*
Pilliga Grey Box	*Eucalyptus pilligaensis*
Wilga	*Geijera parviflora*
Belah	*Casuarina cristata*
Western Rosewood	*Alectryon oleifolius*
Shrubs	
Western Golden Wattle	*Acacia decora*
Amulla	*Eremophila debilis*
Sandalwood	*Santalum lanceolatum*
Eastern Cottonbush	*Maireana microphylla*
Native Jasmine	*Jasminum lineare*
Gargaloo	*Parsonsia eucalyptophylla*
Yellow Berry Bush	*Maytenus cunninghamii*
Wild Lemon	*Canthium oleifolium*
Wild Orange	*Capparis mitchellii*
Hopbush	*Dodonaea* spp.
Emubush	*Eremophila longifolia*
Native Olive	*Notelaea microcarpa*
Butterbush	*Pittosporum angustifolium*
Cough Bush	*Cassinia laevis*

Source: WCL 2010

Fencing is being established around rehabilitated areas if required. 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, appropriate erosion control devices will be implemented accordingly. Tree guards will be installed where stock exclusion has not occurred if grazing of tubestock is deemed excessive. Noxious weeds will be regularly monitored.

A.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.

The external boundary of ML 1579 covers an area of approximately 726 ha. A total estimated area of 293.9 ha has been disturbed to date (TCPL 2011). Areas of completed rehabilitation (as at 2012) are shown in **Figure A-1.** The 2011/2012 AEMR (TCPL 2011) indicates that 27.5 ha of land has been rehabilitated and has established tube stock and a further 9.4 ha of land has had tube stock recently planted but are not yet established. A summary of rehabilitation areas is provided in **Table A-3**.

Figure A-1: Tarrawonga Mine - existing rehabilitation areas (2012)

Table A-3: Rehabilitation summary (as at 2012)

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)	30.7 ha
Southern Emplacement	Native woodland with an additional area of pasture	102 ha	6.2 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 figures presented in 'area rehabilitated' have been calculated using rehabilitation polygons created in ArcGIS, and therefore do not exactly match those presented in the 2011/2012 AEMR.

A conceptual landform rehabilitation plan that incorporates the proposed expansion is provided in the Tarrawonga Coal Project Environmental Assessment (Resource Strategies 2012).

A.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 proposed 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.

Greater detail regarding the final rehabilitated landform will be supplied 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 summarised in **Table A-4**. These objectives shall be revisited each monitoring period to ensure currency with any new MOPs or other management plans associated with the recently approved continuation and extension of operations at the Tarrawonga Coal Mine.

Table A-4: Summary of rehabilitation objectives for Tarrawonga

TIMEFRAME	OBJECTIVE
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 areas
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.

A.5 BIODIVERSITY OFFSET AREAS

Under the terms of a modified approval in October 2010 and subsequent provision of a revised Biodiversity Offset Strategy to the Department of Planning and Infrastructure, the removal of the original biodiversity offset areas for the Tarrawonga development on and adjoining the Tarrawonga mine site was approved. To replace these areas, it was approved to retire 2,731 credits from the Whitehaven Regional Biobank site to account for the original Tarrawonga development, and a further 3,051 credits to account for the modified development as approved in October 2010. As a consequence, this Rehabilitation Monitoring Program does not consider the management or development of the offset requirements for Tarrawonga as these are dealt with under the Biobank Management Plan.

Appendix B Management Triggers

B.1 REMOTE SENSING MONITORING TRIGGERS

A two-tiered system of triggers for management was developed in the RMP as a 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 B-1**).

The second tier of response is triggered if changes are confirmed or discovered on-ground (**Table B-2**). These triggers instigate the development of site specific management responses and remedial actions.

Table B-1: Remote sensing monitoring triggers for management

TRIGGER	INVESTIGATION	MANAGEMENT
Remote sensing change detection identifies area of significant change (> +/-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 B-2**).

Table B-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. Noxious weed management plans have been produced by the Gunnedah Shire Council for all noxious weed species except Galvanised Burr (*Sclerolaena birchii*). 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

B.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 B-3**).

Table B-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 WCML
Weed infestation	Notify WCML
Soil erosion	Notify WCML

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 B-4**).

Table B-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 WCML
Soil erosion	Notify WCML

Appendix C Methods

Rehabilitation has taken place in a progressive manner to create areas of woodland, resulting in six unique rehabilitation zones (**Table C-1; Figure C-2**). A control area to the east of the site has been selected as a temporary control zone using plots established in earlier monitoring programs.

Table C-1: Rehabilitation monitoring zones

LANDSCAPE TYPE	REHABILITATION DATE	REHABILITATION ZONE	AREA (ha)
Woodland	2009/10	Rehabilitation zone 1	1.6
Woodland	2007/08	Rehabilitation zone 2	16
Woodland	2008/09	Rehabilitation zone 3	3
Woodland	2008/09	Rehabilitation zone 4	8.7
Woodland	2012/13	Rehabilitation zone 5	3
Woodland	2012/13	Rehabilitation zone 6	4.6

Given the size of the area and the different land uses and domains, a multi-scale, multi-data source monitoring approach has been used. Remote sensing has been used to monitor the entire target area including control areas. Targeted field work was implemented for native vegetation environments, with surveys directed into control and impact areas.

Due to proposed future works at Tarrawonga, only one of the existing rehabilitation zones will remain (rehabilitation zone 2). 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.

C.1 REMOTE SENSING

Multi-spectral image processing and analysis

Multi-spectral imagery was captured across the entire target area (including control areas) on 30 September 2012 using 4-Band GeoEye-1. True colour and false colour images were generated.

The image was also processed into a normalised difference vegetation index (NDVI) image, which provides an indication of photosynthetically active biomass (PAB) across the area. The NDVI image was then stratified into the rehabilitation and control zones for the woodland areas. Point data were extracted from each zone from the NDVI image, from which 1000 points were randomly selected (to ensure equal sample size). NDVI was compared using an ANOVA to determine if data in any of the zones are significantly different from each other ($p<0.05$). Tukey's HSDs (honestly significant difference) comparison of means was used to identify where the differences occur.

NDVI change detection

The NDVI images from 13 September 2011 (as processed for the 2011 monitoring report) and 30 September 2012 were processed to create a change detection image. The September 2011 image was subtracted from the September 2012 image (**Equation 1**).

Equation 1: ∆ NDVI = September 2012 (new image) (NDVI) – September 2011 (old image) (NDVI)

The change detection image was enhanced using a three part density slice to divide the image into three colour categories to help define the areas of change (Red = loss, Blue = gain and Light Green = no change). The density slice was set up to display significant change as regions with change detection values greater than two standard deviations from the mean as regions of change (either gain or loss).

The change image was then assessed one monitoring zone at a time by zooming in to a viewing scale of 1:5,000 or higher (**Figure C-1**). In addition to the NDVI change image, the true colour and false colour images from September 2011 and September 2012 were compared and assessed for areas of significant change.

C.2 PASTURE AREA SURVEYS

Pasture monitoring procedures prescribed in the RMP assess parameters that relate to pasture productivity and soil nutrient status. Baseline monitoring for pasture assessment was undertaken in 2011. Rehabilitation of the pasture area has only recently been undertaken; monitoring of the rehabilitated pasture area will take place during the 2013 monitoring period.

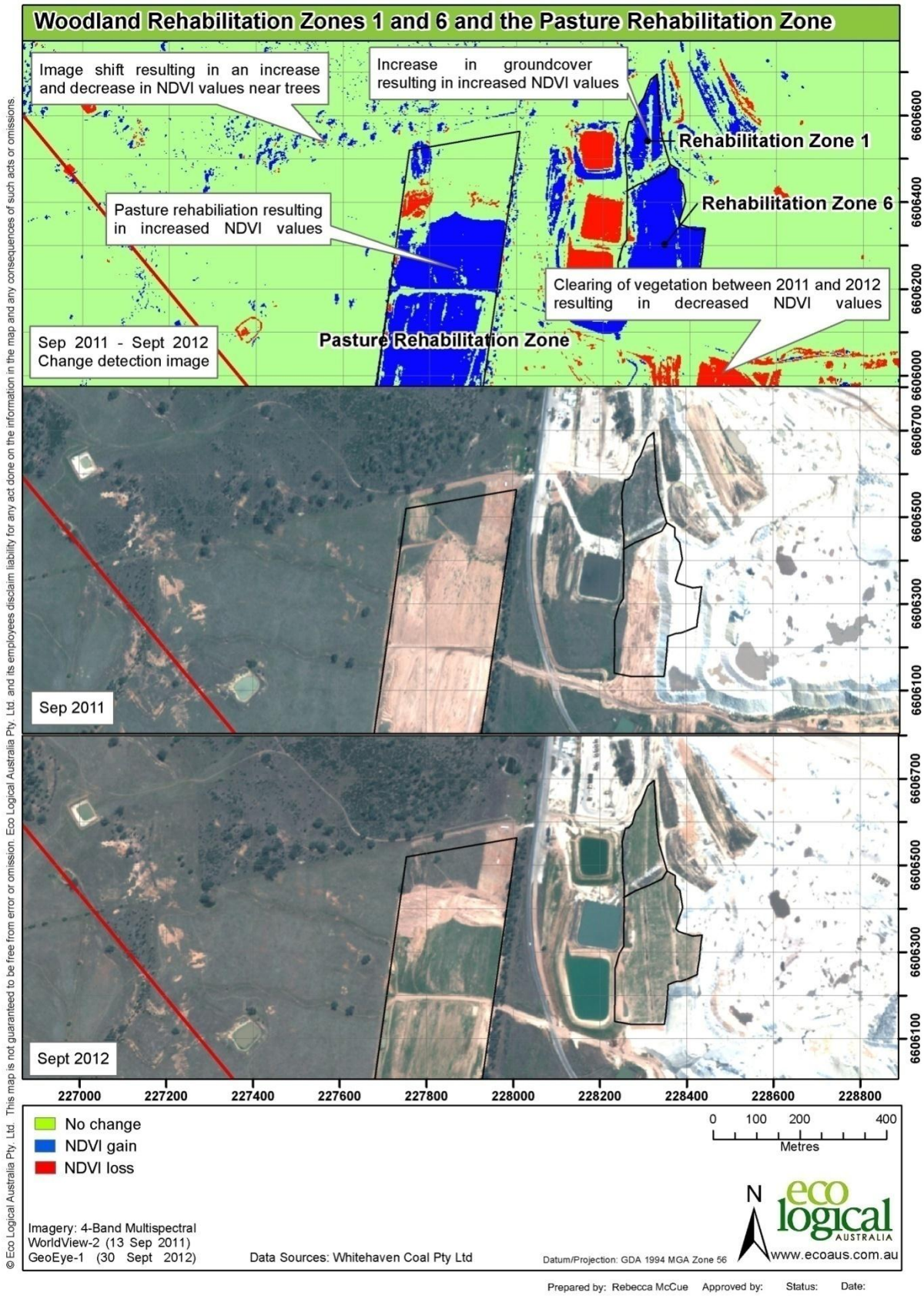


Figure C-1: Example image sequences with change detection from the Pasture Rehabilitation Zone and Woodland Rehabilitation Zones 1 and 6

C.3 WOODLAND SURVEYS

Vegetation

Permanent survey locations were selected and established in 2011. Five sites each were selected from Rehabilitation Zone 2 and from the Native Woodland Control Zone 1 (**Table C-2; Figure C-2**). A targeted design was used to select plot locations so that each site was at least 50 m from a rehabilitation boundary and at least 150 m from another site.

Due to proposed future works at Tarrawonga, it is likely that a number of the rehabilitation zones will be impacted and so only one zone (rehabilitation zone 2) was monitored. 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.

Surveys were conducted between 13 and 14 December 2012 by botanist Dr Lachlan Copeland and environmental scientist Emily Southwell.

Vegetation monitoring focused on the woodland rehabilitation zone and the adjacent control area. Surveys focused on condition and function of woodland vegetation and a suite of parameters relating to vegetation health and habitat value were assessed (**Table C-3**). Key parameters were collected for the upper, mid and ground strata at both impact sites and control sites to enable comparison.

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 it is 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 percentage) 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.

The base vegetation plot was 50 m x 20 m and incorporated a 20 m x 20 m nested subplot, a 50 m centre transect, a photo point, and an alignment point (**Table C-4**; **Figure C-3**).

As nominated in the RMP, soil profiles are required every three years. Baseline profiles were described in 2011 and subsequently soil profiles were not described in spring 2012.

Table C-2: Location of woodland vegetation monitoring plots

TREATMENT	PLOT	START EASTING	START NORTHING	TRANSECT BEARING (°)
Temp Native Woodland Control Zone	1	229693	6607097	240
	2	229734	6607621	240
	3	229584	6607459	90
	4	229407	6607627	70
	5	229501	6607813	270
Rehabilitation Zone 2	6	227083	6608091	10
	7	227053	6607908	20
	8	227063	6607720	160
	9	227203	6607927	360
	10	227208	6607711	210

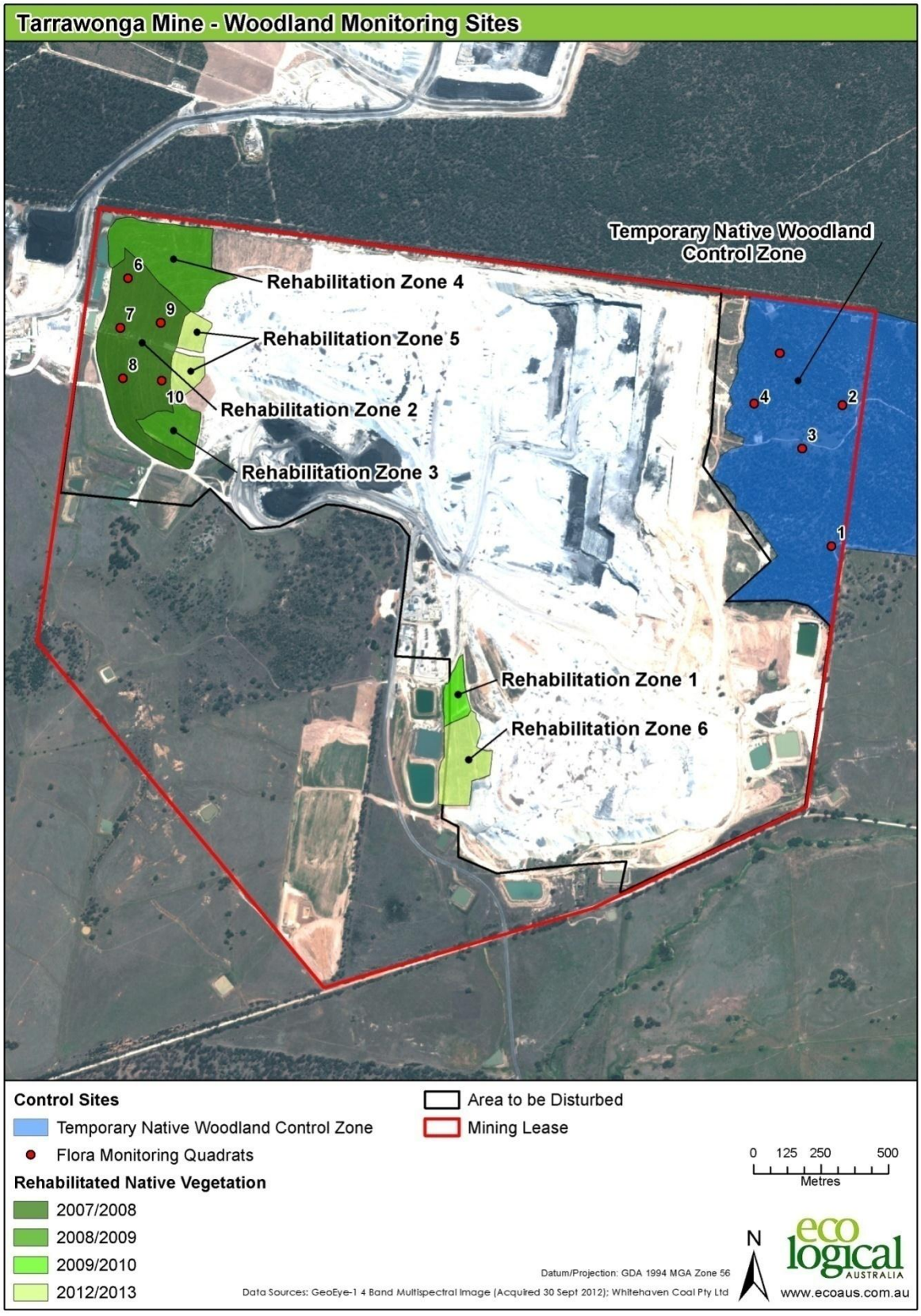


Figure C-2: Woodland vegetation monitoring quadrats for the spring 2012 survey

Table C-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)

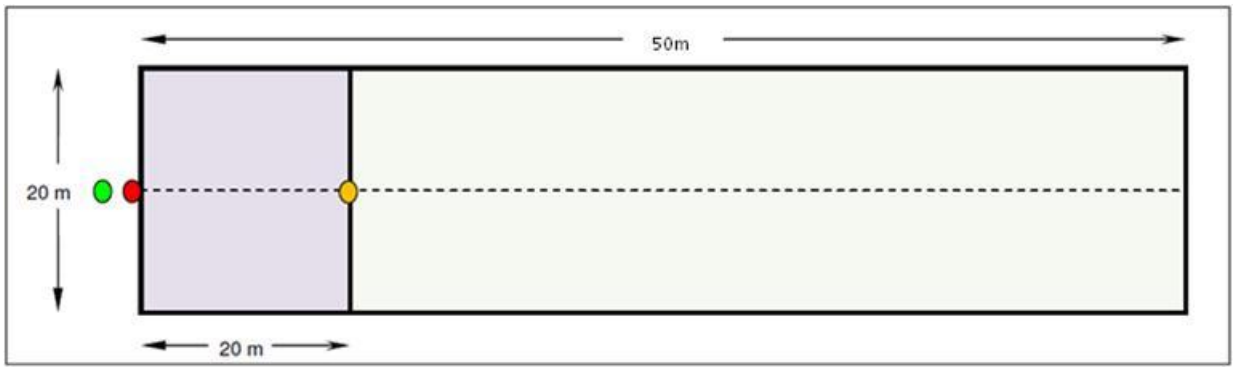


Figure C-3: Plot design and layout

Table C-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
Transect (50 m)	Native canopy cover Native midstorey cover Native groundcover Exotic cover Organic litter Cryptogam Rock Bare ground

Terrestrial fauna & habitat monitoring

Fauna monitoring was conducted by ELA ecologist Stephen Debus on 18 December 2012.

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.

Artificial reptile habitats were unable to be located in 2011 and 2012 monitoring. Incidental reptile sightings were recorded.

Terrestrial fauna and habitat monitoring occurred in the surrounding areas of the sites identified in **Figure C-4** with opportunistic observations in other areas 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 C-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 C-5: Data to be collected for terrestrial fauna

PARAMETER	ANALYSIS	PURPOSE	SURVEY METHOD	SAMPLING FREQUENCY
Woodland birds	Presence/absence	Establish presence	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	Establish presence	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
Mammals	Mammal species diversity	Establish presence	No mammals surveys undertaken in spring 2012. Baseline monitoring for mammals should commence in control zones when permanent monitoring sites are established.	Baseline Annual in spring

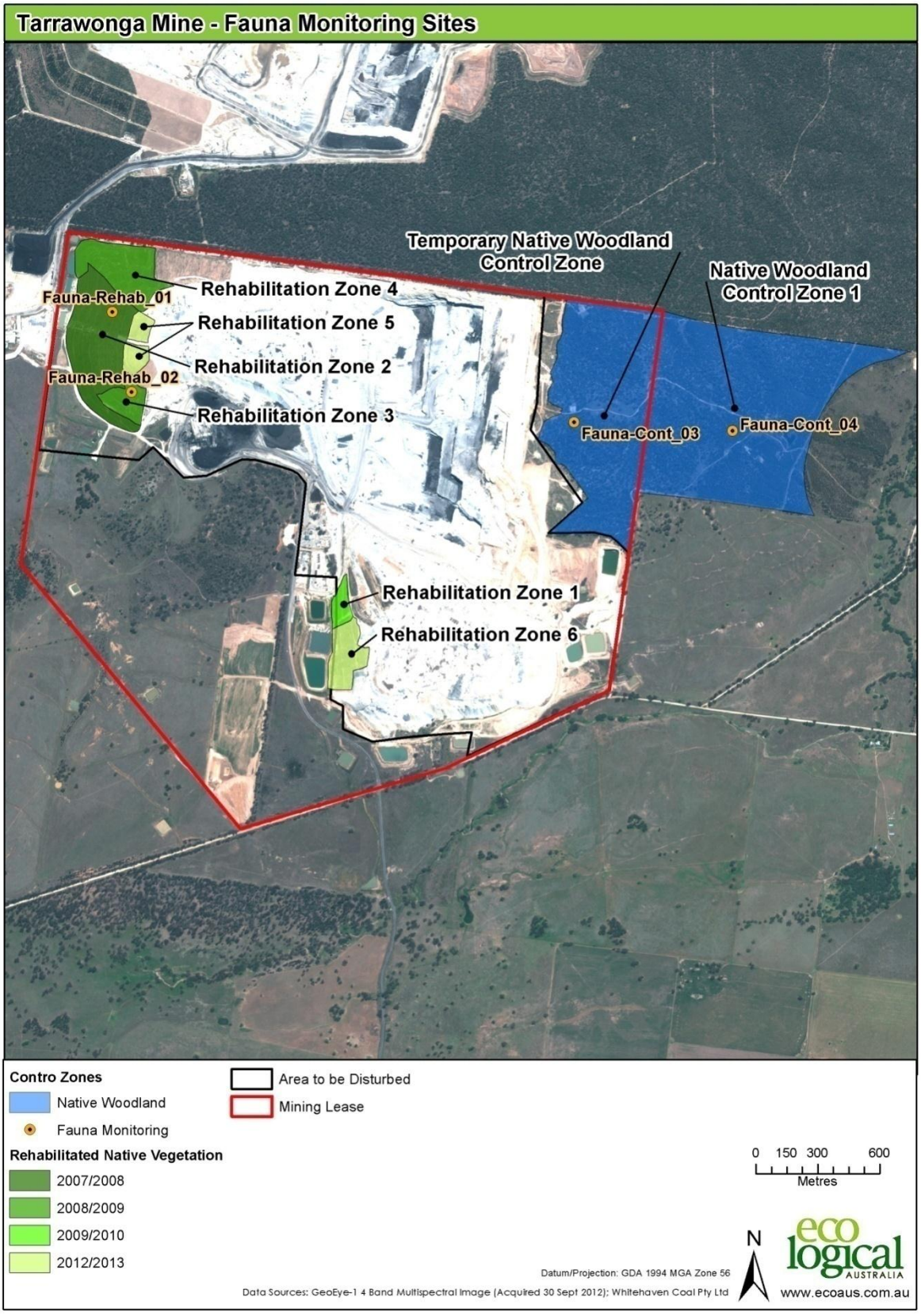


Figure C-4: Fauna monitoring locations

C.4 STATISTICAL METHODS

Monitoring plots were compared using non-metric multidimensional scaling (MDS). MDS plots allow multi-parametric data, such as species presence/absence, species abundance or percent 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 & Warwick 2001). Where MDS plots showed clustering of points a subset of the clustered points was generated, removing the points outside the subset area to provide a clearer understanding of the relationship between clustered points. For repeated longitudinal sampling of quadrats it is possible to then detect and map changes in a community over time (Clarke and Warwick 2001). This method was used to assess progression of groundcover characteristics of rehabilitated areas towards the control sites. It would be expected that those sites rehabilitated earliest would most resemble the control sites. MDS plots were constructed for NDVI data, following the calculation of Euclidean Distance similarity matrices and for groundcover species composition, following Bray-Curtis similarity matrices.

Analysis of Variance (ANOVA) was conducted to compare rehabilitated monitoring sites with each other and with the control sites 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.

Monitoring data collected between 2007 and 2010 has also been reviewed with the last two years of monitoring data where appropriate, to further track rehabilitation progress at Tarrawonga.

REFERENCES

Clarke, K.R. and Gorley, R.N. 2006. *Primer v6: User Manual/Tutorial*. Primer-E, Plymouth.

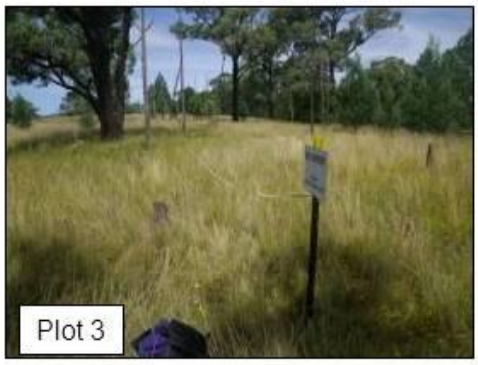
Clarke, K.R. and Warwick, R.M. 2001. *Change in Marine Communities: An Approach to Statistical Analysis and Interpretation* (2nd edn.). Primer-E Ltd, Plymouth.

Watson, D.M. 2004, 'Comparative evaluation of new approaches to survey birds' in *Wildlife Research* 31, pp.1-11.

Appendix D Woodland Monitoring Results

D.1 PLOT PHOTOGRAPHS

2011



2012

No photo for plot 3, 2012

2011

2012

No photo for plot 5, 2011

2011

2012

D.2 OVERSTOREY AND MIDSTOREY COVER SCORES IN 20 X 50 M WOODLAND PLOTS

OVERSTOREY/ MIDSTOREY (O/M):	SPECIES	NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
M	*Acacia cheelii* Motherumbah		1								
M	*Acacia decora* Western Silver Wattle	2	1	1		2					
M	*Allocasuarina luehmannii* Bulloak								1	1	
M	*Amyema* sp.				1						
M	*Beyeria viscosa* Pinkwood				1						
M	*Callitris glaucophylla* White Cypress Pine	4	3	2	3	4					
M	*Cassinia laevis* Cough Bush	1	1	1		2					
M	*Dodonaea viscosa subsp. angustifolia* Sticky Hop Bush					1					
M	*Eucalyptus albens* White Box								1		1
M	*Eucalyptus blakelyi* Blakely's Red Gum							2	1	1	2
M	*Eucalyptus crebra* Narrow-leaved Ironbark				1					1	
M	*Eucalyptus populnea* subsp. *bimbil* Bimble Box							1		1	1
M	*Eucalyptus* sp. Red Gum							1	1	1	
M	*Eucalyptus melliodora* Yellow Box										1
M	*Geijera parviflora* Wilga			1							

OVERSTOREY/ MIDSTOREY (O/M):	SPECIES	NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
M	*Lycium ferocissimum** African Boxthorn								1		
M	*Parsonsia eucolyptophylla* Gargaloo	1									
M	*Pittosporum angustifolium* Weeping Pittosporum	1									
M	*Psyrdrax odorata* Shiny-leaved Canthium	1									
O	*Eucalyptus crebra* Narrow-leaved Ironbark	3	1	3	3	2					
O	*Eucalyptus melanophloia* Silver-leaved Ironbark				1						
O	*Eucalyptus albens* White Box	2									

*Denotes exotic species

Braun-Banquet cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

D.3 GROUNDCOVER SPECIES – BRAUN-BLANQUET COVER SCORES

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
**Anagallis arvensis*	Scarlet Pimpernel			2			2		2	2	1
**Aster subulatus*	Wild Aster							2	1		1
**Carthamus lanatus*	Saffron Thistle						1	2			
**Centaurea melitensis*	Maltese Cockspur								2		
**Centaurium erythraea*	Common Centaury										1
**Chloris gayana*	Rhodes Grass						5	5	2	5	6
**Conyza bonariensis*	Flaxleaf Fleabane						1				
**Cyclospermum leptophyllum*	Slender Celery							1			1
**Chondrilla juncea*	Skeleton Weed	Recorded in 2011, though not in 2012									
**Glandularia aristigera*	Mayne's Pest						3	3	3	3	3
**Gomphrena celosioides*	Gomphrena Weed								1		
**Lactuca serriola*							2		1		
**Lepidium africanum*				2			1		1		
**Lepidium bonariense*		Recorded in 2011, though not in 2012									
**Leptorhynchos panaetioides*		Recorded in 2011, though not in 2012									
**Linaria arvensis*		Recorded in 2011, though not in 2012									
**Lolium rigidum*	Wimmera Ryegrass						2			2	

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
**Malvastrum americanum*		Recorded in 2011, though not in 2012									
**Medicago polymorpha*	Burr Medic	Recorded in 2011, though not in 2012									
**Medicago sativa*	Lucerne								2		
**Medicago* sp.							2		2		
**Misopates orontium*	Lesser Snapdragon	Recorded in 2011, though not in 2012									
**Opuntia stricta*	Common Prickly Pear		1		1						
**Oxalis* sp.	Soursob	Recorded in 2011, though not in 2012									
**Panicum maximum*		Recorded in 2011, though not in 2012									
**Polygonum aviculare*	Wireweed	Recorded in 2011, though not in 2012									
**Petrorhagia nanteuilii*	Proliferous Pink			2							
**Rapistrum rugosum*	Turnip Weed						1	1	1	2	
**Rumex crispus*	Curled Dock						1				
**Schkuhria pinnata*	Dwarf Marigold	Recorded in 2011, though not in 2012									
**Setaria incrassata*	Purple Pigeon Grass	Recorded in 2011, though not in 2012									
**Sida subspicata*		Recorded in 2011, though not in 2012									
**Solanum nigrum*		Recorded in 2011, though not in 2012									
**Sonchus oleraceus*	Common Sowthistle	Recorded in 2011, though not in 2012									
**Sisymbrium orientale*	Indian Hedge Mustard								1		

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
**Trifolium arvense*	Haresfoot Clover	Recorded in 2011, though not in 2012									
**Trifolium campestre*	Hop Clover						2		2		
**Urochloa panicoides*	Urochloa Grass	Recorded in 2011, though not in 2012									
**Verbena caracasana*							2	1			
**Verbena litoralis*		Recorded in 2011, though not in 2012									
**Vicia* sp.								1	1		
Aristida personata	Purple Wire-grass	3	3	3	3	3			3		
Rytidosperma racemosum var. *obtusatum*					1						
Rytidosperma sp.	Wallaby Grass	Recorded in 2011, though not in 2012									
Austrostipa scabra		3	4	4	2	2			2	1	
Austrostipa sp.				2							
*Boerhavia s*p.	Tar-vine		1								
Bothriochloa decipiens	Red Grass	2		2	2				4		
Brachychiton populneus	Kurrajong				1						
Brunoniella australis	Blue Trumpet	Recorded in 2011, though not in 2012									
Calotis cuneifolia	Purple Burr-daisy	Recorded in 2011, though not in 2012									
Calotis lappulacea	Yellow Burr-daisy						2				
Carex inversa	Knob Sedge	Recorded in 2011, though not in 2012									

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Centaurium sp.		Recorded in 2011, though not in 2012									
Cheilanthes distans	Bristly cloak fern		2								
Cheilanthes sieberi	Poison Mulga Fern		2	2	2	1					
Chloris truncata	Windmill Grass	Recorded in 2011, though not in 2012									
Chloris ventricosa	Plump Windmill Grass		2								
Chrysocephalum apiculatum	Yellow Buttons		1		2	2					
Convolvulus graminetinus		Recorded in 2011, though not in 2012									
Conyza bonariensis	Flaxleaf Fleabane	Recorded in 2011, though not in 2012									
Cyclospermum leptophyllum	Slender Celery	Recorded in 2011, though not in 2012									
Cymbopogon refractus	Barbed Wire Grass	2	3	2	3	2					
Cynodon dactylon	Couch	Recorded in 2011, though not in 2012									
Cyperus fulvus			2								
Cyperus gracilis	Slender Flat-sedge	Recorded in 2011, though not in 2012									
Desmodium brachypodum	Large Tick-trefoil	2		2	1	1					
Desmodium varians	Slender Tick-trefoil	Recorded in 2011, though not in 2012									
Dichanthium sericeum	Queensland Bluegrass	Recorded in 2011, though not in 2012									
Dichondra repens	Kidney Weed	Recorded in 2011, though not in 2012									
Dichondra sp. *A*							1				

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Digitaria breviglumis		Recorded in 2011, though not in 2012									
Digitaria brownii	Cotton Panic Grass	Recorded in 2011, though not in 2012									
Digitaria divaricatissima	Umbrella Grass	Recorded in 2011, though not in 2012									
Echinopogon caespitosus	Bushy Hedge-hog Grass	Recorded in 2011, though not in 2012									
*Echium plantagineum**	Paterson's Curse						2			1	
Einadia polygonoides							1				
Elymus scaber				1							
Enneapogon nigricans	Nineawns			2							
Enneapogon sp.	Nineawns	Recorded in 2011, though not in 2012									
Enteropogon acicularis			2	2	1						
Eragrostis leptostachya	Paddock Love-grass	1				2					
Eragrostis setifolia	Bristly Love-grass	Recorded in 2011, though not in 2012									
Eriochloa pseudoacrotricha	Early Spring Grass	Recorded in 2011, though not in 2012									
Euchiton sphaericus	Cudweed	Recorded in 2011, though not in 2012									
Evolvulus alsinoides		Recorded in 2011, though not in 2012									
Fimbristylis dichotoma	Common Fringe-sedge	Recorded in 2011, though not in 2012									
Geijera parviflora	Wilga					1					
Glossogyne tannensis	Native Cobblers Pegs	Recorded in 2011, though not in 2012									

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Glycine clandestina	Variable glycine	Recorded in 2011, though not in 2012									
Glycine tabacina		Recorded in 2011, though not in 2012									
Gonocarpus elatus			2								
Gonocarpus sp.		Recorded in 2011, though not in 2012									
Goodenia glabra		Recorded in 2011, though not in 2012									
Haloragis heterophylla	Rough Raspwort	Recorded in 2011, though not in 2012									
Hypericum gramineum	Small St John's Wort	Recorded in 2011, though not in 2012									
Leiocarpa panaetioides	Woolly Buttons	Recorded in 2011, though not in 2012									
Leptorhynchos panaetioides							2		2	2	2
Lomandra filiformis	Savannah Blue	1		2		2					
Lomandra multiflora	Many-flowered Mat-rush	1			1						
Maireana microphylla	Small-leaf Bluebush		1	1					3	1	
Oncinocalyx betchei		1	2	2							
Panicum effusum	Hairy Panic	2	2	1							
Paspalidium sp.		Recorded in 2011, though not in 2012									
Phyllanthus virgatus		Recorded in 2011, though not in 2012									
Pimelea sp.		Recorded in 2011, though not in 2012									
Rostellularia adscendens	Pink Tongues	Recorded in 2011, though not in 2012									

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Rumex brownii	Swamp dock									1	
Rumex crystallinus	Shiny Dock						1				
Salsola kali		Recorded in 2011, though not in 2012									
Sclerolaena birchii	Galvanised Burr						1	1	1		
Scutellaria humilis					2						
Senecio quadridentatus	Cotton Fireweed						2	2		2	
Sida corrugata	Corrugated Sida						1				
Sida cunninghamii	Ridged Sida			1			1				
Sida spinosa		Recorded in 2011, though not in 2012									
Sida subspicata				1							
Solanum parvifolium		Recorded in 2011, though not in 2012									
Sporobolus creber	Slender Rat's Tail Grass					2					
Stackhousia viminea	Slender Stackhousia		1								
Swainsona galegifolia	Smooth Darling-pea					2					
Tephrosia brachyodon		Recorded in 2011, though not in 2014									
Themeda australis	Kangaroo Grass					2					
Verbena gaudichaudii										1	
Vittadinia cuneata	Fuzzweed			1	2			1	1		

SPECIES	COMMON NAME	2012									
		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Vittadinia dissecta	Dissected New Holland daisy	Recorded in 2011, though not in 2012									
Vittadinia muelleri											1
Vittadinia sp.	Fuzzweed	Recorded in 2011, though not in 2012									
Wahlenbergia communis	Tufted Bluebell		1	1							
Wahlenbergia sp.	Bluebell	Recorded in 2011, though not in 2012									
Xerochrysum bracteatum	Golden Everlasting			1							
Xerochrysum viscosum	Sticky Everlasting	Recorded in 2011, though not in 2012									
Zornia dyctiocarpa	Zornia	Recorded in 2011, though not in 2012									

*Denotes exotic species; Cells shaded grey indicate species recorded in 2012 but not in 2011

Braun-Banquet cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

D.4 TREE AND SHRUB SPECIES >1 M TALL IN 20 X 20 M PLOT

SPECIES	NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
**Lycium ferocissimum* African Boxthorn								1		
Acacia cheelii		1								
Acacia decora Western Silver Wattle	2	1	1		2					
Allocasuarina luehmannii Bulloak								1	1	
Amyema miquelii				1						
Beyeria viscosa Pinkwood				1						
Callitris glaucophylla White Cypress Pine	4	3		3	3					
Cassinia laevis Cough Bush	1	1	1	1	2					
Dodonaea viscosa subsp. Angustifolia Sticky Hop-bush					1					
Eucalyptus albens White Box	1							1		1
Eucalyptus blakelyi Blakely's Red Gum							1	1	1	2

SPECIES	NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Eucalyptus crebra Narrow-leaved Ironbark	2	1	2	3	2				1	
Eucalyptus populnea							1			2
Eucalyptus sp. (Red Gum)							1	1	1	
Geijera parviflora Wilga			1							
Parsonsia eucalyptophylla Gargaloo	1									
Psydrax odoratum Shiny-leaved Canthium	1									

*Denotes exotic species; Cells shaded grey indicate species recorded in 2012 but not in 2011

Braun-Banquet cover scores: 1=projected foliage cover <5% of the plot, plants uncommon; 2=projected foliage cover <5% of the plot, plants common; 3=projected foliage cover 6-25%of the plot; 4=projected foliage cover of 26-50% of the plot; 5=projected foliage cover of 51-75% of the plot; 6=projected foliage cover of 76-100% of the plot.

D.5 REHABILITATED WOODLAND AND CONTROL WOODLAND HABITAT CHARACTERISTICS

PLOT NUMBER:		NATIVE VEGETATION CONTROL ZONE					REHABILITATION ZONE 2				
		PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10
Canopy DBH Thresholds:	Large Tree ≥:	60	-	-	-	-	-	-	-	-	-
	Mature Tree ≥:	30	-	-	-	-	-	-	-	-	-
	Advanced Regrowth (x cm to x cm):	-	-	-	-	-	-	-	-	-	-
	Sapling ≤ x cm to x cm:	-	-	-	-	-	-	-	-	-	-
	Seedlings < x cm dbh:	-	-	-	-	-	-	-	-	-	-
	Canopy ≥ x m:	-	-	-	-	-	-	-	-	-	-
	Midstorey x m to x m:	-	-	-	-	-	-	-	-	-	-
	Ground layer ≤ x m:	-	-	-	-	-	-	-	-	-	-
Canopy Species and Age Classes:	No. of native canopy species:	2	1	1	2	1	0	0	0	0	0
	No. of large trees:	0	0	1	1	0	0	0	0	0	0
	Juveniles present (Y/N):	y	y	n	y	y	n	y	y	y	y
	Mature trees present (Y/N):	n	y	y	y	y	n	n	n	n	n
	Seedlings present (Y/N):	y	y	n	y	y	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):	97	32	58	86	66	82	101	0	47	29
	No. of sections of CWD:	39	10	24	36	30	27	46	0	17	14
Midstorey, Understorey Species:	No. of native midstorey species:	6	5	4	5	4	0	4	5	5	2
	No. of native species in ground layer:	14	16	19	13	12	10	6	6	6	4
Transect:	% Projected Crown Cover- Canopy Species:	12	-	10	26	6	0	0	0	0	0
	% Projected Crown Cover - Midstorey Species:	20	14	6	28	62	0	0	0	8	4

Appendix E Fauna Monitoring Data

SCIENTIFIC NAME	COMMON NAME	REHABILIATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Mammals									
Macropus giganteus	Eastern Grey Kangaroo	X	X		X		X	X	X
Macropus robustus	Common Wallaroo		X		X		X	X	X
Macropus rufogriseus	Red-necked Wallaby						X		
#Oryctolagus cuniculus	Rabbit							X	
Wallabia bicolor	Swamp Wallaby						X		X
Total (4 for 2012)		**1**	**2**	**0**	**2**	**0**	**4**	**3**	**3**
Amphibians									
Crinia signifera	Eastern Froglet					X			
Limnodynastes fletcheri	Barking Marsh-Frog					X			
Litoria peronii	Peron's Tree-Frog					X			
Total (0 for 2012)		**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**
Reptiles									
Morethia boulengeri	Boulenger's Skink					X	X	X	
Pogona barbata	Eastern Bearded Dragon								X
Varanus varius	Lace Monitor						X		
Total (3 for 2012)		0	0	0	0	1	2	1	1

#denotes introduced species; shaded cells indicative of species being recorded in 2012, but not in 2011

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Acanthagenys rufogularis Spiny-cheeked Honeyeater	Canopy feeder				X	X	X	X	X
Acanthiza apicalis Inland Thornbill	Generalist - insects					X		X	X
Acanthiza chrysorrhoa Yellow-rumped Thornbill	Ground forager - insects						X	X	X
Acanthiza nana Yellow Thornbill	Canopy feeder					X	X	X	X
Acanthiza uropygialis Chestnut-rumped Thornbill	Generalist - insects						X		X
Accipiter cirrocephalus Collared Sparrowhawk	Bird of prey					X	X		
Alisterus scapularis Australian King-Parrot	Canopy feeder					X			
Anthus novaeseelandiae Australasian Pipit	Ground forager - insects	X		X	X				
Aprosmictus erythropterus Red-winged Parrot	Canopy feeder					X			
Aquila audax Wedge-tailed Eagle	Bird of prey							X	
Artamus cyanopterus Dusky Woodswallow	Aerial forager					X	X	X	X
Artamus superciliosus White-browed Woodswallow	Generalist - insects						X		

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Barnardius zonarius Australian Ringneck	Generalist - plant based					X			X
Cacatua galerita Sulphur-crested Cockatoo	Generalist - plant based					X			
Cacomantis variolosus Brush Cuckoo	Canopy feeder							X	
Chalcites basalis Horsfield's Bronze-Cuckoo	Generalist - insects					X			X
Chalcites lucidus Shining Bronze-Cuckoo	Generalist - insects							X	
Chalcites osculans Black-eared Cuckoo	Generalist - insects							X	
**Chthonicola sagittata* Speckled Warbler	Ground forager - insects					X	X	X	X
Cincloramphus mathewsi Rufous Songlark	Ground forager - insects	X				X		X	
**Circus assimilis* Spotted Harrier	Bird of prey	X				X			
**Climacteris picumnus* Brown Treecreeper	Bark prober						X		
Colluricincla harmonica Grey Shrike-thrush	Ground forager - carnivorous					X		X	X
Coracina novaehollandiae Black-faced Cuckoo-shrike	Generalist - insects					X		X	X
Corcorax melanorhamphos White-winged Chough	Ground forager - insects						X		

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Cormobates leucophaea White-throated Treecreeper	Bark prober					X	X	X	X
Corvus coronoides Australian Raven	Generalist - carnivorous	X				X	X	X	X
Coturnix ypsilophora Brown Quail	Ground forager - plant based	X				X			
Cracticus nigrogularis Pied Butcherbird	Generalist - carnivorous		X		X		X	X	X
Cracticus tibicen Australian Magpie	Generalist - carnivorous							X	X
Cracticus torquatus Grey Butcherbird	Generalist - carnivorous					X	X		
Dacelo novaeguineae Laughing Kookaburra	Generalist - carnivorous						X		
**Daphoenositta chrysoptera* Varied Sittella	Bark prober							X	X
Dicaeum hirundinaceum Mistletoebird	Canopy feeder		X			X	X	X	
Eolophus roseicapillus Galah	Ground forager - plant based						X		
Eopsaltria australis Eastern Yellow Robin	Ground forager - insects					X	X	X	X
Eurystomus orientalis Dollarbird	Aerial forager							X	
Falco cenchroides Nankeen Kestrel	Bird of prey				X				

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Falcunculus frontatus Crested Shrike-tit	Bark prober						X		
Geopelia humeralis Bar-shouldered Dove	Ground forager - plant based					X	X	X	X
Geopelia striata Peaceful Dove	Aerial forager						X	X	X
Gerygone fusca Western Gerygone	Bird of prey							X	
**Glossopsitta pusilla* Little Lorikeet	Canopy feeder							X	
Haliastur sphenurus Whistling Kite	Bird of prey					X			
**Hieraaetus morphnoides* Little Eagle	Bird of prey						X		
^*Hirundapus caudacutus* White-throated Needletail	Aerial forager					X			
Hirundo neoxena Welcome Swallow	Aerial forager					X	X		X
Lalage sueurii White-winged Triller	Aerial forager					X		X	
Lichenostomus chrysops Yellow-faced Honeyeater	Canopy feeder						X		
Lichenostomus fuscus Fuscous Honeyeater	Canopy feeder								X
Lichenostomus penicillatus White-plumed Honeyeater	Canopy feeder					X	X	X	X
Lichenostomus virescens Singing Honeyeater	Generalist		X		X	X		X	X

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Lichmera indistincta Brown Honeyeater	Canopy feeder					X			
**Lophoictinia isura* Square-tailed Kite	Bird of prey							X	
Malurus cyaneus Superb Fairy-wren	Ground forager - insects	X	X	X	X	X	X	X	X
Malurus leucopterus White-winged Fairy-wren	Ground forager - insects	X	X	X	X				
Manorina melanocephala Noisy Miner	Generalist					X			
Megalurus timoriensis Tawny Grassbird	Ground forager - insects	X							
Melithreptus brevirostris Brown-headed Honeyeater	Canopy feeder					X		X	
Neophema pulchella Turquoise Parrot	Ground forager - plant based							X	
Ocyphaps lophotes Crested Pigeon	Ground forager - plant based							X	X
Pachycephala rufiventris Rufous Whistler	Canopy feeder					X	X	X	X
Pardalotus punctatus Spotted Pardalote	Canopy feeder					X		X	
Pardalotus striatus Striated Pardalote	Canopy feeder					X	X		X
Petrochelidon nigricans Tree Martin	Aerial forager					X	X	X	
Petroica goodenovii Red-capped Robin	Ground forager - insects					X	X	X	X

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Phaps chalcoptera Common Bronzewing	Ground forager - plant based						X		
Philemon citreogularis Little Friarbird	Canopy feeder					X			X
Philemon corniculatus Noisy Friarbird	Canopy feeder							X	
Platycercus eximius Eastern Rosella	Ground forager - plant based					X	X	X	X
Plectorhyncha lanceolata Striped Honeyeater	Generalist - plant based					X	X	X	X
Pomatostomus superciliosus White-browed Babbler	Ground forager - insects							X	
Psephotus haematonotus Red-rumped Parrot	Ground forager - plant based					X			
Ptilonorhynchus maculatus Spotted Bowerbird	Canopy feeder							X	
Rhipidura albiscapa Grey Fantail	Generalist - insects					X	X	X	X
Rhipidura leucophrys Willie Wagtail	Aerial forager		X		X	X	X	X	X
Smicrornis brevirostris Weebill	Canopy feeder		X	X	X	X	X	X	X
Strepera graculina Pied Currawong	Generalist - carnivorous					X		X	X
Struthidea cinerea Apostlebird	Ground forager - omnivorous					X	X	X	

BIRDS									
SCIENTIFIC NAME	GUILD	REHABILITATION ZONE 2				NATIVE WOODLAND CONTROL ZONE			
		2011	2012	2011	2012	2011	2012	2011	2012
		2007/08	2007/08	2008/09	2008/09	FAUNA_04	FAUNA_04	FAUNA_03	FAUNA_03
Taeniopygia bichenovii Double-barred Finch	Ground forager - plant based					X	X	X	X
Taeniopygia guttata Zebra Finch	Ground forager - plant based		X		X				
Turnix varia Painted Button-quail	Ground forager - omnivorous					X		X	X
Zosterops lateralis Silvereye	Generalist					X	X	X	X
Total (56 for 2012)		8	8	4	10	49	39	50	38

* Denotes listed as threatened under the TSC Act; ^Denotes migratory or marine under the EPBC Act; Cells shaded grey indicate species recorded in 2012 but not in 2011

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Narooma NSW 2546
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35 Orlando Street
Coffs Harbour Jetty NSW 2450
T 02 6651 5484
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16/56 Marina Boulevard
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Appendix 8

BLAST MONITORING RESULTS

Environmental Blast Monitoring

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	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		
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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
102	2/06/2008	Bollol Creek	0.74	94.60	14:56:54

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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*		
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*		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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*		
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			

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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		
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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		
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		

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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		
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
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
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
358	2/05/2012	Tarrawonga Station	DNT		1:00:00
358	2/05/2012	Templemore	DNT		1:00:00
359	3/05/2012	Tarrawonga Station	DNT		12:04:00
359	3/05/2012	Templemore	1.590	108.7	12:03:44
360	11/05/2012	Tarrawonga Station	DNT		11:55:00
360	11/05/2012	Templemore	DNT		11:55:00
361	16/05/2012	Tarrawonga Station	DNT		12:05:00
361	16/05/2012	Templemore	1.770	105.3	12:05:30
362	17/05/2012	Tarrawonga Station	DNT		12:06:00
362	17/05/2012	Templemore	DNT		12:06:00
363	18/05/2012	Tarrawonga Station	DNT		12:02:00
363	18/05/2012	Templemore	0.800	113.1	12:02:44
364	24/05/2012	Tarrawonga Station	1.432	108.6	12:03:34
364	24/05/2012	Templemore	DNT		12:03:00
365	1/06/2012	Tarrawonga Station	DNT		15:39:00
365	1/06/2012	Templemore	0.699	103.9	15:39:01
366	18/06/2012	Tarrawonga Station	DNT		12:03:00

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
366	18/06/2012	Templemore	0.371	103.3	12:03:41
367	22/06/2012	Tarrawonga Station	DNT		11:56:00
367	22/06/2012	Templemore	0.510	107.9	11:56:44
368	26/06/2012	Tarrawonga Station	DNT		12:01:00
368	26/06/2012	Templemore	0.730	98.7	12:01:18
369	4/07/2012	Tarrawonga Station	0.470	102.1	12:00:29
369	4/07/2012	Templemore	0.590	97.5	11:59:42
370	10/07/2012	Tarrawonga Station	0.400	113.4	12:02:21
370	10/07/2012	Templemore	1.230	109.2	12:02:43
371	20/07/2012	Tarrawonga Station	DNT		11:55:00
371	20/07/2012	Templemore	0.710	100.9	11:55:04
372	24/07/2012	Tarrawonga Station	0.062	111.5	11:58:02
372	24/07/2012	Templemore	1.673	105.8	11:57:57
373	30/07/2012	Tarrawonga Station	DNT		12:00:00
373	30/07/2012	Templemore	0.550	106.4	12:00:58
374	1/08/2012	Tarrawonga Station	DNT		11:59:00
374	1/08/2012	Templemore	0.732	103.2	11:59:44
375	6/08/2012	Tarrawonga Station	DNT		12:02:00
375	6/08/2012	Templemore	0.480	101.8	12:02:14
376	8/08/2012	Tarrawonga Station	0.450	97.4	12:03:14
376	8/08/2012	Templemore	2.570	114.3	12:03:14
377	10/08/2012	Tarrawonga Station	DNT		12:00:00
377	10/08/2012	Templemore	0.530	101.8	11:58:39
378	13/08/2012	Tarrawonga Station	DNT		12:02:00
378	13/08/2012	Templemore	DNT		12:02:00
379	16/08/2012	Tarrawonga Station	DNT		12:04:00
379	16/08/2012	Templemore	DNT		12:04:00
380	24/08/2012	Tarrawonga Station	DNT		12:00:00
380	24/08/2012	Templemore	DNT		12:00:00
381	29/08/2012	Tarrawonga Station	DNT		12:01:00
381	29/08/2012	Templemore	1.228	101.6	12:01:05
382	4/09/2012	Tarrawonga Station	DNT		12:02:00
382	4/09/2012	Templemore	0.700	104.2	12:01:16
383	5/09/2012	Tarrawonga Station	DNT		12:00:00
383	5/09/2012	Templemore	DNT		12:00:00
384	7/09/2012	Tarrawonga Station	DNT		12:03:00
384	7/09/2012	Templemore	DNT		12:03:00
385	14/09/2012	Tarrawonga Station	DNT		12:06:00
385	14/09/2012	Templemore	DNT		12:06:00
386	18/09/2012	Tarrawonga Station	DNT		12:02:00
386	18/09/2012	Templemore	DNT		12:02:00
387	21/09/2012	Tarrawonga Station	DNT		12:04:00
387	21/09/2012	Templemore	0.380	111.8	12:04:14
388	26/09/2012	Tarrawonga Station	DNT		12:02:00
388	26/09/2012	Templemore	DNT		12:02:00
389	27/09/2012	Tarrawonga Station	DNT		11:57:00
389	27/09/2012	Templemore	DNT		11:57:00
390	4/10/2012	Tarrawonga Station	DNT		12:01:00
390	4/10/2012	Templemore	DNT		12:01:00
391	5/10/2012	Tarrawonga Station	DNT		12:01:00
391	5/10/2012	Templemore	0.952	105.9	12:01:37
392	8/10/2012	Tarrawonga Station	DNT		12:05:00
392	8/10/2012	Templemore	0.944		12:05:12
393	11/10/2012	Tarrawonga Station	0.168	101.7	12:18:54
393	11/10/2012	Templemore	DNT		12:18:00
394	12/10/2012	Tarrawonga Station	DNT		12:16:00
394	12/10/2012	Templemore	DNT		12:16:00
395	17/10/2012	Tarrawonga Station	DNT		12:09:00
395	17/10/2012	Templemore	DNT		12:09:00
396	22/10/2012	Tarrawonga Station	0.670	96.09	12:00:00
396	22/10/2012	Templemore	DNT		12:00:00
397	25/10/2012	Tarrawonga Station	DNT		12:07:00
397	25/10/2012	Templemore	1.051	107.4	12:07:03
398	1/11/2012	Tarrawonga Station	DNT		12:01:00
398	1/11/2012	Templemore	0.100	113.7	12:01:16
399	2/11/2012	Tarrawonga Station	DNT		12:06:00
399	2/11/2012	Templemore	0.958	106.2	12:06:17
400	8/11/2012	Tarrawonga Station	0.057	112.2	12:09:44
400	8/11/2012	Templemore	1.021	107.2	12:09:14
401	16/11/2012	Tarrawonga Station	0.630	102.7	12:07:30
401	16/11/2012	Templemore	0.840	103.3	12:07:17

SHOT NO	DATE	MONITOR LOCATION	PEAK GROUND PRESSURE (mm/s)	PEAK OVERPRESSURE (dBL)	TIME
402	20/11/2012	Tarrawonga Station	0.700	110.3	12:06:23
402	20/11/2012	Templemore	1.570	103.7	12:06:13
403	21/11/2012	Tarrawonga Station	DNT		12:04:00
403	21/11/2012	Templemore	0.943	105.2	12:04:00
404	22/11/2012	Tarrawonga Station	DNT		11:59:00
404	22/11/2012	Templemore	0.709	107	11:59:00
405	28/11/2012	Tarrawonga Station	DNT		11:59:00
405	28/11/2012	Templemore	DNT		11:59:00
406	29/11/2012	Tarrawonga Station	DNT		12:06:00
406	29/11/2012	Templemore	0.600	104.2	12:06:00
407	6/12/2012	Tarrawonga Station	DNT		12:00:00
407	6/12/2012	Templemore	DNT		12:00:00
408	7/12/2012	Tarrawonga Station	DNT		12:06:00
408	7/12/2012	Templemore	0.867	112.3	12:06:37
409	13/12/2012	Tarrawonga Station	DNT		12:00:00
409	13/12/2012	Templemore	1.113	98.66	12:00:49
410	19/12/2012	Tarrawonga Station	0.131	101.3	11:59:00
410	19/12/2012	Templemore	1.237	98.5	11:59:00
411	28/12/2012	Tarrawonga Station	DNT		12:04:00
411	28/12/2012	Templemore	0.651	104.7	12:04:00
412	4/01/2013	Tarrawonga Station	0.055	94.5	11:59:15
412	4/01/2013	Templemore	DNT		11:59:00
413	14/01/2013	Tarrawonga Station	DNT		12:03:00
413	14/01/2013	Templemore	DNT		12:03:00
414	18/01/2013	Tarrawonga Station	0.498	110.9	12:00:00
414	18/01/2013	Templemore	1.791	110.5	12:00:00
415	25/01/2013	Tarrawonga Station	DNT		12:01:00
415	25/01/2013	Templemore	1.140	101.5	12:01:00
416	7/02/2013	Tarrawonga Station	DNT		14:21:00
416	7/02/2013	Templemore	DNT		14:21:00
417	13/02/2013	Tarrawonga Station	DNT		12:02:00
417	13/02/2013	Templemore	0.584	99.74	12:02:15
418	18/02/2013	Tarrawonga Station	0.080	111	12:00:51
418	18/02/2013	Templemore	0.920	105.6	12:00:54
419	28/02/2013	Tarrawonga Station	DNT		11:55:00
419	28/02/2013	Templemore	0.983	111.7	11:55:00
420	15/03/2013	Tarrawonga Station	DNT		12:48:00
420	15/03/2013	Templemore	0.503	100.7	12:48:00
421	21/03/2013	Tarrawonga Station	DNT		12:04:00
421	21/03/2013	Templemore	0.500	115.7	12:04:00
422	27/03/2013	Tarrawonga Station	DNT		11:56:00
422	27/03/2013	Templemore	0.930	110.3	11:56:00
423	5/04/2013	Tarrawonga Station	DNT		12:02:00
423	5/04/2013	Templemore	1.977	95.23	12:02:00
424	12/04/2013	Tarrawonga Station	DNT		12:07:00
424	12/04/2013	Templemore	DNT		12:07:00
425	17/04/2013	Tarrawonga Station	DNT		12:06:00
425	17/04/2013	Templemore	DNT		12:06:00
426	23/04/2013	Tarrawonga Station	DNT		14:37:00
426	23/04/2013	Templemore	0.258	98.46	14:37:00
427	26/04/2013	Tarrawonga Station	DNT		14:02:00
427	26/04/2013	Templemore	0.370	105	14:02:00

*no monitor results obtained on basis of blast size (coal/parting shots or misfires)

Appendix 9

NOISE MONITORING RESULTS

6 July 2012

Ref: 04095/4429

Mr Danny Young
Tarrawonga Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: JUNE 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 25th, 26th and 27th June, 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:*
  - *wind speeds of up to 3 m/s at 10 metres above ground level; or*
  - *Temperature inversion conditions of up to 3ºC/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**.

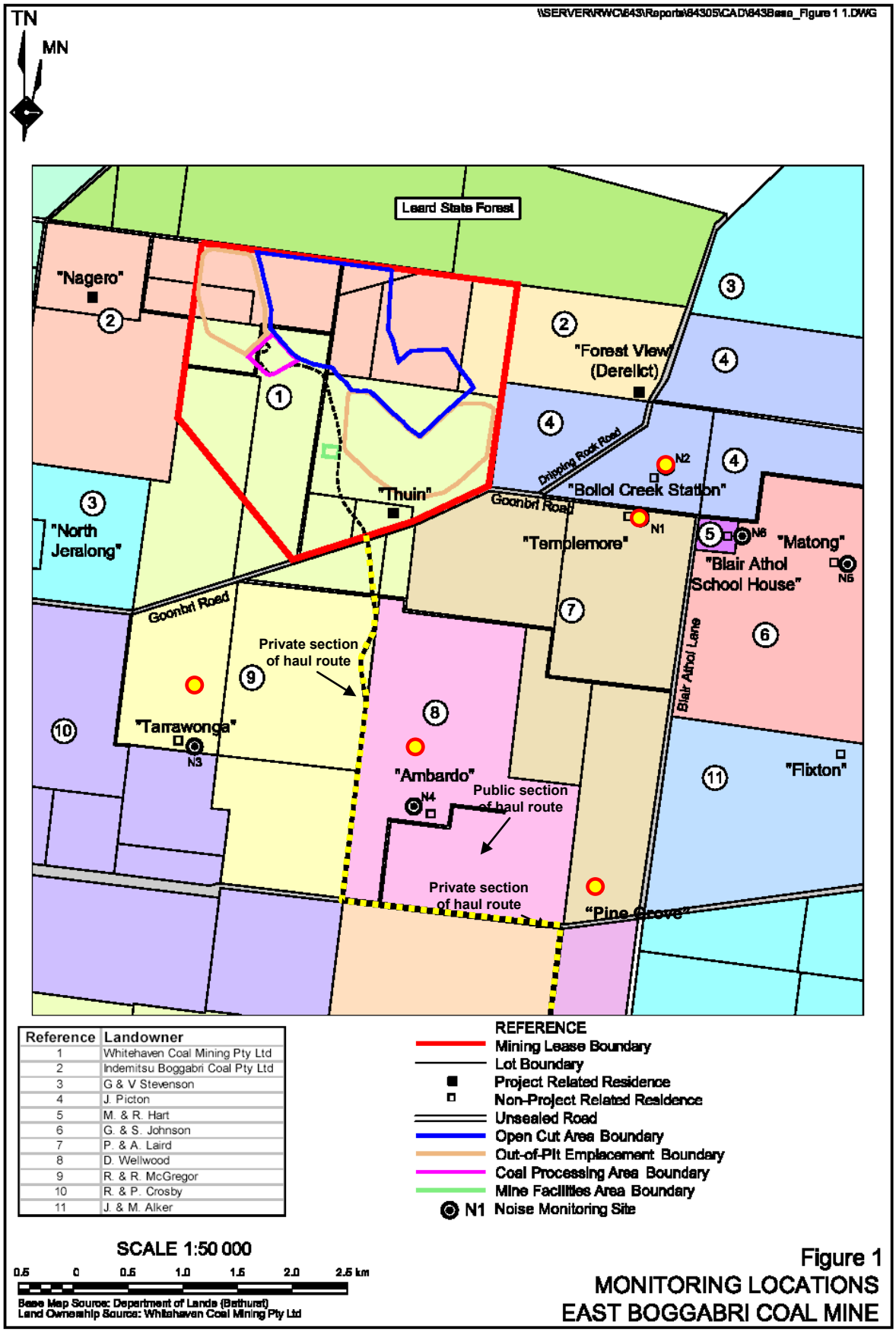
\\SERVER\RWC\643\Reports\643O5\CAD\643Base_Figure 1 1.DWG
TN
MN
Leard State Forest
"Nagero"
"Forest View"
(Derelict)
"Thuin"
"Bollol Creek Station"
"North Jeralong"
"Templemore"
"Matong"
"Blair Athol School House"
Dripping Rock Road
Goonbri Road
Blair Athol Lane
Private section of haul route
"Tarrawonga"
"Ambardo"
Public section of haul route
Private section of haul route
"Pine Grove"
"Flixton"
N1
N2
N3
N4
N5
N6
Reference | Landowner
1 | Whitehaven Coal Mining Pty Ltd
2 | Indemitsu Boggabri Coal Pty Ltd
3 | G & V Stevenson
4 | J. Picton
5 | M. & R. Hart
6 | G. & S. Johnson
7 | P. & A. Laird
8 | D. Wellwood
9 | R. & R. McGregor
10 | R. & P. Crosby
11 | J. & M. Alker
REFERENCE
Mining Lease Boundary
Lot Boundary
Project Related Residence
Non-Project Related Residence
Unsealed Road
Open Cut Area Boundary
Out-of-Pit Emplacement Boundary
Coal Processing Area Boundary
Mine Facilities Area Boundary
N1 Noise Monitoring Site
SCALE 1:50 000
0.5 0 0.5 1.0 1.5 2.0 2.5 km
Base Map Source: Department of Lands (Bathurst)
Land Ownership Source: Whitehaven Coal Mining Pty Ltd
Figure 1
MONITORING LOCATIONS
EAST BOGGABRI COAL MINE

TABLE 1 TCM Noise Monitoring Locations		
Mine site noise monitoring locations		
Receiver (see Figure 1)	**Land owner**	
"Templemore"	P. & A. Laird[1]	
"Bollol Creek Station"	J. Picton[1]	
"Tarrawonga"	R. & R. McGregor	
"Ambardo"	D. Wellwood[1]	
Road traffic noise monitoring locations		
Receiver	**Land owner**	**Road type**
"Ambardo"	D. Wellwood[1]	Private
"Pine Grove"	J., S., M, & C. Bull[1]	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.

The monitoring location at "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 the locations detailed in Table 1. "Templemore" and "Bollol Creek Station" are very close together relative to their distance from TCM and the measurement at the gates to "Bollol Creek Station" was considered to represent the worst case for both. Both residences are mine owned. The NMP details noise monitoring must be undertaken over 15 minute periods for each of the day, evening and night time periods.

In addition to the NMP, Environmental Protection Licence (EPL) 12365 contains the following condition.

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.

As per the referenced Noise Limits table the above is applicable to "Tarrawonga" only.

Throughout the monitoring survey 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**, **4** and **5**. 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). Mine noise from TCM is shown in the tables in bold type.

Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

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 "Ambardo" and **50dB(A) Leq (15 min)** at "Pine Grove", for all operating times. It is noted that "Ambardo" and "Pine Grove" are now mine owned.

Table 2
TCM Noise Monitoring Results – 26 June 2012 (day)

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Bollol Ck Station	12:20 pm	40	2 m/s, SE	Birds & insects (37), wind (36) **TCM (30)**
Ambardo	8:02 am	58	0.5 m/s SE	Birds (58), **TCM (40)**[1]
Pine Grove	8:33 am	47	0.5 m/s SE	**TCM (43)**[2], birds (42), traffic (40)

[1] Trucks on private section of haul road (40), mine noise (<30).
[2] Trucks on private section of haul road (43).

Table 3
TCM Noise Monitoring Results – 26 June 2012 (evening)

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Bollol Ck Station	7:10 pm	29	1 m/s S	**TCM (27)**, birds (24)
Ambardo	7:26 pm	40	0.5 m/s S	**TCM (38)**[1], birds (35)

[1] Trucks on private section of haul road (38), mine noise (<30).

Table 4
TCM Noise Monitoring Results – 26 June 2012 (night)

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Bollol Ck Station	12:16 am	33	Calm	**TCM (33)**
Ambardo	10:43 pm	36	Calm	**TCM (36)**

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring at "Tarrawonga" for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement at "Tarrawonga" and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period at "Tarrawonga" is shown in the tables below.

Table 5
TCM Noise Monitoring Results – "Tarrawonga"

Date	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
25 June 2012	1:30 pm	40	1.5 m/s WNW	Birds (40), **TCM (31)**
25 June 2012	9:29 pm	30	Calm	Cattle (29), **TCM (23)**
25 June 2012	10:20 pm	25	Calm	**TCM (25)**
26 June 2012	2:09 pm	37	1 m/s SE	**TCM (35)**, birds (33)
26 June 2012	7:50 pm	39	Calm	**TCM (38)**, birds (32)
26 June 2012	1:22 am	37	Calm	**TCM (37)**
27 June 2012	3:52 pm	41	2.5 m/s SE	Birds (41), **TCM (32)**
27 June 2012	9:04 pm	38	Calm	**TCM (38)**
27 June 2012	1:47 am	38	Calm	**TCM (37)**, insects (31)

DISCUSSION OF RESULTS

The results in Tables 2-4 show that noise emissions from TCM did not exceed the adopted operational noise criterion at either of the "Bollol Creek/Templemore", "Ambardo" or "Pine Grove" monitoring locations during the survey on June 26th.

The results in Table 5 show that noise emissions from TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the evening and night of both June 26th and June 27th.

EPL 12365 details a requirement for an outline of any management actions taken within the monitoring period to address any exceedences of the limits detailed in the limit conditions of the licence. Upon final analysis the total noise was 2 to 3 dB(A) above the criterion for the period. Such an exceedance of a criterion would, typically, be regarded as minor and managed through monitoring to ensure levels do not increase to more than 5 dB above the criterion.

Atmospheric conditions at the times of the monitoring were calm and cold and there is high likelihood of a moderate to strong temperature inversion being in place. As such the elevated noise levels were

most likely the result of noise enhancement due to the temperature inversion and, therefore, would have occurred under non-compliant atmospheric conditions.

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

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. The results of the sleep disturbance monitoring are shown below in **Table 6**.

Table 5
TCM Sleep Disturbance Monitoring Results

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction
Bollol Ck Station (26/6)	12:16 am	40	Calm
Ambardo (26/6)	10:43 pm	43	Calm
Tarrawonga (25/6)	10:20 pm	40	Calm
Tarrawonga (26/6)	1:22 am	46	Calm
Tarrawonga (27/6)	1:47 am	43	Calm

The results in Table 6 show that the worst case L1 (1 min) noise from TCM was 1 dB(A) over the sleep disturbance criterion at the "Tarrawonga" monitoring location on the night of June 26. As the exceedance is only minor, and to avoid undue disturbance to the tenants at the house further measurements at 1 m from a bedroom façade were not made.

Traffic noise monitoring for the Rocglen and Tarrawonga mines is conducted on an approximately 6 monthly basis. The last round of monitoring was carried out in April 2012 and was reported upon in Spectrum Acoustics report number 06259/4362 dated 7 May 2012.

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

Project No: 04095

ATTENDED NOISE MONITORING – SEPTEMBER 2012
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

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October 2012

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) on 24th, 25th, 26th and 27th September, 2012. The monitoring was carried out in accordance with the requirements of Environment Protection Licence (EPL 12365) and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

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

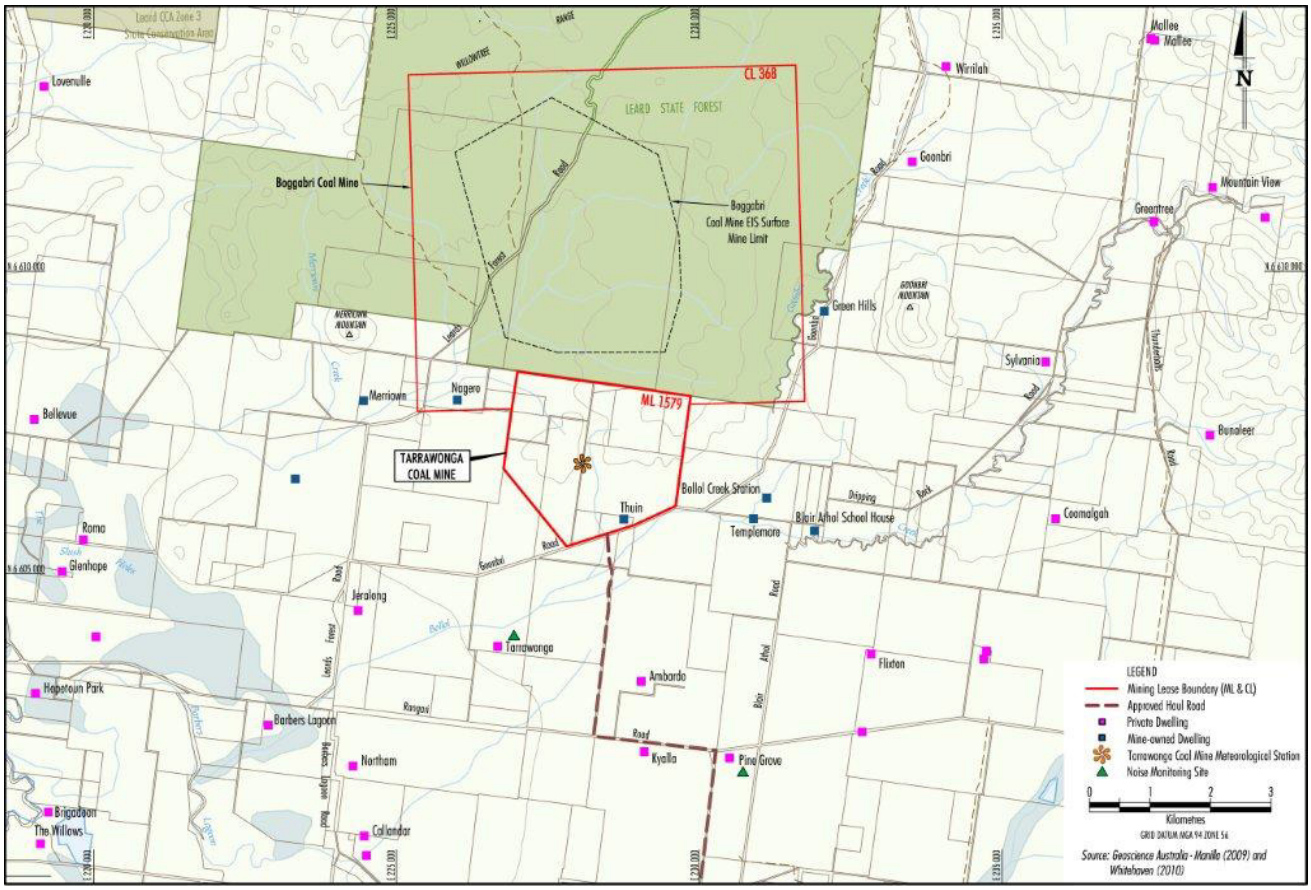

Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

Section M7.7 of EPL 12365 states that the attended noise monitoring must be conducted;

a) at each of the locations detailed above.

b) quarterly in a reporting period.

c) during each day, evening and night period for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening; and
- 1 hour during the night.

d) occur for three consecutive operating days.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

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

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
Kyalla	*37*	*37*	*37*	*45*
All other surrounding residences	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2.5m above ground level, supplemented, where applicable, with data from the mine operated weather station.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1**, **2**, and **3**. 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). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Noise Monitoring Results – 24 September 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	1:22 pm	49	3.5 m/s, S	Birds & insects (49), wind (40) **TCM inaudible**
Tarrawonga	8:32 pm	28	1.5 m/s NE	Traffic (28), insects (20), **TCM inaudible**
Tarrawonga	11:22 pm	26	2.5 m/s E	Mine noise (26)

Table 2
TCM Noise Monitoring Results – 25/26 September 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	9:00 am	42	4 m/s S	Birds & insects (41), wind (35), **TCM inaudible**
Tarrawonga	8:02 pm	40	0.5 m/s S	Birds & insects (39), mine noise (31)
Tarrawonga	12.04 am	32	Calm	Mine noise (32)

Table 3
TCM Noise Monitoring Results – 26/27 September 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	9:47 am	39	3 m/s SE	Birds & insects (39), mine noise (20)
Tarrawonga	9:03 pm	42	3 m/s SE	Insects (40), wind (35), mine noise (33)
Tarrawonga	12.59 am	40	0.5 m/s NE	Mine noise (40) **TCM (est. 39)**

4.2 Discussion of Results

The results in Tables 1 - 3 show that noise emissions from TCM were in excess of the operational noise criterion at the Tarrawonga monitoring location during the early hours of September 27th.

EPL 12365 details a requirement for an outline of any management actions taken within the monitoring period to address any exceedence of the limits detailed in the limit conditions of the licence. Upon final analysis the total noise was 4 dB(A) above the criterion for the period. Such an exceedance of a criterion would, typically, be regarded as minor and managed through monitoring to ensure levels do not increase to more than 5 dB above the criterion.

Atmospheric conditions at the times of the monitoring were calm and cool and there is a likelihood of a temperature inversion being in place. During the time of the exceedence on the 27th September the Tarrawonga weather station recorded a temperature inversion with the 10m sensor recording 11.1°C and 2m sensor recording 8°C. As such the elevated noise levels were most likely the result of noise enhancement due to the temperature inversion and, therefore, would have occurred under non-compliant atmospheric conditions.

In addition to the above, exceedance of the noise criteria at the "Tarrawonga" property was predicted to occur in the modelling conducted for the 2010 Tarrawonga Modification Project. This modelling placed "Tarrawonga" in the project acquisition zone, and a consent condition was applied providing the owner of the "Tarrawonga" property with acquisition rights, which they can investigate at any time.

On this basis, the measured noise levels at "Tarrawonga" are in accordance with predictions for which there is limited capacity for any site based actions to further reduce noise impacts.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 4**.

Table 4
TCM Sleep Disturbance Monitoring Results

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction
Tarrawonga (24/9)	10:20 pm	<30	2.5 m/s E
Tarrawonga (26/9)	1:22 am	37	Calm
Tarrawonga (27/9)	1:47 am	47	0.5 m/s NE

The results in Table 4 show that the worst case L1 (1 min) noise from TCM was 2 dB(A) over the sleep disturbance criterion at the "Tarrawonga" monitoring location in the early hours of 27th September. The Tarrawonga weather station recorded a temperature inversion during the time of the exceedance with the 10m sensor recording 12.2°C and 2m sensor recording 8.4°C. As such the elevated noise levels were most likely the result of noise enhancement due to the temperature inversion and, therefore, would have occurred under non-compliant atmospheric conditions.

4.4 Traffic Noise

Traffic noise monitoring for the Rocglen and Tarrawonga mines is conducted on an approximately 6 monthly basis. Monitoring was carried out in September 2012 and is reported upon in Spectrum Acoustics report number 06259/4532 dated October 2012.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

17 October 2012

Ref: 06259/4532

Mr. Danny Young
Whitehaven Coal Pty Ltd
PO Box 600
GUNNEDAH NSW 2380

RE: WHITEHAVEN COAL – ROAD TRAFFIC NOISE MONITORING, SEPTEMBER 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 $L_{Aeq(1\ hour)}$ 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),$L_{eq(1hour)}$ during the day and 55 dB(A),$L_{eq(1hour)}$ 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 Residences 1 and 2 at "Brooklyn" between 10:44 am and 11:44 am and 1:21 pm and at "Werona" between 11:06 am and 12:16 pm on Monday, September 24, 2012 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 35 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 at "Brooklyn" is summarised in **Table 1**.

Table 1 Coal Truck pass bys - "Brooklyn" - Blue Vale Road 24/09/12	
Time	Vehicle direction of travel
10:49 am	Laden coal truck from mine
10:52	Laden coal truck from mine
10:53	Empty coal truck to mine
10:56	Laden coal truck from mine
10:56	Empty coal truck to mine
10:58	Empty coal truck to mine
10:58	Laden coal truck from mine
10:59	Empty coal truck to mine
11:02	Laden coal truck from mine
11:03	Laden coal truck from mine
11:05	Empty coal truck to mine
11:06	Laden coal truck from mine
11:06	Laden coal truck from mine
11:07	Laden coal truck from mine
11:09	Empty coal truck to mine
11:11	Laden coal truck from mine
11:12	Empty coal truck to mine
11:15	Empty coal truck to mine
11:15	Empty coal truck to mine
11:20	Laden coal truck from mine
11:22	Empty coal truck to mine
11:27	Laden coal truck from mine
11:27	Laden coal truck from mine
11:29	Laden coal truck from mine
11:29	Laden coal truck from mine
11:30	Empty coal truck to mine
11:31	Empty coal truck to mine
11:33	Laden coal truck from mine
11:36	Empty coal truck to mine
11:37	Laden coal truck from mine
11:43	Empty coal truck to mine
11:44	Empty coal truck to mine
11:44	Laden coal truck from mine
11:45	Empty coal truck to mine
11:46	Laden coal truck from mine

The calculated contribution from mine-related vehicles to the overall noise level at Residence 1 at "Brooklyn" was **53 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 **41 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 36 coal truck movements related to TCM and RCM. A breakdown of the heavy vehicle movements for "Werona" is summarised in **Table 2**.

Table 3
Coal Truck pass bys - "Werona", Blue Vale Road 24/09/12

Time	Vehicle direction of travel
11:06 am	Empty coal truck to mine
11:07	Laden coal truck from mine
11:08	Empty coal truck to mine
11:09	Laden coal truck from mine
11:12	Empty coal truck to mine
11:13	Empty coal truck to mine
11:13	Empty coal truck to mine
11:16	Laden coal truck from mine
11:18	Empty coal truck to mine
11:18	Laden coal truck from mine
11:24	Laden coal truck from mine
11:24	Laden coal truck from mine
11:25	Laden coal truck from mine
11:25	Empty coal truck to mine
11:25	Empty coal truck to mine
11:29	Laden coal truck from mine
11:32	Empty coal truck to mine
11:34	Empty coal truck to mine
11:35	Laden coal truck from mine
11:47	Empty coal truck to mine
11:48	Laden coal truck from mine
1148	Empty coal truck to mine
11:51	Laden coal truck from mine
11:53	Empty coal truck to mine
12:00pm	Laden coal truck from mine
12:02	Empty coal truck to mine
12:02	Laden coal truck from mine
12:04	Empty coal truck to mine
12:05	Laden coal truck from mine
12:06	Empty coal truck to mine
12:07	Empty coal truck to mine
12:08	Laden coal truck from mine
12:08	Laden coal truck from mine
12:10	Empty coal truck to mine
12:11	Laden coal truck from mine
12.13	Empty coal truck to mine

Note that the survey was interrupted between approximately 11:42 and 11:47 am during which time it is uncertain if any trucks passed. The survey was extended by approximately 10 minutes to allow for this.

The total measured contribution from mine-related vehicles at "Werona" was **49 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

Project No: 04095

ATTENDED NOISE MONITORING – DECEMBER 2012
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
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January 2013

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) 4-day period from 11 to 14 December, 2012. The monitoring was carried out in accordance with the requirements of Environment Protection Licence (EPL 12365) and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

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

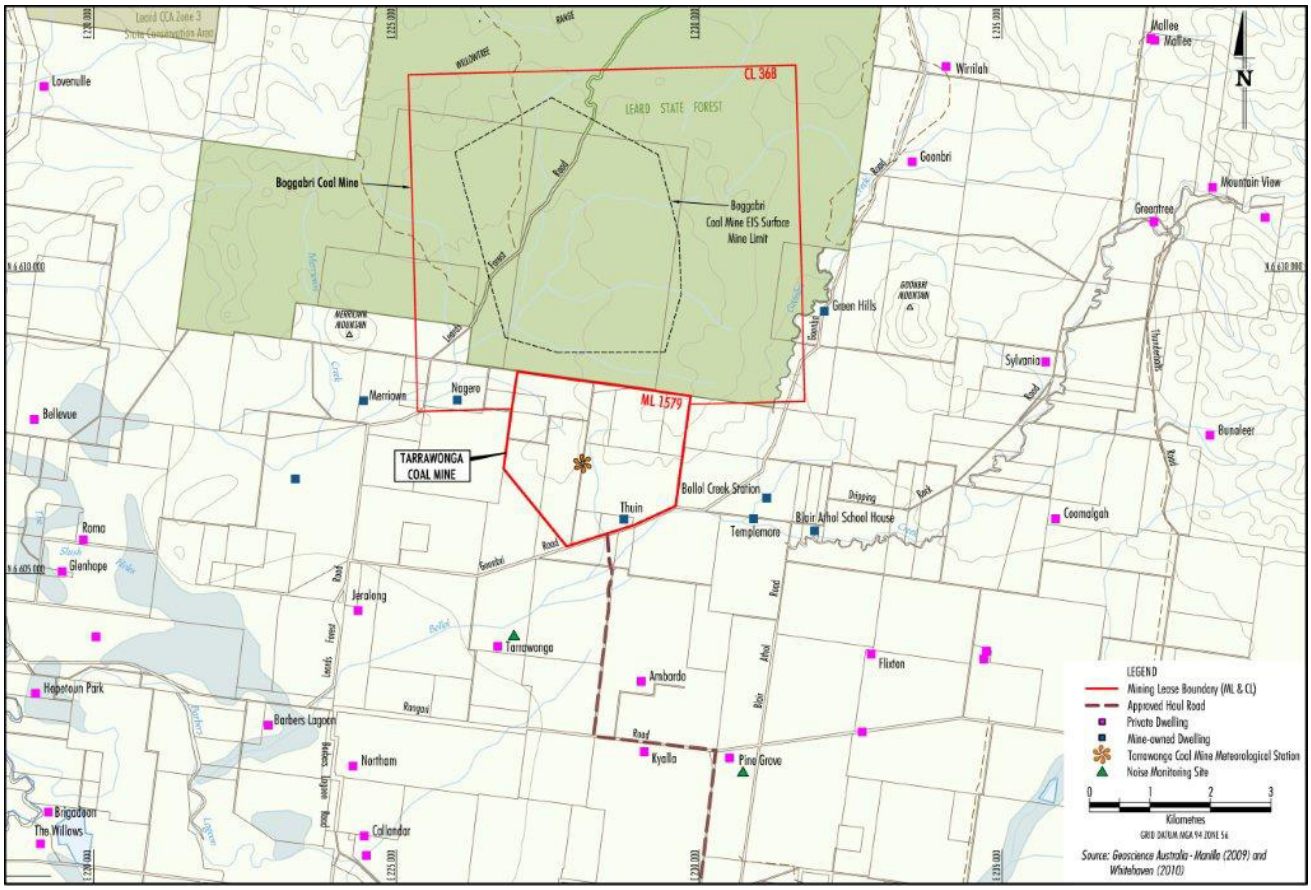

Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

Section M7.7 of EPL 12365 states that the attended noise monitoring must be conducted;

a) at each of the locations detailed above.

b) quarterly in a reporting period.

c) during each day, evening and night period for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening; and
- 1 hour during the night.

d) occur for three consecutive operating days.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

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

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
Kyalla	*37*	*37*	*37*	*45*
All other surrounding residences	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report was taken using a hand held weather station at a height of approximately 2.5m above ground level, supplemented, where applicable, with data from the mine operated weather station.

The monitoring initially commenced on 9th December but had to be postponed due to high winds in the area until the morning of 11th December. The winds increased in strength during the day and evening of 11th December and, hence, the monitoring was, again, postponed and recommenced on 12th December.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1**, **2**, and **3**. 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). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Noise Monitoring Results – 11 December 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	8:07 am	53	4.7m/s-160	Birds & insects (53), **TCM inaudible**

Table 2
TCM Noise Monitoring Results – 12 December 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	8:57 am	45	4.8m/s-123	Birds & insects (45), wind (35), **TCM (20)**
Tarrawonga	8:37 pm	39	3.9 m/s-109	Insects (34), mine noise (38), **TCM est. (37) = trucks noise (34), mine hum (33)**
Tarrawonga	10:05 pm	37	3.2 m/s-108	Mine noise (34), **TCM est. (33)**, insects (32)

Table 3
TCM Noise Monitoring Results – 13 December 2012

Location	Time	dB(A),Leq (15 min)	Wind speed/ direction	Identified Noise Sources
Tarrawonga	7:57 am	38	1.4 m/s-95	Birds & insects (38), mine noise (25)
Tarrawonga	8:28 pm	35	1.3 m/s-13	Insects (31), mine noise (33) **TCM est. (32) = trucks noise (32), mine hum (22)**
Tarrawonga	11:09 pm	32	0.6 m/s-30	Insects (32), mine noise (22)

Table 4 TCM Noise Monitoring Results – 14 December 2012				
Location	**Time**	**dB(A),Leq (15 min)**	**Wind speed/ direction**	**Identified Noise Sources**
Tarrawonga	7:35 pm	42	1.4 m/s-92	Birds & insects (42), mine noise (30), **TCM (30) = truck noise (28), mine hum (26)**
Tarrawonga	1:04 am*	38	5.0 m/s-28	Insects (38), wind (31), **TCM inaudible**

*morning of 15 December

4.2 Discussion of Results

The results in Tables 1 - 4 show that noise emissions from TCM were higher than the operational noise criterion at the Tarrawonga monitoring location during the evening of December 12th.

Atmospheric conditions at the time of the monitoring indicated a 3.9 m/s wind was blowing from an easterly direction. As such the elevated noise levels occurred under non-compliant atmospheric conditions. The majority of the noise was due to emissions from trucks on the haul road. The atmospheric conditions would have resulted in noise enhancing source to receiver winds at the monitoring location. It should be noted that the Tarrawonga property retains acquisition rights in the Project Approval for the Tarrawonga Mine as a consequence of modelled noise predictions exceeding 35dB(A). The result of 37dB(A) attributed to Tarrawonga operations on the evening of 12th December 2012 is consistent with the modelled predictions established in the noise model for the modification to Tarrawonga operations in 2010. As a consequence, the noise limit of 35dB(A) does not apply at the Tarrawonga receiver.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 4**.

Table 4 TCM Sleep Disturbance Monitoring Results			
Location	**Time**	**dB(A),L1 (1 min)**	**Wind speed/ direction**
Tarrawonga (12/12)	10:05 pm	40	3.2 m/s 108
Tarrawonga (13/12)	11:09 pm	25	0.6 m/s 30
Tarrawonga (14/12)	1:04 am	n/a	5.0 m/s 28

The results in Table 4 show that the L1 (1 min) noise from TCM did not exceed the sleep disturbance criterion during any of the night time monitoring periods.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Project No: 04095

ATTENDED NOISE MONITORING – MARCH 2013
Tarrawonga Coal Mine
Boggabri, NSW

Prepared for:

Whitehaven Coal Pty Limited
PO Box 600
Gunnedah NSW 2380

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April 2013

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APPENDIX A Description of Acoustical Terms

1.0 INTRODUCTION

This letter report presents the results of attended operational noise compliance monitoring conducted for the Tarrawonga Coal Mine (TCM) 3-day period from 18 to 20 March, 2013. The monitoring was carried out in accordance with the requirements of Environment Protection Licence (EPL 12365) and other relevant Australian Standards and guidelines.

1.1 Noise Monitoring Locations

Noise monitoring locations defined in Section M7.4 of EPL 12365 are listed in the table below and shown on **Figure 1**.

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

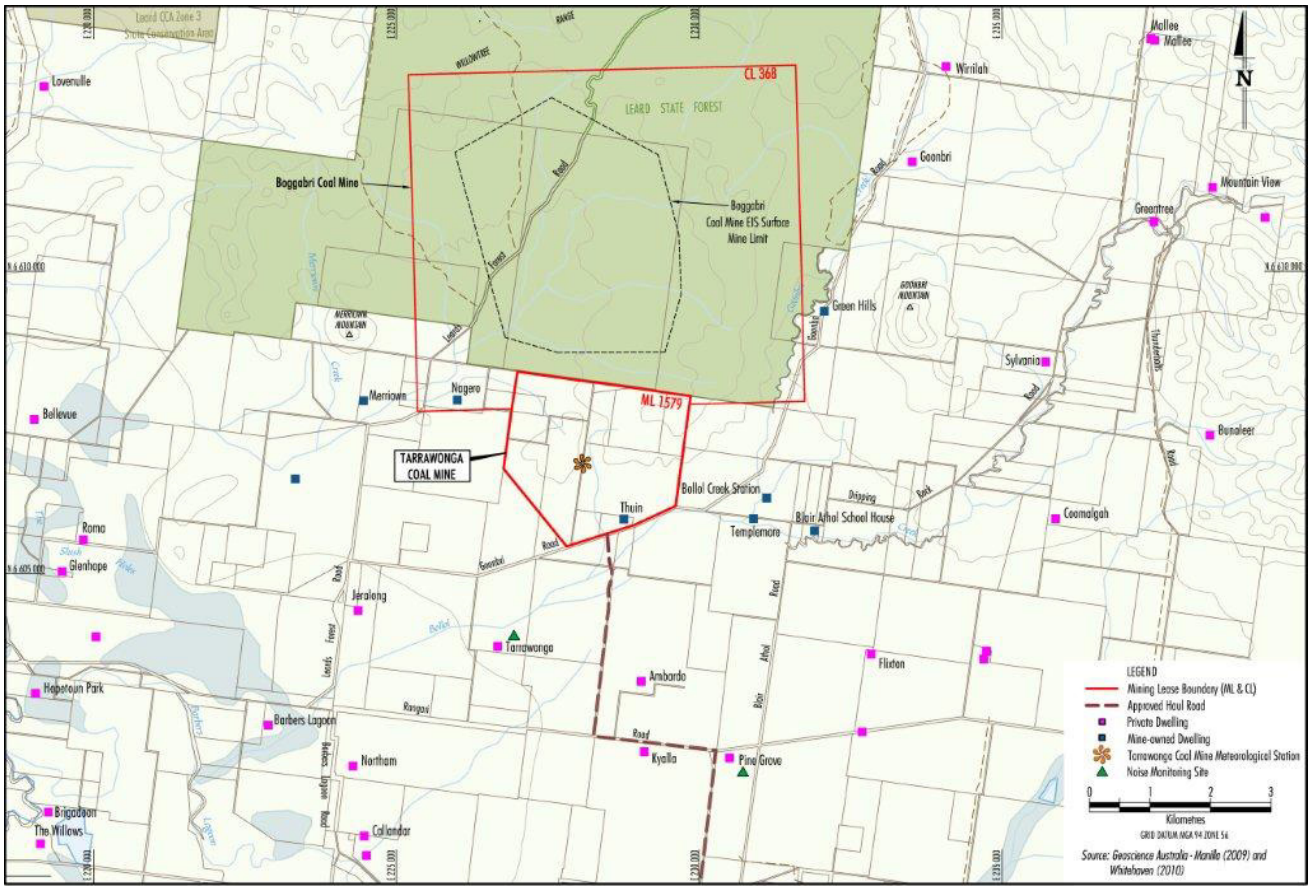


Figure 1 – Noise Monitoring Location

1.2 Monitoring Frequency and Duration

Section M7.7 of EPL 12365 states that the attended noise monitoring must be conducted;

a) at each of the locations detailed above.

b) quarterly in a reporting period.

c) during each day, evening and night period for a minimum of:

- 1.5 hours during the day;
- 30 minutes during the evening; and
- 1 hour during the night.

d) occur for three consecutive operating days.

2.0 NOISE CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

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

Locality and Location	***Day Leq (15 min)***	***Evening Leq (15 min)***	***Night Leq (15 min)***	***Night L1 (1 min)***
Kyalla	*37*	*37*	*37*	*45*
All other surrounding residences	*35*	*35*	*35*	*45*

2.2 Monitoring Location Definition

EPL 12365 states that to determine compliance with the Leq (15 min) operational noise criteria the noise measurement equipment must be located:

- Approximately on the property boundary, where any dwelling is situated 30m or less from the property boundary closest to the premises; or
- Within 30m of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30m from the property boundary closest to the premises; or, where applicable
- Within 50m of the boundary of a National Park or Nature Reserve.

In relation to L1 (1 min) noise limits the noise measurement equipment must be located within 1m of a dwelling façade.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for the following;

1. Wind speeds greater than 3m/s at 10m above ground level; or
2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors detailed in Section 4 of the NSW industrial Noise policy must be applied, as appropriate, to the measured noise levels.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted with Brüel & Kjær Type 2250 and 2260 Precision Sound Analysers. These instruments have Type 1 characteristics as defined in AS1259-1982 "Sound Level Meters" and have current NATA calibration. Field calibration is carried out at the start and end of each monitoring period.

A-weighted noise levels were measured over the appropriate monitoring periods (90 minutes/day, 30 minutes/evening and 60 minutes/night) with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing INP 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The operational noise criteria for compliance with Section L 4.1 of EPL 12365 are based on a 15 minute Leq noise level. The procedures detailed in Section M 7.7 of EPL 12365 require noise monitoring for significantly longer periods than that of the compliance criteria. To determine compliance with the EPL conditions the worst case 15 minute period, in relation to mine noise, was extracted from each measurement and compared to the criteria in Section L 4.1.

This worst case 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from TCM was audible Bruel & Kjaer "*Evaluator*" analysis software was used to quantify the contributions of the mine and other significant noise sources to the overall.

Due to the close proximity, relative to the receiver, of TCM and the nearby Boggabri Coal Mine (BCM), it is sometimes not always possible to determine the partial contributions of emissions from each mine to the overall measured noise level. Where this is the case the total measured mine noise is shown in the tables as "mine". Where the total measured mine noise is equal to, or greater than, the noise criterion for TCM an estimate of the relative contributions of each mine has been made based on the field observations and data analysis.

When no mine noise was audible at a monitoring location, a representative 15 minute noise measurement was made with observations carried out for the remainder of the applicable time period. In these instances, the measured noise level for the representative 15 minute period is that shown in the tables below.

The compliance measurement locations are different for each of the operational and sleep disturbance noise. That is, the sleep disturbance criterion is typically applicable at 1m from the façade of a bedroom window.

To avoid undue disturbance to residents the L1 (1 min) noise level from the operational measurements are used to show general compliance with the sleep disturbance criterion. That is, as the distance between the noise source and the operational noise monitoring location is significantly greater than the distance between the operational noise monitoring location and the sleep disturbance monitoring location (i.e. 1m from the facade of the house) there will be little variation in L1 (1 min) levels between the two monitoring locations.

It must be noted, however, that the sleep disturbance criterion is to be measured near a bedroom window. As the internal layout of each residence is not known, to consider a worst case, this is assumed to be facing the operational noise monitoring location.

Meteorological data used in this report were taken from the nearby BCM operated meteorological station. Stability class information is that interpreted by the meteorological station software.

3.3 Special Conditions

Before the noise surveys, Spectrum Acoustics personnel were briefed on the current location(s) of activities.

4.0 RESULTS AND DISCUSSION

4.1 Measured Operational Noise Levels

Measured noise levels are summarised in **Tables 1** to **8**. 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). Mine noise from TCM is shown in the tables in bold type.

Table 1
TCM Operational Noise Monitoring Results – 18 March 2013 (day)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction(°)	Identified Noise Sources
Tarrawonga	9:05 am	39	5.4 m/s-127	Wind in trees (36), birds & insects (32), mine noise (32)

Table 2
TCM Operational Noise Monitoring Results – 18 March 2013 (evening)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction(°)	Identified Noise Sources
Tarrawonga	9:29 pm	37	6.3 m/s-146	Birds & insects (37), cattle (26), **TCM inaudible**

Table 3
TCM Operational Noise Monitoring Results – 18/19 March 2013 (night)

Location	Time	Total dB(A), Leq (15 min)	Wind speed/ direction(°)	Stability Class	Identified Noise Sources
Tarrawonga	1:15 am	40	3.4 m/s-117	D	Mine noise (40) (**TCM est. (39)**), insects (29)

Table 4 TCM Operational Noise Monitoring Results – 19 March 2013 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Identified Noise Sources**
Tarrawonga	1:52 pm	36	2.6 m/s-146	Birds & insects (35), mine noise (25)

Table 5 TCM Operational Noise Monitoring Results – 19 March 2013 (evening)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Identified Noise Sources**
Tarrawonga	9:22 pm	43	3.7 m/s-140	Wind in trees (40), birds & insects (39), mine noise (33)

Table 6 TCM Operational Noise Monitoring Results – 19/20 March 2013 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Stability Class**	**Identified Noise Sources**
Tarrawonga	1:17 am	38	3.1 m/s-86	D	Insects (36), mine noise (34)

Table 7 TCM Operational Noise Monitoring Results – 20 March 2013 (day)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Identified Noise Sources**
Tarrawonga	9:53 am	35	2.6 m/s-64	Birds & insects (35), mine noise (26)

Table 8 TCM Operational Noise Monitoring Results – 20 March 2013 (evening)				
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Identified Noise Sources**
Tarrawonga	7:31 pm	37	1.2 m/s-343	Birds & insects (34), dogs (32), mine noise (28)

Table 9 TCM Operational Noise Monitoring Results – 20/21 March 2013 (night)					
Location	**Time**	**Total dB(A), Leq (15 min)**	**Wind speed/ direction(°)**	**Stability Class**	**Identified Noise Sources**
Tarrawonga	1:05 am	40	6.5 m/s-27	D	Mine noise (38) (**TCM est. (38)**), insects (33), dogs (32)

4.2 Discussion of Results

The results in Tables 3 and 9 show that noise emissions from TCM were higher than the operational noise criterion at the Tarrawonga property monitoring location during the night of 18/19 and 20/21 March 2013.

Atmospheric conditions at the time of the monitoring indicated that on 18/19 March the wind was at 3.4 m/s from the east south east and on 20/21 March the wind was at 6.5 m/s from a north easterly direction. As such the elevated noise levels occurred under non-compliant atmospheric conditions.

It should be noted that the Tarrawonga property retains acquisition rights in the Project Approval for the Tarrawonga Mine as a consequence of modelled noise predictions exceeding 35dB(A). The measured levels of 38 and 39 dB(A) attributed to Tarrawonga operations is consistent with the modelled predictions established in the noise model for the modification to Tarrawonga operations in 2010. As a consequence, the noise limit of 35dB(A) does not apply at the Tarrawonga receiver.

4.2.1 Modifying Factor Corrections

Data from those times where TCM operations were audible were analysed using the *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive or low frequency components as per definitions of "modifying factor corrections" in the NSW Industrial Noise Policy.

4.3 Sleep Disturbance

The results of the sleep disturbance monitoring are shown below in **Table 10**.

Table 10
TCM Sleep Disturbance Monitoring Results

Location	Time	dB(A),L1 (1 min)	Wind speed/ direction
Tarrawonga (19/3)	1:15 am	47	3.4 m/s 117
Tarrawonga (20/3)	1:17 am	41	3.1 m/s 86
Tarrawonga (21/3)	1:05 am	47	6.5 m/s 27

The results in Table 10 show that the L1 (1 min) noise from TCM exceeded the sleep disturbance criterion during the night time monitoring periods on March 19 and 21 (i.e. at approximately 1 am). As per the discussion relating to operational noise the measurements were made under non-compliant atmospheric conditions and Tarrawonga property is subject to acquisition per the TCM Project Approval.

APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS

Table A1

Definition of acoustical terms

Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and below atmospheric pressure and expressed in decibels. The human ear responds to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise over time. The time-varying level is computed to give an equivalent dB(A) level that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Appendix 10

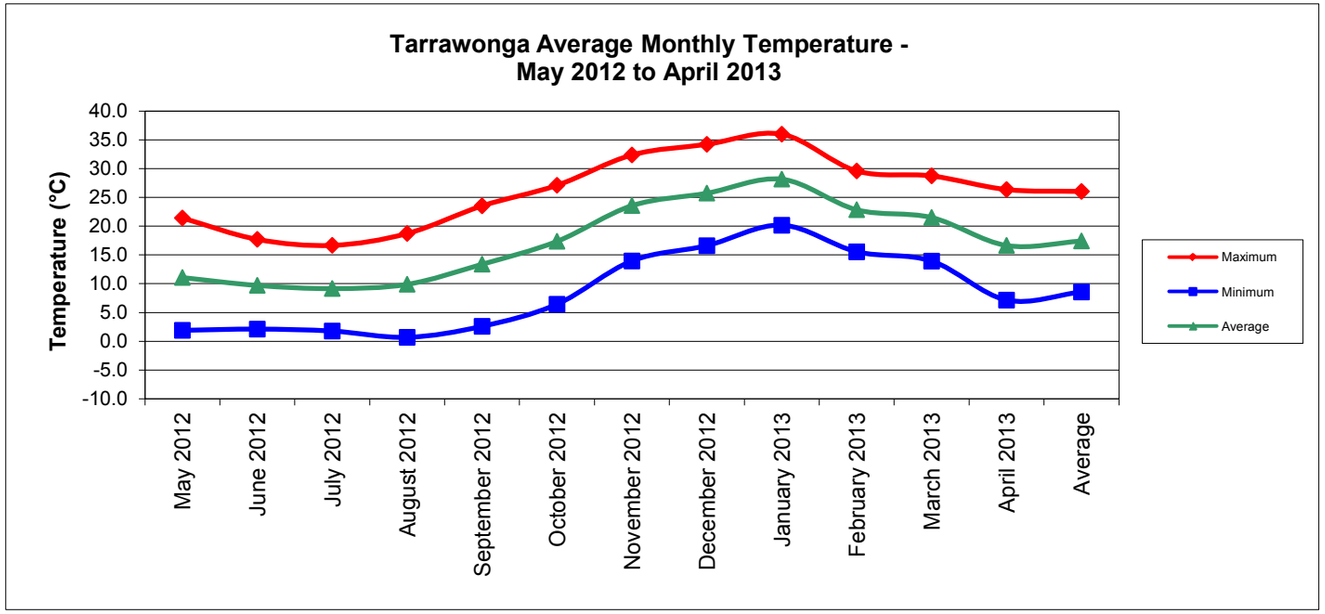
METEOROLOGICAL DATA

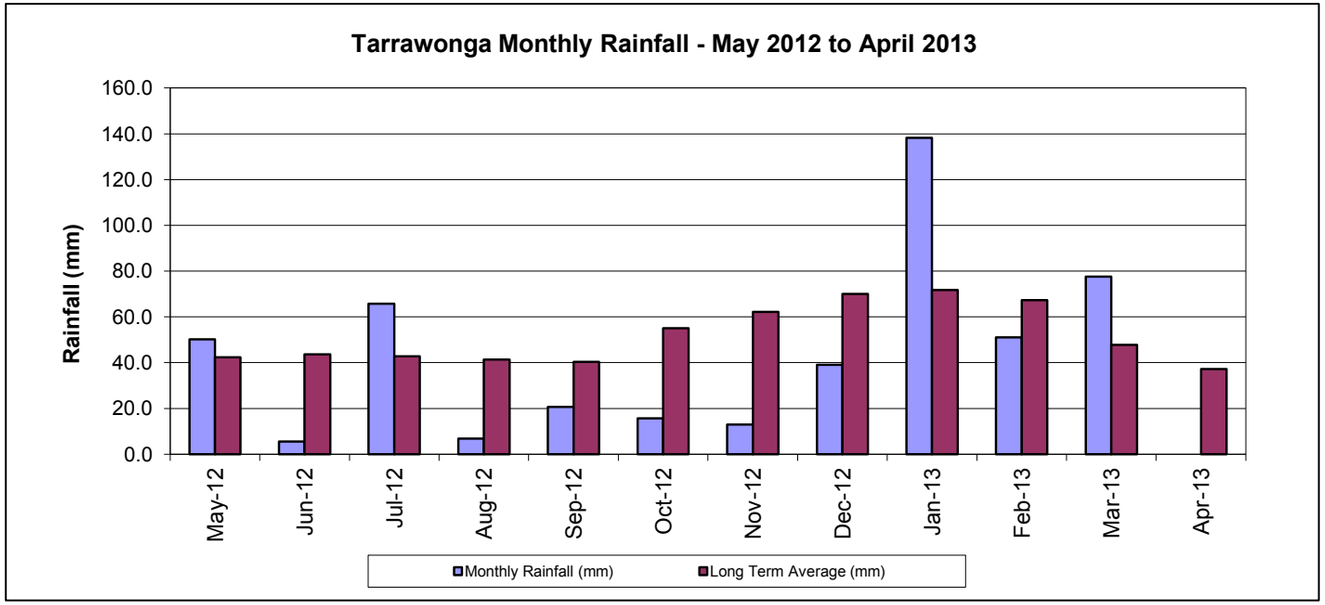
Tarrawonga Coal Mine Average Monthly Results

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 2012	1.9	11.1	21.4	30.7	67.4	93.7	0.0	**0.8**	**1.5**
June 2012	2.1	9.7	17.7	44.1	74.6	96.3	0.0	1.4	2.2
July 2012	1.8	**9.2**	**16.7**	**46.0**	**75.1**	**96.6**	0.0	1.2	2.5
August 2012	**0.7**	9.9	18.7	32.1	62.4	92.1	0.0	1.4	3.3
September 2012	2.6	13.4	23.5	25.6	58.0	91.9	0.0	1.2	2.5
October 2012	6.4	17.4	27.1	**20.7**	48.8	85.5	0.1	1.6	3.7
November 2012	13.9	23.6	32.4	22.0	46.6	80.2	0.0	1.4	5.0
December 2012	16.6	25.7	34.2	23.3	46.2	78.5	0.1	1.7	**6.1**
January 2013	**20.2**	**28.2**	**36.0**	27.0	**1.9**	**76.9**	0.1	1.9	5.7
February 2013	15.5	22.9	29.6	37.3	2.2	91.5	0.1	**2.2**	4.9
March 2013	13.9	21.5	28.7	39.2	65.7	92.1	0.1	1.9	3.9
April 2013	7.1	16.7	26.4	27.2	58.2	91.1	0.0	1.2	2.1
Average	**8.6**	**17.4**	**26.0**	**31.3**	**50.6**	**88.9**	**0.0**	**1.5**	**3.6**
Minimum	**0.7**	**9.2**	**16.7**	**20.7**	**1.9**	**76.9**	**0.0**	**0.8**	**1.5**
Maximum	**20.2**	**28.2**	**36.0**	**46.0**	**75.1**	**96.6**	**0.1**	**2.2**	**6.1**
Total									

Month	Monthly Rainfall (mm)	Long Term Average (mm)	Cumulative Rainfall (mm)	Number of Rain Days (≥1mm)
May 2012	50.2	42.3	50.2	4
June 2012	5.6	43.6	55.8	2
July 2012	65.8	42.7	121.6	4
August 2012	6.8	41.3	128.4	1
September 2012	20.6	40.3	149	2
October 2012	15.6	55.1	164.6	3
November 2012	13.0	62.2	177.6	2
December 2012	39.0	70	216.6	4
January 2013	138.2	71.7	354.8	5
February 2013	51.0	67.3	405.8	4
March 2013	77.6	47.8	483.4	3
April 2013	0.0	37.2	483.4	0
Total	**483.4**	**621.5**	**483.4**	**34**

* Long term average is from Gunnedah Pool (Station 055023) 1877 - 2013


Tarrawonga Average Monthly Temperature -
May 2012 to April 2013
Temperature (°C)
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
-5.0
-10.0
May 2012
June 2012
July 2012
August 2012
September 2012
October 2012
November 2012
December 2012
January 2013
February 2013
March 2013
April 2013
Average
Maximum
Minimum
Average


Tarrawonga Monthly Rainfall - May 2012 to April 2013
Rainfall (mm)
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
May-12
Jun-12
Jul-12
Aug-12
Sep-12
Oct-12
Nov-12
Dec-12
Jan-13
Feb-13
Mar-13
Apr-13
Monthly Rainfall (mm)
Long Term Average (mm)

Meteorological Daily Statistics Summary

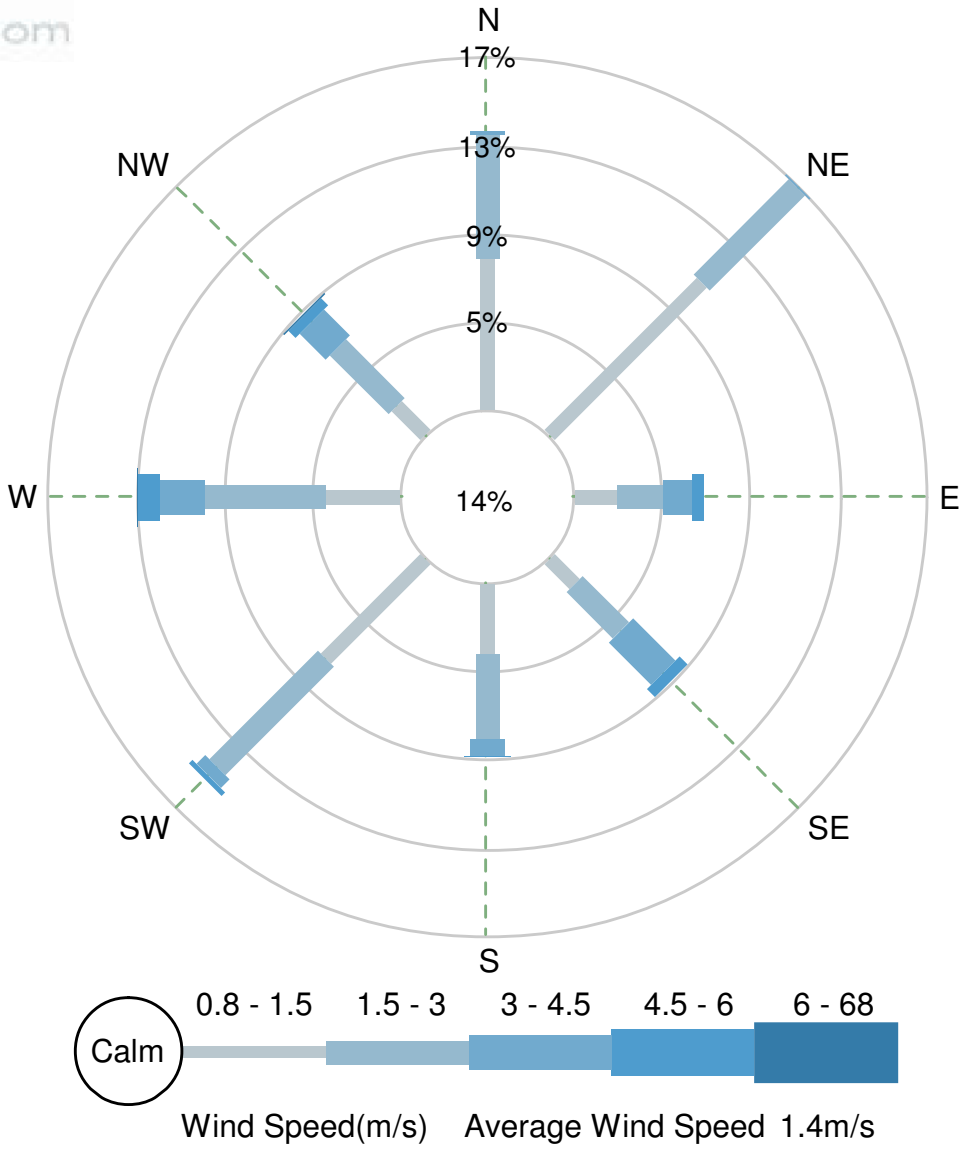
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/06/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)
2012/05/01 00:00:02	14.9	6.5	23.2	15.8	9.2	22.3	-99.0	-99.0	-99.0	67.2	35.2	97.5	2.0	0.0	5.2	7.4	118	0.0
2012/05/02 00:00:02	14.8	6.0	25.2	16.5	9.4	24.9	-99.0	-99.0	-99.0	67.0	32.8	96.2	1.0	0.0	0.6	5.5	80	0.0
2012/05/03 00:00:02	16.5	5.9	25.2	17.0	8.6	24.4	-99.0	-99.0	-99.0	69.8	32.6	97.3	0.7	0.0	1.3	6.8	289	2.0
2012/05/04 00:00:02	15.7	9.1	21.9	16.4	11.8	21.3	-99.0	-99.0	-99.0	88.5	54.3	98.8	0.8	0.0	0.0	5.5	226	17.4
2012/05/05 00:00:03	12.2	4.6	22.3	13.7	6.4	21.9	-99.0	-99.0	-99.0	77.3	36.7	99.5	0.3	0.0	0.0	4.9	214	0.0
2012/05/06 00:00:02	10.0	1.6	20.2	11.8	3.8	19.9	-99.0	-99.0	-99.0	75.4	38.1	99.3	0.3	0.0	2.1	5.2	224	0.0
2012/05/07 00:00:03	10.4	1.3	19.9	12.0	3.9	19.9	-99.0	-99.0	-99.0	69.2	30.4	98.3	0.6	0.0	1.6	5.5	328	0.0
2012/05/08 00:00:02	11.3	4.3	21.2	12.6	5.8	21.3	-99.0	-99.0	-99.0	67.1	26.7	95.0	0.4	0.0	1.0	4.9	358	0.0
2012/05/09 00:00:03	11.4	2.2	22.9	13.3	4.6	22.8	-99.0	-99.0	-99.0	68.2	27.5	97.2	0.2	0.0	0.0	5.1	51	0.0
2012/05/10 00:00:02	12.3	1.9	25.3	14.5	4.4	24.9	-99.0	-99.0	-99.0	65.4	21.5	97.7	0.2	0.0	1.8	4.9	38	0.0
2012/05/11 00:00:02	13.0	2.2	26.4	15.3	5.1	26.4	-99.0	-99.0	-99.0	62.6	18.3	97.3	0.2	0.0	1.5	4.7	63	0.0
2012/05/12 00:00:03	14.0	3.0	26.2	16.0	5.6	25.5	-99.0	-99.0	-99.0	59.8	26.7	94.7	0.9	0.0	2.9	5.1	329	0.0
2012/05/13 00:00:02	13.0	2.9	25.3	15.5	6.8	23.7	-99.0	-99.0	-99.0	63.1	29.0	93.3	1.5	0.0	0.8	7.7	268	0.0
2012/05/14 00:00:02	8.5	-0.8	17.4	10.3	3.0	16.7	-99.0	-99.0	-99.0	64.1	29.8	96.2	1.9	0.0	0.0	9.0	261	0.0
2012/05/15 00:00:02	7.0	-1.0	16.9	9.5	3.0	16.7	-99.0	-99.0	-99.0	68.6	25.5	98.6	0.1	0.0	0.0	5.8	116	0.0
2012/05/16 00:00:02	6.3	-3.6	18.8	8.8	-0.7	18.6	-99.0	-99.0	-99.0	66.2	19.0	96.5	0.3	0.0	0.0	4.6	213	0.0
2012/05/17 00:00:02	7.6	-3.1	21.3	10.1	-0.1	21.0	-99.0	-99.0	-99.0	64.4	19.8	96.1	0.2	0.0	0.0	5.2	294	0.0
2012/05/18 00:00:02	8.3	-2.1	21.4	10.9	2.0	21.1	-99.0	-99.0	-99.0	65.1	23.3	96.5	0.4	0.0	0.5	4.4	355	0.0
2012/05/19 00:00:02	8.7	-2.0	21.7	11.0	1.6	21.3	-99.0	-99.0	-99.0	60.9	19.1	96.5	0.3	0.0	1.8	4.0	354	0.0
2012/05/20 00:00:02	8.5	-1.7	22.2	10.9	1.2	21.1	-99.0	-99.0	-99.0	59.8	17.4	93.7	0.2	0.0	2.2	8.8	11	0.0
2012/05/21 00:00:02	7.6	-2.5	21.3	10.2	1.1	20.6	-99.0	-99.0	-99.0	62.1	19.9	95.2	0.4	0.0	0.0	7.5	178	0.0
2012/05/22 00:00:03	10.1	-1.0	22.1	12.1	3.3	21.2	-99.0	-99.0	-99.0	66.7	31.8	95.9	0.9	0.0	1.5	62.0	296	0.0
2012/05/23 00:00:02	9.2	-0.8	21.6	12.0	2.8	20.8	-99.0	-99.0	-99.0	62.8	19.2	96.2	0.9	0.0	0.0	7.3	328	0.0
2012/05/24 00:00:02	9.5	-2.6	22.8	11.7	0.7	22.3	-99.0	-99.0	-99.0	57.9	18.8	93.5	0.7	0.0	0.0	5.8	3	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/05/25 00:00:02	13.6	6.8	23.6	14.1	8.2	22.9	-99.0	-99.0	-99.0	77.7	41.4	99.0	0.8	0.0	1.8	8.0	274	20.4
2012/05/26 00:00:02	11.8	7.2	15.9	12.1	8.5	16.7	-99.0	-99.0	-99.0	78.8	53.9	99.0	2.8	0.6	8.6	13.3	313	10.4
2012/05/27 00:00:03	9.9	3.0	14.9	10.8	5.8	14.3	-99.0	-99.0	-99.0	66.9	43.8	96.2	0.6	0.0	2.6	5.7	287	0.0
2012/05/28 00:00:02	9.0	1.9	16.4	10.3	4.3	16.3	-99.0	-99.0	-99.0	76.2	46.5	98.5	0.1	0.0	0.0	5.3	192	0.0
2012/05/29 00:00:02	12.5	0.7	18.5	13.2	3.4	18.2	-99.0	-99.0	-99.0	66.4	45.9	99.4	2.3	0.0	2.7	7.3	150	0.0
2012/05/31 00:00:02	14.9	6.9	20.8	15.4	7.8	20.5	-99.0	-99.0	-99.0	58.2	36.3	90.4	2.6	0.0	5.2	7.6	125	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20120501-00:00 till 20120531-23:59

Meteorological Daily Statistics Summary

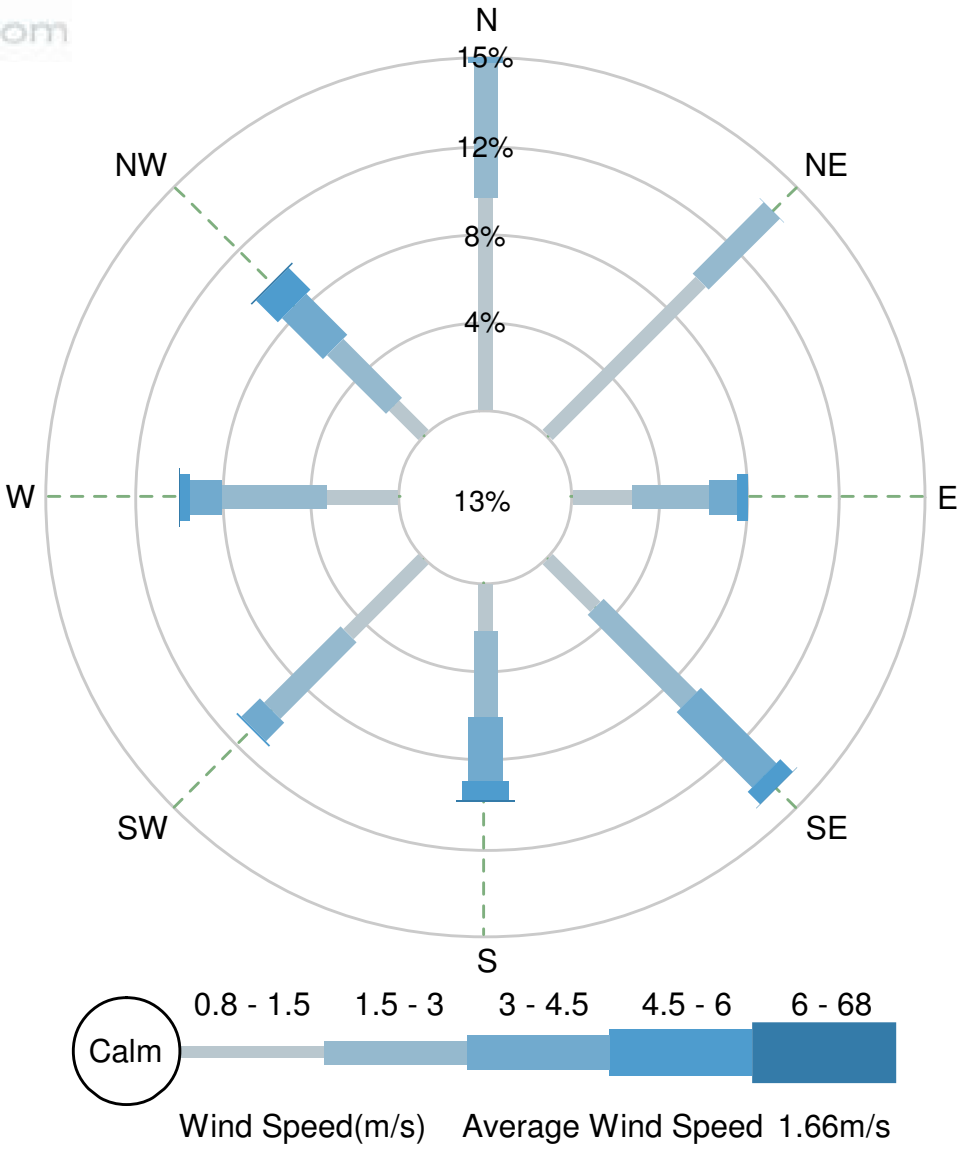
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/07/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/06/01 00:00:02	15.7	8.4	21.1	16.3	9.7	20.7	-99.0	-99.0	-99.0	57.5	40.3	79.3	3.2	0.0	0.0	7.9	111	0.0
2012/06/07 00:00:02	13.0	10.1	15.3	13.1	10.6	15.1	-99.0	-99.0	-99.0	63.8	53.5	77.4	3.5	0.0	2.3	11.7	153	0.2
2012/06/08 00:00:02	9.6	1.5	16.8	10.7	5.1	16.4	-99.0	-99.0	-99.0	77.0	48.0	99.1	1.8	0.0	1.9	9.4	140	0.0
2012/06/09 00:00:02	10.8	3.0	17.9	11.5	6.2	16.8	-99.0	-99.0	-99.0	73.6	44.8	97.9	1.2	0.0	0.0	7.3	119	0.0
2012/06/10 00:00:02	8.3	1.7	17.7	10.0	4.1	17.5	-99.0	-99.0	-99.0	79.2	39.2	98.5	0.4	0.0	1.0	4.5	247	0.0
2012/06/11 00:00:02	9.6	1.1	18.6	11.0	3.9	18.1	-99.0	-99.0	-99.0	64.9	25.8	95.8	1.6	0.0	1.4	7.7	137	0.0
2012/06/12 00:00:02	9.0	0.4	14.4	10.0	3.6	14.3	-99.0	-99.0	-99.0	82.8	67.1	99.9	2.0	0.0	3.7	7.5	150	0.0
2012/06/13 00:00:03	10.9	2.3	18.4	11.9	5.6	17.7	-99.0	-99.0	-99.0	78.5	53.1	98.8	2.0	0.0	0.0	9.2	155	0.0
2012/06/14 00:00:02	9.0	1.3	18.8	11.0	4.1	18.4	-99.0	-99.0	-99.0	81.0	43.1	99.3	1.0	0.0	0.8	7.4	114	0.0
2012/06/15 00:00:04	9.2	0.1	19.8	10.9	3.4	19.7	-99.0	-99.0	-99.0	81.3	44.4	99.8	0.4	0.0	1.4	4.5	323	0.0
2012/06/16 00:00:02	11.0	1.6	21.9	12.4	3.9	21.5	-99.0	-99.0	-99.0	73.3	33.2	99.4	1.0	0.0	3.0	7.4	341	0.0
2012/06/17 00:00:02	14.7	6.5	21.7	15.4	8.9	20.9	-99.0	-99.0	-99.0	66.3	38.7	95.1	2.1	0.0	6.7	10.2	320	3.0
2012/06/18 00:00:02	10.8	4.2	16.4	11.6	7.1	16.1	-99.0	-99.0	-99.0	76.0	43.2	99.7	1.5	0.0	2.4	7.3	301	0.2
2012/06/19 00:00:02	8.8	1.7	16.4	10.7	5.5	16.1	-99.0	-99.0	-99.0	75.5	41.8	98.3	0.7	0.0	2.3	6.6	254	0.0
2012/06/20 00:00:02	7.9	0.6	17.0	9.7	4.2	17.0	-99.0	-99.0	-99.0	77.9	45.0	98.7	0.0	0.0	2.3	6.3	113	0.0
2012/06/21 00:00:02	6.9	-1.0	17.0	9.2	2.2	16.6	-99.0	-99.0	-99.0	80.5	40.2	99.6	0.7	0.0	3.1	4.9	345	0.0
2012/06/22 00:00:02	9.1	-1.4	19.4	10.4	0.7	18.8	-99.0	-99.0	-99.0	67.4	31.9	99.6	1.6	0.0	2.0	8.7	329	0.2
2012/06/23 00:00:02	13.5	6.9	17.5	14.1	8.3	17.4	-99.0	-99.0	-99.0	60.8	48.5	87.2	3.0	0.9	8.1	12.6	311	0.0
2012/06/24 00:00:02	5.5	-1.4	12.8	7.3	2.8	12.8	-99.0	-99.0	-99.0	79.9	47.6	98.3	0.3	0.0	1.2	6.0	260	0.0
2012/06/25 00:00:02	3.2	-4.8	14.2	5.3	-2.8	14.9	-99.0	-99.0	-99.0	80.0	40.0	97.3	0.2	0.0	1.0	3.9	19	0.0
2012/06/26 00:00:02	4.5	-5.2	17.5	6.5	-2.6	17.4	-99.0	-99.0	-99.0	73.5	25.6	99.0	0.3	0.0	1.8	5.5	337	0.0
2012/06/27 00:00:02	8.7	-1.2	19.1	9.9	1.7	19.0	-99.0	-99.0	-99.0	71.1	38.6	96.2	1.5	0.0	0.0	8.0	125	0.0
2012/06/28 00:00:02	11.0	6.4	15.1	11.4	7.5	14.6	-99.0	-99.0	-99.0	83.7	68.7	96.9	1.8	0.0	4.6	6.5	144	1.4
2012/06/29 00:00:02	11.5	5.6	19.2	12.4	7.5	18.7	-99.0	-99.0	-99.0	77.0	46.6	98.6	1.6	0.0	1.7	7.7	111	0.6

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/06/30 00:00:02	10.8	4.6	18.9	12.1	7.4	18.9	-99.0	-99.0	-99.0	82.0	52.6	97.2	0.4	0.0	2.4	4.7	324	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20120601-00:00 till 20120630-23:59

Meteorological Daily Statistics Summary

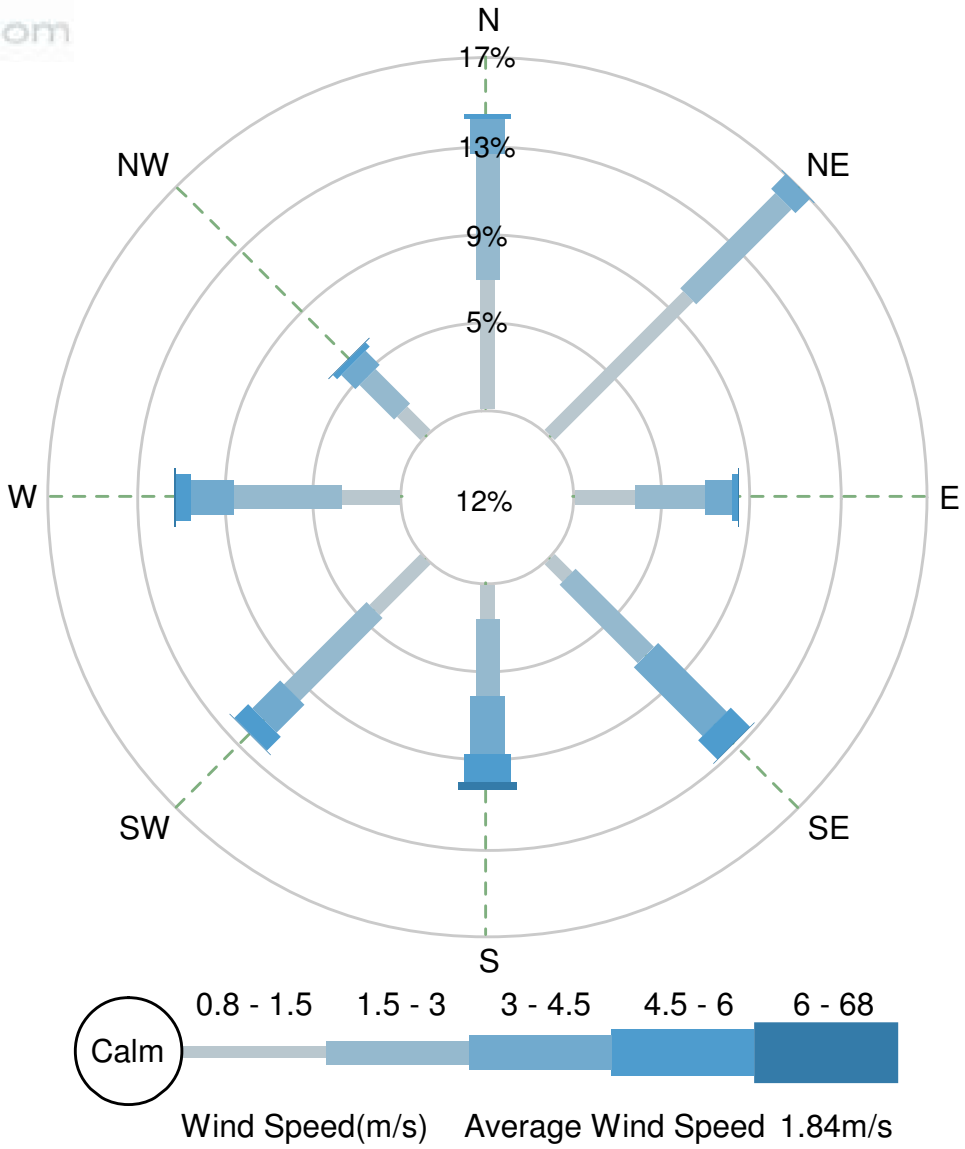
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/08/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/07/01 00:00:02	12.2	5.2	20.1	13.4	8.4	18.9	-99.0	-99.0	-99.0	68.5	35.8	96.9	1.4	0.0	1.2	8.4	316	0.0
2012/07/02 00:00:02	9.4	1.2	15.9	10.9	6.9	14.8	-99.0	-99.0	-99.0	62.0	33.7	88.6	1.7	0.0	3.0	9.2	282	0.0
2012/07/03 00:00:02	7.7	0.5	14.5	8.4	4.3	14.0	-99.0	-99.0	-99.0	66.3	43.7	89.2	1.0	0.0	3.0	7.6	267	0.0
2012/07/04 00:00:02	5.5	-1.0	14.4	7.9	1.7	14.0	-99.0	-99.0	-99.0	75.7	39.5	97.8	0.5	0.0	2.0	5.9	248	0.0
2012/07/05 00:00:02	3.5	-4.5	13.2	6.1	-1.6	13.1	-99.0	-99.0	-99.0	78.6	42.2	98.0	0.5	0.0	0.9	7.6	149	0.0
2012/07/06 00:00:02	6.1	-3.7	16.0	7.8	0.5	15.7	-99.0	-99.0	-99.0	73.3	43.1	97.5	2.1	0.0	6.9	10.0	147	0.0
2012/07/07 00:00:02	7.5	-2.6	17.3	9.2	2.2	16.3	-99.0	-99.0	-99.0	73.1	44.3	98.7	2.3	0.0	0.7	10.0	137	0.0
2012/07/08 00:00:02	6.6	-2.6	17.5	9.0	1.3	17.3	-99.0	-99.0	-99.0	71.7	30.7	99.3	1.1	0.0	3.8	6.6	128	0.0
2012/07/09 00:00:02	7.1	-2.0	18.6	9.6	1.6	17.9	-99.0	-99.0	-99.0	70.5	30.4	97.7	1.5	0.0	0.0	7.2	94	0.0
2012/07/10 00:00:02	9.7	-0.7	19.9	11.4	1.9	19.5	-99.0	-99.0	-99.0	62.5	26.0	95.6	0.9	0.0	4.9	9.2	59	0.0
2012/07/11 00:00:02	15.6	13.0	19.8	15.8	13.5	19.4	-99.0	-99.0	-99.0	60.5	44.9	81.1	2.9	1.1	5.5	11.9	24	0.8
2012/07/12 00:00:02	14.2	10.4	18.8	14.6	11.6	18.1	-99.0	-99.0	-99.0	87.1	66.0	98.7	0.9	0.0	0.6	9.7	336	23.0
2012/07/13 00:00:02	13.1	9.6	15.6	13.6	10.5	16.2	-99.0	-99.0	-99.0	97.4	90.2	98.6	0.3	0.0	2.4	3.7	90	21.6
2012/07/14 00:00:02	14.9	11.2	17.3	15.4	12.4	17.9	-99.0	-99.0	-99.0	93.1	84.3	99.3	1.9	0.0	5.1	9.6	355	15.6
2012/07/16 00:00:02	9.3	0.8	15.1	10.2	3.2	14.7	-99.0	-99.0	-99.0	70.1	43.6	96.9	1.6	0.0	1.9	8.6	267	0.0
2012/07/17 00:00:02	8.3	-0.7	15.0	9.4	0.6	14.9	-99.0	-99.0	-99.0	74.9	48.5	98.9	0.6	0.0	0.0	6.0	128	0.2
2012/07/18 00:00:02	9.2	-0.6	18.6	10.4	1.6	18.3	-99.0	-99.0	-99.0	77.5	42.3	99.7	0.2	0.0	2.9	4.5	222	0.8
2012/07/19 00:00:02	12.5	6.2	16.8	13.3	9.3	16.4	-99.0	-99.0	-99.0	83.9	61.3	98.6	0.0	0.0	0.0	0.0	-99	0.0
2012/07/20 00:00:02	7.9	0.2	14.8	9.3	3.4	14.5	-99.0	-99.0	-99.0	76.0	31.2	99.3	1.4	0.0	1.2	9.1	223	0.0
2012/07/21 00:00:02	6.6	-1.6	15.1	7.8	0.2	15.1	-99.0	-99.0	-99.0	73.4	41.5	98.0	1.0	0.0	4.1	6.3	155	0.0
2012/07/22 00:00:03	8.7	-0.3	16.3	9.9	1.5	15.9	-99.0	-99.0	-99.0	76.7	57.9	98.8	2.4	0.0	7.2	9.9	139	0.0
2012/07/23 00:00:02	9.8	3.2	16.4	10.4	5.4	15.9	-99.0	-99.0	-99.0	74.7	52.5	93.2	2.2	0.0	6.8	9.8	143	0.0
2012/07/24 00:00:02	10.7	4.1	17.2	11.3	6.4	16.9	-99.0	-99.0	-99.0	71.8	40.2	93.3	2.4	0.0	2.0	10.1	136	0.0
2012/07/25 00:00:02	8.3	-1.2	18.0	10.1	1.8	17.8	-99.0	-99.0	-99.0	77.0	45.5	98.0	1.1	0.0	1.1	7.1	114	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^{\circ}C$)						(%)			(m/s)		(m/s)	($^{\circ}$)	(mm)
2012/07/26 00:00:02	8.6	-0.6	19.3	10.5	3.5	18.8	-99.0	-99.0	-99.0	75.5	38.4	99.0	0.6	0.0	3.9	5.8	316	0.0
2012/07/27 00:00:02	11.3	5.4	19.0	12.0	6.6	18.7	-99.0	-99.0	-99.0	77.8	47.1	95.9	0.6	0.0	0.6	10.1	341	3.6
2012/07/28 00:00:02	9.1	1.5	16.1	9.8	5.6	15.3	-99.0	-99.0	-99.0	73.4	38.6	99.3	1.3	0.0	2.3	7.6	298	0.0
2012/07/29 00:00:02	9.2	4.6	13.3	9.5	6.5	13.0	-99.0	-99.0	-99.0	75.2	53.9	94.3	1.7	0.0	0.6	7.9	253	0.0
2012/07/30 00:00:02	7.2	0.2	15.7	9.0	2.5	15.6	-99.0	-99.0	-99.0	77.5	45.4	98.7	0.6	0.0	1.4	6.5	234	0.0
2012/07/31 00:00:02	5.2	-2.1	14.6	7.6	0.1	14.6	-99.0	-99.0	-99.0	76.8	38.1	99.0	0.6	0.0	0.0	7.6	157	0.2



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20120701-00:00 till 20120731-23:59

Meteorological Daily Statistics Summary

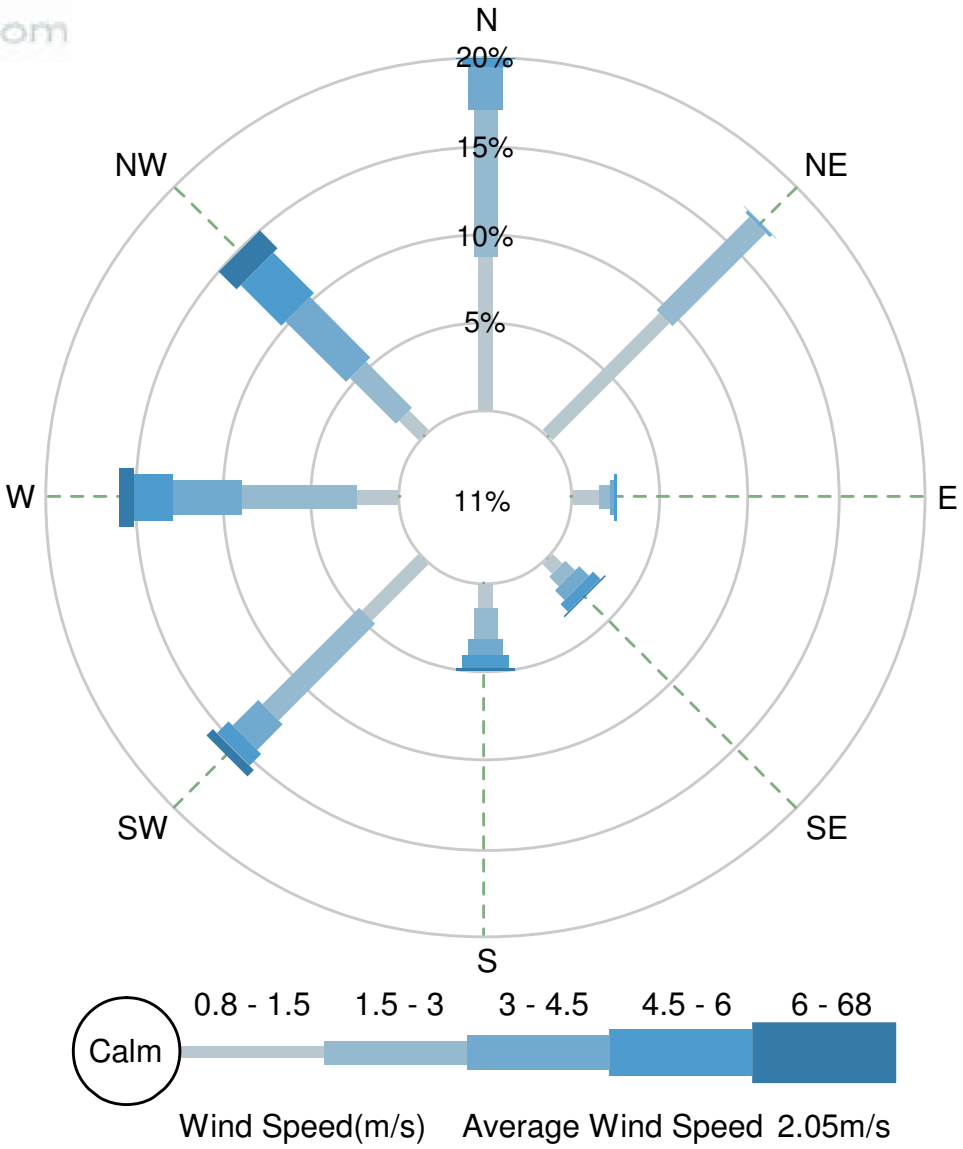
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/09/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/08/01 00:00:02	4.5	-4.0	14.5	6.5	-1.1	14.2	-99.0	-99.0	-99.0	77.5	44.6	96.9	0.9	0.0	0.0	7.9	126	0.0
2012/08/02 00:00:02	5.8	-3.7	16.2	7.3	-1.9	15.8	-99.0	-99.0	-99.0	70.0	30.1	98.1	1.2	0.0	1.8	6.5	278	0.0
2012/08/03 00:00:02	6.2	-2.7	15.2	7.9	-1.1	15.3	-99.0	-99.0	-99.0	65.9	30.2	96.4	0.5	0.0	0.7	5.3	35	0.0
2012/08/04 00:00:02	8.6	0.9	16.9	10.0	3.2	16.3	-99.0	-99.0	-99.0	60.5	30.6	90.0	1.4	0.0	5.3	7.6	324	0.0
2012/08/05 00:00:02	7.5	-2.7	19.1	10.1	-0.1	18.6	-99.0	-99.0	-99.0	64.0	23.0	95.7	0.9	0.0	5.2	7.3	301	0.0
2012/08/06 00:00:02	9.0	-2.8	19.5	10.7	0.8	18.9	-99.0	-99.0	-99.0	58.5	24.7	96.0	1.7	0.0	0.6	9.0	315	0.0
2012/08/07 00:00:02	9.2	-0.3	19.2	11.5	3.3	18.4	-99.0	-99.0	-99.0	60.1	25.1	93.4	1.3	0.0	3.1	9.8	274	0.0
2012/08/08 00:00:02	6.0	-3.1	15.8	8.1	-0.9	16.1	-99.0	-99.0	-99.0	68.4	30.9	96.2	0.5	0.0	3.0	5.7	3	0.0
2012/08/09 00:00:02	8.5	1.9	18.5	11.7	6.7	18.0	-99.0	-99.0	-99.0	52.3	19.3	79.9	0.0	0.0	2.0	0.0	-99	0.0
2012/08/10 00:00:02	7.5	1.1	14.7	9.3	3.1	14.9	-99.0	-99.0	-99.0	68.1	49.7	89.6	0.9	0.0	4.2	8.9	244	0.2
2012/08/11 00:00:02	7.5	-0.1	14.7	8.7	3.9	14.1	-99.0	-99.0	-99.0	60.7	36.4	87.2	3.0	0.0	0.6	11.5	223	0.0
2012/08/12 00:00:03	6.3	-3.1	16.0	9.0	0.7	15.7	-99.0	-99.0	-99.0	71.7	41.0	96.9	1.4	0.0	0.6	10.9	152	0.0
2012/08/13 00:00:02	10.7	3.4	16.5	11.2	6.9	16.2	-99.0	-99.0	-99.0	64.3	42.3	94.2	2.7	0.0	6.7	9.8	160	0.0
2012/08/14 00:00:03	8.7	-0.0	18.4	10.6	2.6	18.3	-99.0	-99.0	-99.0	71.6	38.4	97.2	0.5	0.0	2.5	5.5	91	0.0
2012/08/15 00:00:02	8.3	-1.8	19.2	9.9	1.2	18.3	-99.0	-99.0	-99.0	67.8	28.4	97.2	1.4	0.0	1.6	8.3	318	0.0
2012/08/16 00:00:02	11.9	-1.2	22.6	13.4	3.1	21.1	-99.0	-99.0	-99.0	50.9	22.1	94.3	2.1	0.0	7.4	10.0	332	0.0
2012/08/17 00:00:02	11.9	1.5	20.2	13.8	5.5	19.1	-99.0	-99.0	-99.0	48.0	27.7	81.0	1.7	0.0	1.9	9.0	309	0.0
2012/08/18 00:00:03	10.9	-1.6	20.2	12.4	1.9	19.3	-99.0	-99.0	-99.0	50.6	21.5	95.4	4.1	0.0	10.8	15.4	299	0.0
2012/08/19 00:00:02	9.9	1.4	15.5	10.4	5.2	14.7	-99.0	-99.0	-99.0	51.8	31.5	75.9	2.9	0.0	2.6	11.7	299	0.0
2012/08/20 00:00:02	9.8	1.8	16.9	11.0	6.1	16.5	-99.0	-99.0	-99.0	62.7	34.2	89.3	0.3	0.0	4.1	7.0	257	0.0
2012/08/21 00:00:03	7.2	-1.0	17.7	9.0	1.5	16.9	-99.0	-99.0	-99.0	65.4	27.3	95.6	0.8	0.0	2.3	6.5	325	0.0
2012/08/22 00:00:03	11.1	-1.3	22.0	12.3	1.6	21.3	-99.0	-99.0	-99.0	64.2	35.1	94.3	0.6	0.0	4.5	8.1	334	0.4
2012/08/23 00:00:02	20.1	17.0	24.4	20.8	18.7	24.0	-99.0	-99.0	-99.0	51.2	37.7	60.7	0.0	0.0	5.2	0.0	-99	0.0
2012/08/24 00:00:02	19.8	12.2	25.7	20.3	14.5	25.6	-99.0	-99.0	-99.0	61.7	36.6	96.4	2.6	0.7	11.5	16.4	3	6.2

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/08/25 00:00:02	13.3	5.2	19.1	14.2	7.8	19.8	-99.0	-99.0	-99.0	57.6	28.0	96.2	2.0	0.0	1.2	10.8	300	0.0
2012/08/26 00:00:02	11.4	4.0	20.0	12.7	7.4	19.0	-99.0	-99.0	-99.0	57.3	29.4	92.5	1.2	0.0	2.3	8.3	317	0.0
2012/08/27 00:00:02	7.4	0.7	15.3	9.1	3.1	14.9	-99.0	-99.0	-99.0	74.1	41.5	98.3	0.4	0.0	2.1	4.4	356	0.0
2012/08/28 00:00:02	8.0	-2.5	19.4	9.9	-0.3	19.1	-99.0	-99.0	-99.0	72.2	35.6	97.2	0.3	0.0	0.0	5.6	246	0.0
2012/08/29 00:00:02	9.2	-1.3	20.6	11.2	2.3	20.3	-99.0	-99.0	-99.0	72.4	35.1	96.9	0.6	0.0	2.4	6.8	289	0.0
2012/08/30 00:00:02	13.9	0.5	24.4	14.9	3.5	23.5	-99.0	-99.0	-99.0	61.5	30.0	97.9	1.2	0.0	5.9	9.6	330	0.0
2012/08/31 00:00:02	16.9	2.7	22.2	17.8	8.3	21.5	-99.0	-99.0	-99.0	50.2	28.1	87.9	2.9	0.0	1.0	12.5	296	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20120801-00:00 till 20120831-23:59

Meteorological Daily Statistics Summary

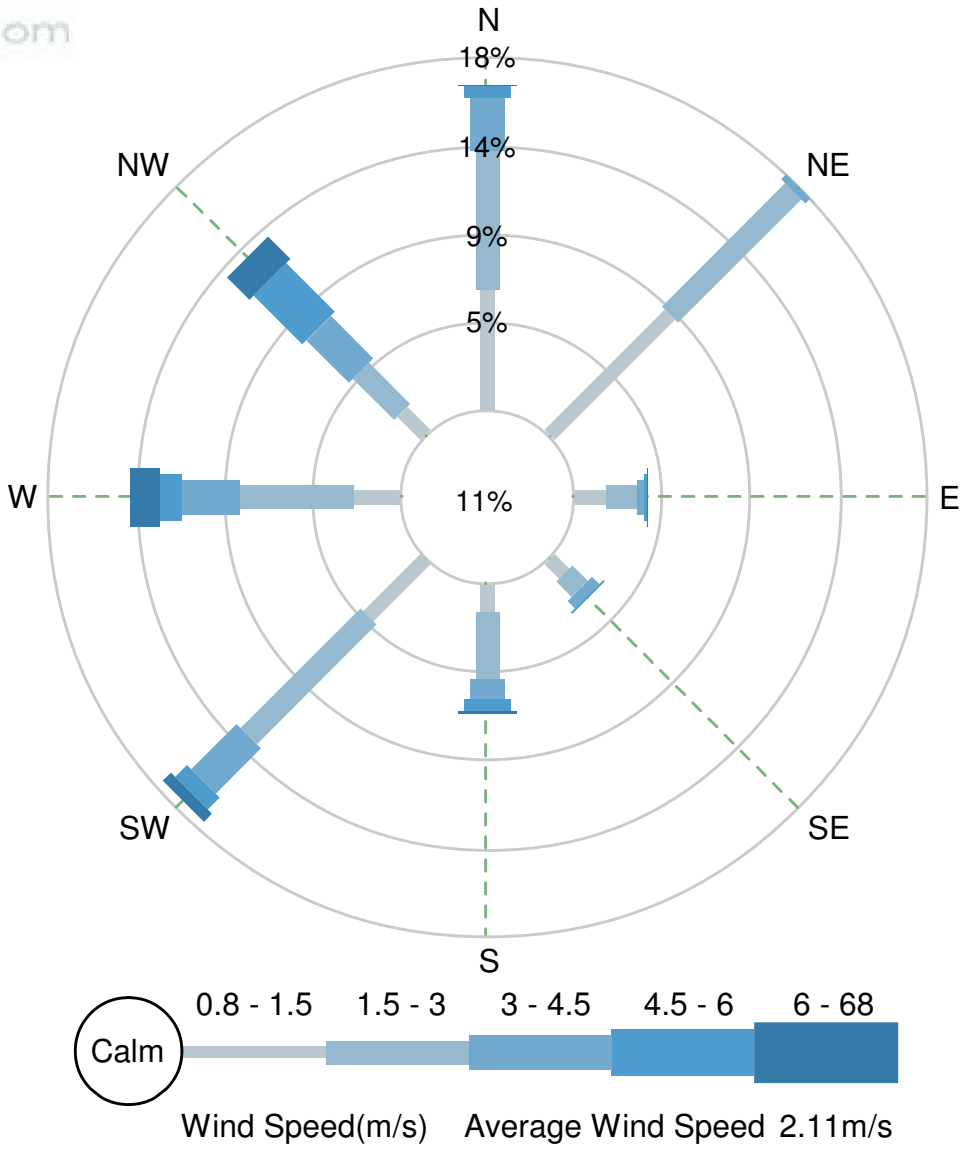
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/10/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/09/01 00:00:02	7.6	-0.3	17.5	9.7	2.8	16.7	-99.0	-99.0	-99.0	62.0	27.3	94.0	1.7	0.0	2.0	9.3	251	0.0
2012/09/02 00:00:02	5.9	-2.9	15.8	8.3	1.4	15.5	-99.0	-99.0	-99.0	65.6	21.9	97.4	0.4	0.0	1.2	6.8	220	0.0
2012/09/03 00:00:03	7.2	-4.0	18.4	9.1	-1.4	18.4	-99.0	-99.0	-99.0	61.0	23.7	93.0	0.1	0.0	2.5	6.3	110	0.0
2012/09/04 00:00:02	9.1	-2.9	20.8	11.1	0.7	20.8	-99.0	-99.0	-99.0	55.9	18.4	94.6	0.3	0.0	2.5	5.0	46	0.0
2012/09/05 00:00:03	10.3	-2.4	23.2	12.6	1.4	22.5	-99.0	-99.0	-99.0	54.7	16.7	93.9	0.7	0.0	2.6	7.1	305	0.0
2012/09/06 00:00:02	14.7	-1.0	24.3	15.7	2.9	23.7	-99.0	-99.0	-99.0	47.0	24.7	91.0	2.5	0.0	7.5	11.4	339	0.0
2012/09/07 00:00:03	20.0	10.0	25.3	20.9	15.5	24.8	-99.0	-99.0	-99.0	42.6	31.2	73.6	4.1	0.0	0.0	742.8	324	0.0
2012/09/08 00:00:02	13.9	2.5	23.1	16.3	9.7	21.9	-99.0	-99.0	-99.0	44.5	20.9	78.4	3.3	0.0	1.6	13.9	275	0.0
2012/09/09 00:00:02	9.3	-0.5	19.8	11.6	3.6	19.1	-99.0	-99.0	-99.0	60.3	28.7	89.7	1.6	0.0	1.6	10.0	263	0.0
2012/09/10 00:00:03	9.8	0.7	19.8	12.1	4.2	19.7	-99.0	-99.0	-99.0	65.1	32.0	95.0	0.3	0.0	1.5	6.6	79	0.0
2012/09/11 00:00:02	17.5	7.6	23.9	18.3	11.0	22.7	-99.0	-99.0	-99.0	53.1	33.0	86.9	1.3	0.0	2.6	7.4	287	0.0
2012/09/14 00:00:02	12.2	1.7	27.4	13.6	5.8	26.7	-99.0	-99.0	-99.0	64.2	19.1	97.9	0.0	0.0	0.0	0.0	-99	0.2
2012/09/15 00:00:02	7.9	-1.1	18.2	10.1	1.9	18.0	-99.0	-99.0	-99.0	64.3	22.8	98.3	0.5	0.0	1.1	7.3	204	0.2
2012/09/16 00:00:02	9.9	-1.3	21.5	12.3	1.3	21.3	-99.0	-99.0	-99.0	60.1	27.9	91.3	0.1	0.0	1.1	5.2	215	0.0
2012/09/17 00:00:02	12.6	1.1	22.9	14.5	5.1	21.8	-99.0	-99.0	-99.0	62.9	31.3	95.2	1.6	0.0	2.3	9.1	301	0.0
2012/09/18 00:00:02	14.5	5.6	23.4	15.3	7.6	21.7	-99.0	-99.0	-99.0	63.0	33.7	92.0	1.0	0.0	0.0	9.7	306	0.0
2012/09/19 00:00:02	13.6	6.3	22.4	14.2	9.4	21.8	-99.0	-99.0	-99.0	74.0	29.1	98.5	0.2	0.0	0.6	10.1	147	3.2
2012/09/20 00:00:02	12.5	3.5	24.0	14.1	5.9	22.9	-99.0	-99.0	-99.0	69.9	23.6	99.7	1.0	0.0	2.6	9.2	293	0.2
2012/09/21 00:00:02	16.2	3.7	28.2	17.9	6.8	28.0	-99.0	-99.0	-99.0	54.9	21.1	94.1	0.5	0.0	4.1	6.3	302	0.0
2012/09/22 00:00:02	18.4	9.1	27.2	19.7	14.2	26.6	-99.0	-99.0	-99.0	58.8	30.9	85.8	0.9	0.0	0.0	10.9	297	0.6
2012/09/23 00:00:02	13.7	2.8	25.5	16.0	6.1	24.1	-99.0	-99.0	-99.0	56.6	19.3	95.5	0.2	0.0	1.5	6.8	166	0.0
2012/09/24 00:00:02	16.6	2.4	28.6	18.1	5.6	28.0	-99.0	-99.0	-99.0	45.2	16.4	88.1	1.1	0.0	3.3	7.3	332	0.0
2012/09/25 00:00:03	15.0	2.8	23.6	17.0	9.8	22.6	-99.0	-99.0	-99.0	46.7	21.8	82.9	1.9	0.0	1.9	11.9	212	0.0
2012/09/26 00:00:02	13.2	-0.8	25.4	15.4	3.5	24.8	-99.0	-99.0	-99.0	53.7	18.4	93.2	0.8	0.0	3.4	7.2	161	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/09/27 00:00:02	15.7	4.8	26.0	17.0	7.9	25.0	-99.0	-99.0	-99.0	61.1	28.1	96.1	0.5	0.0	2.0	7.9	268	0.0
2012/09/28 00:00:02	17.3	5.5	27.5	18.6	9.0	27.0	-99.0	-99.0	-99.0	60.9	33.2	91.9	0.7	0.0	3.8	7.6	280	0.0
2012/09/29 00:00:02	23.1	9.5	31.0	23.7	13.9	30.2	-99.0	-99.0	-99.0	43.8	23.8	85.7	2.1	0.0	9.2	13.7	333	0.0
2012/09/30 00:00:02	17.4	10.1	24.2	17.8	11.9	24.4	-99.0	-99.0	-99.0	70.9	37.2	98.6	3.2	0.8	8.1	10.9	298	16.2



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20120901-00:00 till 20120930-23:59

Meteorological Daily Statistics Summary

Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/11/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	(°)	(mm)
2012/10/01 00:00:02	10.7	1.9	19.5	12.3	5.0	18.9	-99.0	-99.0	-99.0	62.7	24.4	97.5	0.3	0.0	1.5	6.3	224	0.2
2012/10/02 00:00:02	11.9	0.7	22.3	13.5	3.2	21.8	-99.0	-99.0	-99.0	60.9	21.2	96.8	0.6	0.0	4.8	6.5	165	0.0
2012/10/03 00:00:02	15.4	6.5	22.9	16.4	9.9	22.5	-99.0	-99.0	-99.0	55.5	28.5	87.7	2.2	0.0	4.0	8.5	125	0.0
2012/10/04 00:00:02	14.9	3.2	26.3	16.4	5.3	25.2	-99.0	-99.0	-99.0	60.3	25.8	96.8	0.3	0.0	1.6	5.3	313	0.0
2012/10/05 00:00:02	17.8	6.0	28.6	19.1	8.4	27.8	-99.0	-99.0	-99.0	51.2	20.0	89.7	1.2	0.0	2.6	9.0	310	0.0
2012/10/06 00:00:02	21.6	8.0	32.2	23.4	11.5	31.2	-99.0	-99.0	-99.0	39.7	17.6	78.6	1.7	0.0	1.8	9.2	308	0.0
2012/10/07 00:00:03	24.9	11.4	33.2	25.9	13.1	32.3	-99.0	-99.0	-99.0	30.4	13.7	67.3	2.8	0.0	7.6	10.7	314	0.0
2012/10/08 00:00:02	17.8	5.9	26.8	19.0	12.2	27.4	-99.0	-99.0	-99.0	42.1	16.7	83.5	2.2	0.0	0.0	14.3	235	0.0
2012/10/09 00:00:03	15.2	4.2	25.3	16.4	7.5	24.2	-99.0	-99.0	-99.0	48.8	19.8	88.8	1.0	0.0	0.6	9.0	251	0.0
2012/10/10 00:00:02	15.0	3.9	25.3	17.0	8.5	24.4	-99.0	-99.0	-99.0	44.8	20.7	76.3	0.6	0.0	2.6	9.8	246	0.0
2012/10/11 00:00:02	17.0	4.6	30.0	18.3	7.3	28.8	-99.0	-99.0	-99.0	45.7	15.8	86.0	1.7	0.0	2.5	12.2	294	0.0
2012/10/12 00:00:02	13.5	4.1	19.0	14.1	7.3	19.6	-99.0	-99.0	-99.0	67.7	33.1	97.0	1.7	0.0	0.9	8.2	312	6.2
2012/10/13 00:00:02	10.0	3.2	16.1	10.5	5.1	15.7	-99.0	-99.0	-99.0	68.0	42.7	96.6	3.1	0.0	10.2	14.3	278	5.4
2012/10/14 00:00:03	12.5	1.8	22.3	13.8	5.0	20.8	-99.0	-99.0	-99.0	57.9	21.2	95.5	1.3	0.0	2.4	10.9	272	0.0
2012/10/15 00:00:02	12.3	2.3	22.4	14.0	4.6	21.6	-99.0	-99.0	-99.0	61.0	26.1	94.8	0.7	0.0	3.4	7.1	157	0.0
2012/10/16 00:00:02	15.0	2.8	27.5	16.7	6.4	25.9	-99.0	-99.0	-99.0	56.0	18.4	97.8	0.2	0.0	2.2	6.0	248	0.0
2012/10/17 00:00:02	18.9	5.0	29.6	19.9	8.4	28.3	-99.0	-99.0	-99.0	46.2	23.9	85.9	1.1	0.0	5.1	9.6	319	0.0
2012/10/18 00:00:02	23.2	9.9	33.2	25.1	16.4	32.6	-99.0	-99.0	-99.0	36.6	12.0	74.7	2.6	0.0	0.7	11.9	301	0.0
2012/10/19 00:00:02	19.2	6.5	33.0	21.6	10.0	31.8	-99.0	-99.0	-99.0	48.8	16.8	96.0	0.3	0.0	2.2	8.4	185	0.0
2012/10/20 00:00:02	21.3	9.8	31.4	22.9	12.5	30.7	-99.0	-99.0	-99.0	44.9	20.1	74.4	0.8	0.0	3.2	8.2	339	0.0
2012/10/21 00:00:02	26.3	12.9	35.8	27.9	18.0	34.7	-99.0	-99.0	-99.0	28.2	7.5	70.1	2.8	0.0	2.1	15.4	275	0.0
2012/10/22 00:00:02	18.3	9.1	30.1	19.9	13.6	28.8	-99.0	-99.0	-99.0	54.9	21.5	95.9	0.1	0.0	1.4	13.7	236	3.2
2012/10/23 00:00:02	18.2	10.0	27.3	18.4	11.7	26.2	-99.0	-99.0	-99.0	51.8	12.3	97.7	2.7	0.0	9.5	14.5	193	0.2
2012/10/24 00:00:02	16.1	7.7	23.6	16.1	9.0	22.9	-99.0	-99.0	-99.0	41.0	22.3	69.1	4.4	2.0	9.3	12.1	123	0.0

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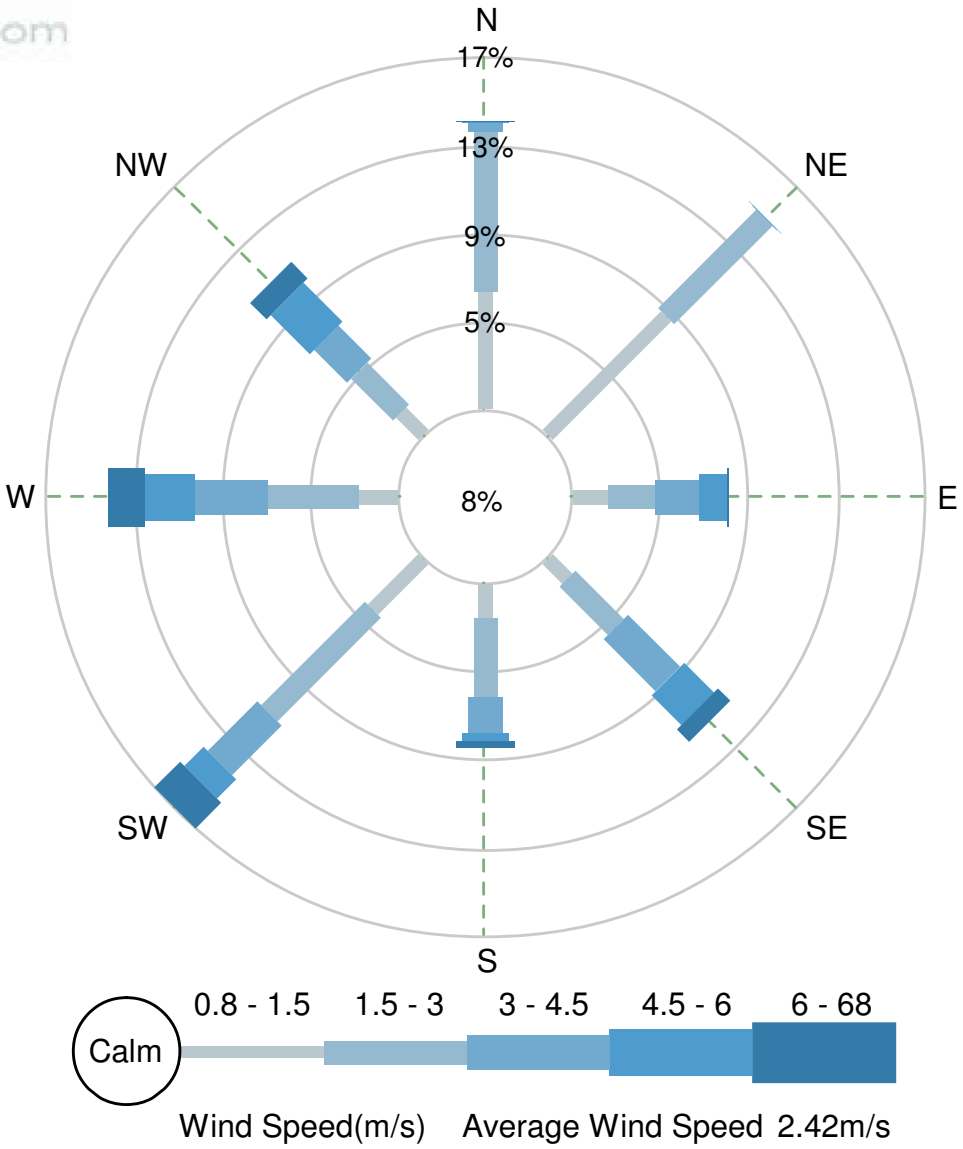
Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)
2012/10/25 00:00:02	17.8	9.2	28.4	18.9	10.5	27.9	-99.0	-99.0	-99.0	39.5	14.2	65.8	1.8	0.0	2.3	7.6	123	0.0
2012/10/26 00:00:02	20.5	4.5	31.6	21.4	7.9	30.5	-99.0	-99.0	-99.0	37.3	16.2	79.4	2.0	0.0	6.5	9.2	301	0.0
2012/10/27 00:00:02	22.0	10.3	33.4	22.8	14.5	31.8	-99.0	-99.0	-99.0	39.4	16.7	80.0	1.8	0.0	8.3	11.4	237	0.4
2012/10/28 00:00:03	16.7	7.9	25.5	17.7	10.6	24.7	-99.0	-99.0	-99.0	47.6	15.9	89.8	1.1	0.0	1.0	8.1	160	0.0
2012/10/29 00:00:02	19.0	10.0	26.5	19.3	12.0	25.9	-99.0	-99.0	-99.0	45.9	24.1	78.2	3.1	0.0	6.2	11.3	131	0.0
2012/10/30 00:00:03	18.3	9.4	24.2	18.9	12.1	23.6	-99.0	-99.0	-99.0	49.1	32.0	76.0	1.6	0.3	5.1	6.8	114	0.0
2012/10/31 00:00:03	18.6	11.7	25.4	18.9	15.0	23.9	-99.0	-99.0	-99.0	56.4	31.2	80.8	0.5	0.0	2.2	10.4	317	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20121001-00:00 till 20121031-23:59

Meteorological Daily Statistics Summary

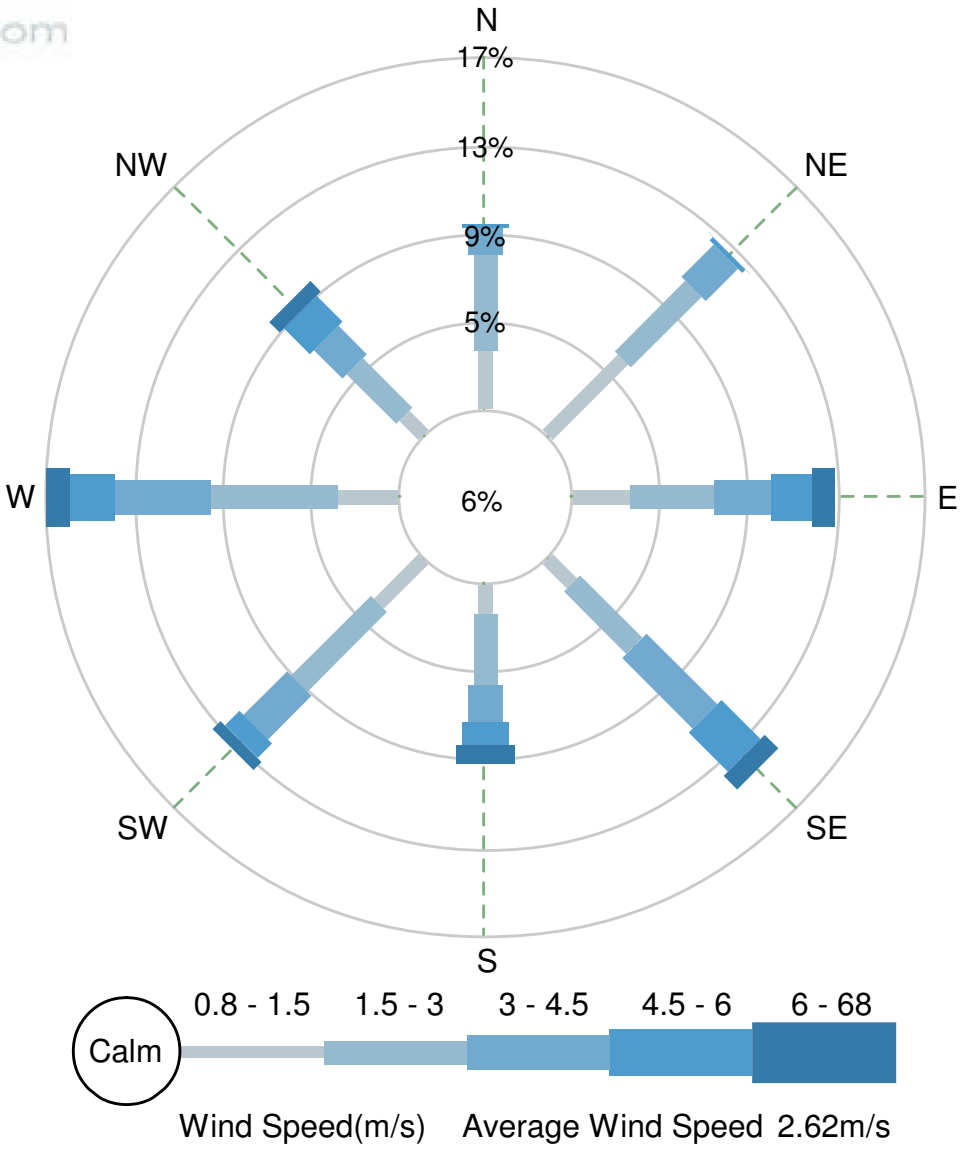
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2012/12/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/11/01 00:00:03	20.0	7.8	31.4	21.2	9.7	30.7	-99.0	-99.0	-99.0	51.8	19.9	93.1	0.3	0.0	2.0	6.7	227	0.0
2012/11/02 00:00:02	24.6	11.0	34.8	25.6	14.8	33.5	-99.0	-99.0	-99.0	37.8	15.8	75.8	2.4	0.0	10.1	14.3	295	0.0
2012/11/03 00:00:02	19.7	6.1	28.7	20.4	9.9	27.9	-99.0	-99.0	-99.0	36.3	12.9	80.4	1.9	0.0	5.5	9.8	174	0.0
2012/11/04 00:00:02	20.1	13.4	26.8	20.1	13.9	25.5	-99.0	-99.0	-99.0	49.9	33.2	71.9	2.4	0.3	5.8	9.8	123	0.0
2012/11/05 00:00:02	22.4	12.2	31.5	22.7	13.6	29.9	-99.0	-99.0	-99.0	48.1	24.0	81.1	0.3	0.0	2.0	8.0	291	0.0
2012/11/06 00:00:02	24.6	14.1	33.5	24.8	16.2	31.9	-99.0	-99.0	-99.0	45.3	23.6	75.6	0.7	0.0	2.2	7.6	310	0.0
2012/11/07 00:00:02	26.5	17.6	34.5	26.6	20.3	32.8	-99.0	-99.0	-99.0	39.7	21.1	61.8	1.1	0.0	1.8	10.8	325	0.0
2012/11/08 00:00:02	26.4	20.0	34.0	26.5	20.7	32.1	-99.0	-99.0	-99.0	39.0	18.7	71.2	1.2	0.0	8.1	12.4	298	0.0
2012/11/09 00:00:02	24.1	18.5	32.9	23.9	19.4	30.5	-99.0	-99.0	-99.0	58.9	26.6	92.8	1.8	0.0	2.9	12.8	301	0.4
2012/11/10 00:00:02	21.4	17.7	29.2	21.5	18.3	27.6	-99.0	-99.0	-99.0	75.9	39.3	96.7	0.7	0.0	1.6	10.3	260	6.0
2012/11/11 00:00:03	19.2	14.0	25.4	19.7	15.5	24.9	-99.0	-99.0	-99.0	61.6	39.6	85.1	2.5	0.0	8.3	10.8	145	0.0
2012/11/12 00:00:02	19.0	8.9	26.8	19.1	10.6	26.0	-99.0	-99.0	-99.0	47.1	23.0	82.3	3.3	0.0	6.3	9.9	109	0.0
2012/11/13 00:00:02	20.0	7.7	30.1	20.8	10.9	29.1	-99.0	-99.0	-99.0	43.3	18.0	84.7	0.3	0.0	1.7	7.6	110	0.0
2012/11/14 00:00:02	23.6	11.0	33.7	24.2	13.8	32.0	-99.0	-99.0	-99.0	36.8	16.5	66.9	1.2	0.0	2.0	14.3	293	0.0
2012/11/15 00:00:02	24.7	13.6	35.5	25.6	16.2	33.9	-99.0	-99.0	-99.0	41.6	15.9	78.9	2.3	0.0	0.0	12.2	279	0.0
2012/11/16 00:00:02	24.3	12.2	35.6	25.4	15.0	34.3	-99.0	-99.0	-99.0	40.0	12.0	90.5	1.8	0.0	2.6	13.3	257	0.0
2012/11/17 00:00:03	21.5	15.4	29.5	22.3	16.6	28.4	-99.0	-99.0	-99.0	42.2	19.7	87.9	1.4	0.0	7.3	11.9	166	1.4
2012/11/18 00:00:02	22.2	13.1	32.7	22.1	14.4	31.5	-99.0	-99.0	-99.0	59.8	22.7	95.6	1.9	0.0	7.3	10.8	143	0.0
2012/11/19 00:00:02	21.8	11.4	30.9	22.2	15.2	30.2	-99.0	-99.0	-99.0	55.6	17.2	97.6	1.5	0.0	0.6	10.0	199	5.0
2012/11/20 00:00:02	19.2	6.8	29.1	20.3	11.2	27.6	-99.0	-99.0	-99.0	37.8	10.0	77.8	2.1	0.0	9.3	13.8	188	0.0
2012/11/21 00:00:03	20.0	7.7	27.9	19.9	11.4	27.2	-99.0	-99.0	-99.0	45.7	27.4	80.5	3.4	0.0	6.5	10.8	123	0.0
2012/11/22 00:00:02	23.1	9.9	32.5	22.9	12.0	31.0	-99.0	-99.0	-99.0	40.6	19.3	81.5	0.2	0.0	2.5	9.7	209	0.0
2012/11/23 00:00:02	25.5	12.2	36.9	25.9	14.5	35.4	-99.0	-99.0	-99.0	37.7	11.3	70.9	0.7	0.0	8.5	11.4	225	0.0
2012/11/24 00:00:03	24.6	13.4	34.3	24.4	14.9	33.3	-99.0	-99.0	-99.0	51.7	20.8	84.5	2.1	0.0	7.3	10.2	136	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^{\circ}C$)						(%)			(m/s)		(m/s)	($^{\circ}$)	(mm)
2012/11/25 00:00:03	27.3	20.9	35.5	27.0	21.5	33.7	-99.0	-99.0	-99.0	45.2	19.4	67.5	1.2	0.3	8.8	12.5	35	0.0
2012/11/26 00:00:02	27.5	17.2	36.4	27.2	18.5	34.8	-99.0	-99.0	-99.0	45.1	23.8	76.4	1.1	0.0	5.6	9.8	337	0.0
2012/11/27 00:00:02	28.4	19.7	35.9	28.1	21.1	34.3	-99.0	-99.0	-99.0	43.9	27.4	78.5	0.4	0.0	12.3	15.4	85	0.2
2012/11/28 00:00:02	25.6	19.3	32.8	25.4	20.0	31.7	-99.0	-99.0	-99.0	57.5	30.7	86.5	0.4	0.0	2.4	13.1	213	0.0
2012/11/29 00:00:02	27.1	19.5	35.2	27.0	20.4	33.9	-99.0	-99.0	-99.0	50.7	26.8	83.5	0.2	0.0	6.1	10.3	254	0.0
2012/11/30 00:00:02	33.1	26.1	37.3	33.0	29.0	36.5	-99.0	-99.0	-99.0	32.3	23.4	49.2	0.0	0.0	2.6	0.0	-99	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20121101-00:00 till 20121130-23:59

Meteorological Daily Statistics Summary

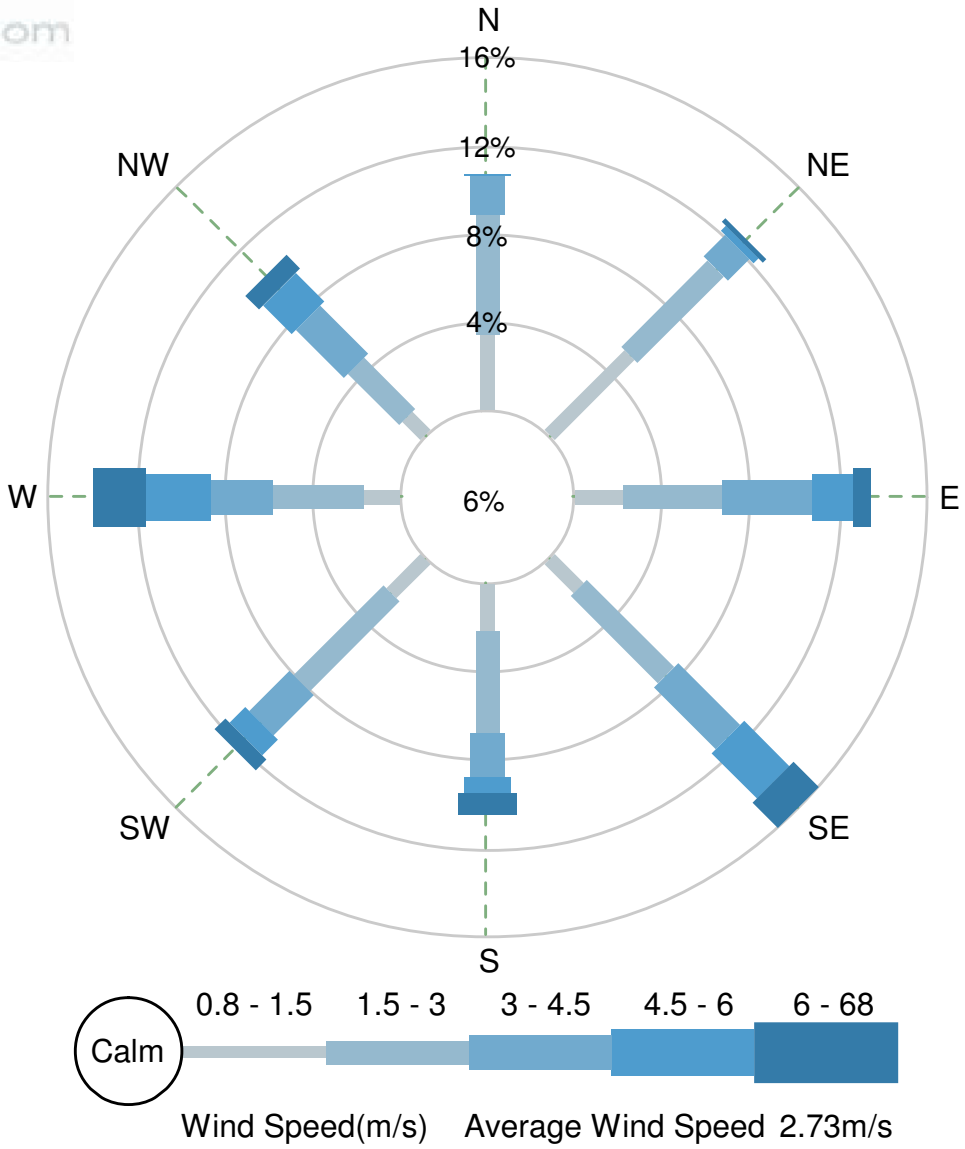
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2013/01/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature 2m			Temperature 10m			Temperature 60m			Humidity			Prevailing Wind Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)
2012/12/01 00:00:02	32.1	19.7	40.4	32.0	21.8	38.9	-99.0	-99.0	-99.0	36.4	18.9	71.3	1.4	0.0	7.1	10.1	312	0.0
2012/12/02 00:00:02	34.3	28.6	41.0	33.9	28.9	39.0	-99.0	-99.0	-99.0	28.6	17.1	44.4	2.9	1.0	7.5	12.5	331	0.0
2012/12/05 00:00:03	25.2	15.4	30.7	25.7	19.2	29.3	-99.0	-99.0	-99.0	22.0	15.4	38.9	0.0	0.0	7.1	0.0	-99	0.0
2012/12/06 00:00:02	19.0	7.4	27.7	20.0	12.8	26.2	-99.0	-99.0	-99.0	35.8	15.5	76.9	3.5	0.0	0.0	12.1	238	0.0
2012/12/07 00:00:02	19.8	7.0	31.0	21.3	11.3	29.9	-99.0	-99.0	-99.0	37.8	15.1	76.0	0.6	0.0	2.3	7.6	201	0.0
2012/12/08 00:00:02	23.7	12.3	32.6	24.3	14.5	32.1	-99.0	-99.0	-99.0	40.2	21.4	74.5	0.4	0.0	3.2	6.6	248	0.0
2012/12/09 00:00:02	27.0	17.4	34.2	27.2	20.5	32.9	-99.0	-99.0	-99.0	39.7	18.5	67.0	1.5	0.0	1.9	9.8	333	0.0
2012/12/10 00:00:02	27.6	18.6	36.5	27.2	19.0	34.8	-99.0	-99.0	-99.0	45.0	21.5	84.1	1.1	0.0	13.7	19.9	355	4.8
2012/12/11 00:00:02	23.2	15.3	31.4	22.9	15.7	30.4	-99.0	-99.0	-99.0	61.2	34.0	93.1	3.8	0.0	9.1	13.9	132	0.2
2012/12/12 00:00:02	22.6	13.5	30.9	22.3	14.2	29.7	-99.0	-99.0	-99.0	55.9	27.9	90.4	3.1	0.0	9.3	12.2	134	0.0
2012/12/13 00:00:03	23.6	14.6	30.6	23.4	16.3	29.6	-99.0	-99.0	-99.0	44.1	21.4	78.0	3.8	0.0	7.2	10.9	108	0.0
2012/12/14 00:00:02	23.8	13.2	32.4	24.1	15.3	31.2	-99.0	-99.0	-99.0	40.3	13.9	81.4	2.2	0.5	5.3	8.8	124	0.0
2012/12/15 00:00:02	25.3	12.2	35.6	26.2	16.3	34.5	-99.0	-99.0	-99.0	35.0	14.1	69.9	0.3	0.0	2.8	7.7	149	0.0
2012/12/16 00:00:02	28.3	19.0	35.2	28.0	20.5	33.5	-99.0	-99.0	-99.0	30.4	17.0	51.5	1.1	0.0	8.5	12.2	286	0.0
2012/12/17 00:00:02	28.7	18.2	38.3	29.2	20.2	37.1	-99.0	-99.0	-99.0	35.6	15.8	66.0	1.7	0.0	1.9	11.7	283	0.0
2012/12/18 00:00:02	28.6	18.1	38.4	29.4	21.6	37.0	-99.0	-99.0	-99.0	33.8	12.4	60.8	2.0	0.0	8.2	11.2	238	0.0
2012/12/19 00:00:03	26.1	13.4	38.1	26.8	15.5	36.8	-99.0	-99.0	-99.0	40.7	12.0	84.9	1.3	0.0	2.8	8.9	238	0.0
2012/12/20 00:00:03	30.5	19.4	38.8	30.7	21.5	37.4	-99.0	-99.0	-99.0	38.2	19.6	76.2	1.6	0.0	11.6	19.1	312	0.2
2012/12/21 00:00:02	27.0	22.5	32.7	27.2	22.9	31.8	-99.0	-99.0	-99.0	57.0	35.6	83.6	1.6	0.0	7.0	10.4	333	0.4
2012/12/22 00:00:02	24.6	20.2	34.1	24.8	20.6	32.7	-99.0	-99.0	-99.0	65.8	37.3	96.3	1.2	0.0	4.9	13.9	117	3.4
2012/12/23 00:00:02	24.5	19.2	34.4	24.6	19.9	33.3	-99.0	-99.0	-99.0	66.3	32.6	98.5	1.5	0.0	8.8	13.5	71	18.4
2012/12/24 00:00:02	26.9	18.2	35.1	26.8	19.6	33.6	-99.0	-99.0	-99.0	54.1	29.5	89.6	0.9	0.0	5.3	10.4	19	0.0
2012/12/25 00:00:03	28.5	18.8	36.1	28.4	20.5	34.7	-99.0	-99.0	-99.0	49.8	27.8	87.5	1.3	0.0	5.7	7.9	329	0.0
2012/12/26 00:00:02	25.4	19.0	35.3	25.3	19.2	33.8	-99.0	-99.0	-99.0	64.2	32.5	94.9	1.3	0.0	10.6	18.0	105	11.2

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2012/12/27 00:00:02	21.5	17.0	28.6	21.4	17.1	27.5	-99.0	-99.0	-99.0	67.9	44.1	93.0	3.4	0.0	9.0	12.6	154	0.4
2012/12/28 00:00:02	23.3	14.0	32.5	23.4	14.9	31.7	-99.0	-99.0	-99.0	52.7	24.7	84.5	0.8	0.0	3.3	7.7	160	0.0
2012/12/29 00:00:03	23.8	17.8	31.6	24.2	19.7	30.4	-99.0	-99.0	-99.0	62.9	38.6	91.7	1.7	0.0	0.7	11.1	305	0.0
2012/12/30 00:00:02	24.8	15.1	33.3	25.1	16.6	32.3	-99.0	-99.0	-99.0	54.9	20.3	97.1	1.2	0.0	5.6	8.5	169	0.0
2012/12/31 00:00:03	27.0	16.2	35.0	27.2	19.0	34.1	-99.0	-99.0	-99.0	42.9	20.5	73.8	1.0	0.0	5.6	8.9	116	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20121201-00:00 till 20121231-23:59

Meteorological Daily Statistics Summary

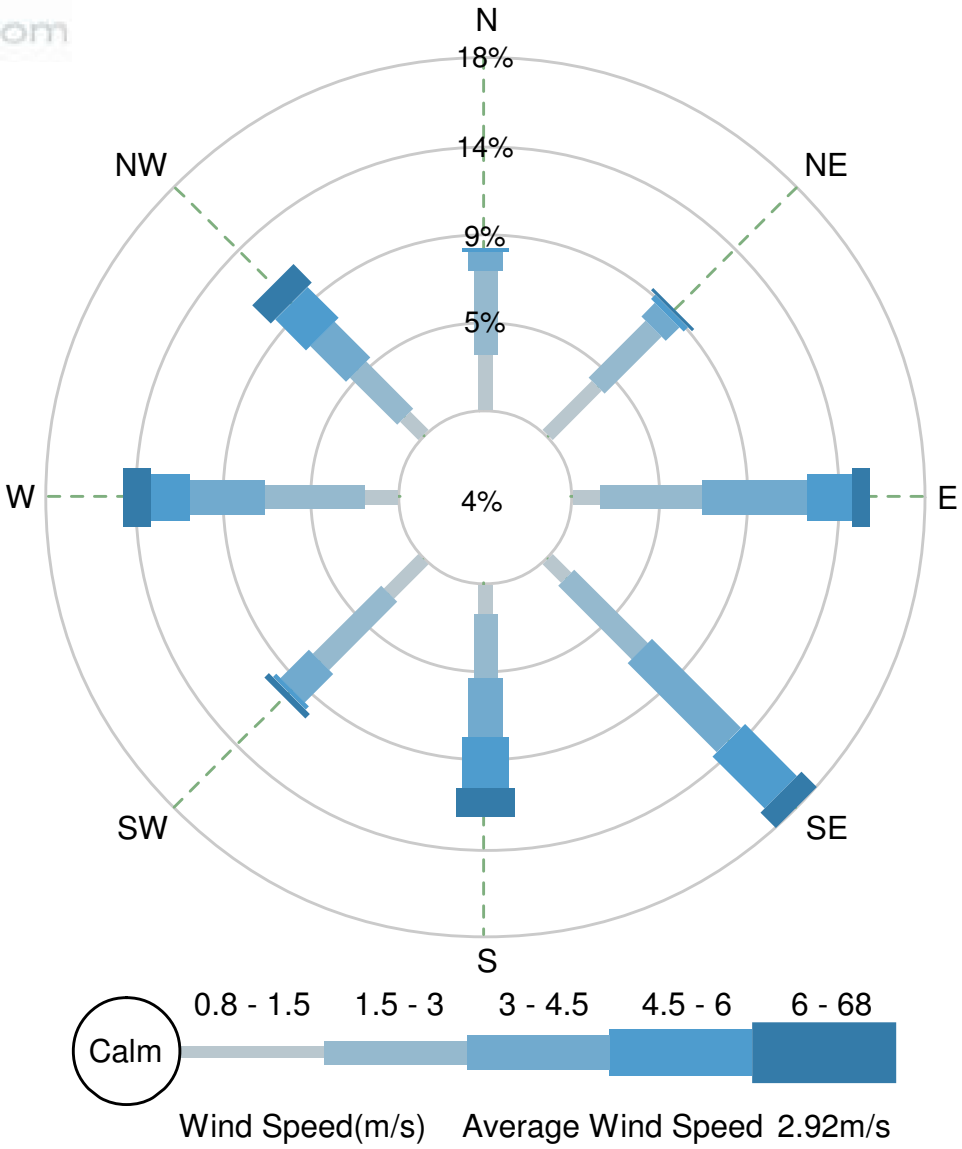
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2013/02/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature 2m			10m			60m			Humidity			Prevailing Wind Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	(°)	(mm)
2013/01/01 00:00:03	28.0	20.0	35.6	27.9	21.2	34.4	-99.0	-99.0	-99.0	43.7	25.4	67.7	0.7	0.3	4.5	7.0	18	0.0
2013/01/02 00:00:02	28.9	19.7	36.5	28.9	21.1	35.2	-99.0	-99.0	-99.0	37.5	22.6	64.0	1.3	0.0	5.5	8.2	300	0.0
2013/01/03 00:00:02	29.9	17.9	39.6	30.3	21.5	38.5	-99.0	-99.0	-99.0	35.0	11.8	71.2	0.7	0.0	6.1	9.4	234	0.0
2013/01/04 00:00:03	28.8	20.9	37.1	28.4	21.3	35.8	-99.0	-99.0	-99.0	46.8	19.7	74.3	2.4	0.3	8.2	11.4	134	0.0
2013/01/05 00:00:03	28.9	20.3	37.2	28.6	20.7	36.3	-99.0	-99.0	-99.0	45.8	23.9	70.9	0.9	0.0	3.6	9.0	133	0.0
2013/01/06 00:00:02	29.2	20.5	36.9	29.6	22.2	36.3	-99.0	-99.0	-99.0	42.0	22.6	68.0	0.7	0.0	2.7	8.1	242	0.0
2013/01/07 00:00:02	30.1	20.0	38.7	30.4	22.0	38.0	-99.0	-99.0	-99.0	36.4	12.0	70.4	1.5	0.0	7.4	10.5	133	0.0
2013/01/08 00:00:03	28.7	17.6	37.1	28.8	19.2	36.5	-99.0	-99.0	-99.0	38.2	16.9	75.1	1.6	0.0	2.6	7.5	89	0.0
2013/01/09 00:00:03	28.5	17.8	36.1	28.9	21.1	34.6	-99.0	-99.0	-99.0	36.8	20.0	66.5	2.6	0.0	7.1	10.7	304	0.0
2013/01/10 00:00:04	31.9	18.9	40.4	32.1	23.7	38.9	-99.0	-99.0	-99.0	22.7	9.9	35.2	3.6	0.5	9.5	17.2	296	0.0
2013/01/11 00:00:02	27.8	14.4	39.5	27.9	16.5	38.2	-99.0	-99.0	-99.0	40.8	8.5	88.8	0.9	0.0	8.7	11.4	264	0.0
2013/01/12 00:00:02	31.5	18.8	40.1	31.4	20.5	39.0	-99.0	-99.0	-99.0	43.6	22.0	83.6	2.0	0.0	2.4	11.4	307	0.0
2013/01/13 00:00:02	34.8	25.1	43.0	34.8	28.5	41.9	-99.0	-99.0	-99.0	35.2	15.1	57.9	1.9	0.0	8.0	11.5	329	0.0
2013/01/14 00:00:02	31.0	21.0	42.9	31.3	21.4	41.6	-99.0	-99.0	-99.0	48.0	17.5	97.9	1.5	0.0	6.6	20.7	323	15.2
2013/01/15 00:00:02	24.9	19.5	31.7	24.6	19.8	30.7	-99.0	-99.0	-99.0	62.2	40.1	88.0	4.6	0.0	9.4	13.0	154	0.0
2013/01/16 00:00:02	25.1	19.4	33.2	25.2	19.7	32.0	-99.0	-99.0	-99.0	47.5	31.1	72.9	1.6	0.0	0.0	8.7	120	0.0
2013/01/17 00:00:03	28.0	19.1	34.9	27.9	20.3	34.4	-99.0	-99.0	-99.0	46.7	25.6	80.1	0.7	0.0	5.0	7.7	289	0.0
2013/01/18 00:00:02	30.4	20.2	38.6	30.7	22.3	37.4	-99.0	-99.0	-99.0	39.3	22.1	70.2	1.4	0.0	2.5	9.0	295	0.0
2013/01/19 00:00:03	34.0	23.7	41.1	34.1	27.2	39.9	-99.0	-99.0	-99.0	31.2	20.0	58.9	2.4	0.0	7.2	10.7	310	0.0
2013/01/20 00:00:02	29.2	24.2	35.9	29.0	24.9	34.2	-99.0	-99.0	-99.0	54.1	34.1	90.2	2.8	0.0	8.4	12.5	174	0.4
2013/01/21 00:00:02	26.6	23.1	31.9	26.4	23.1	30.5	-99.0	-99.0	-99.0	56.3	42.2	66.9	3.7	0.0	7.4	10.4	122	0.0
2013/01/22 00:00:02	28.1	20.5	35.9	27.7	20.4	34.9	-99.0	-99.0	-99.0	49.9	24.3	77.7	1.7	0.0	7.1	9.6	137	0.0
2013/01/23 00:00:02	26.0	21.3	33.9	26.0	22.1	32.9	-99.0	-99.0	-99.0	59.4	35.1	81.5	0.6	0.0	5.5	15.8	140	4.0
2013/01/24 00:00:02	27.5	21.1	36.0	27.3	21.8	35.0	-99.0	-99.0	-99.0	46.8	21.3	81.4	1.5	0.4	11.8	16.9	136	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)
2013/01/25 00:00:02	26.5	20.7	34.4	26.4	20.7	33.3	-99.0	-99.0	-99.0	54.2	27.7	76.5	3.1	0.8	8.2	12.7	110	0.0
2013/01/26 00:00:02	28.2	19.0	36.6	28.2	20.1	35.3	-99.0	-99.0	-99.0	49.2	24.9	80.8	2.0	0.0	6.5	9.3	96	0.0
2013/01/27 00:00:02	27.1	22.6	34.2	27.2	24.0	33.3	-99.0	-99.0	-99.0	59.1	34.1	85.3	2.3	0.0	2.1	13.3	95	1.2
2013/01/28 00:00:02	22.8	21.3	26.3	22.9	21.3	25.8	-99.0	-99.0	-99.0	87.7	71.7	97.8	2.6	0.0	2.2	9.4	144	18.6
2013/01/29 00:00:02	20.6	19.5	22.6	20.8	19.7	23.0	-99.0	-99.0	-99.0	93.1	79.2	97.6	3.7	0.0	7.7	11.1	156	95.8
2013/01/30 00:00:03	24.9	20.0	32.9	24.9	20.0	31.9	-99.0	-99.0	-99.0	73.7	36.3	97.8	1.3	0.0	1.9	6.6	259	3.0
2013/01/31 00:00:02	25.8	16.7	34.9	26.6	17.1	34.5	-99.0	-99.0	-99.0	55.5	18.5	90.2	0.2	0.0	2.4	5.9	106	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20130101-00:00 till 20130131-23:59

Meteorological Daily Statistics Summary

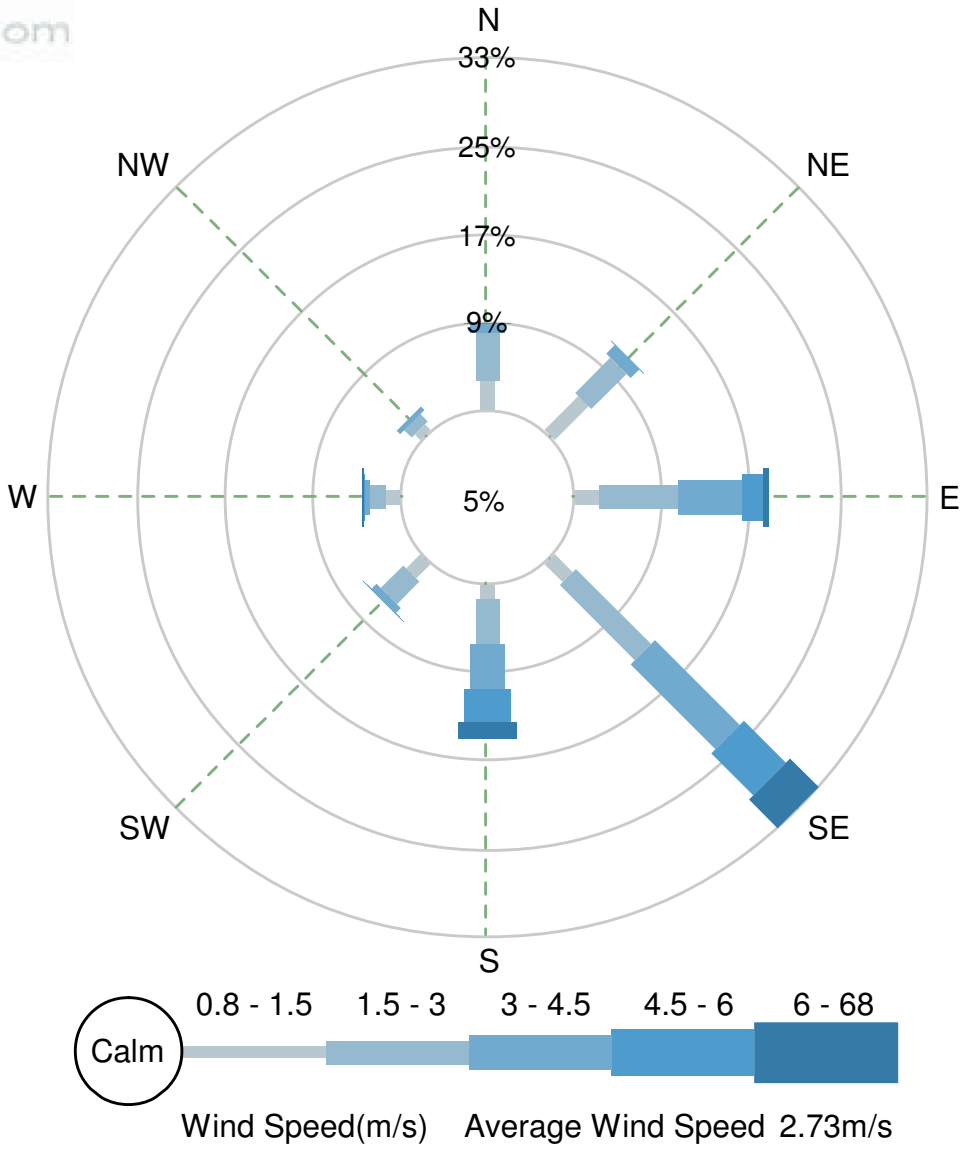
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2013/03/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature 2m			Temperature 10m			Temperature 60m			Humidity			Prevailing Wind Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					(°C)						(%)			(m/s)		(m/s)	(°)	(mm)
2013/02/01 00:00:02	26.3	18.3	34.5	26.9	19.5	33.5	-99.0	-99.0	-99.0	60.6	25.0	95.4	1.0	0.0	2.4	7.0	267	0.0
2013/02/02 00:00:02	24.0	16.9	32.4	24.2	17.2	31.8	-99.0	-99.0	-99.0	72.4	42.3	98.8	1.3	0.0	9.0	17.4	13	23.2
2013/02/03 00:00:03	18.6	15.6	22.8	18.7	16.1	21.9	-99.0	-99.0	-99.0	67.9	51.9	93.9	2.4	0.5	7.7	10.9	183	0.0
2013/02/04 00:00:03	18.0	10.2	24.0	18.2	11.5	23.5	-99.0	-99.0	-99.0	62.0	38.8	96.3	3.0	0.0	7.9	11.5	153	0.0
2013/02/05 00:00:02	21.0	11.4	28.6	21.3	13.0	28.2	-99.0	-99.0	-99.0	57.5	27.9	93.2	3.0	0.0	7.1	10.0	129	0.0
2013/02/06 00:00:02	22.2	13.5	28.7	22.4	15.3	28.3	-99.0	-99.0	-99.0	57.8	33.5	93.0	2.2	0.0	1.2	8.2	138	0.0
2013/02/07 00:00:02	22.6	14.3	29.2	23.0	16.0	28.8	-99.0	-99.0	-99.0	54.8	27.4	89.3	2.0	0.0	0.8	7.7	131	0.0
2013/02/08 00:00:02	22.4	14.3	30.4	23.2	16.3	29.9	-99.0	-99.0	-99.0	57.3	29.7	86.7	0.4	0.0	2.8	6.3	125	0.0
2013/02/09 00:00:02	23.6	13.6	31.4	24.3	15.8	31.2	-99.0	-99.0	-99.0	57.1	27.5	93.1	0.2	0.0	2.1	6.0	108	0.0
2013/02/10 00:00:02	24.4	15.0	32.4	25.3	16.5	32.0	-99.0	-99.0	-99.0	56.9	29.5	90.7	0.1	0.0	2.7	6.0	43	0.0
2013/02/11 00:00:03	25.2	16.4	34.4	26.1	18.6	33.7	-99.0	-99.0	-99.0	59.7	31.9	88.1	0.6	0.0	2.2	7.6	284	0.0
2013/02/12 00:00:02	23.8	18.8	30.0	23.9	18.9	29.2	-99.0	-99.0	-99.0	69.3	46.6	89.5	2.1	0.0	5.7	13.0	139	7.8
2013/02/13 00:00:02	23.1	15.8	29.6	23.2	16.9	29.1	-99.0	-99.0	-99.0	70.9	44.6	98.3	2.3	0.0	7.1	9.3	157	0.2
2013/02/14 00:00:02	22.2	14.8	28.3	22.5	15.9	27.8	-99.0	-99.0	-99.0	63.2	36.7	96.5	2.7	0.0	4.5	8.3	123	0.0
2013/02/15 00:00:02	22.2	12.7	28.7	22.7	15.4	28.3	-99.0	-99.0	-99.0	57.7	34.9	93.0	2.7	0.0	3.9	6.6	121	0.0
2013/02/16 00:00:02	22.7	18.7	29.2	23.0	19.6	28.7	-99.0	-99.0	-99.0	63.3	41.0	77.2	2.4	0.0	8.3	10.2	112	0.0
2013/02/17 00:00:04	23.0	15.8	28.9	23.3	18.1	28.6	-99.0	-99.0	-99.0	57.7	39.0	81.6	3.1	0.8	6.4	9.7	118	0.0
2013/02/18 00:00:02	22.3	13.6	28.7	22.6	15.7	28.3	-99.0	-99.0	-99.0	56.8	33.7	89.7	3.2	0.0	6.1	9.0	129	0.0
2013/02/19 00:00:02	23.1	14.6	30.3	23.4	16.3	29.7	-99.0	-99.0	-99.0	55.3	31.6	84.4	2.4	0.0	5.7	8.1	115	0.0
2013/02/20 00:00:03	24.0	17.9	30.9	24.4	18.7	30.5	-99.0	-99.0	-99.0	57.1	32.8	79.7	2.9	0.0	0.0	9.6	132	0.0
2013/02/21 00:00:03	23.1	14.5	29.4	23.6	16.6	29.0	-99.0	-99.0	-99.0	60.3	33.6	94.9	3.7	0.0	9.0	13.4	132	0.0
2013/02/22 00:00:02	22.9	13.5	29.7	23.2	16.8	29.1	-99.0	-99.0	-99.0	57.1	35.4	93.1	4.1	0.0	8.7	13.6	128	0.0
2013/02/23 00:00:03	21.7	16.4	26.7	21.9	17.5	26.3	-99.0	-99.0	-99.0	62.1	42.6	88.6	5.0	1.2	9.3	13.9	158	0.2
2013/02/24 00:00:02	20.8	17.8	24.4	20.8	18.0	24.1	-99.0	-99.0	-99.0	82.4	63.4	91.4	2.2	0.6	6.2	8.9	172	2.2

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2013/02/25 00:00:02	24.9	15.9	32.6	25.4	17.6	32.1	-99.0	-99.0	-99.0	64.8	35.8	97.0	1.5	0.0	3.4	7.7	23	0.0
2013/02/26 00:00:03	24.4	17.9	31.0	24.8	20.5	30.3	-99.0	-99.0	-99.0	70.1	47.1	94.4	1.8	0.0	2.7	14.7	96	0.4
2013/02/27 00:00:03	23.3	18.7	30.8	23.6	20.1	30.0	-99.0	-99.0	-99.0	78.9	43.1	98.0	1.3	0.0	3.8	7.5	105	16.8
2013/02/28 00:00:02	24.4	18.1	30.7	25.0	19.0	30.5	-99.0	-99.0	-99.0	66.7	35.9	94.9	1.1	0.0	1.2	6.3	57	0.2



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20130201-00:00 till 20130228-23:59

Meteorological Daily Statistics Summary

Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2013/04/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	(°)	(mm)
2013/03/01 00:00:02	24.7	19.1	29.1	24.9	20.3	28.5	-99.0	-99.0	-99.0	65.9	51.1	86.2	1.3	0.0	3.5	8.3	3	1.0
2013/03/02 00:00:02	20.0	17.3	24.5	20.2	17.4	25.0	-99.0	-99.0	-99.0	91.1	69.8	98.1	1.8	0.0	7.4	9.6	125	55.2
2013/03/03 00:00:02	18.7	16.2	23.1	18.8	16.3	22.5	-99.0	-99.0	-99.0	78.0	64.2	89.6	5.0	1.4	10.5	14.9	160	0.6
2013/03/04 00:00:03	20.1	16.7	25.1	20.3	16.8	24.8	-99.0	-99.0	-99.0	80.7	64.1	94.0	3.0	0.0	7.5	10.9	145	3.4
2013/03/05 00:00:02	21.8	15.1	28.3	22.3	17.0	28.0	-99.0	-99.0	-99.0	70.1	45.4	95.7	3.3	0.0	9.1	11.3	114	0.2
2013/03/06 00:00:02	21.6	14.1	27.9	22.1	15.8	27.9	-99.0	-99.0	-99.0	65.2	42.2	95.2	3.5	0.0	7.8	11.3	109	0.0
2013/03/07 00:00:03	22.0	14.5	28.6	22.7	16.3	28.4	-99.0	-99.0	-99.0	59.5	39.0	84.7	2.5	0.2	6.3	8.7	107	0.0
2013/03/08 00:00:02	21.7	13.2	27.8	22.8	16.2	27.8	-99.0	-99.0	-99.0	62.5	35.4	94.3	1.8	0.0	4.9	7.7	114	0.0
2013/03/09 00:00:02	21.9	12.9	28.6	23.0	16.4	28.4	-99.0	-99.0	-99.0	63.5	40.4	92.7	2.1	0.0	2.2	6.8	112	0.0
2013/03/10 00:00:02	21.9	15.1	28.6	22.9	17.0	28.2	-99.0	-99.0	-99.0	66.8	40.2	92.8	2.2	0.0	1.0	7.9	111	0.0
2013/03/11 00:00:02	21.3	14.2	28.2	22.4	16.2	27.7	-99.0	-99.0	-99.0	67.6	42.9	93.5	0.8	0.0	1.5	6.6	114	0.0
2013/03/12 00:00:02	21.8	14.2	28.6	22.8	17.4	28.5	-99.0	-99.0	-99.0	64.8	39.6	94.5	1.8	0.0	1.5	7.1	107	0.0
2013/03/13 00:00:02	21.5	14.6	27.6	22.2	16.4	27.6	-99.0	-99.0	-99.0	60.4	36.4	83.5	3.2	0.0	6.6	9.2	106	0.0
2013/03/14 00:00:02	20.0	10.7	28.4	21.4	13.6	28.1	-99.0	-99.0	-99.0	65.6	33.4	96.8	0.8	0.0	0.0	8.1	120	0.0
2013/03/15 00:00:02	20.7	10.0	29.8	21.9	12.4	29.5	-99.0	-99.0	-99.0	65.9	36.0	96.4	1.5	0.0	1.2	8.5	158	0.0
2013/03/16 00:00:02	23.2	13.5	30.7	23.9	16.3	30.2	-99.0	-99.0	-99.0	63.5	39.1	96.5	1.8	0.0	4.4	7.1	136	0.0
2013/03/17 00:00:02	23.7	12.3	32.5	24.5	15.4	31.9	-99.0	-99.0	-99.0	63.1	33.8	98.6	1.6	0.0	1.5	8.9	299	0.0
2013/03/18 00:00:02	19.3	11.4	26.3	21.3	15.5	25.5	-99.0	-99.0	-99.0	53.0	20.2	87.8	1.8	0.0	5.5	10.1	200	0.0
2013/03/19 00:00:02	19.3	10.5	27.7	19.7	12.5	27.2	-99.0	-99.0	-99.0	52.8	30.6	78.0	2.7	0.0	2.5	8.4	130	0.0
2013/03/20 00:00:03	20.7	11.1	29.0	21.2	14.1	28.0	-99.0	-99.0	-99.0	57.3	31.0	92.2	2.7	0.0	4.3	7.1	117	0.0
2013/03/21 00:00:02	21.2	12.5	28.4	21.9	15.2	27.8	-99.0	-99.0	-99.0	53.3	28.3	84.9	1.7	0.0	5.1	9.5	79	0.6
2013/03/22 00:00:02	23.3	15.8	29.7	23.3	17.7	28.7	-99.0	-99.0	-99.0	50.6	34.3	67.9	1.6	0.0	4.2	8.0	12	0.0
2013/03/23 00:00:03	22.8	18.4	29.6	23.0	18.8	28.4	-99.0	-99.0	-99.0	71.4	50.8	98.0	1.5	0.0	5.3	9.2	359	13.8
2013/03/24 00:00:02	22.4	16.6	29.7	22.8	17.8	28.7	-99.0	-99.0	-99.0	80.8	56.6	97.1	0.9	0.0	1.3	9.3	290	2.0

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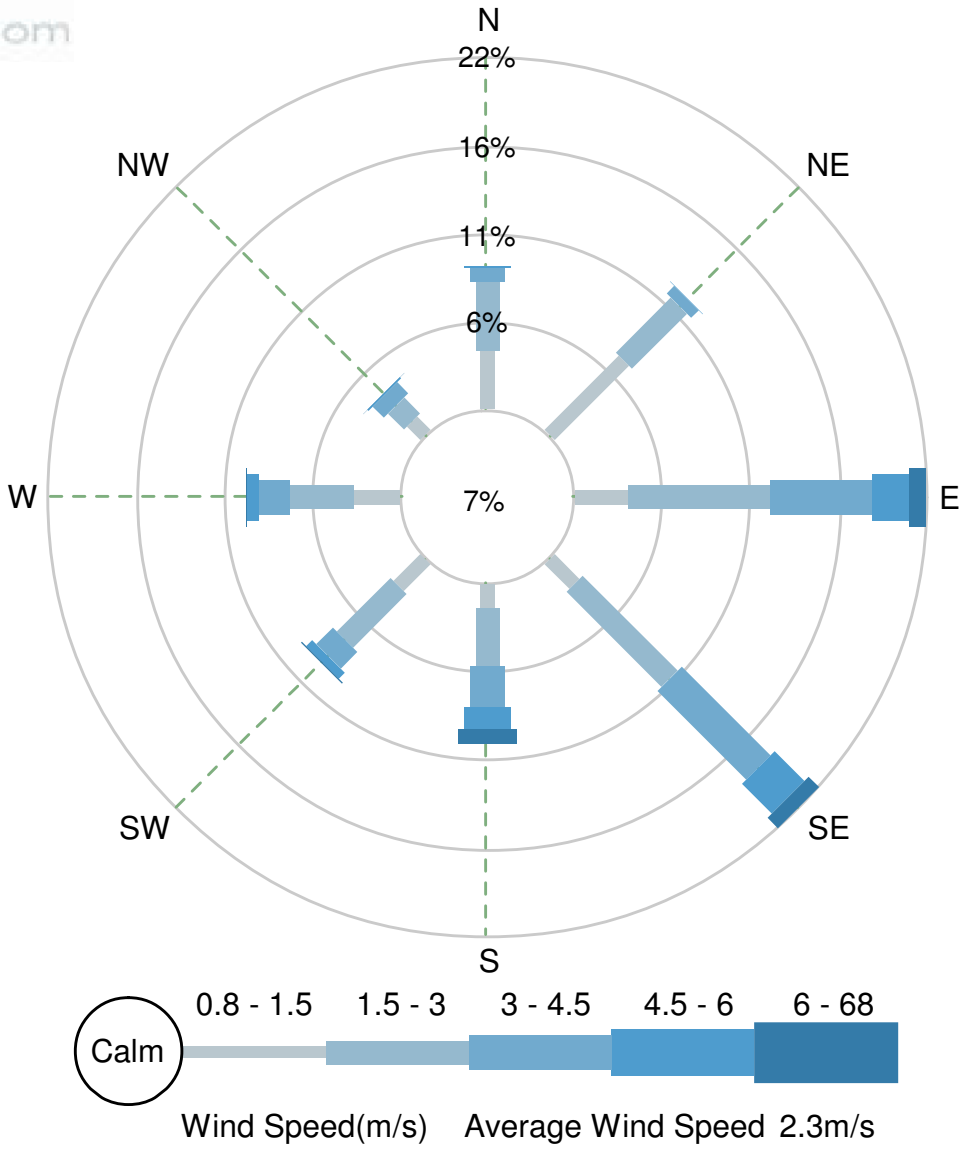
Record Time	Temperature									Humidity			Prevailing Wind			Gust	Dir	Rain
	2m			10m			60m						Speed					
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^\circ C$)						(%)			(m/s)		(m/s)	($^\circ$)	(mm)
2013/03/25 00:00:03	22.5	15.5	31.8	23.7	18.0	31.1	-99.0	-99.0	-99.0	73.8	26.5	98.3	0.9	0.0	2.7	7.0	261	0.0
2013/03/26 00:00:02	21.0	10.9	31.4	22.7	12.8	31.3	-99.0	-99.0	-99.0	64.3	27.0	96.2	0.4	0.0	1.0	7.2	170	0.0
2013/03/27 00:00:02	22.2	14.9	30.4	23.4	16.8	29.9	-99.0	-99.0	-99.0	70.2	38.9	92.6	0.5	0.0	2.2	4.1	268	0.0
2013/03/28 00:00:04	23.5	15.3	31.3	24.4	17.3	30.6	-99.0	-99.0	-99.0	65.6	37.8	95.8	0.6	0.0	2.6	306.1	295	0.0
2013/03/29 00:00:02	23.7	15.7	30.2	24.2	17.8	29.3	-99.0	-99.0	-99.0	60.9	39.2	89.5	1.5	0.0	5.3	9.4	281	0.0
2013/03/30 00:00:02	20.1	11.0	28.0	21.0	15.5	26.9	-99.0	-99.0	-99.0	66.5	22.7	96.7	1.2	0.0	0.9	6.4	240	0.8
2013/03/31 00:00:02	18.4	8.3	30.1	19.8	11.4	28.7	-99.0	-99.0	-99.0	61.5	19.2	98.5	1.7	0.0	2.2	13.0	285	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20130301-00:00 till 20130331-23:59

Meteorological Daily Statistics Summary

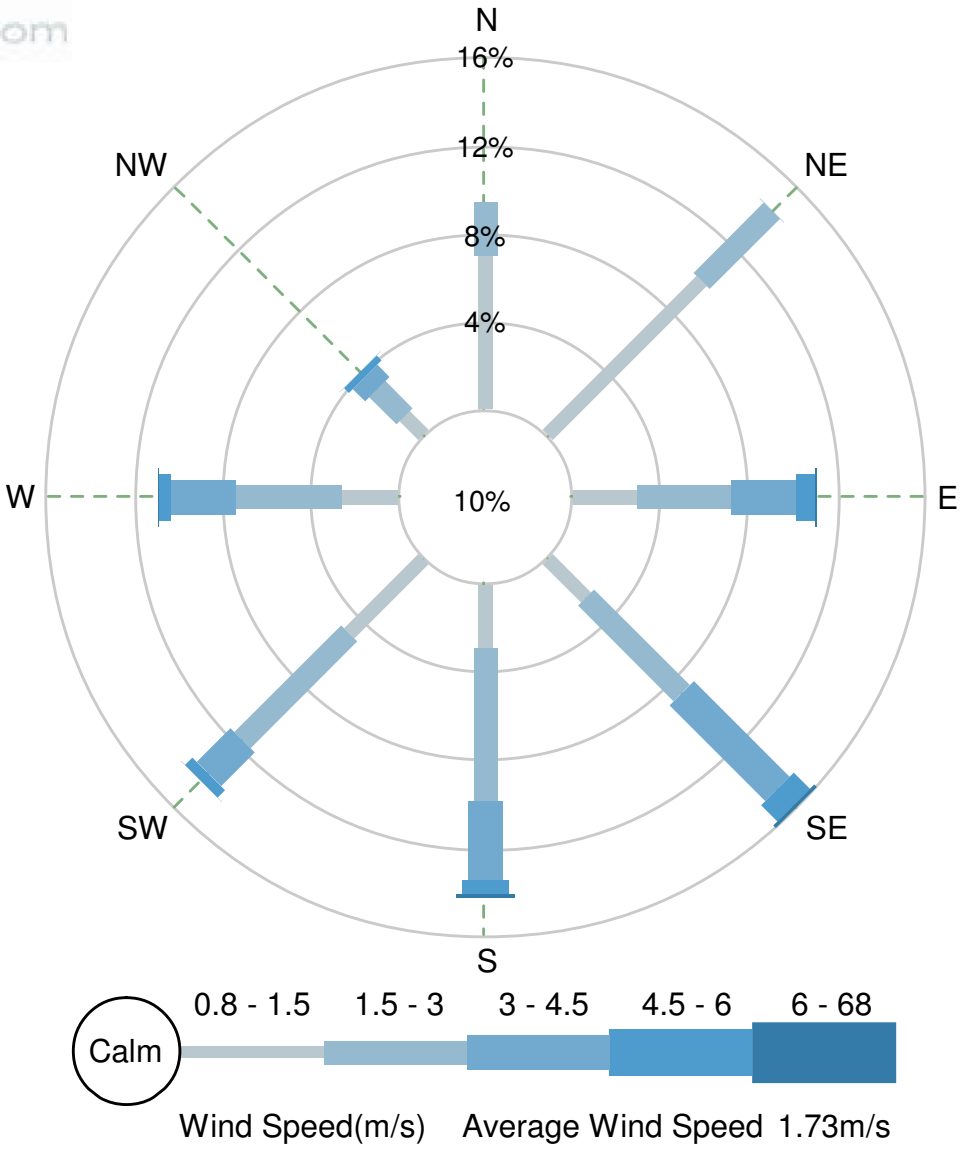
Unit Id	:	Whitehaven Master (Sentinex99)
Module Id	:	M2 (Templemore 10m)
Requested Report Date	:	2013/05/01
Requested Report Hour	:	00
Chart Available	:	no

Main Data Summary

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($°C$)						(%)			(m/s)		(m/s)	($°$)	(mm)
2013/04/01 00:00:02	18.4	11.0	24.1	19.4	13.6	23.1	-99.0	-99.0	-99.0	52.9	37.9	77.9	1.0	0.0	0.0	6.3	270	0.0
2013/04/02 00:00:02	18.6	8.1	26.4	19.7	11.1	25.3	-99.0	-99.0	-99.0	60.2	33.8	95.2	1.1	0.0	1.9	6.3	168	0.0
2013/04/03 00:00:02	17.8	8.8	27.7	19.6	11.4	26.6	-99.0	-99.0	-99.0	62.1	25.4	96.4	0.8	0.0	1.5	7.1	230	0.0
2013/04/04 00:00:02	17.2	6.5	28.0	18.4	8.8	26.7	-99.0	-99.0	-99.0	63.2	29.8	93.0	1.8	0.0	7.2	10.2	146	0.0
2013/04/05 00:00:02	19.5	10.1	27.8	19.9	12.6	27.0	-99.0	-99.0	-99.0	60.1	32.1	94.5	2.3	0.0	6.2	9.2	125	3.0
2013/04/06 00:00:02	19.2	10.2	26.5	19.6	12.1	25.8	-99.0	-99.0	-99.0	54.6	29.4	90.3	3.0	0.0	6.3	9.5	117	0.0
2013/04/07 00:00:02	17.5	11.5	24.3	18.4	13.5	23.5	-99.0	-99.0	-99.0	64.9	40.4	87.2	1.6	0.0	2.3	9.8	130	0.0
2013/04/08 00:00:02	17.0	7.9	26.8	18.3	10.4	25.6	-99.0	-99.0	-99.0	65.3	27.2	97.8	0.8	0.0	0.0	7.7	166	0.0
2013/04/09 00:00:02	17.2	6.5	27.7	18.4	9.2	26.7	-99.0	-99.0	-99.0	58.6	24.9	96.2	1.4	0.0	4.9	7.4	157	0.0
2013/04/10 00:00:04	17.9	8.7	27.0	19.1	11.3	25.9	-99.0	-99.0	-99.0	60.0	26.5	95.0	1.1	0.0	2.9	7.2	162	0.0
2013/04/11 00:00:02	17.9	7.2	27.3	19.1	10.3	26.0	-99.0	-99.0	-99.0	61.0	30.6	97.8	1.7	0.0	3.0	8.5	135	0.0
2013/04/12 00:00:03	17.9	7.7	27.8	19.3	10.5	26.8	-99.0	-99.0	-99.0	56.7	21.7	95.6	1.3	0.0	2.6	7.4	133	0.0
2013/04/13 00:00:02	19.2	9.3	27.6	20.3	12.6	26.7	-99.0	-99.0	-99.0	56.1	26.5	91.2	2.8	0.0	5.2	8.4	106	0.0
2013/04/14 00:00:02	19.1	11.5	28.0	20.1	14.0	27.0	-99.0	-99.0	-99.0	57.6	29.4	84.7	1.6	0.0	1.3	6.6	121	0.0
2013/04/15 00:00:02	17.4	9.4	27.6	18.8	12.5	26.5	-99.0	-99.0	-99.0	65.6	30.9	95.8	0.2	0.0	0.8	4.7	359	0.0
2013/04/16 00:00:02	20.1	9.8	30.2	20.9	12.4	29.1	-99.0	-99.0	-99.0	52.6	22.8	89.6	0.7	0.0	0.7	5.5	319	0.0
2013/04/17 00:00:02	19.8	12.6	28.5	20.6	14.7	27.3	-99.0	-99.0	-99.0	54.5	32.5	89.9	0.9	0.0	1.8	8.5	243	0.0
2013/04/18 00:00:02	17.1	7.6	26.8	18.2	10.0	26.0	-99.0	-99.0	-99.0	64.4	25.9	97.4	0.6	0.0	0.0	6.3	274	0.0
2013/04/19 00:00:02	16.7	5.7	27.1	17.9	7.8	25.9	-99.0	-99.0	-99.0	54.6	24.4	93.4	1.1	0.0	0.0	6.5	309	0.0
2013/04/20 00:00:03	12.7	4.1	22.3	14.9	8.8	21.0	-99.0	-99.0	-99.0	54.0	18.9	87.9	1.5	0.0	0.0	9.5	239	0.0
2013/04/21 00:00:02	11.7	0.4	20.4	13.0	3.4	19.6	-99.0	-99.0	-99.0	66.1	38.0	94.7	1.7	0.0	1.3	8.4	166	0.0
2013/04/22 00:00:02	14.2	2.9	24.7	15.7	5.9	23.5	-99.0	-99.0	-99.0	57.7	13.4	97.6	0.6	0.0	1.5	6.0	135	0.0
2013/04/23 00:00:03	16.7	7.5	26.7	18.3	11.3	25.4	-99.0	-99.0	-99.0	46.2	21.2	74.8	1.7	0.0	1.4	9.8	302	0.0
2013/04/24 00:00:02	13.6	3.1	25.6	15.8	6.1	24.8	-99.0	-99.0	-99.0	52.8	20.8	86.1	0.7	0.0	1.8	7.1	233	0.0

Continued on next page

Record Time	Temperature									Humidity			Prevailing Wind					
	2m			10m			60m						Speed			Gust	Dir	Rain
	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max	Avg	Min	Max			
					($^{\circ}C$)						(%)			(m/s)		(m/s)	($^{\circ}$)	(mm)
2013/04/25 00:00:02	13.5	3.5	25.4	15.8	6.7	24.5	-99.0	-99.0	-99.0	58.1	23.7	90.8	0.6	0.0	1.7	7.1	304	0.0
2013/04/26 00:00:02	12.1	2.7	23.6	14.6	6.8	22.6	-99.0	-99.0	-99.0	57.9	24.4	89.9	0.5	0.0	0.8	6.0	268	0.0
2013/04/27 00:00:02	12.6	1.7	25.7	14.9	4.5	24.7	-99.0	-99.0	-99.0	55.5	20.3	91.3	0.2	0.0	2.0	6.5	53	0.0
2013/04/28 00:00:02	14.3	2.9	27.7	16.7	6.1	26.5	-99.0	-99.0	-99.0	52.2	18.7	86.2	0.9	0.0	1.1	7.2	297	0.0
2013/04/29 00:00:02	15.4	4.0	27.6	17.6	7.7	26.3	-99.0	-99.0	-99.0	56.2	23.3	88.9	1.1	0.0	1.7	7.9	307	0.0
2013/04/30 00:00:02	15.3	3.6	29.0	17.4	6.7	28.0	-99.0	-99.0	-99.0	53.9	17.0	94.7	0.3	0.0	0.0	4.9	10	0.0



Sentinex99 - M2, Whitehaven Master - Wind Rose

Date/Time range = 20130401-00:00 till 20130430-23:59