



**WHITEHAVEN COAL**



**Whitehaven Coal Mining  
Pty Ltd**

ABN: 65 086 426 253

**Annual  
Environmental  
Management  
Report**

for the

**Rocglen Coal  
Mine  
(ML 1620)**

1 August 2010 – 31 July 2011

# Whitehaven Coal Mining Pty Ltd

## Annual Environmental Management Report for the Rocglen Coal Mine (ML 1620)

MOP Commencement Date **01-10-2010** – MOP Completion Date **01-10-2012**  
AEMR Commencement Date **01-08-2010** – AEMR Completion Date **31-07-2011**

### Whitehaven Coal Mining Pty Ltd

#### Head Office

Level 9, 1 York Street  
SYDNEY NSW 2000  
PO Box R1113  
ROYAL EXCHANGE  
NSW 1225  
Phone: +61-2-8507 9700  
Fax: +61-2-8507 9701

#### Site

Rocglen Site Office  
2383 Wean Road  
Via Gunnedah NSW 2380  
PO Box 600  
GUNNEDAH NSW 2380  
Phone: +61-2-6740 7000  
Fax: +61-2-674 7077

#### Gunnedah Office

Whitehaven CHPP  
10409 Kamilaroi Highway  
PO Box 600  
GUNNEDAH NSW 2380  
Phone: +61-2-6742 4337  
Fax: +61-2-6742 3607

**Reporting Officer:** Chris Thomas

**Title:** Environmental Officer

**Signature:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Distribution:** Office of Environment and Heritage  
Department of Planning and Infrastructure  
NSW Trade and Investment, Regional Infrastructure &  
Services – Division of Resources and Energy  
NSW Trade and Investment, Regional Infrastructure &  
Services – Primary Industries, Food and Water  
NSW Office of Water  
Gunnedah Shire Council  
Rocglen Coal Mine Community Consultative Committee

# TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION AND OBJECTIVES .....</b>	<b>1</b>
	<b>1.1 Scope.....</b>	<b>1</b>
	1.1.1 Introduction and Period of Reporting.....	1
	1.1.2 The Company .....	1
	1.1.3 Background and History of the Rocglen Coal Mine .....	3
	1.1.4 Products and Markets .....	4
	1.1.5 Operational and Environmental Management .....	4
	1.1.6 Corporate Occupational Health, Safety and Environmental Policy .	5
	<b>1.2 Approval Status .....</b>	<b>7</b>
	1.2.1 Leases, Licences and Approvals.....	7
	1.2.2 Amendments to Leases, Licences and Approvals .....	8
	<b>1.3 Actions Requested at Previous AEMR Review.....</b>	<b>8</b>
<b>2</b>	<b>SUMMARY OF OPERATIONS .....</b>	<b>9</b>
	<b>2.1 Exploration, Resources / Reserves and Mine Life.....</b>	<b>9</b>
	2.1.1 Exploration.....	9
	2.1.2 Resources and Reserves.....	9
	2.1.3 Estimated Mine Life .....	9
	<b>2.2 Land Preparation .....</b>	<b>9</b>
	<b>2.3 Construction .....</b>	<b>10</b>
	<b>2.4 Mining.....</b>	<b>11</b>
	2.4.1 Mining Method .....	11
	2.4.2 Mining Constraints .....	12
	2.4.3 Mining Equipment .....	13
	2.4.4 Hours of Operations.....	13
	<b>2.5 Processing .....</b>	<b>14</b>
	2.5.1 Outline of Processing Activities.....	14
	2.5.2 Changes or Additions to the Process or Facilities .....	14
	<b>2.6 Waste Management .....</b>	<b>15</b>
	2.6.1 Introduction .....	15
	2.6.2 Domestic Type Wastes .....	15
	2.6.3 Oil Containment and Disposal.....	16
	2.6.4 Sewage Treatment and Disposal .....	16
	2.6.5 Mine Equipment Tyres .....	16
	2.6.6 Overburden and Interburden.....	16
	2.6.7 Processing Plant Residues .....	17
	<b>2.7 Stockpile Capacity.....</b>	<b>18</b>
	<b>2.8 Water Management.....</b>	<b>18</b>
	2.8.1 Objectives .....	18
	2.8.2 Surface Water Management .....	20
	2.8.3 Discharges.....	21
	2.8.4 Water Sources, Demand and Use.....	27

2.8.5	Stored Water.....	28
2.8.6	Groundwater Management .....	28
<b>2.9</b>	<b>Hazardous and Explosive Material Management.....</b>	<b>29</b>
<b>2.10</b>	<b>Infrastructure Management.....</b>	<b>29</b>
<b>2.11</b>	<b>Product Transport .....</b>	<b>30</b>
<b>3</b>	<b>ENVIRONMENTAL MANAGEMENT AND PERFORMANCE.....</b>	<b>31</b>
<b>3.1</b>	<b>Air Pollution .....</b>	<b>34</b>
3.1.1	Criteria.....	34
3.1.2	Control Procedures .....	34
3.1.3	Dust Monitoring.....	35
<b>3.2</b>	<b>Erosion and Sedimentation.....</b>	<b>37</b>
3.2.1	Management.....	37
3.2.2	Performance .....	38
<b>3.3</b>	<b>Surface Water Pollution .....</b>	<b>41</b>
3.3.1	Management.....	41
3.3.2	Performance .....	41
<b>3.4</b>	<b>Groundwater Pollution .....</b>	<b>41</b>
3.4.1	Management.....	41
3.4.2	Performance .....	42
<b>3.5</b>	<b>Contaminated or Polluted Land.....</b>	<b>45</b>
<b>3.6</b>	<b>Threatened Flora.....</b>	<b>45</b>
<b>3.7</b>	<b>Threatened Fauna.....</b>	<b>46</b>
<b>3.8</b>	<b>Weeds.....</b>	<b>47</b>
3.8.1	Management.....	47
3.8.2	Performance .....	47
<b>3.9</b>	<b>Blasting .....</b>	<b>48</b>
3.9.1	Blast Criteria and Control Procedures .....	48
3.9.2	Performance .....	49
<b>3.10</b>	<b>Operational Noise .....</b>	<b>49</b>
3.10.1	Criteria.....	49
3.10.2	Control Procedures .....	50
3.10.3	Operational Noise Monitoring.....	51
<b>3.11</b>	<b>Visual, Light .....</b>	<b>54</b>
3.11.1	Management.....	54
3.11.2	Performance .....	55
<b>3.12</b>	<b>Aboriginal Heritage Management .....</b>	<b>55</b>
3.12.1	Sites Management and Performance .....	55
3.12.2	Consultation.....	58
<b>3.13</b>	<b>Natural Heritage .....</b>	<b>58</b>
<b>3.14</b>	<b>Spontaneous Combustion .....</b>	<b>59</b>
3.14.1	Management.....	59
3.14.2	Performance .....	59
<b>3.15</b>	<b>Bushfire Management .....</b>	<b>59</b>
3.15.1	Management.....	59

3.15.2	Performance .....	59
<b>3.16</b>	<b>Mine Subsidence .....</b>	<b>59</b>
<b>3.17</b>	<b>Hydrocarbon Contamination.....</b>	<b>59</b>
3.17.1	Management.....	59
3.17.2	Performance .....	60
3.17.3	Greenhouse Gas Emissions .....	62
<b>3.18</b>	<b>Methane Drainage / Ventilation.....</b>	<b>64</b>
<b>3.19</b>	<b>Public Safety .....</b>	<b>64</b>
3.19.1	Management.....	64
3.19.2	Performance .....	64
<b>3.20</b>	<b>Feral Animal Control .....</b>	<b>65</b>
<b>3.21</b>	<b>Land Capability .....</b>	<b>65</b>
<b>3.22</b>	<b>Meteorological Monitoring .....</b>	<b>65</b>
3.22.1	Introduction .....	65
3.22.2	Rainfall.....	66
3.22.3	Temperature .....	67
3.22.4	Wind Speed and Direction .....	68
3.22.5	Inversions .....	69
<b>4</b>	<b>COMMUNITY RELATIONS .....</b>	<b>70</b>
<b>4.1</b>	<b>Environmental Complaints.....</b>	<b>70</b>
<b>4.2</b>	<b>Employment Status, Demography and Socio-Economic Contributions .....</b>	<b>74</b>
4.2.1	Employment Status and Demography.....	74
4.2.2	Social and Economic Contributions.....	75
<b>4.3</b>	<b>Community Liaison .....</b>	<b>75</b>
<b>5</b>	<b>REHABILITATION.....</b>	<b>76</b>
<b>5.1</b>	<b>Buildings .....</b>	<b>76</b>
<b>5.2</b>	<b>Rehabilitation of Disturbed Land.....</b>	<b>76</b>
5.2.1	Objectives .....	76
5.2.2	Achievements During the Reporting Period.....	77
<b>5.3</b>	<b>Rehabilitation Monitoring and Performance .....</b>	<b>78</b>
<b>6</b>	<b>CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES .....</b>	<b>84</b>
<b>6.1</b>	<b>Objectives .....</b>	<b>84</b>
<b>6.2</b>	<b>Achievements to Date .....</b>	<b>84</b>
<b>6.3</b>	<b>Targets and Goals .....</b>	<b>85</b>

## TABLES

Table 1 - Tenements, Licences and Approvals.....	7
Table 2 - Production and Waste Summary .....	10
Table 3 - Mining Equipment.....	13
Table 4 - Whitehaven CHPP Fine Reject Leachate Analysis .....	17
Table 5 - Stored Water .....	28

Table 6 - Deposited Dust Monitoring Data.....	36
Table 7 - Groundwater Monitoring.....	42
Table 8 - Aboriginal Artefacts and Scarred Trees.....	56
Table 9 – Water Samples Taken From Diesel Spill.....	61
Table 10 – Water Samples Four Days After Spill.....	61
Table 11 - GHG Emissions - Diesel Fuel.....	62
Table 12 - GHG Emissions Summary.....	63
Table 13 - Rainfall Data (1 Aug 2010 – 31 July 2011) .....	66
Table 14 - Average Monthly Temperatures .....	68
Table 15 - Complaints Summary .....	71
Table 16 - Complaints Comparison .....	74
Table 17 - Rehabilitation Summary .....	77
Table 18 - Maintenance Activities on Rehabilitated Land .....	78
Table 19 – Rehabilitation Planting Records.....	83
Table 20 – Wean Road Alignment Planting Records .....	83

## FIGURES

Figure 1 - Locality Plan.....	2
Figure 2 - Coal Movement and Production Summary .....	15
Figure 3 - Monitoring Locations - North .....	32
Figure 4 - Monitoring Locations - South.....	33
Figure 5 - Glenroc HVAS PM <sub>10</sub> Data.....	37
Figure 6 – Surrey/Roseberry HVAS PM <sub>10</sub> Data .....	37
Figure 7 – Monthly Rainfall Data .....	67

## PLANS

	After
Plan 3 - Land Preparation Rocglen Coal Mine.....	86
Plan 4 - Mining and Rehabilitation Rocglen Coal Mine .....	86

## PLATES

Plate 1 - New Storage Dam North of SB18.....	26
Plate 2 - Mounding used to catch runoff and minimise erosion.....	40
Plate 3 – Hay bales used to control erosion and sedimentation.....	40
Plate 4 – Containing and removing diesel slick from SD 3.....	62
Plate 5 – Manure compost trial.....	79

Plate 6 – Growth eight months after manure trial.....	79
Plate 7 - Mixing seed with humus compost.....	80
Plate 8 – Applying seed compost mix between tree mounds.....	81
Plate 9 – Germination one month.....	81
Plate 10 – Mounding on Western Rehabilitation Area 30/6/2011.....	82

## **APPENDICES**

Appendix 1	PA 06_0198 MOD 1
Appendix 2	Environment Protection Licence 12870
Appendix 3	Compliance Review <ul style="list-style-type: none"> <li>• PA 06_0198 MOD 1 (Table A3-1)</li> <li>• Environment Protection Licence 12870 (Table A3-2)</li> <li>• ML 1620 (Table A3-3)</li> </ul>
Appendix 4	Surface Water and Wet Weather Discharge Monitoring Data
Appendix 5	Dust Monitoring Data
Appendix 6	Groundwater Monitoring Data
Appendix 7	Flora and Fauna Monitoring Reports
Appendix 8	Blast Monitoring Results
Appendix 9	Noise Monitoring Results
Appendix 10	Meteorological Data

# **1 INTRODUCTION AND OBJECTIVES**

## **1.1 Scope**

### **1.1.1 Introduction and Period of Reporting**

This is the third Annual Environmental Management Report (AEMR) produced for the Rocglen Coal Mine, and it has been prepared in accordance with Conditions 4 and 5 of Mining Lease (ML 1620) (Mining Act 1992) and Condition 5 (Schedule 5) of PA 06\_0198 MOD 1. The AEMR generally follows the format identified in the Department of Primary Industries Mineral Resources (DPI-MR) document entitled “*Guidelines to the Mining, Rehabilitation and Environmental Management Process*” Version 3, dated January 2006.

Though primarily covering the period from 1<sup>st</sup> August 2010 to 31<sup>st</sup> July 2011 (the reporting period), where relevant the AEMR 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 1<sup>st</sup> August 2011 to 31<sup>st</sup> July 2012) or beyond.

The Rocglen Coal Mine is located within the Gunnedah Shire, approximately 28 km north of Gunnedah (Figure 1) and 10 km west of the Canyon Coal Mine (formerly Whitehaven Coal Mine) which is currently in the closure phase.

### **1.1.2 The Company**

The Rocglen Coal Mine is owned by Whitehaven Coal Limited (WCL) and operated by Whitehaven Coal Mining Pty Ltd (WCMPL). WCMPL is a wholly owned subsidiary of WCL, a publicly listed company which has several coal mining interests in the Gunnedah region of NSW.

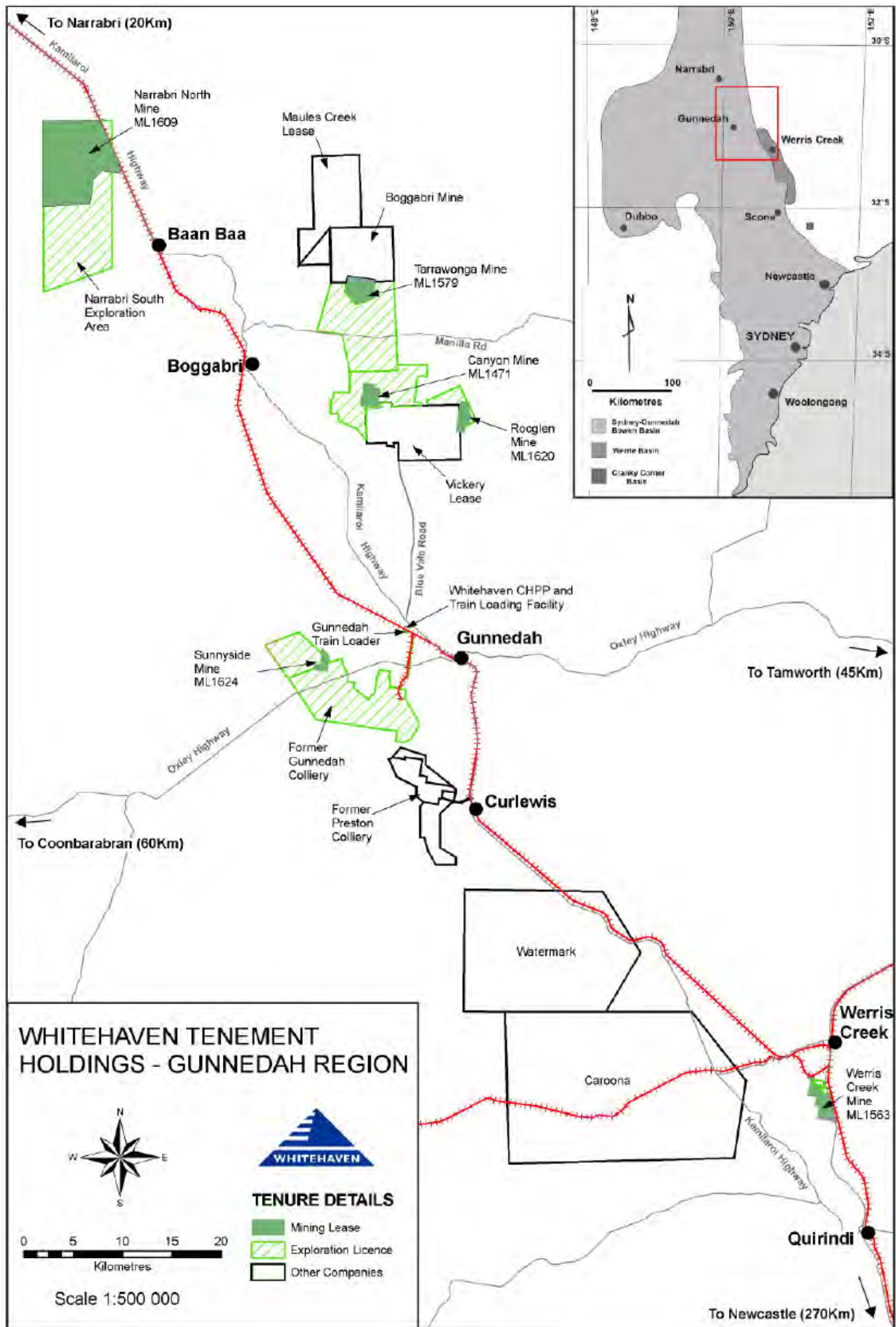


Figure 1 - Locality Plan

WCL's coal mining assets are as follows:

- Canyon Coal Mine (formerly Whitehaven Coal Mine), 10km south of Tarrawonga, 100% owned by WCL, which ceased production in July 2009, and is currently under final rehabilitation;
- Whitehaven Rail Siding and 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 second quarter 2010;
- Tarrawonga Coal Mine, 42km north-west of Gunnedah, owned by Tarrawonga Coal Pty Ltd which is a joint venture between WCMPL (70%) and Idemitsu Boggabri Coal (30%);
- Sunnyside Coal Mine, 15km south west of Gunnedah, 100% owned by subsidiary company Namoi Mining Pty Ltd, which commenced production in 2008;
- 100% ownership of the Bonshaw project near Ashford;
- 100% ownership of the former Gunnedah Colliery through Namoi Mining Pty Ltd; and
- 100% ownership of the former Vickery site, with environmental assessment work underway with a view to re-opening the former Vickery and adjacent deposits.

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 Rocglen Coal Mine**

The Rocglen Coal Mine was developed after substantial investigations were undertaken under Exploration Licence 5831, granted in April 2001 and renewed in August 2003 and November 2008. Following completion of relevant assessments and studies, the former Department of Planning (DoP) provided approval to the development via Project Approval (PA) 06\_0198 on the 15<sup>th</sup> April 2008. Environment Protection Licence (EPL) 12870 was granted on the 22<sup>nd</sup> July 2008.

The Project Approval provided for the extraction of approximately 18 million tonnes of ROM coal, at a maximum rate of 1.5 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 Siding Coal Handling and Preparation Plant (CHPP) near Gunnedah.

Over the life of the approved mine, a total area of approximately 115 ha will be disturbed for mining and associated activities within ML 1620.

The external boundary of ML 1620 corresponds to the area referred to in PA 06\_0198 MOD 1 (see Section 1.2.2 for details on the modification) and covers an area of approximately 365 ha.

### **1.1.4 Products and Markets**

Coal within the Rocglen coal deposit can be described as a high volatility coal which will produce a medium sulphur thermal/PCI coal with ash percentages currently ranging from <10% (low ash PCI) up to 25% (high ash thermal).

All coal produced at Rocglen (0-50mm, raw and washed) is exported for use in heating or power generation.

### **1.1.5 Operational and Environmental Management**

#### ***1.1.5.1 Contacts***

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

- Mr Chris Stephens, Manager Mining Engineering - retains statutory responsibility for mining activities at the site. Contact: (02) 6740 7000.
- Mr Casper Dieben, General Manager, Operations - oversees open cut operations for the Whitehaven Group. Contact: 0407 123 958.
- Mr Danny Young, Environmental Manager – oversees day to day environmental and rehabilitation performance across the site. Contact: (02) 6741 9316, 0427 497 710.

Mining operations are undertaken by Whitehaven Coal Mining Pty Ltd personnel. The day-to-day operational responsibilities are allocated to the Project Manager, Mr Tony Heinrich. Contact: (02) 6740 7000.

### **1.1.5.2 Support Personnel**

In addition to the personnel identified in Section 1.1.5.1, Whitehaven 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:

- Countrywide Ecological Services;
- GSS Environmental Pty Ltd;
- Boztek Solutions Pty Ltd;
- Orica Blasting Limited; and
- Soil Services;
- G&B Ward Earthmoving;
- ALS Acirl; and
- Spectrum Acoustics Pty Ltd;

All mining and environmental management activities are undertaken generally in accordance with the MOP, management plans and procedures prepared in satisfaction of Rocglen's Mining Lease, Environment Protection Licence, Project Approval and the relevant legislation.

### **1.1.6 Corporate Occupational Health, Safety and Environmental Policy**

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

*"Whitehaven is committed to supplying coal in a safe, efficient and environmentally responsible manner. Whitehaven will conduct business in a way that maintains a safe and healthy workplace for our employees, contractors, visitors and the surrounding community and will protect the environment in all stages of mining and processing.*

Whitehaven's Goals are:

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

*Whitehaven will achieve these goals by:*

- *Ensuring health, safety and environment is considered in all planning and work activities.*
- *Involving our 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.*
- *Providing details of legislative and other requirements and necessary training and resources to meet these requirements.*

*Responsibilities:*

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

*Whitehaven employees shall share the responsibility to:*

- *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 and 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 Rocglen 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 PA 06\_0198 MOD 1 (Appendix 1), EPL 12870 (Appendix 2), and ML 1620, are presented in Appendix 3, Tables A3-1, A3-2 and A3-3 respectively.

**Table 1 - Tenements, Licences and Approvals**

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments			
Department of Mineral Resources* <sup>1</sup>	Exploration Licence (EL 5831)	6 <sup>th</sup> April 2001 (Renewed 15 <sup>th</sup> August 2003 and 11 <sup>th</sup> November 2008)	5 <sup>th</sup> April 2013	Approval for exploration			
Minister for Planning	Project Approval (PA) 06_0198	15 <sup>th</sup> April 2008	10 <sup>th</sup> June 2020	Approval for the mine			
Department of Environment and Climate Change* <sup>2</sup>	Environment Protection Licence No. 12870 (Appendix 2)	31 <sup>st</sup> July 2008	Nil Anniversary date: 31 <sup>st</sup> July Next review: 18 <sup>th</sup> August 2014	Approval granted for Mining for Coal and Coal Works to 2 Mtpa.			
Department of Primary Industries* <sup>1</sup>	ML 1620	10 <sup>th</sup> June 2008	9 <sup>th</sup> June 2029	Approval of open cut			
Department of Water and Energy (DWE)* <sup>3</sup>	Water Licence 90BL254855 90BL254856 90BL254857 90BL254858 90BL254859 90BL110883 90BL104367 90BL102845	Various	Nil	Used for groundwater monitoring purposes			
	90BL254684				12 <sup>th</sup> May 2009	11 <sup>th</sup> May 2014	700ML aquifer interference
	90BL254758 90BL255249				18 <sup>th</sup> Jan 2010 18 <sup>th</sup> Jan 2010	17 <sup>th</sup> Jan 2015 17 <sup>th</sup> Jan 2015	120ML total allocation - mining (low security)
Minister for Planning	Project Approval (PA) 06_0198 MOD 1 (Appendix 1)	27 <sup>th</sup> May 2010	10 <sup>th</sup> June 2020	Notice of Modification for highwall stability works			
* <sup>1</sup>	Now, NSW Trade and Investment, Regional Infrastructure and Services (DTIRIS)						
* <sup>2</sup>	Now, Office of Environment and Heritage (OEH)						
* <sup>3</sup>	Now, NSW Office of Water (NOW)						

## 1.2.2 Amendments to Leases, Licences and Approvals

Amendments to leases, licences and approvals for the mine are as follows:

- Exploration Licence (EL 5831) – no changes were made during the reporting period as renewal is not required until 5<sup>th</sup> April 2013.
- Whitehaven has prepared an application for a new Project Approval under Part 3A of the EP&A Act to expand operations in order to maximise resource recovery and allow for improved mine progression. A Preliminary Environmental Assessment (PEA) for the Rocglen Extension Project was submitted to the former DoP in December 2009, with the Director-General's Requirements (DGRs) issued in March 2010. The Environmental Assessment (EA) was submitted to DoP on the 13<sup>th</sup> January 2011 and was placed on public exhibition during March/April 2011. Whitehaven had not received project approval by the end of the reporting period.
- Environment Protection Licence (EPL No. 12870) – no changes were made during the reporting period.
- Mining Lease (ML 1620) – no changes were made during the reporting period.
- Water Licences – no changes were made during the reporting period.
- Following the grant of the Section 75W modification approval in May 2010 (for highwall stabilisation works), a MOP amendment was submitted to the former I&I NSW for review. Approval of the MOP was issued in October 2010.

## 1.3 Actions Requested at Previous AEMR Review

The 2009-2010 AEMR was submitted to the former I&I NSW (now DTIRIS – DRE) in September 2010. No site inspection was carried out following submission of the AEMR and DRE have yet to provide a formal response to the AEMR. As a result, no actions have been requested.

## **2 SUMMARY OF OPERATIONS**

### **2.1 Exploration, Resources / Reserves and Mine Life**

#### **2.1.1 Exploration**

During the year ending 10<sup>th</sup> June 2011 (geology reporting period), 44 non-cored exploration boreholes were drilled in ML1620, for total drilling of 3,630m.

#### **2.1.2 Resources and Reserves**

The mineable coal seams present within the open cut are listed below in increasing depth from the surface. Average thicknesses and thickness ranges have also been listed.

- Upper Glenroc: 0.8 – 5.95m, average 2.65m
- Lower Glenroc: 0.85 - 5.3m, average 2.0m
- Belmont: 4.22 – 12.0m, average 7.0m

All three seams tend to thicken on the eastern limb of the anticline, although many of the thicker intersections are artificially inflated by steeper dips.

The open cut coal resources as at the 31<sup>st</sup> March 2011 total 19.2Mt. Recoverable open cut coal reserves total 13.0Mt. Marketable coal reserves are 10.7Mt.

#### **2.1.3 Estimated Mine Life**

Based on an average production rate of 1.5Mta, the mine life is approximately 8 to 10 years, as specified in the MOP Amendment No.1 (approved October 2010).

If the proposed Rocglen Extension is approved, the mine life will be extended by a further 4 years.

### **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 two different vegetation communities for mining, waste emplacement and infrastructure areas. These communities are Pilliga Grey Box – Whitebox – Yellowbox – White Cypress Pine (Community 3) and

Cleared lands – used for grazing and/or cultivation (Community 8). All clearing works were undertaken following a pre-start clearing check by Countrywide Ecological Services.

- Stripping of topsoil, subsoil and friable overburden over an area of approximately 18ha. Soil stripped during the reporting period comprised soil mapping units SMU2 and SMU4.
- During the reporting period, a total of 35,760 m<sup>3</sup> topsoil and subsoil was stripped and stockpiled. Existing stockpile locations are shown on Plan 3.

Table 2, the “Production and Waste Summary”, shows that at the end of the reporting period, 20,625 m<sup>3</sup> topsoil and subsoil had been replaced for rehabilitation purposes.

**Table 2 - Production and Waste Summary**

	Cumulative Production			
	Start of Reporting Period (up to 31/7/10)	During Reporting Period (1/8/10 to 31/7/11)	Cumulative Total at End of Reporting Period	Cumulative Total at End of next Reporting Period (estimated)
Soil Stripped (m <sup>3</sup> )	61,230	35,760	96,990	242,735
Soil Used/Spread (m <sup>3</sup> )	10,510	20,625	31,135	77,550
Waste Rock (m <sup>3</sup> )	6,309,167	7,823,035	14,132,202	24,389,202
ROM Coal (t)*	956,535	1,249,789	2,206,324	2,506,789
Processing Waste (t)**	138,681	267,707	406,388	540,877
Product (t)	879,676	971,440	1,851,116	1,962,705

\* 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.

\*\* Rocglen waste produced at Whitehaven CHPP.

Soil removal activities are undertaken in 100m wide strips in advance of competent overburden and coal extraction activities.

## **2.3 Construction**

No construction occurred during the 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 waste emplacements; 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 quality was classified into “high ash” and “low ash” for stockpiling.

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

During the reporting period, a total of 7,823,035 bcm (or 10,169,946 m<sup>3</sup>, assuming a swell factor of 1.3) friable and competent overburden was removed to produce 1,249,789 tonnes of ROM coal at an average overburden:coal stripping ratio of 8.3:1 (See Table 2).

Plan 4 presents the status of mine and infrastructure development as of 31<sup>st</sup> July 2011. The plan also identifies the limit of mining at the commencement of the reporting period.

During the reporting period, the mine, which was developed as a series of approximately 100 m wide strips, advanced approximately 200m in an easterly direction. The pit is currently approximately 750m wide and 1,500m in length. Mining activities were generally undertaken in areas formerly identified as Community 2 (Pilliga Grey Box – White Cypress Pine Community), Community 3 (Pilliga Grey Box – Whitebox – Yellowbox – White Cypress Pine Community) and Community 8 (Cleared lands – used for grazing and/or cultivation).

## 2.4.2 Mining Constraints

Day to day mining activities at the mine are primarily constrained by economic considerations which, in turn, are determined to a large extent by factors beyond Whitehaven's control (i.e. coal price and demand). Economic factors determine the viable 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:

- Stability issues associated with the highwall in the north-eastern section of the pit;
- 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;
- The potential for thickening of stone bands within the coal seams;
- Final landform design to allow for re-establishment of class III capability land, with final slopes of the open cut area to be 18 degrees or less and slopes on the reshaped waste emplacement to be 10 degrees or less;
- Existence of the threatened ecological community (Brigalow community) to the north-east of the pit;
- Existence of the timbered area to the north-west of the pit as well as the stand of trees along the former Jaeger Lane, which both form part of the biodiversity offset; and
- Existence of Aboriginal sites within the Mining Lease.

Works to stabilise the highwall continued into the reporting period following issue of PA 06\_0198 MOD 1 in May 2010.

### 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).

**Table 3 - Mining Equipment**

Item (or equivalent)	No. on site	Function
Excavator (Hitachi EX1900)	1	Overburden and coal loading
Excavator (Hitachi EX 3600-6)	1	Overburden excavation and loading
Excavator (Hitachi EX 2500)	1	Overburden excavation and loading
Excavator (CAT 330B)	1 (p/t)	Drainage, windrows etc
Rear Dump Truck (CAT 785C)	7	Overburden/coal haulage
Rear Dump Truck (CAT 777)	3	Overburden/coal haulage
Wheel Loader (CAT IT38)	1 (p/t)	Lifting, stemming etc
Dozer (CAT D10T)	2	Clearing; pit activities; dump maintenance
Dozer (CAT D9N)	1	Ripping and pushing for scrapers
Dozer (CAT D11R)	1	Overburden/rip/push
Grader (CAT 14H)	1 (f/t), 1 (p/t)	Road maintenance
Scraper (CAT 637D)	2	Campaign topsoil/subsoil removal and replacement
Scraper (CAT 631)	2	Campaign topsoil/subsoil removal and replacement
Drill Rig Terex SKF50	1	Campaign blasthole drilling
Water Cart (International 2350G)	2	Dust suppression
Crushing Plant	1	Coal size reduction
Wheel Loader (CAT 988H)	1	Feeding/processing plant/product truck loading
Lighting Plant	8	Light for evening, night operations
Fuel/Service Truck	1	Equipment refuelling/servicing
125 kVA diesel generator	1	Electricity generation for site services
820 kVA diesel generator	1	Coal processing

### 2.4.4 Hours of Operations

Rocglen is permitted to undertake mining operations 24 hours a day, Monday to Saturday, with the exception of public holidays. The mine has two production shifts on weekdays which are day shift (7:00am to 5:00pm) and afternoon shift (4:30pm to 2:30am), and generally an 8 hour overtime production shift on Saturday.

Maintenance crews work 24 hours per day Monday to Friday and 6:30am to 6:30pm on Saturday and Sunday.

Coal transportation from the mine site is undertaken 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. Coal transportation is not permitted on Sundays and public holidays.

Blasting activities were carried out between 9:00am and 5:00pm Monday to Saturday.

The above hours of operation are consistent with the permitted hours of operation identified in PA 06\_0198 MOD 1.

## **2.5 Processing**

### **2.5.1 Outline of Processing Activities**

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

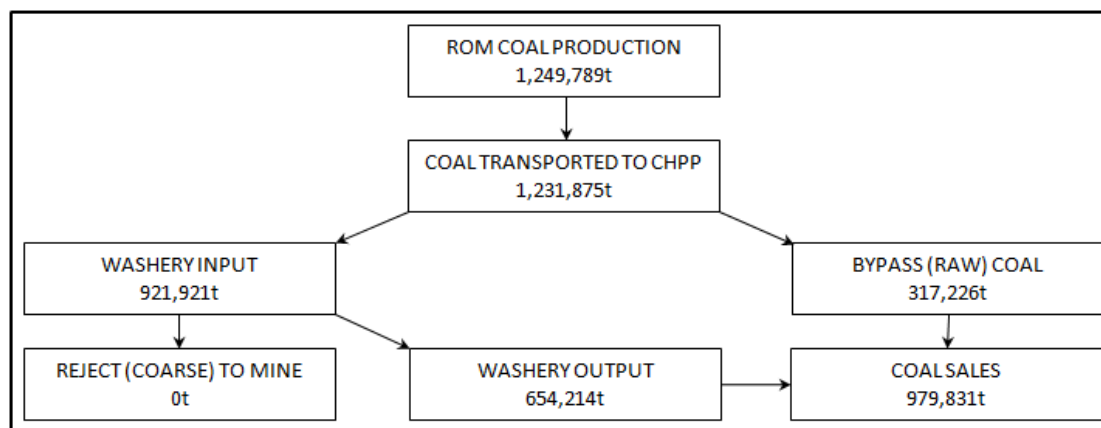
During the reporting period, all Rocglen coal was transported to the Whitehaven Siding CHPP with 75% washed and 25% bypassed (unwashed) for despatch to domestic and export markets.

Figure 2 presents a schematic of coal movements and washery inputs, outputs and yields for the reporting period.

Figure 2 shows that during the reporting period 1,249,789 tonnes of coal was mined and 1,231,875 tonnes of coal was transported to the Whitehaven CHPP, producing 317,226 tonnes bypass coal (i.e. crushed product coal not requiring washing) and 921,921 tonnes of washed product (at an average yield of 71% from the plant).

### **2.5.2 Changes or Additions to the Process or Facilities**

No changes or additions to the process or facilities occurred during the reporting period. The coal movement and production summary is shown in Figure 2.



**Figure 2 - Coal Movement and Production Summary  
(2010/2011 Reporting Period)**

## 2.6 Waste Management

### 2.6.1 Introduction

Wastes produced at the mine or CHPP during the reporting period remain unchanged from those identified in the original EA and are comprised of:

- General domestic-type wastes from on-site buildings and routine maintenance consumables;
- Oils and other hydrocarbons;
- 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.

### 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 generally collected this waste on a fortnightly basis.

The mine maintains a recycling program for office and general recyclables (paper, cardboard, bottles, cans etc) at the site office and crib room and the program has continued to work effectively with collections occurring once a week.

### **2.6.3 Oil Containment and Disposal**

Waste oils from maintenance activities were pumped from equipment to bulk storage tanks banded in accordance with EPA requirements (also see Section 2.8.2). When breakdown maintenance was undertaken away from the workshop, 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 workshop was collected and disposed of by a licensed contractor as required.

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, with pump outs 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. During the reporting period 22 tyres have been disposed of in pit. Records are maintained on the disposal location of all tyres.

### **2.6.6 Overburden and Interburden**

Overburden materials at the mine comprise weathered conglomerates with some fracturing. 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.

## 2.6.7 Processing Plant Residues

### 2.6.7.1 *Physical and Chemical Characteristics*

The coarse and fine rejects produced from washing Rocglen 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.

Analysis of the leachate emanating from the Whitehaven Siding CHPP fine reject ponds is presented in Table 4. The leachate analysis from the finishing pond indicates that the water is of a quality suitable for general agricultural uses.

**Table 4 - Whitehaven CHPP Fine Reject Leachate Analysis**

Parameter	Unit	Analysis
pH		8.05
EC	µS/cm	2770
TSS	mg/L	4
Alkalinity – Bicarbonate	mg/L	218
Chloride	mg/L	342
Sulphates	mg/L	778
Calcium (tot)	mg/L	108
Magnesium (tot)	mg/L	88
Sodium	mg/L	399
Potassium	mg/L	22
Oil & Grease	mg/L	<5

### 2.6.7.2 *Reject Handling and Disposal Procedures*

**Coarse Reject** – As rehabilitation progresses at the mine, it is intended that coarse reject produced from the Whitehaven CHPP will be backloaded to the mine for placement in the open cut prior to reshaping and rehabilitation. An appropriate application will be made to the DRE for Section 100 approval under the Coal Mine Health and Safety Act 2002. Until this occurs, coarse reject from the CHPP will continue to be backloaded to the Tarrawonga Coal Mine emplacement area.

**Fine Reject** – Pumped to a series of seven fine reject ponds (5 within the Whitehaven CHPP balloon loop and two on the eastern side of the 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 from DTIRIS, the statutorily responsible Authority.

## **2.7 Stockpile Capacity**

All ROM coal produced at the mine is delivered to high ash or low ash ROM stockpiles. ROM stockpile capacity at the mine totals 150,000t. Average stockpile volume during the reporting period was 68,954t (51,077m<sup>3</sup>) with volumes ranging from 9,058t (6,710m<sup>3</sup>) to 146,610t (105,400m<sup>3</sup>).

## **2.8 Water Management**

### **2.8.1 Objectives**

The mine lies within the catchment of the Namoi River. Locally, and within proximity of the mine site, Driggle Draggie Creek and the un-named drainage channel to the south of the mine site provide flows to the Namoi River during runoff events. The sediment detention basins within the disturbed area of the mine are designed to limit the opportunity for discharge of runoff from mine-disturbed area (i.e. after appropriate detention time to satisfy licensed discharge criteria). Two wet weather discharge points are nominated in the current EPL 12870. These are SD3 (EPL ID No. 11) and Northern Boundary Site Exit (EPL ID No. 12) (Plan 4). Three ambient monitoring points are also nominated on the EPL for water quality monitoring during discharge events. These are Driggle Draggie Creek (DDCK – EPL ID No. 13), Un-named Drainage Channel (UNDC – EPL ID No. 14) and Storage Dam 7 (EPL ID No. 15).

The management of water at the mine is undertaken with the following objectives:

- To ensure sufficient quantities of water can be obtained through the capture of “dirty” water, harvesting of “clean” water, and extraction/harvesting of groundwater to meet the requirements of dust suppression on the mine site;

- To ensure the segregation of “dirty” water from “clean” water, with “dirty” water directed to and detained in sediment basins which, on discharge, flow to storage dams. “Clean” water, comprising clarified water originating from the sediment basins and run-on water collected in accordance with the Company’s harvestable right, will be directed to and/or collected in storage dams;
- To ensure the treatment and separation of “contaminated” water from the workshop and wash bay area by diversion to an oil separating unit, with clarified water reporting to sediment basins;
- To ensure segregation of “pit” water from surface flows by collection in isolated pit dewatering dams;
- To maximise the use of “dirty” and “pit” water for dust suppression purposes and minimise the necessity to harvest “clean” run-on water;
- To minimise the volume of water discharged from the mine site, but, should the discharge of water prove necessary, ensure sufficient settlement time is provided prior to discharge such that suspended sediment within the water meets the water quality criteria as specified in the EPL 12870;
- To minimise erosion and sedimentation from all active and rehabilitated areas of the mine site;
- To monitor the effectiveness of surface water controls and ensure all relevant surface and groundwater quality criteria are met;
- To monitor the impact on groundwater level, quality and availability;
- To minimise any impacts on the availability of surface water or groundwater to surrounding residents and landholders; and
- To establish a method of assessing the level of impact on groundwater supply attributable to the mine.

Water management is undertaken in accordance with the Site Water Management Plan (SWMP), which was initially approved by the Director-General on the 16<sup>th</sup> June 2008. A subsequent amendment to the SWMP, incorporating additional water management structures and the wet weather discharge locations nominated in EPL 12870, was approved by the Director-General on the 6<sup>th</sup> October 2009.

## 2.8.2 Surface Water Management

Water within the Project Approval area is nominally classified either as “clean”, “dirty”, or “contaminated” depending on the source of the flow and its potential for physical or chemical contamination.

All sediment basins, storage dams and associated banks and drains installed prior to this reporting period within the DA Area were designed and constructed by Department of Lands – Soil Services personnel. During the reporting period one additional storage dam to the north of the site was designed and constructed by G&B Ward Earthmoving.

**“Clean water”** comprises surface runoff from catchments undisturbed or relatively undisturbed by mining or related activities and rehabilitated catchments. Within the Project Approval area, clean surface water flows either flow 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 to provide a final “polishing” storage prior to potential off-site discharge.

**“Dirty water”** comprises surface runoff from disturbed catchments such as the active mine area and overburden emplacement, ROM and product coal stockpiles, soil and subsoil stockpiles and rehabilitated areas (until stabilised), all of which could contain sediments.

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 while water pumped from the open cut is piped to the Void Water Dam or retained in pit within managed sumps. Water collecting within the sediment basins and the Void Water Dam 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 25% 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.

Sediment levels were assessed in all sediment basins at the end of the 2008 – 2009 reporting period, with maximum sediment levels recorded at 2% in two sediment

basins. All other sediment basins had a negligible amount of sediment. An assessment of sediment levels was not conducted during this reporting period due to the volume of water currently held in most sediment basins. The next sediment level check will be conducted when water levels are low in order to enable easy cleanout of sediment, if required.

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

**“Contaminated Water Management”**. Two 68,000 L (62,000 L safe fill) self bunded diesel fuel tanks are maintained adjacent to the Rocglen 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. An additional concrete bund has been installed 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. Water potentially contaminated with hydrocarbons from the workshop area is also diverted to the oil separator, with clarified water reporting to surface storages and 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.

### **2.8.3 Discharges**

A total of 6 wet weather discharges occurred from the site during the first half of the reporting period between the 10<sup>th</sup> August 2010 and 6<sup>th</sup> December 2010. No discharges have occurred since, due to a significant drop in rainfall during the second half of the reporting period. The storage structures onsite have been built to the 90<sup>th</sup>ile 5 day event design criteria, with the design specification incorporated in the existing EPL 12870. Nevertheless, sampling has been undertaken during each discharge event to monitor the water quality parameters.

Water analysis results from each discharge, as well as any ambient monitoring upstream and downstream of the site are included in Appendix 4 and a discussion of the results is provided below.

### **10<sup>th</sup> and 11<sup>th</sup> August 2010 – SB18 and SD3**

Discharge occurred following 20.6mm of rain on the 10<sup>th</sup> August 2010, in addition to the 85.6mm received over the previous month. The discharge was compliant with all EPL parameters except for TSS. SB18 and SD3 exceeded the TSS criteria at levels of 2320mg/L and 368mg/L respectively. Driggle Draggie Creek (DDCK) downstream of SB18 recorded 964mg/L, and the Un-named Drainage Channel (UNDC) downstream of SD3 recorded 116mg/L. No criteria limits apply to DDCK and UNDC, but rather these locations give indications of sediment levels in surrounding creek lines.

The elevated results from the northern point SB18 and DDCK are likely a result of the difficulty when sampling due to the ill-defined nature of the channel. Low depths resulted in disturbance of sediment to the surface when obtaining a sample. The close proximity of runoff from the northern subsoil stockpile to SB18 would have also had a significant contribution to SB18's discharge of turbid water. It should be noted that SB18 was at full capacity leading up to the discharge with no site capacity to utilise water.

Discharge results from SD3 were also elevated despite ongoing efforts of flocculation in this storage. The use of 'Floc Blocks' had proven to be effective in the past, provided adequate time was given to dissolve the blocks and no additional inflow of sediments occurred. However for rapid response after heavy rainfall events, the results proved the method to be ineffective. Downstream UNDC results have similar sampling issues to DDCK due to the ill-defined nature of the channel.

### **20<sup>th</sup> August 2010 – SB18 & SD3**

Further discharge occurred at SB18 and SD3 following 11.2mm of rainfall on the 19<sup>th</sup> August 2010 and 4.2mm on the 20<sup>th</sup> August 2010. Again the discharge was compliant with all EPL parameters except for TSS. Exceedance of EPL criteria levels included 2300mg/L at SB18 and 172mg/L at SD3. DDCK recorded at 1912mg/L, and UNDC recorded 52mg/L. The results are again due to:

- Difficulty when sampling within ill-defined channels;
- The close proximity of SB18 to the northern subsoil stockpile;

- Full capacity at every dam on-site due to frequent heavy rainfall, despite prioritising discharge dams for use of water for dust suppression; and
- Insufficient time for 'Floc Blocks' to adequately settle out the additional inflows of sediment laden water after rainfall events.

### **10<sup>th</sup> September 2010 – SB18 and SD3**

Discharge occurred after 13.4mm over the 9<sup>th</sup> and 10<sup>th</sup> September 2010 and a total of 86.2mm over the previous month. All EPL parameters were compliant except for a TSS exceedance at SB18 recording 1220mg/L. The discharge was a low flow event which was ultimately captured in a subsequent storage dam on the Whitehaven property "Glenroc", north of the mine lease boundary. Both DDCK and UNDC recorded elevated TSS in subsequent sampling, albeit, as a low flow event where sampling could only be undertaken in low points along the drainage depression where water had pooled. SD3 measured exactly on the EPL threshold at TSS 50mg/L. This would be due to a period of approximately 21 days since the previous discharge event allowing adequate time for sediment to settle and flocculants to take effect within the dam. This is also evident in SB18 where TSS levels were reduced from 2300mg/L on the 20<sup>th</sup> August 2010 to 1220mg/L for this event.

### **12<sup>th</sup> October 2010 – SD3 controlled discharge attempt**

A controlled discharge was going to be undertaken after a sample on the 12<sup>th</sup> October 2010 indicated TSS within EPL criteria at 11mg/L. However, the oil and grease from the sample was unusually high at 32 mg/L. No discharge occurred and a resample was taken on the 19<sup>th</sup> October 2010 which indicated an oil and grease level of <5 mg/L. After consulting ALS it was suspected that an error during sampling was the cause of the original high result. The resample also indicated a high pH of 8.64 and for this reason a controlled discharge again could not be pursued. Samples taken in the following days indicated a drop in pH levels to below 8.5 (EPL threshold criteria), by this time however, TSS levels had again risen to above 50mg/L and a controlled discharge was not possible.

### **25<sup>th</sup> October 2010 – SB18**

This discharge occurred after 12.8mm of rain on the 24<sup>th</sup> October 2010. It recorded an elevated TSS of 488mg/L, but was again captured in the storage located on the northern side of the mine lease boundary on the Whitehaven-owned “Glenroc” property. Following this event, actions commenced to attempt flocculation of SB18 to reduce sediment load. Sampling of DDCK during this event also recorded elevated TSS of 234mg/L. There was no direct connection between the discharge from site, and sampling from DDCK.

### **2<sup>nd</sup> November 2010 – SD3 controlled discharge**

A controlled discharge was undertaken at SD3 following a sample taken on the 2<sup>nd</sup> November 2010 that confirmed previous flocculation efforts had reduced the TSS level below the EPL criteria to 33mg/L. The controlled discharge allowed for extra storage for future rainfall events.

### **1<sup>st</sup> and 6<sup>th</sup> December 2010 – SD3 controlled discharge and SB18 discharge**

On the 1<sup>st</sup> December 2010, 20.8mm of rain fell during a controlled discharge which was carried out at SD3. Flocculation had occurred over the previous days, reducing TSS levels in SD3 to 23mg/L, which enabled controlled discharge to occur. On the 6<sup>th</sup> December 2010 discharge from SB18 occurred following 38.4mm of rain over the previous five days. This coincides with the 5 day 90<sup>th</sup> percentile design criteria in EPL12870. The saturated conditions did not allow any other mechanism to reduce the water level, and flocculation attempts in SB18 prior to discharge had proven ineffective due to continued rainfall preventing adequate settling time prior to additional inflow.

### **Summary**

Water management onsite has been problematic since the start of 2010 due to the level of disturbance immediately upstream of SD3 through the extension of SB19 and construction of the additional sediment basin SB21. Disturbance upstream of SB18 from the northern subsoil stockpile has also created similar problems. The frequent nature of rainfall events has made it very difficult to adequately reduce the volume of water stored on site through controlled discharge or dust suppression.

During 2010, Whitehaven made a concerted effort to reduce the suspended solids in SD3 through the use of 'Floc Blocks'. This has involved the placement of blocks on the inflow of SD3 and the pumping/recirculation of water through the block to activate the flocculent within the dam. The results prove the blocks are effective with time and no additional inflow, however they are ineffective when a rapid response is required such as over the events displayed from August to December 2010. It should also be noted that difficulties occur for this method with the time frame in which results are obtained from the laboratory. A typical sample can often take a week to receive the final water quality result. Therefore efforts to complete controlled discharges are often delayed as any inflows of sediment laden water whilst waiting for results impacts all previous flocculation efforts.

Investigations into further measures for controlling the sediment level in dams involved the use of Magnafloc LT425. This is a more active liquid flocculant that after laboratory testing has proven to provide faster flocculation with only a small dose rate of 0.5 - 1 litre per megalitre. Water treatment involves steady application of the Magnafloc mixture through the inflow of a new pump specifically purchased for the flocculation process. Magnafloc was consistently used within SB18 and SD3 between October and December 2010. The new method proved successful for SD3 bringing TSS levels from around 500mg/L to below 50mg/L on numerous occasions, in a faster time frame than 'Floc Blocks'. However, for SB18 Magnafloc proved less effective due to the sheer high concentration (above 1000mg/L) of TSS within the dam. An exposed subsoil stockpile forms a major portion of the catchment area for SB18. LT425 can bring high concentrations of sediment down with high dose rates, but dosage rates must comply with manufacturer's instructions in order to ensure no toxicity to aquatic organisms. Therefore, it was used to its maximum safe level only and consequently did not prove effective at SB18 over a short time frame.

Dry ground over January/February 2011 allowed for the installation of a new sediment dam north of SB18 as a measure to further reduce discharges from the northern end of the mine (Plate 1). The new dam has a storage capacity of 6 megalitres and allows for further capacity to hold and settle sediment laden water on-site during times of heavy rainfall. Water carts also now have access to fill up from dams downstream of SB18. This will further restrict the chance of overflow and discharge from the northern points on site. Whitehaven has and will continue to utilise every effort possible under the given circumstances to reduce wet weather discharge from SB18.

It is noteworthy that Whitehaven was unable to seed the exposed northern stockpile during the reporting period as the area was being utilised by scrapers shifting soil as the pit progressed east. The northern stockpile will continue to move in a northerly direction as the mine progresses and will eventually cover the northern discharge point, SD1, SD6 and SB18. Prior to coverage of these storages, new sediment storage and discharge locations will be established in accordance with the Rocglen Extension Project Approval. Over the reporting period topsoil was spread on the eastern slope of the existing northern emplacement to initiate the first stages of rehabilitation.

The southern discharge point SD3 will continue to be managed using liquid flocculants and controlled discharges when required over wetter months. Investigations will be undertaken in providing additional storage south of SD3 if issues continue to arise from this location.



**Plate 1 - New Storage Dam North of SB18**

The Rocglen Environmental Protection Licence also requires water quality monitoring of SD7 during wet weather discharge events to determine upstream water quality. Due to a misinterpretation of monitoring requirements this did not occur over the

reporting period, albeit, SD7 has not discharged any water during wet weather events and as a consequence has had no influence on any downstream water quality..

SD7 has been sampled during quarterly surface water sampling events which provides some indication of comparisons between upstream and downstream water quality during discharge events. Sampling personnel have now been made aware of the requirement to sample SD7 during wet weather events and results will be provided for the next reporting period. Samples will be labelled to identify whether the water is from within the storage or from overflows.

#### **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 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.

During the reporting period, a total of approximately 106.8ML was used for mine site and processing facility dust suppression purposes, the majority of which was sourced within the Project Approval Area. The approximate volumes obtained from the various sources are as follows:

- 5 ML from pit water (pumped to the void water dam)
- 2.8 ML from the bore located on the Whitehaven-owned section of the “Roseberry” property; and
- 99 ML from surface water storages.

Due to the prolonged dry period prior to December 2009/January 2010 and the lack of water in site storages, the “Roseberry” bore was commissioned in early December 2009 to supply water for dust suppression purposes. Use of the bore ceased in late December 2009 as a result of the onset of wet weather. A minor quantity of water was pumped from the bore to the bore pump dam during the reporting period.

Pit water seepage has decreased since the last reporting period where the pit was at its deepest in the north-eastern limit, as evidenced by the minor quantity of pit water used in total dust suppression requirements.

The total water use of 106.8 ML lies within the annual water use predicted in the Environmental Assessment, which indicated a water requirement of approximately 90-109ML per year for dust suppression and processing requirements. The water use is approximately 32.9 ML greater than the 2009-2010 reporting period. This can be attributed to ongoing wet weather over the first half of the reporting period, resulting in the mine making a concentrated effort to reduce the volume of stored water in discharge dams. This was achieved by increasing water cart runs on unused roads in order to evaporate excess water. It should also be noted that with increased production and expansion of the pit and the northern and western emplacements, a larger amount of water was actually required for dust suppression purposes over the reporting period.

### 2.8.5 Stored Water

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

**Table 5 - Stored Water**

	Volumes Held (m <sup>3</sup> )		Storage Capacity at the end of the Reporting Period (m <sup>3</sup> )
	Start of Reporting Period	At end of Reporting Period	
Clean Water (in Storage Dams)	57,900	34,900	72,300
Dirty Water (in Sediment Basins)	43,200	28,600	42,400
Controlled Discharge Water (salinity trading schemes)	N/A*	N/A*	N/A*
Pit Water	9,000	0	13,300

\* N/A = Not applicable for the Rocglen Coal Mine

### 2.8.6 Groundwater Management

Inflows into the open cut result from a combination of:

- Direct rainfall runoff and infiltration through the emplaced overburden which flows down-dip to the open cut sump(s); and
- Inflows from the exposed coal seam.

Any water produced in pit was pumped to the void water dam and was subsequently prioritised for dust suppression purposes to avoid discharge from the dam.

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 OEH requirements.

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

## **2.9 Hazardous and Explosive Material Management**

No explosive materials are retained at the site. Orica Mining Services has a storage facility located between the Tarrawonga and Canyon sites, which removes 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, 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**

During the reporting period, all sized (<200 mm) ROM coal from the mine was delivered directly to the Whitehaven CHPP, with all product coal destined for the export market transported by train to the Port Waratah or NCIG ship loaders at the Port of Newcastle. 1,231,875 tonnes of coal was transported from the mine during the reporting period. This equated to an approximate average of 99 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 mine, together with monitoring data for the reporting period. Existing monitoring sites have not changed since the previous reporting period, and are shown in Figure 3 and Figure 4. Life of mine monitoring data is included in the relevant appendices, where relevant, to allow for discussion on longer-term trends. A risk identification matrix and the relevant environmental management procedures are identified in the Rocglen Coal Mine Mining Operations Plan (MOP) Amendment 2010.

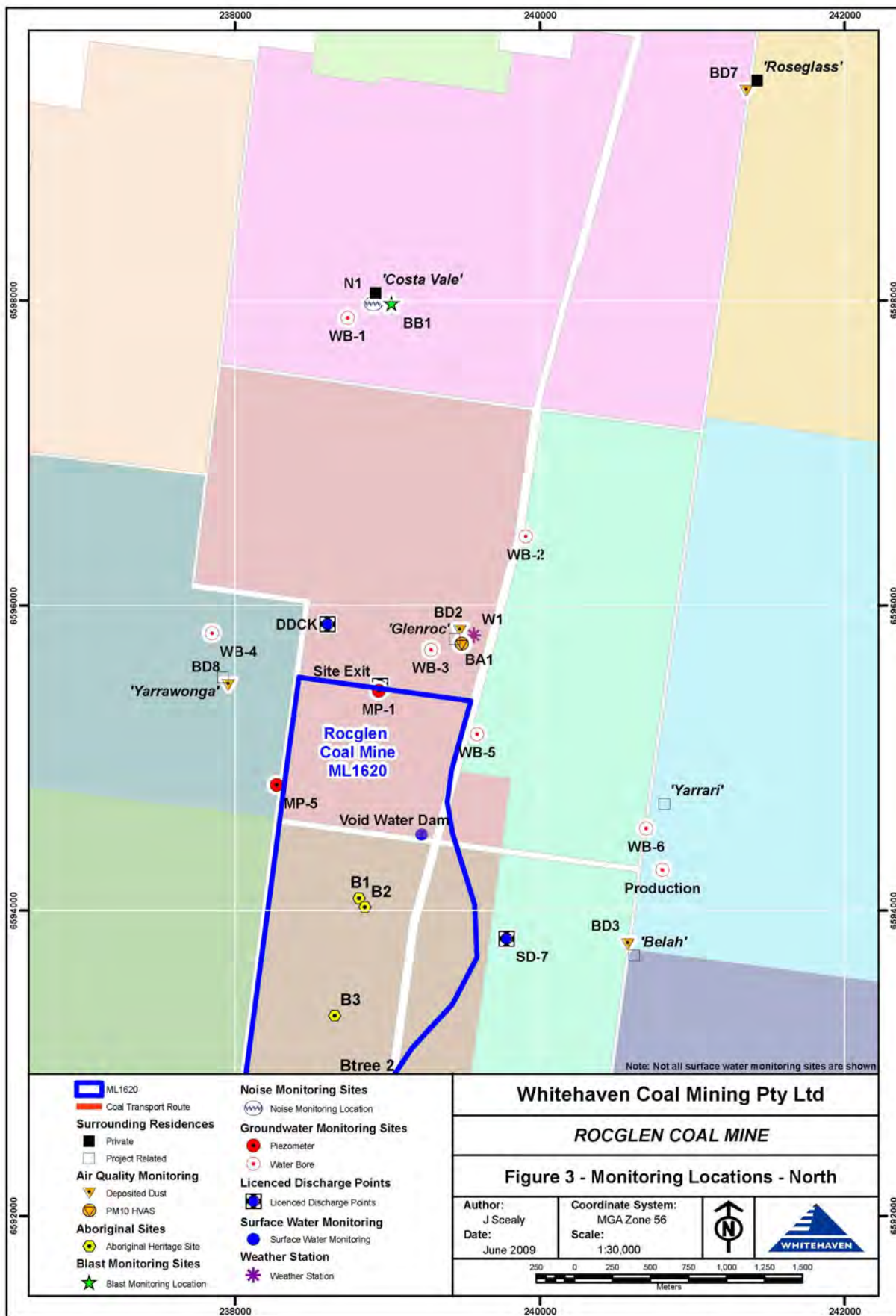


Figure 3 - Monitoring Locations - North

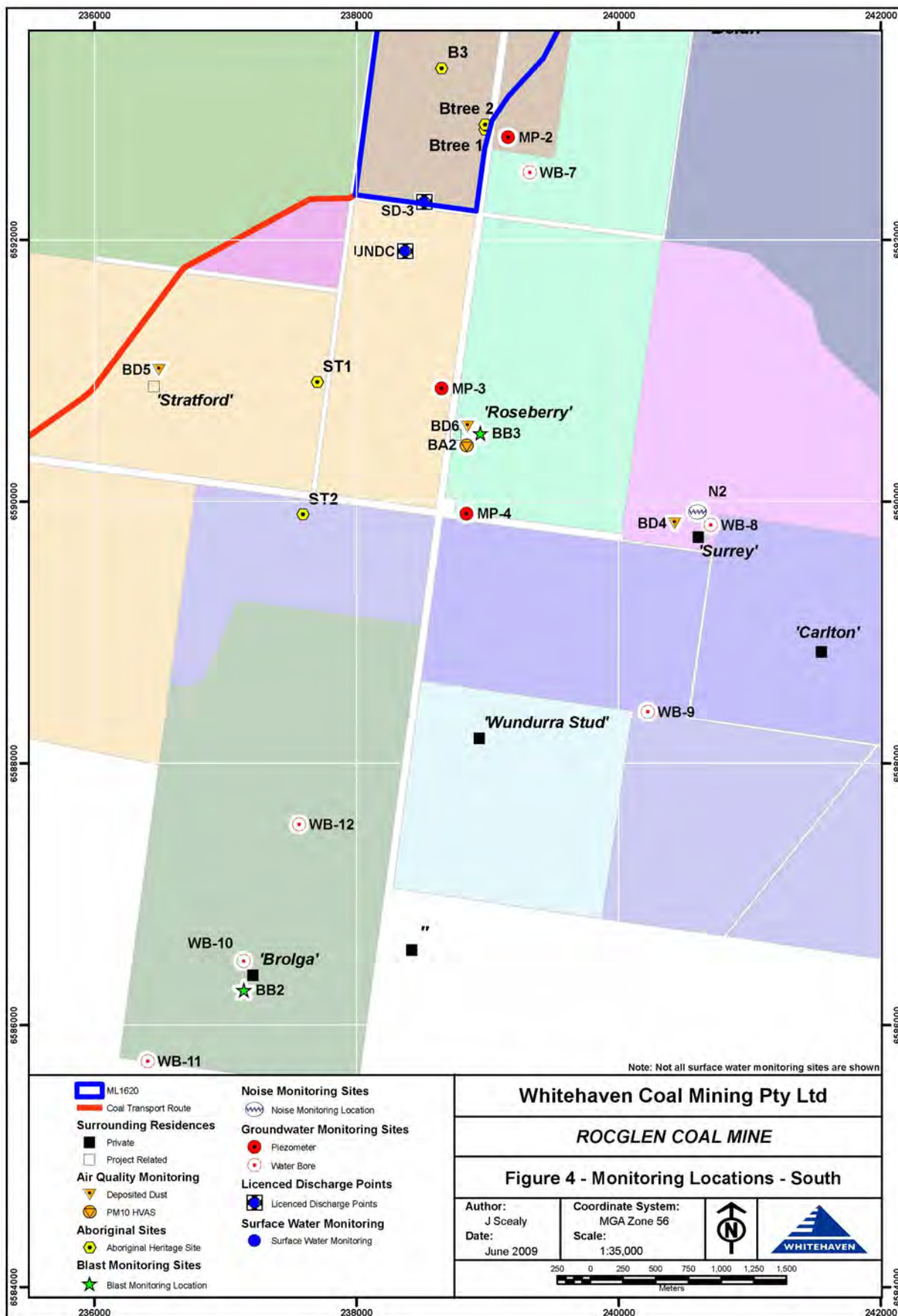


Figure 4 - Monitoring Locations - South

## 3.1 Air Pollution

### 3.1.1 Criteria

The air quality criteria applicable to the Rocglen Coal Mine are specified in PA 06\_0198 MOD 1 Schedule 3, Tables 5, 6 & 7 (Appendix 1), which is summarised below.

- Acceptable mean annual increase in deposited dust – 2g/m<sup>2</sup>/month.
- Mean annual dust deposition (all sources) – 4g/m<sup>2</sup>/month.
- Mean annual TSP (all sources) concentration – 90 µg/m<sup>3</sup>. Although no specific TSP monitoring occurs, Whitehaven has received approval from DoPI to determine TSP air quality monitoring values by multiplying measured PM<sub>10</sub> values by a factor of 2.
- Mean annual PM<sub>10</sub> particulate level – 30 µg/m<sup>3</sup>.
- 24 hour average PM<sub>10</sub> particulate level – 50 µg/m<sup>3</sup>.

Notwithstanding the diversity of the criteria identified above, routine air quality monitoring at the Rocglen Coal Mine is required for deposited dust and PM<sub>10</sub> particulates. Monitoring of deposited dust is undertaken on a monthly basis whilst PM<sub>10</sub> levels are monitored every 6 days.

### 3.1.2 Control Procedures

In order to satisfy the criteria identified above, Whitehaven 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 Rocglen Mine to the CHPP. All Toll vehicles and those operated by its contractors are fitted with roll-over tarpaulins.

### **3.1.3 Dust Monitoring**

Table 6 presents a summary of the deposited dust monitoring data presented in Appendix 5. 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 5. Figure 3 and Figure 4 identify the locations of the various deposited dust gauges maintained during the reporting period.

**Table 6 - Deposited Dust Monitoring Data  
(August 2010 - July 2011)**

Site (see Figure 3 and Figure 4)	Property Name	Mean Total Insoluble Solids* <sup>1</sup> (g/m <sup>2</sup> /month)	Mean Ash* <sup>1</sup> (g/m <sup>2</sup> /month)
BD-2	Glenroc	1.1	0.6
BD-3	Belah	1.3	0.2
BD-4	Surrey	1.0	0.3
BD-5	Stratford	0.9	0.1
BD-6	Roseberry	1.1	0.9
BD-7	Roseglass	1.0	0.2
BD-8	Yarrowonga	1.1	1.4
* <sup>1</sup> At end of reporting period			

A review of Table 6 and Appendix 5 shows that, as with the previous reporting period, the mean annual total insoluble solids (deposited dust) criterion of 4g/m<sup>2</sup>/month was satisfied at all monitoring locations over the last 12 months.

Whitehaven has a High Volume Air Sampler (PM<sub>10</sub>) located at the property “Glen Roc”, to the north of the mine site, which was relocated from the “Costa Vale” property in November 2008. There is another PM<sub>10</sub> monitor located on the “Roseberry” property, to the south-east of the mine site. This monitor was relocated from the “Surrey” property in June 2009 following issues with the landholder switching off the unit. Each sampler runs for 24 hours every 6 days, with filter papers sent to an accredited laboratory for analysis.

PM<sub>10</sub> results have indicated compliance with the 24 hour criteria and the annual average limit at both monitoring locations throughout the reporting period, as shown in Figure 5 and Figure 6.

The long term PM<sub>10</sub> levels and averages are provided in Figure 5 and Figure 6. Both figures indicate a reduction in annual average PM<sub>10</sub> level. This is due to the exclusion of elevated results that no longer fall within the 12 month reporting period. These include those from September/October 2009 (from regional dusty conditions) and December 2009 (from the Kelvin Range bushfire).

The full PM<sub>10</sub> data set is provided in Appendix 5.

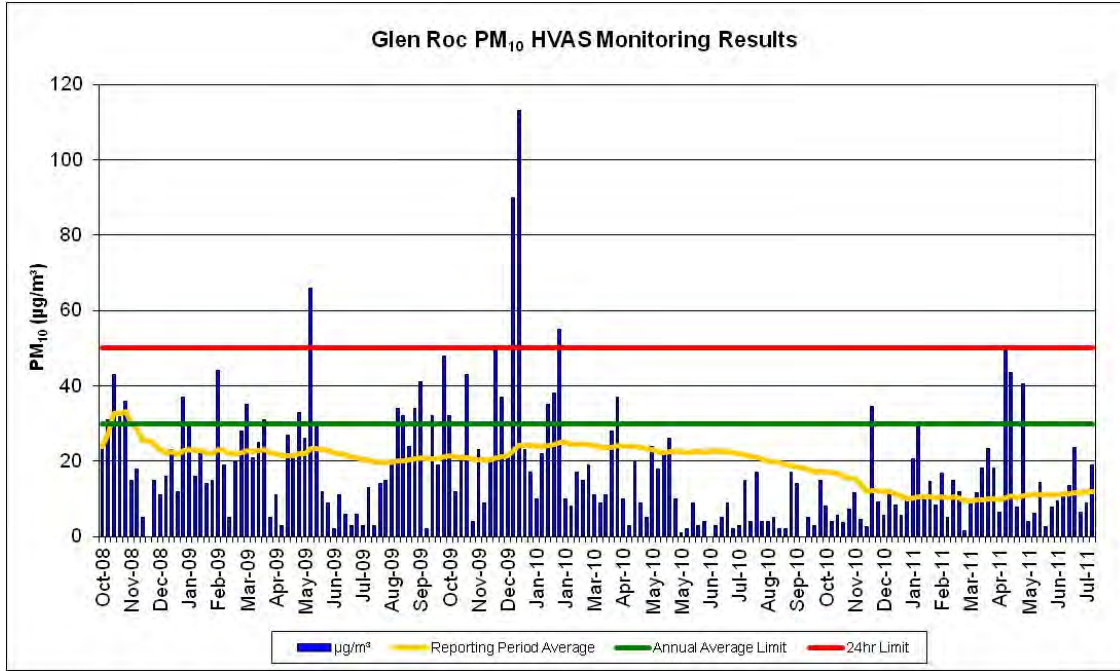


Figure 5 - Glenroc HVAS PM<sub>10</sub> Data

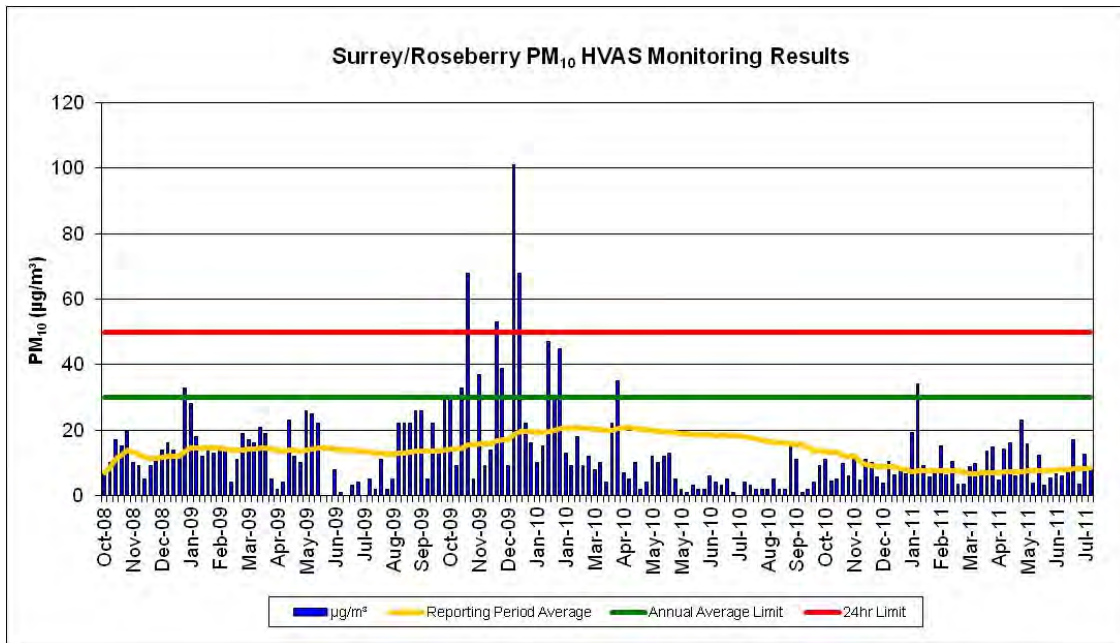


Figure 6 – Surrey/Roseberry HVAS PM<sub>10</sub> Data

### 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 and Site Water Management Plan prepared in accordance with PA 06\_0198 MOD 1.

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

- Minimising the extent of disturbance consistent with operational requirements. A maximum of 100 m is generally disturbed in advance of mining;
- Revegetation of long-term subsoil and topsoil stockpiles, areas shaped to their final landform and areas no longer required for mining-related purposes;
- Undertaking soil management activities generally in accordance with the soil stripping and stockpiling recommendations from Geoff Cunningham Natural Resource Consultants; and
- Installation of contour banks, mounds 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, Whitehaven 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 including monthly inspections undertaken by Whitehaven personnel, with any ameliorative works initiated as and when required.

During the reporting period, Whitehaven made every effort to control erosion and sedimentation where practical. The extent of rainfall over the first half of the period provided a good opportunity to review performance of structures which all performed to design with no significant erosion events identified or requiring ameliorative actions. Only minor channels were 'patched' with hay bales within the rehabilitation area (Plate 3).

The volume of rainfall between August 2010 and December 2010 has highlighted the necessity for additional surface storages to adequately provide for settling time to reduce discharge of sediment laden waters, despite the fact the site currently meets the 90<sup>th</sup>ile 5 day storage criteria. A lack of rainfall since January 2011 and subsequent dry ground allowed for the installation of a new sediment dam north of SB18. The new dam has a storage capacity of 6 megalitres and provides further capacity on-site to hold and settle water before discharging during times of heavy rainfall. Water carts now have access to fill up from the storage dams north of SB18. This will further restrict the chance of overflow and discharge from the northern point on site. Sediment levels at the southern discharge point SD3 will continue to be managed using liquid flocculants and controlled discharges when required over wetter months. This method has proved successful for SD3 in the past, however if issues arise in future, options for additional storages from SD3 will be considered.

The site has maintained sediment fencing in appropriate locations throughout the reporting period, particularly at the two discharge locations. This incorporated the use of hay bales as additional sediment traps at these locations. Hay bales have also been utilised on rehabilitation slopes in order to 'patch' erosion channels through contours and mounds. Mounding was used as an alternative to rip lines with the aim to catch more water on-slope hence reducing runoff and erosion whilst aiding fast root establishment through increased moisture within the soil profile (Plate 2). Whilst the sampling results have indicated elevated sediment loads in the first half of the reporting period, site personnel have made every effort to try to minimise sediment loading in surface waters in difficult circumstances given the extent of regular rainfall.

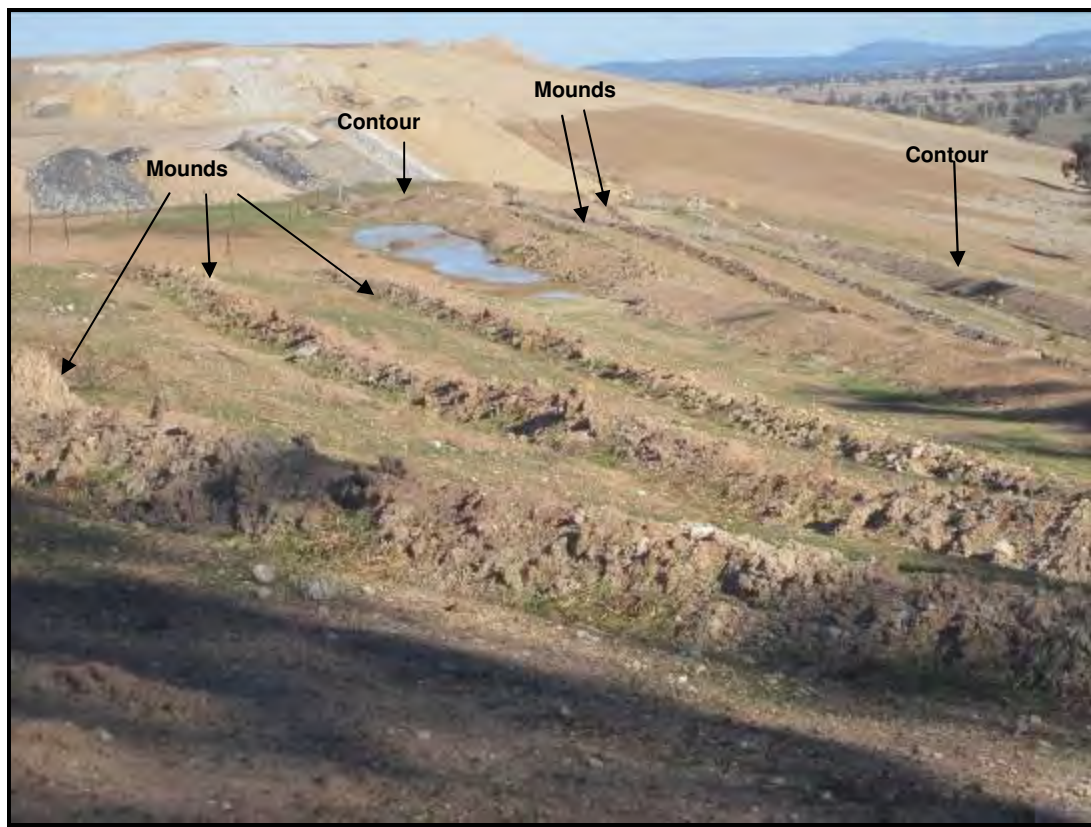


Plate 2 - Mounding used to catch runoff and minimise erosion



Plate 3 – Hay bales used to control erosion and sedimentation

### **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**

Surface water management worked well during the second half of the reporting period, however management of concentration threshold limits and offsite discharges was particularly problematic between August 2010 and December 2010. Section 2.8.3 provides a detailed description of each wet weather discharge as well as the efforts made during the period to reduce TSS levels and minimise discharges.

In addition to monitoring any water discharge events, Rocglen undertakes quarterly sampling of surface waters. The results of analysis are presented in Appendix 4. 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. In general, the water quality in each dam remained consistent throughout the reporting period. The Void Water Dam has consistently poorer water quality in terms of pH and EC than the other surface water storages due to the collection of pit water. This dam is not allowed to discharge and is prioritised as a water source for dust suppression to prevent any discharge occurring. SD7 displayed a high pH over November 2010 and March 2011. The dam collects runoff from private property to the east of the site. The most recent sampling over May 2011 indicates the pH at SD7 returned to a neutral level of 7.45. Fluctuations in TSS between SB18 and SD3 are common. This is described in more detail in Section 2.8.3.

### **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 2.8.6. 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 Table 7.

### 3.4.2 Performance

Throughout the life of the mine to date, the mine'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 piezometers and bores within ML 1620 and extending to adjacent properties, where practicable, at the frequency and for the parameters identified in Table 7.

**Table 7 - Groundwater Monitoring**

Site (see Figure 3 and Figure 4)	Registered Bore No. & Licence No	Property/ Location	Frequency		Purpose
			SWL <sup>*2</sup> , EC <sup>*3</sup> and pH	Representative Metals and Ions <sup>*4</sup>	
MP-1	GW968533 90BL254855	"Glenroc"	Quarterly	Six monthly	To determine existing status and any impacts
MP-2	GW968534 90BL254856	Mine site	Quarterly	Six monthly	To determine existing status and any impacts
MP-3	GW968535 90BL254857	"Stratford"	Quarterly	Six monthly	To determine existing status and any impacts
MP-4 <sup>*1</sup>	GW968536 90BL254858	Surrey Lane	Quarterly	Six monthly	To determine existing status and any impacts
MP-5	GW968537 90BL254859	"Yarrowonga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-1 <sup>*1</sup>	GW000743	"Costa Vale"	Quarterly	Six monthly	To determine existing status and any impacts
WB-2 <sup>*1</sup>	GW050395 90BL111536	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-3 <sup>*1</sup>	GW050166 90BL110883	"Glenroc"	Quarterly	Six monthly	To determine existing status and any impacts
WB-4	GW045621 90BL104367	"Yarrowonga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-5 <sup>*1</sup>	GW011066 90BL004169	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-6 <sup>*6</sup>	GW044068 90BL102845	"Yarrari"	Quarterly	Six monthly	To determine existing status and any impacts
WB-7 <sup>*1</sup>	GW022319 90BL013922	"Roseberry"	Quarterly	Six monthly	To determine existing status and any impacts
WB-8 <sup>*1</sup>	GW052958 90BL107181	"Surrey"	Quarterly	Six monthly	To determine existing status and any impacts
WB-9 <sup>*1</sup>		"Carlton"	Quarterly	Six monthly	To determine existing status and any impacts
WB-10 <sup>*1</sup>		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-11 <sup>*1</sup>		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
WB-12 <sup>*1</sup>		"Brolga"	Quarterly	Six monthly	To determine existing status and any impacts
Yarrari		"Yarrari"	Quarterly	Six monthly	To determine existing status and any impacts

<sup>\*1</sup> Non-Company owned bore

<sup>\*2</sup> SWL – Standing Water Level

<sup>\*3</sup> EC = Electrical Conductivity

<sup>\*4</sup> As specified in SWMP

<sup>\*5</sup> Company production bore

Appendix 6 presents the results of the groundwater monitoring undertaken since the commencement of the mine. Monitoring sites are shown on Figure 3 and Figure 4.

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 have remained relatively consistent at all monitoring locations, with the exception of MP-2, WB-3, WB-5 and WB-7.
- MP-2 is located just south of the Wean Road diversion within Whitehaven owned land to the east of the mine. It is also located within close proximity to WB7 on the “Roseberry” property. MP-2 has remained relatively consistent with groundwater levels remaining at around 14m since the start of monitoring. However from October 2010 to May 2011 water levels rose by 3 – 3.5m. The recharge follows a similar pattern to nearby WB-7 which rose by 16.75m between November 2010 and May 2011. WB-7 now has a similar standing water level to MP-2 at 14.78m as of the 3<sup>rd</sup> May 2011. WB-7 is attached to a windmill and it is expected that fluctuations in water levels from these locations could be associated with water actively being pumped from the windmill during the time of sampling.
- WB-3 is located north of the mine site on the “Glenroc” property. The SWL has remained relatively consistent since monitoring began in September 2008, with eleven separate monitoring occasions recording an SWL of 8.6 – 9m. Monitoring from previous periods has identified outlier results recorded on the 23<sup>rd</sup> January 2009 (23.72m) and 3<sup>rd</sup> May 2010 (18.53m). Similarly, over the reporting period an outlier result was recorded on the 2<sup>nd</sup> March 2011 (17.63m). The outlying results are likely due to the SWL being measured immediately following water being drawn from the bore to fill water storage points for stock/domestic purposes on the “Yarrowonga” and “Glenroc” properties.
- WB-5 is located adjacent to the north-eastern corner of the Mining Lease. The initial SWL was recorded as 4.23m on the 3<sup>rd</sup> September 2008. This dropped to approximately 13m between October 2008 and February 2009. The bore was not able to be dipped between February and November 2009, as it was

equipped, and when SWL checks recommenced in November 2009 the SWL had dropped to 22.9m. Since then, the SWL has recovered to a more consistent 13m. This trend continued from February 2010 until the 2<sup>nd</sup> March 2011 where an outlier result recorded the SWL at 20.99m. As with WB-3, it is believed the erratic nature of the SWL in WB-5 is likely associated with water extraction for non-mine related activities. The most recent sampling result depicts that the SWL returned to a level of 12.7m on 3<sup>rd</sup> May 2011.

- WB-8 is located on the “Surrey” property, approximately 4km from the mine site. The SWL has varied between 32m and 50m since monitoring commenced in January 2009. More recent monitoring between May and November 2010 displayed consistent levels at 32 m. Again, it is believed that the variation in SWL is associated with water extraction for stock/domestic purposes, as confirmed by the landholder. Unfortunately, results were unable to be obtained during monitoring over March and May 2011 due to the landholder locking gates. Whitehaven has begun notifying the landholder before sampling to ensure access issues are not a problem.
- MP-1 to MP-5 were established as monitoring piezometers at the commencement of the Rocglen operation. Since June 2009, MP-3 and MP-4 have been consistently dry, although a recent measurement taken from MP-4 on the 7<sup>th</sup> March 2011 recorded a SWL of 24.12m, which remains consistent with earlier measurements taken over 2008 and January 2009. MP-5 and MP-1 have continued to record at consistent levels, whilst MP-2 displayed a slight recharge of 3.5m as discussed above. The groundwater assessment conducted by Douglas Partners Pty Ltd for the proposed Rocglen Extension recommended that the piezometers should be deepened as they only just intersect the water table. The report also suggested establishing additional monitoring locations to determine the impact, if any, of the mine on the Namoi alluvium. Any additional groundwater monitoring works will be incorporated in a revised Site Water Management Plan and will be reported on in subsequent AEMRs.
- Douglas Partners Pty Ltd also noted in their proposed Rocglen Extension Groundwater Assessment that they believed the mine has had very little impact on surrounding groundwater levels.

### **Groundwater quality**

- The water in most bores generally has a neutral pH.

- The water in all bores can be described as fresh to brackish.
- Water quality has been compared to the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000) (ANZECC) guidelines for drinking water (cattle). During the reporting period all sampled water complied with the criteria for stock drinking water (cattle). The quality of groundwater at each monitoring location remained relatively consistent throughout the reporting period.

### **3.5 Contaminated or Polluted Land**

Prior to mining, the mine site 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 Approval area.

### **3.6 Threatened Flora**

Investigations into the occurrence of threatened flora within the Project Approval area were undertaken as part of the Environmental Assessment by Geoff Cunningham Natural Resource Consultants Pty Ltd (GCNRC) in 2007 following field surveys in 2002 and 2006. The investigation identified no significant impact on threatened flora species, endangered ecological communities, endangered flora populations or critical habitat as a consequence of the development, either because they do not exist in the area or avoidance is possible due to project design.

The mine contains a remnant of the *Brigalow within the Brigalow Belt South, Nandewar and Darling Riverine Plains Bioregions Endangered Ecological Community*. This community was recorded on the "Glenroc" property in the northern section of the mine. The original design for the mine allowed this community to remain intact, however should the Rocglen extension project be approved this community would be cleared to enable extension to the northern emplacement area.

Whitehaven has not yet prepared the required Landscape Management Plan (LMP) for the site on the basis that the Regional Biodiversity Offset Strategy is pending approval, and would form a significant component of the LMP. It is expected the Regional Offset Strategy would be finalised by the end of 2011. It is also expected

that the revised Project Approval from the Rocglen Extension Project may result in changes/modifications to requirements in regard to the LMP. Regardless of the form the LMP ultimately takes, it will include requirements for a Flora Monitoring Plan. Control plots will be established within areas of vegetation that replicate the vegetation communities which have been cleared. Control plots within these communities will provide the basis for future rehabilitation efforts over that area of the mine site to be returned to native vegetation. Monitoring plots will also be established on rehabilitated areas to allow for comparison of these areas with control plots and rehabilitation criteria.

No flora monitoring was undertaken during the reporting period, although two flora monitoring plots were established by GCNRC in April 2010. The report is included in Appendix 7. Continued monitoring will occur upon approval of the LMP and subsequent Flora Monitoring Plan. This is due to anticipated changes in the monitoring requirements under the new program.

Whitehaven engaged RPS Harper Somers O'Sullivan (RPS) to undertake a Flora and Fauna Assessment to support an application for a new Project Approval under Part 3A of the *Environment Planning and Assessment Act 1979* (as discussed in Section 1.2.2). The assessment forms part of the Specialist Consultant Studies Compendium for the project application.

### **3.7 Threatened Fauna**

Investigations into the occurrence of threatened fauna within the Project Approval Area were undertaken by Countrywide Ecological Service as part of the Environment Assessment, following surveys conducted during the period 2001-2007. These investigations identified that the proposed development was unlikely to significantly affect any of the threatened species, fauna populations or communities found or likely to occur in or around the mine site.

Whitehaven currently engages Countrywide Ecological Service to conduct pre-clearing inspections for fauna impact mitigation, as required. Inspections were carried out in November 2010 and February 2011.

As discussed in Section 3.6, Whitehaven will be developing a Landscape Management Plan (LMP) for the site upon finalisation of the regional Biodiversity Offset Strategy expected to be completed by December 2011. The LMP will include a Fauna Management Plan including details for any fauna monitoring requirements. Countrywide Ecological Service established fauna monitoring plots during spring

2009. The first annual fauna monitoring report was completed in November 2010. The report is included in Appendix 7.

Whitehaven engaged RPS Harper Somers O'Sullivan (RPS) to undertake a Flora and Fauna Assessment to support an application for a new Project Approval under Part 3A of the *Environment Planning and Assessment Act 1979* (as discussed in Section 1.2.2). The assessment forms part of the Specialist Consultant Studies Compendium for the modification application.

## **3.8 Weeds**

### **3.8.1 Management**

Weed management within the ML involves general observations during monthly inspections to determine levels of weed infestation. Weed control is undertaken by contractors or Whitehaven's environmental personnel. All persons involved with weed control hold ChemCert Australia accreditation. Whitehaven have also been working closely with the Gunnedah Shire Council Noxious Weed Inspector to identify target control areas surrounding the site and implement actions in accordance with the Noxious Weeds Act 1993 and the local Noxious Weed Management Plan. The last inspection was undertaken on the 7<sup>th</sup> December 2010.

### **3.8.2 Performance**

Rocglen has not experienced any major weed issues during the reporting period. Minor ongoing weed management comprised spot spraying of weeds such as African Boxthorn and Bathurst Burr. Target areas for African Boxthorn control were identified and mapped after the noxious weed inspection. These areas will be sprayed using Roundup 360 over September/October 2011, being the optimum time of year for control. Boxthorns within 50 metres of adjoining boundaries will be initially targeted in order to prevent the species spreading into neighbouring land.

## **3.9 Blasting**

### **3.9.1 Blast Criteria and Control Procedures**

#### ***3.9.1.1 Blast Criteria***

Blasting criteria for the mine are nominated in Project Approval PA 06\_0198 MOD 1 (Appendix 1), and Condition L7 of Environment Protection Licence 12870 (Appendix 2) and specify that:

- Blasting must only be carried out between 9.00 am and 5.00 pm, Monday to Saturday.
- The overpressure level from blasting operations must not:
  - (a) exceed 115dB (Lin Peak) for more than 5% of the total number of blasts over each Reporting Period; and
  - (b) exceed 120dB (Lin Peak) at any time.

at any residence on privately-owned land.

- Ground vibration peak particle velocity from the blasting operations must not:
  - (a) exceed 5mm/s for more than 5% of the total number of blasts during each Reporting Period; and
  - (b) exceed 10mm/s at any time,

at any residence on privately-owned land.

PA 06\_0198 MOD 1 also restricts blasting to the following conditions without the written approval of the Director-General:

- (a) a maximum of 2 blasts a day; and
- (b) 5 blasts a week, averaged over a 12 month period.

#### ***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.

Road closures during blasting occur as per the Road Closure Management Plan.

### 3.9.2 Performance

During the reporting period, a total of 26 blasts were initiated. All blasts remained within the compliance criteria specified above.

The maximum recorded ground vibration during the reporting period was 0.70 mm/s recorded at "Costa Vale" on the 6<sup>th</sup> December 2010. The maximum recorded peak overpressure level during the reporting period was 113.4 dBL recorded at "Costa Vale" on the 16<sup>th</sup> April 2011.

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

## 3.10 Operational Noise

### 3.10.1 Criteria

#### *3.10.1.1 EPA Criteria*

The EPA-nominated noise emission criteria, identified in Environment Protection Licence 12870 as applicable to the mine, are as follows.

L6.1 *"Noise from the premises must not exceed:*

- (a) an  $L_{Aeq}(15\text{minute})$  noise emission criterion of 35 dB(A) at all times (day, evening and night time periods); and*
- (b) an  $L_{A1(1\text{minute})}$  noise emission criterion of 45 dB(A) at night.*

L6.2 (Provides definitions)

L6.3 *The noise emission limits identified in this licence apply under all meteorological conditions except:*

- (a) during rain and wind speeds (at 10m height) greater than 3m/s; and*
- (b) under "non-significant weather conditions".*

L6.4 *The noise limits set by condition L6.1 of the licence do not apply where a current legally binding agreement exists between the licensee and the occupant of a residential property that:*

- a) agrees to an alternative noise limit for that property; or*
- b) provides an alternative means of compensation to address noise impacts from the premises.*

A copy of any agreement must be provided to the EPA before the licensee can take advantage of the agreement.

### 3.10.1.2 Consent Criteria

Noise emission criteria nominated in Project Approval PA 06\_0198 MOD 1 (Condition Schedule 3(7) and Schedule 3(8)) is as follows:

3(7) *“The Proponent shall ensure that the noise generated by the project does not exceed the noise impact assessment criteria set out in Table 1 at any residence on privately-owned land, or on more than 25 percent of any privately-owned land.*

<b>Location</b>	<b>Day</b> <i>L<sub>Aeq(15 minute)</sub></i>	<b>Evening</b> <i>L<sub>Aeq(15 minute)</sub></i>	<b>Night</b> <i>L<sub>Aeq(15 minute)</sub></i>	<b>Night</b> <i>L<sub>A1(1 minute)</sub></i>
<i>All privately owned residences</i>	35	35	35	45

Table 1: Impact Assessment Criteria dB(A)

However, if the Proponent has a written negotiated agreement with any landowner and a copy of this agreement has been forwarded to the Department and DECC, then the Proponent may exceed the noise limits in accordance with the negotiated noise agreement.

3(8) *The Proponent shall ensure that the cumulative noise generated by road traffic associated with the project, Canyon (Whitehaven) and Tarrawonga mines on public roads does not exceed the criteria in Table 2.*

<b>Day</b> <i>L<sub>Aeq(1 hour)</sub></i>	<b>Evening</b> <i>L<sub>Aeq(1 hour)</sub></i>	<b>Night</b> <i>L<sub>Aeq(1 hour)</sub></i>	<b>Location</b>
60	60	50	<i>Any residence on privately-owned land</i>

Table 2: Road Traffic Noise Criteria dB(A)

### 3.10.2 Control Procedures

Control of noise generation and propagation at the mine 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;
- Ongoing site road maintenance using the mine-based grader; and
- Regular equipment maintenance.

Whitehaven 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***

The Noise Monitoring Program details the requirements for attended, unattended and cumulative road haulage noise monitoring to assess noise impacts from mining operations and haulage associated with the mine. Additional noise monitoring was also undertaken during the reporting period to address any community concerns. The noise monitoring sites are identified on Figure 3 and Figure 4.

Attended noise monitoring was undertaken on a quarterly basis during the reporting period (September 2010, December 2010, March/April 2011 and June 2011).

Unattended noise monitoring occurs on a 3 monthly basis to establish background noise levels for the mine. Monitoring events occurred in September and December 2010 and March and June 2011. Whitehaven will seek to remove the requirement for unattended monitoring in the near future as sufficient background data has now been obtained.

Cumulative road noise monitoring occurred in June 2010 and March 2011, as required under the Road Noise Management Plan.

The following sub-sections present a summary of the outcomes of attended noise monitoring as well as cumulative road noise monitoring. Monitoring results for

attended, unattended and cumulative road noise monitoring are present in Appendix 9.

## **ATTENDED NOISE MONITORING**

### ***3.10.3.2 September 2010 Attended Noise Monitoring***

On the 21<sup>st</sup> and 22<sup>nd</sup> September 2010 attended noise monitoring was undertaken at “Costa Vale” (N1) and “Surrey” (N2). Spectrum Acoustics reported that noise emissions from the mine did not exceed the criterion of 35 dB(A) at both monitoring locations.

In addition to the operational noise, the noise from mine must not exceed 45 dB(A) L1<sub>(1 min)</sub> between the hours of 10pm and 7am. This is to minimise the potential for sleep disturbance as a result of individual loud noises from the mine. During the night time measurement circuit the L1<sub>(1 min)</sub> noise from mine did not exceed 45 dB(A) at the monitoring locations.

### ***3.10.3.3 December 2010 Attended Noise Monitoring***

On the 14<sup>th</sup> December 2010 attended noise monitoring was undertaken at “Costa Vale” (N1) and “Surrey” (N2). Spectrum Acoustics reported that noise from the mine remained below the 35 dB(A) criterion at all times.

Spectrum Acoustics also confirmed that during the night time measurement circuit the L1<sub>(1 min)</sub> noise from the mine did not exceed 45 dB(A) the monitoring locations.

### ***3.10.3.4 March/April 2011 Attended Noise Monitoring***

Attended noise monitoring was conducted at the “Costa Vale” (N1) and “Surrey” (N2) properties on the 15<sup>th</sup> March 2011 for the day survey before monitoring was abandoned due to strong winds. A replacement monitoring event was conducted at both locations on the 14<sup>th</sup> April 2011 for the evening and night periods. Spectrum Acoustics reported that the mine did not exceed the criterion of 35 dB(A) at the time of monitoring. In addition, during the night time measurement circuit the L1<sub>(1 min)</sub> noise from the mine did not exceed 45 dB(A) at the monitoring locations.

### ***3.10.3.5 June 2011 Attended Noise Monitoring***

On the 23<sup>rd</sup> and 24<sup>th</sup> June 2011 attended monitoring was undertaken at the “Costa Vale” (N1) and “Surrey” (N2) properties. The report from Spectrum Acoustics noted that noise from the mine did not exceed the 35 dB(A)<sub>L<sub>Aeq</sub> (15 min)</sub> day, evening and night criterion or the L<sub>1</sub>(1 min) criterion of 45 dB(A) during the night time measurement circuit.

## **CUMULATIVE ROAD HAULAGE NOISE MONITORING**

### ***3.10.3.6 March 2011 Road Noise Monitoring***

Road noise monitoring activities were conducted at “Brooklyn” (2 residences) and “Werona” on Blue Vale Road. Simultaneous noise measurements were made at the front of both residences on “Brooklyn”. Residence 1 is closest to Blue Vale Road (approximately 90m) and residence 2 is approximately 480m from road. Spectrum Acoustics reported that:

- Noise measurements were undertaken at both “Brooklyn” residences between 9:23am and 10:23am and “Werona” between 8:03am and 9:03am.
- 46 coal truck movements were recorded during monitoring at the “Brooklyn” property. Based on the 30 minute measurement the calculated contribution from mine-related vehicles was 54.0 dB(A)<sub>L<sub>eq</sub> (1 hour)</sub> at residence 1 and 49.0 dB(A)<sub>L<sub>eq</sub> (1 hour)</sub> at residence 2. Both measurements are below the daytime criterion of 60 dB(A) L<sub>eq</sub> (1 hour).
- Over the course of the measurement period at “Werona” there were 46 coal truck movements. The total measured contribution from mine-related vehicles at “Werona” was 49.0 dB(A)<sub>L<sub>eq</sub> (1 hour)</sub>. This is below the daytime criterion of 60 dB(A) L<sub>eq</sub> (1 hour).

## **ADDITIONAL NOISE MONITORING**

### ***3.10.3.7 August 2010 “Surrey” Additional Attended Noise Monitoring***

Additional attended noise monitoring was undertaken at the “Surrey” residence to address noise concerns raised by the resident and to attempt to monitor noise levels over a range of weather conditions. The results indicated compliance within the night survey, however noise emissions exceeded the 35 dB(A) criteria by 5 dB at 7.15am on the 31<sup>st</sup> August 2010. The mine noise was from engine revs (trucks and shovels),

dozer tracks and general mine hum. On review of the weather station data at the time it was identified that a temperature inversion was present which would have affected results.

### ***3.10.3.8 September 2010 "Penryn" Additional Attended Noise Monitoring***

Additional noise monitoring was also undertaken at the "Penryn" residence on the 21/9/2010 (following a noise related complaint from the resident) with day, evening and night results all being compliant with the 35 dB(A)<sub>L<sub>Aeq</sub> (15 min)</sub>. In addition, during the night time measurement circuit the L<sub>1(1 min)</sub> noise from the mine did not exceed 45 dB(A) at the monitoring locations.

### ***3.10.3.9 Real Time Noise Monitoring***

Following complaints pertaining to noise levels at the "Surrey" property, a real time noise monitor was placed at the property between 1<sup>st</sup> February 2011 and 20<sup>th</sup> April 2011. An assessment of noise levels was undertaken, with results being reviewed and presented to the landholder in July 2011. Although Whitehaven has no compliance commitment to use real-time noise monitoring at Rocglen, the monitors have proved to be an effective tool for communicating patterns in mine related noise to landholders within the area.

The real time noise monitor was moved to the property "Penryn" on the 21<sup>st</sup> April 2011 following further concerns about noise levels. The monitor recorded at this property until the 3<sup>rd</sup> June 2011. The results are currently being reviewed and will be presented to the landholder during the first half of the next reporting period.

## **3.11 Visual, Light**

### **3.11.1 Management**

The mine is generally well positioned with respect to visual aspects, with views of the mining operations and/or areas of mine-related disturbance initially limited to those from the project related residences "Glenroc" located adjacent to the northern boundary of the mine site, "Stratford" to the south of the mine site and Vickery State Forest to the west. Wean Road is adjacent to the eastern boundary of the mine site, however amenity bunds have been installed to reduce visual impacts for the public which utilise this road. As mining has progressed, the western emplacement has

developed to be close to maximum height which has resulted in the site being visible from locations further to the south and east. Reshaping of the western emplacement began in July 2011 and will advance into the next AEMR period which will reduce visible impact.

Management / minimisation of local and more distant visual impacts are 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, when possible, to avoid impacting on local residences.

### **3.11.2 Performance**

Whitehaven received one complaint during the reporting period in regards to lighting impacts at a property to the south-east of the mine site. It was identified that the lighting plant on top of the south western emplacement was causing the concern. The Project Manager reiterated to the Open Cut Examiners (OCEs) the need to ensure placement of lighting is appropriate to minimise impacts on surrounding residences where practical and safe to do so. No further actions were considered necessary and the mine has not received any lighting complaints since. During the next reporting period the southern point of the western emplacement will be targeted for shaping and rehabilitation. This will reduce the exposure and visibility of the area to properties south of the mine.

## **3.12 Aboriginal Heritage Management**

### **3.12.1 Sites Management and Performance**

An assessment of the cultural heritage of the mine site was conducted by Archaeological Surveys and Reports Pty Ltd (ASR). The investigation commenced in 2002 when officers from Red Chief Local Aboriginal Land Council (LALC) were consulted and assisted in the field work. In 2007 representatives of Red Chief LALC were consulted again along with representatives of the Bigundi Biame Gunnedarr Traditional People to confirm the previous investigations. The assessment was used

in the preparation of the Environmental Assessment for the mine, undertaken by R.W. Corkery & Co. Pty Ltd on behalf of Whitehaven Coal Mining Pty Ltd.

Three artefact sites were recorded within the survey area, with two scarred trees in the Wean Road easement recorded as sites at the request of the Red Chief LALC Sites Officers. Also, two scarred trees were recorded in the Shannon Harbour Road easement to the east of its proposed junction with Riordan Road. Table 8 provides details of the identified artefacts and scarred trees:

**Table 8 - Aboriginal Artefacts and Scarred Trees**

Site Name	Site Type	Site Description/Comments
B1	Isolated Artefact	8 negative flake scars partly exposed in a dust/sand erosion feature along a fence line, 10m from the central drainage line.
B2	Artefact Scatter	8 small trimming flakes were scattered on and around a large ant mound on the crest of a contour bank. Perhaps the remains of a knapping or a tool manufacturing site.
B3	Extended Artefact Scatter	Artefact scatter extending approximately 800m along the western bank of the central drainage line containing >40 artefacts.
Btree 1	Scarred Tree	The scar is 160cm long, 40cm wide and 295cm from the ground on a large box gum located on the eastern side of the Wean Road Easement.
Btree 2	Scarred Tree	The scar is 57cm long, 15cm wide and 146cm from the ground on a large box gum located on the eastern side of the Wean Road Easement
Stratford ST1	Scarred Tree	The scar is 223cm long, 70cm wide and 18cm from the ground on a large box gum located in a closed road on the "Stratford" property
Stratford ST2	Scarred Tree	The scar is 140cm long, 42cm wide and 14cm from the ground on a large box gum located north-south oriented closed road easement on the "Stratford" property
Source: Modified after ASR (2007) – Section 7		

Of the seven Aboriginal sites identified, it is noted that three (Sites B1, B2 & B3) are located within the limit of open cut mining. Sites Btree 1 and Btree 2 lie within the Project's site boundary, and Sites ST1 and ST2 lie within the "Stratford" property, adjacent to the mine site, coal transport route and Wean Road, as depicted in Plan 3.

All of these sites have been identified in the Rocglen Coal Mine Aboriginal and Cultural Heritage Management Plan which is held at the administrative office of the mine site.

The conservation methods for each artefact and scarred tree is as follows:

### **Sites B1, B2 and B3**

Sites B1, B2 and B3 were salvaged by Archaeological consultant, Mr John Appleton, together with representatives of the Red Chief Local Aboriginal Land Council, Bigundi Biame Traditional People, Gunida Gunya and Min Min Aboriginal Corporation August 2008. The GPS coordinates for each artefact have been recorded.

Application for a Care Agreement for Aboriginal Artefacts was made for the keeping of the Artefacts at the Cumbo Gunerah Keeping Place in accordance with Section 85a of the NP&W Act.

A report regarding salvage of the artefacts was prepared by Mr John Appleton and copies of the report were provided to each of the representative Aboriginal groups and to the then DECC.

### **Sites Btree1 and Btree2**

Btree1 and Btree2 are two scarred trees both located on the eastern side of the Wean Road easement as depicted on Plan 3. They lie just within the eastern boundary of the mine site. The construction of soil stockpiles within this vicinity have been engineered so that no disturbance to the scarred trees will occur.

On recommendation of representatives of the Red Chief LALC, these scarred trees will not be disturbed in any way. Fencing and/or signage of the scarred trees has not occurred, as recommended, as it was considered that these actions could be potentially detrimental by drawing attention to the existence of the artefacts which are within a public road reserve.

### **Sites ST1 and ST2**

ST1 and ST2 are two scarred trees both located on the "Stratford" property on a section of closed road oriented north-south. They lie approximately 1.5km to the south of the Project's site boundary, approximately 1.25km south-east of the transport route, and approximately 1km west of Wean Road. They both lie within ribbons of remnant vegetation.

### **3.12.2 Consultation**

Whitehaven, through the soil stripping contractor, regularly consults with representatives of the local Aboriginal community. In accordance with the agreement with the representative Aboriginal groups, notification of planned topsoil stripping is provided by the soil stripping contractor directly to the nominated Aboriginal 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 EA and consent criteria in place.

RPS has undertaken Aboriginal and European archaeological works for the proposed Rocglen Extension Project detailed in Section 1.2.2. RPS recorded three sites during the field investigation, comprising an isolated find and two artefact scatters. All three sites were found in the level plain area of the valley depression between the Kelvin and Vickery State Forests (north of the current ML boundary). Following approval of the Rocglen Extension Project, the Aboriginal and Cultural Heritage Management Plan will be updated to incorporate the new sites. If the northern waste emplacement will impact on any of the sites a salvage will take place, in consultation with Aboriginal stakeholders and OEH, prior to the disturbance occurring.

### **3.13 Natural Heritage**

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

## **3.14 Spontaneous Combustion**

### **3.14.1 Management**

The 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, Whitehaven 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 mine 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. Rocglen personnel also liaise with the local (Nandewar) Rural Fire Service, as required.

### **3.15.2 Performance**

There have been no bushfire incidents within the mine lease since development commenced.

## **3.16 Mine Subsidence**

Mine subsidence is not an issue with open cut mines and hence it is not an issue at Rocglen.

## **3.17 Hydrocarbon Contamination**

### **3.17.1 Management**

It is Whitehaven's objective that:

- All bulk hydrocarbons, i.e. fuel, oils, grease etc (both new and waste) retained at the 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 as follows.

- Phase 1 – Initial Recovery: Recover as much as possible at the source by pumping free hydrocarbon from the surface and excavating hydrocarbon-contaminated materials. Fuel/oil absorbent pads were immediately used in SB19
- Phase 2 – Source Control: Begin hydraulic control of the source to prevent spreading of contamination.
- Phase 3 – Recovery: If necessary, install boreholes to remove and treat contaminated groundwater.

### **3.17.2 Performance**

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

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

One spill occurred over the reporting period involving a diesel leak into the surface water storage SB19 which overflows into the southern discharge point SD3. The leak was noticed on the 6<sup>th</sup> September 2010 on regular inspection of surface water storages. The three phase system was immediately put into place with the following actions taking place to control the spill:

- Phase 1: Initial Recovery: It was identified that the fuel leak was coming from a diesel pump used to fill water carts from SB19. The pump was immediately

removed for repair and fuel/oil absorbent pads were immediately placed around the area the pump was sitting.

- Phase 2: Source Control: SB19 was banded to ensure water could not flow into SD3. Marine booms were used to isolate the diesel slick within SD3. More absorbent pads were then placed within the isolated areas of SD3 to continue to absorb the oil slick on the surface of the water (Plate 4).
- Phase 3: Water samples taken on the 6<sup>th</sup> September 2010 from SB19, SD3 and UNDC (downstream drainage point from SD3) indicated that grease and oil levels were below EPL criteria (Table 9). Further samples taken following a discharge four days later indicated that oil and grease levels were still well below EPL criteria (Table 10). Given this information, it was clear that the actions taken had been effective in removing the diesel from SB19 and SD3. Absorbent pads were collected and disposed of in appropriate bags supplied by the manufacturer, following the manufacturer's instructions.

**Table 9 – Water Samples Taken From Diesel Spill**

Site	Date	Time	pH	EC (us/cm)	TSS (mg/L)	TOC (mg/L)	Oil/Grease (mg/L)
SB19	6/9/10	1:45	8.19	684	56	8	6
SD3	6/9/10	1:30	8.19	626	181	12	8
UNDC	6/9/10	4:30	8.60	477	144	6	6

**Table 10 – Water Samples Four Days After Spill**

Site	Date	Time	pH	EC (us/cm)	TSS (mg/L)	TOC (mg/L)	Oil/Grease (mg/L)
SD3	10/9/10	12:15	8.18	583	50	6	<5
UNDC	10/9/10	13:00	8.34	477	229	5	<5

The timeframe of the leak from the pump is difficult to ascertain based on set up from 2<sup>nd</sup> September 2010 and limited use by water carts over the period to the 6<sup>th</sup> September 2010 due to wet weather. It is estimated that up to 150 litres of diesel may have leaked from the pump based on last known fill date and quantum retained in the tank prior to repair. Given the results displayed in Table 9 and Table 10, Whitehaven is confident that the diesel was effectively removed by the actions taken following the spill.

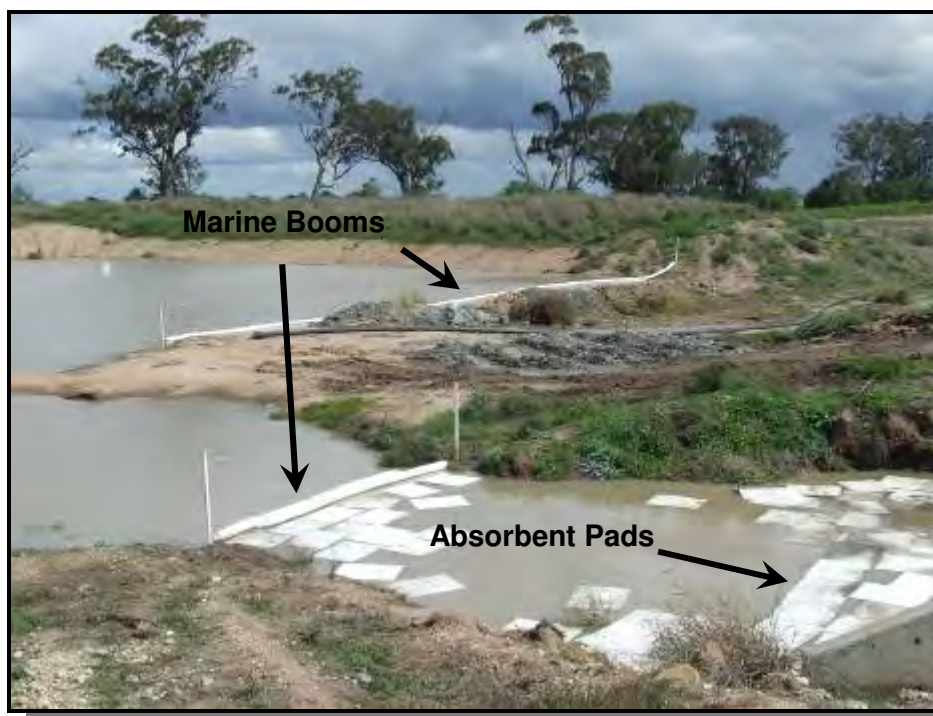


Plate 4 – Containing and removing diesel slick from SD 3

### 3.17.3 Greenhouse Gas Emissions

#### Diesel Consumption

During the reporting period, a total of 8,551,485 litres of diesel fuel was used on site for mining related activity. Assuming an energy content of diesel fuel of 38.6MJ/L, and using Table 3 of the “National Greenhouse Accounts (NGA) Factors” – November 2008, the estimated direct – scope 1, Greenhouse Gas Emissions including all CO<sub>2</sub> and non CO<sub>2</sub> gases are as follows.

Table 11 - GHG Emissions - Diesel Fuel

	Diesel Fuel Usage kL	Emission Factor T CO <sub>2</sub> -e/kL	Equivalent Tonnes
<b>GHG 2008/09</b>	5,852	2.7	15,803
<b>GHG 2009/10</b>	6,697	2.7	18,082
<b>GHG 2010/11</b>	8,551	2.7	23,088

The 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 2,589 t of explosives was used at the mine. Assuming a conversion factor of 0.1778, it is estimated that blasting at the mine yielded 460 equivalent tonnes of CO<sub>2</sub>.

### Fugitive Emissions

ROM coal production is used to estimate fugitive emission factors. Based on 1,249,789 tonnes of ROM coal production during the reporting period and a conversion factor of 0.045 (from Table 8 of the “National Greenhouse Accounts (NGA) Factors” – November 2008), it is estimated that 56,241 tonnes of CO<sub>2</sub> were emitted during the reporting period.

### Summary

A summary of calculated total CO<sub>2</sub> equivalent tonnes/year for the reporting period is provided in Table 12.

**Table 12 - GHG Emissions Summary**

<b>Source</b>	<b>Calculated Total CO<sub>2</sub> Equivalent (t/year)</b>
Diesel	23,088
Explosives	460
Fugitive Emissions	56,241
<b>TOTAL</b>	<b>79,789</b>

The potential for reducing greenhouse gas emissions at Rocglen 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.

Whitehaven is committed to a reduction in emission levels as a result of operations at the mine site. As part of this process, the mine operates a fleet of new Caterpillar rear dump trucks which burn less diesel fuel as compared to older trucks with the same capacity. Fuel burn during the reporting period was 6.84 litres/tonne ROM coal. This is slightly lower than the last reporting period which had a fuel burn of 7.0 litres/tonne ROM coal.

In addition to this, the coal haulage contractor, Toll Resources continues to utilise a fleet of purpose built B-Doubles with the Prime Mover's specifically engineered to comply with emission and noise criteria. This includes being speed limited to 93km/hr which has been determined as the optimum operating speed in terms of operational and fuel efficiency.

Whitehaven reported greenhouse gas emissions for the Whitehaven Group (including Rocglen) for the 2009/2010 financial year via the Federal Government's National Greenhouse and Energy Reporting Scheme (NGERS). Reporting was undertaken in October 2010 and will continue in subsequent years. Whitehaven has also begun participation in the Federal Government's Energy Efficiency Opportunities (EEO) program. The program encourages the improvement of the mines energy efficiency by identifying, evaluating and reporting publicly on cost effective energy efficiency opportunities. Whitehaven holds monthly meetings to discuss EEO.

### **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 owned land in a relatively remote area, with a private access road entering the site on the south-western boundary and the Wean Road positioned adjacent to the eastern side of the mine boundary. The site is fenced and appropriate signs installed.

Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied. Procedures are in place with respect to blasting to ensure the area around each blast site is clear of personnel and that all surrounding residents are advised in advance of proposed blasts.

#### **3.19.2 Performance**

The procedures in place have been effective throughout the reporting period. There have been no issues of public safety or theft at Rocglen.

### **3.20 Feral Animal Control**

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

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

In accordance with prior commitments, Whitehaven 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, V and VI with the remaining areas to be disturbed over the life of the approved mine primarily comprising the same classes.

On completion of all mining activities, the successful rehabilitation of areas of disturbance and the relinquishment of the mining lease, the land affected by mining within the Project Approval 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 new meteorological station for the Rocglen Mine was commissioned in April 2009 at the "Glenroc" property north of the mine site. The previous weather station was located at "Belmont" (installed 2002) and relocated to "Glenroc" in January 2008. Whitehaven has encountered no issues with data collection since the weather station was serviced by Boztek Solutions Pty Ltd in June 2009. Monthly inspections since the service have also ensured no issues with battery failure due to the detection and replacement of broken super capacitors (which store electricity generated from the solar panel).

The station, shown on Figure 3, has been operating continuously since April 2009 recording 15 minute wind speed, wind direction, temperatures, humidity and rainfall.

Daily meteorological data for is presented in Appendix 10.

### 3.22.2 Rainfall

Rainfall data from the previous 12 months is presented in Table 13 and Figure 7. Full station data is presented in Appendix 10.

**Table 13 - Rainfall Data (1 Aug 2010 – 31 July 2011)**

Month	Monthly Rainfall Reporting Period	Long Term Average Rainfall* <sup>1</sup>	Raindays Reporting Period	Long Term Average Raindays* <sup>1</sup>
August 2010	59.8	41.5	8	4.8
September 2010	37.6	39.9	7	4.5
October 2010	57.6	55.4	6	5.4
November 2010	111.2	61.5	11	5.7
December 2010	88.8	69.8	9	6.0
January 2011	26.2	71.1	4	5.5
February 2011	12.4	66.5	2	5.1
March 2011	12.4	47.9	3	3.9
April 2011	8.2	37.6	3	3.4
May 2011	69.2	42.5	6	4.1
June 2011	14.8	43.6	4	4.8
July 2011	2.8	42.4	0	4.8
<b>TOTAL</b>	<b>501.0</b>	<b>619.7</b>	<b>63</b>	<b>58</b>

\*<sup>1</sup> Gunnedah Pool (Station 055 023) averages from 1876-2011.

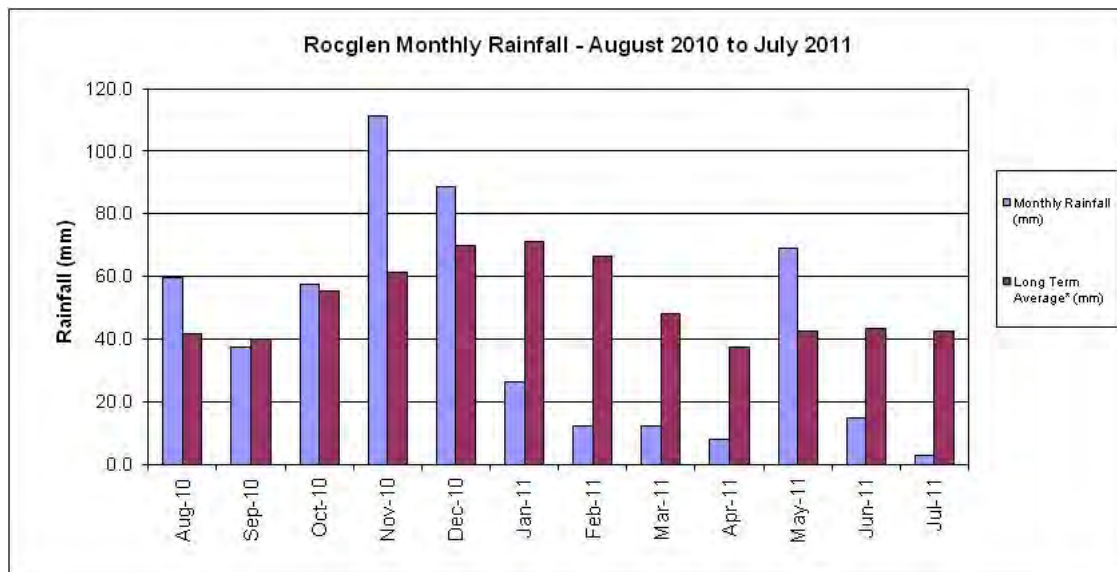


Figure 7 – Monthly Rainfall Data

A review of Table 13 and Figure 7 shows that the total rainfall at the mine during the reporting period was 501.0mm, compared to a long term average of 619.7mm at Gunnedah and 521.4.mm (lower than expected result due to battery issues – Gunnedah Pool BOM recorded 780.6mm) recorded in the previous reporting period. Figure 7 also depicts the heavy rainfall events received over the first half of the reporting period as compared to the drier months from January 2011 (disregarding May 2011).

### 3.22.3 Temperature

Average maximum and minimum temperatures for the reporting period are presented in Table 14 together with long-term monthly averages for Gunnedah Pool (Bureau of Meteorology Station 055023).

**Table 14 - Average Monthly Temperatures  
(August 2010 – July 2011)**

Month	Average Daily Temperature			
	Reporting Period (°C)		Station 055023 (Gunnedah Pool)* (°C)	
	Min	Max	Min	Max
August 2010	4.9	16.9	4.2	18.9
September 2010	8.4	21.4	7.0	22.8
October 2010	11.5	24.3	10.7	26.7
November 2010	15.3	27.1	14.2	30.3
December 2010	17.1	28.7	16.8	32.9
January 2011	19.8	34.2	18.4	34.0
February 2011	20.4	34.6	18.1	32.9
March 2011	17.4	30.2	15.8	30.7
April 2011	11.3	26.2	11.4	26.4
May 2011	6.1	20.1	7.1	21.3
June 2011	4.8	17.6	4.3	17.6
July 2011	3.2	16.7	3.0	16.9

\* Gunnedah Pool (Station 055 023) averages from 1876-2011

Table 14 shows that:

- Average minimum temperatures at the mine site were above the Gunnedah average for the majority of the reporting year, apart from April and May 2011; and
- Average maximum temperatures were below the Gunnedah average for the majority of the reporting year, apart from January, February and May 2011.

### 3.22.4 Wind Speed and Direction

Fifteen minute average wind speed and direction data is collected from the 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.

Wind roses for the reporting period, specifically winter 2010 (August 2010), spring 2010 (September-November 2010), summer 2010/2011 (December 2010-February 2011), autumn 2011 (March-May 2011) and winter 2011 (June-July 2011) as well as an annual wind rose are presented in Appendix 10, and show the following:

- Predominant wind directions throughout the seasons varied between wind from the north west and south west (winter 2010) and dominant southerlies (spring 2010 through to winter 2011) with the predominant wind direction for the reporting period being from the south. The distinct trend of north/south wind directions is a result of the local topography, with the mine located in a gully bordered by the Kelvin Range to the east and the Vickery State Forest to the west; and
- Throughout the year wind speeds predominately fell within the 3-5 m/s range. From spring 2010 to winter 2011 the majority of wind reaching speeds of >10m/s were from an easterly direction. Occasional wind speeds of >10m/s from the south west can be noted between spring 2010 and autumn 2011.

### **3.22.5 Inversions**

Rocglen's meteorological station is fitted with temperature sensors at 2m and 10m intervals to assist in the determination of inversion conditions. As discussed in Section 3.10.3.7, the meteorological station data was used to identify an inversion at the time of a noise investigation at the "Surrey" property.

## **4 COMMUNITY RELATIONS**

### **4.1 Environmental Complaints**

Whitehaven 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".

Over the last 12 months, eight complaints have been received in relation to operations at the mine. The nature of the complaints, details and responses to each complaint are presented in Table 15. Table 16 compares the number and nature of complaints registered during the previous and current reporting periods.

Table 15 - Complaints Summary

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	22/09/2010 9:50pm	Excessive noise from the mine during the night.	Environmental Manager spoke with complainant in relation to the noise and outlined that monitoring the previous month had identified compliance with the exception of the morning monitor which was affected by temperature inversion. It was also noted that monitoring was undertaken again the night before his complaint for which we were awaiting results. It was suggested to the complainant that a meeting be arranged once those results are available to discuss ongoing noise mitigation measures.	Attended noise monitoring results were compliant and the complainant was advised of the results. Discussions were held on the 10 <sup>th</sup> November 2010 regarding the possible use of a real time noise monitor.
Phone call to Environmental Manager	27/10/2010 1:30pm	Excessive noise and dust from the mine.	Recent noise monitoring was discussed. The complainant noted that there was no noise during the monitoring event and the Environmental Manager noted that Whitehaven will soon have the capacity to place a real time noise monitor at the property for successive days to avoid this issue. In terms of dust, it was acknowledged that the mine creates dust, but is not the only dust source, particularly with Wean Road (unsealed) within close proximity to the residence. It was suggested that Whitehaven would be prepared to look at installing a first flush diverter on their rainwater tank if that would assist in alleviating her concerns.	Conversations have been held with the complainant as well as a meeting at the residence by the Community Liaison Officer. It is intended to provide real time noise monitoring for a period of time in the near future.
Phone call to Environmental Manager (left message)	9/12/2010 8:30am	Excessive noise from the mine during the night.	Environmental Officer rang the complainant at 9:40am on 9 <sup>th</sup> December 2010 to discuss his concerns. He said that the noise went all afternoon and into the night causing them to have to go inside rather than eating outside. He said he could hear the trucks roaring through the gears. The complainant was given the Project Manager's mobile phone number again and was advised that it was best to call him or the OCE in the future to enable the issue to be dealt with immediately.	Nil

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
Phone call to Environmental Manager	20/01/2011 2:00am	Mining noise woke complainant at 2am. Complaint made in relation to the noise and that operations were continuing after 12am which is when the complainant thought operations were supposed to stop.	The Environmental Manager advised the complainant that approval is for 24hrs, but that operations are undertaken over two shifts, with night shift generally completed by 2:30am. The complainant was also advised that a real time noise monitor would be placed at his property for several weeks to obtain some ongoing noise data to determine if the operation is exceeding noise criteria.	An assessment of noise levels at the "Surrey" property using a real time noise monitor was completed. The results have been reviewed and presented to the landholder. Instances of mine noise were evident whilst monitoring occurred. however Whitehaven could not find mine noise above 35 dB(A) $L_{Aeq}(15minute)$ and 45 dB(A) $L_{A1}(1 minute)$
Phone call to complaints line	29/03/2011 9:30am	Road noise from Wean Road causing sleep disturbance. It is assumed by the complainant that the road noise is related to traffic to and from the Rocglen Coal Mine. The complainant asked that a meeting be arranged with the Community Liaison Officer to discuss the matter.	A meeting was held with the complainant, the Whitehaven Community Liaison Officer and the Group Environmental Manager on 4 <sup>th</sup> April to discuss the concerns. It was accepted at the time that the complainant's property was in close proximity to a public road and that Whitehaven was unable to stop mine personnel from travelling to site along Wean Road. However, Whitehaven acknowledged the potential impacts from traffic at the end of night shift, with employees travelling back to Gunnedah between 2:30am and 3:00am. It was agreed that the matter would be raised with the Rocglen Project Manager to discuss with employees the impacts of cumulative traffic noise and to ask that they be aware when driving home to minimise noise by reducing speed when travelling past residences that are within close proximity to the road. It was also agreed to meet with the complainant's in one month's time to determine if this action results in any improvement.	The complainant will contact Whitehaven to arrange for a follow up meeting.
Phone call to Environmental Officer	15/4/2011 4.12pm	Noise from the mine is getting louder at night and causing sleep disturbance. Also suggested coal dust is getting more intense at night particularly during a south east breeze and the mine is not watering at night for dust suppression. Coal dust also found in gutters on roof of house.	Complaint was referred to Environmental Manager who made a follow up phone call to complaint on the 18/04/2011. It was decided that a real-time noise monitor would be used to collect background noise data with a later possibility of conducting dust monitoring. The noise monitor was set up on the property on the 21/4/2011.	Follow up meeting to be held with complainant following collection and analysis of sufficient real-time noise data.
Phone call on complaints line	6/5/2011 2:40pm	Traffic on Wean Road travelling out to the Rocglen Mine travelling	It was explained to the complainant that these issues had been toolboxed with staff several times, and signs had been installed along Wean Road to discourage	Employees and contractors made aware of concerns.

Method	Date/ Time	Nature of Complaint	Investigation	Action Taken / Follow-up
		<p>at excessive speed which is causing additional noise and general hazards on the roads, including potential dangers to people living in proximity to Wean Road. The complaint also related to the extent of rubbish that is on the road verge and that in the complainant's view service vehicles and personnel should be using Blue Vale Road as access to the mine as opposed to Wean Road.</p>	<p>littering. It was advised that the issues would be raised again, particularly with service providers in an effort to get them to reduce speed and refrain from littering. It was suggested that these matters were virtually impossible to police. With regard to the use of Wean Road, it was discussed that the road upgrade had made Wean Road a much more attractive prospect for staff and service providers. The use of Wean Road by service providers would be raised with them, albeit, as a public road, Whitehaven has no means of restricting its use.</p>	
<p>Raised at CCC on behalf of complainant</p>	<p>11/5/2011 3:20pm</p>	<p>Lighting impacts at the complainant's property which is south-east of the mine. It was identified that the lighting plant on top of the western emplacement was causing the concern.</p>	<p>The Project Manager reiterated to the OCE's the need for sympathetic positioning of lighting plants, where it is practicable and safe to do so.</p>	<p>No further action required.</p>

**Table 16 - Complaints Comparison**

AEMR period	Issue						Total
	Driver behaviour (contractors)	Dust/Noise/speed/Rubbish from Wean Rd	Lack of consultation	Blasting	Noise/Light/Rubbish	Mine Noise/Dust	
2008-2009	1	1	1	4			7
2009-2010					2		2
2010-2011		2			1	5	8

The number of complaints received during the reporting period has increased by 6 since the previous period. The majority of complaints have been associated with mine noise and dust. Issues with noise have been investigated using additional attended noise monitoring and also real-time noise monitoring (Section 3.10.3). Air quality data for the period shows that both deposited dust and PM<sub>10</sub> levels remain below the specified criteria at all monitoring locations. Concerns in regards to noise, dust, speeding and rubbish on Wean Road have been expressed to employees and contractors through tool box talks and 'Do Not Litter' signage has also been installed. It should be noted however that these issues can be difficult to manage with Wean Road being a public road and that Whitehaven's Field Officer often identifies rubbish on the roadsides that is not related to the mine (ie. nappies).

Any complaints that are made are reported to the Community Consultative Committee (CCC) and documented in the AEMR.

## **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 86 personnel with additional personnel employed by contractors (Toll Global Resources) in the haulage of coal from the mine site back to the Whitehaven CHPP.

Approximately 85% of mine related employees reside in the Gunnedah area with the remainder residing in the surrounding districts.

## 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 9 of Schedule 5 of PA 06\_0198 MOD 1 a Community Consultative Committee (CCC) was formed in July 2008. The committee comprises representatives of Gunnedah Shire Council, Rocglen Coal Mine and the community and is chaired by Mr John Sturgess.

Since its inception, the CCC has met on a regular basis, meeting 4 times per year. During the reporting period meetings were held on the 11<sup>th</sup> August 2010, 10<sup>th</sup> November 2010, 9<sup>th</sup> February 2011 and 11<sup>th</sup> May 2011.

Rocglen Mine representatives and Whitehaven's Community Liaison Officers (1 x full time, 1 x part time) continue to maintain regular personal contact with the neighbours in the vicinity of the mine. These contacts not only provide a means of information dissemination, but also enable Whitehaven 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. Rocglen has provided tours for the CCC during the reporting period.

## **5 REHABILITATION**

### **5.1 Buildings**

No rehabilitation of buildings occurred during the reporting period.

### **5.2 Rehabilitation of Disturbed Land**

#### **5.2.1 Objectives**

Rocglen Coal Mine's rehabilitation/land use objectives for the mine site are as follows:

##### **(a) Areas affected by mining – short term**

- (i) Stabilising all earthworks, drainage lines and disturbed areas that are no longer required for mine related activities; and
- (ii) Reducing the visibility of mining activities from adjacent properties and the local road network.

##### **(b) Areas affected by mining – long term**

- (i) Creating a low maintenance, geotechnically stable and safe landform which is commensurate with the agricultural and nature conservation land uses on and around the mine site.
- (ii) Blending of the final landform with the surrounding topography such that the visual impact of the post-mining landform is minimised.
- (iii) Re-establishing 61ha of agricultural land over the areas disturbed by the mine; and
- (iv) Increasing the area of land allocated to nature conservation through the revegetation of 77.5ha of those areas disturbed by the mine and the long-term conservation of 51.3ha of remnant and degraded native vegetation and/or habitat corridors on the mine site.

##### **(c) Areas to be unaffected by mining**

- (i) Stock exclusion through fencing of the entire mining lease. This includes areas disturbed and rehabilitated with native vegetation and existing agricultural land fenced to exclude stock and allowed to naturally revegetate.

## 5.2.2 Achievements During the Reporting Period

Table 17 and 18 presents a Rehabilitation Summary and listing of maintenance activities as required in the DMR Guidelines. Rehabilitation of disturbed land undertaken during the reporting period comprised reshaping approximately 5.2ha and reshaping and topsoiling approximately 5.2ha of the western emplacement.

Seed collection programmes were undertaken through Bilby Blooms who supply Whitehaven with significant quantities of understorey and overstorey species each year. Discussions were held with the Red Chief Local Aboriginal Land Council to determine their interest in seed collection, however, this failed to eventuate. Seeds will continue to be propagated at the Whitehaven CHPP propagation unit as well as off-site by local contractors.

Table 17 - Rehabilitation Summary

	Area Affected (hectares)		
	This Report Period (as of 31.07.11)	Last Report Period (as of 31.07.10)	Cumulative Next Report Period (estimated)
<b>A: MINE LEASE AREA</b>			
<b>A1 Mine Lease(s) Area</b>	365		
<b>B: DISTURBED AREAS</b>			
<b>B1 Infrastructure area</b> (other disturbed areas to be rehabilitated at closure including facilities, roads)	17	16	17
<b>B2: Active Mining Area</b> (excluding items B3 - B5 below)	28	46	28
<b>B3 Waste emplacements,</b> (active/unshaped/in or out-of-pit)	110	83	163
<b>B4 Tailings emplacements,</b> (active/unshaped/uncapped)	N/A	N/A	N/A
<b>B5 Shaped waste emplacement</b> (awaits final vegetation)	5	5	0
<b>ALL DISTURBED AREAS</b>	155	150	208
<b>C REHABILITATION PROGRESS</b>			
<b>C1 Total Rehabilitated area*</b> (except for maintenance)	2	0	32
<b>D: REHABILITATION ON SLOPES</b>			
<b>D1 10 to 18 degrees</b>	5	5	32
<b>D2 Greater than 18 degrees</b>	0	0	0
<b>E: SURFACE OF REHABILITATED LAND</b>			
<b>E1 Pasture and grasses</b>	0	5	5
<b>E2 Native forest/ecosystems*</b>	2	0	27
<b>E3 Plantations and crops</b>	0	0	0
<b>E4 Other</b> (include non vegetative outcomes)	N/A	N/A	N/A

F1

F2

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

**Table 18 - Maintenance Activities on Rehabilitated Land**

NATURE OF TREATMENT	Area Treated (ha)		Comment/control strategies/ treatment detail
	Report period	Next period	
<b>Additional erosion control works</b> (drains re-contouring, rock protection)	0.1	0.1	Maintenance of drainage line running from existing contours on the western emplacement.
<b>Re-covering</b> (detail - further topsoil, subsoil sealing etc)	Nil	Nil	
<b>Soil treatment</b> (detail - fertilizer, lime, gypsum etc)	3	23	Planned fertilising and seeding of a further 23ha. In addition 15ha of this area will have gypsum applied to address soil sodicity.
<b>Treatment/Management</b> (detail - grazing, cropping, slashing etc)	Nil	Nil	
<b>Re-seeding/Replanting</b> (detail - species density, season etc)	3	5	A total of 800 trees were planted with species listed in Tables 19 & 20. A further 1000 – 1500 will be planted over the next period.
<b>Adversely Affected by Weeds</b> (detail - type and treatment)	5 ha	5 ha	General weed control.
<b>Feral animal control</b> (detail - additional fencing, trapping, baiting etc)	Nil	Nil	

### 5.3 Rehabilitation Monitoring and Performance

During the reporting period the first stages of revegetation on the reshaped western emplacement took place. The area has proven to be challenging due to poor soil resources and a lack of rainfall over the second half of the period. A summary of the rehabilitation activities that occurred within this area is provided below.

**Manure compost trial:** The trial was set up in November 2010 in order to investigate the success of mixing summer/winter pasture seeds and eucalypt seeds into a chicken manure based compost. The product was spread over the topsoil and provided a layer for the mixed seed to germinate within (Plate 5). At the time of the trial the remaining rehabilitation area was seeded with Japanese Millet and fertilised with Granulock 15 to provide a comparison with the compost trial. Over the following summer months low rainfall resulted in a failed millet crop and similarly no vegetation established within the trial area. Continued monitoring has shown signs of plant growth within the trial area over the winter period, however this was predominately identified as broadleaf weed (Plate 6). Although not desirable, the growth of weeds does indicate increased fertility. Consultation will continue with the suppliers in order to further investigate this rehabilitation option.



**Plate 5 – Manure compost trial**



**Plate 6 – Growth eight months after manure trial**

**Humus Compost trial:** After a failed attempt to establish a summer cover crop, investigation was undertaken into alternative methods to establishing cover within the area. Whitehaven began consulting with local agronomists from Cotton Grower Services (CGS) in order to establish better understanding of the state of the soil and best possible planting methods. After soil analysis by CGS it was determined that the rehabilitation area had a high pH, was low in organic matter, low in soil microbes and required additional treatment.

In an attempt to combat this problem a mix of winter pasture seed incorporating 60% Rye Grass, 20% Arrow-leaf clover and 20% Oats was treated with a plant probiotic. This gives the seed the microbial activity it needs to use nutrients supplied through composts and fertilisers. The treated seed was then mixed with humus compost supplied locally by Universal Composts. The compost was 6 months old and made from various plant materials at different stages of decomposition (Plate 7).

The seed/compost mix was applied to the entire topsoiled area using a tractor and spreader at a rate of 6 m<sup>3</sup>/ha on the 2<sup>nd</sup> May 2011 (Plate 8). The trial gave reasonable establishment (Plate 9), however given poor rainfall over recent months it failed to maintain adequate cover. The crop was also pressured by continual grazing from Kangaroos entering site via the adjacent Vickery State Forest. It was not uncommon to observe 10-15 Kangaroos on the pasture during an inspection in the middle of the day.

Given the poor soil resources available, Whitehaven is determined to find a suitable method of achieving successful establishment within this challenging area. Further consultation is underway with local agronomists and new methods will continue to be explored. Ideas involving spreading hay mulch on the area or hydro mulching are potential options warranting further investigation.



**Plate 7 - Mixing seed with humus compost**



Plate 8 – Applying seed compost mix between tree mounds

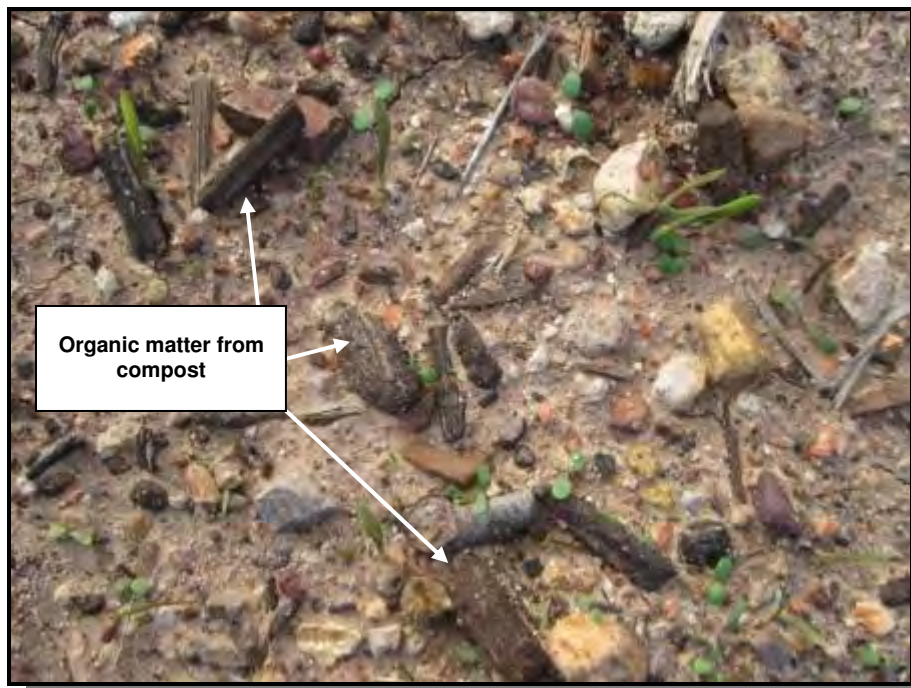


Plate 9 – Germination one month

**Mounding:** Prior to the humus compost/seed application, earthworks were carried out by G&B Ward Earthmoving in order to stabilise and mound smaller inter-contours on the slope. The aim of mounding is to hold as much water as possible on the rehab slope, thereby further reducing runoff and erosion and providing a medium for planting trees during the winter (Plate 10). This also leads to less water draining into

sediment dams and thus is also a measure to help reduce discharges from site. The method has proved effective with desirable tree growth to date, and although some instances of erosion can be noted, pools of water can be sited behind the mounds for up to 2-3 weeks after rainfall events.

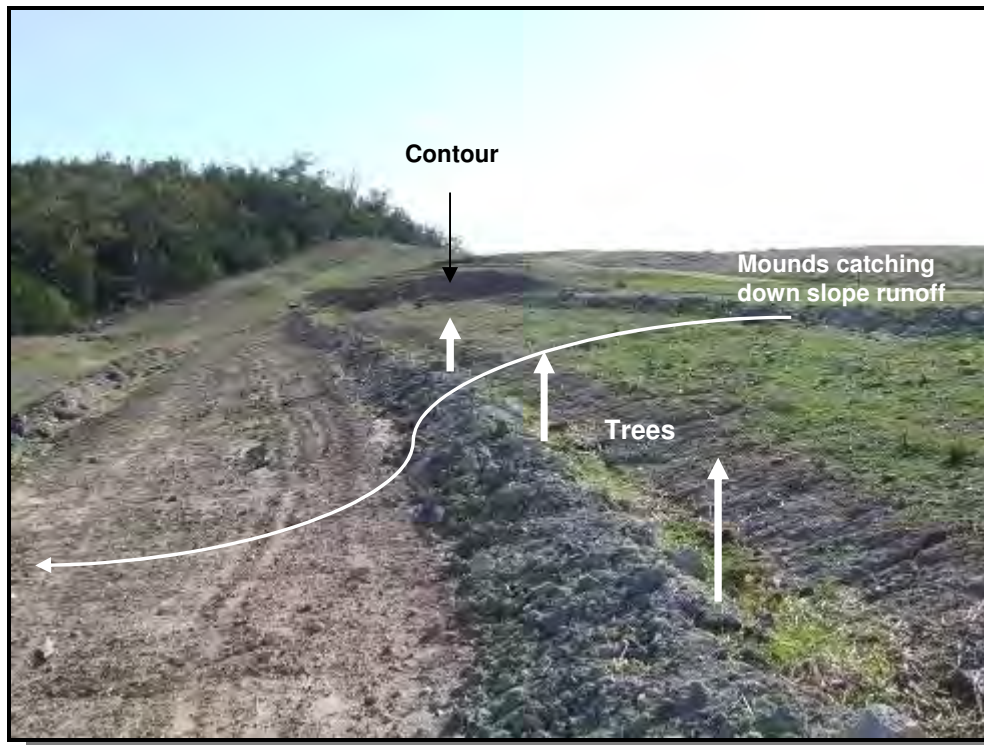


Plate 10 – Mounding on Western Rehabilitation Area 30/6/2011

**Tree Planting:** A total of 800 trees were planted on the western rehabilitation area on the 25<sup>th</sup>, 26<sup>th</sup> May 2011 and the 1<sup>st</sup> June 2011, following 20mm of rainfall the previous week (Table 19). The mounds created by G&B Ward Earthmoving proved successful for holding moisture. Recent inspections indicate that the trees have established well in the mounds despite little follow up rainfall. A further 880 trees were planted along the Wean Road diversion for screening purposes on the 6 & 7<sup>th</sup> July 2011 (Table 20).

**Table 19 – Rehabilitation Planting Records**

<b>Date</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Number of trays</b>	<b>Total Trees</b>
25/05/2011	<i>Pittosporum angustifolium</i>	Butterbush	1	40
	<i>Dodonea viscosaa</i>	Sticky Hop Bush	2	80
	<i>Brachychiton populneum</i>	Kurrajong	1	40
	<i>Eucalyptus albens</i>	White box	1	40
	<i>Euclaypytus melliodora</i>	Yellow box	1	40
	<i>Acacia Salicina</i>	Native Willow	1	40
26/05/2011	<i>Dodonea viscosaa</i>	Sticky Hop Bush	1	40
	<i>Eucalyptus melliodora</i>	Yellow box	2	80
	<i>Callitris glaucophylla</i>	White Cypress Pine	1	40
	<i>Dodonea viscosaa</i>	Sticky Hop Bush	1	40
1/06/2011	<i>Dodonea viscosaa</i>	Sticky Hop Bush	2	80
	<i>Eucalyptus albens</i>	White box	1	40
	<i>Acacia implexah</i>	Lightwood	1	40
	<i>Brachychiton populneum</i>	Kurrajong	1	40
	<i>Dodonea viscosaa</i>	Sticky Hop Bush	1	40
	<i>Euclaypytus melliodora</i>	Yellow box	1	40
	<i>Callitris glaucophylla</i>	White Cypress Pine	1	40

**Table 20 – Wean Road Alignment Planting Records**

<b>Date</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Number of trays</b>	<b>Total Trees</b>
6/07/2011 & 7/07/2011	<i>Hardenbergia violacea</i>	Native lilac	2	80
	<i>Eucalyptus crebra</i>	Narrow leaved Ironbark	4	160
	<i>Eucalyptus albens</i>	White box	3	120
	<i>Eucalyptus melliodora</i>	Yellow box	3	120
	<i>Acacia implexah</i>	Lightwood	1	40
	<i>Acacia decors</i>	Showy wattle	2	80
	<i>Acacia deanei</i>	Deane's wattle	1	40
	<i>Acacia oswaldii</i>	Umbrella wattle	2	80
	<i>Dodonea viscosaa</i>	Sticky Hop Bush	1	40
	<i>Brachychiton populneum</i>	Kurrajong	3	120

## **6 CONTINUOUS IMPROVEMENT AND TARGET INITIATIVES**

### **6.1 Objectives**

Whitehaven Coal Mining Pty Ltd 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 Mining Operations Plan, 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 during the reporting period have included:

- The establishment of a working environmental management program and the establishment of culture of environmental awareness / responsibility within all levels of the workforce;
- Routine implementation of all relevant aspects of approved management plans;
- Continued commitment to a recycling program maintained by Whitehaven personnel;
- Investigated further measures for controlling the sediment level in dams including the use of Magnafloc LT425. This is a more active liquid flocculant that has been used successfully within SD3;
- The establishment and maintenance of an open and honest relationship with the neighbours, community in general, regulatory authorities, Local Government and other groups such as the local Aboriginal community;
- Utilising additional attended noise monitoring and real time noise monitoring to address community concerns;
- Completion of an Independent Environmental Compliance Audit by Umwelt environmental consultants, as required by PA 06\_0168 MOD 1. The audit outcomes identified that operations at Rocglen are generally being

undertaken in accordance with the project approval and associated approval documentation. The majority of actions required are only administrative or minor in nature. An Audit Action Plan has been prepared and will be implemented over the next AEMR reporting period. This will improve the overall environmental management of the site;

- Completing the first stages of rehabilitation within the western emplacement, and investigating new methods for rehabilitation including the use of composts and mounding as an alternative to rip lines. This has led to the establishment of partnerships with local agronomists and local suppliers of compost material. A total of 1680 trees have been planted on site during the reporting period;
- Installation of a new dam north of SB18. The new dam has a storage capacity of 6 megalitres and allows for further capacity to hold and settle sediment laden water draining to the north during times of heavy rainfall; and
- Implementing monthly environmental inspections. The inspection system began in October 2010 and reports on all aspects of the workshop/fuel farm, stores/laydown area, water management, dust management, general land management, rehabilitation and weather station.

### **6.3 Targets and Goals**

- The extension of active rehabilitation on the western waste emplacement over the next 12 months.
- Given the poor soil resources available, continue investigations into further rehabilitation technologies to improve cover establishment within the area.
- Establishment of a Landscape Management Plan to define flora and fauna monitoring locations and objectives, in conjunction with the management of the biodiversity offset area;
- Continued community liaison, support and involvement / education in the mines activities;
- Continue to work on improving surface water quality and reduce sediment loads in discharge waters through the implementation of additional storage and settling capacities, improve inflow and discharge conditions to minimise sediment entrainment, and the flocculation of dirty water where possible;

- Finalisation of the establishment of the Whitehaven Regional Biodiversity Offset Area, which includes areas set aside as offset against the Rocglen development;
- Implementation of the Audit Action Plan over the next reporting period; and
- Continued tubestock planting on the reshaped waste emplacement and along the Wean Road diversion to the east of the mine.