YANCOAL
兖煤澳大利亚有限公司

AUSTAR COAL MINE
PART OF THE YANCOAL AUSTRALIA GROUP

Annual Environmental Management Report

July 2014 – June 2015

TITLE BLOCK

Name of Mine: Austar Coal Mine
Titles/Mining Leases: Refer to Table 1.2 and 1.4

MOP Commencement Date: May 2008
MOP Completion Date: November 2015
AEMR Commencement Date: 01/07/2014
AEMR End Date: 30/06/2015

Name of Leaseholder: Austar Coal Mine Pty Limited
Reporting Officer: Gary Mulhearn
Title: Environment and Community Manager
Date: 30 September 2015

TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF PLANS

TABLE OF APPENDICES

1 INTRODUCTION

1.1 Scope

This Annual Environmental Management Report (AEMR) covers the twelve month reporting period from 1 July 2014 to 30 June 2015. Austar Coal Mine Pty Limited (Austar) is required to prepare and submit an AEMR in accordance with the Department of Industry, Resources and Energy Division's *Guidelines and Format for Preparation of an Annual Environmental Management Report Version 3, January 2006*. The preparation of this AEMR, also satisfies the Annual Reporting and Annual Review requirements under Development Application (DA) No.29/95, Project Approval (PA) 08_0111, Mining Leases, Mining Operations Plan (MOP) and management plans required under the various development consents.

Table 1-1 displays each annual reporting requirement of both DA No.29/95 and PA08_0111 and where these requirements are addressed within the AEMR.

The purpose of the AEMR is to provide a summary of mining and coal handling activities, and environmental and community performance for Austar undertaken during the reporting period. This report outlines:

- details of mining and coal handling activities;
- environmental monitoring activities and results;
- compliance with statutory provisions;
- community relations;
- rehabilitation; and
- proposed mining activities for next reporting period.

1.2 Background

Austar is an aggregate of the former Pelton, Ellalong, Cessnock No.1 (Kalingo) Colliery and Bellbird South Collieries. Austar is owned by Yancoal Australia Limited (Yancoal). Austar is located on Middle Road, Paxton, NSW (**Figure 1.1** and **Plan 1**).

Underground mining commenced in 1916 at Pelton Colliery and continued until 1992. Kalingo Colliery began as an underground mine in 1921 and ceased operations in 1961. In the late 1960's the Kalingo Colliery was amalgamated into the Pelton Colliery. Longwall production commenced at the Pelton Colliery in 1983 and continued until the mine, then known as Ellalong Colliery, was closed in May 1998 by Oakbridge. Southland Coal then acquired the assets of Ellalong and Pelton Collieries and amalgamated those with Bellbird South, which was also owned by Southland Coal.

Southland Coal developed a longwall operation that mined the substantial Bellbird South coal reserves utilising the existing Ellalong facilities and infrastructure.

In December 2003, spontaneous combustion in longwall panel SL4 resulted in Southland Coal ceasing mining activities. The site of the underground fire was sealed and the mine was placed on a 'care and maintenance' program for 18 months. Yancoal purchased the mine in December 2004 and changed the name to Austar Coal Mine.

Yancoal introduced an enhanced form of the conventional retreat longwall system to the Australian Coal Mining Industry at the Austar Coal Mine in 2006 called Longwall Top Coal Caving (LTCC). To allow for the introduction of LTCC to Austar Stage 1 panels A1 and A2 in the Bellbird South area, a modification under section 96(2) of the Environmental Planning and Assessment Act was sought in 2006. The Minister for Planning approved the modification which permitted the extraction of up to 6.5 metres of coal in panels A1 and A2. In 2008, consent was granted for extraction in panels A3, A4 and A5 under a second modification, and for slightly longer and wider panels in A4 and A5 under a subsequent modification. In December 2010 approval was granted for extraction of additional longwall panel A5a in the Stage 2 area, and a modification to lengthen panel A5a was granted on 27 April 2012.

Approval for Stage 3 operations was granted on 6 September 2009 by the Minister for Planning. A minor wording modification was granted on 4 May 2010, and a modification to allow reorientation of Stage 3 longwall panels was granted by the Minister for Planning and Infrastructure on 13 March 2012. A further modification to allow extension of longwall panels A7 to A10 to the west by between 100m and 300m was granted under delegated authority of the Minister for Planning and Infrastructure on 17 December 2013.

The Stage 3 project (as modified) involves mining of known coal resources within Austar's Consolidated Mining Lease 2 (CML2) and Mining Leases Areas (ML1661 and ML1666).

The Stage 3 development (as modified) consists of:

- Extension of underground mining from Stage 1 and Stage 2 Bellbird South operations into the area described as Stage 3 of the Austar Mine. Coal will be extracted from the Greta Coal Seam at depths of 450 to 740 metres using Longwall Top Coal Caving (LTCC) methods. A total of approximately 45.3 million tonnes (Mt) of coal will be produced from longwall panels A7 to A19 over a 21 year mine life. This will involve extraction of up to 3.6 Mt of Run of Mine (ROM) coal per year.
- Construction and operation of a new Surface Infrastructure Site off Quorrobolong Road south of Kitchener. This site will include an access road, upcast and downcast ventilation shafts, main ventilation fan, bathhouse, workshop, electricity substation and distribution line, service boreholes, offices and store. The Surface Infrastructure Site will be used to provide ventilation to the mine and to provide access to the Stage 3 underground workings for men and materials. No coal will be brought to the surface at this site.
- Continued use of Austar's existing water management, coal transport systems, coal preparation plant and rejects emplacement areas.

Mining in the second Stage 3 panel (Longwall A8) commenced on 16 June 2014 and was completed on 24 June 2015. Development operations have been suspended in the Stage 3 area for the time being. Austar has made a business decision to relocate development operations to an alternate area of our mining leases in the Bellbird South and Ellalong Colliery areas. However, the Stage 3 area remains central to the long term future of Austar Coal Mine and the aim is to return to mining in the Stage 3 area at some stage in the medium term, with mining to continue in Stage 3 until the year 2030.

Mining within the Bellbird South and Ellalong Colliery commenced in June 2015 and involved development of first workings of existing approved coal reserves to allow future longwall extraction of proposed longwall panels LWB1 and LWB2 (refer to **Figure 1.1** and **Plan 1**.). Within this area:

- Mining leases are currently held (CML2 and CCL728);
- Development first workings are permissible under existing consent (DA29/95 and DA74/75/79); and,
- Modification to DA29/95 will be sought prior to Longwall extraction of LWB1 and LWB2.

Future longwall extraction of LWB1 and LWB2 will only occur after approval of an Extraction Plan, and will be further detailed in a new MOP for Austar operations prior to extraction.

The location of approved operations is shown in **Figure 1.1** and **Plan 1**.

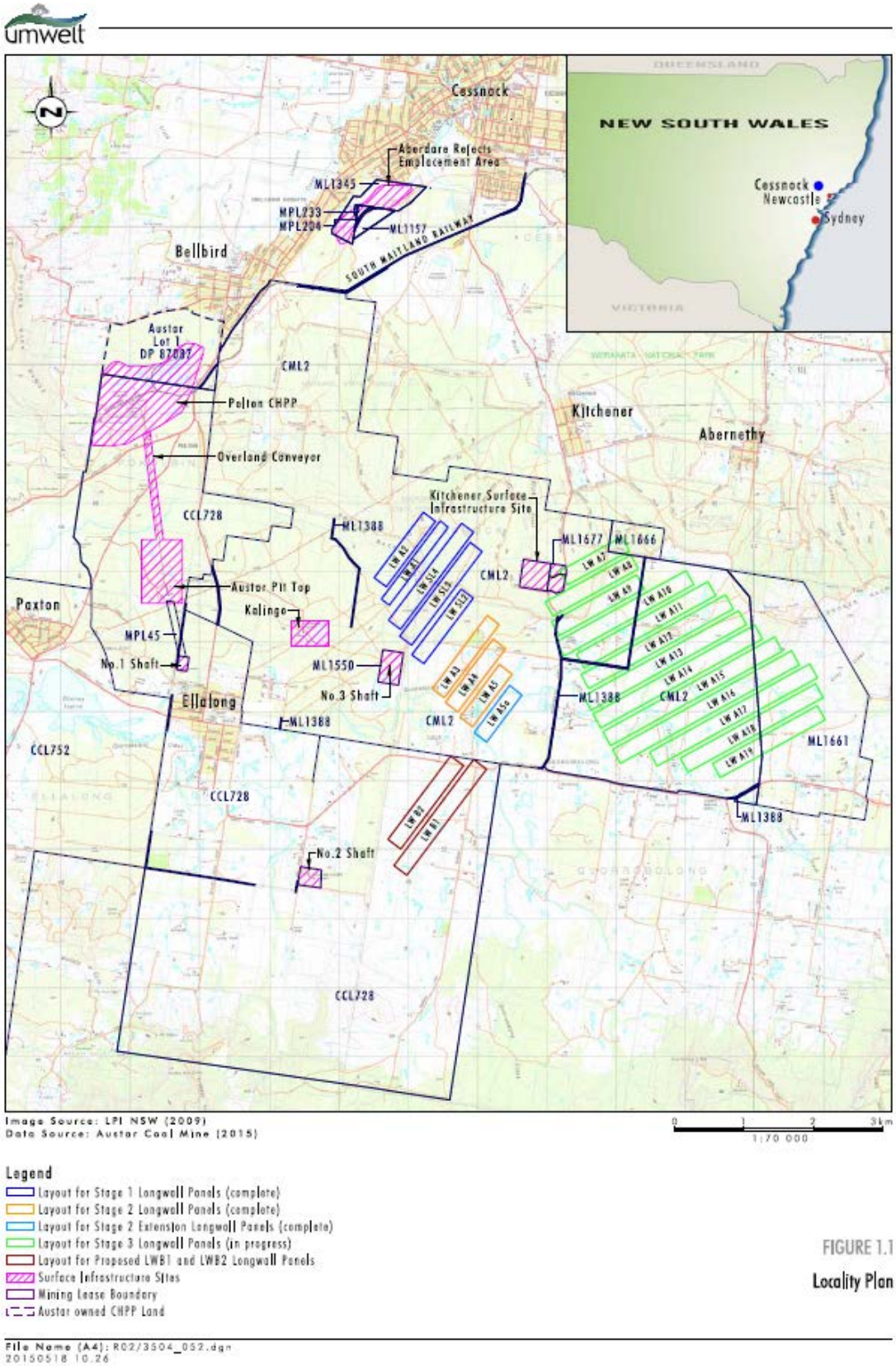


FIGURE 1.1 LOCALITY PLAN AND APPROVED MINING OPERATIONS

TABLE 1-1 ANNUAL REPORTING REQUIREMENTS

DA No. 29/95	Section of the AEMR
Schedule 5	
Annual Reporting 5. Each year, the Applicant shall submit an Annual Environmental Management Report (AEMR) to the Director-General and the relevant agencies. This report must:	This AEMR
(a) identify the standards and performance measures that apply to the development;	Section 3
(b) describe the works carried out in the last 12 months;	Section 2 & 5
(c) describe the works that will be carried out in the next 12 months;	Sections 2 & 6
(d) include a summary of the complaints received during the past year, and compare this to the complaints received in previous years;	Section 4
(e) include a summary of the monitoring results for the development during the past year;	Section 3
(f) include an analysis of these monitoring results against the relevant: • impact assessment criteria/limits; • monitoring results from previous years; and • predictions in the EIS and/or SEE;	Section 3
(g) identify any trends in the monitoring results over the life of the development;	Section 3
(h) identify any non-compliance during the previous year; and	Section 3
(i) describe what actions were, or are being, taken to ensure compliance.	Section 3
PA 08_0111	**Section of the AEMR**
Schedule 7	
Annual Review 3. Each year, the Proponent shall review the environmental performance of the mine complex to the satisfaction of the Director-General. This review must:	This AEMR
(a) describe the works that were carried out in the past year, and the works that are proposed to be carried out over the next year;	Sections 2, 5 & 6
(b) include a comprehensive review of the monitoring results and complaints records of the mine complex over the past year, which includes a comparison of these results against the • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in the EA and Extraction Plan;	Sections 3 & 4
(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;	Section 3
(d) identify any trends in the monitoring data over the life of the mine complex;	Section 3
(e) identify any discrepancies between the predicted and actual impacts of the mine complex, and analyse the potential cause of any significant discrepancies; and	Section 3
(f) describe what measure will be implemented over the next year to improve the environmental performance of the mine complex.	Section 6

1.3 Consents, Leases and Licences

1.3.1 Development Approvals and Consents Held by Austar Coal Mine

A summary of development approvals and consents held by Austar is outlined in **Table 1-2**.

TABLE 1-2 DEVELOPMENT APPROVALS AND CONSENTS

Consent Description	Date	Approval Authority	Approved Development
DA 74/75/79	4 December 1975	Cessnock City Council (CCC)	Development Consent for a coal mine at Ellalong. • Approval for underground coal mining. • Construction of a new access drift, upcast shaft and ventilation shaft. • Expansion of the Pelton CHPP. • Conveyance of coal from the Ellalong pit top to the Pelton CHPP Operation of the Pelton CHPP for the washing and handling of coal. • Water management systems. • Upgrade of the Pelton rail loading facility and railway spur. • Reject emplacement underground, company owned land, open cut areas adjoining Pelton and other abandoned mine sites.
DA 118/680/93	8 October 1980	CCC	Downcast Ventilation Shaft and Man Access Shaft, Bathhouse and Offices at Ellalong Colliery.
DA 118/691/181	26 Nov 1992	CCC	Pelton Open Cut Coal Mine. • Approval of an open cut coal mine adjoining Pelton Colliery up to 300,000 t of coal and underground mining of approximately 27,000 t of coal from a section of prior workings south of the proposed open cut.
DA 118/691/181 (modification)	11 January 1993	CCC	Pelton Open Cut Coal Mine – Modification. • Extension of open cut mining area. • Infrastructure and water management modifications.

Consent Description	Date	Approval Authority	Approved Development
DA 118/691/229	7 Jan 1993	CCC	Pelton Coal Handling Preparation Plant – Raw Coal Handling Facility, Washed Coal Facility and Upgrading Water Management System. • Upgrade and replacement of coal handling infrastructure such as surge bin, automatic stacking system, reclaim facilities and skyline conveyor. • Increase in stockpile capacity. • Upgrade to water management system. • Extension of the reclaim tunnel. • Construction of a mine water transfer pipeline from Ellalong Colliery to Pelton. • Provision of underground workings for emergency mine water disposal. • Upgrade of lime treatment plant.
DA 118/693/42	26 Nov 1993	CCC	Extension of Pelton Open Cut Mine. • Extension of open cut mining area including emplacement of overburden in previously mined blocks and extension of the mine's water management system.
DA 118/694/120	27 June 1994	CCC	Approves the extraction of longwall panels LW13 and LW14 as a minor extension to the Ellalong Colliery within CML2.
DA 118/694/152	7 July 1994	CCC	Relocatable Office and Temporary Bathhouse at Pelton Colliery.
DA 118/695/22	12 July 1995	CCC	Establishment of Overburden Stockpile at Pelton Colliery. • Establishment of an overburden stockpile for the Pelton Open Cut Operations.
DA 118/695/81	12 July 1995	CCC	Additions for Bathhouse, Office and Car park at Ellalong Colliery. • Extension to the bathhouse at the Ellalong drift site. • Extension of existing offices or construction of portable offices. • Construction of a 4000 square metre car park.
DA 8/1999/1658	18 Feb 2000	CCC	Relocation of Ventilation Facilities at Bellbird South Underground Mine. • Installation of a ventilation shaft and fan house. • Upgrading of the existing access track to the site from the Pelton-Ellalong Road.
DA 8/2002/655/1	16 Oct 2002	CCC	Compressor and Pump Enclosure Buildings at Ellalong Colliery.
DA 118/695/18	21 Feb 1995	CCC	Re-locatable Office at Pelton Colliery.

Consent Description	Date	Approval Authority	Approved Development
DA 29/95	14 Feb 1996	Minister for Urban Affairs and Planning	Ellalong Colliery Extension into Bellbird South. • Extension of underground mining activities into Bellbird South area (CML 2). • Mine life of 21 years with a production of 3 Mtpa. • Reject emplacement. • Construction and operation of a new infrastructure site including new ventilation shaft and fan(s) (No. 2 Shaft) adjacent to Sandy Creek Road. • Use of Pelton CHPP for washing and handling of coal. • Provision of a maximum raw coal stockpile of 100,000 t. • Reopening of disused Cessnock No. 1 Colliery shafts for ventilation and access, or the sinking of new shafts, as required. • Construction of various water management devices including sedimentation and clean water dams and drainage systems.
DA 29/95 (modifications)	27 Sep 2006 8 Jun 2008 (MOD 2) 28 May 2009 (MOD 3) 7 Dec 2010 (MOD 4) 27 April 2012 (MOD 5)	Minister for Planning (or delegate)	Extension of Underground Mining Activities into Bellbird South (Ellalong Colliery) – Modification. • Use of long wall top coal caving mining methods in two longwall panels. • Installation of a larger capacity fan at the site approved for DA 8/1999/1658. • Installation of a new downcast ventilation shaft. • Installation of a new 10 MVA substation. • Installation of a nitrogen inertisation plant with a 2,000 m^3 capacity. • Provision of a diesel and emulsion fluid storage area and dispatch system. • Installation of a tube bundle shed to house electronic monitoring equipment. • Upgrade of the existing water treatment plant. • Upgrade of water reticulation and pumps. • Minor embankment stabilisation works at Kalingo Dam. • Longer and wider panels A4 and A5. • Extract one additional Longwall Panel A5a (LW A5a) • Extension of Longwall Panel A5a

Consent Description	Date	Approval Authority	Approved Development
Project Approval 08_0111	6 Sep 2009	Minister For Planning	Stage 3 Expansion Project - extension to longwall mining to an area east of existing operations. Key features: • Longwall production from the Greta coal seam from panels A6 to A17 using longwall Top Coal Caving (LTCC) technology • Construction of a new surface infrastructure site south west of Kitchener including ventilation shafts and fans, winders, bath house facilities, a workshop, electricity substation, store and offices. Construction of a new road and intersection at Quorrobolong Road. • Coal will continue to be brought to the surface at Austar's existing surface facilities at Paxton. These facilities will continue to be used to take large mining equipment into and out of the mine. • Continued use of Austar's existing water management, coal transport systems, coal preparation plant and rejects emplacement areas.
Project Approval 08_0111 (Modifications)	4 May 2010 (MOD 1) 13 March 2012 (MOD 2) 17 Dec 2013 (MOD 3)	Delegate for Minister for Planning Delegate for Minister for Planning	• Minor change to wording regarding subsidence impact performance measures to built features in Table 1 of approval. The key performance indicator requires the project does not cause built features to go beyond safe, serviceable and repairable criteria, unless the landowner agrees in writing. • Reorientation of the Stage 3 longwalls. Removal of longwall A6, and extraction of coal in longwalls A7 to A19, which are a reorientation of previously approved longwalls A7 to A17 to more closely align with the direction of principal stress. In addition, the chain pillar widths are increased from 45m to 55m to reduce roadway failure risks which in turn further minimises subsidence. The modification will enable more efficient and safer extraction of coal from the Stage 3 area. • Extension of longwalls A7 to A10 to the west by approximately 100m and 300m
DA 8/2012/503/1	19 Dec 2012	CCC	• Extension of car parking area associated with Austar Coal Mine

1.3.2 Subsidence Management Plan / Extraction Plan

Austar holds an approved Subsidence Management Plan (SMP) for longwall panels A3 to A5a in Stage 2 and a combined SMP / Extraction Plan for longwall panels A7 to A10 in Stage 3. The combined SMP / Extraction Plan was prepared to satisfy both the conditions of the Mining Leases in relation to SMP, and also the conditions of PA08_0111 in relation to the Extraction Plan.

The SMP approval for the Stage 2 LWA5a extension was granted on 7 May 2012 by the Department of Industry – Division of Resources and Energy (DI-DRE). Conditions of approval were the same as those issued for LW A5a. The SMP includes the monitoring and management strategies for environmental impacts associated with subsidence from the extraction of longwall A5a.

The combined SMP / Extraction Plan for Stage 3 longwalls A7 to A10 was granted Extraction Plan approval by the Department of Planning and Environment (DPE) on 30 May 2013, and was granted SMP approval on 3 June 2013 by DI-DRE. The SMP / Extraction Plan includes the monitoring and management of environmental impacts associated with subsidence from the extraction of longwalls A7 to A10.

The Stage 3 first workings were varied to retract the commencing end of LWA8 to LWA9 with approval of the DPE in November 2013 and December 2013 in response to further geological information on the location of a dyke structure.

A variation to the Extraction Plan / SMP for longwalls A7 to A10 to address the extension of LWA7 to LWA10 to the west by approximately 100m to 300m and the retraction of LWA8 commencing end was approved by DPE on 6 January 2014, and was granted SMP approval on 7 January 2014 by DI-DRE. A variation to the SMP was approved by DI-DRE on 19 February 2014 to reflect the change to first workings by retracting the commencing end of LWA9, short of the dyke structure, this will be followed by a variation to the Extraction Plan prior to extraction of longwall A9.

A summary of SMP approvals for Stage 2 and 3 mining areas held by Austar is outlined in **Table 1-3**.

TABLE 1-3 SUBSIDENCE MANAGEMENT PLAN / EXTRACTION PLAN APPROVALS

Consent Description	Date	Approval Authority	Approval Summary
SMP Approval 06/7775	30 Jan 2009	DI-DRE	Subsidence Management Plan approval for Austar Colliery Longwall A3 only
SMP Approval 08/2956	24 Dec 2009	DI-DRE	Subsidence Management Plan approval for Austar Colliery Longwalls A4-A5
SMP Approval 10/22	27 April 2011	DI-DRE	Subsidence Management Plan approval for Austar Colliery Longwall A5a
SMP Approval 10/22	7 May 2012	DI-DRE	Subsidence Management Plan approval for Austar Colliery Longwall A5a extension. Conditions of approval are the same as those issued for Longwall A5a.

Consent Description	Date	Approval Authority	Approval Summary
Extraction Plan Approval	30 May 2013	DPE	Extraction Plan approval for Austar Coal Mine Longwalls A7 to A10
SMP Approval 13/1876	3 June 2013	DI-DRE	Subsidence Management Plan approval for Austar Coal Mine Longwalls A7 to A10.
Extraction Plan Approval	6 January 2014	DPE	Extraction Plan approval for Austar Coal Mine Longwalls A7 to A10 to correspond to PA08_0111 MOD3 and retraction to LWA8 commencing end
SMP Variation Approval 13/1876	7 January 2014	DI-DRE	Subsidence Management Plan approval for Austar Coal Mine Longwalls A7 to A10 to correspond to PA08_0111 MOD and retraction to LWA8 commencing end
SMP Variation Approval 13/1876	19 February 2014	DI-DRE	Subsidence Management Plan approval for retraction to LWA9 commencing end

1.3.3 Mining Leases

Details of the relevant mining leases are summarized in **Table 1-4**.

TABLE 1-4 MINING LEASES

Mining Title (Act)	Date Granted	Expiry Date	Area (Ha)	Surface	Depth Restriction
Dam Site Lease 89 (1901)	04/04/1908	04/04/2030	3.961	Yes	Surface to 15.24 metres
Mineral Lease No. 1157 (1906)	8/07/1949	08/07/2028	10.24	Yes	Surface to 15.24 metres
Mineral Lease No. 1283 (1906)	13/07/1961	13/07/2022	1.973	No (subsurface)	7.62 to 15.24 metres
Mining Purposes Lease No. 23 (1906)	17/05/1909	17/05/2030	2.421	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 204 (1906)	03/02/1916	03/02/2018	1.2	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 217 (1906)	12/04/1916	12/04/2018	0.6298	Yes	Surface to 15.24 metres
Mining Purposes Lease No. 233 (1906)	01/08/1916	01/08/2016	1.973	Yes	Surface to 7.62 metres
Mining Purposes Lease No. 269 (1906)	07/12/1917	07/12/2018	2.79	Yes	Surface to 6.1 metres below the level of the rails when laid
Mining Purposes Lease No. 1364 (1906)	28/10/1968	28/10/2029	0.4527	Yes	Surface to 15.24 metres

Mining Title (Act)	Date Granted	Expiry Date	Area (Ha)	Surface	Depth Restriction
Consolidated Coal Lease No. 728 (1973)	10/10/1989	30/12/2023	3296.8	Various	Various
Consolidated Coal Lease No. 752 (1973)	23/05/1990	30/12/2023	3802	No (subsurface)	Various
Consolidated Mining Lease No. 2 (1992)	24/03/1993	15/05/2025	3388	Various	Various
Mining Lease No. 1345 (1992)	23/03/1995	30/12/2023	41.895	Yes	Surface to 900 metres
Mining Lease No. 1388 (1992)	02/04/1996	02/04/2017	15.12	No (subsurface)	30.48 metres to unlimited depth
Mining Lease No. 1550 (1992)	24/06/2004	23/06/2025	14.11	Yes	Surface to 20 metres
Mining Lease No. 1661 (1992)	22/11/2011	22/11/2032	469.32	No (subsurface)	20 to 900 metres
Mining Lease No. 1666 (1992)	25/01/2012	25/01/2033	34.13	No (subsurface)	30.48 to 900 metres
Mining Lease No. 1677 (1992)	23/08/2012	23/08/2033	9.16	Yes	Surface to 30.48 metres

1.3.4 Environment Protection Licence

Austar operates in accordance with Environmental Protection Licence 416 (EPL 416), issued on 5 April 2000 by the NSW Environment Protection Authority (EPA), under the authority of the *Protection of the Environment Operations Act 1997*.

1.3.5 Water Licences

Austar currently holds water licences for a number of monitoring and dewatering bores across the operation. Austar's current water licences issued under Part 5 of the Water Act 1912 are provided in **Table 1-5**.

TABLE 1-5 WATER LICENCES

Licence Held	Licence Number	Validity of Licence	Purpose of Licence	Extraction Limit
Bore Licence Certificate	20BL171481	17 Aug 2012 – 16 Aug 2017	Dewatering (groundwater) (No 2 Shaft Borehole Pump)	20BL171481, 20BL173349 and 20BL173350 have a combined extraction limit of 770ML in any 12 month period commencing 1 July.
Bore Licence Certificate	20BL173349	01 Nov 2012 – 31 Oct 2017	Mining (16CT pump station)	
Bore Licence Certificate	20BL173350	01 Nov 2012 – 31 Oct 2017	Dewatering (groundwater) (No 2 Shaft Pump)	

Licence Held	Licence Number	Validity of Licence	Purpose of Licence	Extraction Limit
Bore Licence Certificate	20BL171361	17 May 2007 - Perpetuity	Monitoring Bore (AQD1077)	N/A
Bore Licence Certificate	20BL172524	20 Jul 2010 - Perpetuity	Monitoring Bore (NER1010)	N/A
Bore Licence Certificate	20BL172852	7 Jun 2011 - Perpetuity	Monitoring Bore (WBH1, WBH2, WBH3)	N/A
Bore Licence Certificate	20BL173843	1 Oct 2014 - Perpetuity	Monitoring Bore (BB1, BB2, BB3)	N/A
Bore Licence Certificate	20BL173878	8 Dec 2014 - Perpetuity	Monitoring Bore (MB01)	N/A
Bore Licence Certificate	20BL173891	19 Mar 2015 - Perpetuity	Monitoring Bore (MB02)	N/A

1.3.6 Mining Operations Plan (MOP)

In accordance with the Mining Act 1992, Austar conduct operations in accordance with a Mining Operations Plan (MOP). An amendment to the Mining Operations Plan 2008-2015 was approved on 29 May 2015 extending the approved MOP period to November 2015. The approval of this amendment will allow a transition between the previous EDG03 MOP Guidelines and the new ESG3 MOP Guidelines (September 2013), and inclusion of further details on mining in the Bellbird South area.

The approved MOP covers underground mining, coal handling and other associated activities. All mining activities at Austar were carried out generally in accordance with the approved MOP during the reporting period.

A new MOP will be prepared for approval during the 2015-2016 reporting period.

1.3.7 Environmental Management Plans

In accordance with DA No.29/95 and PA08_0111, Austar have developed and implemented a range of environmental management plans. **Table 1-6** outlines the environmental management plans currently required by each relevant development consent, the determining authority and their approval status.

TABLE 1-6 ENVIRONMENTAL MANAGEMENT PLANS

Plan	DA Requirement	Approval Authority	Approval Date
Environmental Management Strategy, May 2013	DA29/95 – Schedule 5 Condition 1 PA08_0111 - Schedule 7 Condition 1	DPE	2 October 2013
Environmental Monitoring Program, May 2013	DA29/95 – Schedule 5 Condition 2 PA08_0111 - Schedule 7 Condition 1	DPE	2 October 2013
Shaft Construction Environmental Management Plan, June 2012	PA08_0111 – Schedule 4 Condition 1, 2, 8	DPE	15 June 2012

Plan	DA Requirement	Approval Authority	Approval Date
Landscape Management Plan – Kitchener SIS, June 2013	PA08_0111 – Schedule 6 Condition 4	DPE	22 July 2013
Site Water Management Plan, April 2013	DA29/95 – Schedule 3 Condition 6-11 PA08_0111 – Schedule 4 Condition 9	DPE	17 May 2013
Noise and Vibration Management Plan, July 2013	DA29/95 – Schedule 3 Condition 13-16 PA08_0111 – Schedule 4 Condition 2-3	DPE	2 August 2013
Air Quality and Greenhouse Gas Management Plan, June 2013	DA29/95 – Schedule 3 Condition 17-20 PA08_0111 – Schedule 4 Condition 6-7	DPE	26 June 2013
Aboriginal Cultural Heritage Management Plan, May 2013 & Addendum October 2013.	PA08_0111 – Schedule 3 Condition 4 and Schedule 4 Condition 10	DPE	30 May 2013 & 6 January 2014
Historic Heritage Management Plan, January 2014	PA08_0111 – Schedule 4 Condition 11	DPE	19 February 2014
Surface Infrastructure Site Traffic Management Plan, December 2009	PA08_0111 – Schedule 4 Condition 1 Statement of Commitments 1.12.1	Cessnock City Council	22 December 2009
Austar Coal Mine Longwalls A7 to A10 Extraction Plan, December 2013	PA08_0111 – Schedule 3 Condition 4-5	DPE	6 January 2014

Environmental management plans are available from the Austar website (**www.austarcoalmine.com.au**).

1.4 Mine Contacts

Table 1-7 outlines the contact details for site personnel responsible for mining, coal preparation, rehabilitation, environmental and community liaison at Austar.

TABLE 1-7 SITE PERSONNEL

Position	Name	Company	Contact Number
Mine Operations Manager	Brian Wesley	Austar Coal Mine	(02) 4993 7356
CHPP Manager	Paul Davis	Austar Coal Mine	(02) 4993 7501
Environment & Community Manager	Gary Mulhearn	Austar Coal Mine	(02) 4993 7334
Environment & Community Coordinator	Jack Potter	Austar Coal Mine	(02) 4993 7363

1.5 Actions Required at Previous AEMR Review

DPE reviewed the 2013-2014 AEMR and advised in correspondence dated 19 January 2015 that the form and content meets the annual reporting requirements of development consent DA29/95 and PA08_0111. DPE advised that the Director-General approved the 2013-2014 AEMR.

DI-DRE reviewed the 2013-2014 AEMR and conducted an inspection on 27 January 2015. DI-DRE found the AEMR was acceptable for the reporting period. The following actions were identified to ensure conformance and improvement in site rehabilitation for issues that were identified during the inspection, this information is presented in **Table 1-8**.

TABLE 1-8 ISSUES/ACTIONS FROM DI-DRE SITE INSPECTION

Item	Issue / Action	Addressed
Aberdare East Rehabilitation Area (AREA)		
Issue 1	**Inconsistencies between planned and executed rehabilitation.**	
Action 1.1	Revise rehabilitation plan for AREA to include progress related to volume/tonnage of reject emplacement, showing contours considering pit floor emplacement required to maintain a safe working environment and progression of clean water diversion development.	New MOP to be submitted in next AEMR period.
Issue 2	**No completion criteria for rehabilitation.**	
Action 2.1	Development of rehabilitation phase completion criteria.	New MOP to be submitted in next AEMR period.
Issue 3	**Disposal of exploration waste.**	
Action 3.1	Ensure the disposal of waste including exploration cuttings material, at the AREA is consistent with NSW Environmental Protection Authority approvals.	Material observed during AEMR inspection at the AREA was sediment from onsite dam maintenance works, not from offsite exploration works. No further EPA approvals are required.
Kitchener Surface Infrastructure Site (SIS)		
Issue 4	**Large area requiring stabilisation to minimise sediment sources.**	
Action 4.1	Monitor progress of vegetative cover and undertake management to minimise sediment sources.	Monthly monitoring of vegetation establishment and performance of erosion and sediment controls is undertaken.
Kitchener Surface Infrastructure Site (SIS) (Applicable to other sites with bunds to manage spills and leaks)		
Issue 5	**Bunds within electrical compound with water compromising bund capacity.**	
Action 5.1	The inspection schedule for bunds should be revised include inspection following rainfall that may compromise bund capacity.	Addressed post DI-DRE inspection and periodically during AEMR period.
Pelton CHPP		
Issue 6	**Bioremediation site/laydown – potential cross contamination of material, for example mulch and reject.**	

Item	Issue / Action	Addressed
Action 6.1	Ensure runoff from potentially contaminated material does not impact other materials resulting in restriction of the beneficial use or waste classification of other materials.	Materials separated adequately to prevent risk of contamination from bioremediation area.
General		
Issue 7	**Final land use unknown for majority of site.**	
Action 7.1	Development of final land use to inform current management actions that are not inconsistent with those land uses.	New MOP to be submitted in next AEMR period.
Issue 8	**Planned contamination studies for infrastructure areas to be commenced.**	
Action 8.1	Contamination studies required to determine management requirements to minimise future legacy issues post closure.	Proposals have been sought for completion of a Phase 1 Contamination Assessment of Austar's surface mining lease areas. The assessment will be completed during the 2015-2016 reporting period.

2 Operations During The Reporting Period

2.1 Exploration

Four (4) exploration boreholes were completed during the 2014-2015 reporting period, the details of these exploration boreholes are outlined in **Table 2-1**.

TABLE 2-1 EXPLORATION SUMMARY

Title	Easting (m)	Northing (m)	Coordinate System	Collar RL (AHD) (m)	Borehole Depth (m)
EL6598	346853	6356930	MGA 56S	125.5	585.6
EL6598	346879	6356258	MGA 56S	140.0	630.7
EL6598	347735	6357716	MGA 56S	133.3	593.5
EL6598	347294	6356395	MGA 56S	130.6	630.6

During the 2015-2016 reporting period it is planned to undertake further exploration boreholes and a seismic line survey.

2.2 Land Preparation

2.2.1 Kitchener SIS

As part of the Stage 3 mining activities to construct the approved Surface Infrastructure Site (SIS), land clearing activities are required for the construction of the new facilities and for access to the proposed location. The Stage 3 Environmental Assessment (EA) indicates that approximately 10 Ha of the SIS site may be disturbed to achieve the final SIS layout.

Approximately 8.1ha of Austar owned land has been cleared between 2009-2013 to facilitate construction of shafts, mine access roads, ventilation fans, electrical installations (switch yard and switch room), and a 33kV power line. The land preparation associated with Kitchener SIS is shown in **Plan 4C**.

To date all clearing activities at the SIS have been undertaken in accordance with the approved Shaft Construction Environmental Management Plan (SCEMP) and the MOP. The SCEMP has both a preclearance procedure and vegetation clearing procedure to minimise the impacts on both flora and fauna. The Landscape Management Plan – Kitchener SIS (AECOM, June 2013) has, since its approval, superceded the SCEMP in respect of land preparation measures at the SIS.

No further land preparation was required during the 2014-2015 reporting period as the site transitioned from construction into an operational and rehabilitation phase.

2.3 Construction

There were no construction activities carried out at Austar during the 2014-2015 reporting period.

2.4 Mining

2.4.1 Underground Mining Operations

The Austar Coal resource covers a large area of the Greta Seam in the Newcastle Coalfield, situated approximately 10km west of Cessnock

Stage 3 Operations

Mining in the second Stage 3 panel (Longwall A8) commenced on 16 June 2014 and was completed on 24 June 2015. Longwall A8 production commenced just before the start of the reporting period on 16 June 2014, and was completed on 24 June 2015. The longwall equipment was subsequently recovered and stored underground. Minor development operations were also completed in May 2015, prior to moving to the Bellbird South Project Area. Development operations have been suspended in the Stage 3 area for the time being.

Bellbird South Area

Austar has made a business decision to relocate development operations to an alternate area of our mining leases in the Bellbird South and Ellalong Colliery areas. However, the Stage 3 area remains central to the long term future of Austar Coal Mine and the aim is to return to mining in the Stage 3 area at some stage in the medium term, with mining to continue in Stage 3 until the year 2030.

Infrastructure installation and limited development operations commenced in the Bellbird South area on 30 May 2015 and has been focused on creating roadways to suit future longwall gate roads. It is estimated the first longwall in the Bellbird South area is scheduled to commence in Sept 2016, pending appropriate approvals from relevant agencies.

Management of the other key mine hazards of ventilation, spontaneous combustion and water have been effective in that no major incidents have occurred during the 2014-2015 reporting period.

Mining undertaken in the 2014-2015 reporting period, and planned in future years is presented in **Plan 4A**.

2.4.2 Production and Forecast Production

Table 2-2 provides a summary of coal production and waste generation for the 2014-2015 reporting period.

TABLE 2-2 PRODUCTION AND WASTE SUMMARY

	Cumulative Production			
	Unit	2013-2014 Reporting Period	2014-2015 Reporting Period	2015-2016 Reporting Period (Prediction)
Topsoil stripped	T	0	0	0
Topsoil used/spread	T	1840	3407	0
Processing waste				
Fine Tailings	m^3	228,200	354,600	36,827
Coarse Reject	T	101,900	188,197	7,627
ROM Coal Mined				
- **Development**	T	242,245	31,100	217,911
- **Longwall**	T	1,323,756	2,066,095	0
Total ROM	T	1,566,002	2,097,195	217,911
Product Coal	T	1,359,961	1,681,841	195,615

The provisional mine production in the MOP for the 2014-2015 reporting period estimated approximately 2.43 Mt ROM coal mined and approximately 2.04 Mt product coal produced. Coal production at Austar during the reporting period was lower than predicted due to operational mining constraints.

2.5 Mineral Processing

All ROM coal from the underground is transferred by conveyors via the Ellalong Drift to a 2000 tonne bin at Pit Top, where an overland conveyor system with a nominal capacity of 750 tonnes per hour conveyors the coal to the Pelton CHPP raw coal stockpile. The majority of product coal processed at the CHPP is railed to the Port of Newcastle via the Austar Rail Line, the South Maitland Railway and the Main Northern Rail Line.

The CHPP is a heavy medium (HM) plant. There are three circuits that treat different fractions:

- No.1 HM circuit treats the -10mm x 1mm coal;
- No.2 HM circuit treats the - 40mm x 10mm coal; and
- Fines circuit treats the -1mm fraction (spirals and Classifying cyclones).

Coal enters the plant passing over a set of sizing screens.

The +40mm material reports to the plant MMD sizer, where it is sized to -38mm. The -38mm +0mm material then reports to the No.2 heavy medium circuit. The -10 x 1mm material is fed over the desliming screens and to the No.1 heavy medium circuit. The -1mm fraction is fed to the fines circuit.

2.6 Waste (Coal Reject) Management

2.6.1 Chemical/Physical Characteristics of Reject

Analysis of the waste materials at Austar indicates that it contains sulphur in the organic or pyritic form, and therefore has the potential for acid mine drainage (AMD). Details regarding the control of acid water onsite are outlined in the approved Site Water Management Plan (SWMP). Rehabilitation strategies have been developed to reduce the potential for acid mine drainage to leave the site with emplacement areas designed to drain to old mine workings.

2.6.2 Coarse Reject Material

In accordance with the MOP, coarse reject emplacement was undertaken at the following sites during the 2014-2015 reporting period.

Aberdare Extended Open Cut Void (Aberdare Extended)
The Aberdare Extended Open Cut area is the primary reject emplacement area utilised by Austar during the approved MOP term. Rejects are hauled by truck along a private haul road from the CHPP to the emplacement area.

It is planned that following the emplacement of rejects, the area will be rehabilitated to a final landform that has been agreed with the private landowner of the property. The area will be progressively rehabilitated during the MOP term. Once Aberdare Extended Emplacement Area has reached its maximum capacity, the voids on the CHPP site will become the primary Austar coal reject emplacement areas.

The Aberdare Extended Emplacement Area is situated in close proximity to neighbouring residences, as near as 40 metres, with a significant number of residences within 300 metres of the emplacement area. A consultation program was implemented prior to resuming use in 2009, and an update on progress and consultation was undertaken prior to recommencing night emplacement in June 2013. Subsequently there have been no complaints regarding reject emplacement activities at Aberdare.

East Open Cut Void (East Open Cut)
The East Open Cut is a small void on the CHPP site covering an area of approximately 15 hectares. Previously the remaining void has been used as an emergency emplacement area when dumping at the Aberdare Extended area was unavailable due to heavy rain. Since the mine recommenced in June 2005, coarse reject has been emplaced in the East Open Cut void.

It is intended that in the future until the Aberdare Extended reject emplacement area is complete, the East Open Cut reject emplacement area will be primarily utilised at times when the Aberdare Extended Emplacement Area is not available. Once the Aberdare Extended emplacement area has reached its maximum capacity, the East Open Cut will become the primary emplacement area for Austar.

West Open Cut Emplacement Area (West Open Cut)

The west open cut area has been utilised as a clean material overburden emplacement area during previous open cut operations at the site. This area provides a source of inert capping material, which will be utilised as part of the rehabilitation of reject emplacement areas. After removal of the clean overburden for capping purposes at Aberdare Extended and East Open Cut emplacement areas, it is planned to use the resultant void at the West Open Cut for ongoing reject emplacement.

2.6.3 Tailings Disposal

The fine rejects, known as tailings, flow from the CHPP and are discharged into the Pelton old underground mine workings. The return water from these tailings gravitates through the old mine workings and is recovered by dewatering pumps back into Austar's contaminated water management system for treatment and reused in the CHPP or discharged off-site under Austar's EPL license.

2.7 Waste Management

Waste management at Austar is undertaken using licensed waste contractors (Transpacific Industries, Sell & Parker and Close the Loop®) to collect and dispose of waste from the Austar site on a regular basis. Austar will continue to work with external waste contractors and mine site personnel to implement a total waste management system.

Transpacific Industries Group, who manages all waste except scrap metal and printer cartridges, produces a monthly waste management report which summarises the amount of waste produced at Austar across the different waste streams (see **Table 2-3**). The monthly waste reports also allow Austar to determine whether contamination between waste streams has occurred during the reporting month. Any issues and further information regarding cross contamination of the various waste streams can be delivered to employees and contractors through tool box talks and inductions.

TABLE 2-3 WASTE MANAGEMENT DATA FOR THE 2014-2015 REPORTING PERIOD (TONNES)

Month	Cardboard Recycle	General Waste	Oil Filters	Oily Rags	Paper Recycle	Parts Washer	Waste Oil	Wash Water	Effluent
Jul-14	0.85	27.52	0.24	-	-	0.10	0.50	25.00	-
Aug-14	0.74	46.37	0.48	-	0.24	0.10	1.20	30.00	13.00
Sep-14	1.08	57.10	0.24	0.12	0.48	0.10	3.40	-	-
Oct-14	1.26	54.96	0.48	0.12	0.24	0.10	1.60	-	-
Nov-14	0.58	41.50	-	-	-	0.10	2.00	-	-
Dec-14	1.02	35.56	0.48	-	-	0.10	1.50	-	-
Jan-15	0.66	33.18	0.24	0.24	-	0.10	3.60	-	-
Feb-15	0.83	33.87	0.24	-	0.24	0.05	3.00	-	-
Mar-15	0.60	27.49	0.72	-	0.24	0.10	1.00	-	-
Apr-15	1.08	22.81	0.24	-	0.24	0.10	2.70	-	-
May-15	0.73	26.94	0.24	-	-	0.15	1.10	-	-
Jun-15	0.74	31.53	-	-	0.72	-	2.80	-	-
TOTAL	**10.17**	**438.83**	**3.60**	**0.48**	**2.40**	**1.10**	**24.40**	**55.00**	**13.00**

Sell & Parker manage scrap metal recycling at Austar Coal Mine. Metals are sorted into categories and measured by weight recovered. Metals collected in the 2014-2015 reporting period are documented in **Table 2-4**.

TABLE 2-4 SCRAP METAL DATA FOR THE 2014-2015 REPORTING PERIOD

Metal	Total Weight (Tonnes)
Black Iron	235.55
Heavy	14.37
Mixed Scrap	58.03
No Value	6.00
Oversized	13.58
Reinforcing Steel	0.82
Steel (Irony)	20.57
Steel 300 Series	0.90
Rail	1.92
TOTAL	**351.74**

Close the Loop® collect and recycle printer cartridges from site. Cartridges collected in the 2014-2015 reporting period are documented in **Table 2-5**.

TABLE 2-5 PRINTER CARTRIDGES COLLECTED FOR THE 2014-2015 REPORTING PERIOD

Printer Cartidges	Total Weight (Kilograms)
751 Grey Waste Collector	6.22
Cartridge	16.98
Inkjet	0.54
Other	12.20
Small Bottle	0.20
Small Inkjet	0.08
Waste Collector	18.72
Total Diverted from landfill	**54.94**

2.7.1 Hydrocarbon Management

All necessary measures are taken to ensure that operations at the colliery are conducted in a responsible manner, minimising the risk of pollution to the environment. Hydrocarbon management systems are designed and installed in accordance with Australian Standards and EPA guidelines.

The CHPP hydrocarbon management systems include a covered oil store on concreted flooring, covered and bunded empty oil drum store, heavy vehicle lubrication service area and an oil evacuation system.

Austar operates a hydrocarbon remediation area at the CHPP to manage hydrocarbon contaminated material retrieved from the site. As shown in **Figure 2.1** the area is signposted and has three bunded cells for segregation of materials of different ages. The bunded area was constructed on a disused laydown area and is within the sites dirty water catchment. The contaminated materials are periodically turned to allow an adequate supply of oxygen to microbes that use the contaminants as a source of food and energy.

FIGURE 2.1 HYDROCARBON REMEDIATION AREA

At the Austar Pit Top site, the hydrocarbon management system includes a covered oil store, an oily water treatment system for the washdown bay and surface runoff, and a covered empty drum draining rack before drums are placed in recycling bins. Longwall fluid (solcenic) is stored in an above ground bunded storage area at the No. 3 shaft infrastructure site.

There is one 55,000L and one 15,000L above ground bulk diesel storage tank at the CHPP and one 58,000L above ground bulk diesel storage tank at the Pit Top. All bulk diesel storage tanks are bunded. Rain water caught on the floor of the bunds drains to a sump which can be emptied by pumps when required. Water pumped from the bund at the Pit Top bulk diesel storage bund enters the washdown pit which in turn flows into the oil water separator.

All hydrocarbon storage areas are equipped with mobile spillage kits.

2.8 ROM and Product Stockpiles

The raw or ROM coal stockpile has a live capacity of 50,000 tonnes, and an overall capacity of 500,000 tonnes. The washed product coal stockpile has a capacity of approximately 350,000 tonnes. All coal stored in excess of the live storage capacity of the system is handled using tracked bulldozers.

2.9 Water Management

2.9.1 Overview

Austar operate under an approved Site Water Management Plan (SWMP). The current approved version of the SWMP incorporating the requirements of the Stage 3 project was prepared in accordance with Condition 9 of Schedule 4 of PA08_0111 and approved by the Director General of the DPE on 17 May 2013.

The factors that influence the site water balance at Austar are complex and variable. There are a number of geographically separated interrelated systems that are managed as a whole to ensure that the operational needs of the mine are addressed whilst also meeting Environment Protection Licence (EPL) requirements.

There are many large water storage areas, both on the surface and underground, that act as buffers such that individual systems can operate independently of each other.

The water management system at Austar comprises of three (3) major components or systems:

- Underground Mine Water Management System;
- Pelton CHPP Site Water Management System; and,
- Surface Water Storage and Management System.

Water treatment onsite includes pH adjustment, flocculation and settlement of suspended sediments in addition to a reverse osmosis water treatment plant.

With the use of the reverse osmosis water treatment plant, the site operates almost independently of the town potable supply and only discharges treated water to Bellbird Creek in accordance with EPL416 conditions.

2.9.2 Surface Water

Austar's surface water management system has been designed to match the capacity of the underground dewatering systems with additional provision to store and handle surface runoff during heavy rain events.

The main surface water storage facilities are located at the CHPP, Kalingo Dam, Austar Dam and the Kitchener Surface Infrastructure Site. The water storages at Austar are summarised in **Table 2-6**.

TABLE 2-6 STORED WATER

	Volume held (cubic metres)		
	Start of reporting period (1 July 2014)	At end of reporting period (30 June 2015)	Storage capacity
Clean water			
Doyle Street Dam	4 ML	4 ML	5 ML
Dirty water			
Precipitate Dam	8 ML	8 ML	8 ML
Process Water Dam	52 ML	54.6 ML	70 ML
Number 7 Dam	86 ML	82 ML	100 ML
Water Pollution Control Ponds	0 ML	0 ML	8 ML
Storm Water Retention Dam	0 ML	0 ML	10 ML
Water Pollution Control Dam	3.2 ML	2.8 ML	40 ML
Emergency Overflow Dam	0 ML	0 ML	40 ML
Kalingo Dam	51.7 ML	92.4 ML	110 ML
Austar Dam	25.9 ML	25.6 ML	35 ML
Kitchener SIS Water Storage Dams	1 ML	1 ML	5 ML
Kitchener SIS Eastern Sediment Basins	0 ML	0 ML	1.6 ML
Controlled discharge water			
SW6 Discharge to Bellbird Creek	0 ML	0 ML	1 ML Tank
Contaminated water			
Not applicable (identified in Dirty water)			

CHPP Water Management System

The CHPP water management system includes a number of surface storage dams. The system has been developed over time and is designed to limit the need for off-site discharges to Bellbird Creek (other than at the treated water discharge point licenced by EPL 416) whilst also maximising the potential for water reuse on-site.

Kalingo Dam

Kalingo Dam has a capacity of approximately 110ML and receives water from old underground workings via No. 2 shaft dewatering pumps via a buried 450mm HDPE pipeline. Kalingo Dam is used as a staging and water storage facility. This dam assists in the removal of iron and manganese via oxidation.

Austar Dam

Austar Dam has a capacity of approximately 35ML and receives water from Kalingo Dam via a buried 315mm HDPE pipeline. It also receives water from an underground pumping station (16 cut through main south) via a rising main along the drift and surface runoff from the Austar mine pit top.

Kitchener Surface Infrastructure Site

The eastern sediment basin at the Kitchener SIS has a capacity of approximately 1.6ML and receives runoff water from the disturbed areas on the eastern part of the SIS. The water storage dams have a capacity of approximately 5ML and accept water from the western disturbed part of the site. The eastern sediment basin sends water to the water storage dams (or discharges off-site in a greater than design rainfall event), which in turn can pump water to Kalingo Dam.

2.9.3 Underground Mine Water Management

The mine has a complex groundwater management system that is heavily influenced by inflow from surrounding historic mine workings. This system is discussed in detail in the following sections.

Inflow Sources

Inflow water sources into the mine workings can be described as:

- Fairly static natural strata inflow of groundwater;
- Water piped underground used for mining and ancillary underground operations (such as dust control). A large proportion of this water is returned to the surface in the ROM coal;
- Water from high rainfall periods that enter old shallow mine workings via surface cracks etc;
- Coal washery reject water pumped underground into the old shallow mine workings;
- Water from dirty surface water management systems from mining operations, the pit top, and CHPP pumped underground into the old shallow workings; and
- Brine from the Reverse Osmosis water treatment plants pumped underground into the old shallow mine workings.

All major inflow sources have been identified and systems put in place to measure the cumulative volumes. Measurements are generally recorded on a monthly basis and results logged in a database that allows analysis of long term trends and inflows. Water levels are also monitored for the old workings of the neighbouring Bellbird, Kalingo and Aberdare Central Collieries.

Underground Water Storages

The main underground water storages include the following:

- East Pelton;
- West Pelton;
- Ellalong (2 East Panel, Longwalls 1-12);
- Ellalong Longwall 13;
- SL2 Panel; and
- Bellbird/ Aberdare Central.

For more detail, refer to the approved SWMP, available on the Austar website www.austarcoalmine.com.au.

Underground Pumping

There are two (2) underground pumping systems that deliver mine water to the surface water management system, they include:

16 Cut Through (East Pelton and West Pelton)

The 16 c/t Main South Pump Station has been designed and installed to pump mine strata water inflow from the old Pelton (East and West) Mine workings. The main tank has two pumps to pump the water to the surface to Austar Dam via a rising main installed in the drift.

Number 2 Shaft (Ellalong)

The old Ellalong Colliery workings (Longwalls 1 to 12) within Austar mine are utilised as the main underground water storage reservoir for the mine. A large diameter, multistage bore hole pump and additional pumping system installed directly within the Number 2 shaft site pumps water from these underground workings to Kalingo Dam via a vertical rising main and connecting polyethylene pipe line. Mine water may be diverted from this pipeline to Bellbird Colliery.

Groundwater Interception

Austar maintains a comprehensive water inflow database which allows assessments to be made regarding the origin of inflow sources. The recirculation of stored waters, which reside in the up dip old mine workings and percolate through the coal barriers at a relatively constant rate, can be separated from the inflows resulting from the interception of natural groundwater bearing zones due to mining. These natural groundwater bearing zones will typically comprise water held within the Greta seam depressurising into the mine as new workings enter virgin domains and similarly as a result of goaf formation above the longwall panels within the lower sections of the Branxton Formation.

Bore Licence Certificates 20BL171481, 20BL173349 and 20BL173350 have a combined extraction limit of 770ML (approximately 2.1 ML/day) in any 12 month period commencing 1 July.

The amount of groundwater intercepted from monthly flow rates and volumes for the annual licence period are provided in **Table 2-7**.

TABLE 2-7 INCIDENTAL GROUNDWATER INTERCEPTION AT AUSTAR

Month	Groundwater Interception (ML/day)	Monthly Groundwater Interception (ML)
July 2014	2.0	62
August 2014	2.0	62
September 2014	1.1	33
October 2014	1.4	43.4
November 2014	0.8	24
December 2014	0.8	24.8
January 2015	0.8	24.8
February 2015	0.9	25.2
March 2015	1.0	31
April 2015	0.4	10.8
May 2015	0.5	16.1
June 2015	0.5	15
TOTAL		**357.1**

The total incidental groundwater interception of 357.1 ML for the reporting period is within the licensed groundwater interception of 770 ML in any 12 month period. The total incidental groundwater intercepted is similar to but slightly less than in the 365 ML recorded for the 2013-2014 reporting period.

Groundwater interception rates will continue to be reviewed as mining progresses. A 2007 study by Connell Wagner determined the most important natural groundwater resource in the Newcastle / Cessnock area is found in the alluvial sediments. These aquifers are not predicted to be intercepted by Austar mining due to the depth of cover above the Greta Coal Seam. Groundwater monitoring within the alluvial aquifer supports this prediction with no depressurisation identified by monitoring in the Stage 2 area (**Section 3.6**). Mining in the Stage 3 area to the end of the AEMR period has not yet reached alluvial areas.

2.9.4 Monitoring System

The site has a centralised monitoring and communication system (CITECT) that is managed 24 hours a day by the Control Room Operator. The system enables remote control of the major components and communications across the entire mine site. The real time monitoring system includes a wide range of parameters including water pressure, flow rates and storage dam levels.

In addition, a range of water quality and flow data is collected underground. The following component areas are monitored regularly:

- Water pumped underground by events or processes controlled at the CHPP;
- Inflow from inseam drilled boreholes;
- Flow from stored water bodies;
- Water piped underground and used for mining operations; and
- Water intercepted underground and pumped out of the mine.

2.9.5 CHPP Water Management System

Monitoring System

All mine water pumped from underground inflow sources and the surface mine water dams (Austar Dam / Kalingo Dam) is pumped to the Process Water Dam at the CHPP after passing through the lime treatment plant and precipitate dam.

Depending on dam levels, flow rate and demand within the system, water is managed via the:

- Reverse osmosis (RO) water treatment system;
- Coal washing and handling system; and
- Stormwater runoff and management system.

Dirty water from the three systems is discharged back into the old underground mine workings where settling of sediment occurs prior to the water being collected and pumped to the surface again.

Clean permeate from the treatment plant is used as the water supply for underground mining operations and in the coal preparation plant. Excess treated water that is not utilised on site is discharged into Bellbird Creek in accordance with the conditions of EPL 416. The CHPP site, including water management infrastructure, is inspected daily by CHPP personnel.

Water Treatment System – Reverse Osmosis (RO)

Mine water collected from underground workings is passed through a lime softening process neutralising pH causing the precipitation of iron and other metals prior to treatment at the Water Treatment Plant (WTP). Limited oxidation occurs in Austar and Kalingo dams preceding this. The water then enters into the precipitation dam where the precipitated iron and other metals settle out with the assistance of a flocculation aid. Water then flows to the Process Water Dam from where it is pumped to the WTP.

The WTP contains three reverse osmosis (RO) units and can treat up to 6.2 ML/day in total of mine water with three units running in parallel at >50% recovery. The current configuration is two units in

parallel (primary stage) with the third unit, a secondary recovery brine treatment stage, for additional clean water recovery from the brine of the primary units.

Water pumped from the process dam undergoes primary filtration, secondary filtration through multi-media filters and final tertiary filtration through cartridge/bag filters. Filtered water is then pumped through the RO Trains for permeate (clean water) production. The reject or brine (approximately <50% of feed water to the WTP plant) is returned underground via the Bellbird boreholes. The clean permeate is used in the CHPP or underground mine with any excess discharged to Bellbird Creek in accordance with EPL requirements.

Coal Handling Preparation Plant (CHPP)

The Austar CHPP is a heavy medium cyclone and spirals plant that operates at nominal capacity of 750 tph.

The CHPP requires an average 2.0 ML/day of water to operate. This water may be a blend of process dam water and permeate from the RO plant. Approximately 1.0 ML/day of fine tailings (approximately 30-45% solids) is returned underground to the abandoned Pelton underground workings.

Storm Water Run-Off and Management System

Stormwater management at the CHPP aims to contain all runoff in surface dams up to their capacity with excess dirty water runoff piped into the former Bellbird Colliery workings via a borehole. All dirty water runoff from the CHPP surface is contained within the dirty water management system, with the final destination in normal operation being the Water Pollution Control Dam in the eastern part of the CHPP site. Other areas of the CHPP site are used to act as on site retention structures to control stormwater flow to the Water Pollution Control Dam in large storm events.

Water levels in the Water Pollution Control Dam are monitored and pump status to the Bellbird Colliery borehole checked regularly. In the event of a major storm exceeding the Water Pollution Control Dam capacity, the overflow is directed to the Emergency Overflow Dam. A pump in the Emergency Overflow Dam can return storm water to the dirty water system to minimise the risk of off-site discharge at the licensed outlet (weir) of the Emergency Overflow Dam.

On one occasion during an east coast low on 21-22 April 2015, stormwater inflows were so large that the Emergency Overflow Dam discharged over it's discharge weir. Further detail on that event are included in **Section 3.5**.

2.10 Hazardous and Explosive Materials Management

An explosive magazine storage facility is located at the Austar Pit Top. Two relocatable type magazines are installed in a bunded area. The magazines were prepared in accordance with AS 2187.1 – 1998, behind an earth embankment that is approximately 10 m high. The magazine stores have been located to provide appropriate separation distances from other buildings and facilities on the site, with appropriate security in place.

In addition, the following dangerous goods depots are located on site:

- Packaged oil store (20,000 L), in accordance with AS 1940 - 1993;
- Flammables cabinet (<100 litres); and
- Compressed gas store (<7 Size G Cylinders) containing no more than 4x E oxygen and 2x E acetylene plus nitrogen and argon in store.

2.11 Other Infrastructure Management

Other infrastructure associated with Austar Coal Mine includes the following:

- Austar Pit Top Facilities (mine drift, mine dewatering, workshop, equipment storage, services, coal clearance, and offices);
- Pelton CHPP (coal handling, water treatment, and coal transport);
- Aberdare Extended Emplacement Area (coarse reject emplacement);
- No. 1 Shaft (second egress man winder);
- No. 2 Shaft (mine dewatering);
- No. 3 and No.4 Shaft service facilities (ventilation fans, underground services);
- Kalingo Pit Top (including Kalingo Dam); and
- Kitchener Surface Infrastructure Site (ventilation shaft No. 5 and No. 6, ventilation fans, services borehole/drophole).

The above mentioned areas are part of the monthly environmental inspection at Austar.

2.12 Product Coal Transport

The existing approved coal transport system has continued to be utilised to transport product from the site. During the reporting period 1,542,738 t of product coal from Austar was transported 65 km by rail to Port Waratah Coal Services (PWCS) ship coal loading facilities for sale on the export market.

During the 2014-2015 AEMR reporting period, 20,344t of product coal was transported by road haulage. The product coal was transported by road to Port Waratah Coal Services (PWCS) ship coal loading facilities. PA08_0111 states that Austar may transport up to 60,000 t of coal by road in any calendar year. During the entire 2014 calendar year, 10,268 t of coal was hauled by road which complied with PA08_0111's road haulage limit.

3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

3.1 Environmental Management

Austar operates in accordance with the approved Environmental Management Strategy (EMS). The EMS is a requirement of Condition 1, Schedule 7 of PA08_0111 and Condition 1, Schedule 5 of DA29/95. **Figure 3.1** outlines the relationship between the EMS and the other management plans and monitoring programs. The objectives of the EMS include:

- provide an overall framework for environmental management;
- identify key environmental aspects to be addressed in the strategy and supporting plans and procedures;
- establish procedures for reviewing progress and implementing corrective actions; and
- provide a framework for review and continual improvement.

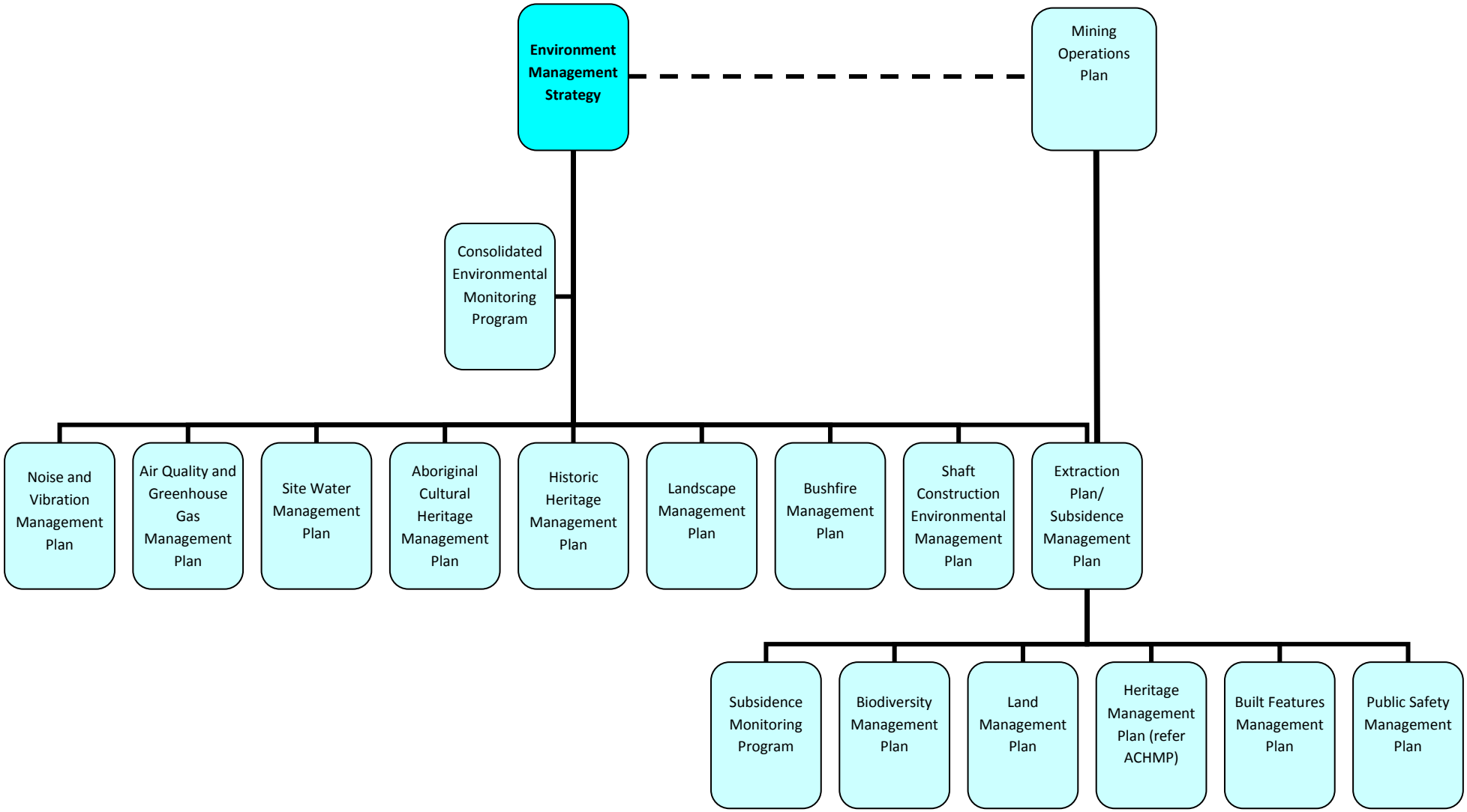


FIGURE 3.1 EMS FRAMEWORK & OTHER MANAGEMENT PLANS

Environmental monitoring at Austar is undertaken in accordance with requirements of the various individual management plans, the monitoring details of which are consolidated into the Environmental Monitoring Program (EMP) for ease of reference. The EMP monitoring details are summarised in **Table 3-1**.

TABLE 3-1 ENVIRONMENTAL MONITORING FOR 2014-2015 REPORTING PERIOD

Element	Frequency	Method
Air Quality	Monthly 6 daily Continuous	8 x static dust gauges (1 x temporary static dust gauge) 3 x high volume air sampler (HVAS) 1 x continuous dust monitor (TEOM)
Noise	Quarterly	Attended monitoring at 9 locations, 3 nights per quarter (CHPP, KIA and SIS)
Water – Surface	Monthly	Sampling at 5 locations as per EPL 416 and 4 locations per SWMP
Water – Ground	Quarterly	Sampling at range of locations in accordance with SWMP
Vibration	Continuous	Triaxial geophone at 2 locations
Subsidence	Intervals dependent on mining per the monitoring program	Field survey per Subsidence Monitoring Program
Meteorology	15 minute	Weather station at CHPP
Ecology	Bi-annual	Spring / Autumn survey over Stage 2 and 3 mining area
General Environmental Conditions	Monthly	Visual inspection of key facilities
Community	Checked daily during business hours	24 hour community complaint/enquiry line

Environmental monitoring is an integral part of the overall EMS. The measurement and evaluation of monitoring data allows for the assessment of performance against quantitative and qualitative standards and assists in the identification of any non-conformances or areas that may require additional attention. The location of Austar's surface water, groundwater, air quality, noise and vibration monitoring sites are shown on **Plan 2**.

3.2 Meteorological Data

In accordance with DA29/95, PA 08_0111 and EPL 416, Austar operate and maintain a meteorological station located at the CHPP (**Plan 2**). The following section summarises the meteorological data for the 2014-2015 reporting period.

3.2.1 Rainfall

The total monthly rainfall (mm) and number of rain days during the reporting period is shown in **Table 3-2** and **Figure 3.2**. A total rainfall of 814.8 mm was recorded during the 2014-2015 reporting period. This represents an increase of 334.3 mm from the previous 480.5 mm for the 2013-2014

reporting period, additionally it is 99.1 mm above the annual average rainfall for the Cessnock region of 715.7mm (Bureau of Meteorology Cessnock Airport AWS 1968 - 2015).

TABLE 3-2 RECORDED RAINFALL 2014-2015

Total Monthly Rainfall (mm)												
Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Total**
13.2	89.2	33.8	29.4	20.8	126.8	114.4	29.6	26	230.6	81.6	19.4	**814.8**
Number of Rain Days (>0.2mm)												
3	12	7	8	6	17	12	10	9	11	11	9	**115**

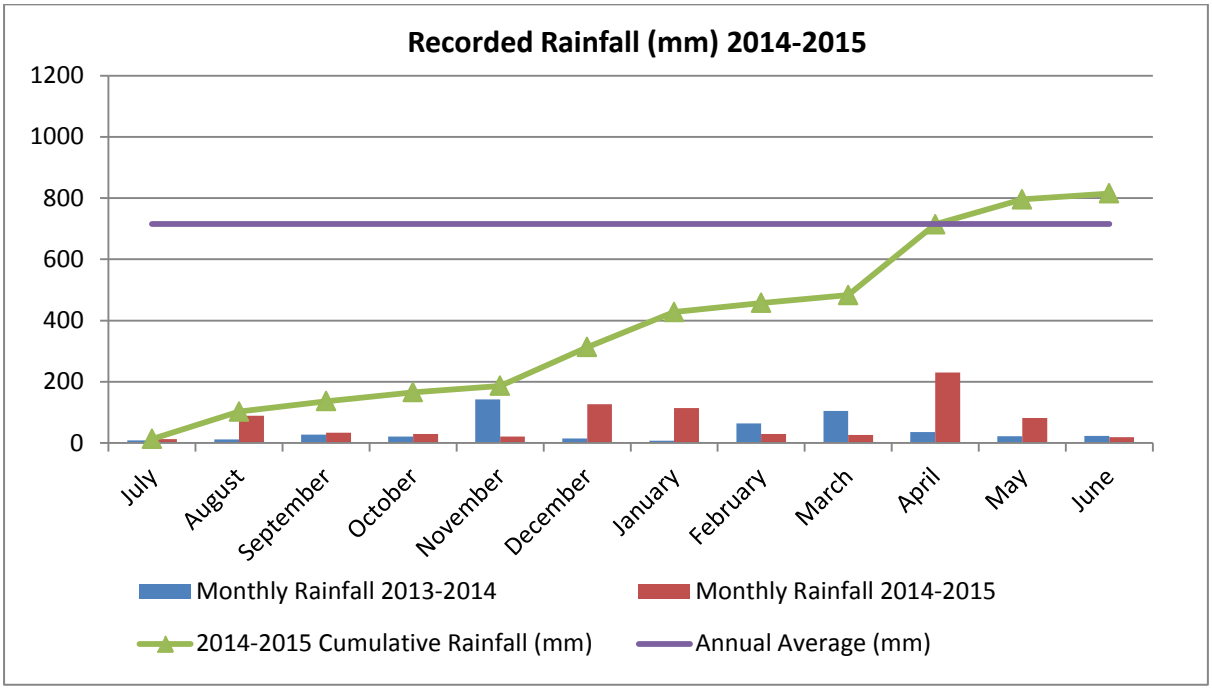


FIGURE 3.2 RECORDED RAINFALL AT AUSTAR METEOROLOGICAL STATION (MM) 2014-2015

3.2.2 Temperature

Monthly maximum and minimum temperatures recorded during the reporting period are shown in **Table 3-3**.

TABLE 3-3 MONTHLY MINIMUM AND MAXIMUM TEMPERATURES 2014-2015

Minimum and Maximum Monthly Temperatures (°C)												
	Jul	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Min	-1.6	0.3	4.2	5.0	8.6	13.2	11.9	13.5	8.4	9.3	3.8	1.7
Max	22.6	20.4	30.7	38.1	44.1	36.7	35.7	35.2	38.6	29.8	25.2	21.7

3.2.3 Wind Speed

The recorded wind speed and direction data is summarised in **Table 3-4**. The annual wind rose for the reporting period is displayed in **Figure 3.3**.

TABLE 3-4 MEAN MONTHLY WIND SPEED 2014-2015

Month	Mean Wind Speed (m/s)	Mean Maximum Wind Speed (m/s)	Dominant Wind Direction
July 2014	1.1	8.4	SW
August 2014	1.6	7.9	SW
September 2014	1.4	8.0	SSW
October 2014	1.2	8.9	SSW
November 2014	1.3	8.8	S
December 2014	1.0	8.7	SE
January 2015	1.1	7.6	SSE
February 2015	0.9	7.1	SE
March 2015	1.0	7.7	SSW
April 2015	1.4	8.4	SW
May 2015	1.1	7.4	SW
June 2015	0.7	5.8	SSW

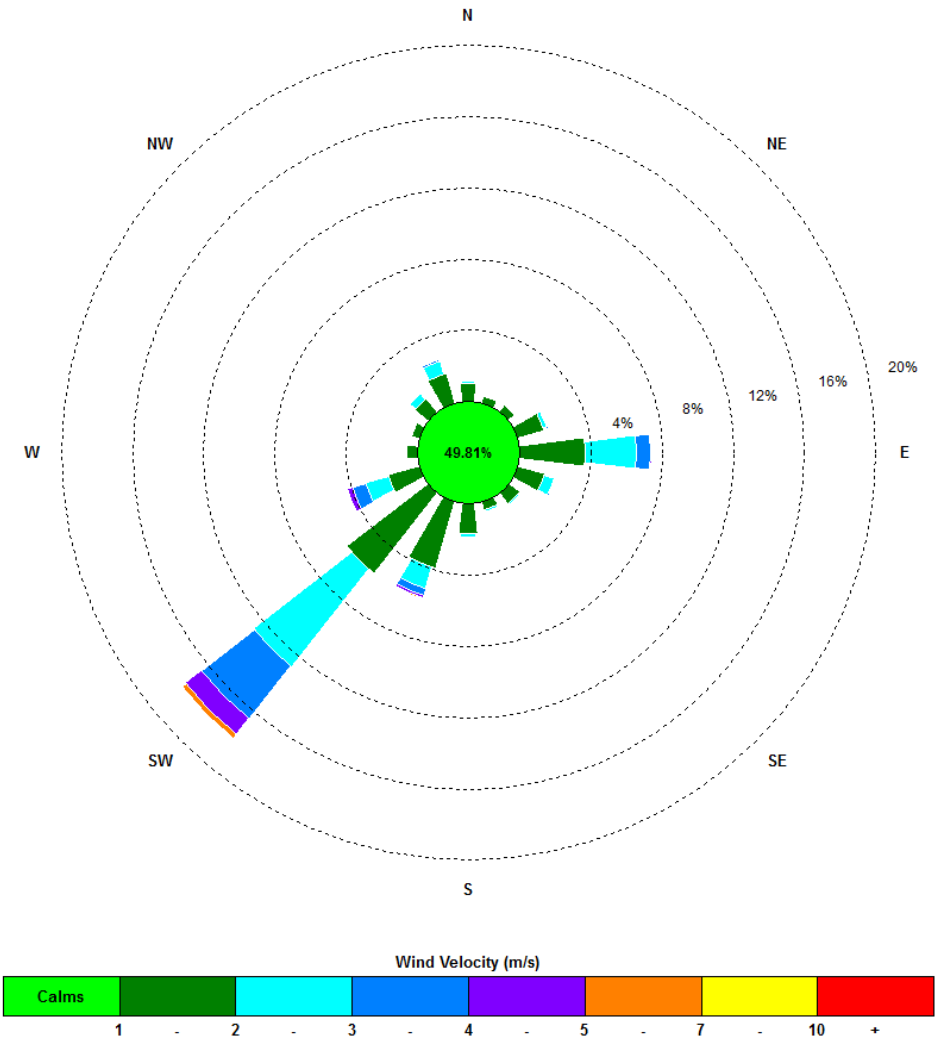


FIGURE 3.3 MONTHLY AVERAGE WIND ROSE 2014-2015

3.3 Air Pollution

3.3.1 Environmental Management

Austar prepared an updated Air Quality and Greenhouse Gas Management Plan for the Mine Complex as required by PA08_0111 Schedule 4 Conditions 6 and 7 which included the Stage 3 operations. This Plan was approved by DPE on 26 June 2013. In accordance with this Plan, additional air quality monitoring commenced in July 2013.

Dust generated from traffic around the CHPP, Pit Top, workshop areas and access roads is controlled by a water cart during active use of these areas. Generally, the majority of the site is stable, and does not generate excessive dust.

The AQM&MP was implemented by Austar and utilises eight (8) dust depositional gauges, three (3) high volume air samplers (HVAS) and one (1) continuous dust monitor (TEOM). The HVAS and TEOM measure for particulate matter less than 10 micrometres (<=10µm), or more commonly referred to as PM_{10}. The location of Austar's air quality monitoring equipment is listed in **Table 3-5**, and shown on **Plan 2**.

TABLE 3-5 LOCATION OR AIR QUALITY MONITORING POINTS

Site	Location Description
Dust Gauge D1	Pyne Way, Mount View
Dust Gauge D2	Ellalong Road, Pelton Village
Dust Gauge D2A	Ellalong Road, Pelton Village
Dust Gauge D3	Bimbadeen Road, Mount View
Dust Gauge D4	Ellalong Village
Dust Gauge D5	Kalingo Infrastructure Area (Upcast Shaft 3)
TEOM D6	Bimbadeen Road, Mount View
Dust Gauge D7	Pelton Fire Trail, Quorrobolong
Dust Gauge D8	Coney Creek Lane, Quorrobolong
Dust Gauge D9	Kitchener Village
HVAS 1 (PM_{10})	Pyne Way, Mount View
HVAS 2 (PM_{10})	Ellalong Road, Pelton Village
HVAS 3 (PM_{10})	Coney Creek Lane, Quorrobolong

The air quality criteria for deposited dust, particulate matter <10µm (PM_{10}) and total suspended particulates (TSP) are provided in **Table 3-6**.

TABLE 3-6 AIR QUALITY CRITERIA FOR PARTICULATE MATTER

Description	Pollutant	Criterion	Averaging Period
Long Term Impact Assessment Criteria for Particulate Matter	Total Suspended Particulate (TSP) matter	90 µg/m^3	Annual
	Particulate Matter < 10µm (PM_{10})	30 µg/m^3	Annual
Short Term Impact Assessment Criterion for Particulate Matter	Particulate Matter < 10µm (PM_{10})	50 µg/m^3	24 hour
Long Term Impact Assessment Criteria for Deposited Dust	Depositional Dust	2 g/m^2/month (maximum increase in deposited dust level)	Annual
		4 g/m^2/month (maximum total deposited dust level)	Annual

Note: *Deposited Dust is assessed as insoluble solids as defined by Standards Australia, 2003 AS3580.10.1 -2003: Methods for Sampling and Analysis of Ambient Air – Determination of Particulates – Deposited Matter – Gravimetric Method.*

Methods for sampling and analysis of ambient air as defined by Standards Australian, AS 3580.9.6 -2003: Determination of suspended particulate matter—PM10 high volume sampler with size selective inlet—Gravimetric method.

3.3.2 Environmental Performance

In accordance with the AQM&MP, eight (8) dust depositional gauges, three (3) high volume air samplers (HVAS) and one (1) continuous dust monitor (TEOM) were operated by Austar during the reporting period. During the reporting period, all dust samples were collected by trained specialists and analysed by NATA certified laboratories. This work is carried out in accordance with statutory requirements and relevant standards. Monitoring equipment is maintained in accordance with the manufacturer's specifications by qualified specialists. A compilation of dust deposition results and PM_{10} monitoring data for the reporting period is provided in **Appendix A**.

Dust Deposition

Table 3-7 provides a summary of Austar's annual average for insoluble solids during the reporting period and the previous reporting period.

Depositional dust results during the reporting period were below the annual average criteria of 4g/m^2/month for insoluble solids. Overall dust results were generally equivalent to the 2013-2014 reporting year.

Dust results for the reporting period are consistent with dust results stated in the 1995 Environmental Impact Statement (EIS) for extension of underground mining operations at Pelton/Ellalong Colliery. Section 4.7.2 of the 1995 EIS states that historical dust depositional data since 1991 ranges between 0.2 to 2.7 g/m^2/month.

TABLE 3-7 DUST GAUGES ANNUAL AVERAGE

No	Location	Annual Average Insoluble Solids (g/m^2/month) 2013/2014	Annual Average Insoluble Solids (g/m^2/month) 2014/2015
D1	Pyne Way, Mount View	1.9	1.0
D2	Ellalong Road, Pelton Village	1.8	1.5
D3	Bimbadeen Road, Mount View	1.1	1.2
D4	Ellalong Village	1.8	2.4
D5	Kalingo Infrastructure Area (Upcast Shaft 3)	1.5	2.3
D7	Pelton Fire Trail, Quorrobolong	0.7	0.7
D8	Coney Creek Lane, Quorrobolong	0.6	0.8
D9	Kitchener Village	0.8	0.9

In August and September 2014, D4 in Ellalong Village recorded results of 4.9 and 4.3 g/m^2/month, respectively. The annual average for D4 at the end of the reporting period remained at 2.4 g/m^2, well below the Annual Maximum Criteria of 4 g/m^2.

In December 2014, D5 in Kalingo Infrastructure Area (Upcast Shaft 3) recorded a result of 4.8 g/m^2/month. The annual average for D5 at the end of the reporting period remained at 2.3 g/m^2, well below the Annual Maximum Criteria of 4 g/m^2.

Overall, a total of nine (9) monthly dust deposition gauges were contaminated with bird droppings/ insects and one (1) monthly dust deposition gauge was stolen, these results were left out of the annual average calculation.

Assessment criterion of a maximum increase of 2g/m^2/month annual average for deposited dust was undertaken by comparing annual average deposited dust results for 2014-2015 to those from the previous reporting period. All gauges had a difference in annual averages of less than 2g/m^2/month when compared with dust results from the 2013-2014 reporting period.

PM_{10} (Fine Dust)

The annual average PM_{10} results for the reporting period are provided in **Table 3-8**.

TABLE 3-8 PM_{10} HVAS RESULTS

No	Location	Annual Average PM_{10} ($\mu g/m^3$) 2013-2014	Annual Average PM_{10} ($\mu g/m^3$) 2014-2015
HVAS1	Pyne Way, Mount View	12.4	11.1
HVAS2	Ellalong Road, Pelton Village	13.8	11.9
HVAS3	Coney Creek Lane, Quorrobolong	-	10.8

The HVAS units continued to operate on a six day cycle (in line with the OEH cycle) during the reporting period. HVAS3 was installed at 159 Coney Creek Lane, Quorrobolong on 9 June 2014, as such there is insufficient data available for the 2013-2014 reporting period from HVAS3 to provide a meaningful annual average for comparison with the 2014-2015 data. The annual average PM_{10} results for the reporting period are well below the annual average criterion of 30 µg/m^3 at HVAS1, HVAS2 and HVAS3. Results have decreased or remained unchanged since the previous reporting period of 2013-2014 for HVAS1 and HVAS2.

The measured 24 hour PM_{10} did not exceeded the 24 hour maximum criteria of 50µg/m^3 during any monitoring events during the 2014-2015 reporting period.

Total Suspended Particulates

The annual average TSP results for the reporting period are provided in **Table 3-9**.

TABLE 3-9 TSP HVAS RESULTS

No	Location	Annual Average TSP (µg/m^3) 2013/2014	Annual Average TSP (µg/m^3) 2014/2015
HVAS1	Pyne Way, Mount View	31.0	27.8
HVAS2	Ellalong Road, Pelton Village	32.5	29.8
HVAS3	Coney Creek Lane, Quorrobolong	8.8	27.0

The current project average for calculated Total Suspended Particulates (TSP) is well below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} result by 2.5 in accordance with the method outlined in the AQM&MP.

PM_{10} (Fine Dust) Continuous Dust Monitoring

A Tapered Element Oscillating Microbalance analyser (TEOM) which measures PM10 on a real-time continuous basis was installed by Austar in February 2015 and monitoring commenced on 24 March 2015. 24 hour average results for the reporting period and graphical representation of the running and cumulative average of PM10 results are provided in **Appendix A**. The annual average from 24 March 2015 to 30 June 2015 is 6.3µg/m^3 for PM10.

3.4 Erosion and Sediment

3.4.1 Environmental Management

In accordance with PA08_0111 Schedule 4 Condition 9, Austar prepared a Site Water Management Plan (SWMP) for the mine complex which includes an erosion and sediment control plan. The SWMP was approved by the Director-General of DPE on 17 May 2013.

In accordance with the SWMP, a range of erosion and sediment control measures have been implemented across the mining complex with the aim of preventing soil erosion and the entry of sediments into surrounding water bodies. Monthly environmental inspections are undertaken to

inspect the sediment control structures for capacity, structural integrity and effectiveness. A summary of Austar's sediment and erosion control measures is outlined below. The performance of these measures is discussed in **Section 3.4.2** of the AEMR.

The Landscape Management Plan for Kitchener SIS has been developed to document management strategies for the Kitchener SIS in the short, medium and long term and was approved by the Director-General of DPE 22 July 2013. Stabilisation works were progressed at the SIS during the 2014-2015 reporting period with landform shaping and ground cover establishment.

The Landscape Management Plan and SWMP indicates that the erosion and sediment controls documented in the Shaft Construction Environmental Management Plan (SCEMP) will continue to be implemented until the site is stabilised. Section 6 of the SCEMP details the erosion and sediment control strategy for the SIS during construction, which were implemented in accordance with this plan during the 2014-2015 reporting period.

Drainage Channels

Drains have generally been constructed with either a parabolic or trapezoidal cross section rather than a V-shape which can be easily eroded. Where possible, channels have been constructed with an adjacent earth bank. All channels are periodically inspected (at least every three months or after rain) to repair damage caused by scour, sediment deposition, channel obstruction and loss of vegetative cover.

Sediment Basins

Several small sediment basins have been constructed within the dirty water system. These are in addition to the main pollution control structures. The sediment control basins have been designed and located to contain dirty water from disturbed areas on site. The primary purpose of these basins is to contain sediment from normal rainfall events as well as reduce flow velocity during high rainfall events.

These structures are regularly maintained and cleaned out once capacity has reduced by over 10%. The structures are inspected after major rainfall events and any erosion of the spillway is corrected.

Within the footprint of the SIS disturbed area there are two designed sediment basins for surface water runoff management. These sediment basins are designed for a specific design rainfall event, and are managed using pumping to minimise overflow occurrences during greater than design rainfall. The sediment basins are inspected regularly by the Environment and Community Coordinator.

Sediment Fences

The use of sediment fences and hay bales provides interim protection from sediment runoff at Austar. Regular inspection of sediment fences and hay bales is undertaken at Austar following significant rainfall events.

3.4.2 Environmental Performance

During the 2014-2015 reporting period there were three reportable incidents at the Kitchener SIS that involved water overflowing from the eastern sediment basin or water storages dams after a rainfall event that exceeded the design capacity of the basin. The sediment basin design size is based on a catchment area of 3.7 Ha (being the cleared area on the eastern side) and Type D soils for a 90th percentile five day rainfall depth of 42.8mm. The sediment dam has a volume of approximately 1.6ML. Details of the overflows are as follows:

- 8/12/2014 – The incident involved the lower water storage dam at the SIS discharging over its lowest point into Black Creek, due to a greater than design rainfall event. A total of 146mm fell over the period 3 to 8 December 2014 prior to the incident. The approved 90th percentile, 5 day rainfall design is 42.8mm.

- 21/04/2015 – The incident involved the Eastern Sediment Basin and the Lower Water Storage Dam discharging over their lowest points during an east coast low storm event. A total of 231mm fell over the period 20 to 22 April 2015 prior to and during the incident. The approved 90th percentile, 5 day rainfall design for the Eastern Sediment Basin is 42.8mm. The lower water storage dam design runoff capacity is greater than the 90th percentile, 5 day rainfall depth.

- 4/05/2015 – The incident involved the Eastern Sediment Basin discharging over its spillway due to higher than design rainfall. A total of 45.4mm fell over the period 30 April 2015 to 3 May 2015 prior to the incident. The approved 90th percentile, 5 day rainfall design for the Eastern Sediment Basin is 42.8mm.

The following actions were taken in response to each of these incidents:

- Overflow was immediately reported to the EPA Environment Line;

- The EPA was provided with a written incident report;

- Pumping of water from the eastern sediment basin to the water storage dams occurred as soon as sufficient runoff had collected in the basin, to reduce accumulated stormwater in readiness for future rainfall events; and,

- Pumping of water from the water storage dams to Kalingo Dam occurred as soon as sufficient water had collected, to reduce accumulated stormwater pumped to these dams in readiness for future rainfall events.

For further details regarding this incident please refer to **Appendix G**.

3.5 Surface Water

3.5.1 Environmental Management

In accordance with PA08_0111 Schedule 4 Condition 9, Austar prepared a Site Water Management Plan (SWMP) for the mine complex which includes a surface water monitoring program. The SWMP was approved by the Director-General of DPE on 17 May 2013.

Austar have engaged an environmental monitoring specialist to undertake routine surface water sampling and analysis in accordance with the SWMP. Austar's surface water monitoring program includes:

- 5 EPL monitoring sites (three creek sites and two discharge points); and
- 4 creek monitoring sites (three sites in Quorrobolong Creek and one site in Cony Creek).

In addition, grab samples are taken opportunistically from other points around the mine when required (e.g. sediment dams and mine water storage dams). The surface water monitoring locations are presented in **Table 3-10** and shown on **Plan 2**.

TABLE 3-10 SURFACE WATER MONITORING LOCATIONS

Area	Monitoring Location	Parameters	EPL Limits /Criteria
CHPP – EPL Points	• **SW1** – Emergency Dam Spillway, **EPL Point 1**	pH EC Fe TDS TSS Volume	6.5-8.5 N/A 1 mg/L 6,000 mg/L 50 mg/L 2,000 KL/day
	• **SW2** – Bellbird Creek Pinch Bridge, **EPL Point 2** • **SW4** – Bellbird Creek Eastern Boundary Downstream of CHPP, **EPL Point 4** • **SW5** – Unnamed Creek Western Boundary Upstream of CHPP, **EPL Point 5**	EC pH Fe TSS	N/A N/A N/A N/A
	• **SW6** – 1ML tank discharge to Bellbird Creek, **EPL Point 6**	EC pH Fe TSS Volume	600 µS/cm 6.5-8.5 1 mg/L 50 mg/L 2,000 KL/day as annual average

Area	Monitoring Location	Parameters	EPL Limits /Criteria
Creeks – Stage 2 UG Mining Area	• **SWQ1** – Quorrobolong Creek Sandy Creek Road • **SWQ2** – Quorrobolong Creek Upstream of Stage 2 Area • **SWQ3** – Quorrobolong Creek Downstream of Stage 2 Area • **SWC1** – Cony Creek	EC pH Fe TSS	N/A N/A N/A N/A

3.5.2 Environmental Performance

Surface water quality data is presented in **Appendix B**. Only EPL licensed discharge points SW1 and SW6 have water quality limits. Other locations are monitored for baseline data, or to observe any changes in water quality in the Stage 2 and Stage 3 areas.

There was one (1) discharge event from SW1 during the reporting period, the details of this event are outlined below. At the permeate EPL discharge point SW6, water quality results for pH and EC were within EPL limits.

For the background CHPP creek monitoring points (SW2, SW4 & SW5):

- the pH measured at individual sites remained relatively constant ranging between pH 6.50 (SW2) and 7.60 (SW5) which was similar to the 2013-2014 range of pH 6.51 to 7.74;
- Surface water EC ranged between 220µS/cm (SW2) and 14,100µS/cm (SW5) which was similar to the 2013-2014 range of 124µS/cm (SW2) to 13,700µS/cm (SW5);
- TSS recorded a maximum of 442mg/L (SW4) with a minimum TSS of <1mg/L (SW2 & SW4) for the reporting period, the maximum TSS was slightly elevated when compared with the 2013-2014 range of <5mg/L (SW2 & SW4) to 104mg/L (SW5); and,
- Fe (Iron) recorded a minimum of <0.05mg/L (SW2) and a maximum of 19.5mg/L (SW4) for the reporting period, similar to the 2013-2014 range of 0.06mg/L (SW2) of 14.9mg/L (SW5).

Results from SW5 (upstream of CHPP influence) for TSS and iron were similar to those from the 2013-2014 reporting period but remain variable, most likely due to the ephemeral nature of the stream in this location. SW5 samples were collected from small pools in the creek bed on numerous occasions throughout the reporting period.

Natural fluctuations in water quality in Quorrobolong and Cony Creeks were observed, with sample points displaying similar trends when compared to the previous reporting period. No environmental impacts upon surface waters from mining in the Stage 2 area can be interpreted.

For the Quorrobolong and Cony Creek monitoring points (SWQ1, SWQ2, SWQ3 & SWC1):

- The pH measured at individual sites remained relatively constant ranging between pH 6.60 (SW Q2 & SW Q3) and pH 7.85 (SW Q1), which was similar to the 2013-2014 range of pH 6.52 to 8.03;
- EC ranged between 112µS/cm (SW Q2) and 3,020µS/cm (SW Q2), which was similar to the 2013-2014 range of 144 to 3,000 µS/cm;
- TSS recorded a maximum of 210mg/L (SW C1) with a minimum TSS of <1mg/L (SW Q3) for the reporting period, the maximum TSS was slightly lower compared to the 2013-2014 range of <5 to 381mg/L; and,
- Fe (Iron) recorded a minimum of 0.39mg/L (SW C1) and a maximum of 15.30mg/L (SW C1) for the reporting period, which slightly elevated compared to the 2013-2014 range of 0.07 to 9.40mg/L.

EPL Licenced Discharge Point 1

A discharge occurred from Licenced Discharge Point No. 1 (LDP1) on 21 to 22 April 2015 at Austar's CHPP, during the intense east coast low storm event occurring which occurred in the Hunter Region during April 2015.

LDP1 is located at the overflow weir of the Emergency Overflow Dam (EOD). The dirty water management system at the CHPP is designed so that all CHPP site dirty runoff is directed to the Water Pollution Control Dam (WPCD) where it can then be pumped to the Bellbird underground workings for disposal via electric or diesel pumps. If the WPCD fills it overflows to the EOD.

Discharge is permitted from LDP1 when the discharge occurs solely as a result of rainfall at the premises exceeding:

- A total of 168mm over any consecutive five day period; or,
- 48mm less than any consecutive 12 hour period.

The volume limit for LDP1 is 2000 kilolitres per day. The pollutant concentration limits for LDP1 are presented in **Table 3-11**.

TABLE 3-11 LDP1 CONCENTRATION LIMITS

Pollutant	EPL Concentration Limit
pH	6.5-8.8
TDS (mg/L)	6000
TSS (mg/L)	50
Iron (mg/L)	1

The EPL also requires that Black Creek Water users are notified that of a discharge from LDP1.

The location of LDP1 (SW1) is presented in **Plan 2**. The discharge occurred from 5:30pm 21 April 2015 to 2:30pm 22 April 2015. The discharge was the result of the high volume of rainfall received at the CHPP from a significant east coast low storm event. A total of 178mm was received over 5 days between 19 April and 23 April 2015. In addition, during one consecutive 12 hour period on 21 April 2015 between 4:30am and 4:30pm, 77.8mm rainfall was received. Both the 5 day rainfall and the 12 hour rainfall figures are greater than the minimum rainfall required before discharge is permitted from LDP1 by the EPL.

1981kL of water was discharged from LDP1 to Bellbird Creek on 21-22 April 2015, which is less than the LDP1 volume limit of 2000kL per day.

pH and iron concentrations in the discharged water exceeded the discharge concentration limits in the EPL. The non-compliance was identified when laboratory results from samples collected during the discharge event were received on 28 April 2015. Other water quality concentrations were within concentration limits. The pollutant concentration limits for LDP1 and the results of sampling at LDP1 (sampling site SW1) are presented in **Table 3-12**.

Sampling of the stormwater discharge was carried out in response to the discharge in accordance with the EPL requirements for discharging from LDP1, which are:

- Samples to be collected from LDP1 (SW1) daily at a minimum of twelve hourly intervals when a discharge is occurring from LDP1.
- Samples to be collected from Point 2, Point 4 and Point 5 (SW2, SW4 and SW5 respectively) three times per week during any period of discharge from Point 1 at a minimum of 48 hour intervals.

The samples were sent to the laboratory for testing for pH, EC, TDS, TSS and iron, as per EPL requirements. The results of sampling are presented in **Table 3-12** and **Table 3-13**.

TABLE 3-12 LDP1 SAMPLING RESULTS

Pollutant	SW1 (22/04/15 09:00)	EPL Concentration Limit
pH	3.55	6.5-8.8
TDS (mg/L)	830	6000
TSS (mg/L)	17	50
Iron (mg/L)	10.7	1

TABLE 3-13 SW2, SW4 AND SW5 SAMPLING RESULTS

Site	Date/Time	pH	EC (µS/cm)	TSS (mg/L)	Iron (mg/L)
SW2	22/04/15 09:40	6.49	300	28	2.64
	24/04/15 12:10	6.92	364	<5	0.35
	28/04/15 10:40	7.11	91	<5	0.22
	Historical Average (Jan 2010 – Mar 2015)	*7.01*	*438*	*11.20*	*0.42*
SW4	22/04/15 09:10	6.25	478	168	3.64
	24/04/15 12:20	6.73	1070	24	3.67
	28/04/15 10:40	7.01	970	6	1.52
	Historical Average (Jan 2010 – Mar 2015)	*7.19*	*974*	*28.97*	*1.45*
SW5	22/04/15 9:30	6.95	338	26	1.13
	24/04/15 12:10	7.29	838	<5	0.50
	28/04/15 10:40	7.34	1940	<5	0.24
	Historical Average (Jan 2010 – Mar 2015)	*7.30*	*4469*	*43*	*4.55*

The following actions were taken during the discharge and in response to identification of the non-compliance:

- Water was pumped from the WPCD to underground workings and from the EOD to No.7 Dam during the storm event to contain as much runoff as possible;
- Numerous power outages were caused by the storm event. Austar had backup diesel pumps in place and were operated during the power outages;
- Sampling of the discharge flow at LDP1 and of creek sample locations was completed in accordance with EPL requirements;
- When the rainfall ceased, pumping continued until both WPCD and EOD dams were returned to their low operational level in preparation for future rainfall events;
- Water users of Black Creek were notified of the discharge in accordance with EPL requirements;
- The EPA was advised that water quality results from LDP1 did not comply with pH and iron concentration limits once laboratory results were received; and,
- A discharge report was prepared with further details on the discharge event and non-compliance.

It is noted that in response to Austar's written report provided to the EPA in relation to the discharge from LDP No. 1 on 21-22 April 2015, the EPA has responded to Austar in a letter dated 10 September 2015 (received after the reporting period) to advise that "*as the relevant discharges were the result of rainfall that significantly exceeded the design capacity of water management systems at the Austar Coal Mine premises in Paxton, the EPA does not intend to take regulatory action regarding this matter at the present time.*"

3.6 Ground Water

3.6.1 Environmental Management

In accordance with PA08_0111 Schedule 4 Condition 9, Austar prepared a Site Water Management Plan (SWMP) for the mine complex which includes a groundwater monitoring program. The SWMP was approved by the Director-General of DPE on 17 May 2013.

Additional groundwater bores are to be installed in several locations in the Stage 3 area prior to subsidence impacts in accordance with the SWMP. During the 2014-2015 reporting period two (2) additional piezometers (MB01 and MB02) and a multilevel vibrating wire piezometer (EX01H) were installed in the Stage 3 area. The locations of these monitoring sites are presented in **Plan 2**.

An environmental monitoring specialist is engaged by Austar to undertake quarterly groundwater monitoring and analysis in accordance with the SWMP, utilising seven (7) piezometers (MB01, MB02, AQD1073a, NER1010, WBH1, WBH2 and WBH3) to assess impacts on groundwater levels in the Stage 2 and Stage 3 areas. Limited groundwater level data is available for MB02 during the 2014-2015 reporting period, as installation of the piezometer was ongoing at the completion of the reporting period. For general operational purposes, Austar's groundwater monitoring program also includes monthly and quarterly monitoring of underground flows, water quality and pressure. Groundwater level data from EX01H is downloaded quarterly by Austar personnel.

There have been no known incidences of groundwater pollution as a result of Austar operations to date.

Groundwater resources in the vicinity of Austar operations include:

- Shallow alluvial aquifers associated with Bellbird Creek downstream of the CHPP. These groundwater resources are very limited in extent. The potential for Austar mining operations to cause pollution of this groundwater resource is very low and is mitigated by the surface water management controls that are in place at the CHPP and the leachate controls at the East and West Open Cut emplacement areas;

- Shallow alluvial aquifers associated with the Black Creek system. These groundwater resources are also very limited in extent. The potential for Austar mining operations to cause pollution of this groundwater resource is very low and is mitigated by leachate controls at the Aberdare Extended emplacement area and the surface water management controls that are proposed for the final landform at the CHPP. The Kitchener Surface Infrastructure Site off Quorrobolong Road also drains to the Black Creek system. The potential for groundwater pollution to result from operations at the Kitchener Surface Infrastructure Site is limited to

spills and surface runoff and is mitigated by the surface water management system that is implemented at the site;

- Shallow alluvial aquifers associated with the Quorrobolong Creek system in the vicinity of Stage 2 and Stage 3 underground mining areas. Analysis indicates that underground mining operations will have negligible to low potential to impact on these shallow alluvial resources and negligible potential to result in pollution of this groundwater resource;

- Fractured rock aquifers in the vicinity of the underground mining area. Monitoring indicates that there are very limited groundwater reserves in the fractured rock aquifer and that what groundwater there is, exhibits high salinity. Mining operations have negligible potential to result in pollution of these resources; and

- Coal seam aquifers including groundwater contained in abandoned underground workings. Monitoring indicates that there are extensive volumes of this mine water associated with the coal seams and abandoned underground workings with the mine water exhibiting low pH, high iron concentrations, high manganese concentrations and high salinity. The mine contributes to the ongoing management of this groundwater and through the control of groundwater levels in the abandoned underground workings, minimises the potential for this poor quality groundwater to discharge into surrounding surface waters. Reverse osmosis brine derived from the treatment of the mine water pumped from the underground workings and tailings are discharged underground into abandoned workings. This process effectively returns the existing contaminates from the coal seams and underground mine water to the abandoned underground workings. As a result operations at Austar mine have low potential to pollute these groundwater reserves.

3.6.2 Environmental Performance

A groundwater specialist was engaged to undertake quarterly groundwater depth monitoring in the Quorrobolong Creek alluvial aquifer (AQD1073a), in the fractured rock aquifer (NER1010, MB01 and MB02), and in alluvial groundwater monitoring wells (WBH1, WBH2 and WBH3).

A multilevel vibrating wire piezometer (EX01H) was installed in a completed exploration borehole in February 2015. The details of the multilevel VWP's are as follows:

- VWP 1 – 280m bgl – Above predicted height of connected subsidence;

- VWP 2 – 400m bgl – Within range of predicted height of connected subsidence;

- VWP 3 – 500m bgl – Below predicted height of connected subsidence;

- VWP 4 – 580m bgl – Roof (above coal seam);

- VWP 5 – 607m bgl – Coal seam (centre); and,

- VWP 6 – 617.8m bgl – Floor (below coal seam).

Appendix C illustrates the groundwater monitoring results at Austar during the reporting period. The graphs compare groundwater depth and rainfall, and pH and conductivity.

- Overall, the groundwater levels within alluvial monitoring wells AQD1073a, WBH2 and WBH3 have remained fairly high, with water within 3 m of the surface. The piezometer within WBH1 is measuring the same alluvial 'aquifer', although plots at a lower level below ground, due to the higher elevation of this well. There were significant increases in the groundwater level at all alluvial aquifers as a result of the major rainfall event that occurred from 20 to 22 April 2015 during which there was 231mm of rainfall. Groundwater levels slowly decreased to historical levels following this event.

- The groundwater in NER1010 increased at a steady rate from 18m to 15m below ground level (m bgl) during the period July 2014 to June 2015, but remained consistent with historical results. Increase is likely due to the above average rainfall received during the 2014-2015 reporting period. Over the long-term, the groundwater in NER1010 was on a rising trend throughout all of 2011, before plateauing at a maximum base level (ignoring the short-term spikes) of 15.2 m bgl. The trend then reversed in February 2012. Throughout 2012 and early 2013 groundwater levels were on a steady decline until wetter climatic conditions experienced over the period 27 January to 3 March 2013, which saw an increase in groundwater level from 18 to 14.7 m bgl. The groundwater level declined to approximately 18 m bgl during the 2013-2014 reporting period due to the below average rainfall. This piezometer generally reacts to daily rainfall events greater than 20 mm and reacted to the rainfall event from 20 to 22 April 2015 by increasing significantly.

- There is limited groundwater level data available for MB01 during the reporting period, as monitoring commenced on 6 February 2015. The groundwater level remained steady between 120 to 121m bgl during the monitored period.

- One (1) instantaneous dip groundwater level measurement was recorded for MB02 during the 2014-2015 reporting period. The measured level was 22.65m bgl.

- Monitoring of the multilevel vibrating wire piezometer (EX01H) commenced on 23 February 2015, as such there is limited data available for the 2014-2015 reporting period. The available groundwater data shows that the VWP 1 and VWP 2 groundwater level remained steady, and the VWP 3, 4, 5 and 6 groundwater levels varied significantly. Groundwater level data from the period shortly after the installation of the piezometers is of limited reliability, as the groundwater levels in aquifers are disturbed by the drilling and installation process and take time to settle to natural levels.

- Groundwater quality, pH and conductivity remained relatively stable throughout the reporting period.

There has been no observable depressurisation of either the alluvial or fractured rock aquifers due to longwall extraction in the Stage 2 mining area. Water quality data within the monitoring bores has revealed no obvious trends in relation to mining. There is limited data available from

piezometers located within the Stage 3 mining area to date. Future reports will allow temporal observations to be made for those piezometers within the fractured rock aquifer.

3.7 Contaminated Land

3.7.1 Environmental Management and Performance

A Phase 1 contamination assessment of the potential for contamination on site will be undertaken during the approved MOP term and will be periodically undertaken through the life of the operation and immediately prior to site decommissioning.

In regards to the areas on site that may be identified from the Phase 1 assessment as posing low to moderate risk of resulting in contamination, it is planned that further investigations will be postponed until the decommissioning phase or at the time of demolition/decommissioning of particular infrastructure. Alternatively, where there is a high risk of contamination that may lead to environmental harm, a Phase 2 – Detailed Investigation (e.g. Soil sampling and analysis) will be undertaken to verify the type, extent and level of contamination that may exist.

In the event that the results of the detailed investigation suggest that the site poses unacceptable risks to human health or the environment then a remedial action plan (Phase 3) will be prepared and implemented. This will be followed by Phase 4 – Site Validation and Reporting to demonstrate that the site clean-up complies with the relevant EPA guidelines.

During the operational phase of the site, contamination resulting from environmental incidents (e.g. Spills) and areas of high risk associated with hydrocarbon storage infrastructure will be cleaned up and appropriately managed (e.g. Remediated or disposed off site by an authorised waste contractor) as soon as possible after they occur. Further details on hydrocarbon contamination are provided in **Section 3.18**.

3.8 Threatened Flora and Fauna

3.8.1 Environmental Management

In accordance with DA No.29/95 Schedule 3 Condition 23, Austar have implemented an ecological monitoring program of riparian vegetation over Stage 2 Longwall Panels A3 to A5a, with particular reference to the River Flat Eucalypt Forest EEC. The Stage 2 monitoring program commenced with baseline surveys in 2008 and now has six years of data prior to and following the commencement of mining which commenced in LWA3 in February 2009.

In accordance with PA08_0111 Schedule 4 Condition 9, Austar have implemented an ecological monitoring program as part of the Stage 3 Biodiversity Management Plan. Baseline surveys were carried out in Spring 2012 and Autumn 2013. Routine surveys were conducted during this reporting period in Spring 2014 and Autumn 2015.

In addition, to satisfy Condition 1 Schedule 4 of PA08_0111, Austar implemented the approved SCEMP to manage any fauna impacts resulting from construction activities at the SIS. Ecological

considerations for the SIS have since been incorporated into the Landscape Management Plan – Kitchener SIS (June 2013), prepared in accordance with Schedule 6 Condition 4 of PA08_0111.

There are no rare or threatened flora or fauna known to occur within colliery holding land that requires active management. Austar land ownership is approximately 2,600 hectares of land which is predominantly vegetated, where threatened flora and fauna are known to occur in the area. As such, any land disturbance that is required for the on-going operation is only carried out following the appropriate assessments.

Stage 2

Baseline ecological monitoring was undertaken for the Stage 2 mining area during autumn and spring 2008, and autumn and spring 2009. The 2009 Ecological Monitoring Report for Stage 2 Longwalls documented the baseline results from monitoring sites in the Stage 2 Mine Area. The results included a description of the vegetation structure, floristics and condition in such a way that comparisons with post-mining data can be readily made to determine any possible impacts of the longwall mining. Photo monitoring further supplements this data, providing a visual reference of the baseline condition of the vegetation and creeklines.

During the baseline survey all monitoring sites were found to be in varying states of disturbance, particularly due to past clearing and grazing practices and subsequent heavy weed invasion. Because the longwall mining had not commenced in this area at the time of the baseline surveys, the report indicated that no observed disturbance-related matters were a result of subsidence.

Stage 3

Baseline surveys ahead of mining longwalls A7 and A8 were undertaken in Spring 2012 and Autumn 2013. A monitoring location above each longwall and two additional monitoring locations outside the affected subsidence zone were surveyed. Baseline monitoring of each of these sites indicated that vegetation is stable, in good health and consistent with that of Lower Hunter Spotted Gum Ironbark Forest EEC.

3.8.2 Environmental Performance

Ecological monitoring during the 2014-2015 reporting period was undertaken by qualified ecologists during Spring 2014 and Autumn 2015 in accordance with Austar's Stage 2 Ecological Monitoring Program and Stage 3 Biodiversity Management Plan. The Study Area for the ecological monitoring is shown in **Figure 3.4** for Stage 2 and **Figure 3.5** for Stage 3.

Ecological monitoring concluded the following for the Stage 2 and Stage 3 areas:

- Longwall mining has now passed under monitoring Sites 3, 4, 6, 7, 12 and 13. Ongoing monitoring of these sites will consequently be tracking potential impacts resulting from longwall mining;
- None of the Stage 2 or Stage 3 sites currently appear to be experiencing impacts as a result of longwall mining (in particular surface cracking, subsidence, or resulting fluctuations to species numbers);

- No obvious increase in rates of erosion or bank instability has been recorded at any of the Stage 2 sites monitored, or elsewhere in the Stage 2 Study Area;
- No obvious increase in dieback has been recorded at any of the Stage 2 or Stage 3 sites monitored;
- Good levels of regeneration of canopy species were observed along the length of the Stage 2 monitoring sites and are considered likely to be a result of stock exclusion from the riparian zone;
- The photo monitoring indicates there have been no obvious visual changes to the health of Stage 2 or Stage 3 vegetation since baseline photos were taken;
- The biggest threat to the ecological integrity of the Stage 2 sites continues to be weed infestation wandering Jew (*Tradescantia fluminensis*); however less blackberry (*Rubus fruticosus sp. agg*) appears to be present throughout Stage 2 than has been observed in previous years;
- There are not considered to be any significant threats to the ecological integrity of Stage 3 monitoring sites; and,
- To date, there is no evidence of any impacts on ecological features as a result of longwall mining.

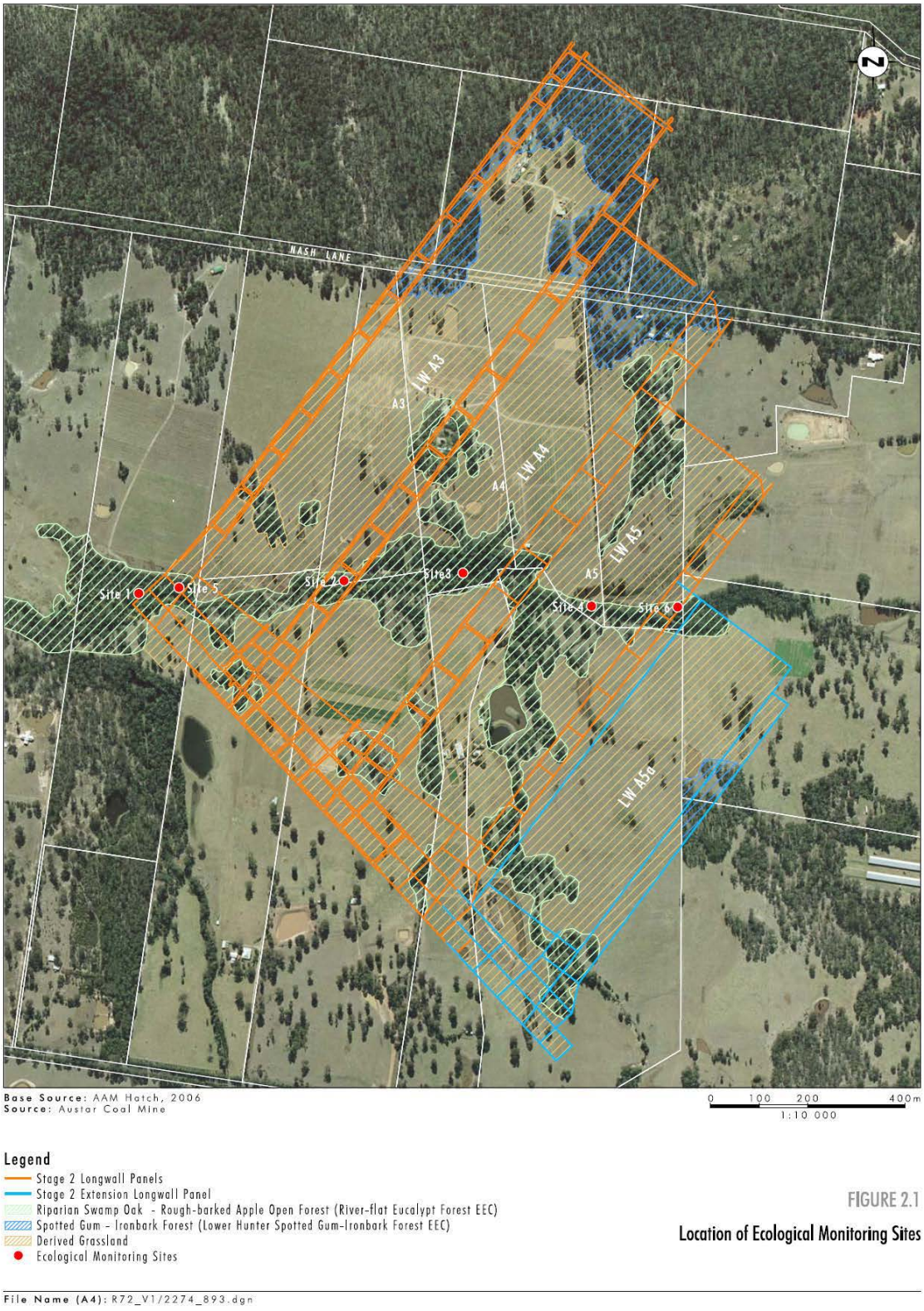


FIGURE 3.4 LOCATION OF STAGE 2 ECOLOGICAL MONITORING SITES

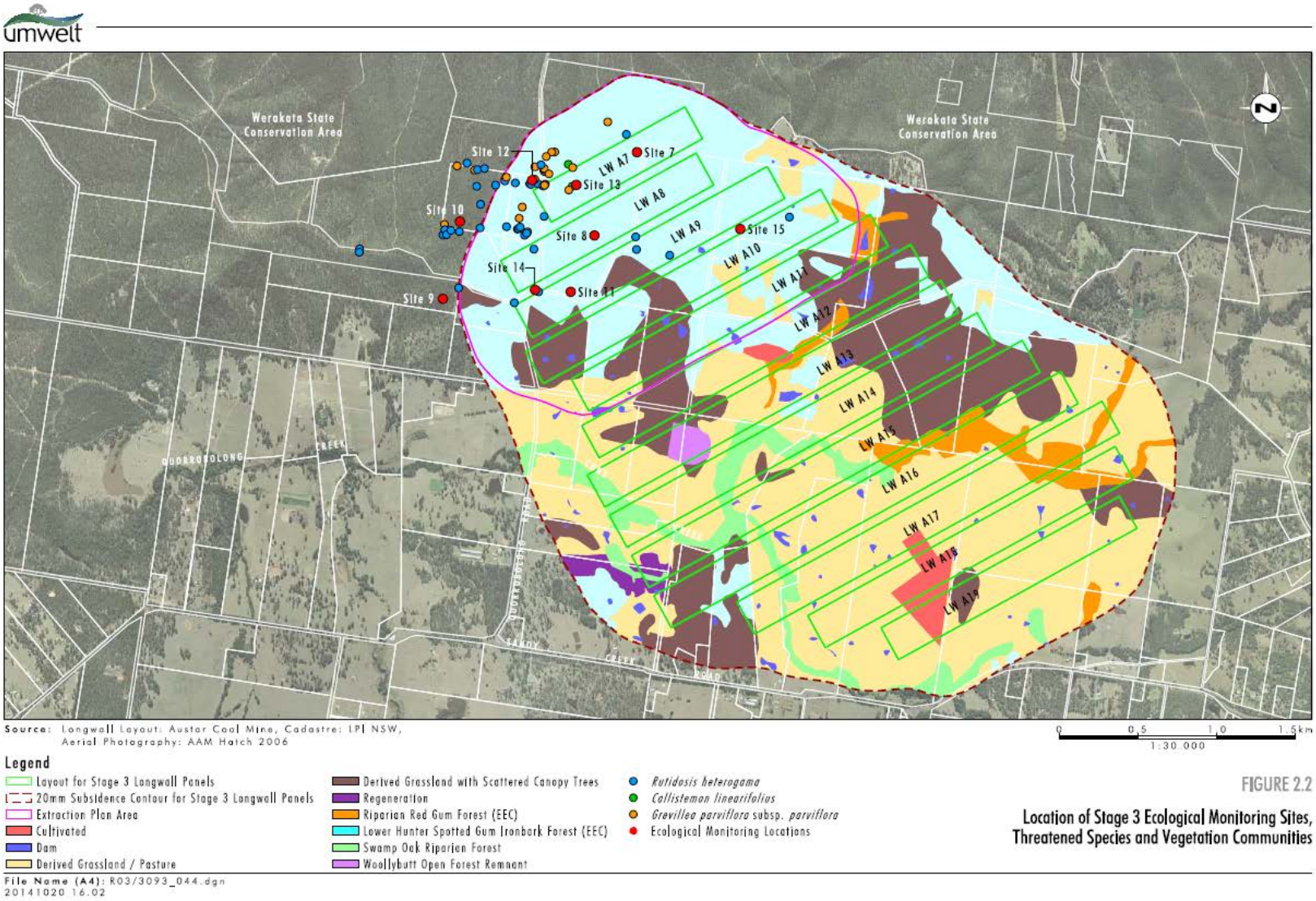


FIGURE 3.5 LOCATION OF STAGE 3 ECOLOGICAL MONITORING SITES

3.9 Weed and Feral Animal Management and Control

3.9.1 Environmental Management and Performance

Weeds Management

No weed control works were undertaken on Austar land during the 2014-2015 reporting period. It is planned to undertake weed control works in Area 12 and 13 during the 2015-2016 reporting period.

Feral Animal Management

Little evidence of feral animal issues were identified during the reporting period. Feral animals will be controlled should the need arise.

3.10 Vibration and Blasting

3.10.1 Environmental Management

The mining complex Noise and Vibration Management Plan (NVMP) prepared in accordance with Schedule 4 Condition 3 of PA08_0111, was approved by the Director General DPE on 2 August 2013 and includes vibration considerations in relation to mining operations undertaken within the Stage 3 area. Longwall mining in the Stage 3 area commenced on 14 June 2013 and Austar have implemented the approved Noise and Vibration Monitoring Program (NVMP). Vibration monitors are located at 159 Coney Creek Lane, Quorrobolong (V8), and at 345 Quorrobolong Road, Quorrobolong (V7).

The NVMP refers to a DECC guideline - *Assessing Vibration: a Technical Guideline* (DECC, February 2006) which provides preferred and maximum vibration values for different receiver types such as residences, offices, workshops, and critical work areas (hospital operating theatres, precision laboratories). The guideline indicates that the criteria are non-mandatory and are goals that should be sought to be achieved through the application of all feasible and reasonable mitigation measures. In the case of longwall mining, there is limited scope for mitigation measures. The NVMP also refers to a British Standard (BS 7385 Part 2-1993 'Evaluation and Measurement for Vibration in Buildings Part') in relation to potential risk of cosmetic damage to buildings.

No surface blasting activities were undertaken at Austar Coal Mine during the 2014-2015 reporting period.

3.10.2 Environmental Performance

Vibration monitoring in the Stage 3 mining area was undertaken during the 2014-2015 reporting period. In accordance with the NVMP, the monitors are set to trigger when vibration is greater than 1mm/second. Vibration monitoring results are presented in **Appendix D**.

During the reporting period extraction of longwall LWA8 commenced on 16 June 2014 and was completed on 24 June 2015.

Monitoring undertaken in previous reporting periods has indicated vibration in the mining area is event based. During the 2013-2014 reporting period 36 events were recorded, and only 2 occurred

in the period between completion of LWA7 and commencement of LWA8. This indicates that vibration is generally coincidental with operational longwall extraction, and generally ceases after longwall extraction ceases. This trend is supported by previous longwall mining vibration data. Vibration is typically generated from the caving zone behind the longwall, or from tensile fractures in the overlying strata immediately above the longwall mining area.

During the 2014-2015 reporting period, there were 205 vibration events recorded during the extraction of LWA8. A large proportion (70%) of the events have been measured at less than 3 mm/s. Vibrations of this magnitude, whilst at levels known to be noticeable for humans, are significantly less than any potential building damage criteria.

There were five vibration events during the reporting period that exceeded DECC vibration criteria. The details of these vibration events are as follows:

- 2 events exceeded the DECC night time maximum criteria (Location V8 - 9.0 mm/sec on 20/10/2014 04:39, and 12.6 mm/s on 21/10/2014 01:39);
- 3 events exceeded the DECC daytime preferred criteria (Location V8 - 8.9 mm/s on 20/04/2015 13:52; Location V7 - 12.5 mm/s on 20/05/2015 18:16, 12.1 mm/s on 21/05/2015 15:24); and
- All of these vibration events were less than the lowest vibration level where a minimal risk of cosmetic damage may occur (15 mm/s).

It is noted that the DECC vibration criteria are non-mandatory. In general, results are similar to those from the previous reporting periods. The trend of an increased frequency of vibration events during extraction of the second longwall panel in the Stage 3 area was also observed during extraction of the second longwall panel in the Stage 2 area (LWA4). This observation is considered to coincide with the forming of the goaf over the combined extracted void of two panel widths and as subsidence develops.

3.11 Noise

3.11.1 Environmental Management

The mining complex Noise and Vibration Management Plan (NVMP) prepared in accordance with Schedule 4 Condition 3 of PA08_0111, was approved by the Director General DPE on 2 August 2013. Monitoring during the 2014-2015 period was in accordance with the NVMP.

3.11.2 Environmental Performance

Periodic noise monitoring was conducted on a quarterly basis during the reporting period in accordance with NVMP by an independent noise consultant. Nine (9) key monitoring locations representative of the surrounding receivers have been selected as reference locations and form the basis for assessing and evaluating noise emissions from the operation. The locations are listed in **Table 3-14** and presented in **Plan 2**.

TABLE 3-14 NOISE IMPACT ASSESSMENT CRITERIA AND GOALS

Receiver	Location	Receiver Description	Criteria/Goal
Nearest Potentially Affected Receivers to CHPP			
C1	South of Bimbadeen Road, Mt View	West of CHPP	L_{A90} 40 dB
C2	Pelton Village	South East of CHPP	L_{A90} 43 dB
C3	Bimbadeen Road, Mt View	North-west of CHPP	L_{A90} 37 dB
C4	84 Bimbadeen Road, Mt View	North of CHPP	L_{A90} 37 dB
C5	43 Doyle Street, Mt View	North East of CHPP	L_{A90} 37 dB
Nearest Potentially Affected Receivers to Surface Infrastructure Site			
K1	Pelton Road, Quorrobolong	South of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
K2	Coney Creek Lane, Quorrobolong	East of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
K3	Richmond Street, Kitchener	North of SIS	L_{Aeq} 35 dB / L_{A1} 45 dB
Nearest Potentially Affected Receivers to Kalingo Infrastructure Area			
K4	Nash Lane, Quorrobolong	East of Kalingo Infrastructure Area	L_{Aeq} 35 dB

A summary of results from attended monitoring undertaken during the 2014-2015 reporting period is provided in **Table 3-15, Table 3-16** and **Table 3-17**.

TABLE 3-15 AUSTAR CHPP PERIODIC ATTENDED NOISE MONITORING RESULTS 2014-2015

Quarter	Period	Austar CHPP Only $L_{A90, 15\ min}$ (dB)				
		C1	C2	C3	C4	C5
	Noise Criteria	40	43	37	37	37
3 2014	Night	35	43	**38**	33	37
		30	42	31	NM	35
		34	41	37	<30	34
4 2014	Night	38	33	34	IA	NM
		39	34	36	30	NM
		39	41	32	<25	37
1 2015	Night	38	36	26	IA	NM
		35	30	25	IA	<25
		32	IA	30	29	<25
2 2015	Night	35	40	34	34	37
		30	43	29	32	34
		NM	29	IA	<20	26

Note: These are results for Austar CHPP in the absence of all other noise sources;
Bolded results indicate exceedance of criteria.
IA denotes inaudible. NM denotes not measurable.

TABLE 3-16 AUSTAR SIS ATTENDED NOISE MONITORING RESULTS 2014-2015

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB)		
		K1	K2	K3
	Noise Criteria	35	35	35
3 2014	Night	26	IA	IA
		31	NM	<25
		<20	IA	IA
4 2014	Night	NM	IA	IA
		IA	IA	25
		NM	IA	IA
1 2015	Night	IA	IA	IA
		<25	IA	IA
		IA	IA	IA
2 2015	Night	35	NA	33
		30	28	<20
		IA	IA	25

Note: These are results for Austar SIS in the absence of all other noise sources;
Bolded results indicate exceedance of criteria.
IA denotes inaudible. NM denotes not measurable. NA denotes no access to monitoring point.

TABLE 3-17 AUSTAR KIA ATTENDED NOISE MONITORING RESULTS 2014-2015

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB)
		K4
	Noise Criteria	35
3 2014	Night	26
		35
		26
4 2014	Night	<20
		IA
		28
1 2015	Night	25
		<20
		<20
2 2015	Night	30
		30
		24

Note: These are results for Austar KIA in the absence of all other noise sources;
Bolded results indicate exceedance of criteria.
IA denotes inaudible. NM denotes not measurable.

Activities from Austar complied with the relevant noise limits during the survey at all monitoring locations, with the exception of C3. On 21 July 2014 (Q3 2014), the L_{A90} criteria was exceeded by 1 dB at C3 (Bimbadeen Road, Mt View). This exceedance is not considered significant as Chapter 11 of the EPA 'Industrial Noise Policy' deems a development to be in non-compliance only when "the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence condition."

Low Frequency Noise Assessment

Noise measurements recorded are analysed for low frequency content. Where the above results exceed the Industrial Noise Policy low frequency criterion, a 5 dB modifying factor correction is applied to the measured L_{A90} level. With this 5 dB correction applied, the correction resulted in noise levels exceeding project specific criteria as specified in **Table 3-18**, **Table 3-19** and

Table 3-20 during the 2014-2015 reporting period.

TABLE 3-18 INP LOW FREQUENCY MODIFYING FACTOR EXCEEDANCES FOR AUSTAR CHPP DURING 2014-2015

Quarter	Period	Austar CHPP Only $L_{A90, 15\ min}$ (dB) Low Frequency Modifying Factor Exceedances				
		C1	C2	C3	C4	C5
	Noise Criteria	40	43	37	37	37
3 2014	Night	-	-	43	-	-
		-	-	-	-	-
		-	-	-	-	-
4 2014	Night	43	-	-	-	-
		44	-	41	-	-
		-	-	-	-	-
1 2015	Night	43	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-
2 2015	Night	-	-	-	-	-
		-	-	-	-	-
		-	-	-	-	-

TABLE 3-19 INP LOW FREQUENCY MODIFYING FACTOR EXCEEDANCES FOR AUSTAR SIS DURING 2014-2015

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB) Low Frequency Modifying Factor Exceedances		
		K1	K2	K3
	Noise Criteria	35	35	35
3 2014	Night	-	-	-
		36	-	-
		-	-	-
4 2014	Night	-	-	-
		-	-	-
		-	-	-
1 2015	Night	-	-	-
		-	-	-
		-	-	-

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB) Low Frequency Modifying Factor Exceedances		
		K1	K2	K3
	Noise Criteria	35	35	35
2 2015	Night	-	-	-
		-	-	-
		-	-	-

TABLE 3-20 INP LOW FREQUENCY MODIFYING FACTOR EXCEEDANCES FOR AUSTAR KIA DURING 2014-2015

Quarter	Period	Austar KIA Only $L_{Aeq, 15\ min}$ (dB) Low Frequency Modifying Factor Exceedances
		K4
	Noise Criteria	35
3 2014	Night	-
		40
		-
4 2014	Night	-
		-
		-
1 2015	Night	-
		-
		-
2 2015	Night	-
		-
		-

When the INP low frequency modifying factor correction was applied a further seven exceedances of project specific noise criteria were recorded. One of the exceedances was not considered significant as Chapter 11 of the EPA 'Industrial Noise Policy' deems a development to be in non-compliance only when "the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence condition." The other six exceedances were reported to the EPA. It is understood that the EPA are developing a revised policy in relation to low frequency noise at present.

CHPP Noise Pollution Reduction Program

Austar has been undertaking a voluntary noise pollution reduction program (PRP) in consultation with the EPA over several years. The PRP commenced with a noise impact assessment titled *Austar Coal CHPP Assessment of Noise Impacts* (Global Acoustics, September 2008). The assessment was prepared in accordance with Section 10 of the Industrial Noise Policy (INP, DECC 2000), which provides guidance on the application of the INP to existing premises, such as the Austar Coal CHPP.

After receipt of the CHPP Assessment of Noise Impacts report, the EPA attached a condition to Austar's EPL 416 indicating specific noise controls and studies with timeframes for completion. In response, Austar completed several noise control initiatives (improving the acoustic performance of the CHPP walls and roof, noise bund, and other fixed and mobile plant controls), and provided regular status reports to the EPA on a 6 monthly basis, which identified the controls implemented and the effectiveness of those controls through onsite and offsite noise measurement. The last status report was provided to the EPA on 31 January 2014.

The EPA issued a notice of variation to Environment Protection Licence No. 416 on 10 February 2014. The Notice acknowledged completion of various noise control projects, and the provision of status reports. Condition U1 of the varied EPL requires a Premises Noise Assessment (PNA) to be conducted in accordance with the INP by 31 August 2014. The assessment of noise levels in the PNA was intended to establish noise levels that can be included as conditions in the EPL.

The assessment included:

1. Project Specific Noise Levels (PSNLs) for the nearest noise sensitive receptors;

2. Predicted or measured noise levels at these noise sensitive receptors due to all activities and operations carried out at the premises;

3. Proposed noise limits for the premises (criteria) derived with regard to the PSNLs and predicted noise level contributions that can be placed on the licence; and

4. Details of methods to determine compliance with noise limits.

Austar completed the PNA for the operations and activities carried out at Austar's licenced premises in accordance with the requirements of condition U1 in August 2014.

After completion of the comprehensive PNA, Austar recognise that existing predicted noise levels are significantly greater than any derived contemporary PSNL prepared in accordance with the INP for several operational areas where no current noise limits exist, or where an older style noise limit (L_{A90}) exists. Austar recognises the processes identified in Section 10 of the INP for existing premises where this situation occurs.

Austar also recognises the extensive history that mining operations at the premises have been conducted, with mining having commenced at Pelton Colliery in 1916, and the more significant current infrastructure of the Austar Mine Complex (Pit Top, Pelton CHPP, Aberdare Extended Emplacement Area) having been in operation in some instances since the 1960s or 1970s. Despite the proximity to Austar's infrastructure and noise generating activities to noise sensitive receivers,

Austar receive very few community noise complaints. With over 50 years of operation for some areas, Austar's mining operations may be considered a feature of the acoustic environment of the area. Austar will to progress the PRP in consultation with the EPA during subsequent reporting periods.

3.12 Visual and Lighting Management

3.12.1 Environmental Management and Performance

All of the infrastructure areas within Austar are well screened, mostly by native vegetation which limits the views to operational areas from public viewpoints. Austar operates 24 hours per day, seven days per week. For safety and security reasons, this requires Austar to have certain operational areas under lighting during non-daylight hours. While fugitive light may be seen from some public areas, lights are positioned to minimise extraneous light off site.

The principles followed for the use of lights are as follows:

- Main flood lights are directed away from the nearest residences;
- Portable lights used are also directed away from residences;
- Flood lights attached to towers are adjustable to enable fine tuning; and
- If necessary, the location of portable lights are varied to ensure that extraneous light catchment is minimised.

Austar did not receive any community complaints during the reporting period in relation to lighting and visual aesthetics.

3.13 Aboriginal Heritage

3.13.1 Environmental Management and Performance

Previous archaeological research has identified 35 Aboriginal archaeological sites within the CML2 mining lease and Stage 3 lease extension area in the vicinity of the Stage 2 and Stage 3 mining areas, as detailed in the Stage 3 Modification Environmental Assessment. In addition the location of registered sites within the wider area is known from AHIMS search data.

The majority of known sites listed have been assessed to be of low scientific significance, being small artefact scatters or isolated finds found in open (and frequently disturbed) contexts. Site types that are rarer or sites that have research potential and are of higher scientific significance, include a grinding groove site recorded as ACM6 which is considered to be of low to moderate scientific significance, and three artefact scatters and isolated finds (ACM9, ACM10 and ACM14) also assessed as having low to moderate archaeological significance. Aboriginal stakeholders involved in previous investigations of the area have identified that all archaeological sites are of cultural significance, but that grinding groove sites and larger artefact scatters are of particular significance.

During the reporting period, to satisfy a condition of Project Approval 08_0111, the Aboriginal Cultural Heritage Management Plan (ACHMP) for the Austar Mining Complex was updated as part of the preparation of the Extraction Plan to mine LWA7 to LWA10.

The aim of this ACHMP is to define Aboriginal cultural heritage management and mitigation strategies for the Austar Mine Complex including: responsibilities of all parties; on-going Registered Aboriginal Party consultation; compliance with current legislative requirements; and timeframes for required heritage works.

Archaeological inspections during the reporting period included due diligence inspections prior to the commencement of drilling operations. At all but one proposed drill site, there was no Aboriginal archaeological material was identified during the due diligence inspection. As a result of these due diligence works, one drilling site was not undertaken at one proposed location. Ten Aboriginal artefacts were identified in the vicinity of the borehole site. In accordance with Section 89A of the NPW Act (1974) an Aboriginal Heritage Information Management System (AHIMS) site card was submitted to OEH to register the site.

3.14 Historic Heritage

3.14.1 Environmental Management and Performance

The Stage 3 Project Historic Heritage Management (HHMP) prepared in accordance with Schedule 4 Condition 3 of PA08_0111, was first approved by the Director General DPE on 19 April 2013, and an update was approved by DPE on 19 February 2014. The HHMP outlines management strategies for historic heritage items within the Stage 3 mining area, and other listed heritage sites in the Austar mine complex.

Historic Heritage assessments of the Bellbird, Pelton and Cessnock No.1 (Kalingo) Collieries were completed by Umwelt in November 2008 as part of rehabilitation proposals for the site in the current MOP. The heritage assessment outlines management strategies for assessed extant structures and foundations within these collieries, including items that require no further management. A structural engineer's report on the condition of existing structures was also completed in August 2008.

The DI-DRE has indicated previously that many of the structures from these collieries present a significant safety liability and they would like to see progress to rehabilitation of these structures. It is intended that structures and foundations will continue to progress towards demolition, with reference to recommendations of the Historical Heritage assessments, to satisfy commitments of the current MOP.

Austar will continue progressing Heritage issues in relation to rehabilitation commitments with Council prior to rehabilitation works occurring.

3.15 Spontaneous Combustion

3.15.1 Environmental Management and Performance

The Greta Seam has a long history of susceptibility to spontaneous combustion. The most recent evidence of this is the fire in the Southland Mine in December 2003. Austar have implemented the Spontaneous Combustion Hazard Management Plan (SCHMP) at the mine to control spontaneous combustion risks. This SCHMP utilises enhanced gas monitoring and management through use of:

- A tube bundle system and gas monitoring analyses;
- An on-site gas chromatograph for gas analysis;
- Air free gas analysis techniques;
- Training of mine officials;
- Nitrogen rich, pressurised balance chambers that help to seal goaved voids;
- Installation of a nitrogen inertisation plant; and
- An infrared camera for scanning of hot areas on coal pillars and stockpiles.

There was no evidence of spontaneous combustion occurring during the 2014-2015 reporting period.

3.16 Bushfire

3.16.1 Environmental Management and Performance

Austar owns significant areas of land surrounding the pit top and coal handling and preparation plant. These properties are covered predominantly by native woodland and forests, with occasional grassland paddocks. These areas are considered valuable in providing a buffer zone to reduce the impact of operations on nearby private residences, however, do require active management to minimise the risk of bushfires originating, or spreading through Austar property.

A Bushfire Management Plan (BFMP) was developed in September 2002 to ensure the land owned by the mine is managed in a way that minimises the risk of bushfire and to reduce the risk of fire originating on Austar owned land and spreading to adjacent properties. Austar is currently reviewing the BFMP.

During the reporting period a number of activities were undertaken to reduce the risk of bushfire including vegetation slashing and maintenance within asset protection zones.

3.17 Mine Subsidence

3.17.1 Environmental Management

In accordance with PA08_0111 Schedule 3 Condition 4, and the conditions of CML2, Austar are required to prepare and implement an Extraction Plan/Subsidence Management Plan prior to the commencement of any second workings in the Stage 3 area. Austar prepared the Longwalls A7-A10 Extraction Plan to satisfy the requirement for both the Extraction Plan and the Subsidence Management Plan, of which the Extraction Plan was first approved on 30 May 2013 by the Director-General DPE, and the Subsidence Management Plan was first approved on 3 June 2013 by the Executive Director of Mineral Resources (File 13/1876). Variations to the Extraction Plan/SMP have since been approved in January 2014 and February 2014 to reflect changes to the mine plan approved by modification to PA08_0111 approved on 17 December 2013 (PA08_0111 MOD3).

Subsidence monitoring for Stage 3 at Austar during the reporting period was completed in accordance with the subsidence monitoring strategy which forms part of the Extraction Plan/Subsidence Management Plan. Monitoring is conducted in affected areas pre and post mining on a monthly and quarterly basis.

The overall framework for subsidence monitoring and management of impacts can be described as a subsidence monitoring program (actual measured subsidence, and inspections for environmental consequences of subsidence to compare against predicted impacts) which may trigger a response, or set of responses.

The response is commensurate with the nature of the measurement or the impact which has been identified. For Stage 3 the Extraction Plan relies on a set of individual management plans which are

intended to address impacts to particular environmental or built features within the Extraction Plan area.

3.17.2 Environmental Performance

During the reporting period, Austar completed extraction of Longwall A8 on 24 June 2015, after commencing A8 in June 2014. An End of Panel report for Longwall A8 was prepared in accordance with Condition 18 of the SMP Approval for Longwall A8. A complete copy of the End of Panel report for Longwall A8 is provided in **Appendix E**.

The End of Panel report encompasses the monitoring undertaken during the extraction of Longwall A8. There has been no abnormal behaviour that has required particular review. The report consists of the analysis from:

- Surface subsidence monitoring program;
- Public safety monitoring and management plan;
- Vibration monitoring plan; and,
- Biodiversity Management Plan.

Subsidence monitoring has been undertaken in accordance with the Subsidence Monitoring Program. Summary results are displayed in **Table 3-21** and compared against maximum predicted subsidence derived from the subsidence predictions from MSEC Report MSEC650 (2013) which supported a modification to the Longwall A8 geometry (shortened start position and lengthened finish position) and associated Extraction Plan/SMP Revision 3.

TABLE 3-21 ACTUAL VS MAXIMUM PREDICTED SUBSIDENCE PARAMETERS

LW	Maximum Predicted Cumulative Subsidence (mm)	Actual Cumulative Subsidence (mm)	Maximum Predicted Cumulative Tilt (mm/m)	Actual Cumulative Tilt (mm/m)	Maximum Predicted Cumulative Tensile Strain (mm/m)	Actual Cumulative Tensile Strain (mm/m)	Maximum Predicted Cumulative Compressive Strain (mm/m)	Actual Cumulative Compressive Strain (mm/m)
After A8	1175	773	5.5	3.9	0.8	0.7	1.4	1.4

Note Predictions for strain after A8 have been converted from curvature predictions from the MSEC650 using the relationship strain = 15 x curvature. The factor of 15 was adopted (rather than 10 which is typically used in the Newcastle Coalfield) due to the higher depths of cover and better correlation with the local monitoring at Austar and Ellalong.

Subsidence monitoring results from Stage 3 longwalls will no longer be compared with Upper Bound subsidence parameters in End of Panel reports as results have been consistently within the maximum predicted range. Summary results from subsidence monitoring of A8 are compared to Upper Bound subsidence parameters from MSEC484 (which were provided in the Stage 3 Environmental Assessment) in **Table 3-22**.

TABLE 3-22 ACTUAL VS UPPER BOUND SUBSIDENCE PARAMETERS – STAGE 3

LW	Upper Bound Cumulative Subsidence (mm)	Actual Cumulative Subsidence (mm)	Upper Bound Cumulative Tilt (mm/m)	Actual Cumulative Tilt (mm/m)
After A8	2050	773	7.5	3.9

Further detailed analysis of the individual monitoring lines can be found in the 'Austar Mine End of Panel Report Stage 3 – Longwall A8' (**Appendix E**).

In summary, surface subsidence recorded after extraction of A8 was approximately 400mm less than predictions. There were no perceptible impacts to the environment or increases in public safety risk. At the completion of mining A8 there was no abnormal behaviour observed that required particular review.

The mine subsidence movements resulting from the extraction of Longwall A8 were monitored using the following:

- Line A7;
- Line A8;
- Line XL3; and
- Quorrobolong Road Line.

The locations of these monitoring lines are shown in the attached report 'Austar Mine End of Panel Report Stage 3 – Longwall A8' (**Appendix E**).

The ground movements measured along Lines A7, A8 and XL3 indicate that the observed subsidence and tilt, resulting from the extraction of Longwall A8, were generally similar to or less than the maximum predicted. The profiles of observed subsidence and tilt also reasonably matched those predicted, but with reduced magnitudes.

Only low level subsidence was measured along the Quorrobolong Road Line as this monitoring line crosses the back end and corner of the longwalls. The observed tilt and strain profiles along this monitoring line were very irregular and the localised movements appear to be the result of disturbed survey marks. The observed strains along Lines A7, A8 and XL3 were typically less than the predicted conventional strains.

The maximum observed compressive strain for Line A8 occurred between marks A866 and A867 which are located on the change of grade at the bottom of a gully and therefore which could be the result of the natural surface slope. Tensile-compressive strain pairs also occurred along each of the

Lines A7, A8 and XL3, at locations outside of the longwall and, therefore, could have resulted from disturbed survey marks. Otherwise, the strains were similar to the order of survey tolerance.

No subsidence management actions were required to be undertaken as a result of A8 extraction during the 2014-2015 reporting period.

3.18 Hydrocarbon Contamination

3.18.1 Environmental Management

All fuel and oil storage areas at the CHPP and Austar Pit Top areas are bunded. Hydrocarbon waste material and liquids are disposed of off-site via an authorised waste contractor.

Measures that are implemented at Austar to improve hydrocarbon management include:

- Rationalisation of the surface storage area;
- Designating specific areas within the pit top area to prevent the spread of equipment as well as limiting the storage of equipment containing oil to hardstand areas;
- Upgrades to the oily water waste treatment system;
- Bunding of hydrocarbon fill and dispensing points; and
- Installation of a dedicated used oil drum draining rack, oil collection system and oil drum disposal facility.

Fuel and oil storage areas at Austar are inspected on a monthly basis by the Environment and Community Coordinator.

3.18.2 Environmental Performance

During the 2014-2015 reporting period there were two environmental incidents that could have potentially resulted in hydrocarbon contamination.

On 12 August 2014 a minor spill to land occurred from a pipe joiner in a pipeline located in the Kalingo Infrastructure Area. The pipeline was transporting oily water. The following actions were taken in response to this incident:

- Pipe joiner was repaired to prevent further leakage; and,
- Soil impacted by the leak was excavated and removed to Austar's hydrocarbon remediation area.

On 28 February 2015 an incident occurred involving a spill of transmission oil from an Eimco (underground loader). The spill occurred due to a drain plug not being properly tightened after servicing. The spill occurred at an Austar Pit Top loading ramp. The following actions were taken in response to this incident:

- Spilled oil was cleaned up using spill sorb; and,

- The transmission drain plug was securely replaced.

For further details regarding these incidents please refer to **Appendix G**.

3.19 Methane Drainage / Ventilation

3.19.1 Environmental Management and Performance

A mine gas monitoring station is located on the surface near the No.3 Shaft facility. Monitoring data indicates low levels of seam gas emissions and a composition that is predominantly CO_2 (2014-2015 Average 0.20%) with some CH_4 (2014-2015 Average 0.09%) under normal operating conditions. Gas desorption tests have been carried out previously in several boreholes and at development faces in the mining area. This indicated seam gas levels in the area are low, however have risen slightly in the Stage 3 area.

3.20 Public Safety

3.20.1 Environmental Management and Performance

Entry to the site is managed as follows:

- All visitors and members of the public are required to report to the main office prior to entering the mine;
- The private haul road has gates which are locked outside of operating hours;
- Key facilities and areas are fenced as appropriate;
- When public access is required, inductions are undertaken and inspections supervised by colliery personnel; and
- A private security company is employed to patrol the site particularly after hours.

Signs have been erected on affected roads and trails in the Stage 2 and Stage 3 mining areas to inform affected residents that they are entering a subsidence zone. This is part of the Public Safety Management Plan for Stage 2 and Stage 3 longwall panels.

3.21 Other Issues and Risks

Other environmental risks which have been previously recognised and addressed in the management systems at Austar include:

- Acid mine drainage;
- Pollution events from excessive rainfall;
- Noise issues arising from the operation (particularly the CHPP);
- Rehabilitation liability;

- Mine subsidence; and
- Risk of trespasser entering onto the property from the adjacent town, surrounding bushland and roads.

3.22 Independent Environmental Audit

The Independent Environmental Audit for Austar was led by Trevor Brown & Associates during November 2014, with the final audit report completed on 16 July 2015. The Independent Environmental Audit indicates Austar Coal operations have generally demonstrated a high degree of compliance with Development Consent DA29/95, Project Approval 08_0111, Environment Protection Licence No. 416, and mining lease conditions.

A number of recommendations were made as a result of the audit that Austar are required to address. **Table 3-23** details each audit recommendation and Austar's progress against each.

TABLE 3-23 INDEPENDENT ENVIRONMENTAL AUDIT RECOMMENDATIONS AND AUSTAR'S PROGRESS

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses
1	Assessment of low frequency noise during attended monitoring should be modified and reported with reference to the noise descriptor of the relevant noise criteria.	Austar has instructed this recommendation to be undertaken from Q2 2015 onwards.
2	The Pollution Reduction Program should continue to build on the outcomes of the Premises Noise Assessment in consultation with the EPA.	Austar have progressed noise control inspection and options identification at the Austar CHPP in Q1-Q2 2015 as follow up to the Premises Noise Assessment. This has been undertaken as continuation of the Pollution Reduction Program to inform further consultation with the EPA.
3	It is recommended that the piezometers be installed at least 1 year in advance of the Stage 3 mining to allow establishment of baseline data. Austar has indicated that access to privately owned land will be available in the near future and that installation of additional monitoring wells should commence in 2015.	Austar's approved SWMP identifies proposed monitoring bores for Stage 3 (Figure 16 of the SWMP). It is noted that all bore locations are sited on private lands, to which agreement from landholders is required prior to installation. Agreement for the nearest monitoring bore to the first Stage 3 panels was finalised in November 2014, and monitoring bore installed over Longwall A9 in January 2015. This was ahead of subsidence impacts in the area of the monitoring bore, and more than 1 year ahead of longwall extraction beneath the monitoring well. An additional deeper monitoring bore was installed over LWA11 in May 2015 on an opportune basis aligned with our exploration program. This is significantly in advance of secondary extraction in that area. Where access to private property allows, the installation of future proposed groundwater monitoring bores will be undertaken at least one year in advance of secondary workings to allow sufficient baseline data to be recorded ahead of mining.

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses
4	It is recommended that a revision of the Erosion and Sediment Control Plan section 6.3 occur to clearly describe the actual management of the Kitchener Basins.	An updated Site Water Management Plan (SWMP) was submitted to the Department of Planning and Environment on 30 January 2015 which includes the management of the Kitchener basins.
5	Any sediment basin is designed to the requirements of *"Managing Urban Stormwater – Soils and Construction"* Volume 1, Landcom, 2004 and its companion document "*Managing Urban Stormwater – Soils and Construction*" Volume 2e (DECC 2008).	Austar's SWMP specifies that the sediment basins in the major disturbed areas (Kitchener SIS and Aberdare emplacement area) are designed in accordance with the requirements of *"Managing Urban Stormwater – Soils and Construction"* Volume 1, Landcom, 2004 and its companion document "*Managing Urban Stormwater – Soils and Construction*" Volume 2e (DECC 2008).
6	Stabilise disturbed lands in the small catchments to the Aberdare Emplacement Area to ensure capture of dirty water and to reduce the potential for loss of sediment laden water to Black Creek.	The Aberdare Reject Emplacement Area is staged to ensure disturbed lands drain into the emplacement area presently, with a sediment basin to be commissioned prior to connecting capped areas of the emplacement area to the Black Creek catchment. This staging will provide erosion and sediment controls prepared in accordance with the requirements of *"Managing Urban Stormwater – Soils and Construction"* Volume 1, Landcom, 2004 and its companion document "*Managing Urban Stormwater – Soils and Construction*" Volume 2e (DECC 2008) whilst vegetation is establishing. Staged rehabilitation of areas of emplacement at the eastern and western ends of the emplacement area has occurred during the audit period, with these areas draining into the emplacement area during the vegetation establishment phase.
7	Attention should be focused during rehabilitation planning to achieve stable areas around the SIS site as soon as possible via shaping channels with broad flat bases and a low grade. Including rock grade stabilising structures to reduce elevation rather than having steep sections of channel would reduce water flow rates and potential erosion of the channel base/walls. Use of jute mesh in the channel invert with rock cover and revegetation of the bare surface areas of the waste emplacement and storage / handling area should also occur to control runoff.	Disturbed parts of the Kitchener SIS that are not used for operational purposes at the SIS were prepared and seeded to stabilize those areas in the period between 2014 and Q1 2015 in accordance with the Kitchener SIS Landscape Management Plan. This included the surface area of the shaft cuttings stockpile. Topsoil was spread prior to seeding, or alternatively, areas were stabilized with mulch. Significant steeper portions of concentrated drainage channels have been rock armoured to prevent scour between elevation changes (the audit report notes this). Austar is currently monitoring vegetation establishment on the seeded areas. Significant road works (including table drains) were also completed to ensure wet weather access and reduce potential scour from drainage works. Other drainage channels within the stabilized parts of the site are wide with shallow grade and have been grassed.
8	A review of the surface water management along power line easement should be undertaken as part of ongoing maintenance and management.	This was completed in May 2015. A local remediation project was undertaken in the specific power line easement observed during the audit which has successfully stabilized this area with grass and drainage works.

No	Independent Environmental Audit Recommendations	Austar Coal Mine Responses
9	It is recommended that a separate risk based examination of the impact of doubled strains around any sensitive features (only), rather than double strain predictions throughout be included in future extraction plans.	In End of Panel reports when analysing subsidence monitoring data, some higher level strains were identified, however were dismissed as being due to disturbed survey pegs on the subsidence lines. Although evidence suggests that survey peg disturbance is more likely to be the cause of higher strains but cannot be unequivocally proved, the audit has recommended that future Extraction Plans should undertake a risk based examination of the impact of double strains around sensitive features to allow development of suitable management strategies. Austar accepts this recommendation for future Extraction Plans in the absence of other confirmation regarding disturbed survey marks.
10	It is recommended that: (i) curvature values should be included in subsequent Stage 3 End of Panel Reports; and (ii) the Statement of Commitments values should be reviewed to ascertain whether the quoted values are unnecessarily / un-realistically low and should be amended to reflect measured values of strains (and curvatures) to-date.	(i) Austar had intended to include curvature reporting in the End of Panel report for Longwall A8 and subsequent panels per the audit recommendation. When preparing the LWA8 End of Panel report and analysing the subsidence monitoring data, it became apparent it is difficult to make meaningful comparisons between the profiles of raw observed curvature and predicted conventional curvature. The reason for this is that survey tolerance can represent a large proportion of the measured curvatures, which can result in very irregular profiles. The survey tolerance for relative vertical movements is typically around ±5 mm, which equates to a survey tolerance for curvature of approximately 0.03 km-1 over a 25 metre bay length. This is significant when compared to the magnitudes of curvatures predicted for Austar, which are typically in the order of 0.05 km-1 to 0.09 km-1, and an upperbound curvature of ±0.15km-1 which represents a minimum radii of curvature of 7 kilometres. The issue may be overcome by adopting curvature derived from smoothed subsidence profiles, although smoothing of the subsidence profile can also however be open to criticism especially with Austar's small predicted upperbound curvature of ±0.15km-1 which represents a minimum radii of curvature of 7 kilometres. Austar has therefore used the method of converting predicted curvatures to strains to allow comparison of measured subsidence parameters for the Longwall A8 End of Panel Report. (ii) Austar will continue to monitor subsidence parameters in accordance with the Extraction Plan for Stage 3. Any update to subsidence predictions required will be undertaken through the Extraction Plan process, as identified in the DPE Guidelines for Extraction Plans, or through the Annual Review process identified in Project Approval PA08_0111.

4 COMMUNITY RELATIONS

4.1 Environmental Complaints

Austar's Environmental Management Strategy (EMS) includes a procedure for receiving, investigating, responding and reporting complaints received from the community. Austar maintains a 24-hour-a-day, 7 days a week, free call number 1800 701 986 to receive environmental complaints and other enquiries.

In the 2014-2015 reporting period a total of 15 complaints were received, an increase on the seven complaints in 2013-2014 reporting period. A summary of all the complaints received during the reporting period is provided in **Appendix F**.

Complaints received during the 2014-2015 reporting period were in relation to vibration, odour, traffic, noise, property, dust and access. Full details of the complaints are provided in **Appendix F**.

4.2 Community Liaison

The mine continues to maintain close relationships with all neighbouring properties, as well as nearby communities as part of normal business.

4.2.1 Community Consultative Committee (CCC)

The Austar Community Consultative Committee (CCC) continued to operate during the 2014-2015 reporting period. Meetings are held on a quarterly basis and the membership is shown in **Table 4-1**. During the reporting period Austar held four CCC meetings, which occurred on the following dates:

- 13 August 2014;
- 12 November 2014;
- 11 February 2015; and
- 29 April 2015.

TABLE 4-1 AUSTAR COMMUNITY CONSULTATIVE COMMITTEE (CCC) DURING THE 2014-2015 REPORTING PERIOD

Organisation/Representative	Name
Independent Chairperson	Ms Margaret MacDonald-Hill
Cessnock Council Representative	Clr Jeff Maybury (or delegate)
Community Representatives	Mr Alan Smith Mr David Holmes Mr Peter Sturrock
Company Representatives	Mr Greg Pawley Mr Gary Mulhearn Mr Jack Potter

Austar coordinates these meetings and provides information before and during the meetings on mining progress, community programs and environmental performance. Minutes from meetings are prepared by Austar in a format and manner acceptable to CCC members. The major discussion points from the Austar meetings in 2014-2015 were:

- Current mining operations – underground, CHPP, Kitchener SIS and rehabilitation;
- Environmental monitoring and results;
- Environmental incidents;
- Complaints management;
- Community sponsorships;
- 2013-2014 AEMR preparation and feedback;
- Bellbird South Mining Area.

These discussions led to outcomes aimed at improving the understanding and management of these issues. Minutes of CCC meetings are published on the Austar Coal Mine website.

4.2.2 Resident Consultation

During 2014-2015, Austar Coal Mine consulted with individual residents who live in areas potentially affected by the mine. This consultation was often conducted informally, in a manner that allowed the residents to openly discuss issues of importance to them. Monitoring results were often provided and discussed as part of this resident consultation.

Landholders over the active mining areas were provided with updates by letter to inform of the location of the underground mining operations, and the results of monitoring of subsidence and environmental impacts over the mining area.

4.2.3 Community Contributions

During the reporting period, Austar provided financial assistance for a number of community activities and projects. Projects and groups sponsored included, but not limited to:

- Hunter Valley Steamfest Maitland;
- Cessnock Mayoral Scholarship;
- Ronald McDonald House Newcastle;
- Charlie Teo Cure Brain Cancer Foundation;
- Cessnock District Rescue Squad;
- Millfield Rural Fire Service;
- Black Dog Institute;
- Diabetes Australia;
- Cessnock Rugby Leagues Football Club;
- Kurri Kurri Bulldogs;
- Mitchell/Grant Families fund;
- Kids with Cancer Foundation;
- Hunter Valley Domestic Violence Group – Jodie's Place;
- Cessnock Library – Summer reading club;
- Cessnock & District Agricultural – Sponsorship of Annual Show;
- Hunter Domestic Violence – Reclaim the night fundraiser;
- Cessnock High School - end of year presentation;
- Mt View High School – end of year presentation;
- Paxton Women's Bowling Club – women's triples carnival; and,
- Ellalong Woodchop Championship.

5 REHABILITATION

This section describes land management within the mining lease area and includes land use objectives, landscaping operations, and a review of the rehabilitation performance of mining and infrastructure areas.

5.1 Buildings

Several buildings are proposed to be demolished as part of site rehabilitation works including the remaining buildings at the Bellbird site, Kalingo site and several buildings and the pony stables at the CHPP site.

A Historical Heritage Assessment and Structural Engineer's inspection report were completed in November 2008 and August 2008 respectively. The Heritage Assessment identified items which did not require further heritage management, and items of potential heritage value. Items which were identified as having no heritage significance in the Heritage Assessment will be progressively demolished.

The needs of Heritage Management will need to be balanced against structural and safety issues identified in the Structural Engineer's report and by DI-DRE. Consultation will continue with Cessnock City Council in the 2015-2016 reporting period.

5.2 Rehabilitation of Disturbed Land

During the 2014-15 reporting period, rehabilitation works were undertaken at the Kitchener SIS from November 2014 to February 2015 with the aim of stabilising the areas not required for operational purposes. The rehabilitation works undertaken involved spreading the stockpiled topsoil at the site to an approximate depth of 100mm across an approximately two hectare area at the Kitchener SIS. Topsoiled areas were ripped and treated with soil ameliorants (lime and gypsum), then seeded with a pasture mix.

Other rehabilitation works undertaken included spreading mulch, constructing rock lined drains, installing fencing and constructing roads and parking areas.

5.3 Other Infrastructure

No rehabilitation activities other than the works outlined in **Section 5.2** were carried out during the 2014-2015 reporting period.

5.4 Rehabilitation Trials and Research

The majority of rehabilitation to be undertaken in the future will principally involve reshaping of disturbed areas once demolition works and rubbish removal has been completed and establishment of a stable vegetative cover in these areas. Methods for these rehabilitation works are well understood and require no further investigation.

The Aberdare Extended Reject Emplacement Area will be the first coarse reject emplacement area to be rehabilitated and will be used to refine emplacement and rehabilitation requirements at the East Open Cut and West Open Cut reject emplacement areas. All of these areas have been selected as they directly drain to former underground workings providing a suitable long term control for acidic leachate from the emplaced reject.

Aberdare Extended is to be rehabilitated as future open space under agreement with the landholder. This will involve:

- Filling the site to within 1 metre of the agreed final landform with coarse reject material;
- Capping the coarse reject with at least 1 metre of suitable overburden material from the West Open Cut;
- Shaping the landform to be free draining in accordance with the agreed final landform;
- Topsoiling the shaped landform (if available), or application of some organic material; and
- Establishing a stable grass cover over the reshaped landform.

These works will be undertaken on an ongoing basis over the approved MOP period.

During the MOP period an adit sealing project was completed in the East Pit of the CHPP site in consultation with DI-DRE mine safety officers to allow for safe emplacement of reject in the vicinity of an adit to underground workings.

During the 2015-2016 reporting period soil testing of the materials within the West Pit will be undertaken to confirm suitability as a capping material. This will also inform a life of mine capping and reject emplacement strategy.

Further research may include:

- An evaluation (e.g. soil analysis) of previously remediated acidic areas on site to determine whether further treatment is required. This information is to assist in determining the level of acid treatment required for other areas on site;
- Monitoring of leachate levels within the emplaced reject material to gain an understanding of maximum leachate levels and potential height of associated capillary rise to determine the need for additional capping material; and,
- Broad chemical characterisation of the reject material and its acid generation potential to explore the amount of acid that may be generated, rate of acid generation and period over which significant amounts of acid may continue to be generated.

Table 5-1 summarises the areas which require rehabilitation at Austar Coal Mine and **Table 5-2** rehabilitation maintenance requirements.

TABLE 5-1 REHABILITATION SUMMARY

	Areas Affected / Rehabilitated (hectares)		
	To Date	**Last Report**	**Next Report (Estimated)**
A. Mine Lease Area			
A1 Mine Lease(s) Area	10927.2	10927.2	10927.2
B. Disturbed Areas			
B1 Infrastructure Area (other disturbed areas to be rehabilitated at closure including facilities, roads) - *CHPP, Pit Top, Shafts 1, 2, 3, Kalingo Site, Rail line, conveyor, Kitchener SIS.*	80.3	80.3	80.3
B2 Active Mining Area (excluding items B3 – B5 below)	NA	NA	NA
B3 Waste Emplacements (active/unshaped/uncapped). *Aberdare Extended Emplacement Area, CHPP East Open Cut, CHPP NW chitter area, Area 12 stockpile..*	38.5	38.5	38.5
B4 Tailings Emplacements (active/unshaped/uncapped) *CHPP No.9 Dam*	3.4	3.4	3.4
B5 Shaped Waste Emplacement (awaits final vegetation) *Next Rpt – no change as no longwall production.*	0	0	0
ALL DISTURBED AREAS	122.2	122.2	121.2
C. Rehabilitation Progress			
C1 Total Rehabilitated Area (except for maintenance) *Next Rpt – no change as no longwall production.*	0	6.48	0
D. Rehabilitation on Slopes			
D1 10 to 18 degrees (*from 2008 MOP*)	0.5	0.5	0.5
D2 Greater than 18 degrees	0.0	0.0	0.0
E. Surface of Rehabilitated Land			
E1 Pasture and grasses *Kitchener SIS, Area 12, Area 13, West Pit, CHPP Trial areas, former CHPP Clay Pit. Next Rpt – no change as no longwall production.*	46.4	46.4	46.4
E2 Native forest/ecosystems *West Pit areas.*	5.2	5.2	5.2
E3 Plantations and Crops	0	0	0
E4 Other (include non-vegetative outcomes)	0	0	0

Notes: *Please refer to the notes in description cells.*

TABLE 5-2 MAINTENANCE ACTIVITIES ON REHABILITATED LAND

	Area Treated (ha)		
Nature of Treatment	**Report Period**	**Next Period**	**Comment/Control Strategies/Treatment Detail**
Additional erosion control works (drains re-contouring, rock protection)	0.5	1.0	Rock-lined drains constructed at Kitchener SIS during 2014-2015 reporting period. Erosion scour maintenance undertaken at Kalingo Infrastructure Area. Establishment of clean water diversion drains at Aberdare in next reporting period.
Re-covering (topsoil, subsoil)	0	0	Nil
Soil treatment	0	0	Nil
Pasture management	0	0	Nil
Reseeding/replanting	0	0	N
Adversely affected by weeds	0	5.0	Weed management and control to occur in next reporting period.
Feral animal control	0	0	Nil

5.5 Further Development of the Final Rehabilitation Plan

Austar's project approval PA08_0111 is valid until 31 December 2030. Final rehabilitation remains as proposed in the current MOP.

6 ACTIVITIES PROPOSED FOR THE NEXT AEMR PERIOD

Austar will endeavour to carry out the following activities during the 2015-2016 reporting period, as outlined in **Table 6-1**.

TABLE 6-1 PROPOSED ACTIVITIES FOR 2015-2016 REPORTING PERIOD

	Activities Proposed in 2015-2016 Reporting Period
1	Preparation of a Mining Operations Plan to replace the current MOP which expires in November 2015.
2	Lodgement of a Mining Lease Application over CHPP Lot 1 DP87087 to encompass mining purposes on that lot.
3	Progression of the sinkhole tributary reinstatement between Area 12 and Area 13.
4	Monitor grassland establishment for Area 12 and the Aberdare Extended Reject Emplacement Area.
5	Progress demolition of existing structures and foundations at Bellbird, Pelton, and Cessnock No. 1 (Kalingo) Collieries.
6	Continued emplacement of coarse reject at Aberdare Extended Emplacement Area.
7	Progressive implementation of the erosion and sediment control plan at the Aberdare Extended Emplacement area for capped areas with potential to drain to natural watercourses. Progress installation of the clean water diversion drain.
8	Establishment of permanent drainage mechanism for leachate/surface water within Aberdare Extended Reject Emplacement Area to underground workings.
9	Continued implementation of noise pollution reduction program at the Austar CHPP.
10	Completion of a Phase 1 Contamination Assessment for all Surface Mining Lease areas.
11	Planning and preparation to allow sourcing of capping from within the West Pit.

Plans

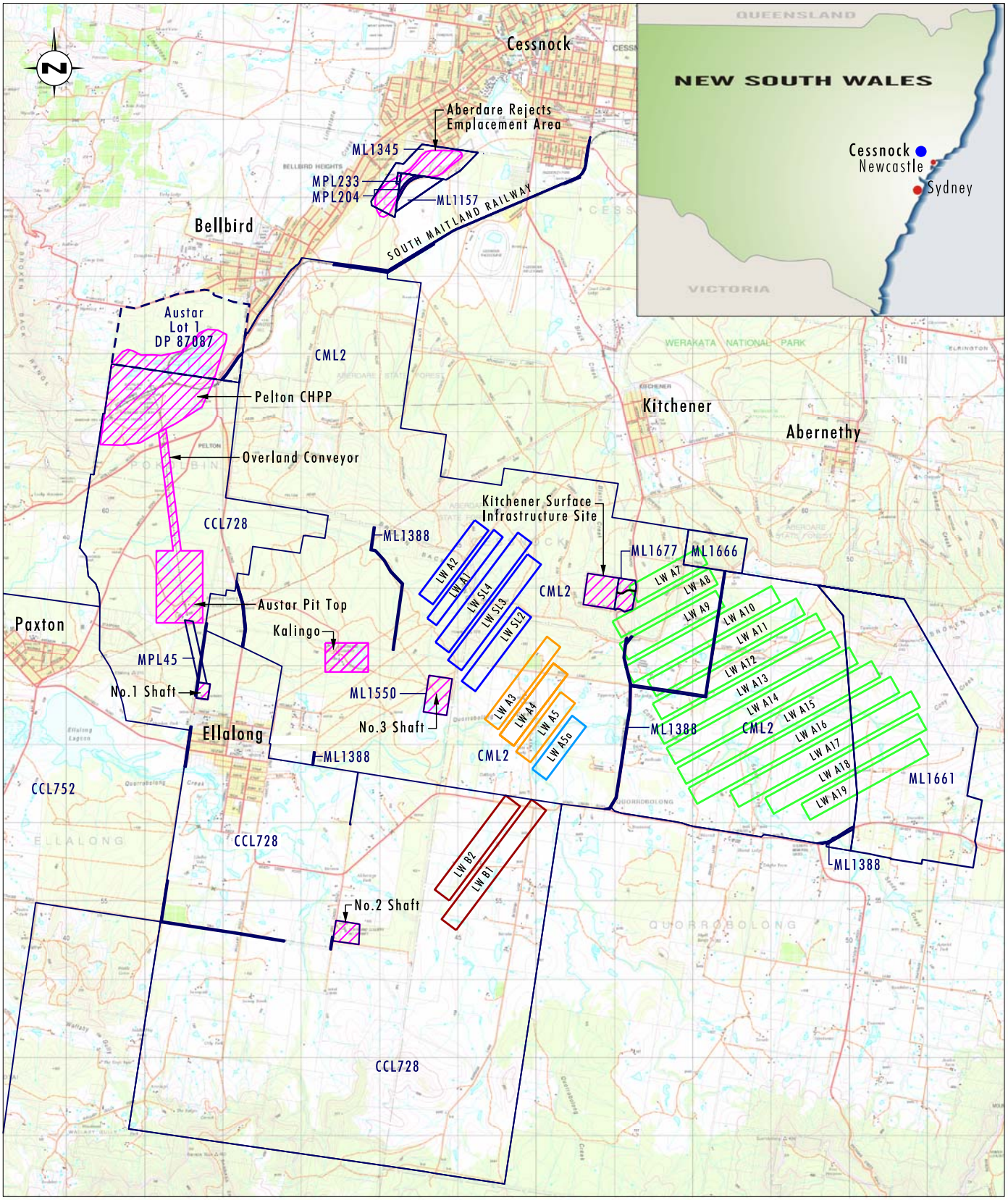


Image Source: LPI NSW (2009)
Data Source: Austar Coal Mine (2015)

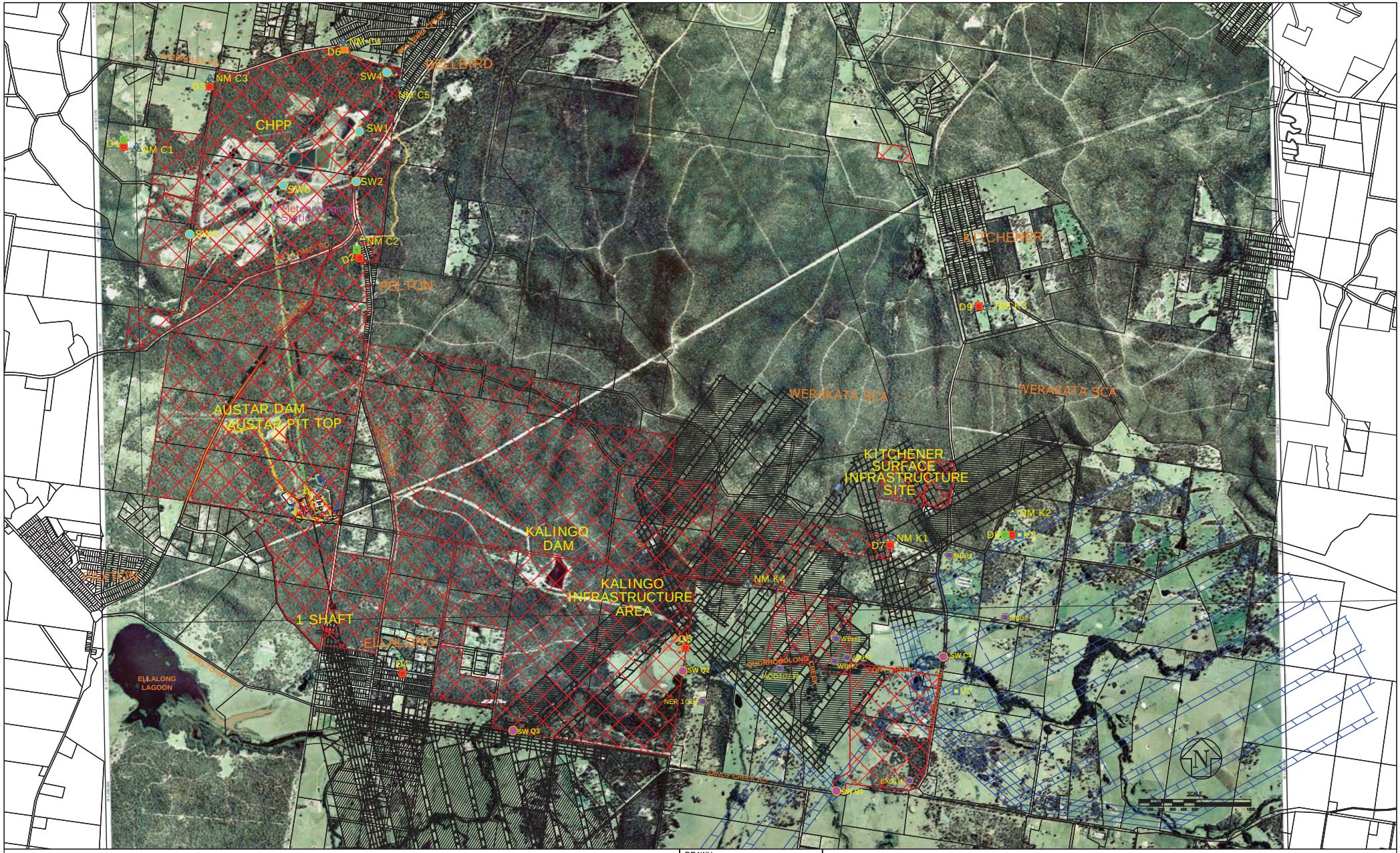
0 1 2 3 km
1:70 000

Legend

- Layout for Stage 1 Longwall Panels (complete)
- Layout for Stage 2 Longwall Panels (complete)
- Layout for Stage 2 Extension Longwall Panels (complete)
- Layout for Stage 3 Longwall Panels (in progress)
- Layout for Proposed LWB1 and LWB2 Longwall Panels
- Surface Infrastructure Sites
- Mining Lease Boundary
- Austar owned CHPP Land

FIGURE 1.1

Locality Plan



DRAWN	G. Mulhearn
DATE	29/9/2015
CHECKED	
APPROVED	

AUSTAR COAL MINE

TITLE **Plan 2: Austar Environmental Monitoring Network**

SCALE: Not to scale

DRAWING No.: Environmental/ Monitoring Plan A3

KITCHENER SURFACE INFRASTUCTURE SITE

SERVICES HOLE

TEMPORARY D/C SHAFT

No5 U/C SHAFT

AQD1120

AQD1121

AQD1122

AQD1123

2016

2017

2018

2019

2020

LW A1 LW A2 LW A3 LW A4 LW A5 LW A6 LW A7 LW A8 LW A9 LW A10 LW A11 LW A12 LW A13 LW A14 LW A15 LW A16 LW A17 LW A18 LW A19

LW B1 LW B2

LW SL-1 LW SL-2 LW SL-3 LW SL-4

LW 13 LW 13A LW 14 LW 15 LW 16 LW 17

A7 TG A8 MG A9 MG A10 MG A11 MG A12 MG A13 MG A14 MG

300 MAINS 200 MAINS BELLBIRD MAINS

LEGEND

JUL 2014 to JUN 2015

MINED AREA

JUL 2015 to DEC 2015

2016

2017

2018

2019

2020

MINE PLAN

BOREHOLES DRILLED JUL 2014 - JUN 2015

AQD1120 - AQD1123

SCALE

0 100 200 300 400 500 1000

DRAWN	D.JOLLIFFE
DATE	8/9/2015
CHECKED	
APPROVED	

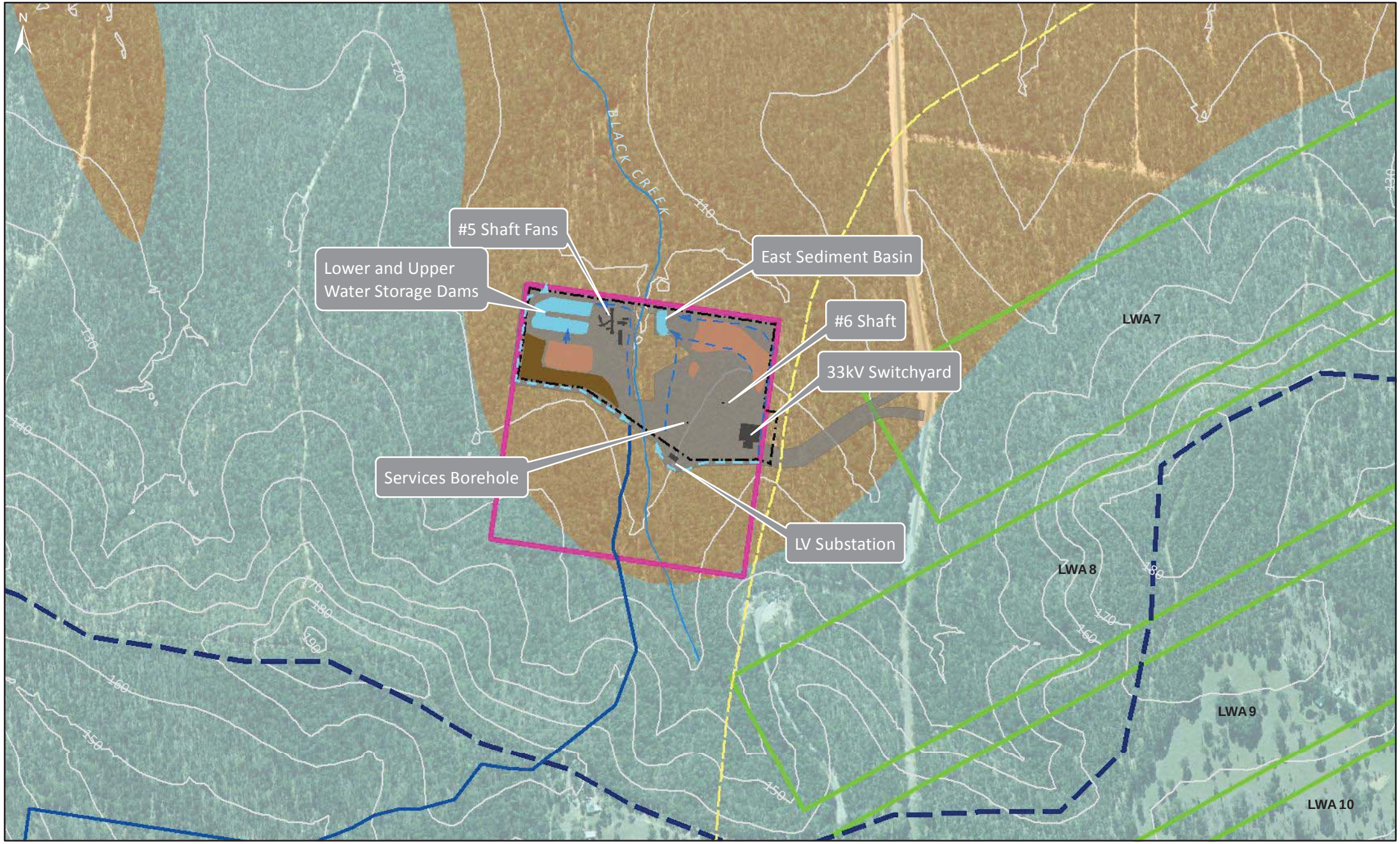
AUSTAR COAL MINE

TITLE: PLAN 4A MINING ACTIVITIES 2014 - 2015 & PLANNED MINING

SCALE: 1:10,000

DRAWING No. P:\Austar\2015\Mop Plans\Plan4A Mining Activities

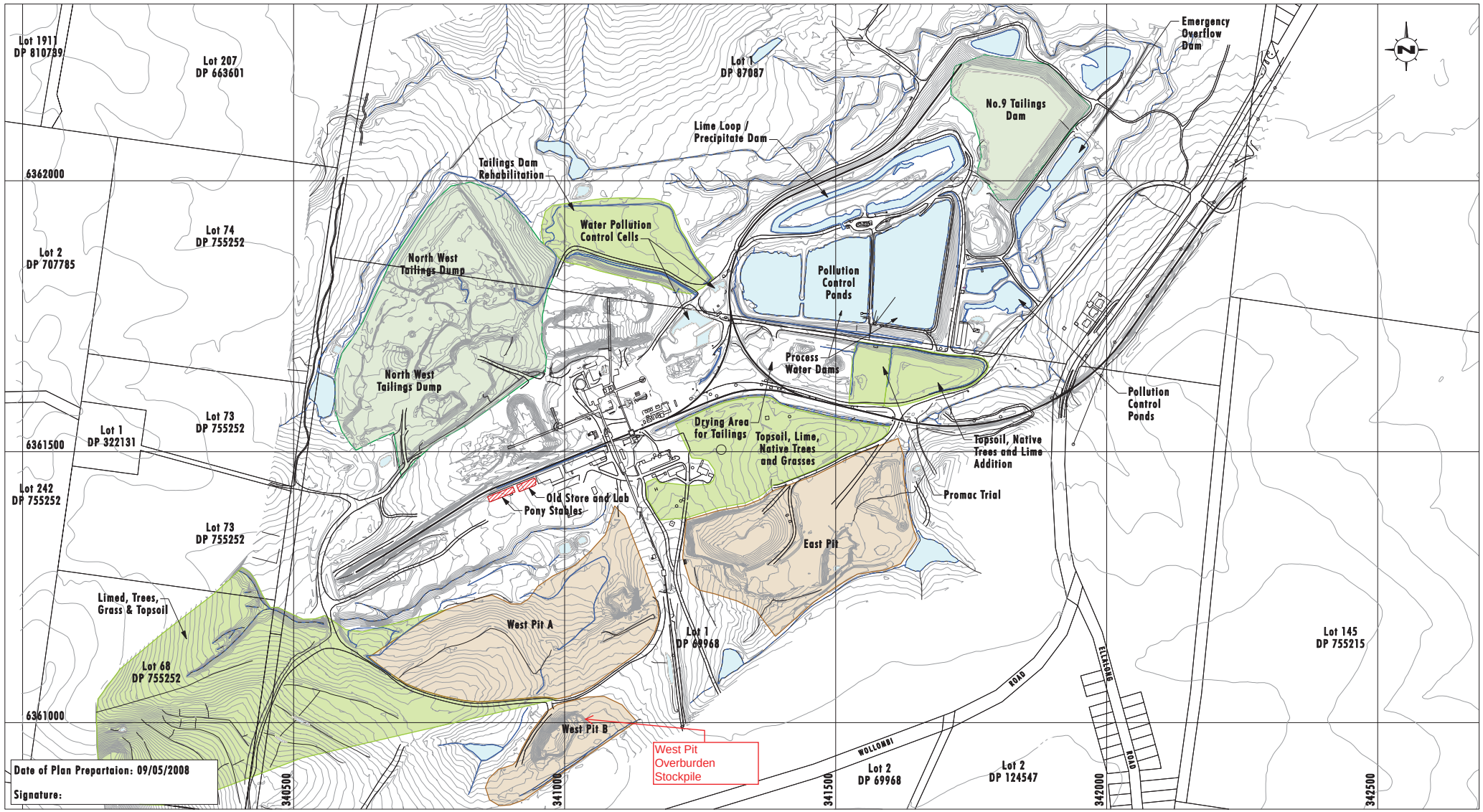
A1



Limit of Subsidence (20mm)
Catchment Boundary
Creek Lines
Pipeline
Stage 3 Longwall Panels
Contours
Surface Infrastructure Site (SIS)
Approximate Cleared Area
Structures
Stockpiled Material
Topsoil Stockpile
Dams/Basins
Soil Landscapes
Aberdare
Branxton
Fence
Site Drainage
Surface Drainage

PLAN 4C - Kitchener Land Preparation 2014-2015 and Erosion and Sediment Control Plan (Source: AECOM, 2015)

0 50 100 200 Metres



Source: Austrar Coal Mine

Legend

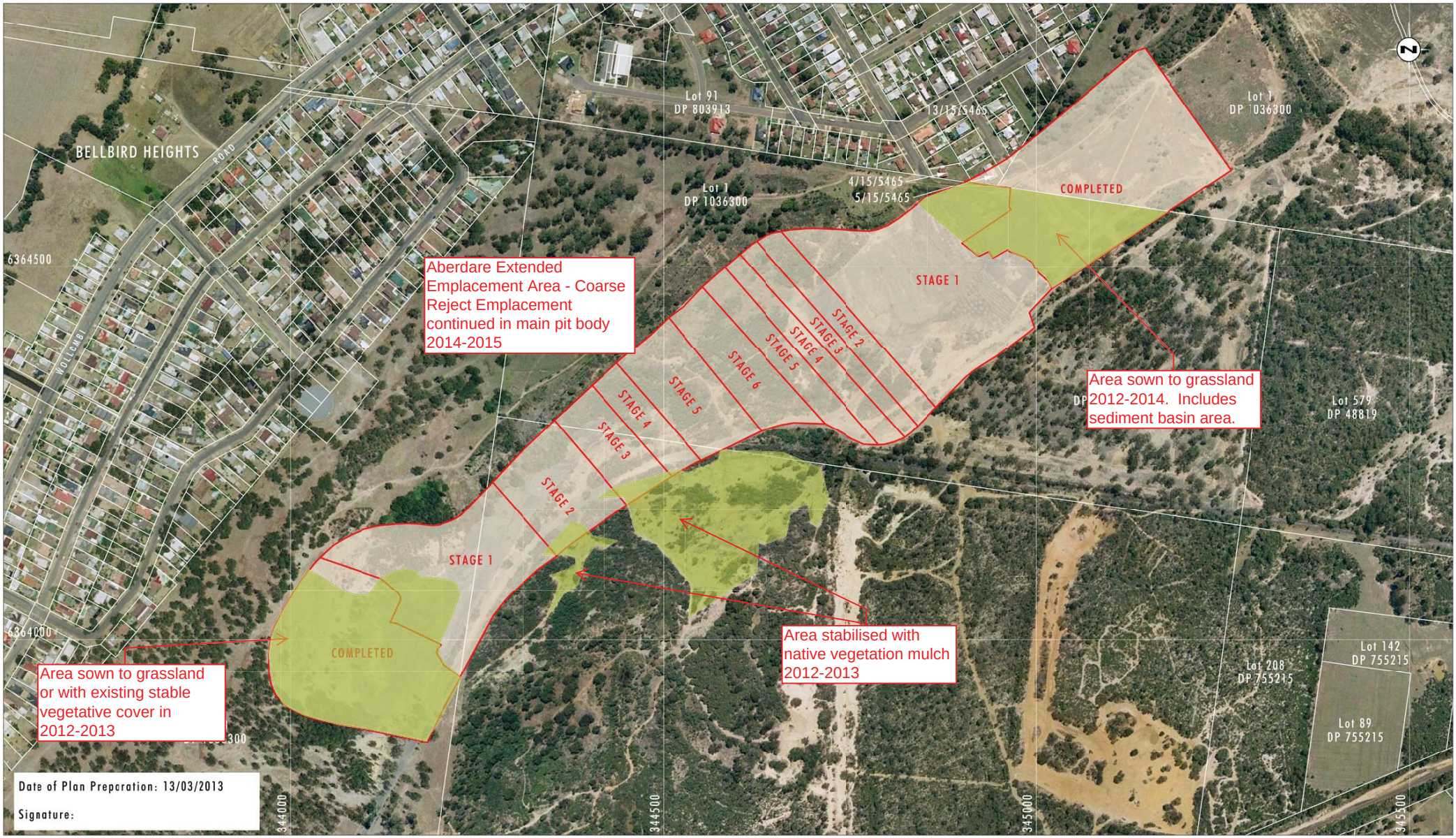
- Rehabilitation Domains
- Reject Emplacement Area
- Area Revegetated to Native Bushland
- Previously Rehabilitated Areas
- Buildings Proposed to Demolished
- Clean Water
- Contaiminated Water
- Contour Line
- Cadastral Line

Note: 1m and 10m Contour Interval, Projection MGA Zone 56

File Name (A2): MOP_V1/2274_295.dgn

PLAN 5B

**Pelton CHPP -
Rehabilitation Schedule**



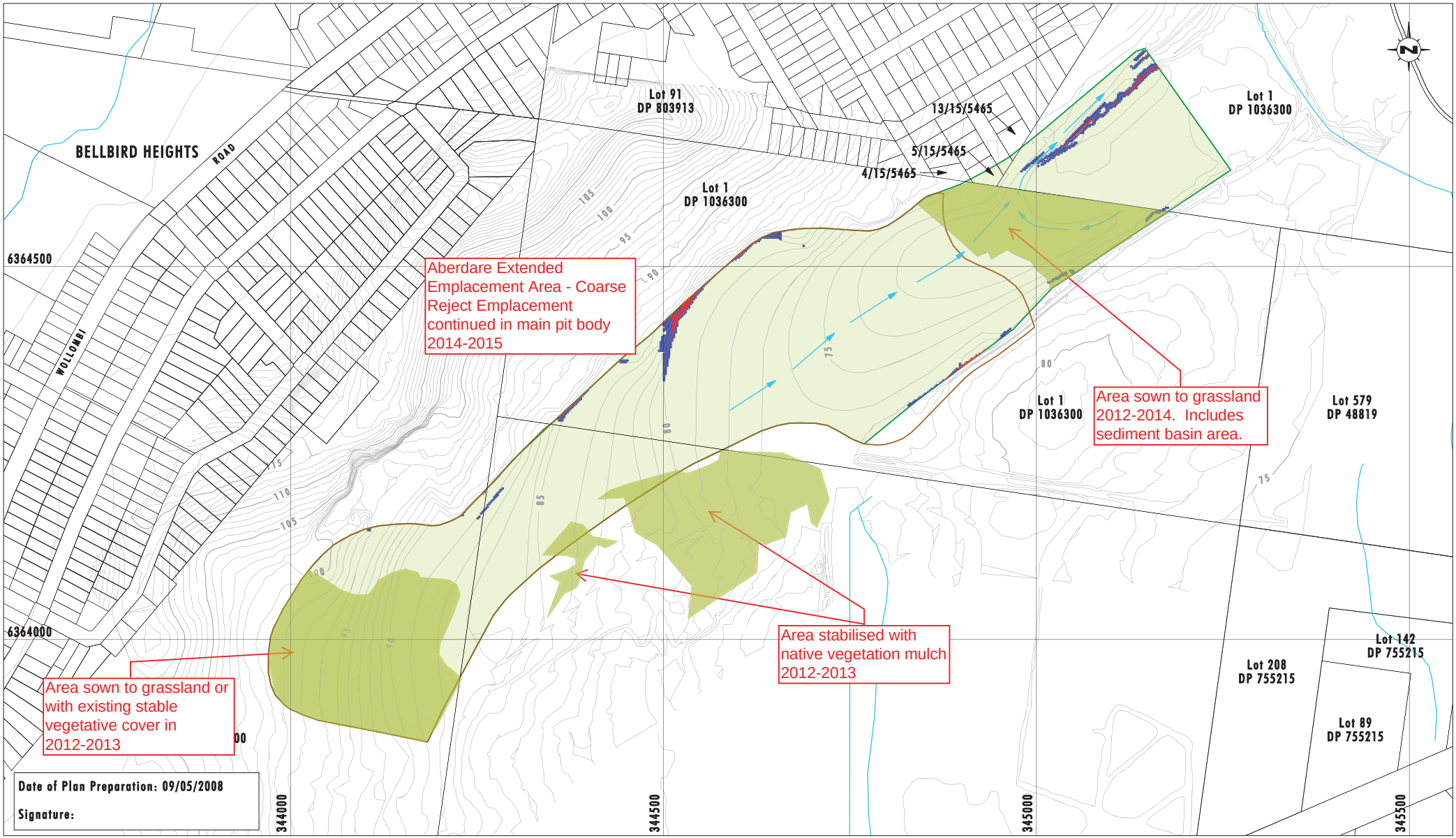
Source: Geo-Spectrum Australia Pty Ltd (2005)

Legend

- Staged Plans
- Reject Emplacement Area

PLAN 5C

Aberdare Extended Emplacement Area - Rehabilitation Schedule



Source: Geo-Spectrum Australia Pty Ltd (2005)

Legend

- Area Revegetated to Open Grassland
- Reject Emplacement Area
- Rehabilitated Areas with Slope 10-18°
- Rehabilitated Areas with Slope >18°
- Drainage Line
- Contour Line
- Cadastral Line

Note: 1m and 10m Contour Interval, Projection MGA Zone 56

File Name (A3): R12_V1/2274_296.dgn

PLAN 6C

Aberdare Extended Emplacement Area - Conceptual Final Landform and Rehabilitation

Appendix A:

Dust Monitoring Data

Austar Coal Mine 2014-2015 Dust Deposition Gauge Results (g/m^2/month)

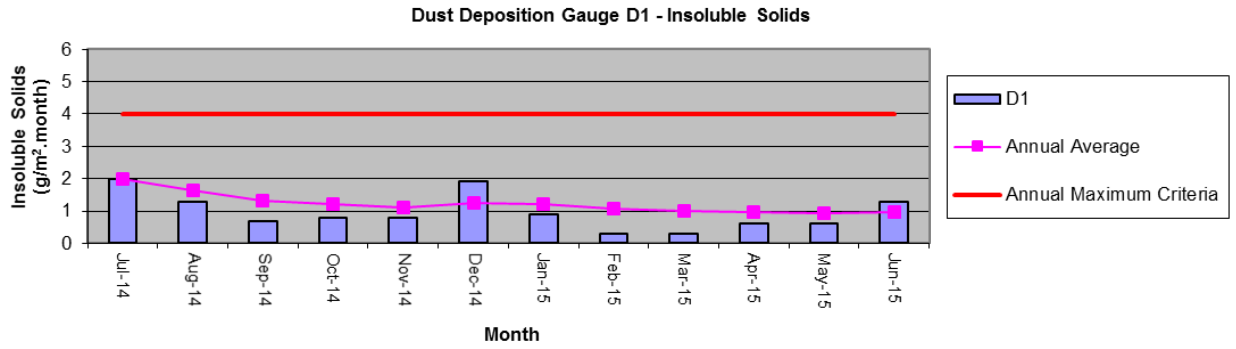
Month	D1			D2			D3			D4			D5			D7			D8			D9			Annual Maximum Criteria
	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	Insoluble Matter	Annual Average YTD	Ash	
Jul-14	2	2.0	1.6	0.7	0.7	0.5	0.1	0.1	0.1	1.3	1.3	1.1	0.6	0.6	0.5	0.5	0.5	0.2	0.4	0.4	0.2	0.4	0.4	0.3	4.0
Aug-14	1.3	1.7	1	1.3	1.0	0.9	0.4	0.3	0.3	**4.9**	3.1	4.5	1.3	1.0	0.8	0.4	0.5	0.3	0.5	0.5	0.4	0.5	0.5	0.4	4.0
Sep-14	0.7	1.3	0.5	2.5	1.5	1	NR	0.3		**4.3**	3.5	3.8	1.8	1.2	1	0.3	0.4	0.3	0.3	0.4	0.3	1	0.6	0.8	4.0
Oct-14	0.8	1.2	0.5	0.8	1.3	0.5	0.6	0.4	0.4	1.9	3.1	1	3.8	1.9	2	0.9	0.5	0.4	0.6	0.5	0.4	0.7	0.7	0.4	4.0
Nov-14	0.8	1.1	0.5	1.5	1.4	0.6	0.4	0.4	0.2	0.7	2.6	0.4	2.4	2.0	1.3	1.1	0.6	0.6	0.9	0.5	0.5	2.9	1.1	2.2	4.0
Dec-14	1.9	1.3	1.1	6.7c	1.4	2	3.6	1.0	0.8	3.4	2.8	1.5	**4.8**	2.5	1.6	1.7	0.8	1.1	3.3	1.0	1.5	7.1c	1.1	3.6	4.0
Jan-15	0.9	1.2	0.6	6.4c	1.4	2.8	3.2	1.4	1.4	2.2	2.7	1.7	3.6c	2.5	1.1	0.7	0.8	0.4	1.1	1.0	0.6	1.9	1.2	0.8	4.0
Feb-15	0.3	1.1	0.2	0.6	1.2	0.3	3.2	1.6	0.6	0.8	2.4	0.4	3.5c	2.5	0.8	0.6	0.8	0.2	0.3	0.9	0.2	0.6	1.1	0.3	4.0
Mar-15	0.3	1.0	0.2	3.5c	1.2	0.5	0.4	1.5	0.2	2.6	2.5	0.9	2.6	2.5	0.9	0.5	0.7	0.2	0.8	0.9	0.5	0.4	1.1	0.1	4.0
Apr-15	0.6	1.0	0.4	1.1	1.2	0.6	0.5	1.4	0.4	5.3c	2.5	2.3	3.3c	2.5	1.5	0.6	0.7	0.4	0.5	0.9	0.3	0.5	1.0	0.3	4.0
May-15	0.6	0.9	0.2	3.6	1.5	0.9	0.3	1.3	0.1	1.6	2.4	1.4	2.2	2.4	1.2	0.7	0.7	0.2	0.3	0.8	0.1	0.3	0.9	0.1	4.0
Jun-15	1.3	1.0	0.6	11c	1.5	9.4	0.5	1.2	0.2	2.5	2.4	1.3	1.1	2.3	0.6	0.3	0.7	0.2	0.3	0.8	0.1	0.3	0.9	0.2	4.0

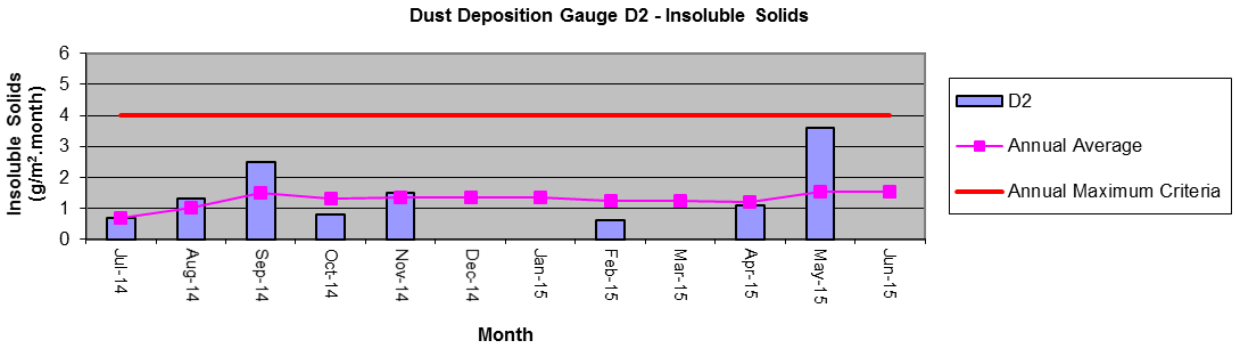
Note: *"c" denotes contaminated with bird droppings or similar. NS denotes sampling not undertaken. NA denotes sample not available as bottle was missing. Not used for Annual Average Calculations.*

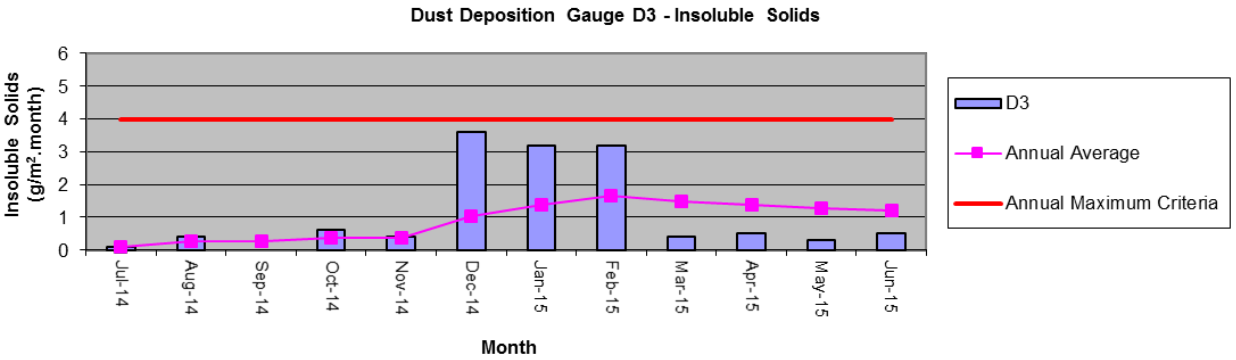
Individual monthly dust results and Annual Average dust results over the Annual Average Criteria of 4g/m^2 are highlighted in bold.

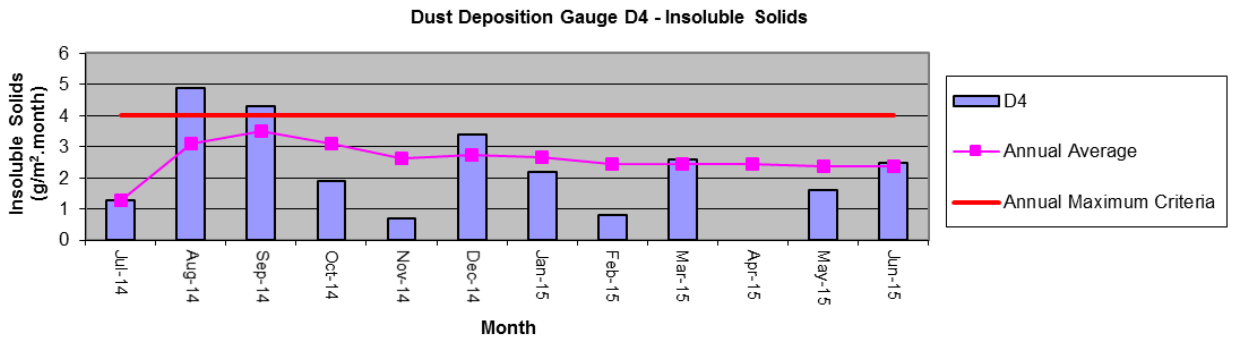
YTD denotes Year to Date.

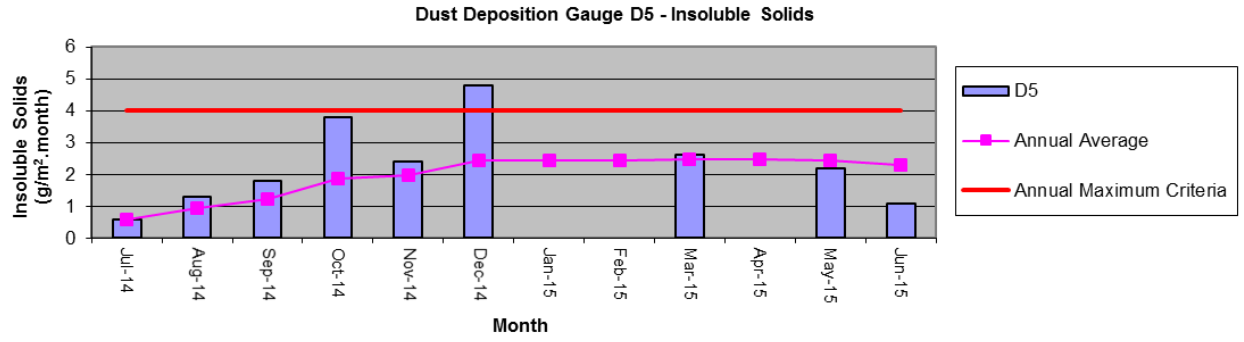
Austar Coal Mine 2014-2015 Dust Deposition Gauge Result Graphs

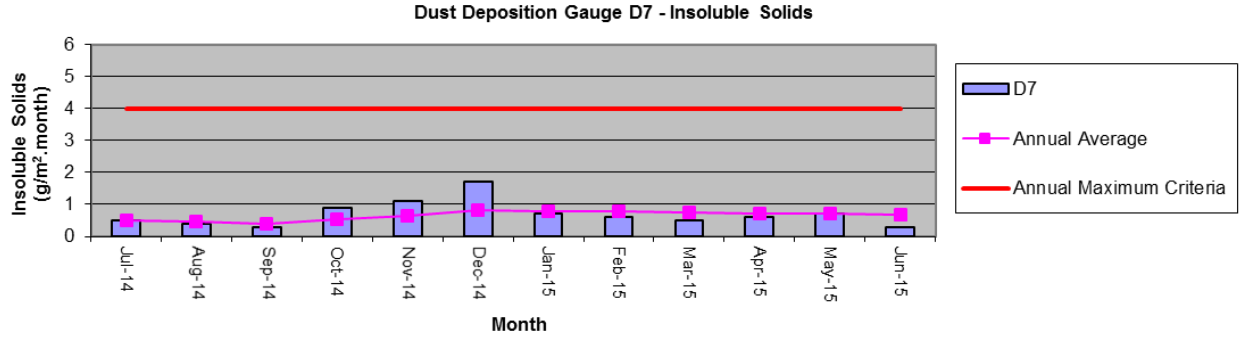


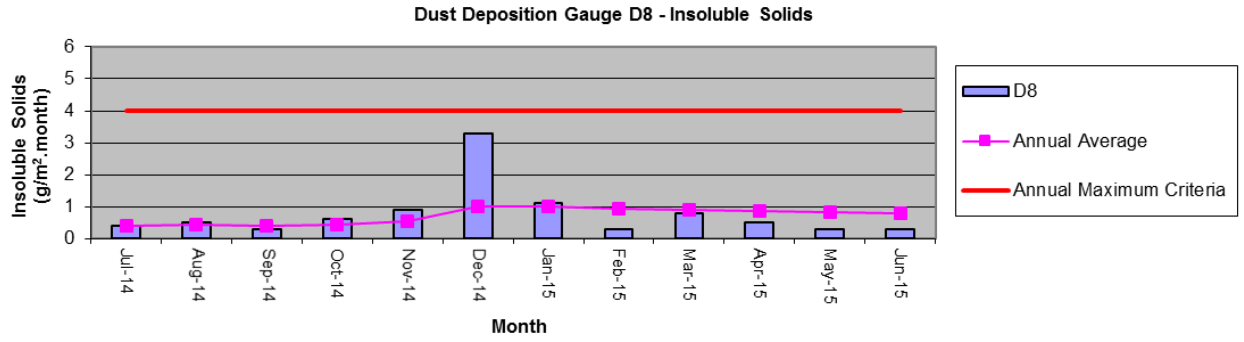


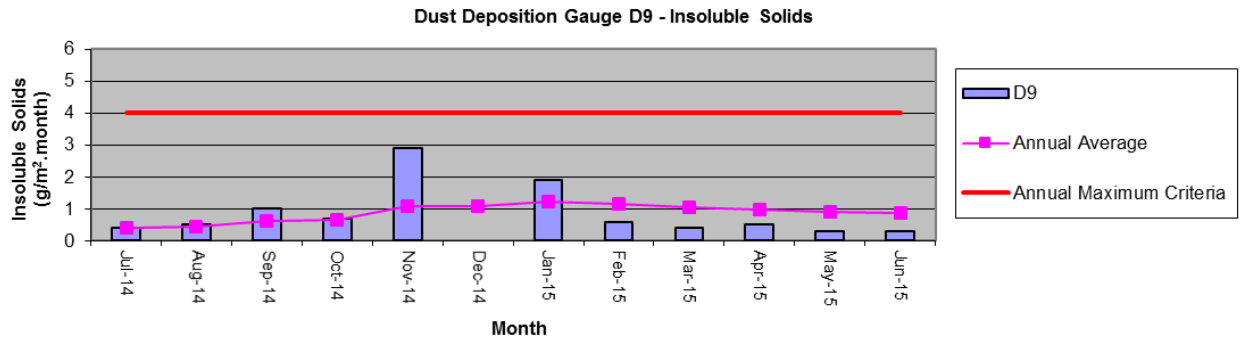












Note: Where dust gauge was contaminated (e.g. bird droppings), data is not presented.

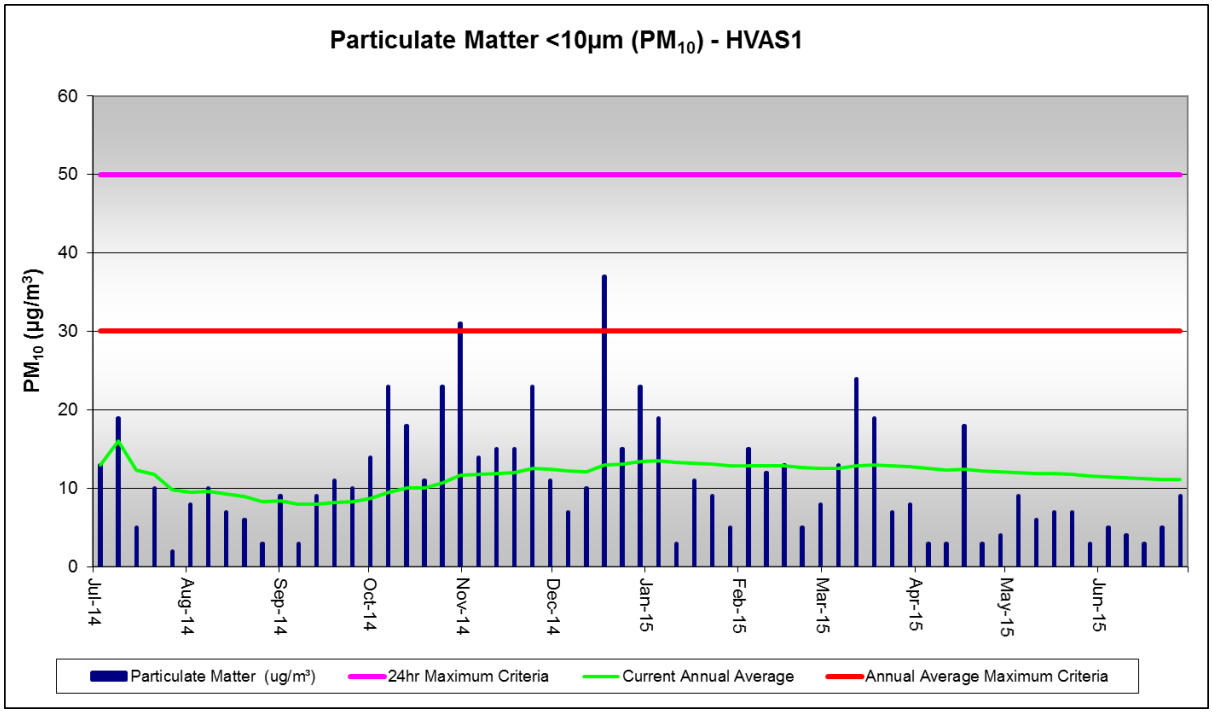
Austar Coal Mine 2014-2015 High Volume Air Sampler (HVAS) Results (PM_{10} µg/m^3)

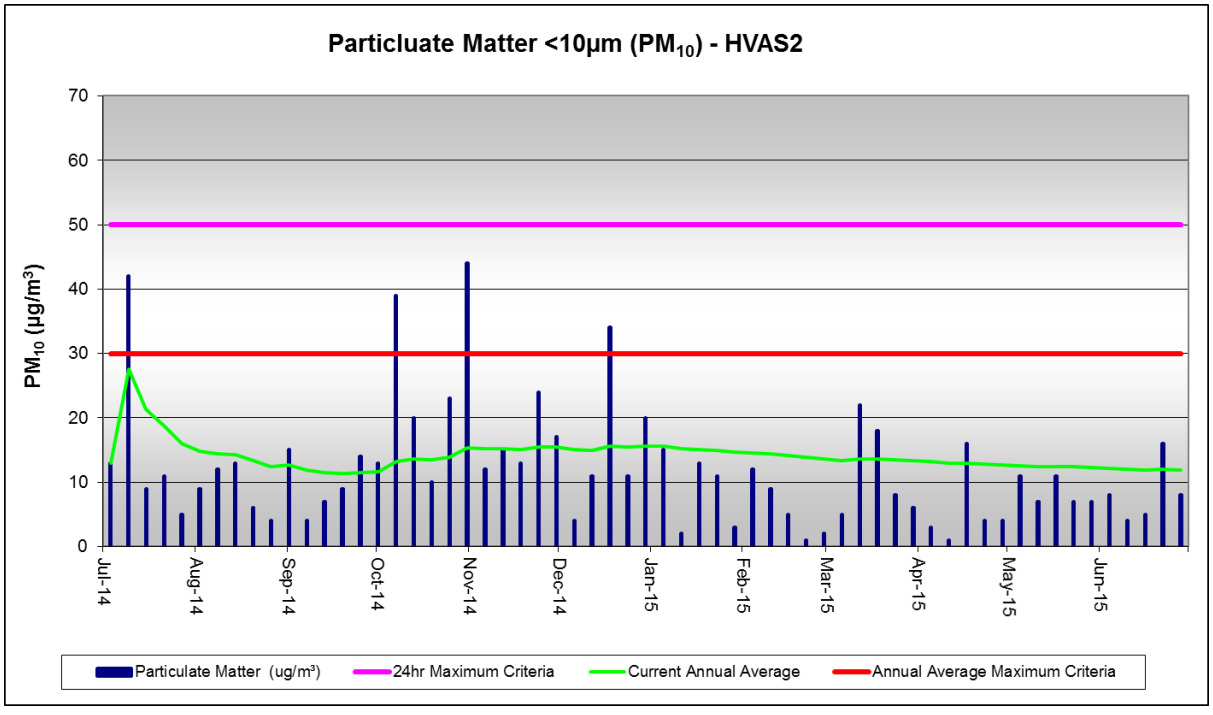
Date	Particulate Matter <10µm (PM_{10}) – HVAS1			Particulate Matter <10µm (PM_{10}) – HVAS2			Particulate Matter <10µm (PM_{10}) – HVAS3		
	Particulate Matter	Monthly Average	Current Annual Average YTD	Particulate Matter	Monthly Average	Current Annual Average YTD	Particulate Matter	Monthly Average	Current Annual Average YTD
3/07/2014	13	-	13.0	13	-	13.0	5	-	5.0
9/07/2014	19	-	16.0	42	-	27.5	12	-	8.5
15/07/2014	5	-	12.3	9	-	21.3	8	-	8.3
21/07/2014	10	-	11.8	11	-	18.8	13	-	9.5
27/07/2014	2	9.8	9.8	5	16.0	16.0	2	8.0	8.0
2/08/2014	8	-	9.5	9	-	14.8	5	-	7.5
8/08/2014	10	-	9.6	12	-	14.4	13	-	8.3
14/08/2014	7	-	9.3	13	-	14.3	6	-	8.0
20/08/2014	6	-	8.9	6	-	13.3	5	-	7.7
26/08/2014	3	6.8	8.3	4	8.8	12.4	3	6.4	7.2
1/09/2014	9	-	8.4	15	-	12.6	7	-	7.2
7/09/2014	3	-	7.9	4	-	11.9	2	-	6.8
13/09/2014	9	-	8.0	7	-	11.5	5	-	6.6
19/09/2014	11	-	8.2	9	-	11.4	8	-	6.7
25/09/2014	10	8.4	8.3	14	9.8	11.5	12	6.8	7.1
1/10/2014	14	-	8.7	13	-	11.6	12	-	7.4
7/10/2014	23	-	9.5	39	-	13.2	17	-	7.9
13/10/2014	18	-	10.0	20	-	13.6	15	-	8.3
19/10/2014	11	-	10.1	10	-	13.4	8	-	8.3
25/10/2014	23	-	10.7	23	-	13.9	22	-	9.0
31/10/2014	31	21.2	11.7	44	27.2	15.3	21	16.6	9.6
6/11/2014	14	-	11.8	12	-	15.2	14	-	9.8
12/11/2014	15	-	11.9	15	-	15.2	19	-	10.2
18/11/2014	15	-	12.0	13	-	15.1	18	-	10.5
24/11/2014	23	-	12.5	24	-	15.4	23	-	11.0
30/11/2014	11	15.6	12.4	17	16.2	15.5	13	17.4	11.1
6/12/2014	7	-	12.2	4	-	15.1	7	-	10.9
12/12/2014	10	-	12.1	11	-	14.9	10	-	10.9
18/12/2014	37	-	13.0	34	-	15.6	31	-	11.6
24/12/2014	15	-	13.1	11	-	15.4	11	-	11.6
30/12/2014	23	18.4	13.4	20	16.0	15.6	19	15.6	11.8
5/01/2015	19	-	13.6	15	-	15.6	19	-	12.0
11/01/2015	3	-	13.2	2	-	15.2	3	-	11.8
17/01/2015	11	-	13.2	13	-	15.1	13	-	11.8
23/01/2015	9	-	13.1	11	-	15.0	9	-	11.7
29/01/2015	5	9.4	12.8	3	8.8	14.6	4	9.6	11.5
4/02/2015	15	-	12.9	12	-	14.6	12	-	11.5
10/02/2015	12	-	12.9	9	-	14.4	9	-	11.4
16/02/2015	13	-	12.9	5	-	14.2	10	-	11.4
22/02/2015	5	-	12.7	1	-	13.9	4	-	11.2
28/02/2015	8	10.6	12.6	2	5.8	13.6	5	8.0	11.1
6/03/2015	13	-	12.6	5	-	13.4	7	-	11.0

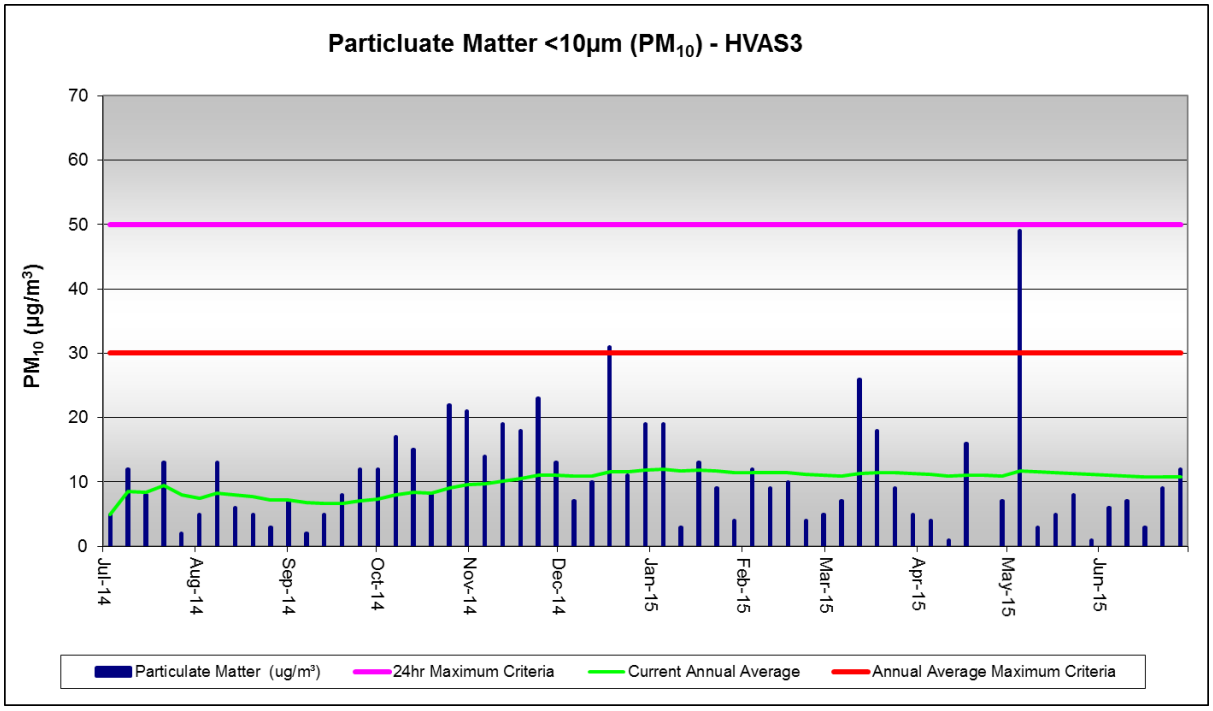
Date	Particulate Matter <10µm (PM_{10}) – HVAS1			Particulate Matter <10µm (PM_{10}) – HVAS2			Particulate Matter <10µm (PM_{10}) – HVAS3		
	Particulate Matter	Monthly Average	Current Annual Average YTD	Particulate Matter	Monthly Average	Current Annual Average YTD	Particulate Matter	Monthly Average	Current Annual Average YTD
12/03/2015	24	-	12.8	22	-	13.6	26	-	11.3
18/03/2015	19	-	13.0	18	-	13.7	18	-	11.5
24/03/2015	7	-	12.8	8	-	13.5	9	-	11.4
30/03/2015	8	14.2	12.7	6	11.8	13.4	5	13.0	11.3
5/04/2015	3	-	12.5	3	-	13.1	4	-	11.1
11/04/2015	3	-	12.3	1	-	12.9	1	-	10.9
17/04/2015	18	-	12.4	16	-	13.0	16	-	11.0
23/04/2015	3	-	12.3	4	-	12.8	<1	-	11.0
29/04/2015	4	6.2	12.1	4	5.6	12.6	7	7.0	10.9
5/05/2015	9	-	12.0	11	-	12.6	49	-	11.7
11/05/2015	6	-	11.9	7	-	12.5	3	-	11.5
17/05/2015	7	-	11.8	11	-	12.4	5	-	11.4
23/05/2015	7	-	11.7	7	-	12.3	8	-	11.3
29/05/2015	3	6.4	11.6	7	8.6	12.3	1	13.2	11.1
4/06/2015	5	-	11.5	8	-	12.2	6	-	11.1
10/06/2015	4	-	11.3	4	-	12.0	7	-	11.0
16/06/2015	3	-	11.2	5	-	11.9	3	-	10.8
22/06/2015	5	-	11.1	16	-	12.0	9	-	10.8
28/06/2015	9	5.2	11.1	8	8.2	11.9	12	7.4	10.8

Note: *The annual average PM_{10} criterion is 30 µg/m^3. Annual average results greater than this figure are bold.*
The 24-hour average PM_{10} criterion is 50 µg/m^3. Results greater than this figure are bold.
YTD denotes year to date.

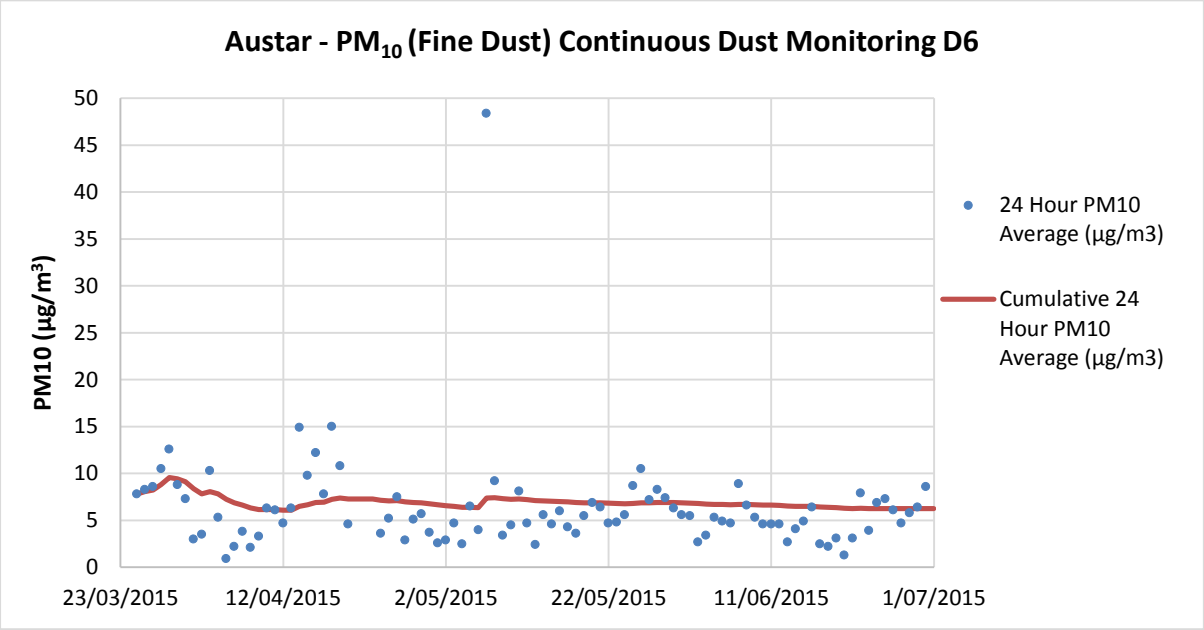
Austar Coal Mine 2014-2015 High Volume Air Sampler (HVAS) Results Graphs






Particluate Matter <10µm (PM10) - HVAS3
PM10 (µg/m3)
70
60
50
40
30
20
10
0
Jul-14
Aug-14
Sep-14
Oct-14
Nov-14
Dec-14
Jan-15
Feb-15
Mar-15
Apr-15
May-15
Jun-15
Particulate Matter (ug/m3)
24hr Maximum Criteria
Current Annual Average
Annual Average Maximum Criteria

Austar Coal Mine 2014-2015 Continuous Dust Monitoring (TEOM) Results Graph

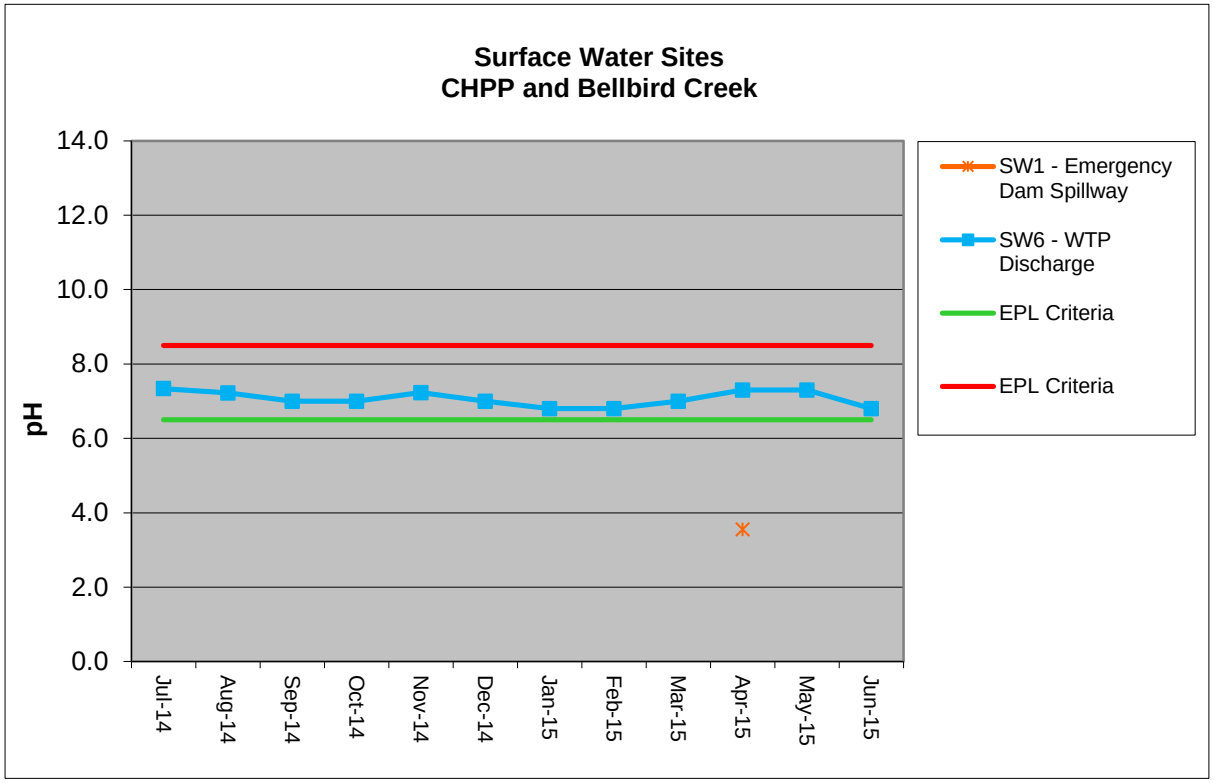


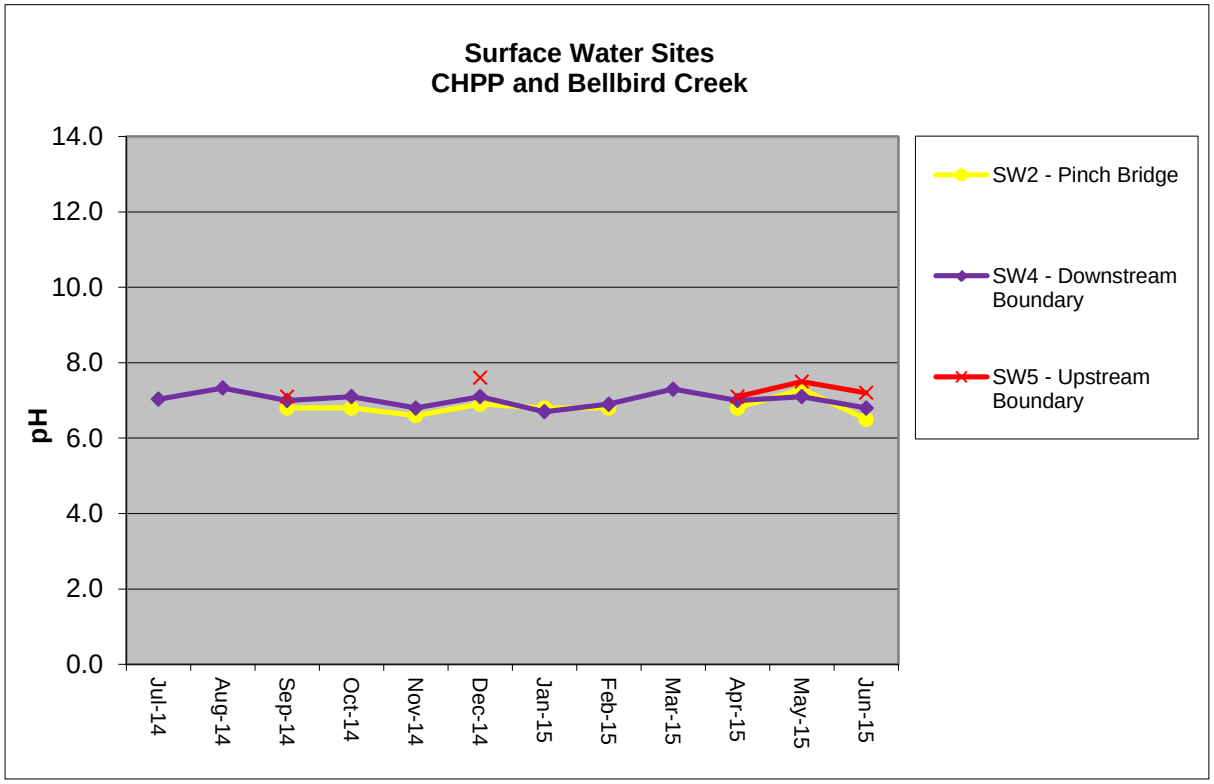
Note: *Continuous dust monitoring commenced on 24 March 2015.*

Appendix B:

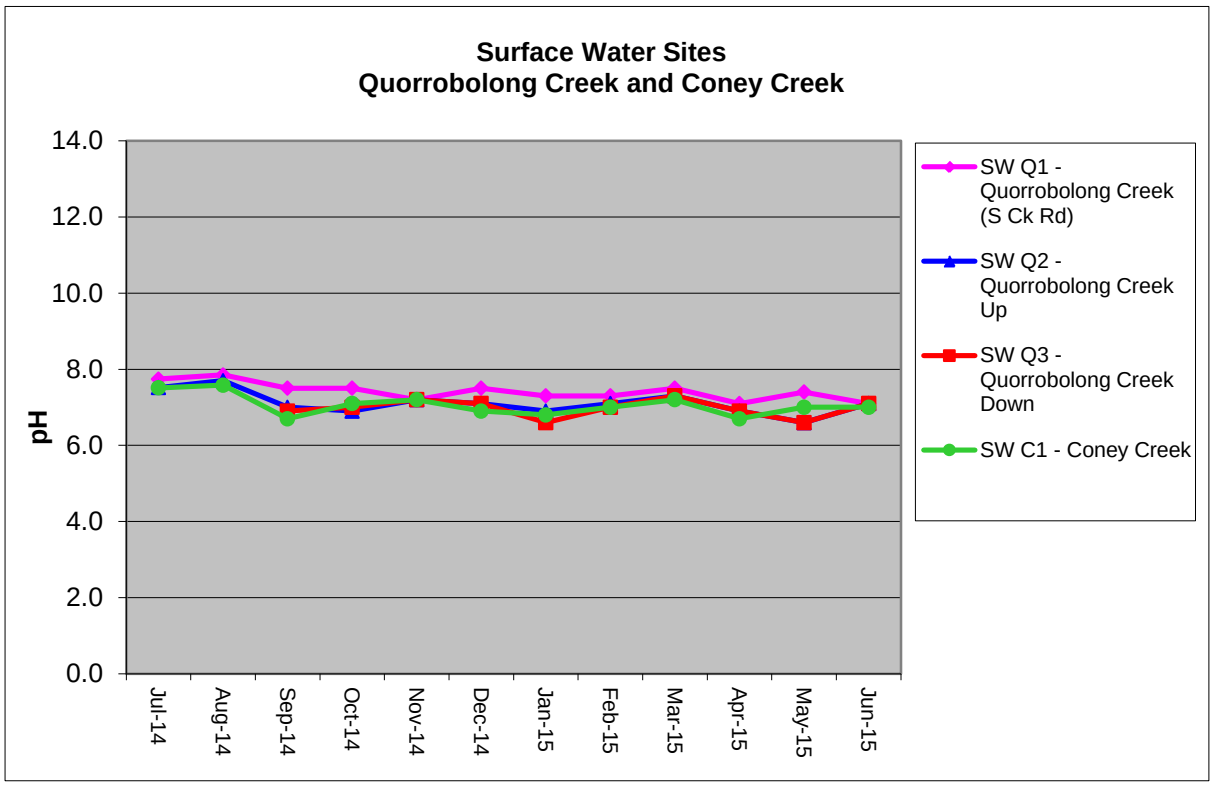
Water Quality Data

Austar Coal Mine 2014-2015 Surface Water Monitoring Results Graphs – pH



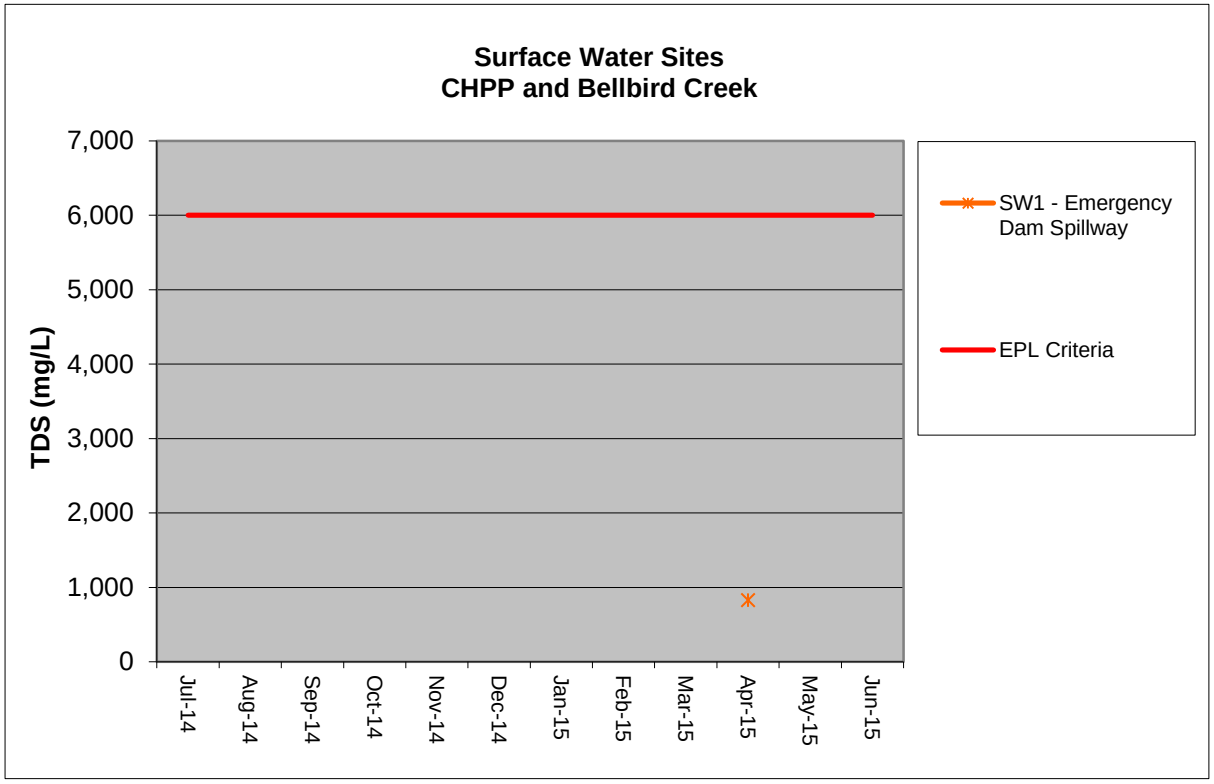


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

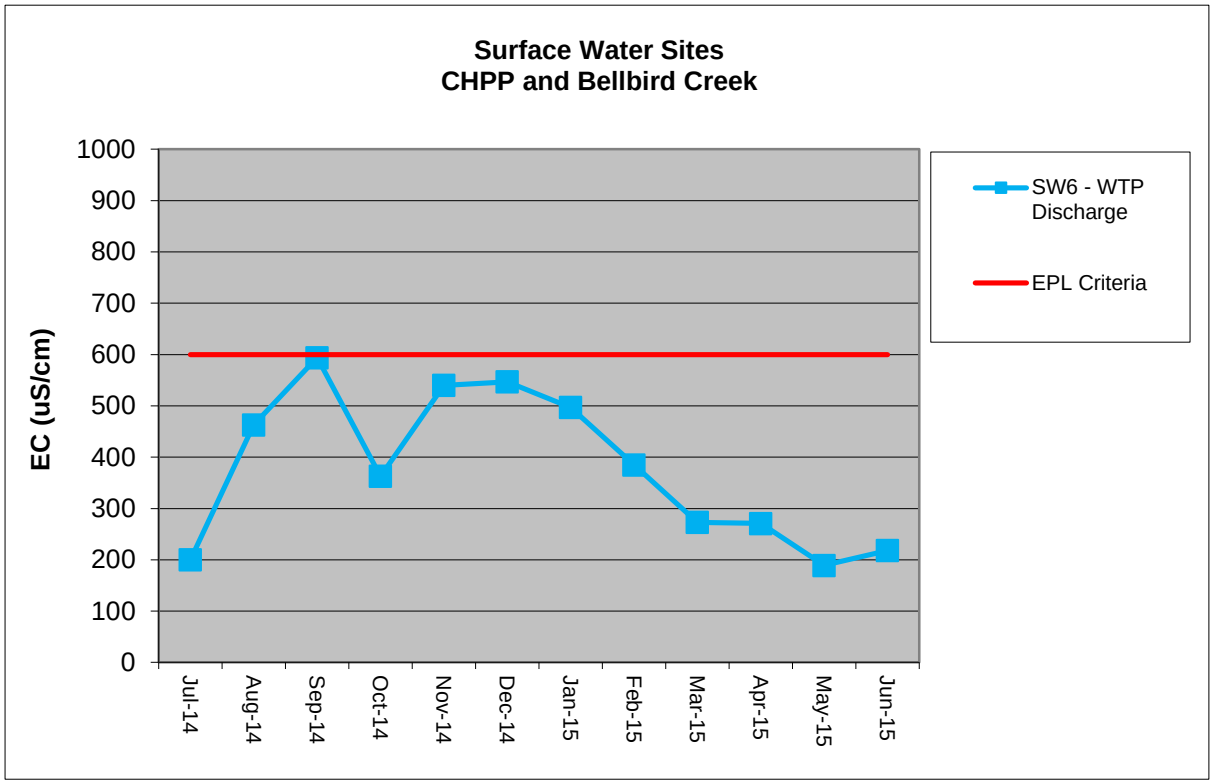


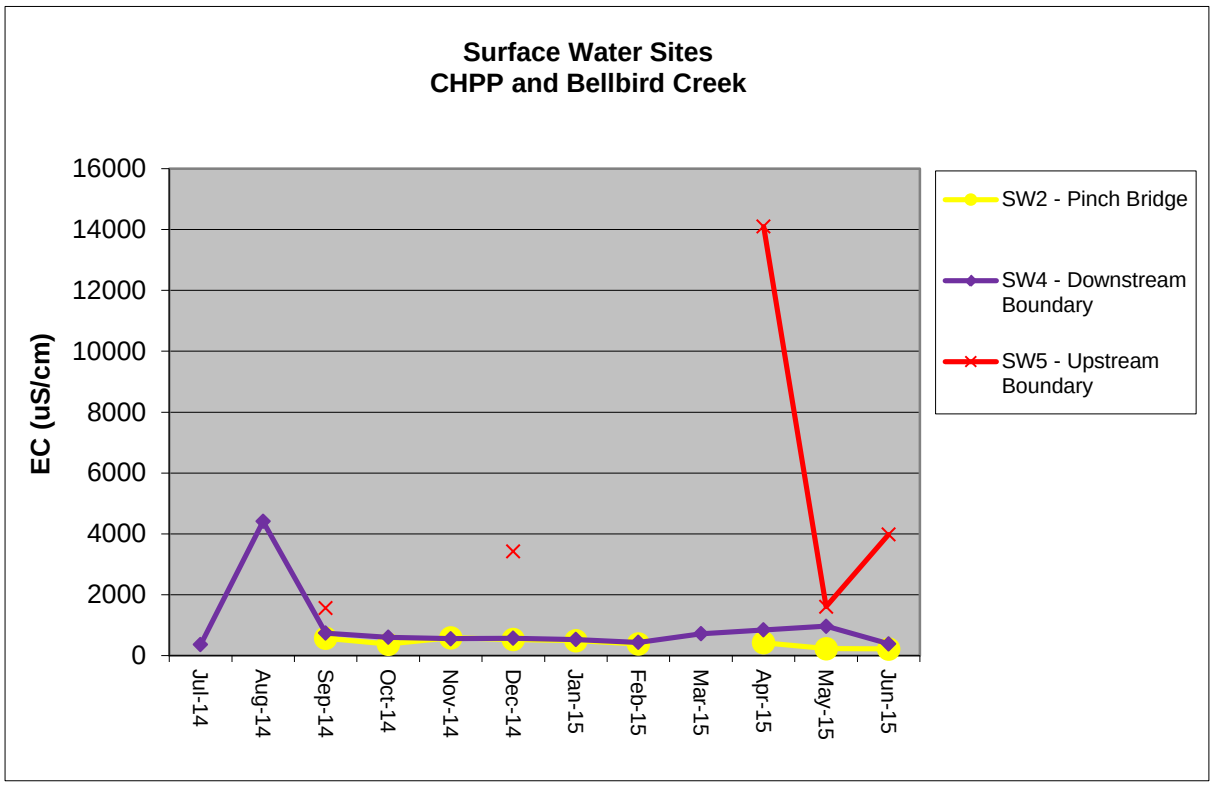
Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

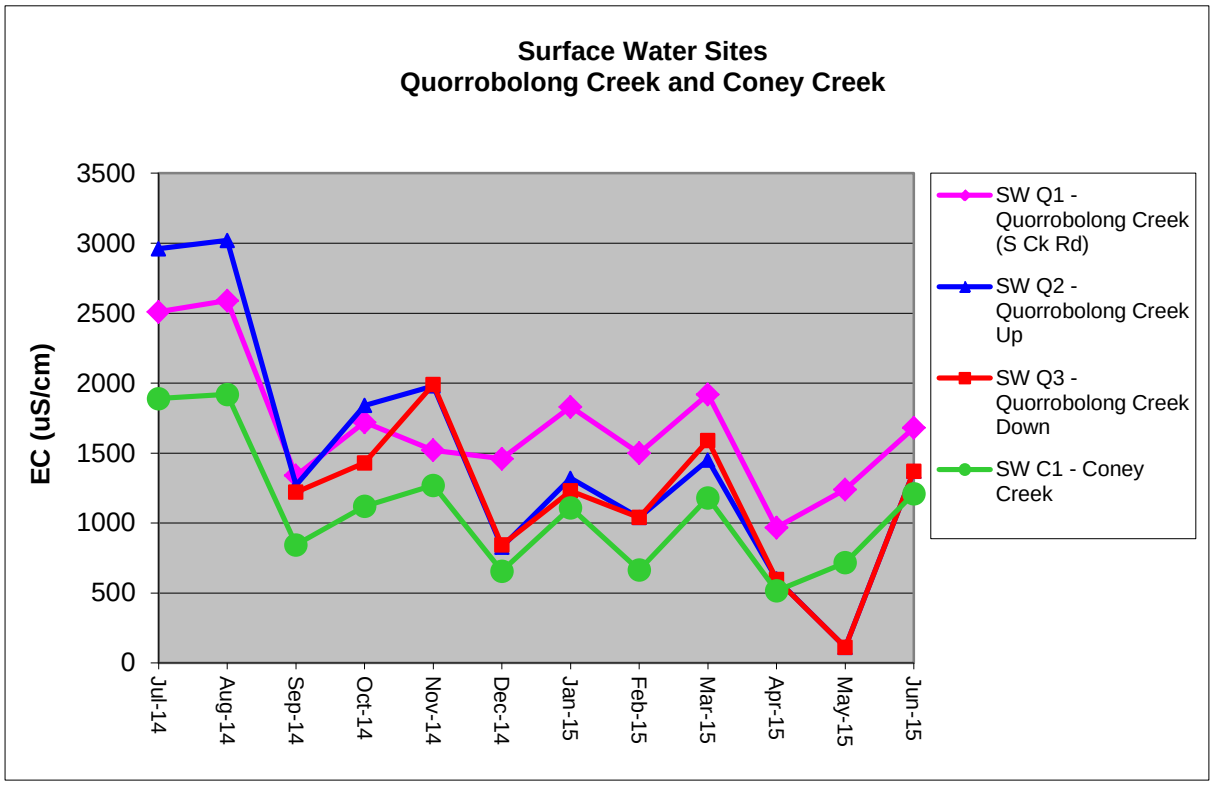
Austar Coal Mine 2014-2015 Surface Water Monitoring Results Graphs – EC and TDS



Note: Discharge only occurred from SW1 in April 2015.

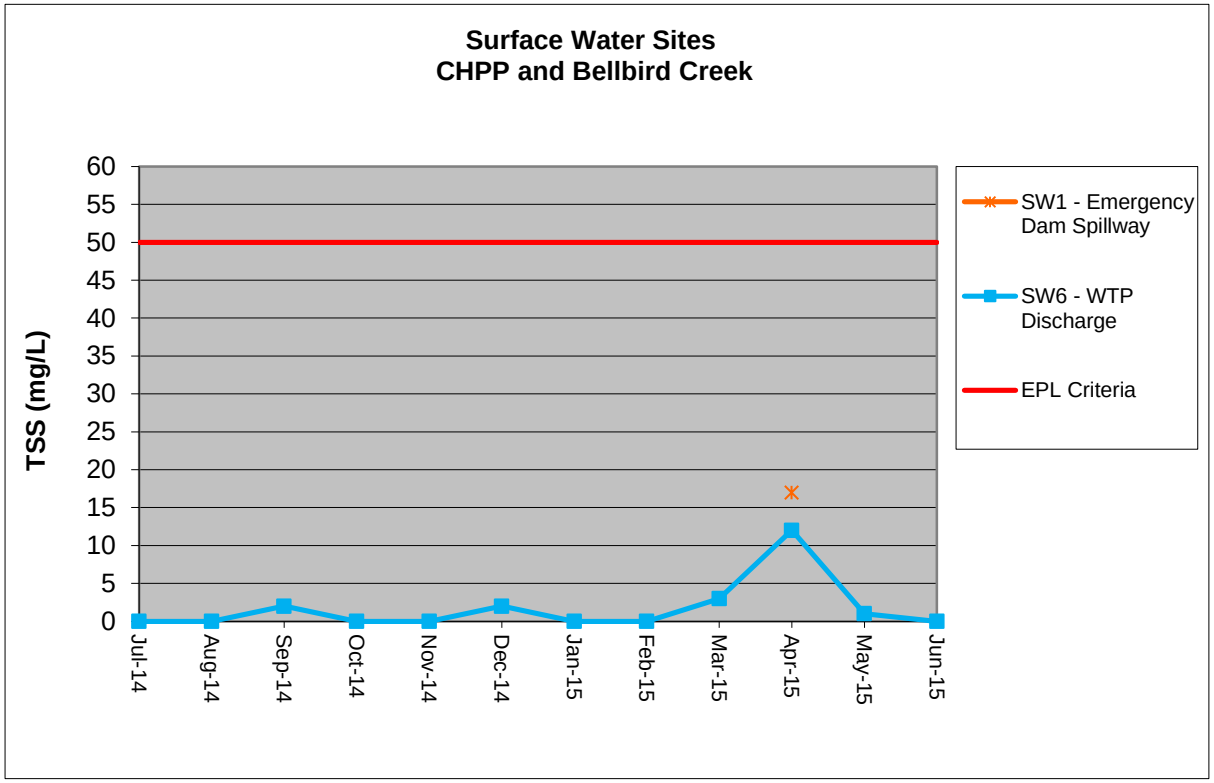




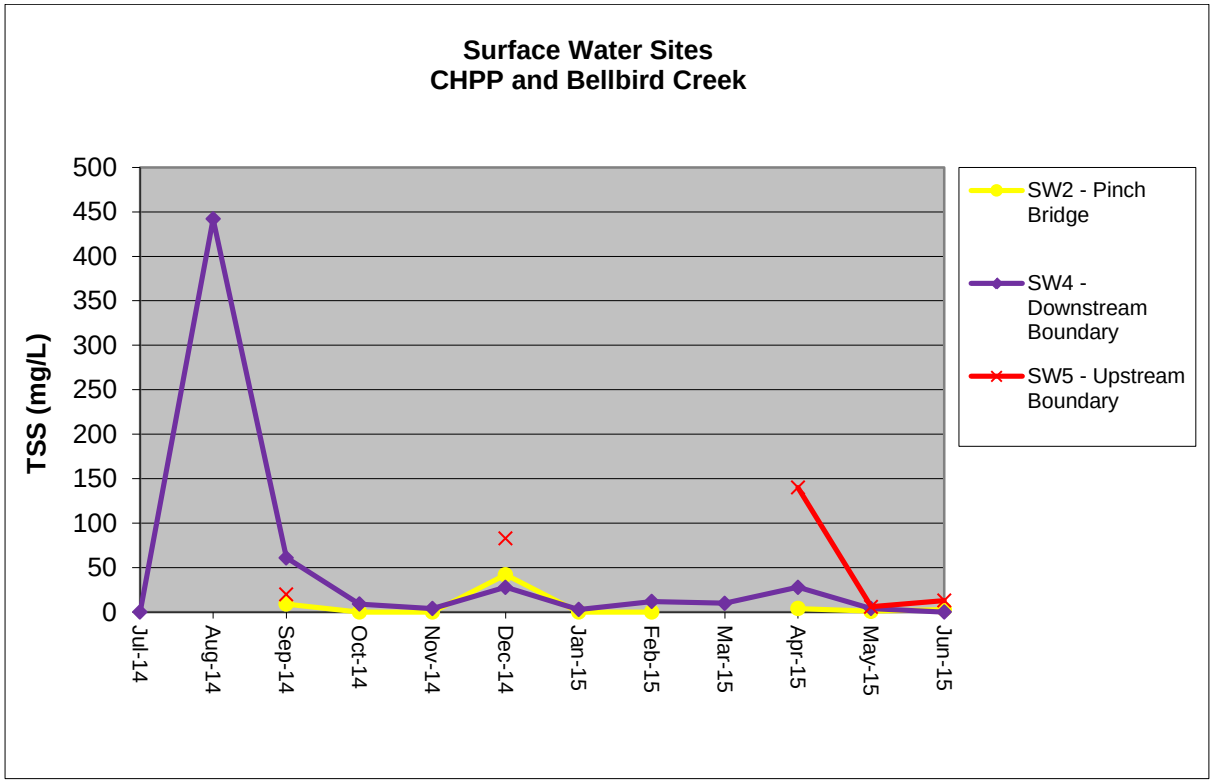


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

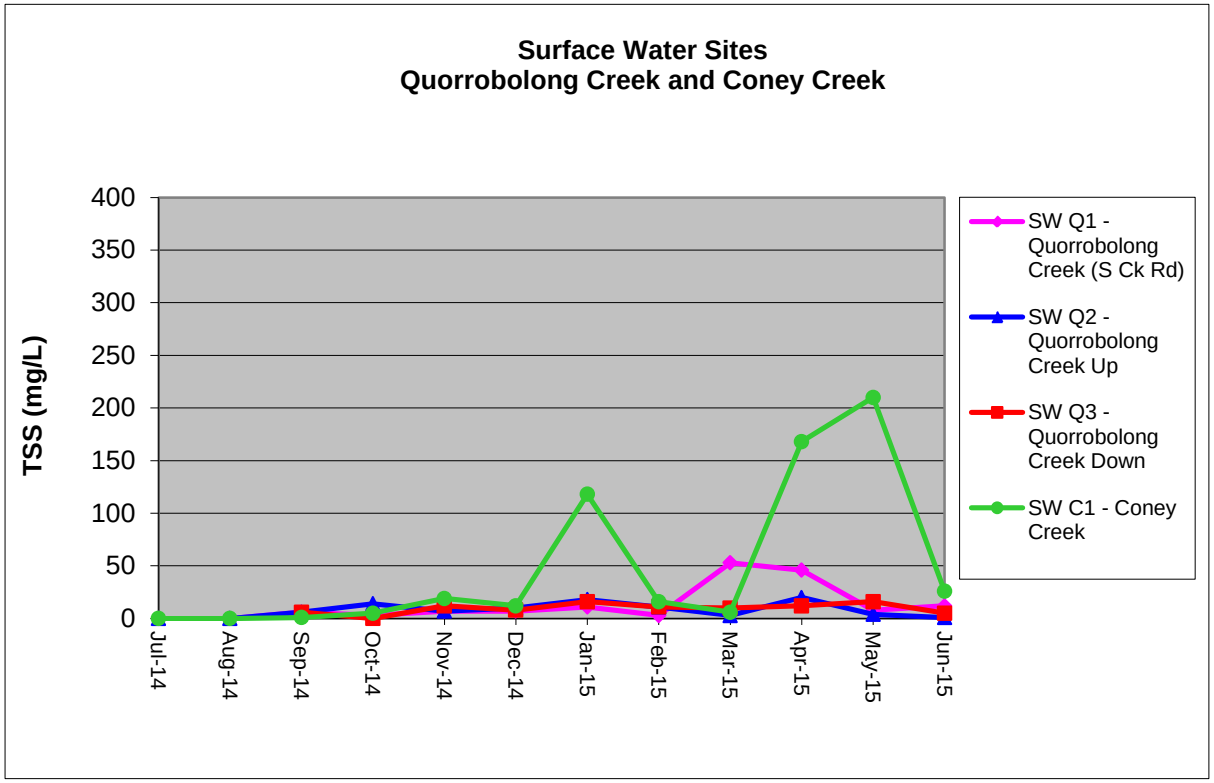
Austar Coal Mine 2014-2015 Surface Water Monitoring Results Graphs - TSS



Note: Discharge only occurred from SW1 in April 2015.

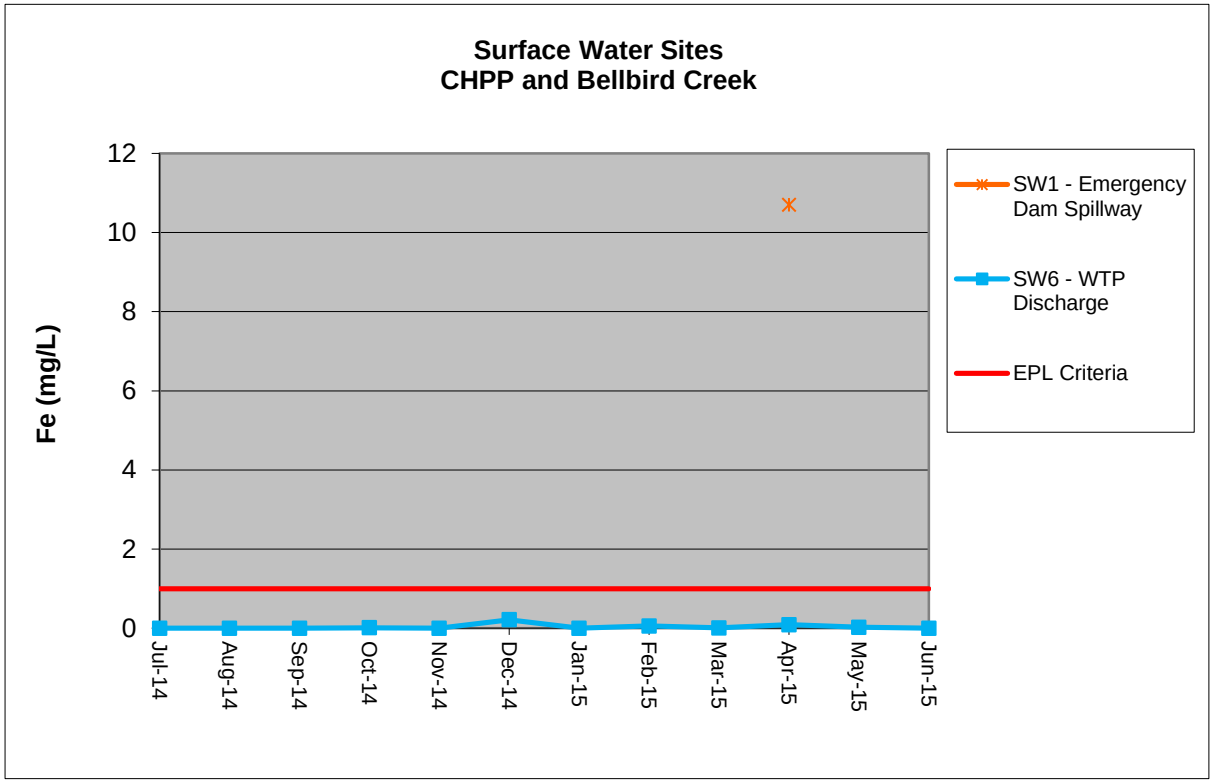


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

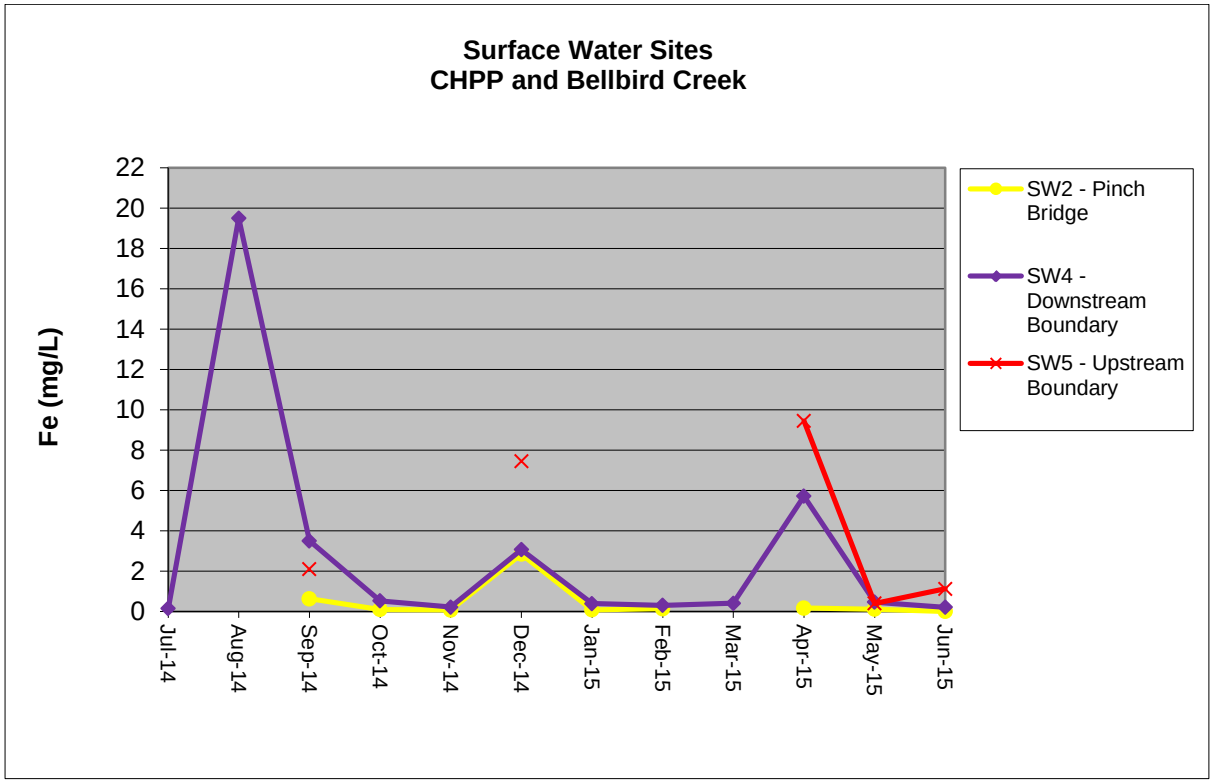


Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

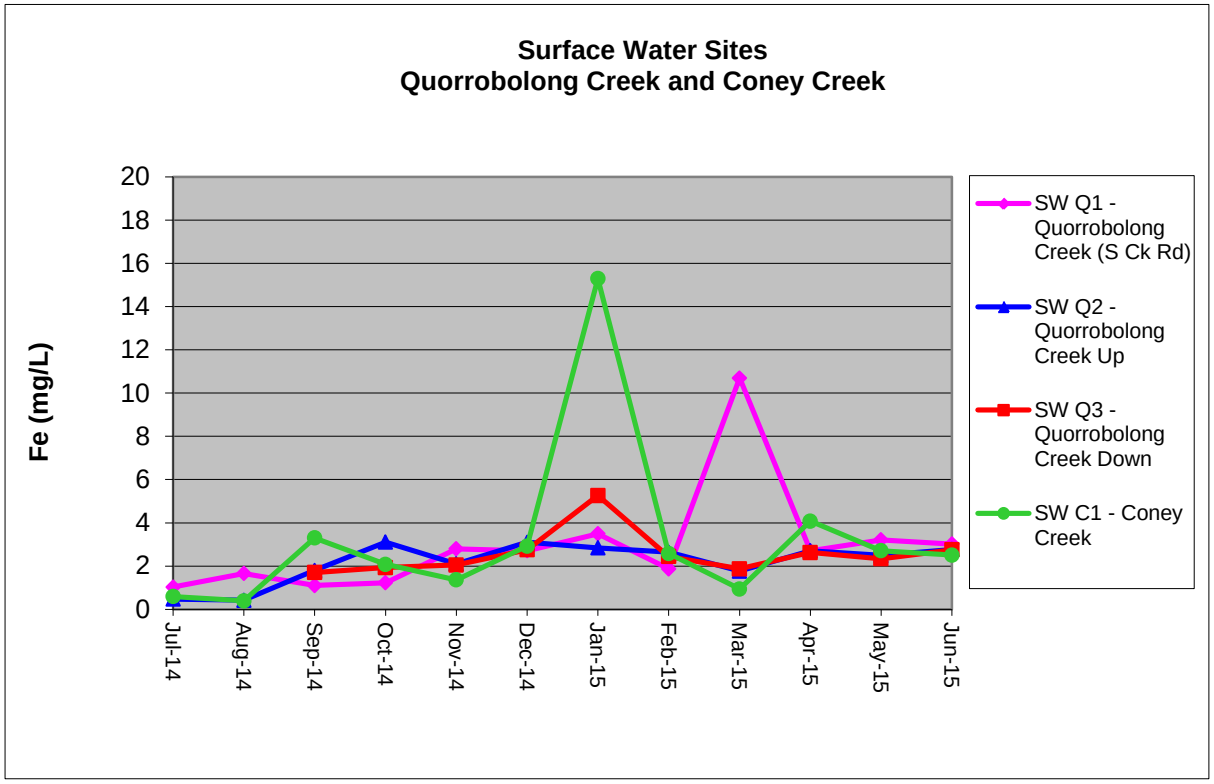
Austar Coal Mine 2014-2015 Surface Water Monitoring Results Graphs - Fe



Note: Discharge only occurred from SW1 in April 2015.



Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

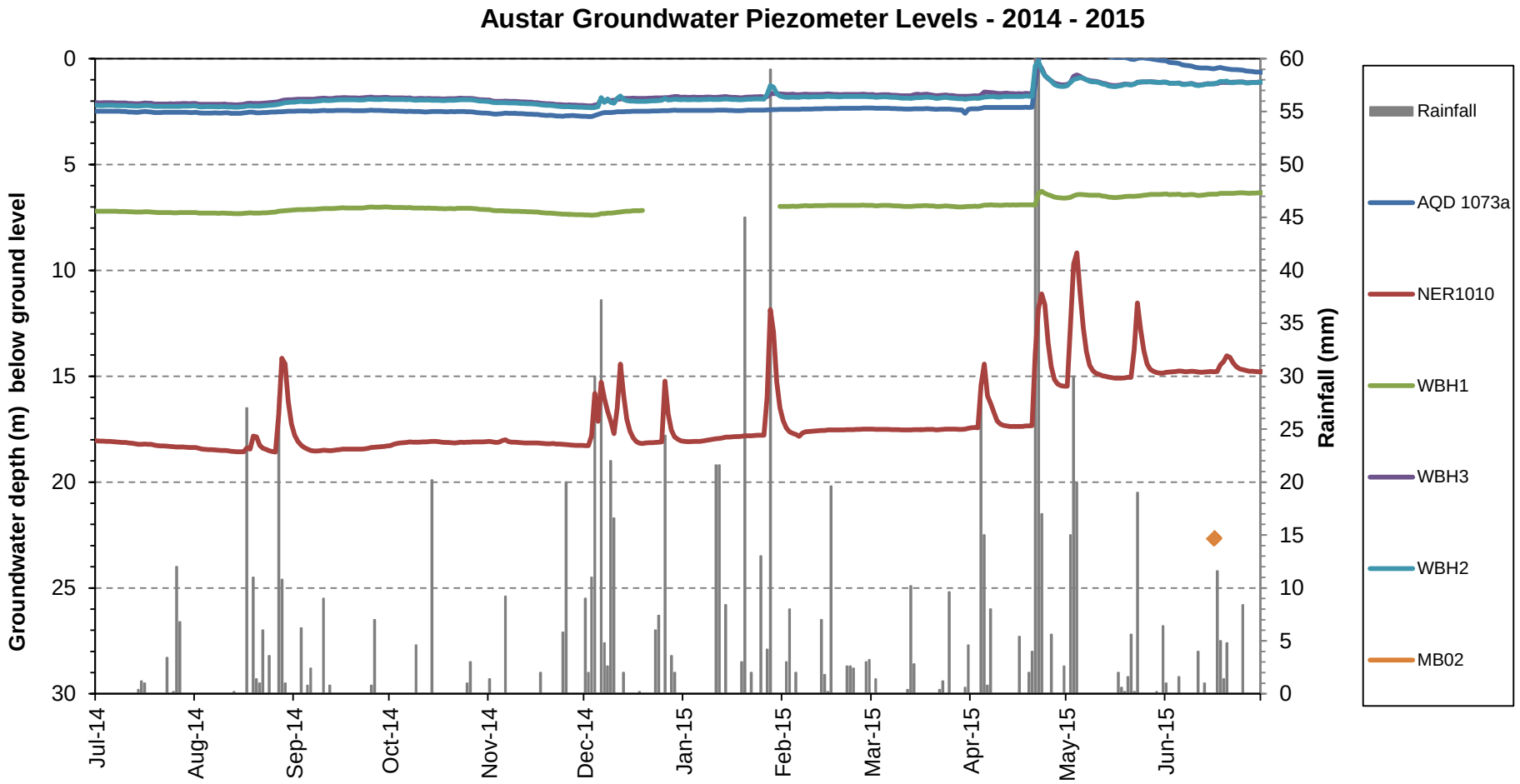


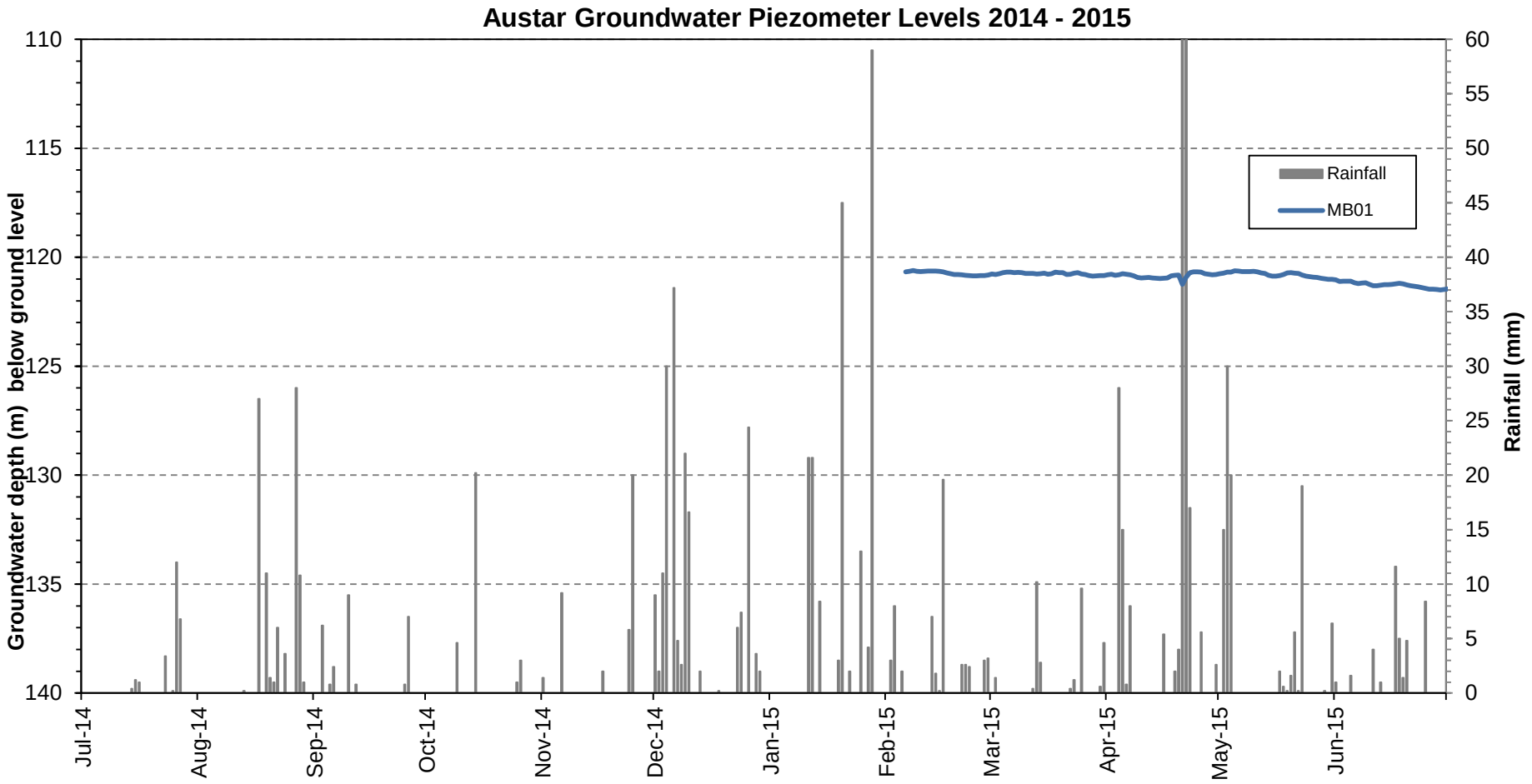
Note: For months where results are not shown the creeks were dry and a sample was not able to be collected.

Appendix C:

Groundwater Level and Quality Monitoring Data

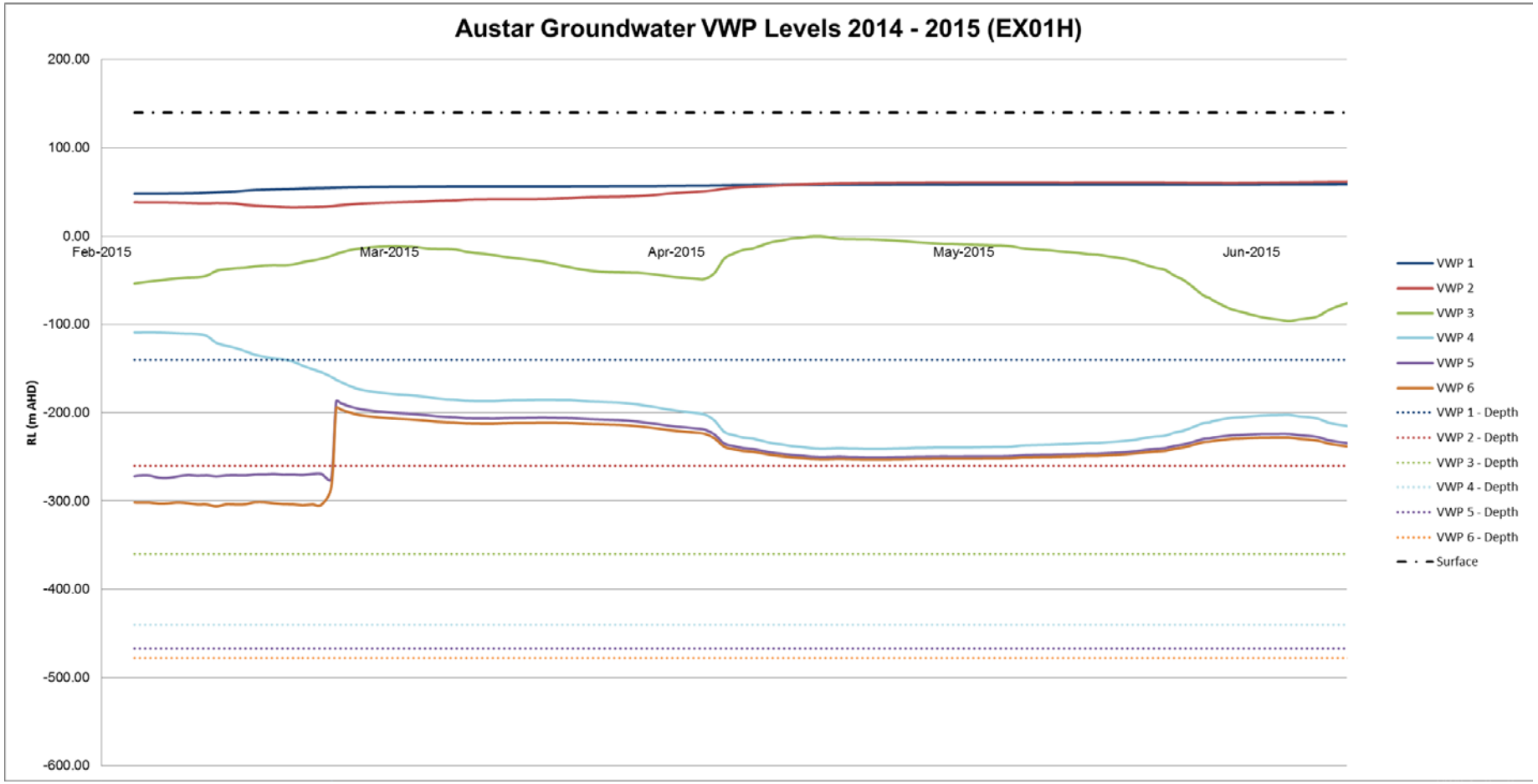
Groundwater Level Monitoring Data – Groundwater Depth and Daily Rainfall





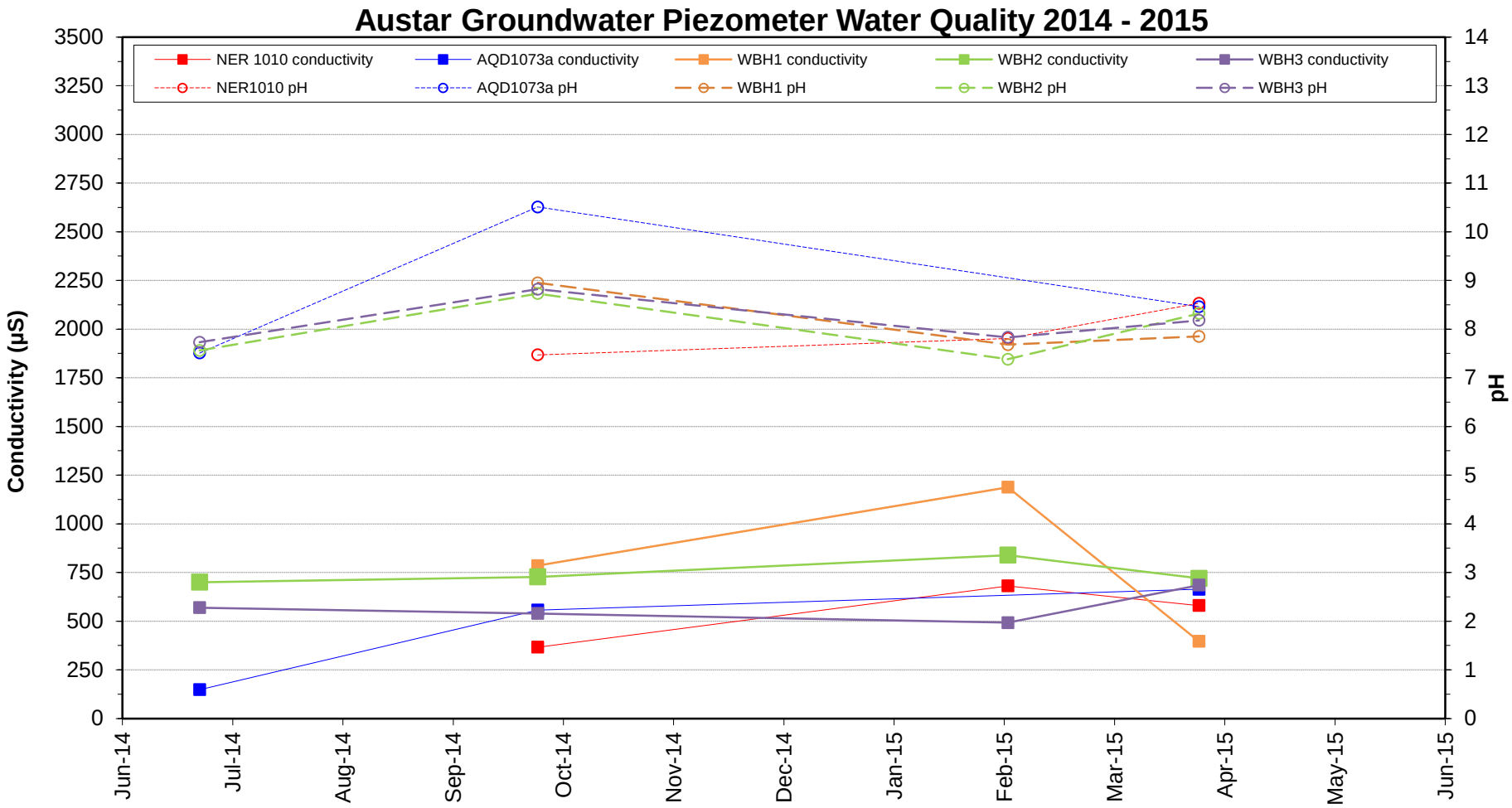
Note: MB01 monitoring commenced on 6 February 2015

Vibrating Wire Piezometer Groundwater Level Monitoring Data – Groundwater Depth



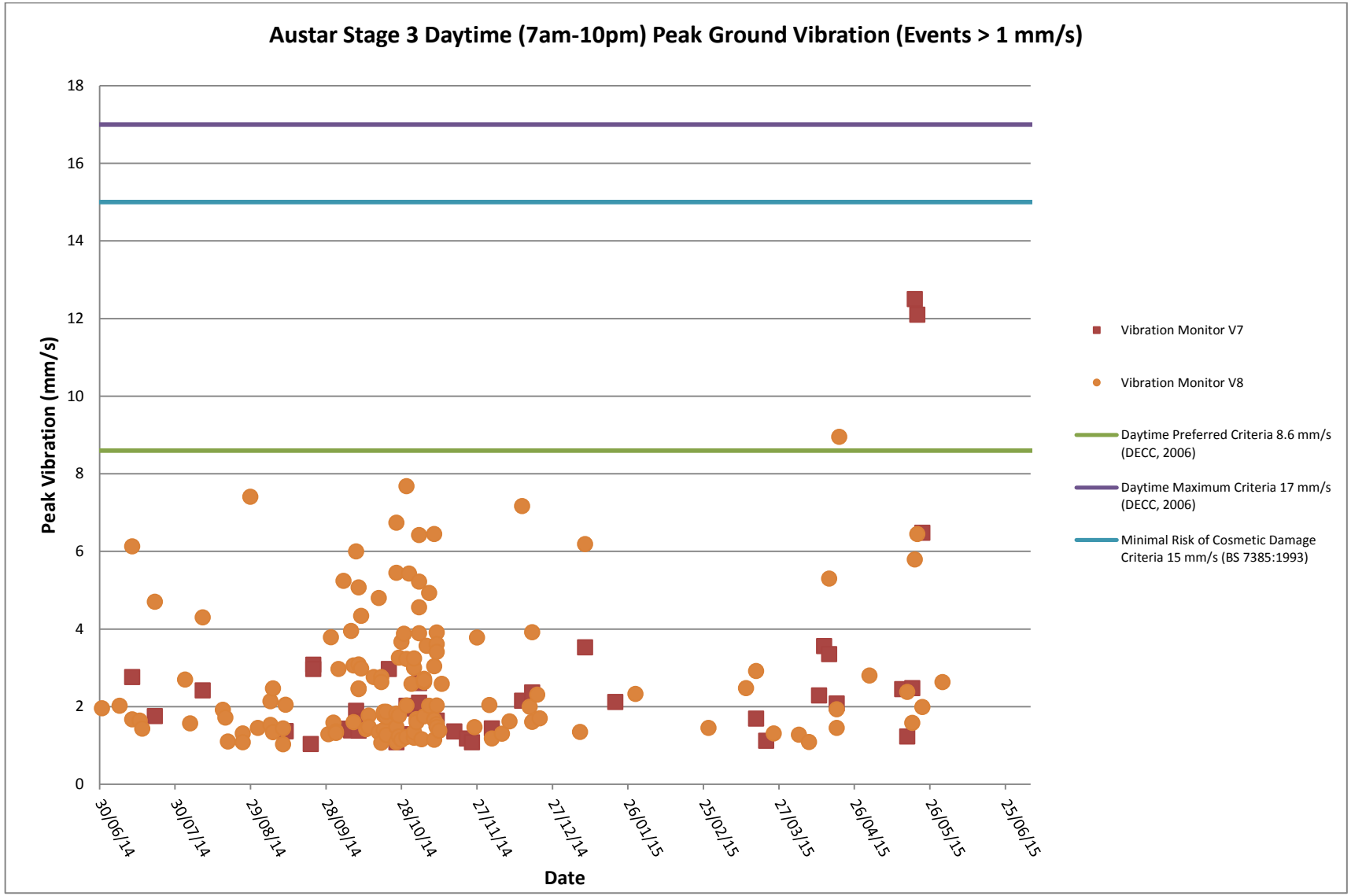
Note: Monitoring of the groundwater level at EX01H commenced on 23 February 2015.

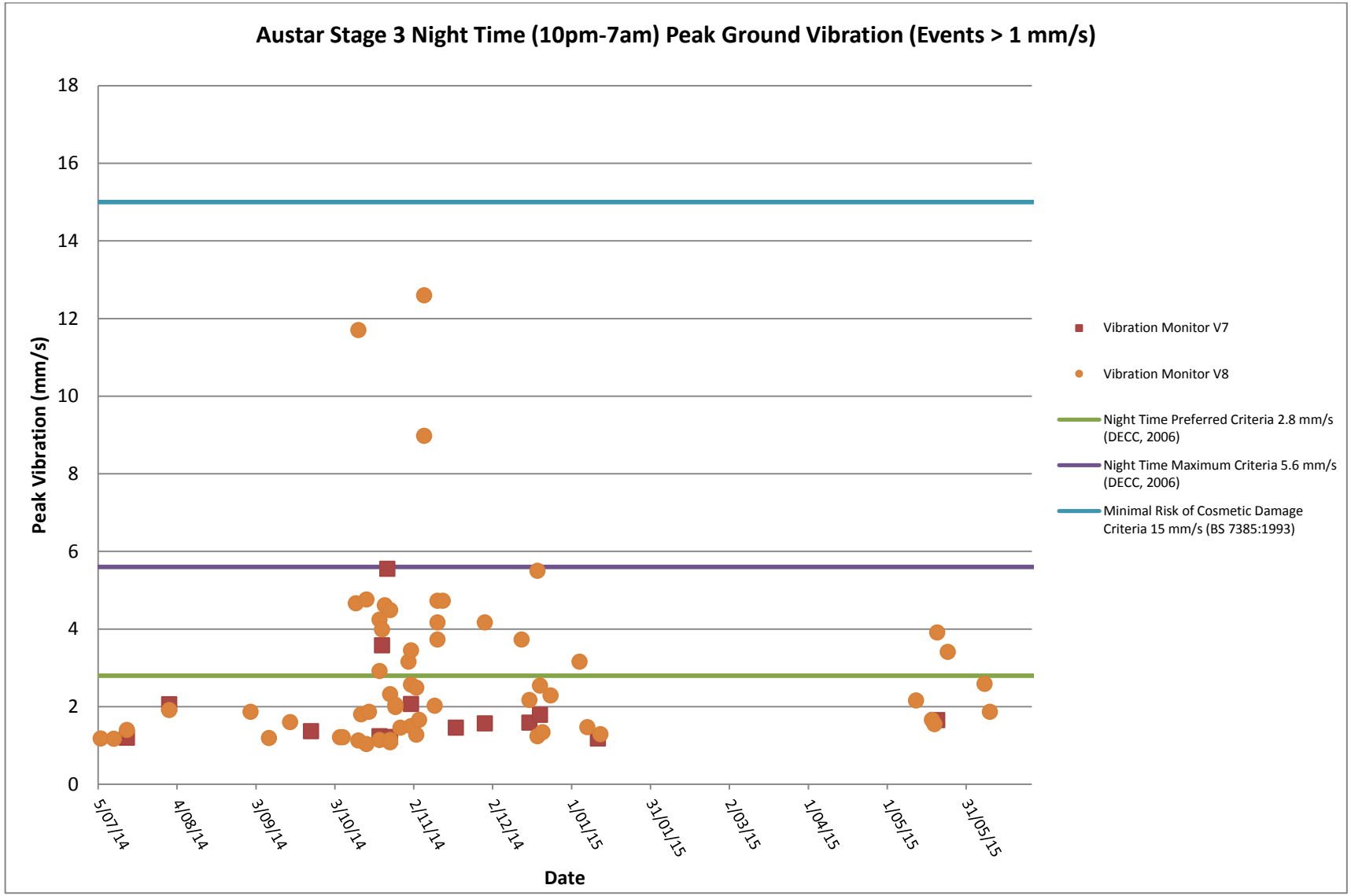
Groundwater Monitoring Data – pH and Conductivity



Note: No water quality sampling was conducted at MB02 during the 2014 – 2015 reporting period.

Appendix D:
Vibration Monitoring Data


Austar Stage 3 Daytime (7am-10pm) Peak Ground Vibration (Events > 1 mm/s)
Peak Vibration (mm/s)
18
16
14
12
10
8
6
4
2
0
30/06/14
30/07/14
29/08/14
28/09/14
28/10/14
27/11/14
27/12/14
26/01/15
25/02/15
27/03/15
26/04/15
26/05/15
25/06/15
Date
Vibration Monitor V7
Vibration Monitor V8
Daytime Preferred Criteria 8.6 mm/s (DECC, 2006)
Daytime Maximum Criteria 17 mm/s (DECC, 2006)
Minimal Risk of Cosmetic Damage Criteria 15 mm/s (BS 7385:1993)


Austar Stage 3 Night Time (10pm-7am) Peak Ground Vibration (Events > 1 mm/s)
Peak Vibration (mm/s)
18
16
14
12
10
8
6
4
2
0
5/07/14
4/08/14
3/09/14
3/10/14
2/11/14
2/12/14
1/01/15
31/01/15
2/03/15
1/04/15
1/05/15
31/05/15
Date
Vibration Monitor V7
Vibration Monitor V8
Night Time Preferred Criteria 2.8 mm/s (DECC, 2006)
Night Time Maximum Criteria 5.6 mm/s (DECC, 2006)
Minimal Risk of Cosmetic Damage Criteria 15 mm/s (BS 7385:1993)

Appendix E:

Subsidence – Stage 3 End of Panel Report, Longwall A8

Austar Coal Mine

End of Panel Report

Stage 3 – Longwall A8

DOCUMENT CONTROL

DOCUMENT DETAILS	**Title**	Austar Coal Mine Stage 3 Longwall A8 End of Panel Report		
	Reference			
	Document Status	Final		
APPROVAL DATE	**Revision**	**Prepared**	**Reviewed**	**Approved**
29/09/15	A	Daniel Lee	Tony Sutherland Gary Mulhearn	Tony Sutherland

TABLE OF CONTENTS **Page**

LIST OF FIGURES & TABLES

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

Austar Coal Mine Pty Ltd (Austar), a subsidiary of Yancoal Australia Pty Limited (Yancoal), operates Austar Coal Mine, an underground coal mine located approximately 10 kilometres south of Cessnock in the Lower Hunter Valley in NSW.

Project Approval 08_0111 (PA 08_0111) was granted by the Minister for Planning in September 2009, enabling longwall mining using Longwall Top Coal Caving (LTCC) technology in the Stage 3 area. PA08_0111 was modified under delegated authority of the Minister for Planning and Infrastructure on 13 March 2012 and 17 December 2013 to allow realignment of the Stage 3 longwall panels and extension of finishing lines for Longwalls A7 to A10.

An updated Extraction Plan for Longwalls A7 to A10 (Austar, December 2013) was approved under delegation of the Director General of the Department of Planning and Infrastructure (DP&I) on 6 January 2014. Austar subsequently received Subsidence Management Plan Approval (SMP Approval) under delegation for the Director General of the Department of Trade and Investment – Division of Resources and Energy (DRE) on 19 February 2014 (File No. 13/1876).

The extraction of Longwall A8 commenced on 13 June 2014 and was completed on 20 June 2015. This longwall is the second in the series in Stage 3 of the Austar Coal Mine, and is also second in the series described in SMP approval for LWA7 to LWA10. The location of Longwall A8 with reference to adjoining Stage 3 longwall panels is shown in **Figure 1.1**.

In accordance with the approved Extraction Plan for Longwalls A7 to A10, subsidence surveys and visual inspections were conducted over Longwall A8 in accordance with the approved Subsidence Monitoring Program, with environmental monitoring conducted in accordance with the relevant approved Environmental Management Plans.

1.1 PURPOSE AND SCOPE

This End of Panel Report for Longwall A8 has been prepared to fulfil the requirements of Condition 18 of the Austar Coal Mine Subsidence Management Plan Approval for Longwalls A7 to A10, which states:

"Within 4 months of the completion of each longwall panel, an end of panel report must be submitted to the Director General. The end of panel report must:

- *a) include a summary of the subsidence and environmental monitoring results for the applicable longwall panel;*
- *b) include an analysis of these monitoring results against the relevant;*
  - *impact assessment criteria;*
  - *monitoring results from previous panels; and*
  - *predictions in the SMP;*
- *c) identify any trends in the monitoring results over the life of the activity; and*
- *d) describe what actions were taken to ensure adequate management of any potential subsidence impacts due to longwall mining."*

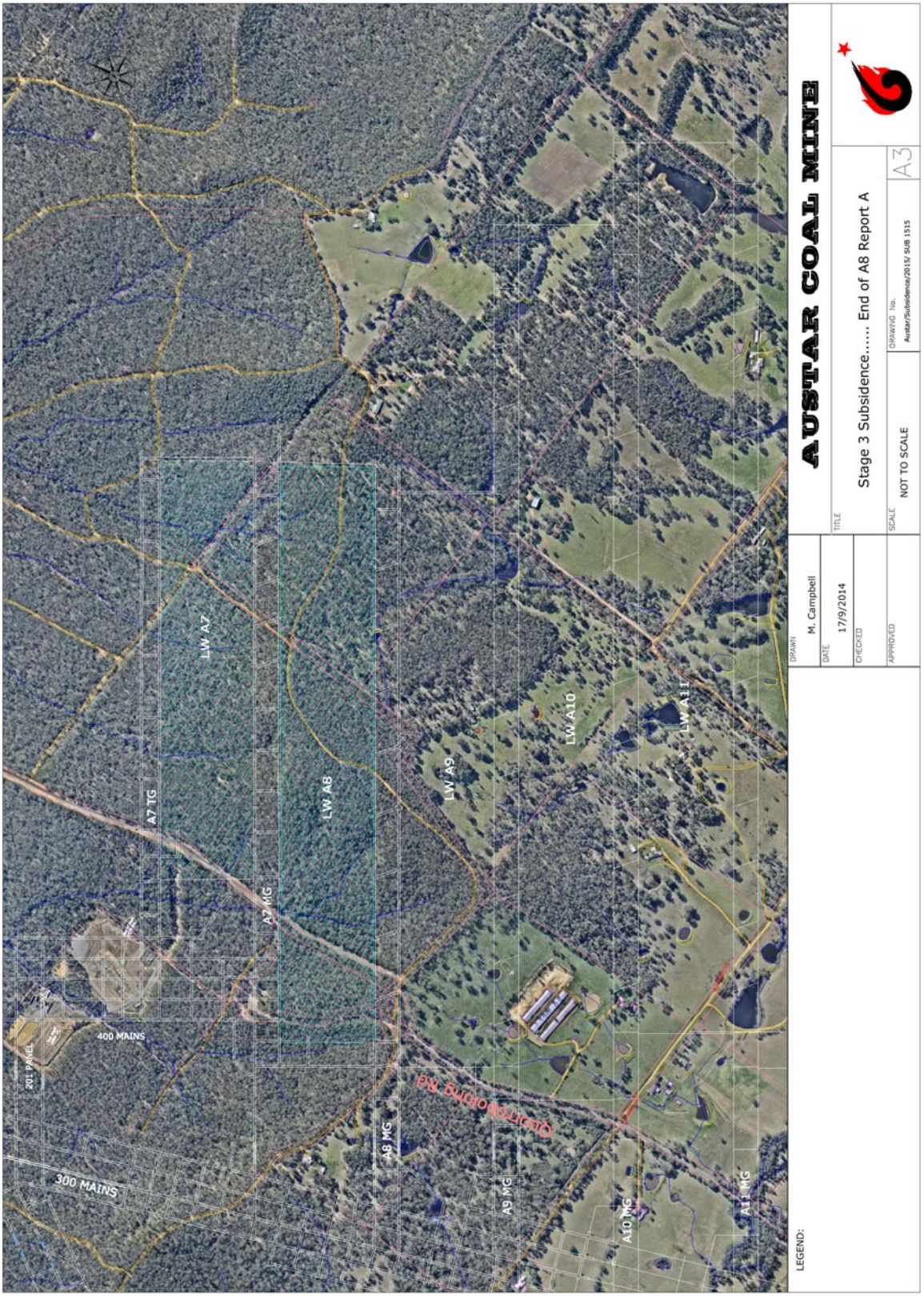


Figure 1.1 - Layout of Longwalls A7 - A10 in Stage 3 at Austar Coal Mine

2 MINE SUBSIDENCE

2.1 LONGWALL A8 EXTRACTION

The extraction of Longwall A8 commenced on 13 June 2014 and was completed on 20 June 2015. Longwall A8 is the second panel to be extracted from Stage 3, after longwall mining commenced on 14 June 2013 with Longwall A7.

The Greta Seam was mined along the length of Longwall A8 at Austar. The overall length of Longwall A8 is 1,406.5 metres and the overall void width, including first workings, is 237 metres.

The depth of cover to the Greta Seam, directly above Longwall A8, varies between a minimum of 500 metres towards each end of the longwall and a maximum of 560 metres above the maingate towards the middle of the longwall.

The thickness of the Greta Seam within the extent of Longwall A8 varies between 6.0 metres and 6.5 metres. The Longwall Top Coal Caving equipment extracted the bottom 3.3 metres of the seam and partially recovered (approximately 60%) of the remaining top coal up to chainage 300 metres, and then recovered no top coal (rear AFC removed) through to the longwall finishing end.

2.2 SUBSIDENCE SURVEYS

Subsidence monitoring has been undertaken in accordance with the approved LWA7 to LWA10 Subsidence Monitoring Program. The mine subsidence movements resulting from the extraction of Longwall A8 were monitored using the following:

- Line A8;
- Line XL3;
- Quorrobolong Road Line; and
- Line A7.

The locations of these monitoring lines are shown in Figure 2.1.

The following sections provide comparisons between the observed and predicted subsidence movements for the monitoring lines which were measured during and after the extraction of Longwall A8.

The predicted subsidence parameters are based on extracting 3.0 metres of bottom coal and achieving an 85 % recovery of the top coal. It is noted, that the as-extracted seam thickness (bottom plus top coal) is around 20 % less than that assumed for the subsidence predictions.

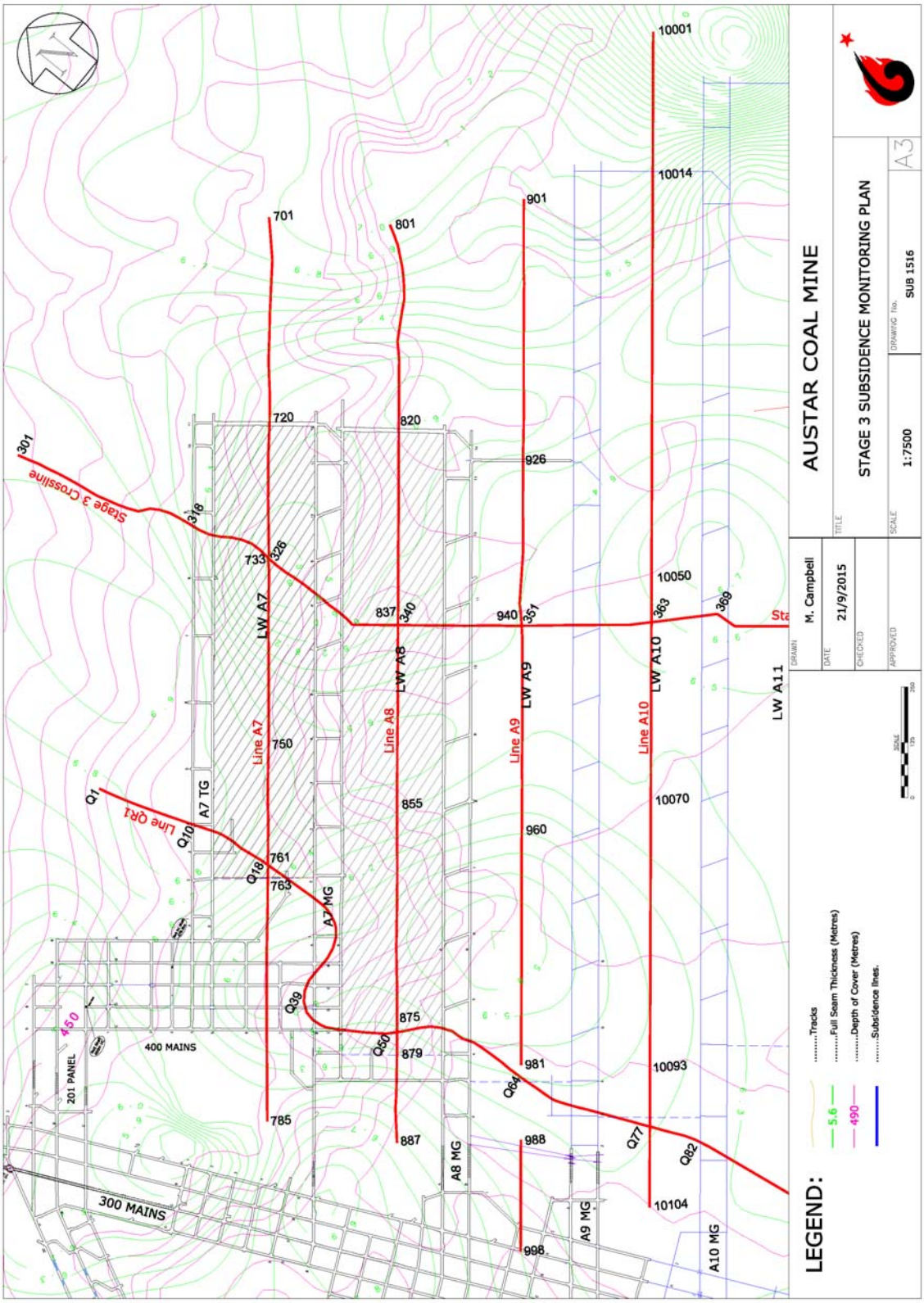


Figure 2.1 - Monitoring Lines over Longwalls A7 – A10 at Austar Coal Mine

2.2.1 Line A8

Line A8 is a longitudinal monitoring line which follows the centreline of Longwall A8. The monitoring line was measured seven times during and one time after the extraction of Longwall A8. The latest survey was carried out on 27 August 2015, around two months after the completion of the longwall. The base survey was carried out on 23 May 2013, around three weeks prior to the commencement of Longwall A7.

The observed profiles of incremental subsidence, tilt and strain along Line A8, resulting from the extraction of Longwall A8 area shown in **Figure 2.2** to **Figure 2.4**. The predicted profile of incremental subsidence along this monitoring line after the completion of the longwall is also shown in Figure 2.2 for comparison.

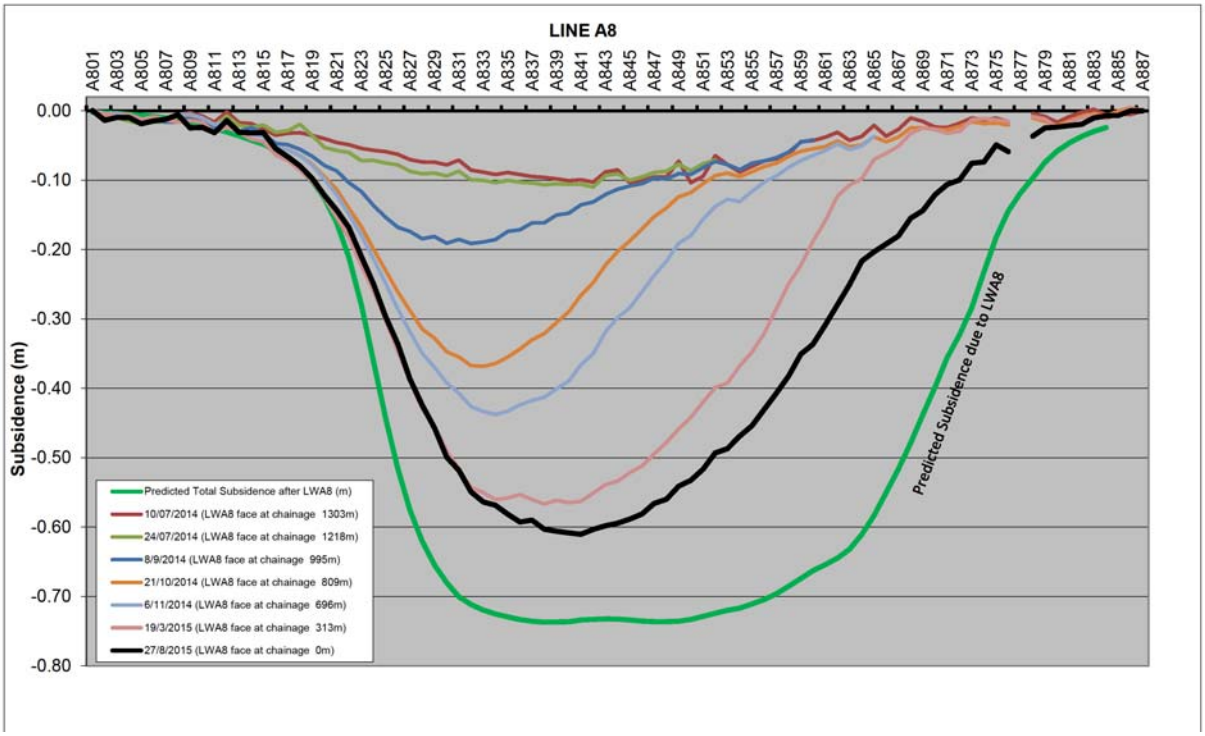


Figure 2.2 - Observed and Predicted Profile of Incremental Subsidence along Line A8

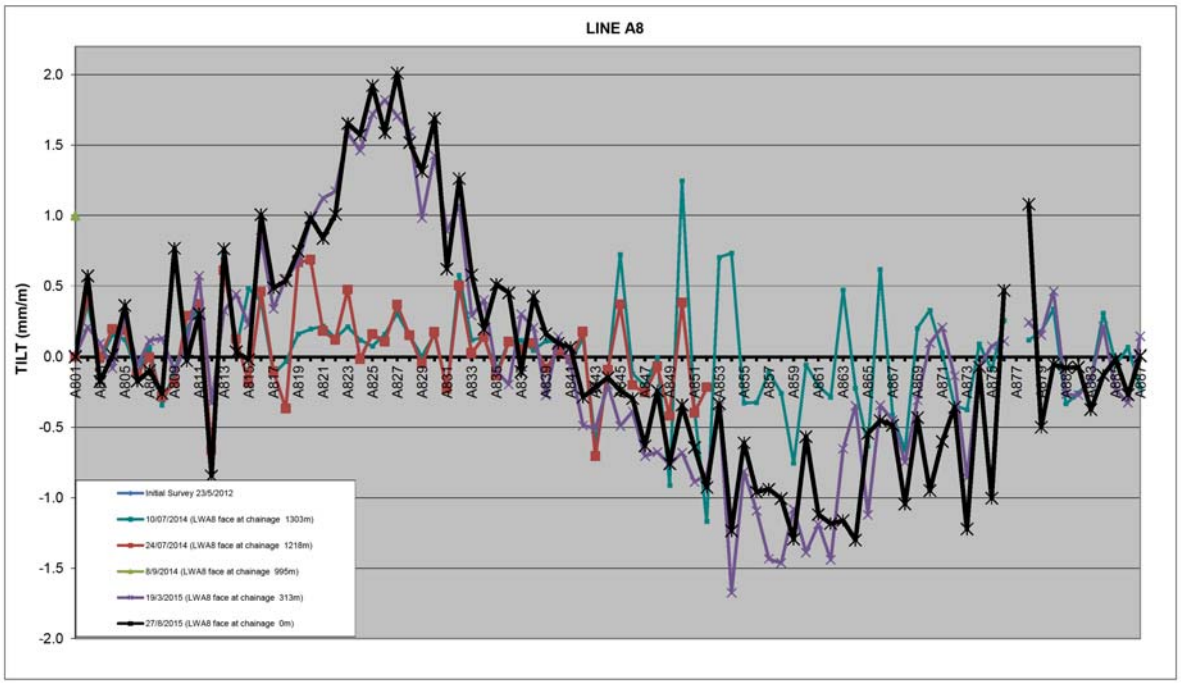


Figure 2.3 - Observed Profile of Incremental Tilt along Line A8

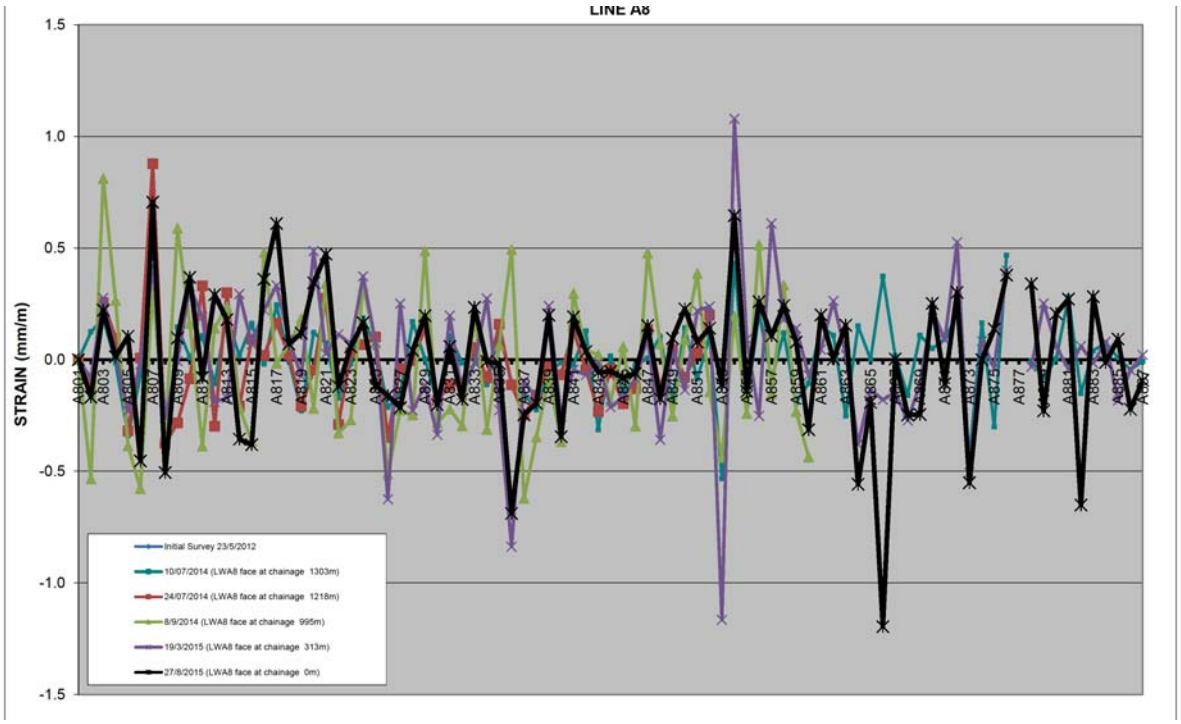


Figure 2.4 - Observed Profile of Incremental Strain along Line A8

A summary of the maximum observed and maximum predicted incremental subsidence parameters along Line A8, resulting from the extraction of Longwall A8, is provided in **Table 2.1**. The observed values are the maxima after the completion of Longwall A8.

Table 2.1 - Maximum Observed and Predicted Incremental Subsidence Parameters along Line A8 Resulting from the Extraction of Longwall A8

Type	Maximum Total Subsidence (mm)	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)
Observed	610	2.0	0.7	1.2
Predicted	750	4.0	Refer to discussion below	

The maximum observed incremental subsidence along Line A8 was 610 mm, which represents 81 % of the maximum predicted subsidence of 750 mm. The maximum observed tilt of 2.0 mm/m represented 50 % of the maximum predicted tilt of 4.0 mm/m.

The observed subsidence and tilt profiles were reasonably symmetrical, but the subsidence profile was slightly flatter (i.e. lower tilt) at the longwall finishing end. Mark A877 was not surveyed due to the dangers involved in occupying the mark so close to the carriageway of Quorrobolong Road.

The maximum observed incremental strains along Line A8 were 0.7 mm/m tensile and 1.2 mm/m compressive. The maximum predicted conventional strains, based on applying a factor of 15 to the maximum predicted conventional curvatures anywhere above Longwall A8, are 0.8 mm/m tensile and 1.4 mm/m compressive.

The maximum observed tensile strain occurs between marks A807 and A808 which are located on the edge of a local access road and could be the results of disturbed survey marks. The maximum observed compressive strain occurs between marks A866 and A867 which are located on the change of grade at the bottom of a gully and therefore which could be the result of the natural surface slope. Elsewhere, the observed strains were typically in the order of survey tolerance, with some localised strains up to around 0.6 mm/m.

There were no strains greater than predicted identified along the Line A8.

2.2.2 Line XL3

Line XL3 is a cross-line located between the middle and commencing end Longwall A8. The monitoring line was measured seven times during and one time after the extraction of Longwall A8. The latest survey was carried out on 20 August 2015, two months after the completion of the longwall. The base survey was carried out on 4 June 2013, which was 10 days prior to the commencement of Longwall A7.

The observed profiles of incremental subsidence, tilt and strain along Line XL3, resulting from the extraction of Longwall A8 are shown in **Figure 2.5** to **Figure 2.7**. The predicted profile of incremental

subsidence along this monitoring line after the completion of longwall A8 is also shown in **Figure 2.5** for comparison.

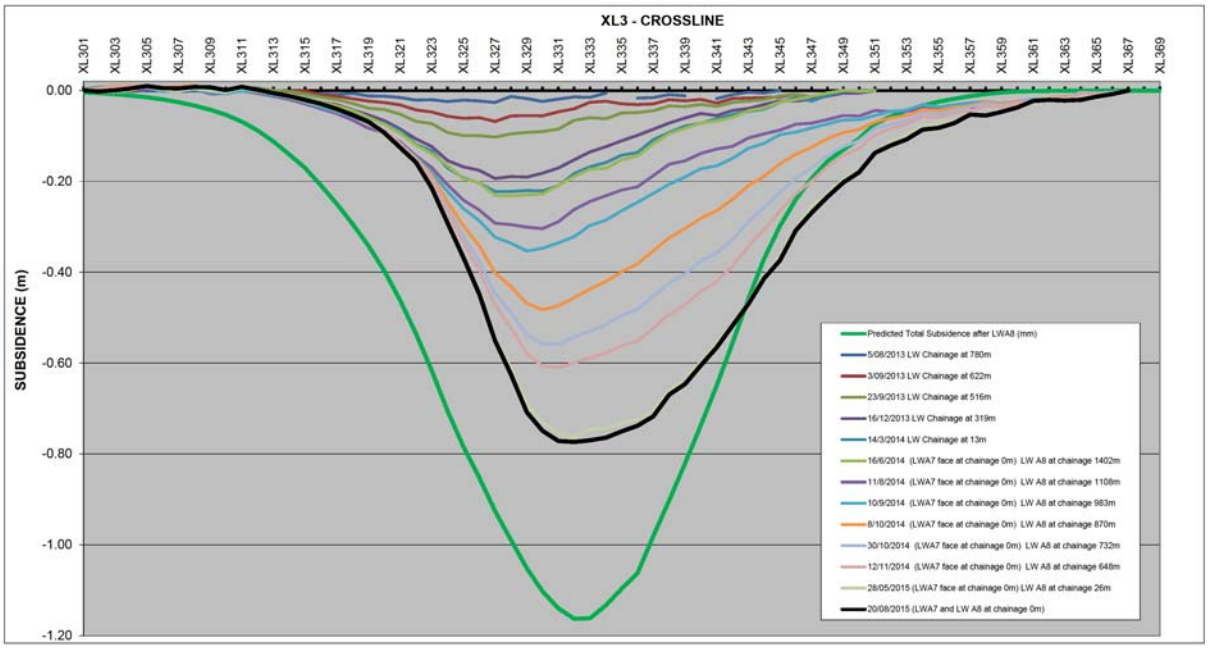


Figure 2.5 - Observed and Predicted Profile of Incremental Subsidence along Line XL3

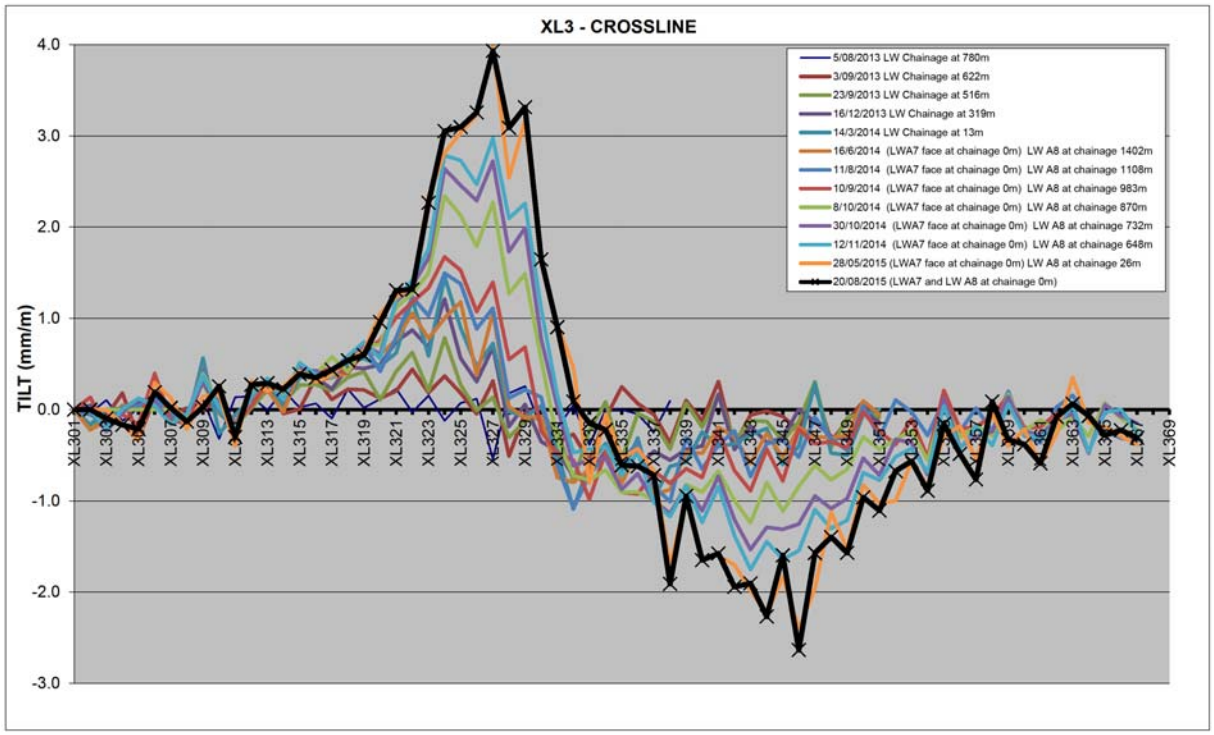


Figure 2.6 - Observed Profile of Incremental Tilt along Line XL3

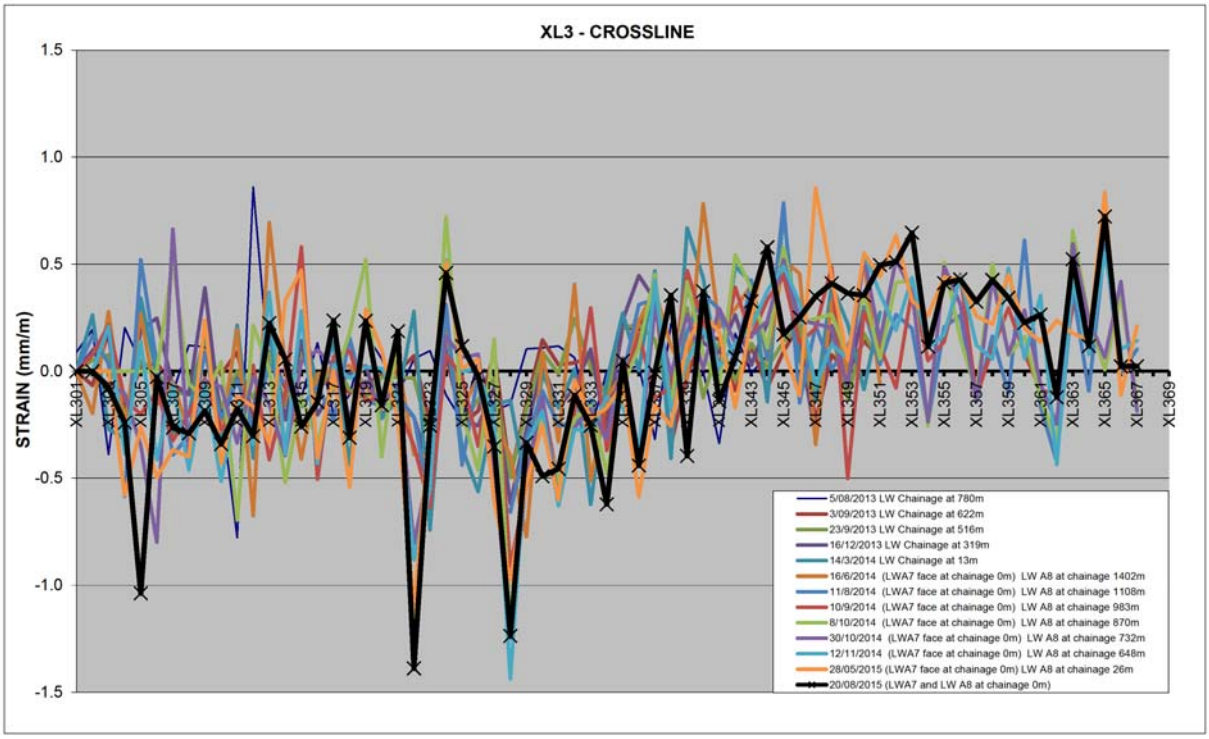


Figure 2.7 - Observed Profile of Incremental Strain along Line XL3

A summary of the maximum observed and maximum predicted incremental subsidence parameters along Line XL3, resulting from the extraction of Longwall A8, are provided in **Table 2.2**. The observed values are the maxima after the completion of Longwall A8.

Table 2.2 - Maximum Observed and Predicted Incremental Subsidence Parameters along Line XL3 Resulting from the Extraction of Longwall A8

Type	Maximum Total Subsidence (mm)	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)
Observed	773	3.9	0.7	1.4
Predicted	1150	4.0	Refer to discussion below	

The maximum observed incremental subsidence along Line XL3 was 773 mm, which represents 67 % of the maximum predicted subsidence of 1150 mm. The shape of the observed subsidence profile reasonably matched the predicted subsidence profile, but with a reduced magnitude. There is a slight lateral shift in the observed subsidence profile, towards the longwall maingate (i.e. right side in Figure 2.5), which could be the result of the natural surface slope and/or cantilevering of the overburden further over the longwall void than what was anticipated. The observed vertical subsidence slightly exceeds the predicted subsidence outside the extents of the extracted longwalls adjacent to the maingate, however this low level vertical subsidence is not associated with any significant observed tilts or strains and impacts are not anticipated at this distance from the

extracted longwall. This lateral shift is similar to what was observed over Line A3X on the previously extracted A3, A4, A5 and A5a longwalls.

The maximum observed incremental tilt was 3.9 mm/m which was very close to the maximum predicted tilt of 4.0mm/m.

The maximum observed incremental strains were 0.7 mm/m tensile and 1.4 mm/m compressive. The maximum predicted conventional strains, based on applying a factor of 15 to the maximum predicted conventional curvatures anywhere above Longwall A8, are 0.8 mm/m tensile and 1.4 mm/m compressive.

The maximum observed tensile strain occurs between Marks XL364 and XL365, which are located away from the mining area above the centre of the proposed longwall A10 where subsidence was observed at less than 20mm. Therefore it is likely that this localised strain is the result of disturbed survey marks. The maximum observed compressive strain occurs between Marks XL321 and XL322, which were located directly above longwall A7 at the base of a hill and could have been influenced by the surface topography. Elsewhere, the observed strains were typically in the order of survey tolerance, with some localised strains up to around 1.0 mm/m.

There were no strains greater than predicted identified along the Line XL3.

2.2.3 Quorrobolong Road

The Quorrobolong Road monitoring line follows the alignment of Quorrobolong Road which crosses the western end of Longwall A8. The monitoring line was measured eight times during and three times after the extraction of Longwall A8. The latest survey was carried out on 22 July 2015, around one month after the completion of the longwall. The base survey was carried out on 28 January 2014, when the longwall chainage for Longwall A7 was 230 metres and the Longwall A7 extraction face was around 100 metres from the road.

The observed profiles of incremental subsidence, tilt and strain along the Quorrobolong Road Line, resulting from the extraction of Longwall A8 are shown in **Figure 2.8** to **Figure 2.10**.

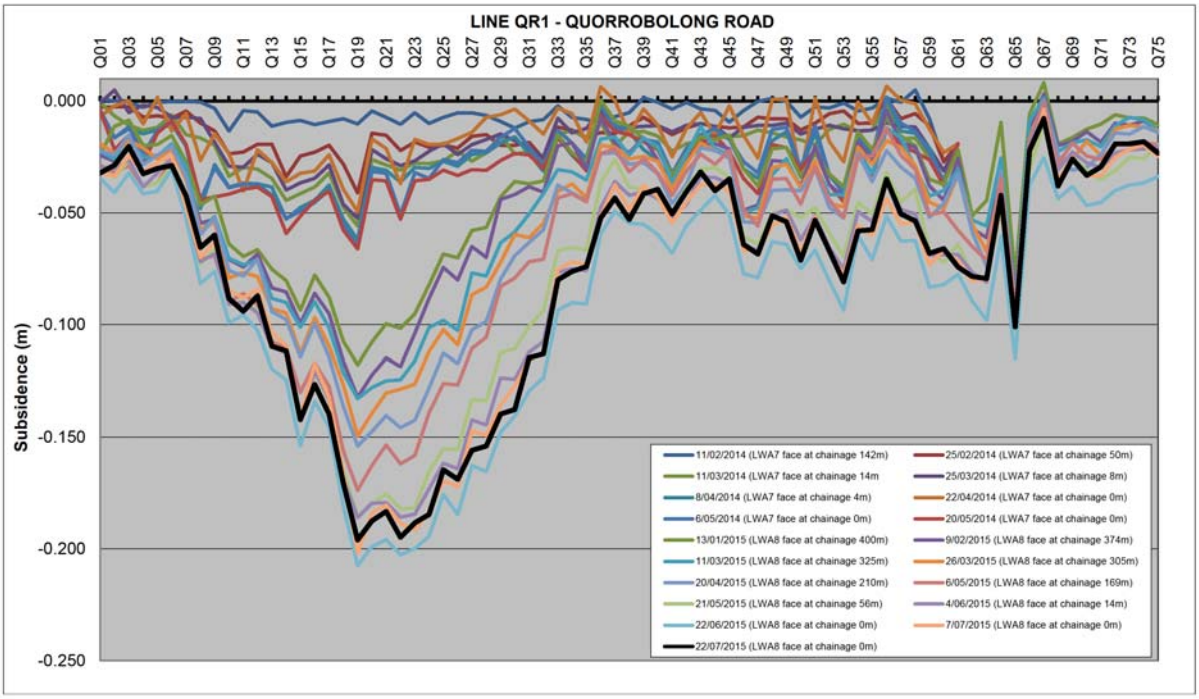


Figure 2.8 - Observed Profile of Incremental Subsidence along Line QR1

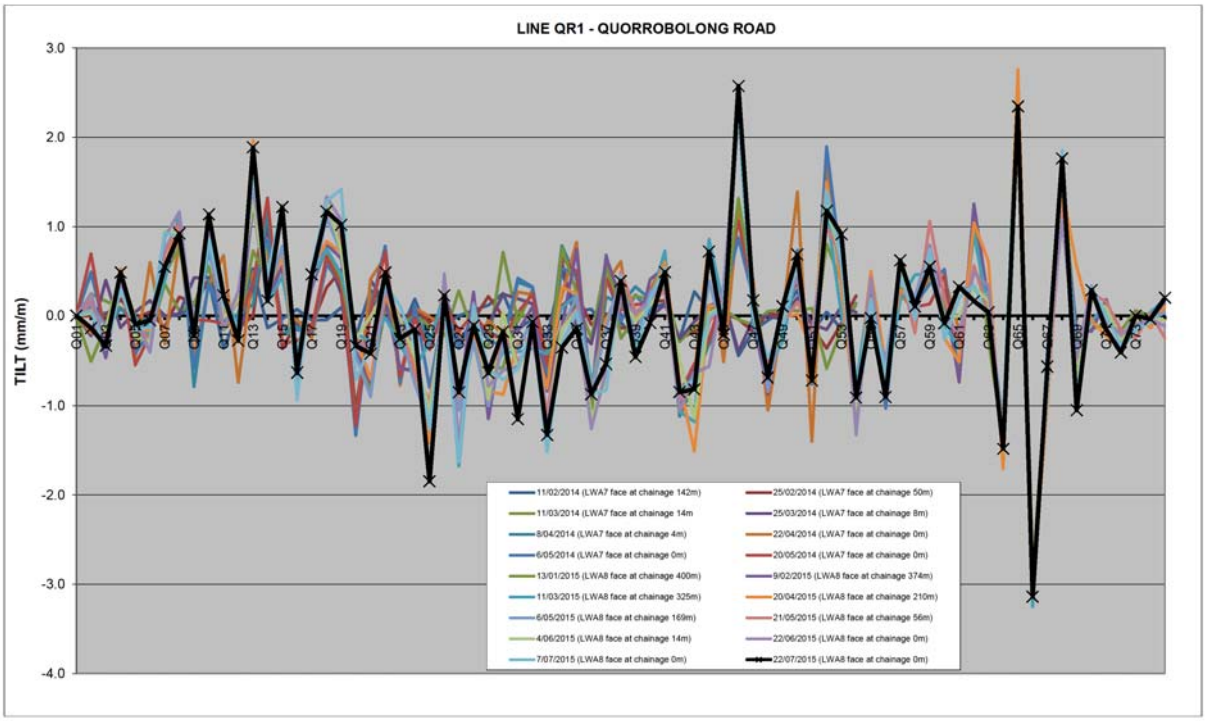


Figure 2.9 - Observed Profile of Incremental Tilt along Line QR1

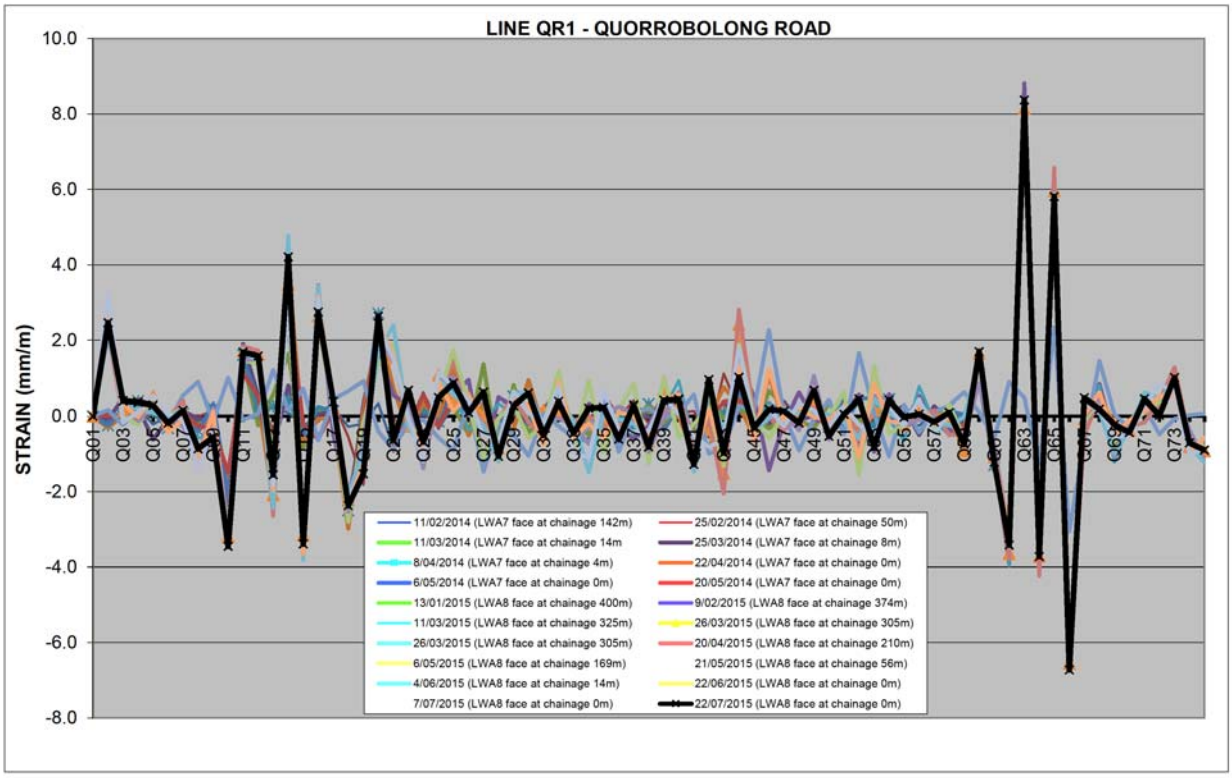


Figure 2.10 - Observed Profile of Incremental Strain along Line QR1

A summary of the maximum observed and maximum predicted incremental subsidence parameters along the Quorrobolong Road Line, resulting from the extraction of Longwall A8, are provided in **Table 2.3**. The observed values are the maxima after the completion of Longwall A8.

Table 2.3 – Maximum Observed and Predicted Incremental Subsidence Parameters along Quorrobolong Road Line Resulting from the Extraction of Longwall A8

Type	Maximum Total Subsidence (mm)	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)
Observed	196	3.1	8.3	6.7
Predicted	500	1.5	0.3	0.6

The maximum observed incremental subsidence along the Quorrobolong Road Line was 196 mm, which is less than half of the maximum predicted subsidence of 500 mm.

It can be seen from **Figure 2.9** and **Figure 2.10** that the profiles of observed tilt and strain were very irregular. The localised tilts and strains along the monitoring line exceed those predicted based on conventional movements and are greater than those which would be expected based on the low level of vertical subsidence.

The survey marks have been established in the verge adjacent to Quorrobolong Road and therefore it is likely that these localised tilts and strains were the result of disturbed survey marks. This is supported by the fact that the visual monitoring did not identify any visual impacts in road pavement as a result of mining.

It is expected, based on the low levels of vertical subsidence that the actual tilts and strains (i.e. excluding the disturbed marks) would be in the order of survey tolerance.

2.2.4 Line A7

Line A7 is a longitudinal monitoring line which follows the centreline of Longwall A7. The monitoring line was measured five times during and one time after the extraction of Longwall A8. The latest survey was carried out on 11 August 2015, around two months after the completion of the longwall. The base survey was carried out on 25 May 2013, around three weeks prior to the commencement of Longwall A7.

The observed profiles of incremental subsidence, tilt and strain along Line A7 resulting from the extraction of Longwall A8 are shown in **Figure 2.11** to **Figure 2.13**. The predicted profiles of incremental subsidence along this monitoring line after the completion of longwall A8 is also shown in this **Figure 2.11** for comparison.

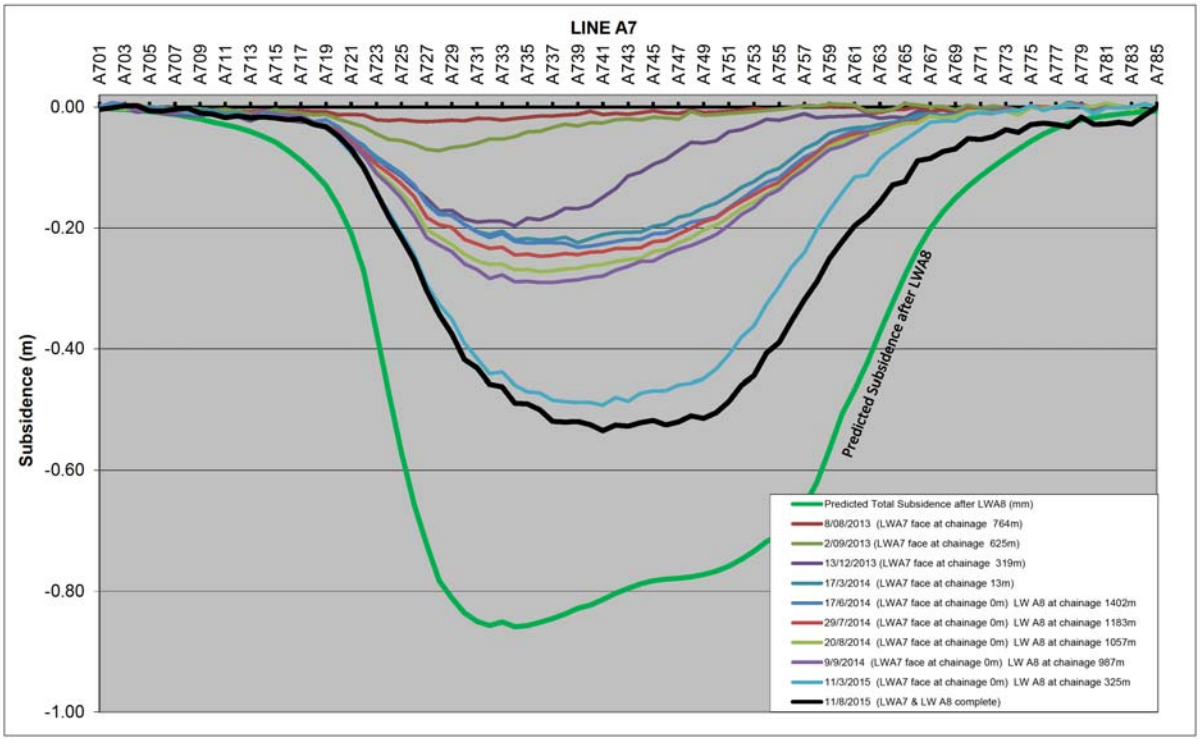


Figure 2.11 - Observed and Predicted Profile of Incremental Subsidence along Line A7

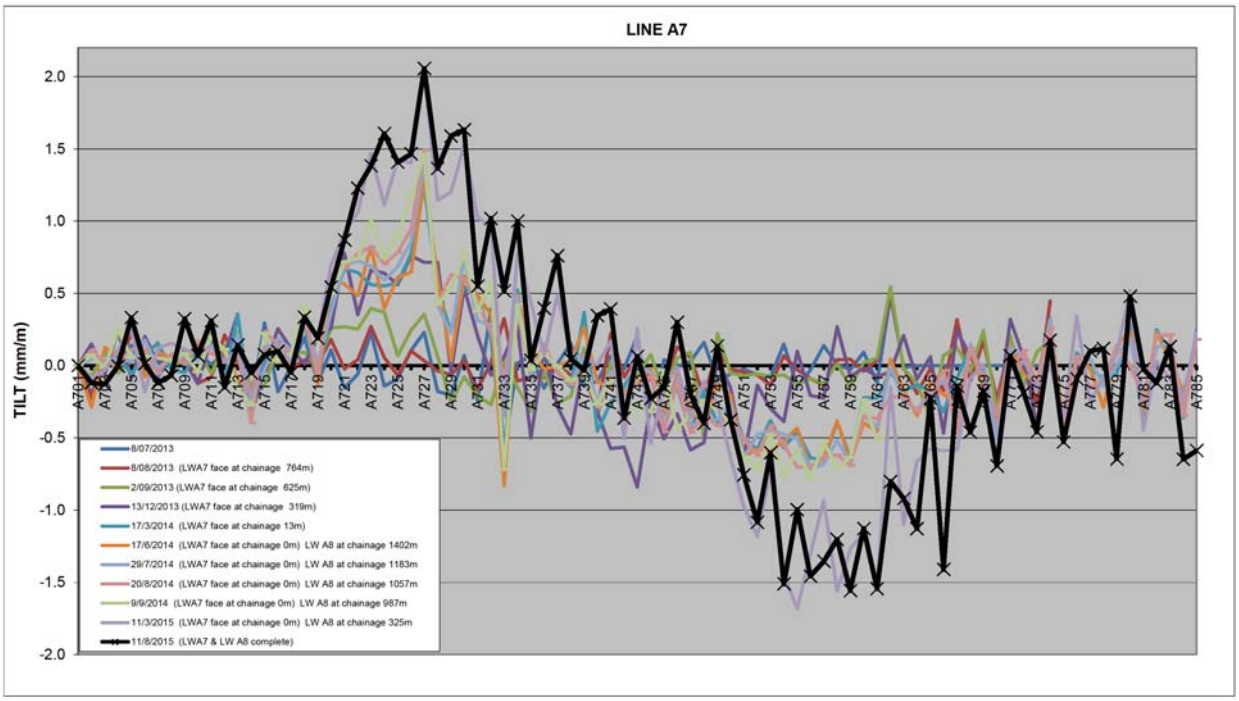


Figure 2.12 - Observed Profile of Incremental Tilt along Line A7

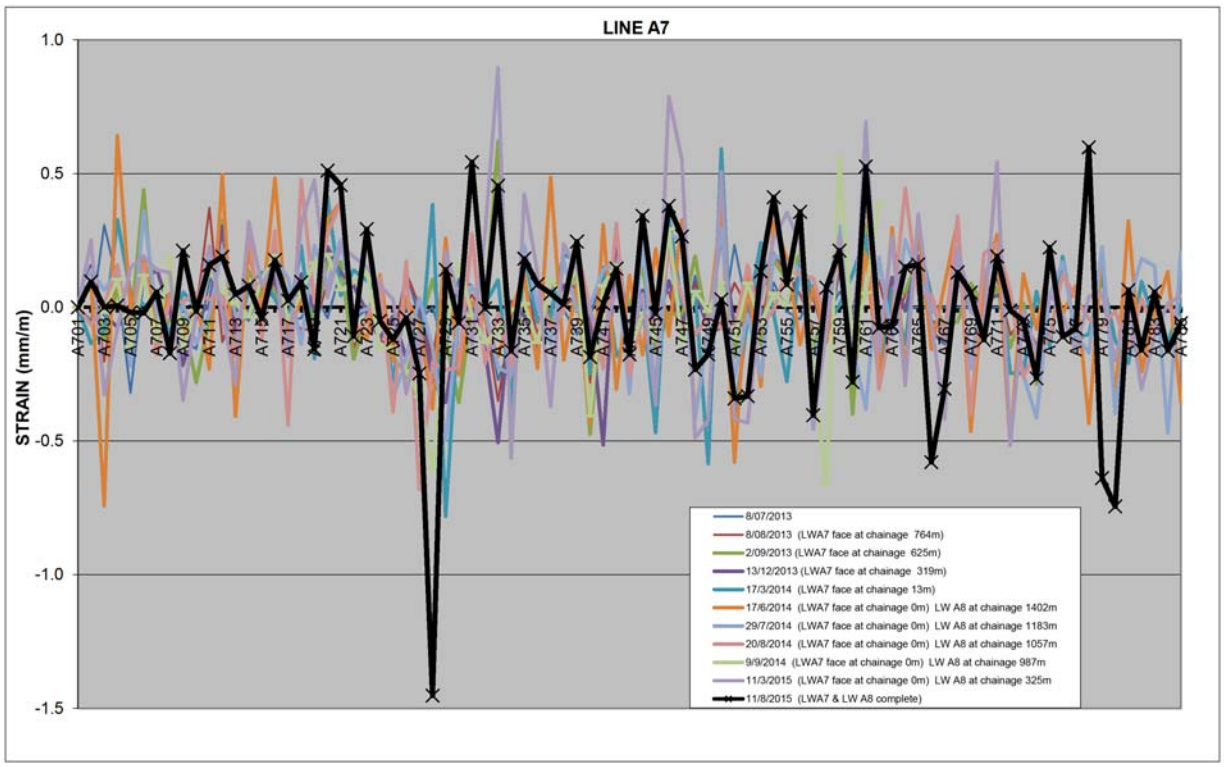


Figure 2.13 - Observed Profile of Incremental Strain along Line A7

A summary of the maximum observed and maximum predicted incremental subsidence parameters along Line A7, resulting from the extraction of Longwall A8, is provided in **Table 2.4**. The observed values are the maxima after the completion of Longwall A8.

Table 2.4 - Maximum Observed and Predicted Incremental Subsidence Parameters along Line A7 Resulting from the Extraction of Longwall A8

Type	Maximum Total Subsidence (mm)	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)
Observed	534	2.0	0.6	1.4
Predicted	850	4.0	Refer to discussion below	

The maximum observed incremental subsidence along Line A7 was 534 mm, which represents 63 % of the maximum predicted subsidence of 850 mm. Similarly, the maximum observed tilt of 2.0 mm/m represented 50 % of the maximum predicted tilt.

The observed subsidence profile is reasonably symmetrical, but the subsidence profile was slightly flatter (i.e. lower tilt) at the longwall finishing end (i.e. left side of Figure 2.11).

The maximum observed incremental strains along Line A7 were 0.6 mm/m tensile and 1.4 mm/m compressive. The maximum predicted conventional strains, based on applying a factor of 15 to the maximum predicted conventional curvatures anywhere above Longwall A7, are 0.8 mm/m tensile and 1.4 mm/m compressive.

The maximum observed tensile strain occurred in adjacent survey bays (i.e. as a tensile-compressive pair) and were located outside of the extents of the longwall and, therefore, could be the result of a disturbed survey mark. The maximum observed compressive strain occurs between Marks A728 and A729, which are at the bottom of a gully and could have been influenced by the surface topography. Elsewhere the observed strains were typically in the order of survey tolerance.

2.3 COMPARISON TO PREVIOUS PANEL

The previous panel extracted was Longwall A7 which lies adjacent to Longwall A8. A comparison of the two panels is shown below in **Table 2.5**.

Table 2.5 - Subsidence Parameters after Extraction of Longwall A7 and Longwall A8

LW	Maximum Predicted Incremental Subsidence (mm)	Actual Incremental Subsidence (mm)	Maximum Predicted Incremental Tilt (mm/m)	Actual Incremental Tilt (mm/m)	Maximum Predicted Incremental Tensile Strain (mm/m)	Actual Incremental Tensile Strain (mm/m)	Maximum Predicted Incremental Compressive Strain (mm/m)	Actual Incremental Compressive Strain (mm/m)
A7	450	232	2.5	1.5	0.6	0.9	0.9	0.8
A8	1150	773	4.0	3.9	0.8	0.7	1.4	1.4

2.4 IMPACT ASSESSMENT

Chapter 3 of the subsidence prediction report (MSEC650) details the anticipated impacts on natural features and surface infrastructure. **Table 2.6** summarises these impacts and makes comment as to the level of impact created by A8 subsidence as compared to maximum predicted subsidence parameters.

Table 2.6 - Impact Assessment Criteria Post Longwall A8 Mining

Item	Subsidence Impact Assessment	Actual Observation / Occurrence	Action
Cracking of alluvial creek beds	None within SMP area	N/A	Nil
Drainage lines	Potential for minor shallow isolated cracking around tensile zones of perimeter of longwalls	None observed	Nil
Steep slopes (northern side A8 near start, northern side of A8 and southern side of A7 along chain pillar mid panel and perpendicular across last part of panel)	Tilts 5.5 mm/m, Strains <1.4 mm/m after LWA10. Potential for minor cracking and unlikely to cause any long term impact	Tilt of 1.3 mm/m and compressive strain of 1.2 mm/m potentially as a result of downward slope movement at the bottom of gully	Continue to monitor
Quorrobolong Rd	500mm after LWA8 and 1.5 mm/m Tilt. After LWA10 1250mm, Tilt 5.0 mm/m, Strains 0.3-1.1 mm/m. Minor surface cracking to 25mm	Subsidence 196mm. Tilt 3.1 mm/m Strains to 8.3 mm/m. Tilts and strains higher but appear to be from disturbed subsidence marks. No visual sings of impact	Nil
Electrical Infrastructure	Unlikely for any adverse impact	No impact observed	Re-contact Ausgrid regarding line roller installation as per M.Plan
Telecommunications Cables	After LWA10 1600mm, Tilt <4 mm/m, Strains 0.3-0.45 mm/m. Moderate likelihood of damage.	OTDR testing completed. No loss of transmission	Continue to monitor as per M.Plan
Rural building structures	No expected impacts	None reported	Nil
Other structures/dams	Minimal impact	None reported	Nil
Archaeological Sites	Minor cracking with no adverse impact	None reported	Nil

2.5 SUBSIDENCE SUMMARY

The ground movements measured along Lines A7, A8 and XL3 indicate that the observed subsidence and tilt, resulting from the extraction of Longwall A8, were generally similar to or less than the maxima predicted. The profiles of observed subsidence also reasonably matched those predicted, but with reduced magnitudes with the exception of Line XL3 which showed a slight lateral shift in the observed subsidence profile towards the longwall maingate.

Only low level subsidence was measured along the Quorrobolong Road Line (<200mm) as this monitoring line crosses the back end of the longwall. The observed tilt and strain profiles along this monitoring line were very irregular and the localised movements appear to be the result of disturbed survey marks.

The observed strains along Lines A7, A8 and XL3 were typically less than the predicted conventional strains. The maximum observed compressive strain for Line A8 occurred between marks A866 and A867 which are located on the change of grade at the bottom of a gully and therefore which could be the result of the natural surface slope. Tensile-compressive strain pairs also occurred along each of the Lines A7, A8 and XL3, at locations outside of the longwall and, therefore, could have resulted from disturbed survey marks. Otherwise, the strains were similar to the order of survey tolerance.

It has been considered, therefore, that the Incremental Profile Method has provided adequate predictions of the mine subsidence movements for Austar Stage 3 Longwall A7 & A8.

3 PUBLIC SAFETY MONITORING AND MANAGEMENT PLAN

During routine subsidence monitoring and on occasions the area was being accessed for other purposes the following items were inspected as per the Public Safety Management Plan:

- Surface cracking;
- Surface humps;
- Step changes in landform;
- Serviceability of roads and access tracks;
- Slope or boulder instability; and
- Other sign of subsidence.

Of all the inspection occasions no evidence of any of the above could be observed (Also refer to **Table 2.6**). Inspections also confirmed that no safety issues manifested and no physical signs of subsidence were observed.

4 VIBRATION MONITORING

4.1 MONITORING RESULTS SUMMARY

Vibration monitoring has been undertaken in accordance with the Noise and Vibration Management Plan. Monitoring was undertaken at locations V7 and V8 during extraction of LWA8 (refer to **Figure 4.1**).

Monitors were set to monitor vibration continuously, and also to record a waveform when vibration exceeded 1mm/sec in any axis. Results of vibration monitoring greater than 1mm/sec are shown in **Figure 4.2** and **Figure 4.3.** Periods which recorded vibration less than 1mm/sec are not shown on the graphs.

Guideline values for annoyance (*Assessing Vibration: a technical guideline, DECC February 2006*), and for minimal risk of cosmetic damage (*BS7385:1993*) are included with the graphed results.

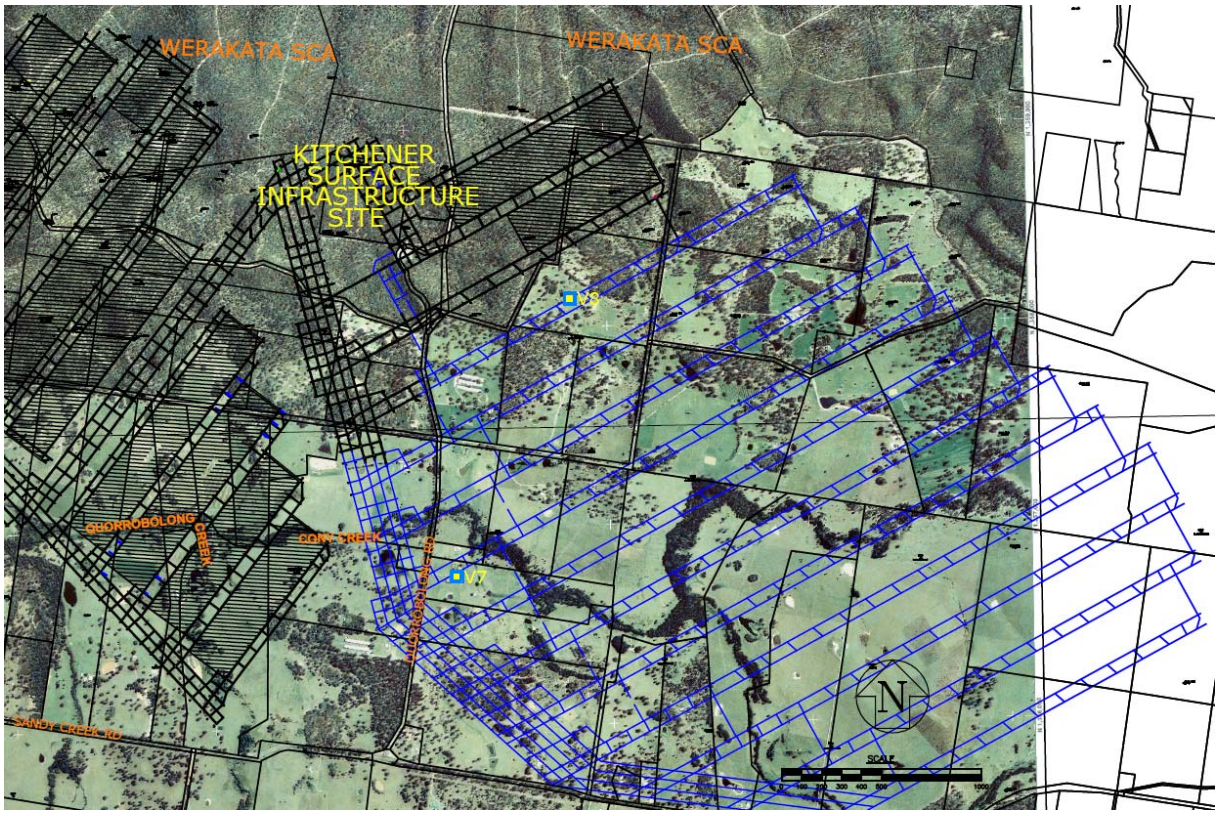


Figure 4.1 - Austar Vibration Monitoring Locations (V7 and V8)

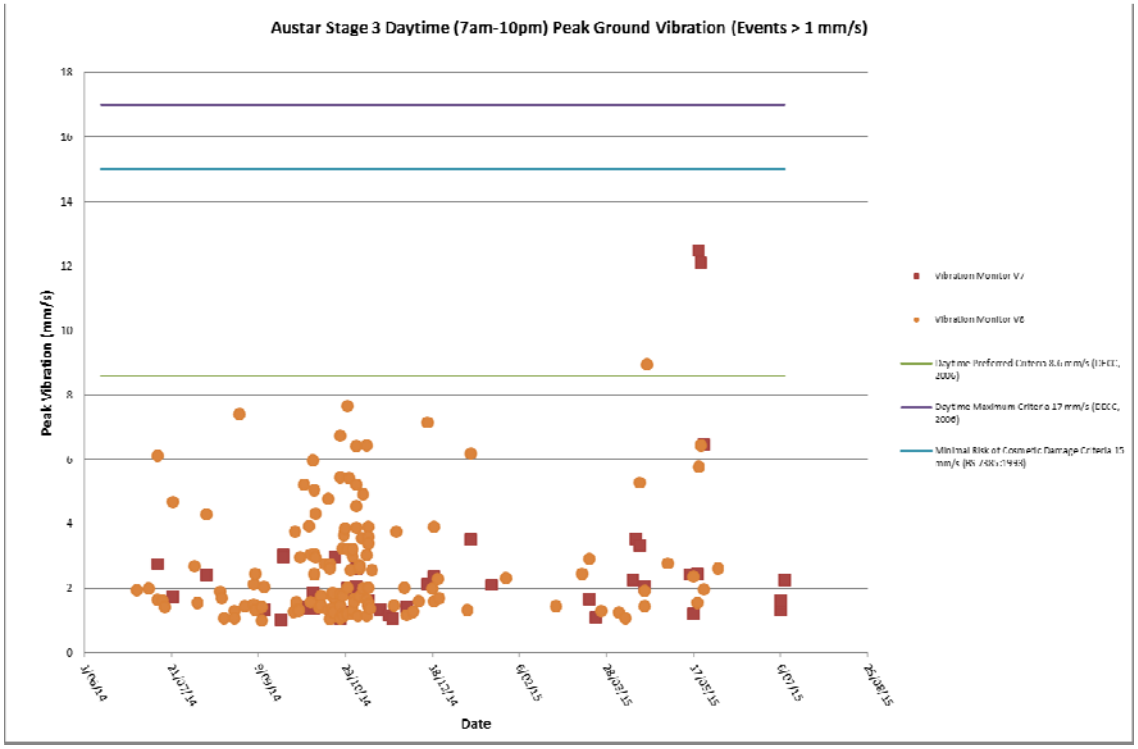


Figure 4.2 - Vibration Monitoring Results – Daytime

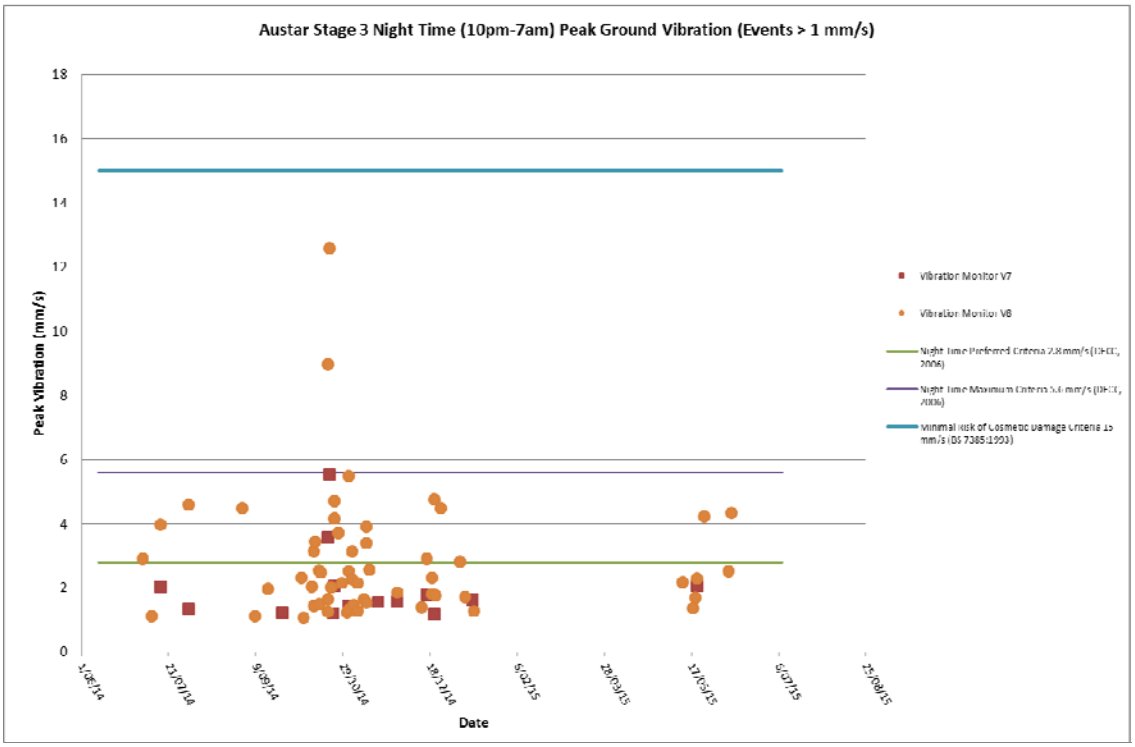


Figure 4.3 - Vibration Monitoring Results – Night

4.2 ANALYSIS OF MONITORING RESULTS

Results indicate that vibration from the extraction of Longwall A8 has been event based in nature. It is considered that vibration events are typically generated from the caving zone behind the longwall, or from tensile fractures in the overlying strata immediately above the longwall area. The majority of vibration events are less than 4 mm/sec, with only 14 events greater than 6 mm/sec over the period of extraction of A8. There were no events greater than 12.6 mm/sec.

Over the period of monitoring (1st June 2014 to 6th July 2015), two events exceeded the maximum criteria for human response to vibration during the night period. It is important to note that the vibration criteria are non-mandatory (DECC 2006) so are used as a monitoring tool to assess possible annoyance. Also, due to the vibration being strata generated, the timing of vibration events cannot be controlled, as would be the case in say pile driving, so operational controls are not feasible in this case. In that context, two exceedances of the maximum criteria over the extraction of Longwall A8 is not considered to be significant.

No events exceeded the guideline value where a minimal risk of cosmetic damage to building structures may occur (15mm/sec).

Community complaints in relation to vibration have been quite low. Only three community complaints were received in relation to vibration during the extraction of Longwall A8.

4.3 TRENDS IN MONITORING RESULTS

This is the second longwall panel in the Stage 3 mining area. There were significantly more vibration events during the extraction of Longwall A8 (216 events) than Longwall A7 (48 events). The observation of an increased number of vibration events for the second longwall panel in a series is consistent with the trend observed in the Stage 2 mining area. However, despite the increased number of vibration events when compared with the extraction of Longwall A7, the majority of events were within relevant criteria.

4.4 MANAGEMENT ACTIONS

No management actions relating to vibration have been necessary. Vibration monitoring should continue for Stage 3 as per the Austar Noise and Vibration Management Plan.

5 BIODIVERSITY MONITORING

5.1 MONITORING RESULTS SUMMARY

A Biodiversity Management Plan (BMP) is being implemented as part of the Extraction Plan for LWA7 to LWA10. The purpose of the BMP is to describe the ecological management strategies, procedures, controls and monitoring programs that are to be implemented for the management of flora and fauna as a result of subsidence related biodiversity impacts described in the Austar Stage 3 Modification Environmental Assessment (Umwelt 2011) and within the Austar Coal Mine LWA7-A10 Modification - Stage 3 Area Environmental Assessment (Umwelt 2013).

Secondary workings undertaken as part of Stage 3 mining are not anticipated to have a significant impact on biodiversity. However, in order to assess any potential impacts, a detailed monitoring program has been developed for the LWA7-A10 Extraction Plan area. The monitoring specifically focuses on the Lower Hunter Spotted Gum – Ironbark Forest EEC and River Flat Eucalypt Forest EEC which occur on the drier slopes and ridges of the Extraction Plan area and on the drainage flats/lower slopes respectively, and threatened species identified within the subsidence zone of LWA7 to LWA10.

Monitoring is undertaken using a mixture of bi-annual monitoring (one survey in autumn and one in spring), and annual monitoring (for threatened species monitoring to coincide with flowering events). Monitoring locations are shown in **Figure 5.1**.

There are seven routine monitoring locations above the mining area and two reference sites. The program is arranged so that monitoring sites will be added to and removed from the program progressively as mining proceeds. For example, sites influenced by mining of LWA8 will be monitored for baseline data 12 months prior to the mining of that longwall, and will continue after the mining of that longwall. Additional sites for future longwall panels (i.e. LW A11 onwards) will be commenced prior to mining of these panels.

For the current stage of the Stage 3 program the following key methods are utilised:

- permanent vegetation sampling quadrats;
- ecological condition assessment;
- photographic monitoring; and
- targeted threatened species monitoring.

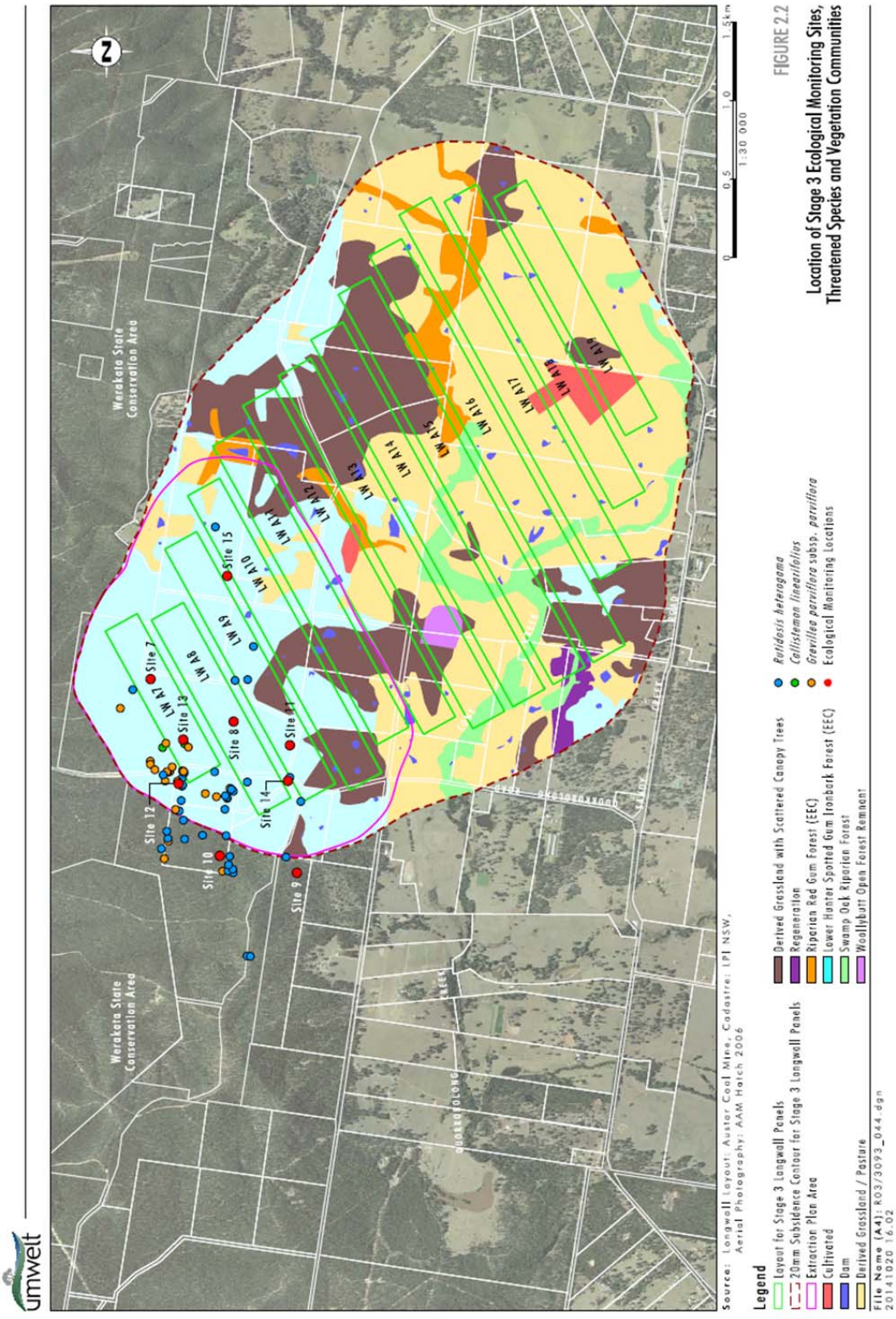


Figure 5.1 - Ecological Monitoring Locations

5.2 ANALYSIS OF MONITORING RESULTS

Monitoring undertaken prior to and up to the completion of LWA8 has included baseline monitoring in 2012, and monitoring in 2013, 2014 and Autumn 2015. The results arising from the data obtained from the monitoring surveys undertaken to date are detailed below.

- Longwall mining has now passed under monitoring Site 7, 8 and 13, and in close proximity to Site 12. Ongoing monitoring will consequently be tracking potential impacts resulting from longwall mining.
- No discernible change was observed in the vegetation or condition of the Stage 3 monitoring sites during the Autumn 2015 monitoring from the Spring 2014 monitoring event.
- No changes have been observed at any of the monitoring sites occurring over longwalls that would be attributable to the impacts of longwall mining.
- As the vegetation of these sites is currently considered stable and there are no impacts as a result of longwall mining, no management recommendations are considered necessary at this point in time.
- The targeted threatened species monitoring locations revealed these species are in a good state of health.
- There was no myrtle rust identified at any of the locations.
- No weed infestation was identified at any of the sites with only seven introduced species recorded across four sites. Lantana was observed at site 11 at a low density.
- One of the Stage 3 reference sites (Site 10) has been subject to bushfire between the Spring 2013 and Autumn 2014 monitoring events. Shrubs and groundcover were largely absent in the Autumn 2014 monitoring event, however the canopy was largely un-impacted. A replacement for reference Site 10 is not considered necessary, as monitoring the site will provide useful data on the how a healthy vegetation community responds to a burning event. Results from monitoring in Autumn 2015 suggested that Site 10 was recovering well from the burning event.

5.3 TRENDS IN MONITORING RESULTS

To date there is no evidence of any impacts on ecological features as a result of longwall mining.

5.4 MANAGEMENT ACTIONS

Nil management actions required to date in relation to biodiversity.

6 SUMMARY

Longwall A8 has been successfully extracted and monitoring of subsidence and environmental aspects has been completed in accordance with relevant Extraction Plan and environmental management plans.

It is considered that the Incremental Profile Method has provided adequate predictions of the mine subsidence movements for Austar Stage 3 Longwall A7 & A8.

There have been no management actions for subsidence impacts based on the monitoring program results.

Nil adverse impacts due to subsidence impacts have been observed during monitoring that would require modification to monitoring programs or management strategies.

Appendix F:

Community Complaints

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
1	Vibration	01/08/2014	Quorrobolong	Resident called about vibration events being felt recently. Resident was advised of the location of permanent vibration monitors and that they were being downloaded on the day of the complaint. ECM would return call later that day.	ECM called resident back at 15:00 1 August 2014. ECM indicated that vibration results nearest to the longwall were approx 4-4.5mm/sec. Resident indicated he had been feeling several vibration events recently and thought that some damage may have occurred to his house. Resident requested a vibration monitor at his house. ECM asked if resident had been receiving the subsidence and mining update letters which include vibration results. Resident has been receiving these. ECM indicated that vibration damage would be subject to claim to the Mine Subsidence Board, therefore resident should also contact the MSB to advise of any issue. ECM offered to install a vibration monitor temporarily for 1-2 weeks to try to establish a correlation with our permanent stations. Resident requested 2 months monitoring. ECM indicated that resident should contact MSB to advise of any issues, and that they may want to monitor vibration themselves. Vibration monitor installed at residents house on 14 August 2014. ECM provided contact details for MSB.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
2	Odour	06/08/2014	Bellbird Heights at/near Francis Street	Council Environmental Health Officer contacted Austar regarding odour complaints received from resident 1 August 2014 and on 6 August 2014. The odour is reported to smell like a dump, has been present for approximately one week and is worse in the evening.	ECC undertook inspection of Aberdare Reject Emplacement Area to investigate. Observed were piles of vegetation which had been set on fire previously and were smouldering outside of the emplacement area. Also noted were piles of illegally dumped rubbish both adjacent to and on the smouldering fire. The access to the emplacement area via Francis St has previously had a heavy gate stolen. CHPP personnel have re-closed off the access to prevent access for illegal dumpers. 7 August 2014 ECM returned call to Council Environmental Health Officer to inform of investigation and actions. Council was satisfied and would respond to the complainants.
3	Vibration	12/08/2014	Coney Creek Lane, Quorrobolong	Resident called about recent vibration events. The call was prompted by an event on the afternoon of 10 August 2014.	ECM provided MSB contact details and vibration results.
4	Traffic	20/08/2014	Truro Street, Ellalong	Resident contacted Austar Reception regarding a truck undertaking works on Truro St on overhead lines near a crest in the road with insufficient traffic warning signage. Truro St is used by the mine between Pit Top and No. 1 shaft and by 3 residents.	Immediate traffic control implemented. Resident advised of measures implemented. ECM followed up with phone call on 22 August 2014.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
5	Noise	26/08/2014	Mitchells Rd, Mount View	Resident left a message regarding excessive conveyor noise. Resident has lived at his property for 18 years and considers that conveyor noise has increased in past 2 years. Resident indicated that especially from 10pm to 8am the previous night noise was high.	ECM investigated with CHPP personnel. There have been no recent changes to conveyor infrastructure. ECM called back 14:30 26 August 2014 and left a message for the resident.
6	Noise	28/08/2014	Cessnock St, Aberdare	Complainant called Austar complaints line and left a message regarding train noise. A train had been idling for over three hours and revving the engine on occasion.	ECM investigated with CHPP Manager. A Pacific National train had a brake failure last night. It had to be pushed back to the port by another locomotive, therefore had to wait for the rescue loco. ECM called resident back on 29 August 2014 to explain that rail activities are the responsibility of Pacific National, and to provide detail of the break down.
7	Property	28/08/2014	Wollombi Road, Pelton	Council officer advised a complaint had been received by Council about a temporary pipeline which had been installed in a Wollombi Road culvert.	Austar advised the officer that Council had approved the temporary pipeline. The Council officer was satisfied.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
8	Noise	14/10/2014	Ellalong	The EPA reported a noise complaint received at 03:00 on 28 July 2014 and the description provided by the caller is as follows. "Noise complaint from resident caused by: Austar Coal Mine Caller said the mine noise has started back again 3am in the mornings - the woo-woo-woo sound is loud and wakes caller up and finds it very hard to go back to sleep and is finding this stressful. Caller said the mine noise was on Monday 28 July, Tuesday 29 July and today Wednesday 30 July all starting at 3am and caller said this will go for hours - a lengthy time. As caller was speaking to me she said the mine noise is still continuing and it's nearly 10am. Caller said ever since the underground explosion incident at the mine, the woo-woo-woo sound seemed to have started." EPA officer acknowledged the complaint is quite old.	ECM responded to EPA that Austar would investigate. ECC investigated with operations and engineering personnel regarding possible sources of noise that may have possibility of commencing at 03:00. Given the age of enquiry (the complaint was for a period more than 2 months ago), no specific activities could be related to the complaint. EPA advised of investigation outcome on 28 October 2014.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
9	Traffic	17/10/2014	NA	Complainant visited Austar Reception at 17:10 to advise of near miss from a car leaving Austar's access road as he drove along Middle Road past the front gate.	On 20 October 2014 Austar personnel identified the driver of the vehicle as a contractor undertaking works at Austar. The driver was subjected to disciplinary action by both Austar contract holder and the manager of the contracting company, and agreed to moderate his driving. 24 October 2014 ECM contacted complainant to advise of follow up in relation to the complaint, who appreciated the follow up.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
10	Noise, Dust	21/10/2014	Clare St, Bellbird Heights	Complainant called Austar complaints line and left a message regarding the Aberdare reject emplacement area. ECM called back at 09:45 on 21 October 2014. The complainant called in relation to dumping and works which occur 24 hours per day. ECM advised that Austar is approved to operate 24 hours per day. Complainant was concerned about noise (tailgates banging, reverse alarms), and dust settling on verandah. ECM advised that Austar manage dust by grassing completed areas and utilising a water cart, and that the reject does not generate a lot of dust as it is typically a coarse and wet material. The complainant also mentioned that there was a fire in the area on Sunday and the Fire Services could not access through the blocked off area at Francis St Armco. ECM advised that NSW Fire services had been advised of the blocking of that access for security reasons, and that other access area available for Fire services.	CHPP Manager investigated the details. The contractors which transport reject were advised to improve their operation to minimise potential for tailgate banging on the reject trucks. Trucks were also directed to tip in deeper parts of the emplacement area during the night period. A review of water truck usage was also undertaken to optimise dust suppression with operations. ECM contacted complainant on 24 October 2014 to advise of actions undertaken. Complainant appreciated the call back and that actions had been taken.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
11	Odour	16/12/2014	Bellbird	The EPA received a complaint about odour from the Austar premises on 5 December 2014 as follow. "Odour coming from stockpile at Austar Coal Mine. Odour hasn't been present for some years but restarted in the past week since the heat and storms started. Odour was incredibly strong last night at dusk. Caller's partner says the smell is most likely from spontaneous combustion in the stockpile. They have not phoned the mine to inform them of the situation. Caller's residence is about 1.5km from the stockpile by map." The caller's location was the suburb of Bellbird, in a northerly direction from the CHPP.	CHPP Manager advised that there has been no spontaneous combustion at Austar Coal for many years. EPA was advised Austar investigated this complaint at our CHPP site, and we have not had a complaint about odour from spontaneous combustion style odour.
12	Vibration	17/12/2014	Sandy Creek Road, Quorrobolong	Complainant called Austar complaints line and left a message regarding the perceived "blasting" on property bought by Austar in the Quorrobolong area where blasting was occurring.	ECM received the message and called back on 18 December 2014. ECM advised there are no surface blasting activities at Austar. There are some exploration activities occurring but this does not include blasting. ECM gave an overview of the UG mining operations and that she may be feeling vibration from fractures developing in strata above the longwall area. ECM directed complainant to Austar's website and offered to meet if they would like.

Austar Coal Mine Community Complaints Register
July 2014 - June 2015

Complaint No	Category	Date	Property	Detail	Follow Up Actions
13	Dust	22/12/2014	NA	The EPA received a complaint about dust from the Austar premises on an unspecified date as follows. "Caller is reporting of dust coming from the trucks using the road which are taking coal refuse from the mine and dumping it into the open cut hole. Caller recently went for a walk and when a truck passed by, caller could not see the truck as there was so much dust. Caller's pool water gets dirty from the dust as well. Caller said there is no water truck from the mine to water the road."	CHPP manager advised that the water cart runs whenever reject hauling is occurring, unless it is raining. ECC provided a response to the EPA outlining water cart usage.
14	Noise	8/01/2015	Wollombi Rd, Bellbird	ECM received a call at 12:40 from a resident on Wollombi Road. He indicated that he can hear the reject trucks clanging/rattling as they cross the rail line, and also on rougher parts of the haul road that are near Skinners Hill.	CHPP team investigated haul road and conducted repairs to improve the surface and rail crossing. Reject trucking contractor inspected trucks to identify and repair any rattling parts.
15	Access/Roads	26/06/2015	Q14 Private Access, Ellalong	The EPA received a complaint about the Austar premises on 24 June 2015, relating to road condition after repairs were made to an Austar Coal Mine pipeline beneath the road after a leak was identified on 21 March 2015.	Austar inspected the road in question, and scheduled road maintenance to occur on 2 July 2015. ECM contacted the affected resident to advise of the scheduled works, and responded to the EPA on 2 July 2015 with the response to this complaint.

Appendix G:

Environmental Incidents

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
1	21/07/2014	Routine quarterly noise compliance monitoring during the night of 21 July 2014 recorded measured noise levels at location NMC3 (O'Hearn Residence - Bimbadeen Road, Mt View) 1 dB over the noise limit. Exceedances of 1 to 2 dB are not considered significant as Chapter 11 of the Industrial Noise Policy deems a development to be in non-compliance only when "the monitored noise level is more than 2 dB above the statutory noise limit specified in the consent or licence condition." However, the noise at NMC3 classified as low frequency noise and attracted a 5 dB modifying factor. When the 5dB modifying factor was applied the resultant noise level was LA90 43 dB, which is 6 dB greater than the EPL LA90 noise limit. No atypical site activities were being undertaken at the time of either monitoring events.	As a result of this incident the following actions were undertaken: • EPA and DP&E notified of noise results. • Follow-up monitoring during the night of 28 July 2014 recorded measured noise levels at location NMC3 (O'Hearn Residence - Bimbadeen Road, Mt View) in compliance with the noise limit. However, the noise at NMC3 classified as low frequency noise and attracted a 5 dB modifying factor. When the 5dB modifying factor was applied the resultant noise level was LA90 40 dB, which is 3 dB greater than the EPL LA90 noise limit. • Monitoring on 6-7 August 2014 was in compliance with noise limits at CHPP. • Incident report prepared for EPA and DP&E.
2	27/07/2014	The incident involved a leak from the Bellbird pipeline at the CHPP. The CHPP had been undertaking maintenance to remove scale from the Bellbird Pipeline. A leak developed from a temporary pipe clamp used for the maintenance program which flowed over ground to Bellbird Creek. The leak appeared to be contained to an on-site portion of Bellbird Creek and the Doyle St Dam.	As a result of this incident the following actions were undertaken: • Incident was reported to the EPA and the Pollution Incident Response Management Plan was triggered and notifications undertaken. • EPA officer inspected the incident on 27 July 2014. • Containment actions undertaken by CHPP personnel to return captured water to dirty water system and remove pipe clamps from the job. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA. • The EPA issued a show cause notice on the 11 August 2014 and Austar provided a response on 29 August 2014.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
3	7/08/2014	Routine quarterly noise compliance monitoring during the night of 7 August 2014 recorded measured noise levels at location NMK4 (Nash Lane, Quorrobolong) equivalent to the noise limit. However, the noise at NMK3 classified as low frequency noise and therefore a 5 dB modifying factor was applicable in accordance with INP methods. When the 5dB modifying factor was applied the resultant noise level was LAeq 40 dB, which is 5 dB greater than the development consent noise limit. A review of meteorological conditions indicated that moderate inversion conditions were present at the time of both monitoring events, which may have caused some enhancement of noise levels. No atypical site activities were being undertaken at the time of the monitoring events.	As a result of this incident the following actions were undertaken: • EPA and DP&E notified on noise results. • Follow-up monitoring during the night of 13 August 2014 recorded measured noise levels at location NMK4 in compliance with the noise limit. • Incident report prepared for EPA and DP&E.
4	12/08/2014	The incident involved a minor spill to land in the Kalingo Infrastructure Area. The spill occurred from a pipe joiner in a pipeline transporting water from an oil/water separator.	As a result of this incident the following actions were undertaken: • Pipe joiner was repaired to prevent further leakage. • Soil impacted by the leak was excavated and removed to Austar's hydrocarbon remediation area.
5	20/10/2014	Noise levels measured from Austar's CHPP during the night of 20 October 2014 were less than EPL noise limits, before INP modifying factors were taken into account. An assessment of the nature of noise, undertaken in accordance with Industrial Noise Policy methods, indicated that noise recorded at NMC1 (and other locations) were classified as low frequency noise and attracted a 5 dB modifying factor. When the 5dB modifying factor was applied the resultant noise level at NMC1 was LA90 43 dB, which is 3 dB greater than the EPL LA90 noise limit. A review of meteorological conditions indicated that moderate inversion conditions were present at the time of the exceedance event, which may have caused some enhancement of noise levels. No atypical site activities were being undertaken at the time of either monitoring events.	As a result of this incident the following actions were undertaken: • EPA and DP&E notified of noise results. • Follow-up monitoring during the night of 11 November 2014 recorded measured noise levels at location NMC1 in compliance with the noise limit. However, the noise at NMC1 classified as low frequency noise and attracted a 5 dB modifying factor. When the 5dB modifying factor was applied the resultant noise level was LA90 40 dB, which is compliant with the EPL LA90 noise limit. • Incident report prepared for EPA and DP&E.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
6	10/11/2014	Noise levels measured from Austar's CHPP during the night of 10 November 2014 were less than EPL noise limits, before INP modifying factors were taken into account. An assessment of the nature of noise, undertaken in accordance with Industrial Noise Policy methods, indicated that noise recorded at NMC1 and NMC3 (and other locations) were classified as low frequency noise and attracted a 5 dB modifying factor. When the 5 dB modifying factor was applied the resultant noise level at NMC1 was LA90 44 dB, and at NMC3 was LA90 41 dB which is 4 dB greater than the relevant EPL LA90 noise limit in both cases. A review of meteorological conditions indicated that weak to moderate inversion conditions were present at the time of the exceedance event, which may have caused some enhancement of noise levels. No atypical site activities were being undertaken at the time of either monitoring events.	As a result of this incident the following actions were undertaken: • EPA and DP&E notified of noise results. • Follow-up monitoring during the night of 11 November 2014 recorded measured noise levels at location NMC1 and NMC3 in compliance with the noise limit. However, the noise at NMC1 and NMC3 classified as low frequency noise and attracted a 5 dB modifying factor. When the 5dB modifying factor was applied the resultant noise level at NMC1 and NMC3 was LA90 40 dB and LA90 34 dB, which is compliant with the relevant EPL LA90 noise limits. • Incident report prepared for EPA and DP&E.
7	8/12/2014	The incident involved the lower water storage dam at the SIS discharging over its lowest point into Black Creek, due to a greater than design rainfall event. A total of 146mm fell over the period 3 to 8 December 2014 prior to the incident. The approved 90th percentile, 5 day rainfall design is 42.8mm.	As a result of this incident the following actions were undertaken: • Reported to EPA. • Water pumping of sediment basin and storage dams, which had commenced on 4 December 2014, continued until basin and dams were empty. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
8	20/01/2015	Noise levels measured from Austar's CHPP during the night of 20 January 2015 were less than EPL noise limits, before INP modifying factors were taken into account. An assessment of the nature of noise, undertaken in accordance with Industrial Noise Policy methods, indicated that noise recorded at NMC1 (and one other location) were classified as low frequency noise and attracted a 5 dB modifying factor. When the 5 dB modifying factor was applied the resultant noise level at NMC1 was LA90 43 dB, which is 3 dB greater than the relevant EPL LA90 noise limit. A review of meteorological conditions indicated that weak to moderate inversion conditions were present at the time of the exceedance event, which may have caused some enhancement of noise levels. No atypical site activities were being undertaken at the time of the monitoring event.	As a result of this incident the following actions were undertaken: • EPA and DPE notified of noise results. • Follow up monitoring conducted on 5 February 2015 complied with noise limits. • Incident report prepared for EPA and DP&E.
9	27/01/2015	The incident involved a brief discharge of stormwater from the rail spur drainage system to Bellbird Creek. The CHPP site experienced an intense 15 minute rainfall event where 10.2mm was recorded in 15 minutes at a rate of up to 85mm/hour. Flash flooding was reported in Cessnock during this event. Excessive runoff from high intensity rainfall caused a ROM catch drain to be overtopped, with the resulting flow causing the ROM drain wall to be eroded. A portion of the ROM catch drain stormwater flow appears to have then entered the rail spur and flowed along its drainage system. This volume combined with the existing rail spur drainage appears to have been greater than the capacity of the rail spur drainage system. A portion of the resulting overland flow passed along the rail line and briefly discharged into Bellbird Creek.	As a result of this incident the following actions were undertaken: • Reported to EPA. • Drain maintenance earthworks to prevent reoccurrence were immediately undertaken on 27 January 2015 in response to the event, this involved repairing the failed section of the ROM catch drain and constructing a high flow overflow drain for the ROM catch drain to direct potential stormwater runoff which exceeds the drain capacity away from the rail spur drain and into the CHPP central dirty water drainage system. • Water sampling was conducted and the results were provided to the EPA.
10	28/02/2015	The incident involved an Eimco (underground loader) spill of transmission oil due to a drain plug on the transmission not being properly tightened after a service. The spill occurred at an Austar Pit Top loading ramp.	As a result of this incident the following actions were undertaken: • Spilled oil was cleaned up using spill sorb. • The drain plug was securely replaced.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
11	5/03/2015	The incident involved the 0.5ML tank at Kalingo Infrastructure Area overflowing due to a failure of the inlet valve to fully close. The valve is designed to automatically shut off when a high level switch is triggered. The 0.5ML tank supplies clean water to the underground and contains a mixture of RO permeate and town water, depending upon RO plant operations.	As a result of this incident the following actions were undertaken: • Reported to EPA. • The faulty valve was replaced. • A monthly work order has been created for the inspection and maintenance of the inlet valve. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA.
12	21/03/2015	The incident involved a leak from the 2 Shaft Pipeline due to a failure in a weld. The No. 2 Shaft Pipeline is used to transfer mine water from No. 2 Shaft to Austar's mine water treatment system. The 2 shaft pipeline is buried along the majority of its length. The leak occurred along a section of the Q14 Private Access Road and affected a portion of an adjacent grazing paddock.	As a result of this incident the following actions were undertaken: • 2 Shaft Pipeline isolated to prevent further leak. • Reported to the EPA and landowner. • A containment drain and bund was constructed within hours. • Pipeline leak located and repaired. • Wet soil area excavated and removed from the site and replaced with clean fill. • Pasture will be re-established in the grazing paddock upon completion of earthworks. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA.
13	8/04/2015	The incident involved a minor leak from the 2 Shaft Pipeline due to a failure in a weld within the 2 Shaft compound identified as a small wet area of ground.	As a result of this incident the following actions were undertaken: • 2 Shaft Pipeline isolated to prevent further leak. • Pipeline leak located and repaired. • Wet soil excavated and removed from the site and replaced with clean fill.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
14	21/04/2015	The incident involved the Eastern Sediment Basin and the Lower Water Storage Dam discharging over their lowest points during an east coast low storm event. A total of 231mm fell over the period 20 to 22 April 2015 prior to and during the incident. The approved 90th percentile, 5 day rainfall design for the Eastern Sediment Basin is 42.8mm. The lower water storage dam design runoff capacity is greater than the 90th percentile, 5 day rainfall depth.	As a result of this incident the following actions were undertaken: • Reported to EPA. • Water pumping of sediment basin and storage dams to make ready for future rain events. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA.
15	21/04/2015	The incident involved a non-compliance with Environment Protection Licence concentration limits for pH and iron during a discharge from Emergency Overflow Dam Licenced Discharge Point 1. The Emergency Overflow Dam discharged over LDP 1 during an east coast low storm event. Austar may only discharge from LDP 1 when rainfall is greater than 168mm in 5 days, or greater than 48mm in any 12 hour period (i.e. wet weather discharge only). The discharge was the result of the high volume of rainfall received at the CHPP, 178mm from the 19/04/15 to 23/04/15, including over 74mm in a 12 hour period. Therefore discharge is permitted by the EPL. The discharge occurred from 5:30pm 21/04/15 to 2:30pm 22/04/15. Approximately 1975kL was discharged from LDP 1 over 2 days (EPL licenced discharge is 2000kL/day). Sampling water quality results measured were within concentration limits for total dissolved solids, and total suspended solids, but outside required EPL concentration limits for pH and iron.	As a result of this incident the following actions were undertaken: • Reported to EPA. • Incident report provided to EPA.

Austar Coal Mine 2014-2015 Environmental Incidents

Incident No.	Date	Incident Details	Follow Up Actions
16	4/05/2015	The incident involved the Eastern Sediment Basin discharging over its spillway due to higher than design rainfall. A total of 45.4mm fell over the period 30 April 2015 to 3 May 2015 prior to the incident. The approved 90th percentile, 5 day rainfall design for the Eastern Sediment Basin is 42.8mm.	As a result of this incident the following actions were undertaken: • Reported to EPA. • Water pumping of sediment basin and storage dams to make ready for future rain events. • Water sampling was conducted and the results were provided to the EPA. • Incident report provided to EPA.