2018 Annual Review

Wilpinjong Coal Mine

Table 1 Annual Review Title Block

Name of operation	Wilpinjong Coal Mine
Name of operator	Wilpinjong Coal Pty Limited
Development consent/project approval #	SSD-6764
Name of holder of development consent/project approval	Wilpinjong Coal Pty Limited
Mining lease #	ML 1573 & ML1779
Name of holder of mining lease	Wilpinjong Coal Pty Limited
Water licences #	WAL21499, WAL19045,WL19055, WL19057,WL19058, WL19426, WAL19425, WAL19430, WAL36398, WAL9476, WAL39785, WAL41548, WAL41549, WAL41550, WAL41551
Name of holder of water licence	Wilpinjong Coal Pty Limited
MOP start date	01 July 2017
MOP end date	30 June 2019
Annual review start date	01 January 2018
Annual review end date	31 December 2018

I, Kieren Bennetts, certify that this audit report is a true and accurate record of the compliance status of the Wilpinjong Coal Mine for the period 01 January 2018 to 31 December 2018 and that I am authorised to make this statement on behalf of Wilpinjong Coal Pty Limited.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental

Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G

(Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer	Kieren Bennetts
Title of authorised reporting officer	Environment & Community Manager
Signature of authorised reporting officer	
Date	30 March 2019

This 2018 Annual Review (AR) (this Report) presents a summary of regulatory compliance, environmental performance and community engagement activities for the *review period* from 1 January 2018 to 31 December 2018.

This Report provides the results and assessment of environmental performance relevant to the current development consent approval SSD-6764 for the *review period*.

This AR has been prepared to satisfy the requirements of Condition 4, Schedule 5 of Development Consent (SSD-6764) requiring the preparation of an Annual Review and conditions within Mining Lease (ML) ML1573 and ML1779 and EPBC Approval 2015/7431. The AR was developed to align with the *Annual Review Guideline (October 2015)* issued by the NSW Department of Planning and Environment (DP&E).

Copies of this Report will be provided to the following stakeholders:

- NSW Department of Planning and Environment (DP&E);
- DP&E – Division of Resources and Geosciences (DRG);
- NSW Environment Protection Authority (EPA);
- NSW Department of Primary Industries – Division of Water (DPI – Water);
- NSW Office of Environment and Heritage (OEH);
- Mid-Western Regional Council (MWRC);
- NSW Health;
- Department of the Environment and Energy (DoEE); and
- The Mine's Community Consultative Committee (CCC).

In addition, a copy will be made publicly available on the Peabody website: http://www.peabodyenergy.com/content/427/australia-mining/new-south-wales/wilpinjong-mine/approvals-plans-and-reports-wilpinjong-mine in accordance with Condition 12(a), Schedule 5 of Development Consent (SSD-6764).

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1.0 STATEMENT OF COMPLIANCE

Table 2 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No*
SSD-6764	**No**
ML 1573	**No**
ML 1779	**Yes**
EL 6169 & 7091	**Yes**
EPL 12425	**No**
Water Licences	**Yes**
EPBC Approval 2015/7431	**Yes**

Notes:* Refer to **Table 3** and **Section 11** for details

Table 3 Non-Compliances

Relevant Approval	Condition	Condition Description	Compliance Status	Comment	Section in AR
	Con 19(a), Sch 3	Implement all reasonable and feasible measures to minimise the off-site odour, fume, spontaneous combustion and dust emissions.	Non-compliance	EPA issued warning letter on 8/2/2018 with regards to dust generation.	**Section 11**
	Con 31, Sch 3	The Applicant must implement the approved Water Management Plan for the development.	Non-compliance	Discrepancies between the approved SWMP, and its implementation on site.	
	Con 37, Sch 3	Within 6 months of the commencement of development develop suitable rehabilitation performance and completion criteria.	Non-compliance	Delays in government feedback/approval has led to timeframe not being met.	
	Con 61, Sch 3	Within 6 months of the commencement of development the Applicant must prepare a Rehabilitation Strategy.	Non-compliance	Delays in government feedback/approval has led to timeframe not being met.	
	Con 30(d)(iii), Sch 3	A plan to respond to any exceedances of the trigger levels and/or performance criteria (surface water)	Non-compliance	Notification to relevant government agencies not in accordance with TARP.	
	Con 30(d)(iv), Sch 3	A plan to respond to any exceedances of the trigger levels and/or performance criteria (groundwater)	Non-compliance	Notification to relevant government agencies not in accordance with TARP.	
EPL12425	O3.1	All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust.	Non-compliance	EPA issued warning letter on 8/2/2018 with regards to dust generation.	
	M2.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	Dust gauge damaged and replaced.	

Relevant Approval	Condition	Condition Description	Compliance Status	Comment	Section in AR
	M2.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	Unplanned power outage and equipment faults.	Section 11
	M2.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	General maintenance instrument failure/repair and power outages.	
	M2.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	General maintenance instrument failure/repair and power outages.	
	M2.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	General maintenance instrument failure/repair and power outages.	
	M4.2	The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns.	Non-compliance	General maintenance instrument failure/repair and power outages.	
ML1573	7	The leaseholder must provide an exploration report, within a period of twenty-eight days after each anniversary of the date.	Non-compliance	Submission delay was caused by the lengthy process associated with uploading the data	

Table 4 Compliance Status Key

Risk Level	Colour Code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-compliant	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	Non-compliant	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

2.0 INTRODUCTION

2.1 Mining Operations

The Wilpinjong Coal Mine (the Mine) is owned by Wilpinjong Coal Pty Limited (WCPL), a wholly owned subsidiary of Peabody Australia Pty Ltd (Peabody). The Mine is an existing open cut coal mining operation situated approximately 40 kilometres (km) north-east of Mudgee, near the Village of Wollar, within the Mid-Western Regional Local Government Area, in central New South Wales (NSW) (**Figure 1**). The mine produces thermal coal products which are transported by rail to domestic customers for use in electricity generation and to the Port of Newcastle for export. Open cut mining operations and associated mobile equipment movements are undertaken 24 hours per day, seven days per week.

WCPL and Peabody Pastoral Holdings Pty Ltd are a major landholder owning adjacent rural properties and land to the east and south-east of the mine. Land to the west of the mine is owned by adjacent mining companies, whilst the National Parks and Wildlife Service estate own significant land to the north and south-west of the Mine.

Private properties are located predominantly in and around the Wollar Village approximately 1.5 km to the east of the Mine and along Mogo Road to the north of the Mine.

The Mine originally operated under Project Approval (PA 05-0021) that was granted by the Minister for Planning under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 1 February 2006. On 24 April 2017, WCPL was granted Development Consent (SSD-6764) for the Wilpinjong Extension Project (WEP) that provides for the continued operation of the Mine at rates of up to 16 million tonnes per annum (Mtpa) of run-of-mine (ROM) out to 2033, and access to approximately 800 hectares (ha) of open cut extensions. Development Consent (SSD-6764) has superseded the Project Approval (Project Approval 05-0021)[1].

The approximate extent of the WEP approved open cut and contained infrastructure area at Wilpinjong Coal Mine is shown on **Figure 2**. Major components include open cut pits, an elevated waste rock emplacement in Pit 2, ROM pads/coal stockpiles, water management infrastructure, CHPP, product coal stockpiles and rail and other associated infrastructure areas. Open cut mining targeting the Ulan Coal Seam and Moolarben Coal Member (within ML1573 & ML1779) and the handling and processing of ROM coal at the CHPP is currently approved to operate 24 hours per day, seven days per week.

2.2 Mine Contact Details

Contact details for key personnel responsible for environmental management at the Mine are in **Table 5**.

Table 5 Mine Contact Details

Name	Position	Contact Details
Blair Jackson	General Manager	Email: bjackson@peabodyenergy.com
Kieren Bennetts	Environment & Community Manager	Email: kbennetts@peabodyenergy.com
Clark Potter	Senior Environmental Advisor	Email: cpotter@peabodyenergy.com

The street, postal address and contact telephone numbers for the Mine are as follows:

Street Address
1434 Ulan-Wollar Road
WOLLAR NSW 2850

Postal Address
Locked Bag 2005
MUDGEE NSW 2850

Phone Number
Ph:(02) 6370 2500

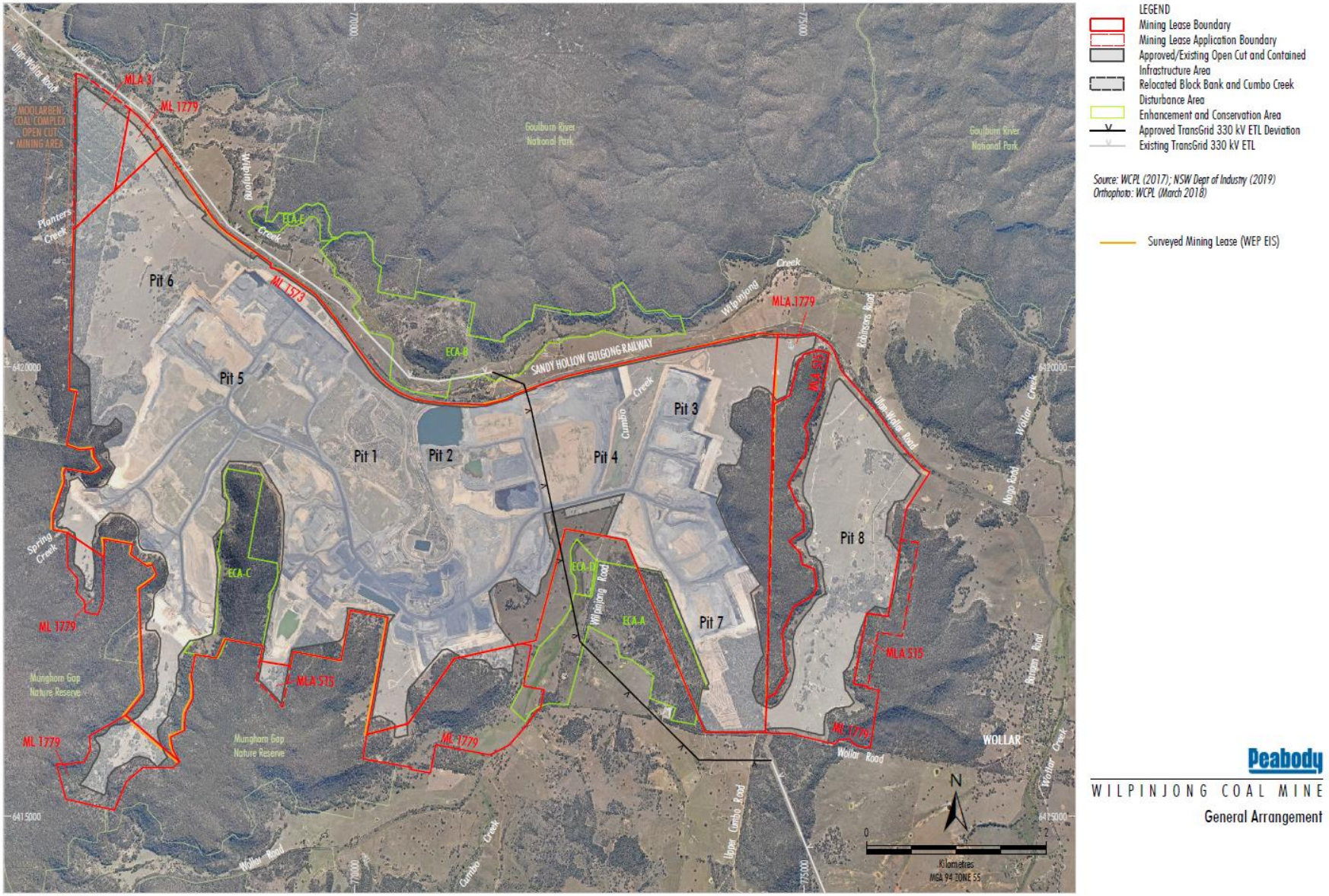
[1] Condition 9, Schedule 2 of SSD-6764 (Surrender of Existing Project Approval). WCPL have sought approval from the DP&E to extend the extension to time for surrendering PA05_0021 until 31 May 2019.

Figure 1 Locality Plan

Source: NSW Land & Property Information (2015); NSW Dept of Industry (2019); Geoscience Australia (2011)

Peabody
WILPINJONG COAL MINE
Regional Location

Figure 2 The Approved WEP Layout and Surrounds



3.0 APPROVALS

Table 6 presents the current approvals, leases and licences that the Mine operates under.

Table 6 Mine Approvals, Leases and Licences

Relevant Authority	Instrument	Approval/Licence No.	Expiry Date
DP&E	Development Consent	SSD-6764*	28 years from commencement of Project Approval (i.e. 2033)
DRG	Mining Lease	ML 1573	February 2027
	Mining Lease	ML 1779	20 December 2039
	Mining Lease Application	MLA 515	**Section 3.2**
	Mining Lease Application	(yet to be lodged)	(yet to be lodged)
	Exploration Licence	EL 6169	28/11/2017
	Exploration Licence	EL 7091	03/03/2019
	Mine within Wilpinjong B Notification Area	ML 1573	Endorsed DSC 19 February 2013 Approved 24 January 2014
	Mining Operations Plan (MOP)	MOP Approved on the 4th July 2017	30 June 2019
	Tailings Emplacement	Section 101 – TD1 and TD2 (approv. No. 07/1226)	February 2006 (Facility decommissioned)
	Tailings Emplacement	TD3 and TD4 (High Risk Activity Notification)	December 2011 (Facility decommissioned)
	Tailings Emplacement	TD5 (High Risk Activity Notification)	December 2013 (Facility decommissioned)
	Tailings Emplacement	Section 100 – TD6 (approv. No. 08/9006)	31 January 2016
	Tailings Emplacement	Section 101 - Decommission TD2 (approv. No. 09/2396)	29 April 2009 (Facility decommissioned)
	Tailings Emplacement	Section 101 - Decommission TD1 (approv. No. 09/2396)	28 October 2011 (Facility decommissioned)
	Environment Protection Licence (EPL)	EPL 12425	Until the licence is surrendered, suspended or revoked. The licence is subject to review every 3 years
EPA	NSW Radiation Control Act 1990 Registration	Licence Number 5061384	02 January 2020
	Explosives Licence	*NSW Explosives Act 2003* Part 3 Licence (Licence Number XSTR200024)	24 March 2018^
DPI-Water	Water Licences	Refer to **Table 22** & **Table 23** in Section 7.1	Refer to **Table 22** & **Table 23** in Section 7.1

Note: Copies of the Development Consent (SSD-6764), EPL 12425 and ML 1573 are available on the Peabody Energy website (http://www.peabodyenergy.com) * WCPL have sought approval from the DP&E to extend the extension to time for surrendering PA05_0021 until 31 May 2019. ^ Extension of the Explosive Licence sought by WCPL and revised expiry date from EPA to be provided next AR.

3.1 Ulan Road Strategy (Summary of Actions 2018)

The Ulan Road Strategy (the Strategy) defines the program for upgrading and maintenance of Ulan Road between Mudgee and the entrance to the underground surface facilities of Ulan Coal Complex over the next 21 years and was approved by NSW Planning and Environment on 25 May 2013. The operation of the Strategy relies upon the *Funding and Delivery of Ulan Road Upgrade and Maintenance* Deed (the Deed) made between the Mines and Mid-Western Regional Council (MWRC) (Appended, clause 19 extracted). Contributions to the Strategy by the Mines in accordance with the deed are mandatory under project approval consent conditions, as modified over the past 5 years. The Strategy also provides for the completion of *Noise Attenuation Works* at the 18 identified properties along Ulan Road.

Noise Attenuation Works

Noise attenuation works requires agreement with land holder on works to be completed using the *RMS Guidelines* as a guide to types of works and spend limit. Each of the 18 properties was inspected and a range of mitigation measure identified, these measures were then agreed upon in consultation with the property owner and an agreement signed between all parties prior to work commencing:

- 10 properties with works completed;
- 3 properties have agreements in place for works to be completed;
- 1 property with agreement in principle;
- 1 property where owners have declined mitigation works;
- 2 properties on review are actually outside the mitigation zone; and
- 1 property recently requested mitigation works - property to be assessed.

As per Condition 56, Schedule 3 of SSD-6764, WCPL wrote to the 3 remaining residents that had not elected to take up mitigation works under the Strategy. The following comments from those residents were;

- 1 resident is now seeking mitigation works;
- 1 resident still does not want any form of mitigation works; and
- 1 resident was confirmed to be outside the 50m mitigation zone.

Road Capital Upgrades

All associated works regarding the road capital upgrades for Ulan Road and Cope Road in line with the Strategy and managed by MWRC have been 100% completed, with the maintenance period now triggered in accordance with the Strategy.

3.2 Changes to Approvals

On 24 April 2017, WCPL was granted Development Consent (SSD-6764) for the Wilpinjong Extension Project (WEP) that provides for the continued operation of the Mine at rates of up to 16 million tonnes per annum (Mtpa) of run-of-mine (ROM) out to 2033, and access to approximately 800 hectares (ha) of open cut extensions. Development Consent (SSD-6764) has superseded the Project Approval (Project Approval 05 0021). WCPL have sought approval from the DP&E to extend the extension to time for surrendering PA05_0021 out to 31 May 2019. Development Consent SSD-6764 commenced on the 19 September 2017.

There was one variation to EPL 12425 during the review period. Licence variation notice 1556753 was issued on the 23 March 2018 in response to variation application lodged with the EPA during August 2017, to align with a number of consent condition requirements as a result of the WEP.

The Mining Operations Plan (MOP) was revised and resubmitted on the 18 December 2018 to the DRG and other relevant stakeholders. The amendment MOP, known as MOP Amendment A, sought minor amendments of the current approved MOP regarding revised locations of rehabilitation areas and mining areas to be completed in the MOP term and adjusted accordingly within mining and rehabilitation plans

MOP Plan 3A and MOP Plan 3B. Initial consultation with the DRG regarding this amendment was undertaken in October 2018. MOP Amendment A was approved on the 24 January 2019.

A new MOP will be developed and submitted for approval in early 2019 in regards to the recently issued ML1779. The new MOP proposes a two year period from 1 January 2019 to 31 December 2020. Until such time the new MOP is submitted and approved, WCPL will continue to operate in accordance with MOP Amendment A which expires on the 30 June 2019.

3.3 Mining Lease Application

The WEP will extended into three new Mining Lease Application (MLA) areas within both EL 6169 and EL 7091 (**Figure 2**). Two MLA's were lodged by WCPL including MLA510 and MLA515 with the DRG (within the NSW Department of Planning and Environment) for the WEP development areas outside of the existing ML1573, these application were made in 2015. On the 20 December 2018, MLA510 was granted approval and converted to ML1779. MLA515 is currently with the DRG for approval.

As discussed with the DRG during 2018, WCPL will amend the MOP and associated MOP Plans accordingly, subject to receiving official confirmation from the DRG when MLA515 is converted into a Mining Lease (ML). No mining activities will occur in an MLA area until a new ML is issued, the current MOP is amended and approved by the DRG and Wilpinjong's Colliery Holding Boundary is amended.

WCPL will also renew existing ELs and ML1573 as required during the life of the Mine.

3.4 Management Plans

WCPL operates an Environmental Management System to manage compliance and advance continual improvement across the Mine. During the review period several management plans were revised and updated accordingly and submitted for re-approval as required by SSD-6764. A summary of the status of management plans required by SSD-6764 is presented in **Table 7**.

Table 7 Status of Environmental Management Plans

Management Plan	Schedule 3 of SSD-6764	Approval Status
Noise Management Plan	Condition 5	Approved on 4 August 2017
Blast Management Plan^	Condition 14	Approved on 28 Sept 2018
Air Quality Management Plan^	Condition 20,	Approved on 8 Sept 2018
Water Management Plan^	Condition 30	Approved on 8 Sept 2018
Site Water Balance	Condition 30(d)(ii)	Approved on 4 August 2017
Surface Water Management Plan	Condition 30(d)(iii)	Approved on 4 August 2017
Groundwater Management Plan	Condition 30(d)(iv)	Approved on 4 August 2017
Biodiversity Management Plan	Condition 42	Approved on 4 August 2017
Aboriginal Cultural Heritage Management Plan	Condition 47	Approved on 4 August 2017
Spontaneous Combustion Management Plan	Condition 20(g)	Approved on 4 August 2017
Historic Heritage Management Plan	Condition 49	Approved on 4 August 2017
Rehabilitation Management Plan	Condition 64	Approved as the MOP
Environmental Management Strategy	Condition 1, Schedule 5	Approved on 4 August 2017

Notes: ^Revised and resubmitted for approval in June & September 2018

During the reporting period, WCPL was in consultation with the relevant agencies and stakeholders developing and progressing the following:

- The Wilpinjong Coal Mine Social Impact Management Plan (SIMP) as required by Condition 63, Schedule 3 of the Development Consent SSD-6764.
    - The SIMP was submitted for approval on the 14 September 2018. At the time of preparing the 2018 Annual Review, WCPL were still awaiting confirmation of approval.
- BVT performance and completion criteria as required by Condition 37, Schedule 3 of Development Consent SSD-6764.
    - WCPL submitted the Draft BVT Performance and Completion Criteria for the BVTs listed in Tables 8 and 9 of the Development Consent and Regent Honeyeater Habitat to OEH, DoEE for consultation on the 19 February 2018.
    - WCPL made amendments to its Proposed BVT Performance and Completion Criteria and provided this together with its response to each of the OEH comments to the DPE by letter dated 19 March 2018. At the time of preparing the 2018 Annual Review, WCPL were still awaiting confirmation of approval.
- The Rehabilitation Strategy as required by Condition 61, Condition 3 of the Development Consent SSD-6764. A Rehabilitation Strategy (March 2018) was prepared and submitted to the DPE for approval on the 19 March 2018.
    - At the time of preparing the 2018 Annual Review, WCPL were still awaiting confirmation of approval.

The status of the above plans, strategies and performance criteria will be provided in the next AR. In accordance with Schedule 5, Condition 5 of SSD-6764, WCPL will review and if necessary revise the strategies, plans and programs required under the consent within three months of the submission of this Report to relevant government regulators. In accordance with Schedule 5, Condition 12 of SSD-6764, relevant management plans have been made available to the public on the Peabody Energy website www.peabodyenergy.com

4.0 OPERATIONS SUMMARY

Table 8 displays the production summary for 2018 and the forecast production summary for 2019.

Table 8 Production Summary

Material	SSD-6764 Approved Limit	This Reporting Period (actual)	Next Reporting Period (forecast)
Waste Rock/Overburden	NA	39.30Mbcm	48.27Mbcm
ROM Coal	16 Mtpa	14.92Mt	15.26Mt
Coarse Reject & Tailings (TFP)*	NA	2.13Mt	2.11Mt
Fine Tailings	NA	0	0
Product Coal	NA#	12.478Mt#	12.88Mt#

Notes: *Tailings Filter Press[2], Million tonnes per annum = (Mtpa), Million bank cubic meters = (Mbcm). # Product coal railed.

4.1 Other Operational Conditions

At the end of the 2018 review period, open cut mining operations were located in Pit 1, Pit 2, Pit 3, Pit 4, Pit 5, Pit 6 and Pit 7 as identified in Plan 3B of MOP Amendment A (**Figure 2**).

In accordance with Condition 51, Schedule 3 of SSD-6764, WCPL maintains records of the amount of coal transported from the site each year, and the number of coal haulage train movements generated by the Mine on a daily basis.

12.478Mt of product coal was transported from the Mine via rail during the 2018 Annual Review period and involved an average of approximately four train movements per day during 2018 (**Appendix 1**).

Train loading is available on a continuous basis, 24 hours a day and 7 days per week, with a maximum of 10 laden coal trains leaving the site per 24 hour period and an average of six train movements per day when calculated over one calendar year (Condition 7, Schedule 2 of SSD-6764).

No overburden material was supplied (or requested) to regional infrastructure projects in the vicinity of the Mine.

Construction activities in the reporting period included relocation of the 330KV transmission line, minor alterations to existing administration buildings, relocation of demountable crib huts, extensions to the main car parking area and refinements to the water treatment facility.

4.2 Next Reporting Period

The proposed mining locations for the 2019 review period are Pit 1, Pit 2, Pit 3, Pit 4, Pit 5, Pit 6, Pit 7 and Pit 8. WCPL are in the process of preparing a new MOP to accommodate the recently issued ML1779 which allows open cut mining activities to proceed in Pit 8.

The revised indicative mining schedule and sequence of open cut mining operations will be provided in new MOP Plans 3A and 3B. Until the new MOP is submitted and approved in 2019, no mining activities will occur in Pit 8.

[2] In 2015 the Belt Press Filter (BPF) commenced at the CHPP. The BPF and associated transfer conveyor allows for co-disposal of tailings with coarse reject/overburden and improved recovery of water from tailings.

5.0 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Both the DP&E and DRG accepted and approved the 2017 Annual Review, subject to addressing a number of actions and comments. These actions and where they were addressed in the 2017 Annual Review are summarised in **Table 9**.

Table 9 Actions Required From Previous Annual Review

Action required from previous 2017 Annual Review	By Who	Action taken by WCPL
Review all graphs within the Annual Review to identify any errors in data reported and update graphs where required.	DP&E	Request for additional information and revisions to 2017 Annual Review Section 6.5 and Section 7.6 and sent to DP&E 18 June 2018.
Incorporate the IEA action update as provided by email to the DP&E.	DP&E	Request for additional information and revisions to 2017 Annual Review Section 10.1 and sent to DP&E 18 June 2018.
Provide a summary of commitments from the approved MOP.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and sent to DRG 18 June 2018.
Summarise the rehabilitation work that has been carried out for the reporting period.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and Section 8.2 sent to DRG 18 June 2018.
Discuss if the rehabilitation activities carried out during the reporting period meet the MOP schedule and provide justification for deviation from the MOP schedule.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and sent to DRG 18 June 2018.
Evaluate the progress of rehabilitation during the reporting period and provide comment as to whether work is on track to meet the MOP completion date.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and Section 8.1.2 and sent to DRG 18 June 2018.
Revise Section 8.2 of the Annual Review to discuss rehabilitation phases in terms of the domains identified in the MOP.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.2 and sent to DRG 18 June 2018.
Ensure the extent of work described in Section 8.2 is specific to rehabilitation phases and domains.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.2 and sent to DP&E 18 June 2018.
Identify whether any rehabilitation areas on site have received formal sign-off from the Department that the appropriate land use Objectives and Completion Criteria have been met.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and sent to DRG 18 June 2018.
Identify any variations in activities undertaken to those proposed in the MOP/ RMP, the reasons for those variations, whether or not the Department was notified, and any actions agreed with the Department to address these issues.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.1 and sent to DRG 18 June 2018.
Include a summary of rehabilitation activities proposed for the next report period.	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.1.2 and sent to DRG 18 June 2018.
Provide a photographic register of all rehabilitation work completed during the reporting period. Photos must include an appropriate reference (including location of photograph and current rehabilitation phase).	DRG	Request for additional information and revisions to 2017 Annual Review Section 8.2 and sent to DRG 18 June 2018.

6.0 ENVIRONMENTAL PERFORMANCE

Environmental management measures undertaken during the 2018 review period have been conducted as required by the MOP (as amended), relevant management plans and monitoring programs developed for the Mine in accordance with SSD-6764 and EPL12425. The 2018 Annual Review provides the results and assessment of environmental performance relevant to development consent approval SSD-6764. The locations of environmental monitoring undertaken throughout the 2018 review period are provided in **Appendix 3**.

6.1 Meteorological Monitoring

Local meteorological data for 2018 was recorded by the Mine's meteorological station and was operated in accordance with SSD-6764 and EPL 12425. The meteorological station monitors a number of parameters, including temperature, humidity, rainfall, wind speed and wind direction. The location of the meteorological station and associated tables and graphs are provided in **Appendix 3A**.

The month with the highest total rainfall recorded was 91.2mm in December 2018. The least amount of rainfall was recorded in July with 6.8mm for the month. The total cumulative annual rainfall recorded for the year was 487.8mm, well below the average long-term cumulative annual average rainfall (in the vicinity of the Mine) ranging from 587.7mm to 651.5mm (WEP EA) and well below the annual rainfall record of 531.4mm recorded in 2017. The total cumulative annual rainfall recorded for 2018 was also below the on-site weather station's average short-term (i.e. year 2006 to 2015) cumulative annual average rainfall of 649.7mm (WEP EA).

A maximum temperature of 40.1^{0}C (at 10m) was recorded in January 2018. The lowest minimum temperature was -4.8^{0}C (at 10m) recorded in May and July. The 2018 average minimum of 4.1^{0}C was slightly higher than the short term (i.e. year 2006 to 2015) average minimum of 3.0^{0}C. The 2018 average maximum of 30.6^{0}C was slightly lower than the short term average maximum of 31.7^{0}C.

Wind speed recorded during the 2018 review period showed an average monthly wind speed range between 1.3 metres per second (m/s) to 2.3m/s. A maximum wind speed of 31.6m/s was recorded in October 2018.

6.2 Air, Blast & Noise Monitoring

Air Quality Monitoring

The Mine has developed and implemented an Air Quality Management Plan (AQMP) (**Table 7**). Criteria for airborne particulate matter (i.e. dust) are specified in Condition 17, Schedule 3 of SSD-6764. During the 2018 review period, the Mine carried out dust monitoring in accordance with the AQMP at the locations in **Appendix 3B** and at the frequency displayed in **Table 10**.

Table 10 Summary of Air Quality Monitoring Program

Monitoring Parameter	Monitoring Locations	Frequency
Dust Deposition	DG4, DG5, DG8, DG10^, DG11 & DG15^	Monthly
	DG12#, DG13# and DG14#	Monthly (mining < 1 km of the site)
High-Volume Air Sampling	HV1, HV4 & HV5	Continuous six day cycle
TSP	HV3^	Continuous six day cycle
TEOM (PM10)	TEOM 1^, TEOM 3 & TEOM 4	Continuous (24 hour average)
TEOM (PM2.5)	TEOM 5	Continuous (24 hour average)*

Notes: ^ Data from DG10, DG15, HV3 and TEOM1 are not for compliance purposes but utilised for management purposes only. # Aboriginal rock art site monitoring Sites 72, 152 and 153.) * $TEOM_{2.5}$ installed and operating prior to 31/12/2017.

Table 12 contains the air quality monitoring results, as well as a discussion of the results for the review period. Further air quality monitoring results for 2018 review period are provided in **Appendix 3B**.

Spontaneous Combustion

The Mine has developed and implemented a Spontaneous Combustion Management Plan (SCMP) (**Table 7**) as Appendix 3 of the AQMP. WCPL completed the removal of the Keylah Dump in 2017. There were no reportable incidents as a result of spontaneous combustion in 2018, however seven unverified odour complaints was received during 2018 (**Section 9**). Follow up checks by WCPL in response to the odour complaints were unable to detect the presence or verify the odour.

An assessment of the spontaneous combustion performance indicators as required by the SCMP is provided in **Table 11**. Refer to **Section 6.7** for ambient air monitoring program. WCPL will continue to implement the SCMP in 2019.

Table 11 Assessment of Spontaneous Combustion Performance Indicators

Performance Indicator	2018 Target	2018 Performance
Number of verified complaints received relating to spontaneous combustion	0	0*
Number of incidents relating to spontaneous combustion	0	0
Number of times operations have been shut down as a result of complaints/incidents relating to spontaneous combustion	0	0

Notes: * Community complainant declined to speak with WCPL staff. WCPL investigated odour complaint and could not determine or verify the likely cause of the odour (refer to **Section 9.0** for further details).

Table 12 Air Quality Monitoring Environmental Performance

Approved Criteria [D]	WEP Predictions	Performance During the Reporting Period	Trend/Key Management Implications
Deposited Dust [C]			
4 g/m^2/month [E] (*at any residences on privately owned land)*	1.5g/m^2/month (for DG4, DG5, DG8, DG11 & DG15)	• Annual average dust deposition results for compliance purposes were below the approved criteria of 4 g/m^2/month at compliance monitoring sites: – DG4 (Ave: 3.2 g/m^2/month) – DG5 (Ave: 2.0 g/m^2/month) – DG8 (Ave: 1.7 g/m^2/month) – DG11 (Ave: 2.2 g/m^2/month) • The annual average dust deposition results at compliance sites for 2018 recorded several increases, compared to the annual average dust deposition results for 2017. • 2018 was another year of below average rainfall and several regional dust events were also noted (**Table 13**). • However, the 2018 dust levels were generally in agreement with the WEP model predictions for DG4, DG5, DG15, DG11 and DG8 (Todoroski, 2019) (**Appendix 3B**).	• Annual average dust deposition results for DG5 (2.0g/m^2/month) and DG15 (1.3g/m^2/month) are at locations nearest to private and mined owned land were below the approved criteria of 4 g/m^2/month (**Graph 1**) and in agreement with WEP model predictions (Todoroski, 2019) (**Appendix 3B**). • Other dust depositional results for management purposes were below the approved criteria, except dust gauges monitoring heritage sites within 1km of active mining (**Appendix 3B**). • Annual average dust deposition at compliance sites for the past seven years (**Graph 2**) indicate a slight increasing trend at DG4, DG5 and DG8 and a greater increasing trend DG11. DG11 is located north of the mine, adjacent to an unsealed section of the Ulan-Wollar Road, where agricultural activities are also undertaken. • 2018 was another year of below average rainfall and several regional dust events were also recorded, which have influenced the air quality results (**Table 13**).
PM_{10} (24hr Average Concentrations)			
50 µg/m^3 [AF]	15-30 µg/m^3 (for Village of Wollar)	• There were a number of results exceeding the maximum 24hour average PM_{10} approved criteria of 50 µg/m^3 during for the 2018 reporting period, the maximum recorded PM_{10} results for 2018 are as follows: – HV1 (Max: 168 µg/m^3) – HV4 (Max: 208 µg/m^3) – HV5 (Max: 167 µg/m^3) – TEOM 3 (Max: 143 µg/m^3) – TEOM 4 (Max: 157 µg/m^3) • **Table 13** shows the majority of the elevated PM_{10} levels were identified at the time, to be due to high regional dust levels associated with either a bushfire/ regional dust storm. Relevant government departments were also notified of these days. The PM_{10} analysis of the result for 2018 was undertaken by Todoroski Air Science (**Appendix 3B**). • Excluding these extraordinary events (**Table 13**), WCPL PM_{10} results for 2018 were below the PM_{10} approved criteria.	• The maximum 24hr average PM_{10} results at compliance sites HV1 (Wollar Village) and HV4 (Wollar Road) from 2007 – 2018 indicates a steady trend (**Graph 3** and **Graph 5**). • The maximum 24hr average PM_{10} results at compliance site HV5 (Araluen Road) indicates an increasing trend from 2007 - 2018 (**Graph 3** and **Graph 5**). • HV5 is located on mine owned land adjacent to Araluen Road which is unsealed and generates dust from local traffic. The increasing trend at HV5 is likely influenced by dust from Araluen Road during stable atmospheric conditions (i.e. inversions). • The 24-hour average PM_{10} concentrations for TEOMS 3 & 4 exceeded the criterion of 50µg/m^3 during a number of extraordinary events (**Graph 6, Graph 7** & **Table 13**), however the long-term trends indicate a slight increase from 2013-2018 (**Graph 7**). • The 24-hour average PM_{10} concentrations are in general agreement with the WEP model predictions when considering that the model predictions only relate to mine emissions, and no other dust (Todoroski, 2019) (**Appendix 3B**).

Approved Criteria [D]	WEP Predictions	Performance During the Reporting Period	Trend/Key Management Implications
PM_{10} (Annual Average Concentrations)			
30 µg/m³ [AE]	16-20 µg/m³ (for Wollar Road & Village of Wollar)	• Annual average PM_{10} results complied with the approved criteria of 30 µg/m3 during for the 2018 reporting period. The average recorded PM_{10} results for 2018 are as follows: – HV1 (Ave: 19 µg/m3) – HV4 (Ave: 23 µg/m3) – HV5 (Ave: 25 µg/m3) – TEOM 3 (Ave: 14 µg/m3) – TEOM 4 (Ave: 18 µg/m3) • **Table 13** shows the majority of the elevated PM_{10} levels were identified at the time, to be due to high regional dust levels associated with either a bushfire/ regional dust storm. Relevant government departments were also notified of these days. The PM_{10} analysis of the result for 2018 was undertaken by Todoroski Air Science (**Appendix 3B**).	• Annual average PM_{10} results in 2018 generally provided a good correlation between the WEP modelling results and the recorded levels at the air quality monitors. This is especially so when considering that the modelling is based on mining activity in Pit 8 to the east that did not occur in practice (and thus the modelling over predicts in that area), and also as the modelling does not have mining activity in the central southern areas that did occur in other areas (and thus slightly under predicts in those areas). The predicted levels in the Village of Wollar, which is relatively well removed form mining activity are consistent with the measured data (Todoroski, 2019) (**Appendix 3B**). • Annual average PM_{10} trends show periods of notably elevated levels in November and December 2018 due to regional dust events. The rolling long term annual averages show a steady to very gradual increases for TEOMS and HVAS (**Graphs 3, 5, 6** and **8**) (**Appendix 3B**).
$PM_{2.5}$ (24hr & Annual Average Concentrations)			
No criteria established	3-4 µg/m³ (for Village of Wollar)	• On the 27 December 2017, the new TEOM 5 ($PM_{2.5}$) was commissioned in the Wollar Village at approximately 5.00pm. • A review of the 2018 data indicates that the annual average $PM_{2.5}$ concentration was below the relevant NSW EPA criterion of 8µg/m³. • The maximum 24-hour average $PM_{2.5}$ concentrations exceeded the current NSW EPA criterion of 25µg/m³ on five occasions during 2018. • The maximum $PM_{2.5}$ levels occur during the summer months indicating that these levels are likely due to bushfires or regional dust events during the warmer periods (Todoroski, 2019) (**Appendix 3B**). • There are no specific $PM_{2.5}$ air quality impact assessment criteria in Development Consent SSD-6764. WCPL have adopted the National Environmental Protection Measures (NEPM) standard for $PM_{2.5}$ in the AQMP.	• The 2018 data from monitoring PM $_{2.5}$ in the Village of Wollar is recorded to establish if there is any correlation between activities under applicable prevailing meteorological conditions. The development of $PM_{2.5}$ trigger values will be forthcoming in consultation with WCPL's air quality specialist in the next AQMP review, due after the submission of this 2018 Annual Review. • The measured $PM_{2.5}$ levels are higher than the WEP modelled results by approximately 3 to 4µg/m³. The $PM_{2.5}$ monitor is located in the Village of Wollar and is influenced by non-modelled local $PM_{2.5}$ sources such as combustion engines, transport movements and various human activities. $PM_{2.5}$ levels across the region are also likely to have been influenced by bushfires or regional dust events which contribute to the measured levels and have not been accounted for in the modelling predictions. (Todoroski, 2019) (**Appendix 3B**).

Notes: g/m^2/month = grams per square metre per month. µg/m³ = micrograms per cubic metre. (A) Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources); (B) Incremental impact (i.e. incremental increase in concentrations due to the development on its own); (C) Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and (D) Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Director-General. (E) Annual Averaging Period. F) 24 Hour Averaging Period.

Table 13 Summary of Elevated 24-hour average PM_{10} Levels During 2018

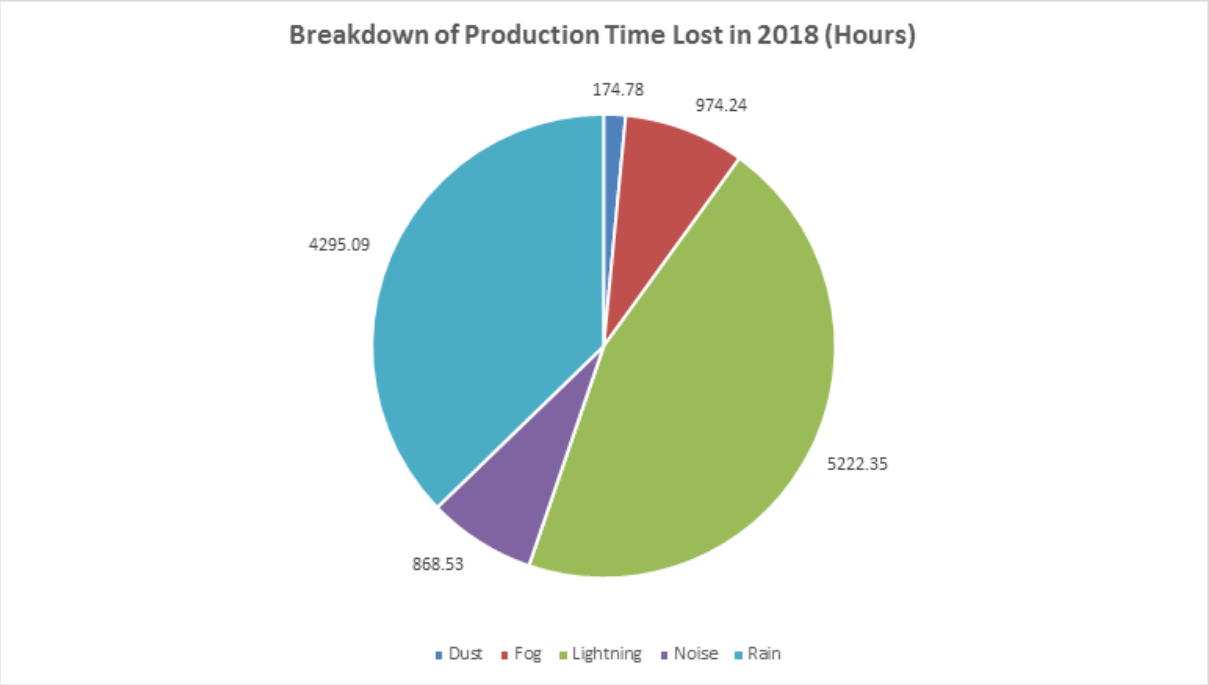
Date	Monitor(s) affected	Likely cause of elevated reading
19/3/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
20/3/18	HV5	Likely due to Regional dust event from previous day
11/4/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
15/4/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
29/5/18	TEOM 4	Notification by WCPL. Local dust from unsealed Araluen Road
18/7/18	HV1 & HV5	Regional dust event as identified by NSW OEH monitors (Bathurst, Wybong ,Merriwa)
24/7/18	HV5*	Potential contribution from WCM estimated as 32.3µg/m³
4/8/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
21/11/18	TEOM 3, TEOM 4, HV1, HV4 & HV5	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
22/11/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
23/11/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
14/12/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
15/12/18	TEOM 3, TEOM 4, HV1, HV4 & HV5	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
16/12/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event

Notes: WCM's estimated maximum contribution to the 24-hour average level recorded at the HV5 monitor was determined by the period in which it was downwind of WCM. The maximum contribution to the HV5 monitor is approximately 32.3µg/m³ or 63% of the 51.3µg/m³ recorded on the 24 July 2018 (Todoroski, 2019) (**Appendix 3B**).

Implemented/Proposed Management Actions (Air Quality)

- The Mine rehabilitated approximately 98.5ha of mine waste rock emplacement areas in 2018;
- The Mine is scheduled to complete approximately 121ha of mine waste rock rehabilitation in 2019.
- In 2018 complaints in response to dust were 13% of the overall complaints recorded (by WCPL during the 2018 reporting period. On review of the dates when each compliant was recorded, they do mostly coincide with a regional dust event as identified in **Table 13**.
- In consideration of the extraordinary dust events recorded in 2018 (**Table 13**), the effectiveness of the adopted control measures as described in the AQMP, WCPL were able to achieve compliance against the Air Quality Assessment Criteria Table 17, Schedule 3 of SSD-6764.
- In accordance SSD-6764, WCPL will review, and if necessary revise, the AQMP within three months of the submission of this Annual Review with reference to the development of $PM_{2.5}$ trigger values, as WCPL have now collected twelve months of data.
- All dust related complaints were responded to in accordance with the Complaints Management Procedure.
- During the review period the following control measures were implemented in accordance with the MOP and AQMP.
    - Mine managed in response to dust alarms from TEOMs;
    - Metrological condition assessed prior to blasting;
    - Active haul roads and traffic areas were watered on an appropriate basis using water carts; and
    - Water sprays were utilised on the ROM coal bins, and recently stripped areas as required.
- In 2018, approximately 174.78hrs of lost time hours associated with implementation of dust management strategies (**Figure 3**).

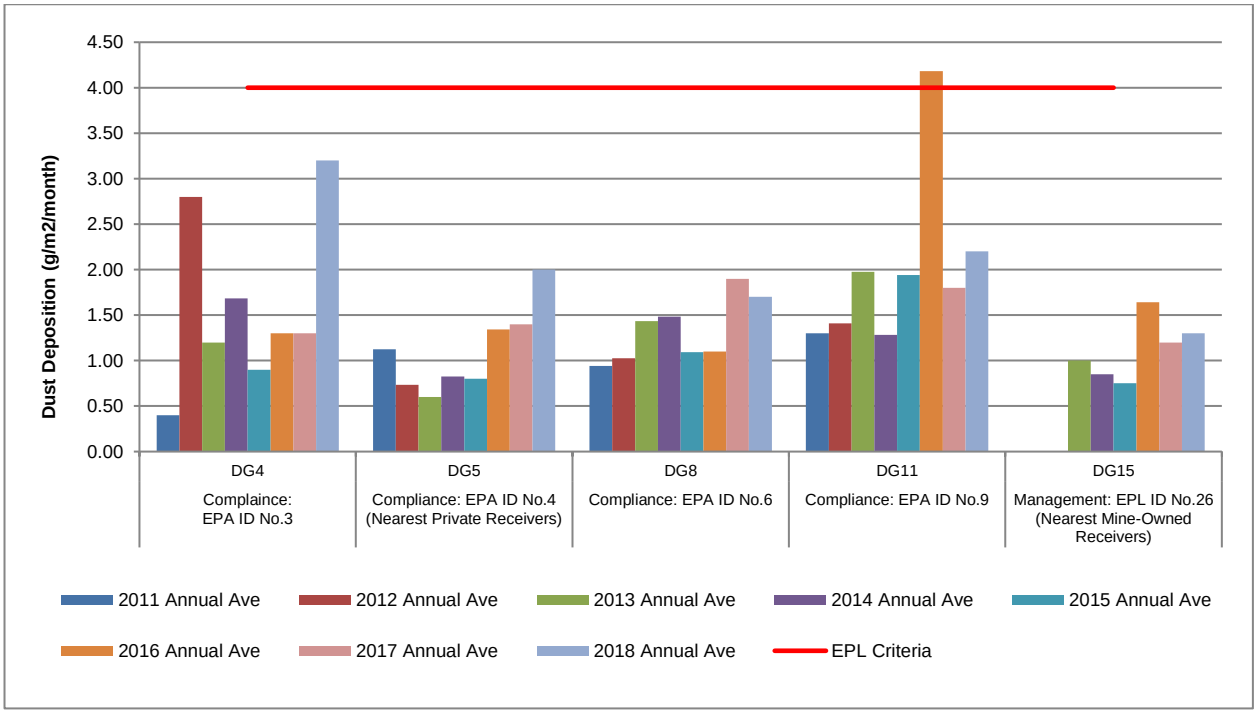
Figure 3 Breakdown of Lost Time Hours 2018 (Dust)



- During August 2018, an Independent Environmental Audit (IEA)[3] was conducted in accordance with SSD-6764. The IEA concluded the AQMP was adequately implemented and adequately addresses the requirements of SSD-6764 and EPL 12425 and compliant with all applicable conditions within Schedule 3 of SSD-6764 in relation to air quality management, with the exception of Condition 19a.
    - On the 8 February 2018, following an unannounced visit to site on 17 January 2018, the EPA identified excessive dust emissions from the mine as a result of activities being undertaken in Pit 7 and Pit 4.
    - The EPA considered the event to be a breach of the sites EPL Condition O3.1 and as a result issued the site with a formal warning. The IEA determined the EPA's formal warning letter a non-compliance of Schedule 3, Condition 19a of SSD-6764 (**Sections 1.0** and **11.2**).
- The IEA also concluded that the management measures in place at the time of the audit site inspection were reasonable and feasible in minimising off-site odour, spontaneous combustion and dust emissions.

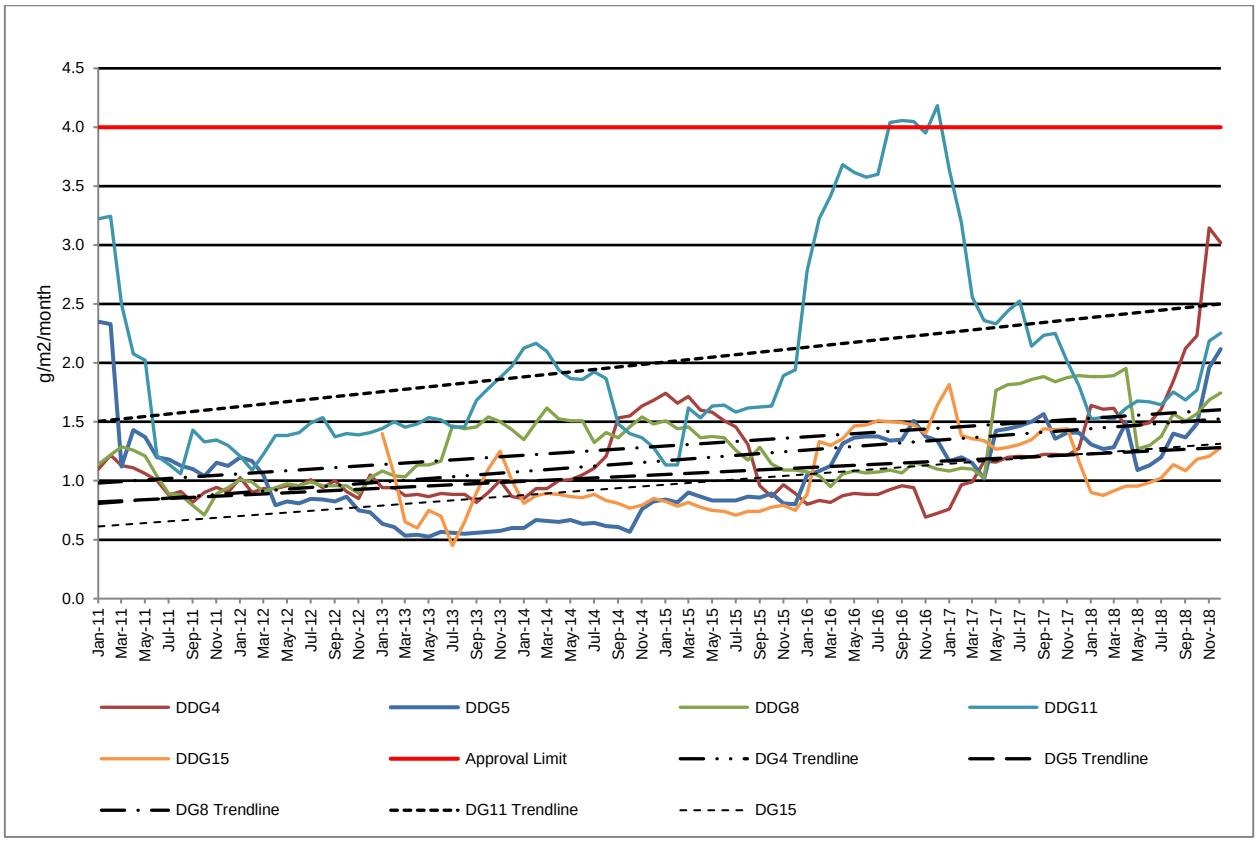
[3] AECOM Australia Pty Ltd (AECOM) was engaged by Wilpinjong Coal Pty Ltd (WCPL) to carry out an Independent Environmental Audit (IEA) in August 2018. For more information refer to **Section 10.1**.

Graph 1 Compliance Annual Average Dust Deposition Results 2011 – 2018

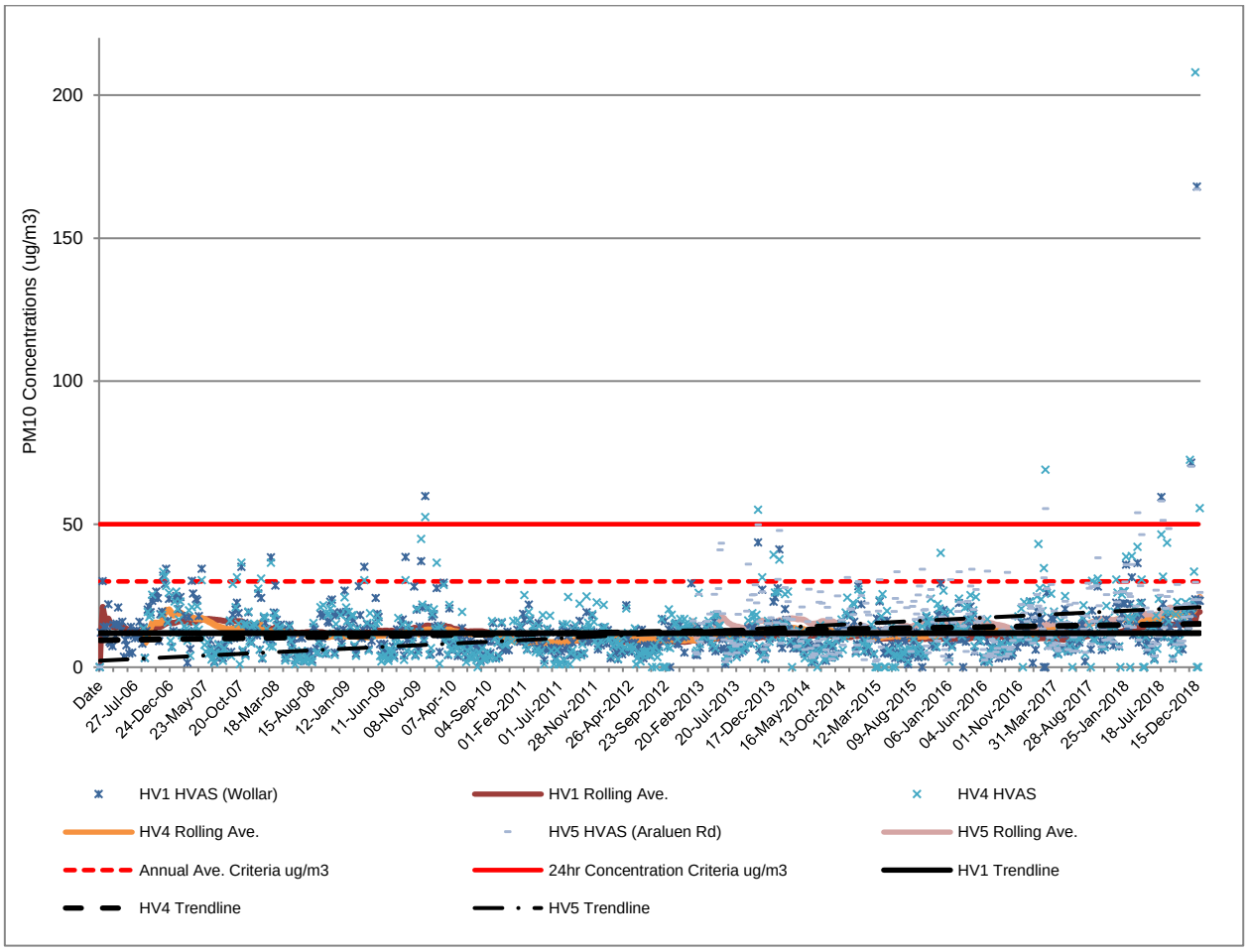


Notes: Based on the positioning of the compliance monitors at WCM, it can be assumed that the DDG8 monitor is sufficiently away from mining activity and is generally represented of background levels for the area. On this basis, the potential incremental contribution from WCM can be estimated as the level recorded at the compliance monitors minus the level at DDG8. The resulting incremental levels would below the relevant criterion of 2g/m²/month and indicate compliance with the criterion (Todoroski, 2019) (**Appendix 3B**).

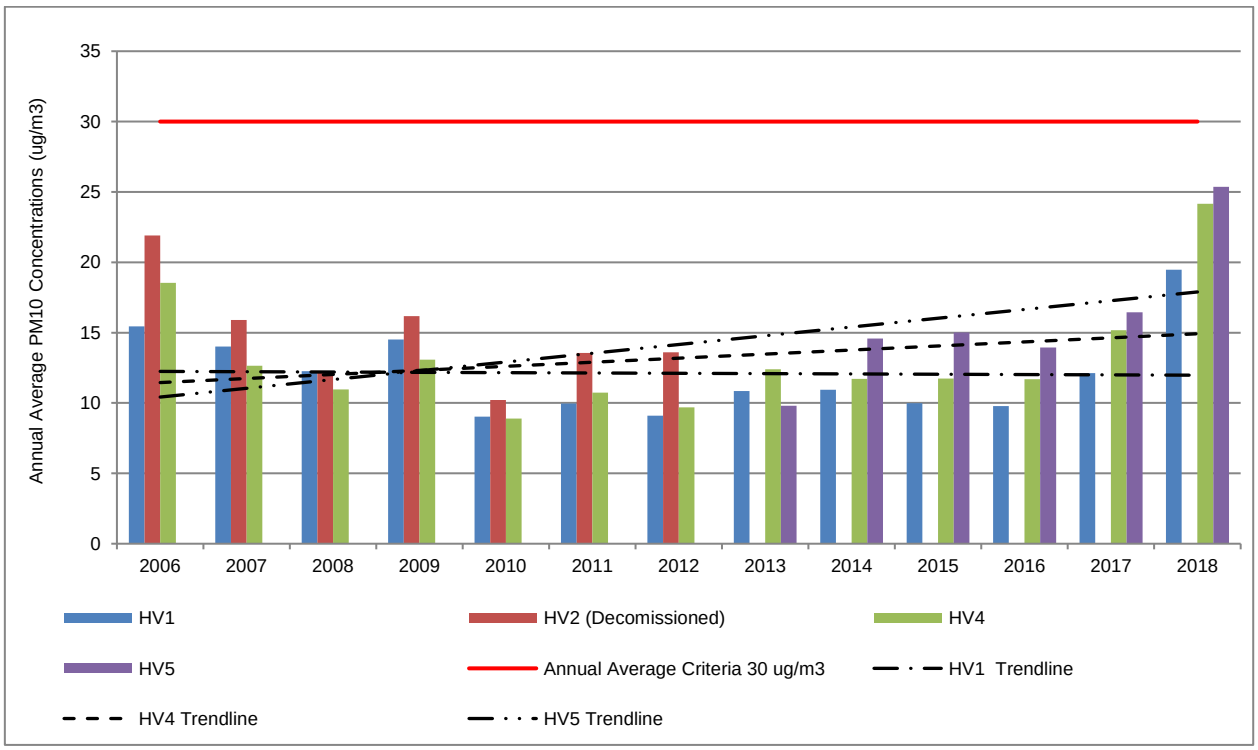
Graph 2 Compliance Dust Deposition Trends (Rolling Averages) 2011-2018



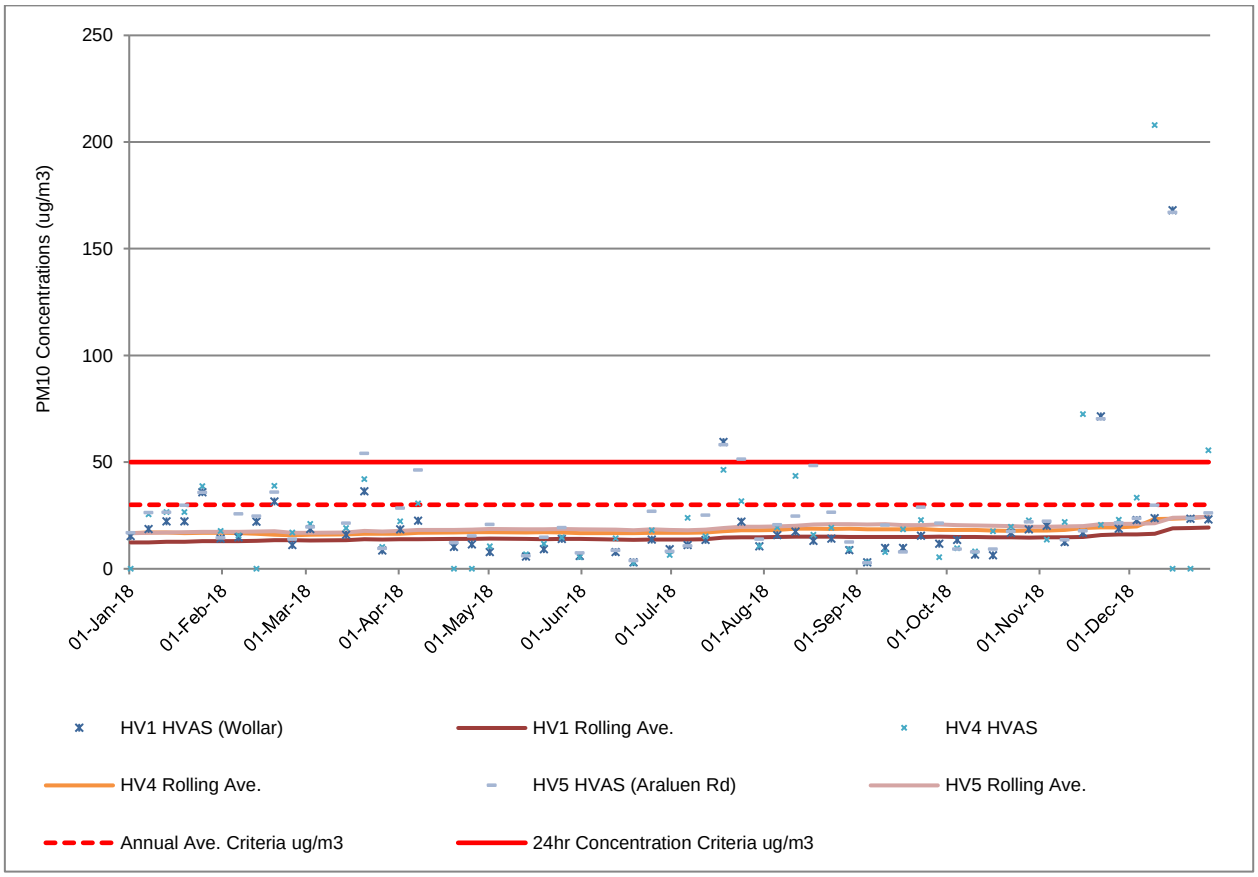
Graph 3 Compliance HVAS PM_{10} Results and Trends (Rolling Averages) 2006 - 2018



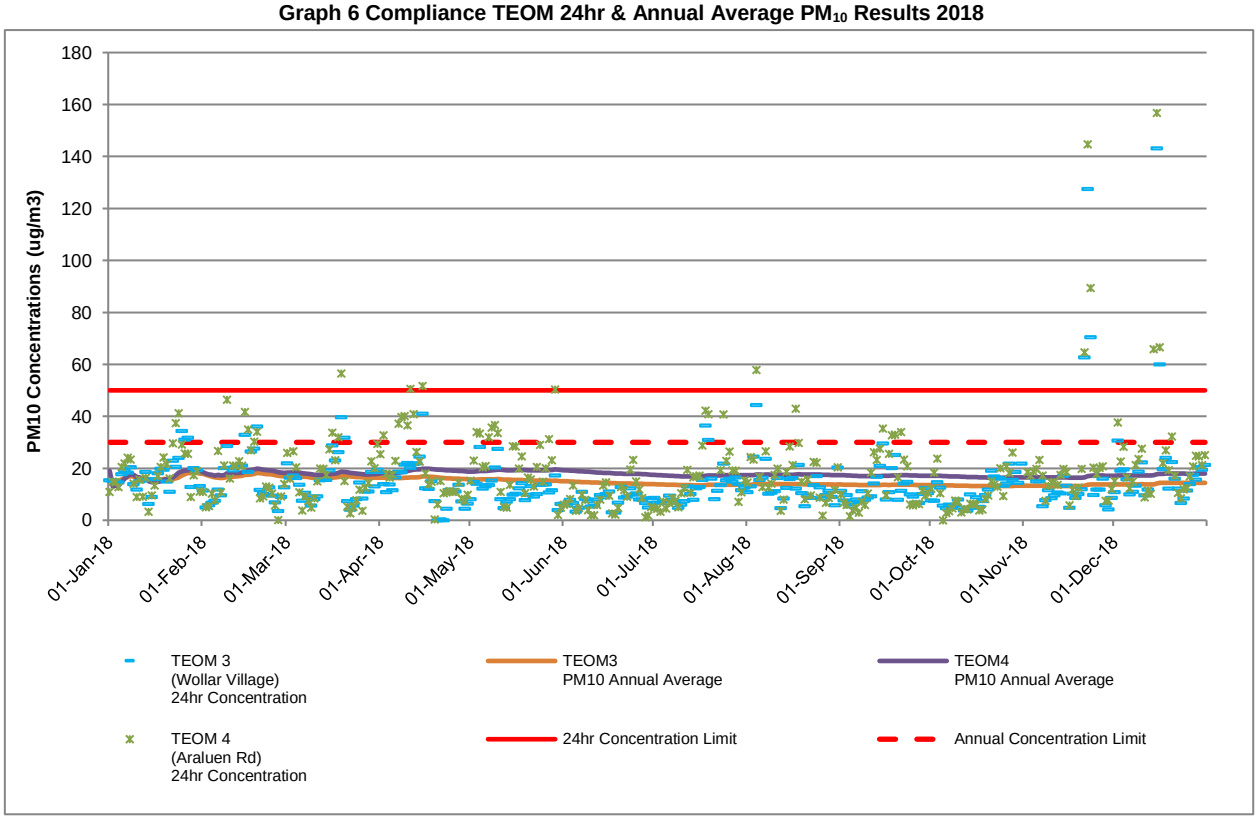
Graph 4 Compliance HVAS Annual Average PM_{10} Results and Trends 2006 – 2018



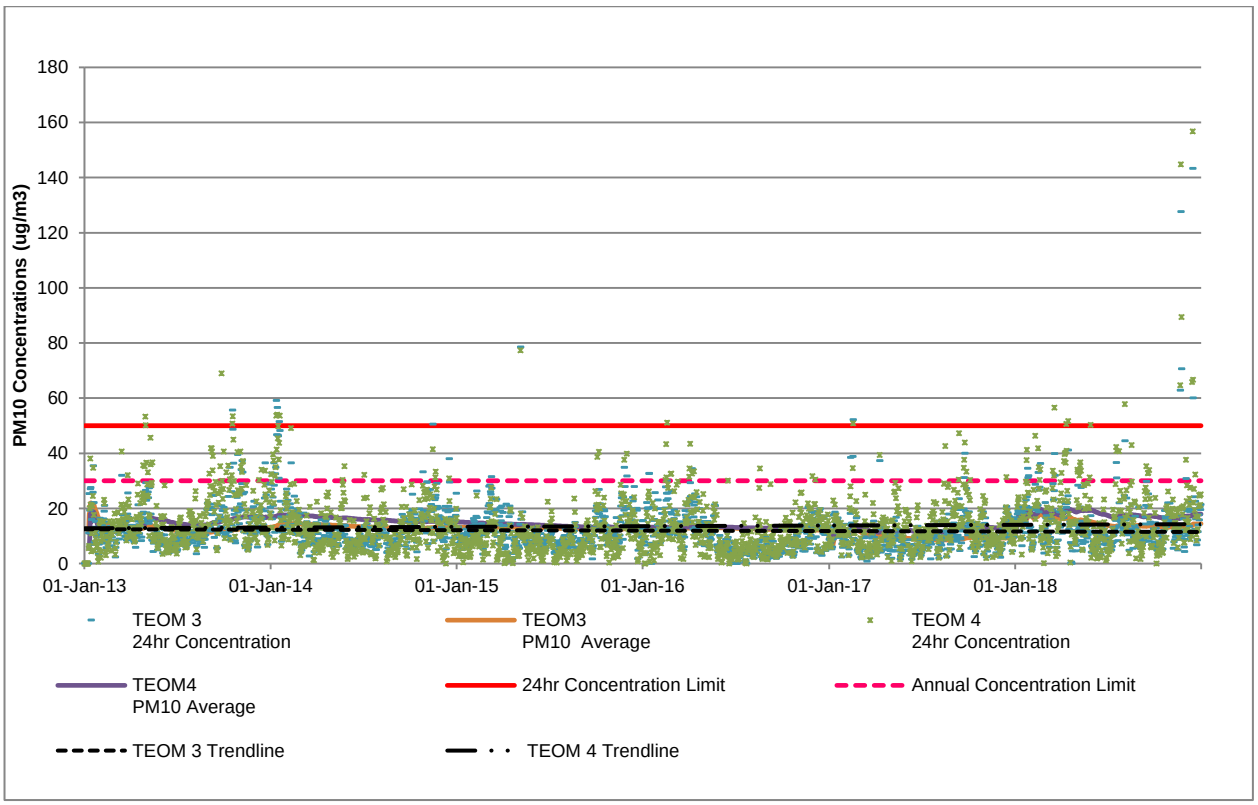
Graph 5 Compliance HVAS 24hr & Annual Average PM_{10} Results 2018



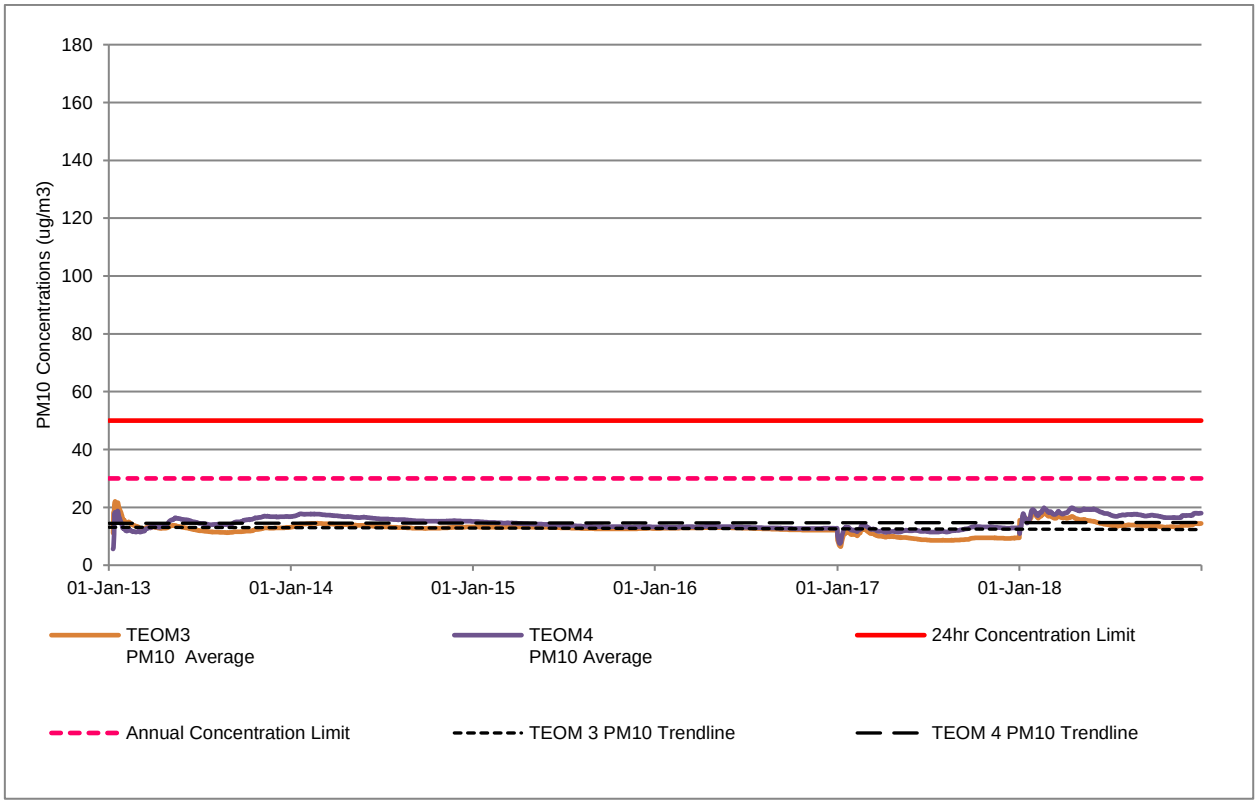
Graph 6 Compliance TEOM 24hr & Annual Average PM_{10} Results 2018



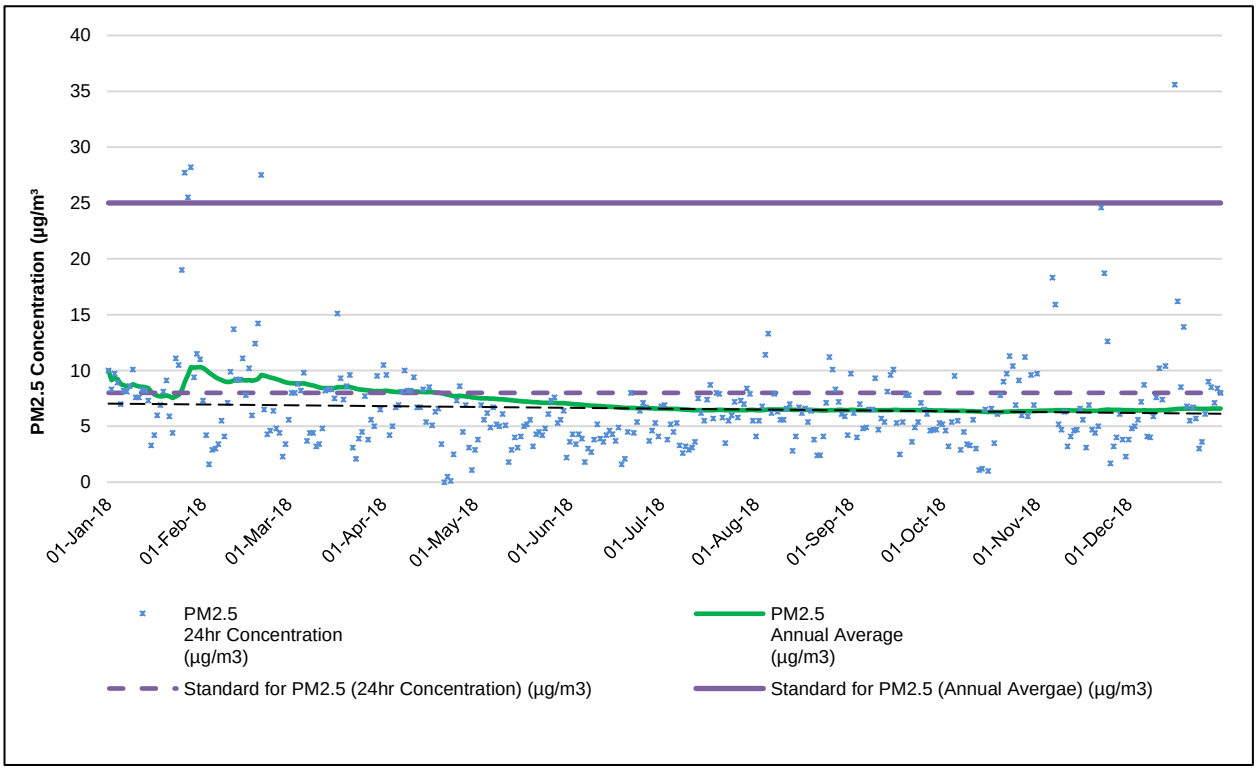
Graph 7 Compliance TEOM PM_{10} 24hr Results and Trends (Rolling Averages) 2013 - 2018



Graph 8 Compliance TEOM PM_{10} Rolling Averages 2013 - 2018



Graph 9 Compliance TEOM $PM_{2.5}$ 24hr Results and Trends (Rolling Averages) 2018



Blast Monitoring

The Mine has developed and implemented a Blast Management Plan (**Table 7**). Blasting vibration, overpressure limits, the time and frequency of blasting are specified in Conditions 7, 8 and 9, Schedule 3 of SSD-6764. During the 2018 review period, the Mine carried out vibration and overpressure monitoring in accordance with the Blast Management Plan (BMgtP) at the locations in **Appendix 3E** and at the frequency displayed in **Table 14**.

Table 14 Summary of the Blasting and Vibration Monitoring Program

Location	Type	Frequency
Wollar Public School	Airblast Overpressure and Ground Vibration	Every blast
Aboriginal rock art sites: 72, 152 & 153	Ground Vibration	Every blast within 1km of Aboriginal rock art sites.
Archaeological sites: WE7, WE10, WCP535, WE76 & WE77	Ground Vibration	Every blast within 1km of Aboriginal sites*
Historical Mine Adit	Ground Vibration	Every blast within Pit 8*
Railway Line/ Culvert	Ground Vibration	Every blast within 350m of railway culverts and 100m of railway lines
Ulan-Wollar Road	Ground Vibration	Every blast within 100m of the Ulan-Wollar Road
Transgrid Powerline Suspension Towers	Ground Vibration	Every blast within 100 of TransGrid powerline suspension towers*
Tailings Dam 3, 4, 5 or 6	Ground Vibration	Every blast within the DSC Approval area.

Notes: Shaded cells indicate added to the blast monitoring program as a result of SSD-6764 and revised Blast Management Plan accordingly. * During the reporting period monitoring was not required as the trigger for blast monitoring was not either within the range and/or relocation of the towers through the Mine had not occurred.

Table 15 Blast Monitoring Environmental Performance (Wollar School)

<table>
<tr><th colspan="4">Approved Criteria[3]</th><th>Performance During the Reporting Period</th><th>Trend/Key Management Implications</th></tr>
<tr><td>Location</td><td>Airblast[1] overpressure (dB(Lin Peak))</td><td>Ground[2] vibration (mm/s)</td><td>Allowable exceedance</td><td rowspan="3">Blast monitoring results for the reporting period complied (Graph 10) with the approved criteria of 115dB (<120dB) and 5mm/s (<10mm/s) at privately owned residences i.e. Wollar Public School:
Max: 116.7 dBL
Max: 2.86 mm/s
No blasts exceeded the 120dBL limit
One blast was greater than 115dBL limit or 0.4% of the allowable exceedence of 5%.
The one recorded overpressure greater than 115dBL of 116.7dBL was on the 18 August 2018.</td><td rowspan="3">All blast monitoring on privately owned land was undertaken in accordance with the Blast Management Plan in 2018;
There were 10 blasting related community complaints in 2018 compared to 6 complaints in 2017.
All blasting events during the review period occurred during the approved times of 9.00am to 5.00pm.
No blasting occurred on a Sunday or on a Public Holiday during the 2018 review period.
There was no more than two blasts per day (max. of 2 allowed) and an average of 4.8 blasts per week (max. of 5 per week allowed).
In accordance with Condition 13(c), Schedule 3 of PA05-0021 and Condition 12(d), Schedule 3 of SD6764, WCPL co-ordinated the timing of blasting with the adjoining Moolarben Coal Mine and Ulan Coal Mine to minimise the potential cumulative blasting impacts of the three mines.
There were a total of 252 blasts for the 2018 reporting period.</td></tr>
<tr><td rowspan="2">Residence on privately owned land</td><td>115</td><td>5</td><td>5% of the total number of blasts over a rolling period of 12 months</td></tr>
<tr><td>120</td><td>10</td><td>0%</td></tr>
<tr><td>All public infrastructure</td><td>-</td><td>50
(or a limit determined by the structural design methodology in AS 2187.2-006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)</td><td>0%</td></tr>
<tr><td colspan="4">Note: However, these criteria do not apply if the Applicant has a written agreement with the relevant owner to exceed these criteria, and has advised the Department in writing of the terms of this agreement.

Notes: 1) dB (Lin Peak) = decibel linear in peak 2) mm/s = millimetres per second 3) SSD-6764 Table 4 Blast Criteria</td></tr>
</table>

Table 16 Blast Monitoring Environmental Performance (Public Infrastructure)

Approved Criteria			Performance During the Reporting Period	Trend/Key Management Implications
Location	***Ground vibration (mm/s)***	***Allowable exceedance***	• Blast monitoring results for the reporting period complied with the approved criteria of 50mm/s at Tailings Dam 6 (TD6): – **Max:** 5.84 mm/s – **Ave:** 0.77 mm/s • Blast monitoring results for the reporting period complied with the approved criteria of 100mm/s at Main Rail Culvert (Pit 3): – **Max:** 33.04 mm/s – **Ave:** 1.68mm/s • Blast monitoring results for the reporting period complied with the approved criteria of 100mm/s at Main Rail Culvert (Pit 5): – **Max:** 61.25 mm/s – **Ave:** 2.54 mm/s • Blast monitoring results for the reporting period complied with the approved criteria of 200mm/s at Main Rail Line: – **Max:** 106.19 mm/s – **Ave:** 3.98 mm/s	• All blast monitoring of public infrastructure was undertaken in accordance with the Blast Management Plan; • No vibration results were above the ground vibration criteria as approved by the DSC of 50mm/s as monitored at TD6 in 2018; • No vibration results were above the ground vibration criteria as approved by ARTC of 100mm/s as monitored at Main Road Culverts (Pit 3 and Pit 4); • No vibration results were above the ground vibration criteria as approved by ARTC of 200mm/s as monitored at Main Rail Line; • The blast monitoring requirements were not triggered during reporting period for monitoring the following public infrastructure for: – Transgrid Powerline.
Tailings Dam[1]	*50*	*0%*		
Railway Lines[2]	*200*	-		
Railway Culverts[3]	*100*	-		
Public Road[4]	*200*	-		
Public Road[5]	*100*	-		
Transgrid Powerline[6]	*50*	-		

1) *Dam Safety Committee approved* ***2)*** *As agreed with ARTC when blasting within 100m* ***3)*** *As agreed with ARTC when blasting within 300m* ***4)*** *As agreed with MWRC when blasting within 100m* ***5)*** *As agreed with MWRC when blasting within 350m* ***6)*** *As agreed with Transgrid when blasting within 100m of a tower.*

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

Table 17 Blast Monitoring Environmental Performance (Heritage Sites)

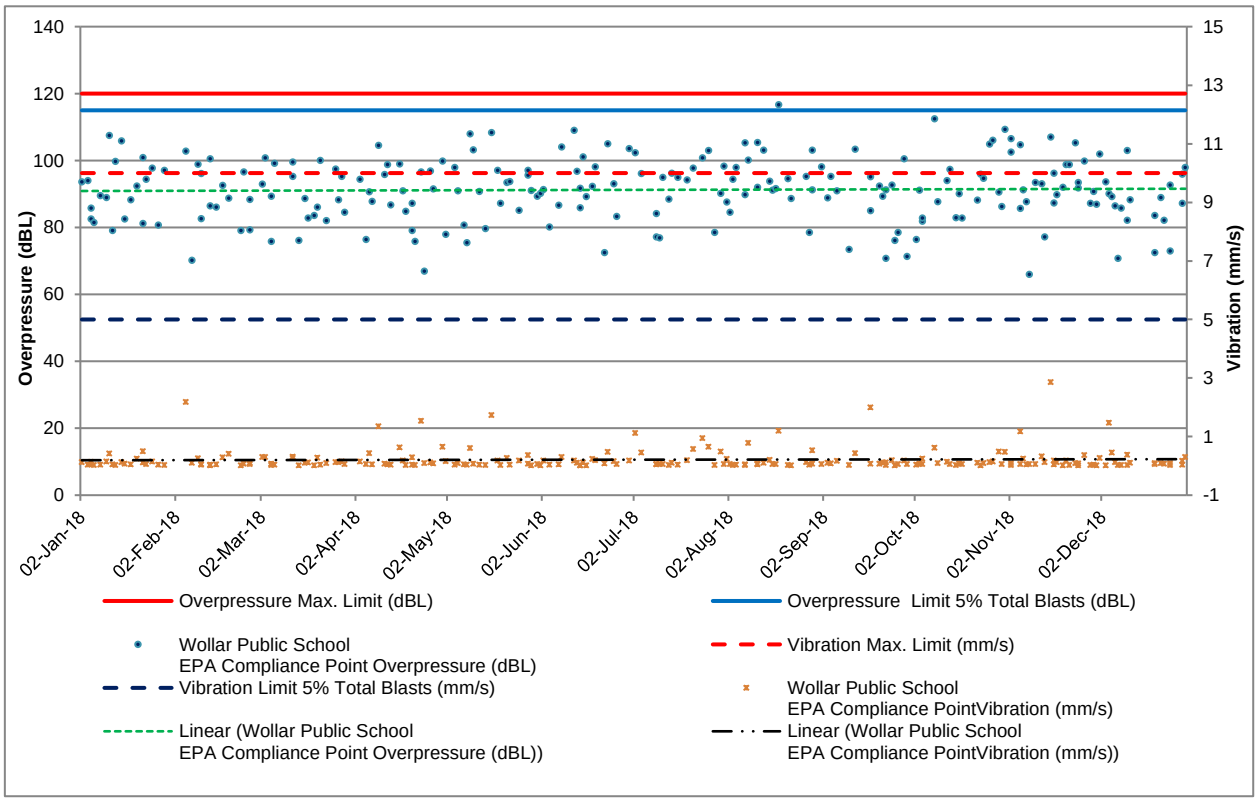
Approved Criteria			Performance During the Reporting Period	Trend/Key Management Implications
Location	***Ground vibration (mm/s)***		• Blast monitoring results for the reporting period complied with the approved criteria of 80mm/s at Archaeological Sites 72, 152, 153. WE7, WE10 & WCP535: – **(Site 72) Max:** 7.74 mm/s – **(Site 72) Ave:** 0.62 mm/s – **(Site 152) Max:** 9.56 mm/s – **(Site 152) Ave:** 0.96 mm/s – **(Site 152) Max:** 9.94 mm/s – **(Site 152) Ave:** 1.55 mm/s – **(Site WE7) Max:** 7.74 mm/s – **(Site WE7) Ave:** 0.62 mm/s – **(Site WE10) Max:** 9.56 mm/s – **(Site WE10) Ave:** 0.96 mm/s – **(Site WCP535) Max:** 9.94 mm/s – **(Site WCP535) Ave:** 1.55 mm/s	• All blast monitoring of Aboriginal Heritage Sites was undertaken in accordance with the Blast Management Plan in 2018; • All blast monitoring of Aboriginal Heritage Sites was undertaken in accordance with the Heritage Management Plan in 2018; • The blast monitoring requirements were not triggered during reporting period at the Historical Mine Adit as no blasting occurred within Pit 8 in 2018, as there were no mining activities undertaken; • No vibration results were above the performance criteria of damage criteria of 80mm/s and/or 250mm/s respectively for Archaeological Sites 72, 152, 153. WE7, WE10 & WCP535 in 2018; and • The blast monitoring requirements were not triggered during reporting period at sites WE76 and WE77 as no blasting occurred within 1km of these sites.
Archaeological Sites 72, 152 and 153 within ML	*Performance Indicator*	*80*[1]		
	Damage Criteria	*250*[1]		
Archaeological Sites WE7, WE10 & WCP535 in the Munghorn Gap Nature Reserve	*Performance Indicator*	*80*[2]		
	Damage Criteria	*250*[2]		
Archaeological Sites WE76 & WE77 in the Munghorn Gap Nature Reserve	*Performance Indicator*	*80*[2]		
	Damage Criteria	*250*[2]		
Mine Adit	-	*80*[3]		

1) *When blasting within 1 km* ***2)*** *Representative site when blasting within 1 km* ***3)*** *When blasting in Pit 8*

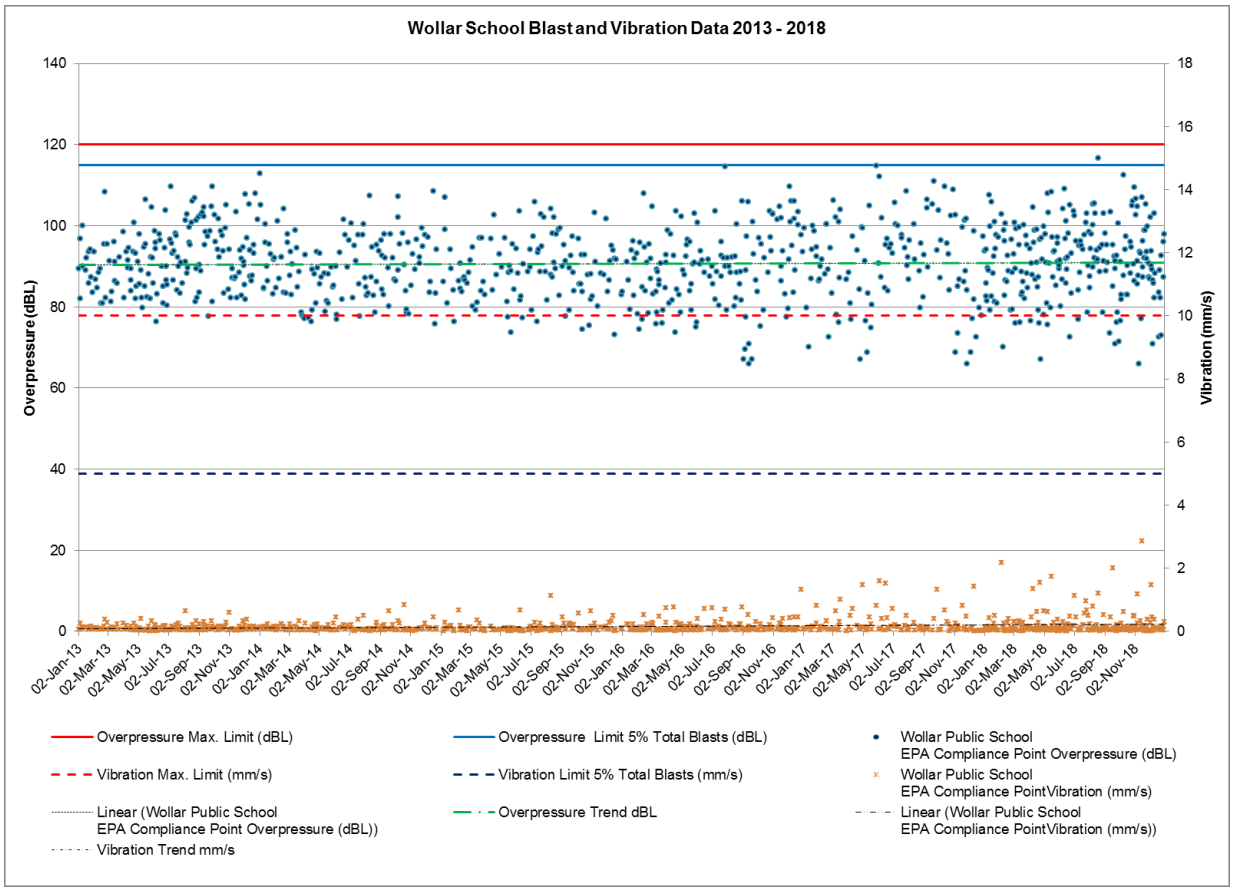
Implemented/Proposed Management Actions (Blasting)

- In accordance with Condition 5, Schedule 5 of SD-6764, WCPL will review, and if necessary revise, the Blast Management Plan within three months of the submission of this Annual Review.
- In accordance with the Blast Management Plan the control strategies were implemented at the Mine in order to minimise the potential for exceedances of the relevant blasting criteria.
- As discussed in **Section 9.0**, all blasting complaints were responded to in accordance with the Complaints Management Procedure.
- There was an increase in blasting related complaints in 2018 with a total of 11 complaints, as opposed to 4 complaints in the 2017 reporting period. However there has been an overall decrease in blast related complaints since 2012.
- WCPL has complied with the blasting requirements of SD-6764 and on this basis will continue to implement the Blast Management Plan and review blasting performance in next review period.
- Blast monitoring requirements were not triggered during the 2018 reporting period at the Historical Mine Adit as no blasting and/or mining activities occurred within Pit 8 in 2018.
- Blast monitoring of the Historical Mine Adit may be triggered, in accordance with the Blast Management Plan, due to scheduled mining activities to commence in Pit 8 during 2019.
- Updated notification process to include blast notice at Wollar Store.
- Installed video and vibration monitoring at the Shale Oil Mine Adit for the purposes of monitoring any potential blasting impacts upon the structural integrity of the adit and micro bat response to vibration.
- During August 2018, an Independent Environmental Audit (IEA) was conducted in accordance with SSD-6764.
- The IEA concluded the BMgtP was adequately implemented and adequately addresses the requirements of SSD-6764 and EPL 12425 and compliant with all applicable conditions within Schedule 3 of SSD-6764 in relation to blast management.

Graph 10 Blasting Monitoring Results for 2018 (Wollar School)



Graph 11 Blasting Monitoring Trends 2013 to 2018 (Wollar School)



Noise Monitoring

The Mine has developed and implemented a Noise Management Plan (NMP) (**Table 7**). During the 2018 review period a combination of attended and unattended noise monitoring was undertaken to assess the performance of the Mine against the Noise Criteria. Attended noise monitoring is used for determining compliance against the Noise Criteria whilst unattended or real-time monitoring is primarily utilised as a proactive noise control system; providing noise alerts when predetermined noise levels are triggered so mining operations can be modified to lower the noise impacts on receptors. A summary of the noise monitoring program is presented in **Table 18.** A summary of noise monitoring results is provided in **Table 19**. Further noise monitoring results for 2018 review period, including figures with noise monitoring locations are provided in **Appendix 3F.**

Table 18 Summary Noise Monitoring Program

Location	Monitoring Site	Parameter	Frequency
St Laurence O'Toole Church	N6	Attended Noise	Monthly
Coonaroo^	N13	Attended Noise	Monthly
Tichular	N14	Attended Noise	Monthly
Wollar Village	N15	Attended Noise	Monthly
Araluen Rd*	N16	Attended Noise	Monthly
Mogo Rd	N17	Attended Noise	Monthly
Barrigan Valley*	N18	Attended Noise	Monthly
Mogo Rd	N19	Attended Noise	Monthly
Ringwood Rd	N20	Attended Noise	Monthly
Wandoona	N21	Attended Noise	Monthly
WCPL Rail Loop	-	Meteorology & Inversion	Continuous
Wollar Village	-	Real-Time Noise - Fixed	Continuous
Araluen Rd*	-	Real-Time Noise - Fixed	Continuous
Mogo Rd	-	Real-Time Noise - Fixed	Continuous
Ringwood Rd	-	Real-Time Noise - Fixed	Continuous
Wandoona	-	Real-Time Noise - Mobile	Continuous

Notes: * Removed from the noise monitoring program as a result of SSD-6764 and the revised Noise Management Plan. ^ Owned by WCPL.

Table 19 Noise Monitoring Environmental Performance

Approved Criteria	Performance During the Reporting Period	Trend/Key Management Implications

Property ID & Location[1]	Day[2]	Evening[3]	Night[4]	
	LAeq (15 minute)	LAeq (15 minute)	LAeq (15 minute)	LA1 (1 minute)
102	36	36	38	45
Wollar Village – Residential[5]	36	37	37	45
All other privately owned land	35	35	35	45
901 – Wollar School	35 (internal) 45 (external) When in use			-
150A – St Luke's Anglican Church[6] **900 – St Laurence O'Toole Catholic Church[6]**	40 (internal) When in use			-

Notes: 1) To interpret the locations refer to **Table 18** and **Appendix 3F**. **2)** Day is defined as the period from 7 am to 6 pm Monday to Saturday and 8 am to 6 pm Sunday and Public Holidays. **3)** Evening is defined as the period 6 pm to 10 pm. **4)** Night is defined as the period from 10 pm to 7 am Monday to Saturday and 10 pm to 8 am Sunday and Public Holidays. **5)** Wollar Village EPL intrusive noise limits are currently day 36dBA, evening 35dBA and night 35dBA. **6)** Both Properties 150A and 900 are owned by WCPL. Both buildings have been deconsecrated and are no longer places of worship.

- Attended noise monitoring during 2018 was undertaken monthly during:
  - 11/12 January
  - 8/9 February
  - 27/28 March
  - 9 April
  - 7/8 May
  - 4/5 June
  - 11/12 July
  - 7/8 August
  - 20/21 September
  - 18/19 October
  - 5/6 November
  - 3/4 December
- Attended monitoring noise levels from WCPL complied with approved criteria and EPL noise limits at all sites during attended noise monitoring undertaken in 2018 (**Appendix 3F**).
- Low frequency assessments were carried out in accordance with the EPA 'Noise Policy for Industry' (NPfI). Low frequency modification factors, where applicable, did not result in any exceedances of WCP noise limits (**Appendix 3F**).

- All noise monitoring was undertaken in accordance with the Nose Management Plan in 2018;
- The frequency of attended monitoring was each monthly during the 2018 review period;
- Attended monitoring at these locations indicated that the mine complied with noise consent limits during the 2018 review period.
- It is noted that the approved criteria may not always be applicable due to meteorological conditions at the time of monitoring.
- In 2018 there was approximately 868.53 hours lost time (i.e. lost time only captured for dig implements such as dozers, excavators and loaders) as a direct result of modifying the operations to remain compliant with relevant noise criteria.
- Validation report of real time noise monitoring is now conducted monthly and provided in **Appendix 3F**.
- Attended noise trend analysis from 2013 to 2018 was undertaken by WCPL noise specialist. The results are provided in **Appendix 3F**.

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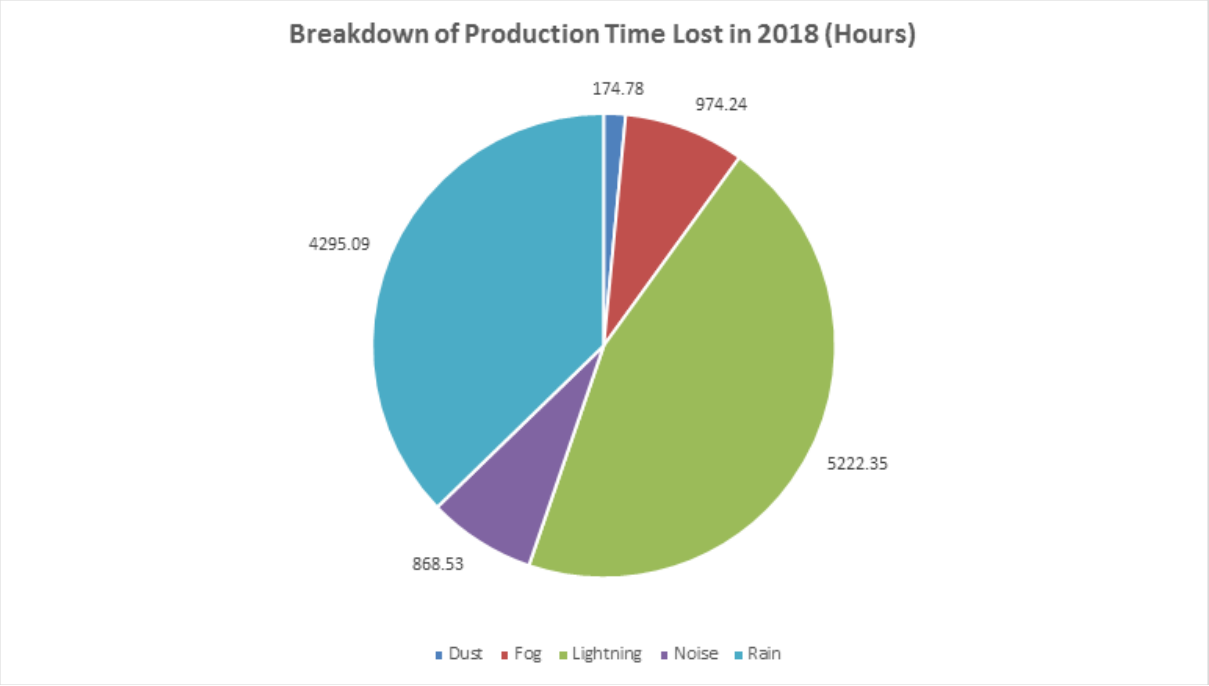
Implemented/Proposed Management Actions (Noise)

- In accordance with Condition 5, Schedule 5 of SD-6764, WCPL will review, and if necessary revise, the Noise Management Plan within three months of the submission of this Annual Review.
- Continue to implement the Noise Management Plan (NMP) in accordance Condition 5, Schedule 3 of SSD-6764.
- As discussed in **Section 9.0**, all noise complaints were responded to in accordance with the Complaints Management Procedure.
- There was a slight increase of noise complaints in 2018. A total of 28 noise complaints were recorded in 2018, as opposed to 22 complaints in 2017. The overall average number of noise complaints from 2016 to 2018 have remained consistent with an average of 24 complaints recorded each year.
- In 2018 there was approximately 868.53 hours lost time (i.e. lost time only captured for dig implements such as dozers, excavators and loaders) as a direct result of modifying the operations to remain compliant with relevant noise criteria (**Figure 4**).

Figure 4 Breakdown of Lost Time Hours 2018 (Noise)



- During August 2018, an Independent Environmental Audit (IEA) was conducted in accordance with SSD-6764.
- The 2018 IEA concluded the NMP was generally being implemented and adequately addresses the requirements of SSD-6764 and EPL 12425 and compliant with all applicable conditions within Schedule 3 of SSD-6764 in relation to noise management.

6.3 Heritage

The Mine has developed and implemented an Aboriginal Cultural Heritage Management Plan (ACHMP) (**Table 7**). Four Cultural Heritage meetings were undertaken in 2018 (inclusive of RAPCC) on March, June, September and December. Key heritage and environmental issues that were raised during consultation included summary of mining operations, exploration, the WEP, review of Aboriginal Cultural Heritage Management Plan, management of Aboriginal heritage including rock shelters and salvage works program.

During the 2018 review period, a number of archaeological surveys, due diligence surveys, surface salvage works and other programs and investigations were carried out, including but not limited to:

- WCPL prepared a Cultural Heritage Awareness Training package for staff who specifically come into direct contact with the RAP representatives and/or Aboriginal issues;
    - WCPL held a Cultural Heritage Awareness Training session 9th May 2018 for Wilpinjong Coal Senior Leadership Team members and other select members of Wilpinjong staff who specifically come into direct contact with the RAP representatives and/or Aboriginal issues.
- Castle Rock (WCP72) vegetation program;
- A re-assessment of the condition of rock art sites within the Munghorn Gap Nature Reserve; and
- A pilot study to test and evaluate a variety of dust and dung removal techniques to determine which is the most appropriate for application in 'Castle Rock';

WCPL are required to assess and report on the following performance indicators as described in the ACHMP:

- (Nil) Number of complaints received regarding Aboriginal cultural heritage management at the Mine;
- (Nil) Number of incidents or non-compliances recorded regarding Aboriginal cultural heritage at the Mine

In 2018 WCPL did not exceed the performance indictors as described in the ACHMP i.e. no complaints were received and no incidents or non-compliance occurred.

The Mine has developed and implemented a Historic Heritage Management Plan (HHMP) in accordance with Condition 49, Schedule 3 of SSD-6764, the HHMP includes a program and description of the measures/procedures that would be implemented for historic heritage management at the Wilpinjong Coal Mine.

In accordance with the HHMP, WCPL are to report on the performance of monitoring the Shale Oil Mine Adit in relation to blasting. In 2018, there was no blasting in Pit 8 therefore no monitoring of the Shale Oil Mine Adit was required under the Blast Management Plan.

In December 2017, WCPL resubmitted the HHMP with the Wilpinjong Coal Mine Archaeological Research Design (ARD) for the test and salvage excavation required at the potential caretaker's cottage site in Pit 8. DP&E approved this revised management plan in July 2018.

6.4 Biodiversity

A Biodiversity Management Plan (BMP) (**Table 7**) has been prepared and implemented for the Mine. The BMP outlines strategies for the management of flora and fauna, threatened species, rehabilitated areas, regeneration areas, biodiversity offset areas (BOA's) and the Enhancement and Conservation Areas (ECA's) (**Appendix 5**). A summary report on the Biodiversity Offset requirements and progress against the 3 year Management Schedule is provided in **Appendix 5**.

The Biodiversity Offset Strategy (**Appendix 5**) in the BMP comprises a package of BOA's that will be set aside for conservation and managed in perpetuity, and WCPL's rehabilitation strategy. In addition, the Biodiversity Offset Strategy includes a number of ECA's and residual Regeneration Areas associated with

the original Wilpinjong Coal Project that will strengthen the linkages between the rehabilitation areas and the Goulburn River National Park and Munghorn Gap Nature Reserve.

In addition, the Biodiversity Offset Strategy also includes on-site rehabilitation to establish the biometric vegetation types (BVTs) and fauna habitat as required in the Development Consent SSD-6764. It should be noted that BVT performance and completion criteria relevant to the rehabilitation areas are still being developed in accordance with Schedule 3, Condition 37 of the Development Consent SSD-6764. Upon resolution of the performance and completion criteria, in accordance with Condition 65 of the Development Consent SSD-6764, the BMP will be comprehensively updated as required to reflect the new criteria.

The 2018 Biodiversity Monitoring Program utilised the previously approved completion criteria and interim performance targets in the currently approved BMP (Version 4). WCPL are expected to finalise the BVT performance and completion criteria in consultation with OEH and DoEE and the revised rehabilitation strategy with the DP&E in 2019. Subject to approval from OEH, DoEE and DP&E, the BMP will comprehensively updated to reflect the new completion criteria and targets in 2019.

WCPL's Biodiversity Monitoring Program in the current BMP includes annual monitoring of flora and fauna, and a range of landscape function indicators. This monitoring program is used to evaluate ecosystem function and performance and the success of specific management actions implemented across the various Management Domains[4].

A summary of the 2018 flora and fauna monitoring results are provided below. A summary of the monitoring within rehabilitation areas is provided in **Section 8.2**. For the complete 2018 biodiversity monitoring reports, prepared by Ecological Australia (ELA) and Fly By Night Bat Surveys, refer to **Appendix 5**.

WCPL's Biodiversity Monitoring Program in 2018 consisted of:

- Vegetation (Biometric) monitoring – autumn and spring;
- Winter bird monitoring;
- Landscape function analysis (LFA) – spring;
- General fauna monitoring – spring and monitoring for microbats in BOAs; and
- Targeted microbat monitoring at the Shale Mine Adit.

Vegetation monitoring surveys occurred within all Management Domains and Reference sites during 2018. Four autumn sites and eight spring sites achieved the Interim Performance Target (IPT). The majority of sites' site value score improved in comparison to the 2017 results. Although no sites achieved all the site attribute scores, all sites achieved at least half the site attributes scores. This is an improvement from previous monitoring periods. 'Native overstorey cover', 'exotic cover' and 'number of trees with hollows' were consistently the highest performing site attributes, with all sites achieving these attribute targets.

Monitoring results from Reference Sites during both autumn and spring 2018 continue to add to the dataset to be used for comparison against vegetation monitoring results within the Management Domains. Ongoing monitoring data collected at the Reference Sites will be used to develop more relevant, locally based benchmark values against which future monitoring data would be analysed.

Landscape Organisation Index scores, developed through analysis of the LFA monitoring data, remain consistently high across the monitoring program, despite decreasing at most sites compared to 2017 results. Similarly, low levels of erosion observed throughout previous monitoring seasons (2007-2013) can be correlated with the high Soil Surface Assessment (SSA) Stability scores and the lack of any substantial erosion (as recorded in the erosion SSA assessment) recorded since 2015. This is consistent

[4] Mine closure or rehabilitation domains are identified in the WCPL's MOP.

with 2018 results, with only one failing to meet the Stability Completion Criteria. Overall these combined data sets demonstrate that consistently stable landforms occur across the Wilpinjong Coal Mine Domains.

Fauna monitoring undertaken in 2018 recorded 134 fauna species, including 106 birds, 13 reptiles, 11 mammals (including 10 positively identified microbat species) and four frogs. This is an overall increase compared to 2017 results, with bird and amphibian diversity increasing. Eleven species listed under the *NSW Biodiversity Conservation Act 2016 and/or the Commonwealth Environmental Protection and Biodiversity Act 1999* were recorded. *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat) remained the most commonly occurring microbat species, whilst the *Pachycephala rufiventris* (Rufous Whistler) was the most commonly occurring bird species.

Slate Gully Mine Adit Monitoring

Three separate surveys were completed in Autumn, Winter and Spring during 2018 of the disused oil shale mine adit in Slate Gully. Counts of bats exiting the adit were conducted from dusk on the evening of 4th and 5th April 2018, 6th June 2018 and the 22 November 2018.

The number of bats utilising the workings during the April survey was between 500 and 1000 individuals based on hand counts. Tallies of bats exiting the mine workings on the evening of 4th April with hand held counters were 640 and 705 individuals. These counts match well with equivalent counts obtained during the April 2017 survey (603 and 669). It was not possible to count all the bats exiting from one position so the true number of bats exiting would have been between 700 and 900 individuals. As with previous surveys, Eastern Bent-wing Bats made up the majority of total bats roosting within the workings during the April 2018 survey. 25 individuals captured had previously been banded during the surveys undertaken during 2017. The relatively low percentage of recaptured suggests that there is considerable movement of individuals to other roosts in the area. This pattern has been observed in the closely related Southern Bent-wing Bat (*Miniopterus orianae bassani*) which occurs in eastern South Australia and western Victoria (Van Harten et al 2018). From harp trap captures, the number of Eastern Horseshoe Bats roosting within the workings would number between ten and twenty individuals. This is consistent with previous surveys of the adit. While the majority of individuals captured were males, some females were also captured.

Counts of bats exiting the adit were conducted from dusk on the evening of 6th June 2018 using hand held counters. Following the counts a harp trap was placed at the adit mouth and bats re-entering the mine were captured from 6.20pm. Individuals of two species were captured, the Eastern Bent-wing Bat (*Miniopterus orianae oceanensis*) and Eastern Horseshoe Bat (*Rhinolophus megaphyllus*). Trapping of the adit was again undertaken from 4.00am until 6.00am on the morning of the 7th June. Bats were identified to species and sex and individuals that had not been banded on previous surveys had their forearm marked with a permanent marking pen. The adit was again harp trapped on the evening of the 7th June to obtain an estimate of the number of individuals roosting within the disused workings. The two species of predominantly cave roosting microbats previously recorded from the mine workings were again recorded during the current survey, the Eastern Bent-wing Bat (*Miniopterus orianae oceanensis*) and Eastern Horseshoe Bat (*Rhinolophus megaphyllus*). As expected, neither species were breeding at the time of survey.

Counts of bats exiting the adit were conducted from dusk on the evening of 22nd November 2018 using hand held counters. Only nine individuals were counted exiting the adit from dusk. From their flight pattern, most of the individuals exiting were Eastern Horseshoe Bats (*Rhinolophus megaphyllus*) although a couple of individuals of the Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*) also appeared to be present. Harp trapping of the adit was undertaken on the evening of 24th November from dusk until 9.30pm. Five bats were captured, two Eastern Bentwing-bats and three Eastern Horseshoe Bats. The two bentwing-bats captured were both pregnant females. In contrast with the survey undertaken in mid-December 2017, the Eastern Bentwing-bat was present. Both females captured were heavily pregnant. These females are most likely among the last of the females from the Slate Gully colony yet to migrate to their maternity roost. But it is also possible that the small number of pregnant females present in the workings originate from a different over-wintering roost. They may be using Slate Gully as a stopover en

route to their maternity site. No bent-wings were recorded during the summer survey undertaken slightly later in the year during 2017.

6.5 Waste Management

The Mine has developed and implemented a Waste Management Plan (**Table 7**) to ensure that waste at the Mine is minimised and effectively managed. The WMP was developed, but not limited to, address the relevant requirements of the SSD-6764, EPL 12425, identify waste streams, waste monitoring and tracking procedures and ensure the generation of waste is minimised and recycling of waste is maximised where practicable.

As required by Condition 58(f), Schedule 3 of SSD-6764, WCPL are required to report on waste management and minimisation (**Table 20** & **Graph 12**) in the 2018 Annual Review. During the reporting period approximately 84% of the total waste removed from the Mine was recycled. The percentage of waste recycled in 2018 was slightly higher than the 80.2% in 2017. **Appendix 3G** has the complete summary of waste statistics for the 2018 annual review period.

Approximately 144.74 tonnes of tyres were buried in Pit during 2018 i.e. 15 tyres in Pit 2 were buried on the 19/01/2018 and 36 tyres in Pit 7 were buried on the 16/9/2018.

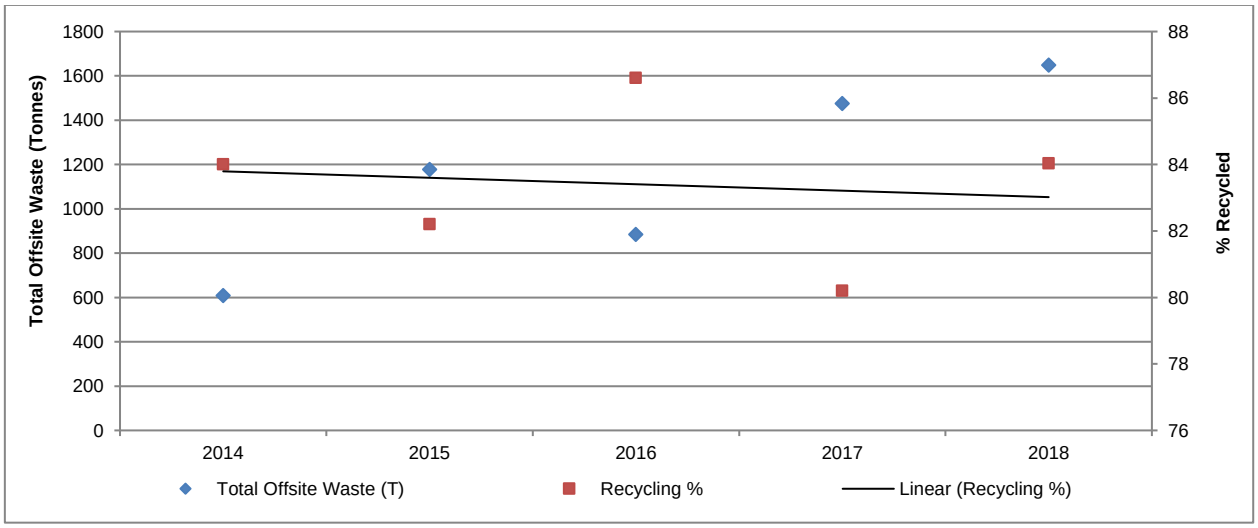
WCPL are permitted to dispose of building and demolition waste in-pit, in accordance with EPL 12425. In 2018 disposal of building and demolition waste was undertaken for several vacant farm houses within offset areas, including Offset Areas 1, Offset Areas 2 and Offset Areas 4. The building waste was buried in Pit 4 on the October/November 2018.

All asbestos encountered in Offset Area 2 and Pit 1 (Mittaville) was removed for offsite disposal by appropriately licensed contractors.

Table 20 Summary of Monthly Waste Statistics for 2018

Totals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Totals
Total Offsite Waste (T)	90.7	114.8	127.2	103.8	126.9	125.0	140.1	148.7	130.0	145.9	270.2	124.5	1647.7
Recycled Waste	72.5	79.1	110.0	76.0	108.0	105.6	116.9	122.8	111.6	131.6	241.7	108.6	1384.6
Recycling %	**79.9**	**68.9**	**86.5**	**73.3**	**85.1**	**84.5**	**83.4**	**82.6**	**85.9**	**90.3**	**89.5**	**87.2**	**84.0%**

Graph 12 Waste Statistics and Trends



6.6 Greenhouse Gas

Greenhouse gas management measures for the Mine are outlined in the AQMP. Diesel and electricity usage was recorded during the 2018 review period, which allows for the calculation of carbon dioxide (CO_2) equivalent emissions. The primary source (approximately 80%) of greenhouse gas emissions at the Mine is due to the release of carbon dioxide (CO_2) and methane (CH_4) during the combustion of diesel fuel during mining operations. Fugitive emissions of CH_4 and CO_2 from the coal seam as the coal is mined and CO_2 released during the use of explosives make up approximately 20% of greenhouse gas emissions at the Mine. Greenhouse gas emission (i.e. Scope 1 & Scope 2) estimates for the 2018 review period are presented in **Table 21**.

Table 21 Estimated Wilpinjong Coal Mine Greenhouse Gas Emissions

Year	ROM Coal (Mt)	Electricity Consumed (kWh)	Diesel Consumed (kL)	CO_2-e Electricity Usage (t)	CO_2-e Diesel Usage (t)	CO_2-e Fugitive Emissions (t)	Total CO_2-e Emissions (t)	Total CO_2-e Emissions (t) Predicted (MOD3)/(MOD5)
2012	14.48	26,328,000	30,202	23,432	80,673	651,633*	755,738	120,978
2013	14.9	32,730,368	39,444.3	29,130	105,360	6702.3**	141,193	120,978
2014	15.4	31,580,001	33,194	27,318	89,049	10,747	127,114	154,395^
2015	12.6	31,713,000	28,325	26,639	75,990	10,046	112,675	148,628^
2016	13.5	31,850,068	30,033	26,754	81,383	11,200	119,337	145,488^
2017	13.6	29,929,870	32,976	25,141	89,356	12,809	127,306	167,977[#]
2018	14.2	32,940,513	38,360	27,341	103,948	13,828	145,117	132,922***

Notes: kWh = kilowatt hours and kL = kilolitre. * A NSW default factor was used to calculate these values. ** The change in tonnes CO2e estimated for 2013 at Wilpinjong results from moving to Open Cut Emissions Method 2/3 (a measurement of seam gas contents, followed by model development and then emission calculation) in line with ACARP Methodology C20005, from NGER Open Cut Emissions Method 1 (default measurement factors for NSW * ROM tonnes).^ MOD5 predictions.[#] Scope 1 and 2 predicted emissions from the WEP for 2017 based on 15.5Mt ROM coal. ***Calculated as (2017 Total CO2-e Emissions/2017 ROM Coal) x 2018 ROM Coal

Greenhouse gas emissions from the Wilpinjong Coal Mine would continue to be monitored and reported annually in accordance with Peabody Energy's obligations under the *Commonwealth Government National Greenhouse and Energy Reporting System*. Peabody Energy and WCPL will also comply with any obligations under the *Commonwealth Clean Energy Act, 2011*.

6.7 Ambient Air Quality Monitoring

Condition 16, Schedule 3 of PA05-0021 and Condition 16, Schedule 3 of SSD-6764 requires WCPL to ensure that no offensive odours are emitted from the site, as defined under the *Protection of the Environment Operations Act, 1997*.

The 2018 ambient air monitoring program, monitors for the following pollutants that can be released during spontaneous combustion events, including Oxides of Nitrogen (NOx), Sulfur Dioxide (SO_2), Hydrogen Sulfide (H_2S), Benzene, Toluene and *p*-Xylene.

An air quality monitoring station was situated in the Village of Wollar to monitor for the above mentioned pollutants during the removal of Keylah Dump, as required by the SCMP and the Keylah Dump Removal Management Plan. The removal of Keylah Dump was completed during 2017. Therefore, this air quality monitoring station in the Village of Wollar specific for the dump removal, was no longer required and subsequently removed in May 2018. The results of the ambient air monitoring program from January to April 2018 are provided in **Appendix 3B**.

Spontaneous combustion propensity testing is scheduled for 2019 in Pit 6 and Pit 8 as suitable areas become available.

7.0 WATER MANAGEMENT

WCPL have prepared and implemented a Water Management Plan (WMP) (**Table 7**). Several key component management plans and programs that support the WMP include the Surface Water Monitoring Program (SWMP), the Groundwater Monitoring Program (GWMP) and Surface Water and Groundwater Response Plan (SGWRP).

7.1 Water Licences

Table 22 lists the water licences held by WCPL and provides a summary of performance for the 'water year' from 01 July 2017 to 30 June 2018. **Table 23** lists the converted water entitlement licenses to Water Access License (WAL) that occurred during October 2017.

Table 22 Water Take Licence

Licence Number	Description	Valid to	Entitlement (ML/annum)	Passive Take (ML/annum)	Active Pumping (ML/annum)	TOTAL (ML/annum)
Licences under the *Water Management Act, 2000* (Alluvial Aquifer)						
WAL 21499[1]	Alluvial Aquifer Licence	Current	474 units[2]	-	Nil	-
Licences under the *Water Act, 1912* (Porous Rock Aquifer)						
20BL173517	Pit 1 Licence	10 June 2020	2021	1009[6]	-	1009[6]
20BL173516	Pit 2 Licence	10 June 2020			-	
20BL173514	Pit 3 Licence	10 June 2020			-	
20BL173515	Pit 4 Licence	10 June 2020			-	
20BL173513	Pit 5 Licence	10 June 2020			-	
20BL173973	Pit 6 Licence	22 December 2021			-	
20BL170147	Dewatering	30 March 2021	770	-	Nil[5]	-
20BL170148	Dewatering	30 March 2021		-	Nil[5]	-
20BL170149	Dewatering	30 March 2021		-	Nil[5]	-
20BL170150	Dewatering	30 March 2021		-	Nil[5]	-
20BL170151	Dewatering	30 March 2021		-	Nil[5]	-
20BL170152	Dewatering	30 March 2021		-	Nil[5]	-
20BL170153	Dewatering	30 March 2021		-	Nil[5]	-
20BL170063	Water Supply Bore (GWs10)	18 December 2016[3]	110	-	Nil[5]	-
20BL170062	Water Supply Bore (GWs11)	18 December 2011[4]	110	-	Nil[5]	-
20BL170061	Water Supply Bore (GWs12)	18 December 2011[4]	110	-	Nil[5]	-
20BL170059	Water Supply Bore (GWs14)	18 December 2016[3]	110	-	Nil[5]	-
20BL170058	Water Supply Bore (GWs15)	18 December 2011[4]	110	-	Nil[5]	-

Source: HydroSimulations (2016) [1] Assigned to the Wollar Creek Water Source. [2] One unit is currently equivalent to 1.0 ML as per the *Available Water Determination Order for Various NSW Unregulated and Alluvial Water Sources (No. 1) 2013*.[3] Under the *Water Management Act 2000* and will convert as of 1 July 2016 in line with the commencement of the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*. [4] Renewal Application lodged with DPI-Water on the 25 June 2016. [5] Active pumping was not required as the mine was in water surplus during the review period (refer to Water Balance in **Section 7.7**). [6] WRM (2018) inferred groundwater extraction at 1009 ML/year and HydroSimulations (2015b) modelled inflow at 1033 ML/year for the 2016-17 water year fall below the 2,021 megalitres allowed in any 12-month period as required by this licence condition

Table 23 Summary of WAL Held by WCPL

WAL	AL #	Water Source	Category	Entitlement*	Holder	Work Approval	Expiry date
21499	20AL211215	Wollar Creek	Aquifer	474 Unit shares	Peabody Pastoral Holdings Pty Ltd/Wilpinjong Coal Pty Limited as 100/374 share	20CA211216	31/7/2022
19045	20AL209956	Upper Goulbourn	Unregulated	183 Unit shares	Peabody Pastoral Holdings Pty Ltd	20CA209957	12/11/2022
19055	20AL209954	Upper Goulbourn	Unregulated	50 Unit shares	Peabody Pastoral Holdings Pty Ltd	20CA209955	31/7/2022
19057	20AL209966	Upper Goulbourn	Unregulated	110 Unit shares	Peabody Pastoral Holdings Pty Ltd	20CA209967	7/2/2024
19058	20AL209974	Upper Goulbourn	Unregulated	168 Unit shares	Peabody Pastoral Holdings Pty Ltd	20CA209975	19/11/2022
19426	20AL210793	Wollar Creek	Unregulated	40 Unit shares	Peabody Pastoral Holdings Pty Ltd	20CA210794	31/7/2022
19423	20AL210790	Wollar Creek	Domestic & stock	2 Ml	Peabody Pastoral Holdings Pty Ltd	20WA210792	31/7/2022
19425	20AL210795	Wollar Creek	Domestic & stock	1 Ml	Peabody Pastoral Holdings Pty Ltd	20WA210796	31/7/2022
19430	20AL210798	Wollar Creek	Domestic & stock	5 Ml	Peabody Pastoral Holdings Pty Ltd	20WA210799	31/7/2022
36398	20AL212799	Wollar Creek	Domestic & stock	1 Ml	Peabody Pastoral Holdings Pty Ltd	20WA212768	30/7/2023
9476	N/A	Macquarie/ Cudgegong	Regulated (General Security)	790 Unit shares	Wilpinjong Coal Pty Limited	No nominated work	
41862	N/A	Sydney Basin - North Coast Groundwater	Aquifer	3121 Unit shares	Wilpinjong Coal Pty Limited	20MW065002	N/A

*Note: Water entitlement held under NSW Water Management Act, 2000 is granted in perpetuity. One unit is currently equivalent to 1.0 ML as per the *Available Water Determination Order for Various NSW Unregulated and Alluvial Water Sources (No. 1) 2013*

7.2 Estimated Groundwater Take

The water balance model for the 2017/2018 water year was revised and completed by WRM (**Appendix 3C**). Using OPSIM water balance model, estimated inflows of groundwater of 815ML/year was determined by WRM. HydroSimulations also confirmed modeled inflows of 980 ML/year for 2017/2018. For the 2017-2018 water year both models predict similar inflows with the previous model (HydroSimulations, 2013) predicting 1033.2 ML/a, and the current model (HydroSimulations, 2015) estimating 980 ML/a. These estimates are marginally greater than the 815 ML/a estimated by WRM for the 2017-2018 water year (WRM, 2019). Inflows predicted by both models and the independent water balance assessment (WRM, 2019) are all below the total hard-rock licence entitlement of 3,121 ML/a.

For the 2017-2018 water year the additional alluvial water loss, over and above what occurs naturally, is estimated to be about 0.21 ML/day from Wilpinjong Creek alluvium and about 0.14 ML/day from Cumbo Creek alluvium. This gives an alluvial groundwater take of about 127 ML/year/, which is below WCPL's entitlement of 374 ML/yr. For more information refer to **Appendix 3D**.

7.3 Water Licence Conditions

Appendix 3D contains a detailed review against licence conditions 2, 3, 4 and 8 for pit extraction for the period 1 July 2017 to 30 June 2019 (2017/18 Water Year), undertaken by Hydrosimulations. WCPL can demonstrate compliance against the relevant conditions, with actions to de developed in 2019 in regards to the groundwater trigger exceedances identified during 2018 (**Table 29** and **Appendix 3D**) . WCPL will consider the recommendations provided by HydroSimulations for improvements in the next reporting period in regards to licence Condition 6.3.6 (**Section 7.6**).

7.4 Water Management System

Water management activities were undertaken during the 2018 review period in accordance with the Mine's water management system outlined in the MOP and the WMP. In summary, water management for the Mine is based on the containment and re-use of mine water as well as the control of sediment laden water that may be potentially carried with runoff from disturbed areas. The mine water management system is shown in schematic form on **Appendix 3C**. The key components of the Mine's water management system include:

- Collection and re-use of surface runoff from disturbed areas;
- Capture and on-site containment of mine water, comprising groundwater inflows and incident rainfall-runoff to operational areas;
- Re-use of contained mine water for dust suppression over active surfaces (e.g. haul roads).
- Recycling of mine water associated with the CHPP and tailings disposal areas;
- Consumption of contained waters in the Mine water supply system;
- Management of treated sewage effluent in accordance with the OEH's *Environmental Guidelines for the Utilisation of Treated Effluent*;
- Standby-operation of an evaporative spray system on the eastern bank of Pit 2 (West); and
- Discharge of treated water via a water treatment facility to Wilpinjong Creek in accordance with EPL 12425.

7.5 Erosion and Sediment Control

An Erosion and Sediment Control Plan (ESCP) has been development (**Table 7**) for the Mine. During the 2018 review period water management structures were either implemented or maintained to to contain potentially sediment laden water from mining activities in Pit 3, Pit 4, Pit 5, Pit 6, Pit 7 within the Mine's water management system.

Other activities included routine removal of sediment from sumps, drains and sediment dams located in the Mining Infrastructure Area (MIA) and CHPP. There were no reportable incidents in relation to erosion and sediment control in the 2018 review period.

In 2018, WCPL were scheduled to construct a series of upslope clean water diversions i.e. separation of undisturbed and disturbed area runoff using upslope diversions, in accordance with the approved SWMP. Due to finalisation of their design, including specialist reviews, the construction of clean water diversion had not commenced. The 2018 IEA concluded that there are some discrepancies between the approved SWMP, and its implementation on site. In particular, relating to sediment basins and up-stream diversions that are depicted in the SWMP but have not been constructed to date.

As an outcome of the 2018 IEA, WCPL are committed to a review of the SWMP to include a detailed description of the assessment process for not adopting clean water diversions, based on further specialist reviews that can clearly identify when a clean water diversion is not adopted by WCPL , this decision can demonstrate the least net impact on the environment or presents the lowest longer term risk; and review of the Site Water Balance if diversions are not adopted to account for in each annual review of the site water balance and calculation of harvestable right.

WCPL are scheduled to continue revegetation of the visual bunds currently under construction along the northern boundary of the Mine. A section of the visual bund Pit 5N was hydromulched in 2018.

7.6 Surface Water

A summary of the surface water monitoring program is presented in **Table 24**. A summary of the surface water monitoring results assessed against each relevant water quality impact criteria from the SWMP is

provided in **Table 25**. Further water monitoring results for 2018 review period, including figures with surface water quality monitoring locations are provided in **Appendix 3C.**

Table 24 Surface Water Monitoring Program

Monitoring Locations		Frequency	Parameters[1]
Wilpinjong Creek	Licenced Discharge Point No. 24	Continuous (during discharge)	Volume of water discharged[6], EC and pH
		Weekly (during discharge)	Oil & Grease and TSS[7]
	WIL-U, WIL-U2, WIL-PC, WIL-NC, WIL-D and WIL-D2[2]	Monthly	Field pH and EC, turbidity[3], and SO_4
		Quarterly^	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	WILGSU and WILGSD (gauging stations)[2]	Continuous	Flow rate, pH, EC and temperature
		Monthly	Field pH and EC, turbidity[3], and SO_4
		Following significant rainfall events[4]	pH, EC, TDS, TSS and sulphate
	WC1, WC2, WC3, WC4, WC5, WC6, WC7, WC8[5]	Annually	Stream health monitoring
	Forty-nine survey points along Wilpinjong Creek[5]	Annually	Channel stability monitoring (photo-points, description, stability)
Cumbo Creek	CC1, CC2 and CC3[2]	Monthly	Field pH and EC, turbidity[3], and SO_4
		Quarterly^	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	CC3[2]	Following significant rainfall events[4]	pH, EC, TDS, TSS and sulphate
	CCGSU and CCGSD (gauging station)[2]	Continuous	Flow rate, pH, EC and temperature
		monthly	Field pH and EC, turbidity[3], and SO_4
		Following significant rainfall events[3]	pH, EC, TDS, TSS and sulphate
	CC1, CC2[5]	Annually	Stream health monitoring
	Nine survey points along Cumbo Creek[5]	Annually	Channel stability monitoring
Wollar Creek	WOL 1 and WOL 2[2]	Monthly	Field pH and EC, turbidity, and SO_4
		Quarterly^	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	WO1, WO2, WO3[5]	Annually	Stream health monitoring
Slate Gully Creek	SGC_1[2]	Monthly	Field pH and EC, turbidity, and SO_4
		Quarterly	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
		Following significant rainfall events[4]	pH, EC, TDS, TSS and sulphate

Notes: **1)** Parameters will be analysed provided water samples can be collected. **2)** Monitoring locations are illustrated on Figure 1. **3)** Turbidity indicates the potential downstream water quality effects caused by suspended solids. **4)** Greater than 20 millimetres (mm) in 24 hours. **5)** Monitoring locations are illustrated on Figure 21. **6)** Volume to monitored using flow meter and continuous logger. **7)** Grab samples. ^ Quarterly under PA05-0021 then monthly under SSD-6764. Shaded cells indicate added to the water monitoring program as a result of SSD-6764 and the revised Surface Water Management Plan.

Table 25 Surface Water Performance

Location		Approved Criteria*	Performance During the Reporting Period	Trend/Key Management Implications
Wilpinjong Creek Sites: • **WIL_NC** • **WIL_D** • **WIL_D2**	EC (µS/cm)	If recorded value at the monitoring site is greater than **3,440 µS/cm** for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded EC values <3,440 µS/cm for 3 consecutive readings at downstream sites **(Refer to Table 26 and Appendix 3C)**	**Assessment of Creeks with Criteria (WIL: NC, D, D2)** • Downstream EC values have declined since 2016 due to low EC discharges from the RO plant and low flow conditions. (**Appendix 3C**). • Downstream pH monitoring has been reasonably consistent from 2015 to 2017, although pH levels in 2018 recorded lower pH values on 2 consecutive occasions. • Turbidity observations at monitoring sites in the downstream area are consistent but variable during 2015 (10-1000 NTU), show a gradual decline during 2016 and 2017 (0.5-30 NTU), and an increase in turbidity during 2018, to levels more consistent with 2015 observations (1-500 NTU) (**Appendix 3C**). • No triggers of the surface water criteria for the period at surface water monitoring sites. **Assessment of Creeks with Criteria (CC1)** • EC observations ranged from <1000 µS/cm to 5000µS/cm during 2015 to mid-2017 before declining <1000µS/cm during 2018. • pH observations are consistently below the trigger level defined in the SWMP around pH 7. They are also generally lower than pH observations from Cumbo Creek Upstream monitoring sites. While these observations constitute an exceedance of the pH trigger level, all observations are within the pH 6.5-8 range defined in the ANZECC (2000) guidelines and do not pose a threat to the health of the system (**Appendix 3C**).. • With respect to the 80th percentile baseline data trigger value, turbidity observations at Cumbo Creek Downstream monitoring sites were elevated for 2015, low during 2016, corresponding with a period of above average rainfall, and again elevated during 2017 and 2018 (**Appendix 3C**).. **Assessment of Creeks with Gauging Stations** • The trend analysis on flow from WILGSU, WILGSD, CCGSU, RO discharge and rainfall, confirm the relationship between stream flow, rainfall and discharge. With rainfall during the period declining consistently, climate rather than mining is the primary cause low flow conditions (**Appendix 3C**).
	Turbidity (NTU)	If recorded value at the monitoring site is greater than **24** NTU for 3 consecutive readings at Wilpinjong Creek Downstream Sites	WIL(D) and WIL(D2) did not exceeded the applicable water quality impact assessment criteria recorded NTU values > 24NTU for 3 consecutive readings at downstream sites **(Refer to Table 26 and Appendix 3C)**	
	pH (lower)	If recorded value at the monitoring site is less than **6.9** pH for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded pH values <6.9 pH for 3 consecutive readings at downstream sites **(Refer to Table 26 and Appendix 3C)**	
	pH (upper)	If recorded value at the monitoring site is greater than **7.7** pH for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded pH values > 7.7 pH for 3 consecutive readings at downstream sites **(Refer to Table 26 and Appendix 3C)**	
Cumbo Creek (Downstream) Site: • **CC1**	EC (µS/cm)	If recorded value at the monitoring site is greater than **7,510 µS/cm** for 3 consecutive readings at Cumbo Creek Downstream Sites	CC1 did not recorded EC values > 7,510 µS/cm for 3 consecutive readings **(Refer to Table 26 and Appendix 3C)**	
	EC (µS/cm)	If recorded value at the monitoring site is greater than **7,510 µS/cm** for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded EC values <7,510µS/cm for 3 consecutive readings **(Refer to Table 26 and Appendix 3C)**	
	Turbidity (NTU)	If recorded value at the monitoring site is greater than **77** NTU for 3 consecutive readings at Cumbo Creek Downstream Sites	CC1 exceeded the applicable water quality impact assessment criteria recorded NTU values > 77NTU for 3 consecutive readings **(Refer to Table 26 and Appendix 3C)**	
	pH (lower)	If recorded value at the monitoring site is less than **7.5** pH for 3 consecutive readings at Cumbo Creek Downstream Sites	CC1 exceeded the applicable water quality impact assessment criteria recorded pH values <7.5 pH for 3 consecutive readings **(Refer to Table 26 and Appendix 3C)**	
	pH (upper)	If recorded value at the monitoring site is greater than **8.2** pH for 3 consecutive readings at Cumbo Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded pH values > 8.2 pH for 3 consecutive readings **(Refer to Table 26 and Appendix 3C)**	

Note: * Trigger is only considered to have been exceeded if the recorded value at monitoring site is greater than (or less than for lower pH Trigger) all values from the upstream monitoring sites sampled on the same day. In the event that a single result is recorded above/below the 80th/20th percentile value, WCPL will undertake a preliminary investigation to ascertain whether the result was caused by an obvious anomaly or whether further testing is required.

Implemented/Proposed Management Actions (Water)

- WCPL will continue to implement the approved Water Management Plan and component plans of the Water Management Plan in accordance with Condition 30, Schedule 3 of SSD-6764.
- In accordance with Condition 5, Schedule 5 of SD-6764, WCPL will review, and if necessary revise, the Water Management Plan within three months of the submission of this Annual Review, with reference:
    - As an outcome of the 2018 IEA, WCPL are committed to a review of the SWMP to include a detailed description of the assessment process for not adopting clean water diversions, based on further specialist reviews that can clearly identify when a clean water diversion is not adopted by WCPL , this decision can demonstrate the least net impact on the environment or presents the lowest longer term risk; and review of the Site Water Balance if diversions are not adopted to account for in each annual review of the site water balance and calculation of harvestable right.
- Implementation of the Surface Water Management Measures (Section of the SWMP) to comply with the water management performance measures (**Appendix 3C**) in Table 6 of the Development Consent SSD-6764.
- Completion of DPI-Water Recommendations (**Section 7.10**).
- Develop interim triggers in 2018 for concentrations of Mo, Se and As for inclusion of the next revision of the SWMP i.e. WCPL will review, and if necessary revise, the SWMP within three months of the submission of this Annual Review.

Implemented/Proposed Management Actions (Groundwater)

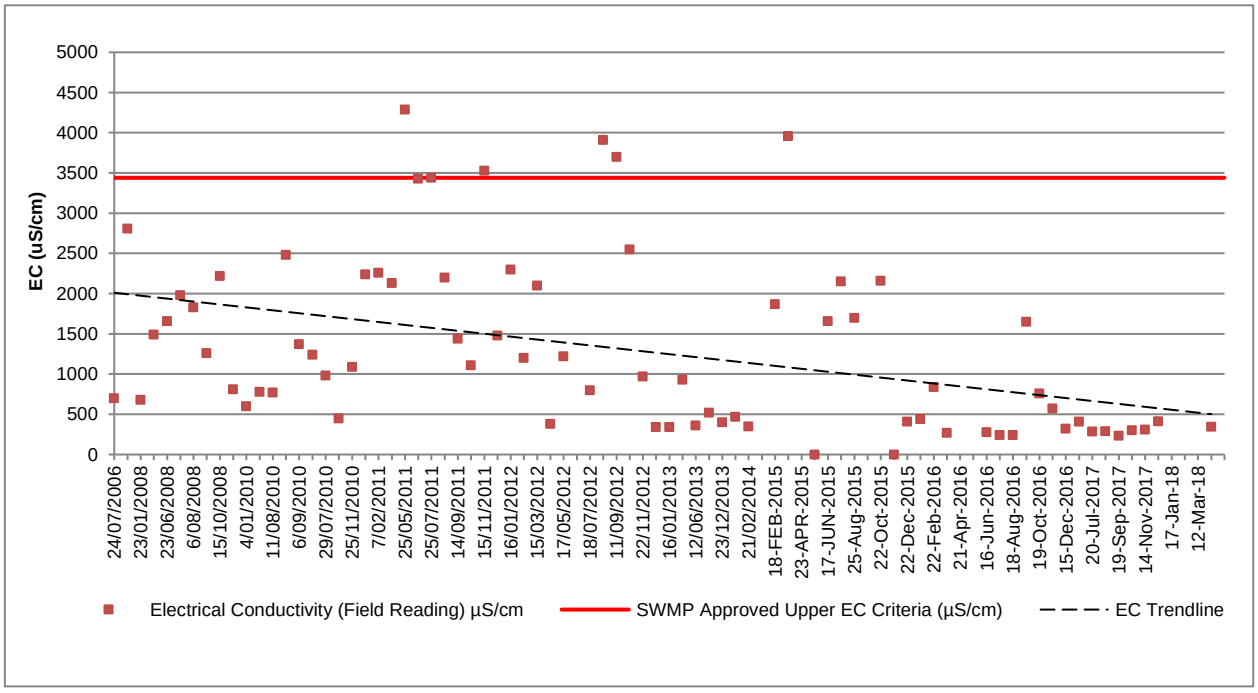
- WCPL will continue to implement the approved Water Management Plan and component plans of the Water Management Plan in accordance with Condition 30, Schedule 3 of SSD-6764.
- WCPL will continue to monitor and evaluate the groundwater system over the 2019 review period.
- In accordance with Condition 5, Schedule 5 of Development Consent SSD-6764, WCPL will review and, if necessary, revise the GWMP within three months of the submission of this Annual Review.
- Consider investigation into the functionality of bore GWa1;
- Re-instatement of trigger level within Groundwater Management Plan for GWa6 now that correct bore depth can be used;
- Drilling of deeper bores at alluvial locations that are frequently observed as dry (GWa1, GWa3, GWa6);
- Based on the assessment of model performance for the prediction of groundwater levels at both alluvial and coal bores located around WCM, HydroSimulations makes the following recommendations to be considered in updating the groundwater model:
    - Updating the rainfall-recharge and evapotranspiration series utilised in the model to reflect the actual rainfall and evapotranspiration experienced following the creation of the model in 2015 would likely assist in improving calibration at both coal and alluvial monitoring locations.
    - Make minor revisions to aquifer properties (hydraulic conductivity, specific yield etc.) in the alluvium associated with Cumbo Creek and the downstream reaches of Wilpinjong Creek in order to simulate water levels closer to those observed at bores GWa6, GWa14, GWa15, and potentially GWa5 and GWa4.
    - Overall, the performance of the groundwater model with respect to matching observed WCM mining impacts is good. The changes recommended by HydroSimulations are minor and could be conducted during 2019 for incorporation in the 2019 Annual Review.

Table 26 Summary of Surface Water Monitoring Result 2015-2018

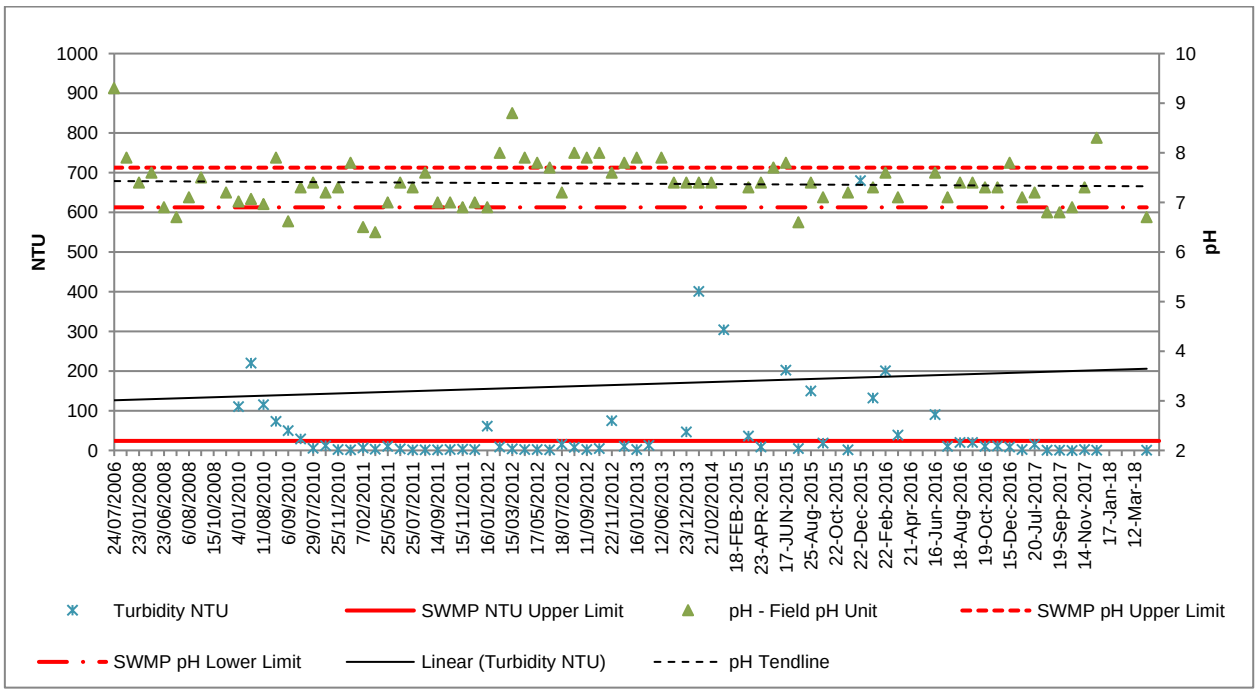
SW Monitoring Point	EC (µS/cm)			pH			SO4 (mg/L)			Turbidity (NTU)		
	Min	Max	Ave.	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
Summary of Surface Water Monitoring Result 2018												
CC1^	308	1280	688	6.7	7.3	7.0	48	384	166	20	5520	2383
CC2	364	6100	3232	7.6	7.9	7.75	67	2960	1513.5	28.8	499	263.9
CC3	40	40	40	7.6	7.6	7.6	67	67	67	499	499	499
WIL (U)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (U2)	4360	4380	4370	3.5	5.3	4.4	358	446	402	19.3	45.7	32.5
WIL (PC)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (NC)^	345	345	345	6.7	6.7	6.7	358	358	358	0.9	0.9	0.9
WIL (D)^	629	2020	1205.5	5.2	8.0	6.85	36	553	261.5	1.3	27	9.1
WIL (D2)^	507	569	538	4.2	7.7	5.95	37	204	120.5	1.6	358	179.8
WOL1	499	1420	1030	7.8	8.4	8.07	37	494	321.3	1.5	358	120.5
WOL2	2370	2850	2680	7.2	7.7	7.4	209	740	506.3	1.9	3.8	2.6
SGC_1*												
Summary of Surface Water Monitoring Result 2017												
CC1^	279	5380	2392.3	7.0	8.3	7.58	45	1790	787	4.4	1970	600.9
CC2	5470	8230	6306	7.7	8.3	7.99	1700	3170	2145	0.6	15.8	4.1
CC3	4100	4990	4520	8.30	8.5	8.4	1490	1920	1688	0.6	1.8	1.2
WIL (U)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (U2)	1360	3890	2851.7	5.4	8.0	6.58	13	121	20.9	2.4	70.8	20.9
WIL (PC)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (NC)^	230	411	313.2	6.8	8.3	7.27	10	85	48.1	0.2	15.2	3.7
WIL (D)^	248	1480	493.5	7.3	7.8	7.55	7	87	46.4	2.2	5.6	3.8
WIL (D2)^	256	650	386.8	7.3	7.9	7.53	2	83	47.7	1.7	31.9	10.3
WOL1	336	1490	872.4	8.1	8.6	8.25	19	184	97.2	0.9	6.1	2.9
WOL2	1800	2950	2133.6	7.4	8.0	7.82	184	440	304.2	0.4	21.1	3.2
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-
Summary of Surface Water Monitoring Result 2016												
CC1^	170	4470	2802.9	7.1	7.9	7.41	28	1710	978.9	4.6	6270	936
CC2	3020	7540	5036.3	7.5	8.0	7.84	920	2940	1738.8	0.5	26.4	5
CC3	80	4860	2771.7	7.4	8.4	8.18	8	1920	972.5	0.7	126	25.1
WIL (U)	520	950	632	6.2	7.4	6.94	13	83	36.8	5.8	43.5	21.2
WIL (U2)	440	4420	2140	6.5	7.6	7.04	14	102	34.8	3.3	153	34.8
WIL (PC)	260	1340	682	6.9	7.4	7.16	7	48	28.6	9.7	64.6	38.3
WIL (NC)^	240	1650	560.8	7.1	7.8	7.39	8	265	64.5	8.6	201	54.2
WIL (D)^	580	3030	1189.2	6.8	8.0	7.46	12	603	165.5	1.2	39.4	10
WIL (D2)^	390	1840	796.1	6.9	8.1	7.50	9	466	159.1	3.9	323	43.8
WOL1	780	2220	1226.3	7.8	8.3	8.11	104	475	205.8	1.3	11.2	5
WOL2	740	3160	1693.3	7.2	8.0	7.56	97	650	303.1	0.9	70.7	15.3
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-
Summary of Surface Water Monitoring Result 2015												
CC1^	120	4380	2316.3	6.6	7.8	7.31	13	1660	237.7	3.3	13000	3415.4
CC2	350	5970	3591.4	7.3	7.9	7.67	1400	2290	1977.8	0.4	20.8	4.7
CC3	150	5130	2220	7.0	8.4	7.93	17	2100	946	1.2	359	93.7
WIL (U)	1650	7550	4306.7	4.8	6.8	5.93	38	146	99	7.4	263	77.0
WIL (U2)	790	5580	3353.8	5.6	7.4	6.71	22	118	41.9	1.5	158	41.9
WIL (PC)	1170	6100	3256.3	6.8	7.9	7.23	3	42	16	1.8	222	90.4
WIL (NC)^	410	3960	1987.1	6.6	7.8	7.31	4	106	43	1.2	1440	284.5
WIL (D)^	340	5880	2713	7.1	8.1	7.67	29	607	253.2	2.6	363	63.1
WIL (D2)^	500	6520	2457.5	7.5	8.2	7.73	16	693	148.4	7.5	557	113.2
WOL1	160	5540	2223	7.5	8.2	7.96	208	956	445.8	1.1	61.8	13.3
WOL2	400	5550	1830	7.3	7.8	7.54	262	822	532.8	0.6	486	53.9
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-

Notes: * Dry & unable to sample ^Surface Quality Impact Assessment Criteria "applicable" in accordance with the SWMP

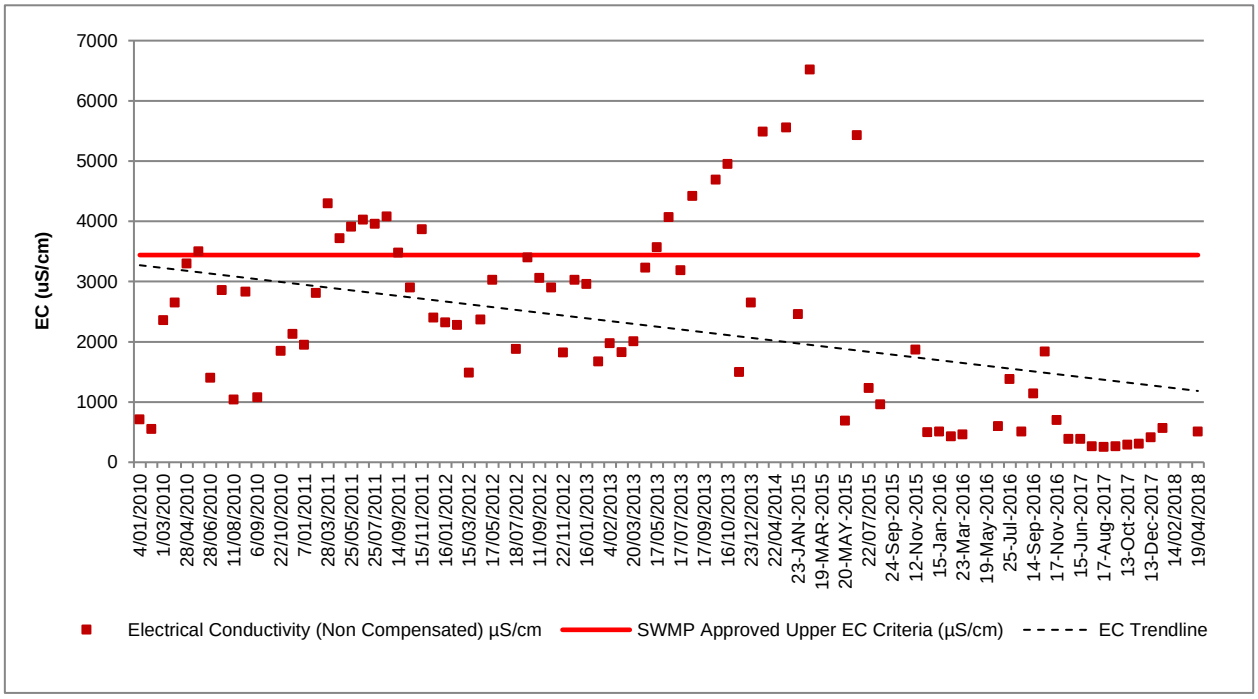
Graph 13 Longterm EC Water Quality Results at WIL_NC



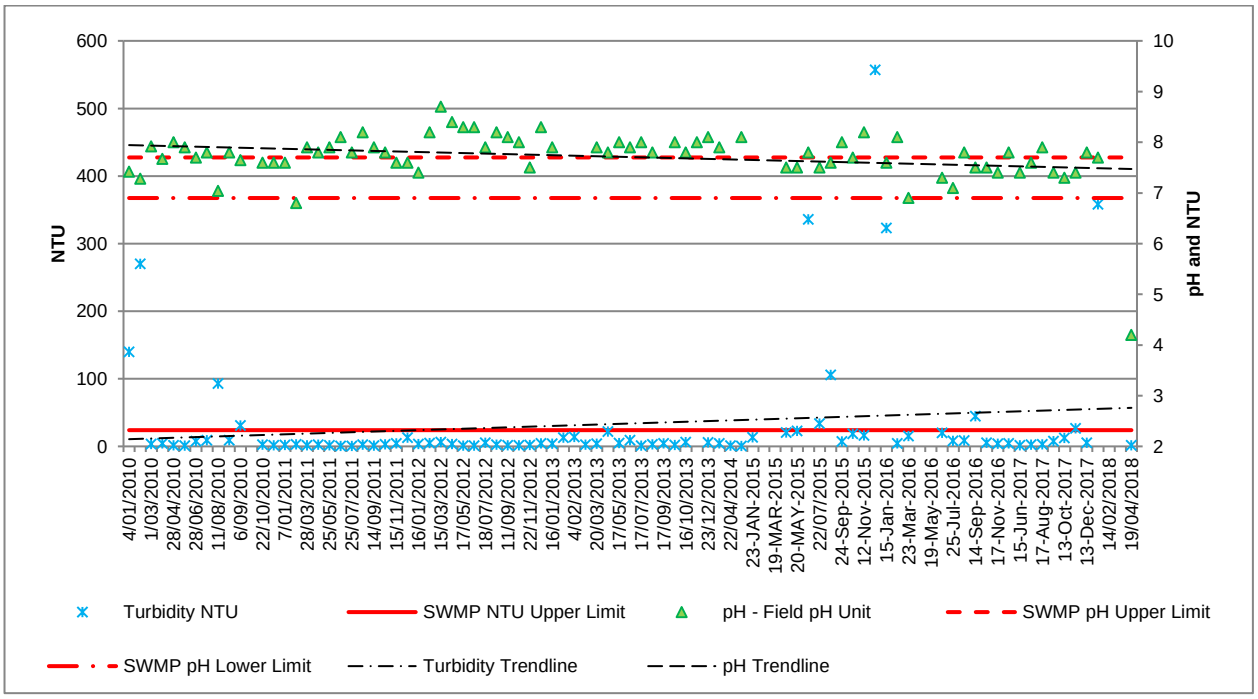
Graph 14 Longterm pH & NTU Water Quality Results at WIL_NC



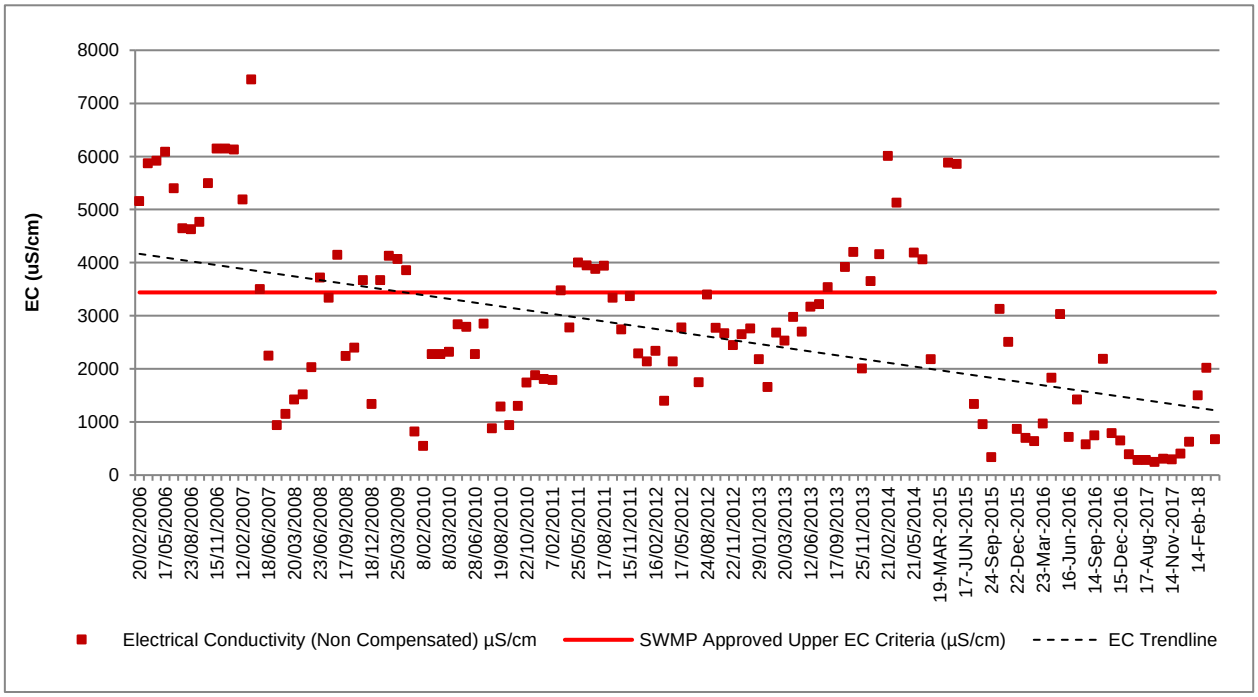
Graph 15 Longterm EC Water Quality Results at WIL_D2



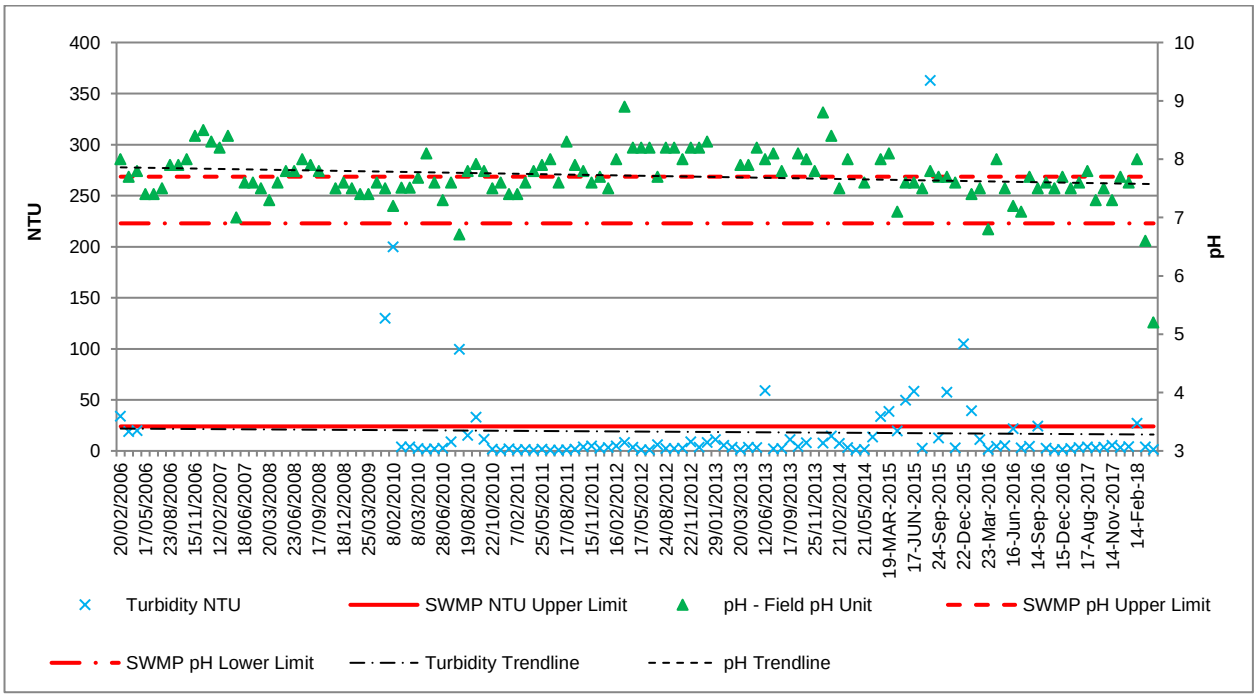
Graph 16 Longterm pH & NTU Water Quality Results at WIL_D2



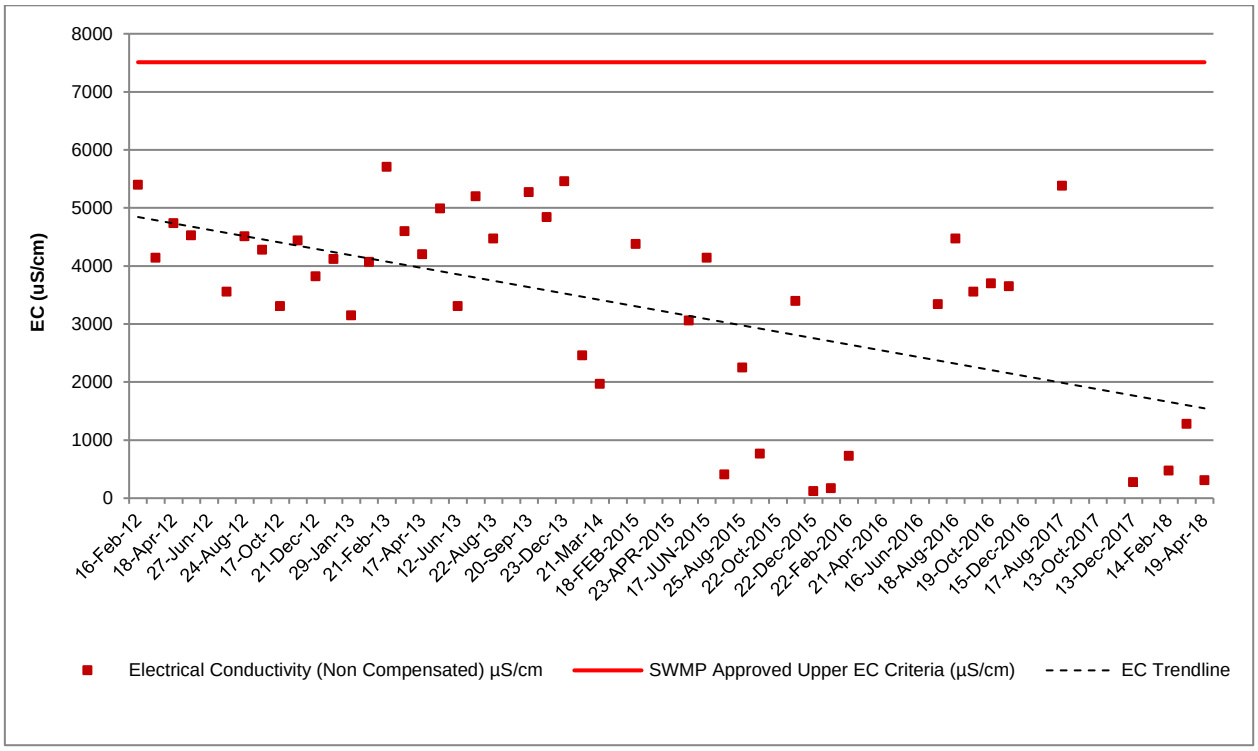
Graph 17 Longterm EC Water Quality Results at WIL_D



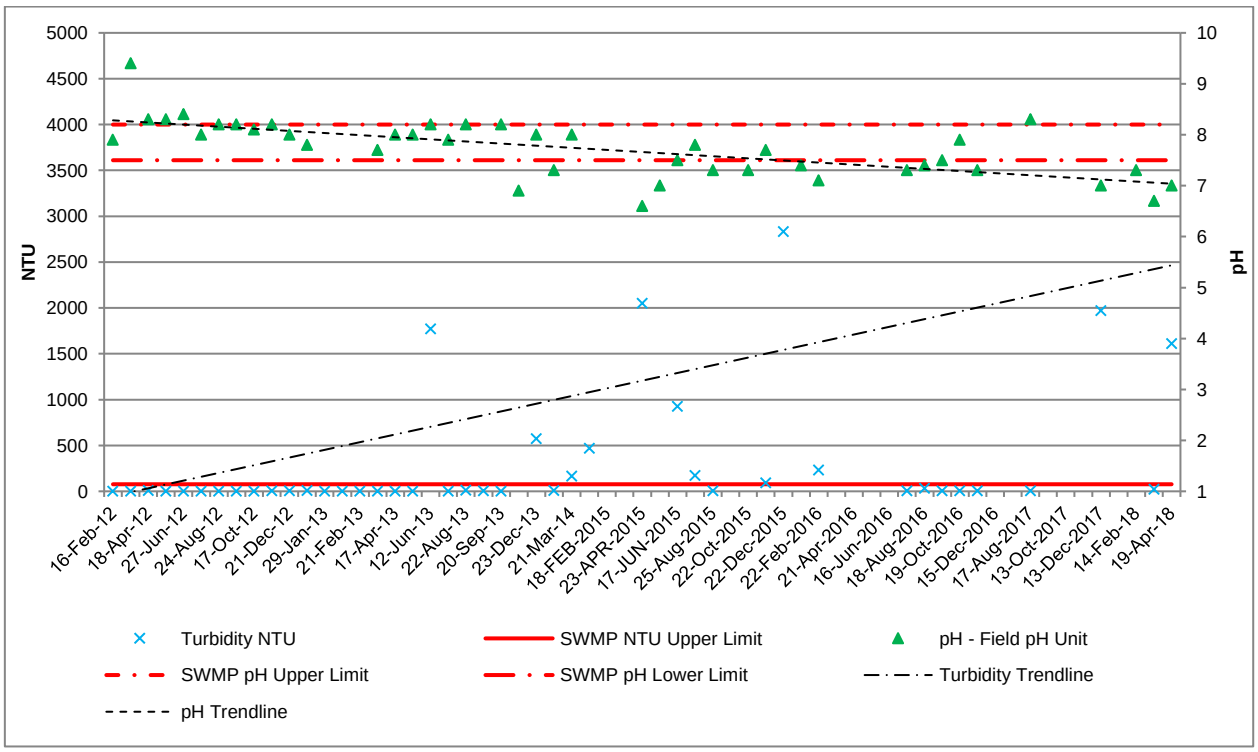
Graph 18 Longterm pH & NTU Water Quality Results at WIL_D



Graph 19 Longterm EC Water Quality Results at CC_1



Graph 20 Longterm pH & NTU Water Quality Results at CC_1



7.7 Site Water Balance

A Site Water Balance (SWB) (**Table 7**) has been prepared for the Mine. The revised water balance model estimated a decrease of the Mine's water inventory of -2,394ML for the 2017/2018 water year. The decrease in total site inventory over the 2017/2018 reporting period (**Appendix 3C**) is notably greater than that estimated in the Site Water Balance (SWB) for the same period. The main differences as identified by WRM may be attributed to the following:

- Annual 2018 rainfall was well below the historical median (approximately 25th percentile), resulting in a significantly lower volume of runoff and direct rainfall reporting to the site water storages than that estimated in (SWB); and
- The actual discharges from the water treatment facilities were greater for the 2017/2018 reporting period than those estimated in (SWB).

No external water supply sources were required for the 2017/2018 period.

A summary review of the site water balance undertaken by WRM for the July 2017 to June 2018 (the water year) is displayed in **Table 27**.

Table 27 Water Balance 2017/2018

Water Balance Summary June 2017 to July 2018	
Inflow: Groundwater into pits	815ML
Rainfall and runoff captured	1036ML
Sub Total	**1851ML**
Outflow: Evaporation	6048ML
Seepage	-
Discharge for WTF	1603ML
Dust suppression on haul roads	836ML
CHPP	1202ML
Sub Total	**4245ML**
Change in Volume (Increase in Inventory)	**-2394ML**

7.8 Water Treatment Facility

Construction of the Water Treatment Facility (WTF) was completed in June 2012 and approved water releases commenced on 16 June 2012 in accordance with EPL 12425. Under EPL 12425, WCPL are approved to discharge treated water from Licensed Discharge Point 24 (LDP24). As a result of the EPL variation in January 2017 to increase the daily discharge limit from 5ML/day to 15ML/day, the maximum volume of water discharge shall not exceed 15ML/day.

Water quality concentration limits (i.e. 100 percentile concentration limit) for LDP24 include:

- Electrical conductivity (EC) not to exceed 500 µS/cm (continuous monitoring);
- Oil and grease (O&G) not to exceed 10mg/L (grab sample weekly during any discharge);
- pH range of 6.5 to 8.5 (continuous monitoring); and
- Total suspended solids (TSS) not to exceed 50mg/L (grab sample weekly during any discharge).

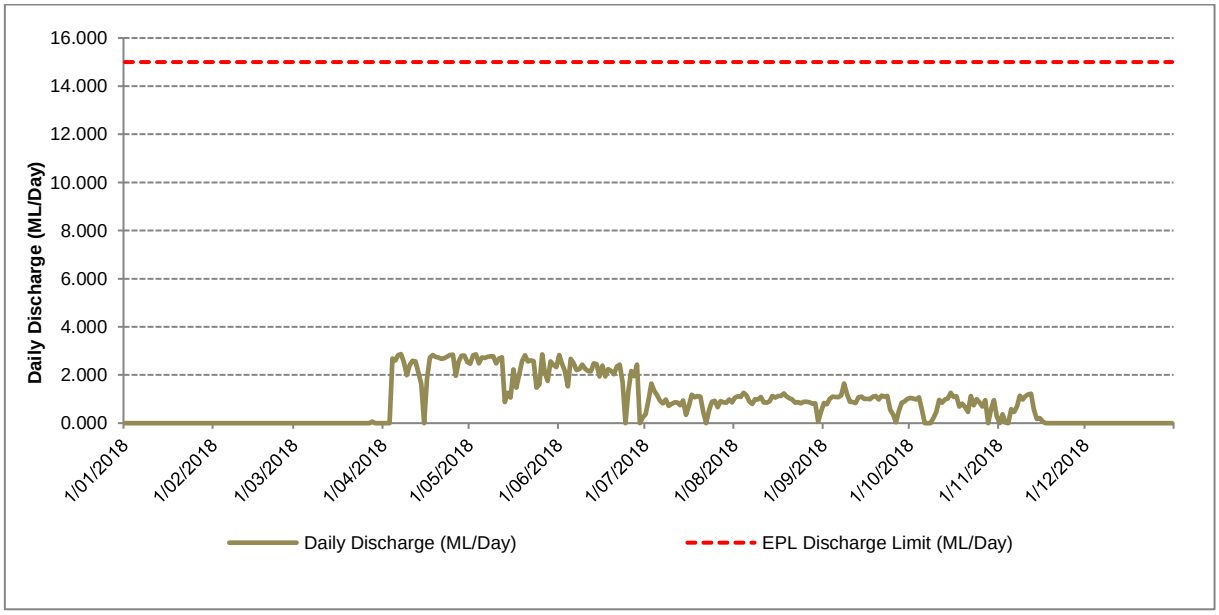
Graph 21 presents the daily discharge (in ML/day) from the WTF during the 2018 review period. The total water discharged over the 2018 review period was 327.19ML. WCPL did not exceed the daily volume

criteria of 5ML/day and 15ML/day. Note that discharge volumes were down in 2018 due to the extended dry periods from 2017 and into 2018.

Graph 22 presents the EC results of the treated water discharged from the WTF during the 2018 review period. WCPL did not exceed the maximum criteria of 500µS/cm for EC. WCPL achieved the water quality criteria for TSS.

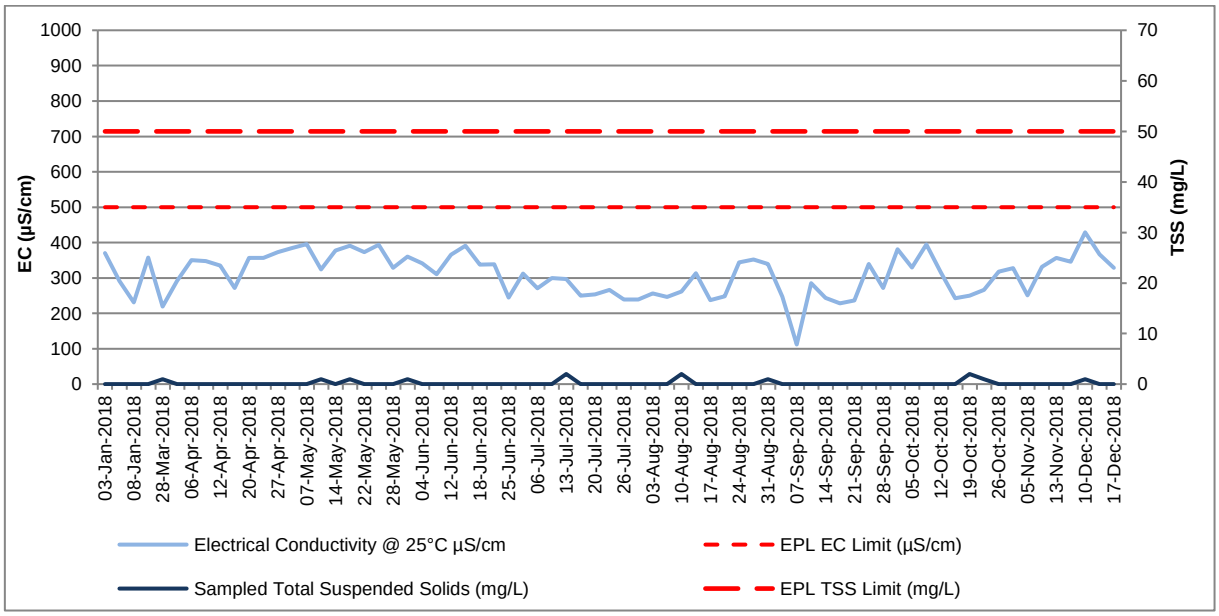
Graph 23 presents the pH and O&G results of the treated water discharged from the WTF during the 2018 review period. WCPL did not exceed the pH maximum or minimum criteria (i.e. 6.5 - 8.5pH) and O&G criteria.

Graph 21 Treated Water Discharged During 2018



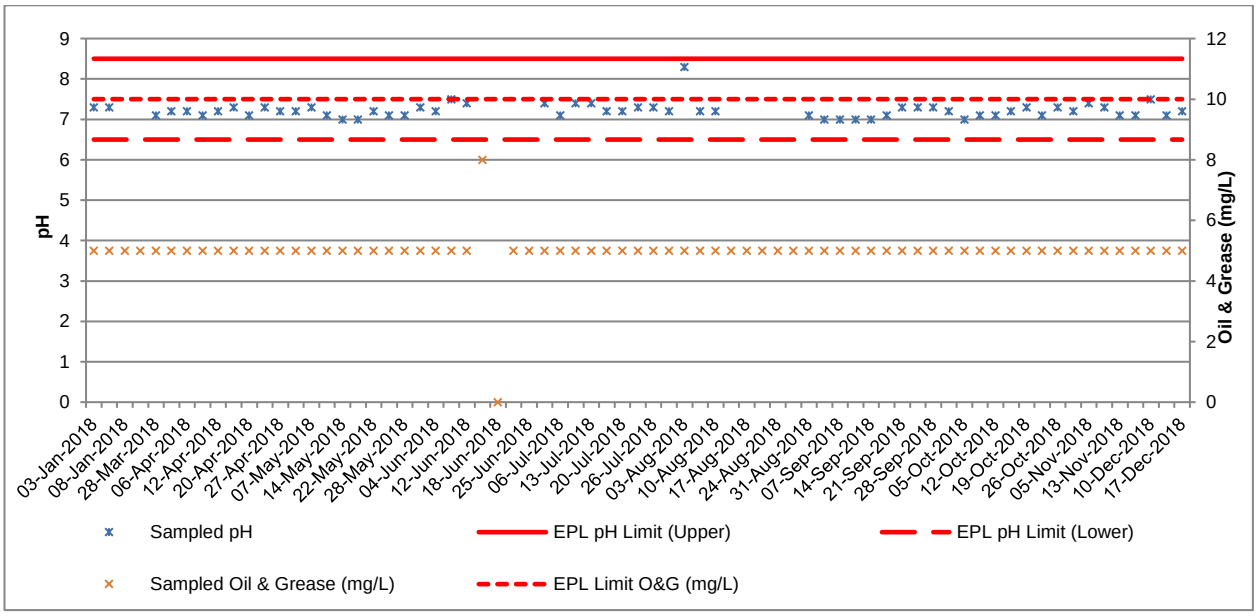
EC(Max): 429uS/cm EC(Ave): 310uS/cm TSS(Max): 2mg/L TSS(Ave): 1.3mg/L

Graph 22 Results for EC & TSS Discharged During 2018



EC(Max): 429uS/cm EC(Ave): 310uS/cm TSS(Max): 2mg/L TSS(Ave): 1.3mg/L

Graph 23 Results for pH & Oil/Grease Discharged During 2018



O&G (Max): 8mg/L O&G(Ave): 5mg/L pH(Max): pH8.3 pH(Min): pH7

7.9 Stream Health & Channel Stability Monitoring

In accordance with the SWMMP, channel stability monitoring is undertaken along sections of Wilpinjong and Cumbo Creeks. The results from the 2018 channel stability monitoring by ELA (**Appendix 3C**) concluded of the 49 sites surveyed along Wilpinjong Creek, six were classified as Highly Stable, 13 Moderately Stable, 16 Stable, 10 Unstable and four Moderately Unstable. As such, a total of 35 sites recorded scores in the stable range, whilst 14 sites recorded scores in the unstable range. The lowest scoring sites (all Moderately Unstable) were WCk4, WCk32 and WCk42, and were typified by severely undercut banks, mass sediment wasting and a low percentage of streambank protection and riparian vegetation cover.

The channel stability of both Wilpinjong and Cumbo Creeks is characteristic of ephemeral systems in agricultural landscapes, consistent with other creeks in the surrounding region. Both creeks systems exhibit characteristic channel stability issues associated with agricultural landscapes including:

- Degraded riparian vegetation and the presence of exotic species, including Regional Priority Weeds such as Bathurst Burr, Blackberry and Sweet Briar;
- Lateral gully-erosion at several locations, formed due to higher velocity runoff from adjacent cleared paddocks occurring perpendicular to the creek line;
- Continued stock access contributing to bank instability, reducing in-stream and riparian vegetation and hampering natural regeneration; and
- Other introduced and native fauna (e.g. European Rabbit and Common Wombat) burrowing within the riparian zone.

Erosion and bank stability issues within the Wilpinjong and Cumbo Creeks are strongly linked to historic agricultural practices within the riparian zone, including widespread clearing and direct animal access to the channels. The consistency of ratings since the commencement of monitoring indicates that mining activities are not contributing further to channel stability issues.

Stream health monitoring includes assessments of macroinvertebrate communities, basic water quality, habitat conditions, and channel conditions along Wilpinjong, Cumbo and Wollar Creeks, including three replicate samples to be taken annually in a range of habitats at each of the 13 monitoring sites.

ELA concluded (**Appendix 3C**) all sites received either 'Good' or 'Very Good' classification for their Riparian, Channel and Environment (RCE) indices. This puts them in the mid-range for riparian and channel habitat quality. Conditions within Wilpinjong, Wollar and Cumbo Creeks were very similar and consistent. Compared to 2017 sites WC4 and WC5 are now dry, which is a change from last year. Many of the sites had less water, and none had more water than last year. This is a result of drought conditions and increased average temperatures compared to the historical means.

The physico-chemical variables within most sites do not meet the ANZECC recommended range. DO saturation scored most poorly with no sites meet the guidelines. Conductivity also scored poorly with only site WC8 meeting the ANZECC guidelines. Turbidity was high within Wilpinjong creek although was within the ANZECC range at Wollar and Cumbo creek sites.

Aquatic health at sites along Wilpinjong Creek was generally poor, with the macroinvertebrate communities characterised by low diversity, and SIGNAL2 scores indicating severe pollution levels. Compared to previous survey rounds, the November 2018 results indicate a slight decrease in ecological health. This is likely a result of low rainfall and subsequent lower water levels.

Climatic factors and flow regimes are a dominant influence on aquatic ecological communities. The lack of major flow events in Wilpinjong Creek since 2012 has potentially resulted more frequent periods of no flow or pool isolation.

7.10 DPI Water Recommendations

DPI Water recommended a number of additional investigations as part its review of the updated SWMP in 2017. **Table 28** provides a status of these recommendations. At the end of the reporting period all outstanding recommendations were completed.

Table 28 Status of DPI Water Recommendations

DPI Water Recommendations	Status of Recommendations
Development of a salinity assessment strategy that considers geomorphic influences on salt migration and expression to surface waters in infilled and incised phases of Wilpinjong Creek.	**Complete**: Findings to be included in the revision of the WMP (after submission of 2018 AR)
Preparation of a detailed drainage line and rehabilitation plan for the Wilpinjong project area by a suitably consultant with geomorphological experience (note Alluvium has been engaged to prepare this study as described in Section 5.5).	**Complete**: Findings to be included in the revision of the WMP (after submission of 2018 AR)
Preparation of a mass salt and water balance for the upstream and downstream stream gauges that includes consideration of the volume and concentration of discharge from the RO Plant, relative salinity of the Wilpinjong and Cumbo Creek catchments and associated salt contributions	**Completed:** *Wilpinjong Mine – Water and Salt Balance for Adjoining Watercourses* (WRM, March 2018)
A review of the construction and operation of the upstream and downstream gauging stations on Wilpinjong Creek against the requirements of the Bureau of Meteorology (2013) *National Industry Guidelines for Hydrometric Monitoring*. Following completion of the review, WCPL would provide a report to DP&E outlining any material differences (if any) between the guideline and the streamflow monitoring undertaken at the Wilpinjong Coal Mine.	**Completed:** *Wilpinjong Creek Hydrometeric Station Construction and Operation Review* (EIS, January 2018)
A review of stream health monitoring methodology by a suitably qualified and experienced person (including consideration of statistical design and power analysis inclusive of reference sites) to identify any recommendations for future stream health monitoring to detect potential changes due to mine expansion.	**Complete**: Findings to be included in the revision of the WMP (after submission of 2018 AR)

7.11 Groundwater

A Groundwater Monitoring Program (**Table 7**) has been prepared by WCPL. A summary of the groundwater monitoring program is presented in **Table 29**. A summary of the groundwater monitoring results is provided in **Table 30**. Further groundwater monitoring results for 2018 review period, including figures with groundwater monitoring locations are provided in **Appendix 3D.**

Table 29 Groundwater Monitoring Program

Monitoring Locations		Frequency	Parameters[1,2]
Open Cut Operations	• Main pit sump(s)	Monthly	• Volume of water extracted.
		Quarterly	• pH, EC, TDS, Na, K, Mg, Ca, Cl, HCO_3, $CaCO_3$, SO_4 and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).
Water Supply Bores[3]	• GWs10, GwS11, GWs12, GWs14, GWs15	Monthly (During Extraction)	• Water level, field pH and EC. • Volume of water extracted.
Alluvial Bores	• GWa10, GWa11, GWa12, GWa14, GWa15, GWa16, GWa22, GWa32	12 Hr (logger)	• Water level, Pressure, Temperature
	• GWa1, GWa2, GWa3, GWa4, GWa5, GWa6, GWa7[5], GWa8[5], GWa9, GWa10, GWa11, GWa12, GWa14, GWa15, GWa16, GWa22, GWa32, GWa33[5]	Monthly	• Water level, temperature field pH and EC.
		Quarterly	• TDS, Na, K, Mg, Ca, Cl, HCO_3, $CaCO_3$, SO_4 and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).
Coal Measures Bores	• GWc10, GWc11, GWc12, GWc14, GWc15, GWc16, GWc17, GWc18, GWc22, GWc23, GWc24, GWc25, GWc26, GWc27, GWc28, GWc29, GWc30, GWc31, GWc32[5]	Daily (logger)	• Water level, Pressure, Temperature
	• GWc1, GWc2, GWc3, GWc4[5], GWc5[5], GWc10, GWc11, GWc12, GWc14, GWc15, GWc16, GWc17, GWc18, GWc19, GWc20, GWc22, GWc23, GWc24, GWc25, GWc26, GWc27, GWc28, GWc29, GWc30, GWc31, GWc33, GWc32[5],GWc34, GWc35	Monthly	• Water level, temperature, field pH and EC.
		Quarterly	• TDS, Na, K, Mg, Ca, Cl, HCO_3, $CaCO_3$, SO_4 and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).
Landholder bores, wells and waterholes[4]		As required	• To be determined

Notes: 1) Parameters will be analysed provided sufficient volumes of water can be collected. 2) Na = Sodium, Ca = Calcium, HCO_3 = Bicarbonate, SO_4 = Sulphate, K = Potassium, Mg = Magnesium, Cl = Chloride and Total Fe = Total Iron. 3) Water supply bores not currently in operation. 4) Monitoring may be undertaken, as required, in consultation with individual landholders. Parameters to be monitored will be determined following consideration of the landholder's concerns. 5) Regional bore – not expected to be affected by mining.

WCPL completed the installation of two groundwater monitoring bores in rehabilitation areas as recommended by HydroSimulations in 2017. The locations of the two new monitoring bores within rehabilitated areas of the WCM are in Pit 5 and Pit 2 (**Appendix 3D**).

7.12 Compensatory Water Supply

In accordance with Condition 24, Schedule 3 of SSD-6467 WCPL shall compensate potentially affected landowners with privately owned groundwater bore within the predicted drawdown impact zone identified in the EA. During the 2018 review period this condition was not triggered. There are no privately owned bores within this predicted impacted zone.

7.13 Groundwater Monitoring Review

A review of groundwater data was undertaken by HydroSimulations for the 2018 review period. The groundwater data review included groundwater levels, groundwater quality, comparison of predicted and

observed drawdowns, and groundwater take. A summary of the HydroSimulations 2018 review is provided below and in **Table 30** with the complete report provided in **Appendix 3D**.

Wilpinjong 2018 Annual Review Groundwater Analysis:

- Throughout 2017 and 2018 conditions have become progressively drier causing a widespread decline in groundwater levels, with a number of alluvial bores recording 'dry' conditions;
- Based on the analysis of the hydrographs in Appendix A, some mining effects are considered to have occurred or be ongoing at the following bores located in the Wilpinjong alluvium and Cumbo Creek alluvium;
- The general trend is for mining-related drawdown to be apparent in coal seam hydrographs, typically within a few hundred metres of active mine areas, but drawdown is much less, if apparent at all, in alluvial bore hydrographs. This is due to the following properties:
    - alluvial bodies not being directly connected to mined areas;
    - rock strata overlying the coal seams and underlying the alluvium serving to mitigate the drawdown response because of low vertical hydraulic conductivity; and
    - unconfined conditions and a greater aquifer storage in the alluvium than in the confined coal seams resulting in much lower head variation (drawdown) in the alluvium.
- Groundwater level observations at GWa3 reported the bore as 'dry' for the entire 2018 monitoring period. The current dry conditions first occurred in mid-2017. As this decline in groundwater level correlates with the extended period of below average rainfall also observed over this period, the exceedance of the groundwater level trigger at GWa3 has likely occurred due to both climatic and mining effects;
- GWa4 has reported dry conditions for the entire 2018 monitoring period. As the below average rainfall conditions have continued during 2018 to be a reduction in rainfall throughout 2018 it is likely that this conclusion remains true;
- Groundwater levels collected for GWa5 during 2018 exceeded the trigger level for the entire period. It is likely that the groundwater level trigger exceedance at GWa5 is being exacerbated by the reduced rainfall throughout the 2018 monitoring period;
- Exceedances of the GWa12 trigger level occurred from March to December 2018. It is likely that a combination of mining and climatic influences has caused groundwater levels at GWa12 to exceed the designated trigger level for the 2018 monitoring period;
- GWa14 has continued to report groundwater levels below the trigger level throughout the 2018 monitoring period, indicating 'dry' conditions at this monitoring bore. The exceedances recorded during 2018 are expected to have resulted due to impacts from mining at Pit 4, along with the reduction in rainfall events throughout the year;
- No trigger exceedances in EC at alluvial bores;
- No trigger exceedances in pH at alluvial bores coal bores;
- Bores GWa3, GWa4 and GWa6 have gone or continued to be dry throughout the 2018 reporting period, with the last recorded EC value being above the designated trigger level.
- Each of these alluvial bores follow similar trends despite varying baseline EC levels with each of the bores recording declines in groundwater level due to reduced rainfall and mining (GWa3, GWa4, GWa5 and GWa6). The increased EC at these bores is expected to be correlated to the higher contributions of more saline Permian groundwater that occurs during dry conditions. As the EC at these bores can be seen to freshen during periods of higher rainfall it is expected that the exceedance of the EC trigger level at GWa5 and GWa7 during 2018 has occurred due to climatic factors. Therefore, no further investigation is required.

Table 30 Groundwater Performance

Location	Approved Criteria			Performance During the Reporting Period			Trend/Key Management Implications
Groundwater Monitoring (Alluvium)				**Assessment of Triggers**			
	Water Levels (mAHD)	**EC (µS/cm)**	**pH**	**Water Level (mAHD)**	**EC (µS/cm)**	**pH**	• Throughout 2017 and 2018 conditions have become progressively drier causing a widespread decline in groundwater levels, with a number of alluvial bores recording 'dry' conditions. • Water trigger levels were exceeded during 2018 for GWa3, GWa4, GWa5, GWa12 and GWa14, GWc1, GWc3 & GWc5 (refer to comments above and **Appendix 3D** for the complete review by HydroSimulations). • No trigger exceedances in EC at alluvial bores occurred during 2018. The average EC was approximately 4,100µS/cm, the lowest EC (GWa2) was 1,500µS/cm and the highest EC (GWa5) was 10,600µS/cm. • Trigger exceedances for coal bores are observed in GWc1, GWc3 and GWc5. • Overall, the alluvial groundwaters are more saline than the coal seam waters. This suggests that the alluvial waters are sourced from Permian sediments and are concentrated through evapotranspiration which is expected to be an active process. • Bores GWa3, GWa4 and GWa6 have gone or continued to be dry throughout the 2018 reporting period, with the last recorded EC value being above the designated trigger level. • No exceedances of pH trigger levels were observed during the 2018 monitoring period.
GWa1	#	12,272	7.2	No data 2018			
GWa2	373.4	2,280	7.0	✓	✓	✓	
GWa3	360.5	1,970	7.3	Y	^	✓	
GWa4	353.8	2,596	7.1	Y	^	✓	
GWa5	372.8	13,926	7.1	Y	✓	✓	
GWa6	#	6,720	7.6	#	^	✓	
GWa7	#	10,126	7.0	#	✓	✓	
GWa8	353.3	2,898	7.4	✓	✓	✓	
GWa10	367.1	#	#	✓	#	#	
GWa11	365.2	#	#	✓	#	#	
GWa12	362.3	#	#	Y^	#	#	
GWa14	358.0	#	#	Y^	#	#	
GWa15	355.0	#	#	✓	#	#	
Groundwater Monitoring (Coal)							
GWc1	#	2,844	7.2	#	Y	✓	
GWc2	#	1,290	7.7	#	✓	✓	
GWc3	#	3,304	7.3	#	Y	✓	
GWc4	#	2,412	7.1	#	✓	✓	
GWc5	#	4,798	7.0	#	Y	✓	
Groundwater Production Bores							
GWs10	346	#	#	No groundwater was extracted from the licenced groundwater production bores during the 2018 review period.			
GWs11	348.5	#	#				
GWs12	332.5	#	#				
GWs14	319.5	#	#				
GWs15	314.5	#	#				

Notes: (✓) Represent no trigger exceedance, # = Not applicable, Y= Yes (trigger exceedance recorded), ^ Bore was dry/ goes dry during 2018

7.14 Groundwater Model Verification & Refinement

The timing of the mining effects modelled at the alluvial bores shows good correlation with the observed effect and often indicates a repressed response to rainfall that is also seen in the observed data. The observed drawdown is often greater (e.g. GWa5, GWa12, GWa14) than is seen in the modelled data.

This may be attributed to below average rainfall that has occurred throughout 2017 and 2018 which has not been simulated in the model, opposed to the model underestimating mining related drawdown. However, some improvements to model performance may also be made by making minor revisions to the aquifer properties of the alluvium.

Differences between modelled and observed data also arise surrounding the predicted recovery of groundwater levels. The model estimates that recovery will begin five years after the mining effect occurs. Although rainfall responses can be identified in the observed data, recovery at most alluvial bores has not occurred to the same extent and timing as predicted by the model.

Again, this is likely to be a result of reduced rainfall during 2017 and 2018 which is expected to be prolonging any mining-related drawdown.

8.0 REHABILITATION

8.1 Rehabilitation Activities

To minimise the area of disturbance at any one time, rehabilitation occurs progressively at the Mine as ancillary disturbance areas and final mine landforms become available for revegetation. The mine waste rock emplacements behind the advancing open cut are constructed to approximate the pre-mining topography or the final landform was initially approved by Project Approval PA 05-0021.

The Development Consent (SSD-6764) has superseded the Project Approval (05-0021). WCPL are preparing a revised Rehabilitation Strategy to address Condition 61, Schedule 3 of Development Consent (SSD-6764). Consistent with the requirements of Condition 61, the revised Rehabilitation Strategy presents a revised final landform that builds on the rehabilitation objectives in Table 11 of Development Consent (SSD-6764). Subject to approval by the DP&E (refer to **Section 3.4**), the current approved MOP will be revised accordingly in 2019 to incorporate the revised Rehabilitation Strategy.

Rehabilitation of disturbed areas is undertaken on a progressive basis in accordance with the approved MOP[5]. Rehabilitation of disturbed areas commenced in 2008, with 10 ha of land being rehabilitated for final land use (grazing and wildlife corridors) as required by the former PA 05-0021. As at December 2018, approximately 556 ha of completed landforms have been rehabilitated (**Figure 5**).

As part of the WEP EIS, WCPL identified an opportunity to prioritise woodland establishment within the existing mine rehabilitation areas where rehabilitation to date has focussed on the establishment of productive pasture for grazing. As such, WCPL proposes to conduct a re-evaluation of the previous rehabilitation areas against contemporary BVT classifications to prioritise Regent Honeyeater habitat establishment within existing mine rehabilitation areas. It should be noted that BVT performance and completion criteria relevant to the rehabilitation areas are still being developed in accordance with Schedule 3, Condition 37 of the Development Consent SSD-6764. Upon resolution of the performance and completion criteria, in accordance with Condition 65 of the Development Consent SSD-6764, the BMP and the MOP will be comprehensively updated as required to reflect the new criteria.

8.1.1 Summary of Performance

The WCPL MOP is a two year MOP, which outlines the forecasted rehabilitation commitments for each 12 month period:

- **Year 1** – 1 July 2017 to 30 June 2018; and
- **Year 2** – 1 July 2018 to 30 June 2019.

Mining and progressive rehabilitation activities over the term of this MOP are shown in **Plans 3A** to **3B**. At the completion of the MOP term, a total of approximately 219ha of waste rock emplacement areas will be rehabilitated. During the MOP term, WCPL are scheduled to rehabilitate selected areas of waste rock emplacements areas (i.e. Domain 5) located in Pit 1, Pit 2, Pit 3, Pit 4, Pit 5, Pit 7 and rehabilitate TD3 (i.e. Domain 6). A summary of the rehabilitation performance against the MOP forecast rehabilitation is provided in **Table 31** as of the 31 December 2018.

Table 31 Status of Proposed MOP Rehabilitation

Year	MOP Proposed Rehabilitation	Status of Rehabilitation	Comments
Year 1	98.5ha	98*	Rehabilitation of Overburden emplacement areas in Pit: 4,5,7 & TD3
Year 2	121.0ha	121**	Ongoing rehabilitation of overburden emplacement areas in Pit: 1, 2, 3, 4, 5 & 7.

Note: * Rehabilitation target completed in calendar year 2018, **Rehabilitation target on track to be completed in calendar year 2019

[5] MOP Amendment A was submitted in December 2018 and approved in January 2019. MOP Amendment A was sought to adjust and align the rehabilitation areas as identified in MOP Plans 3A and 3B.

Figure 5 2018 Rehabilitation Status

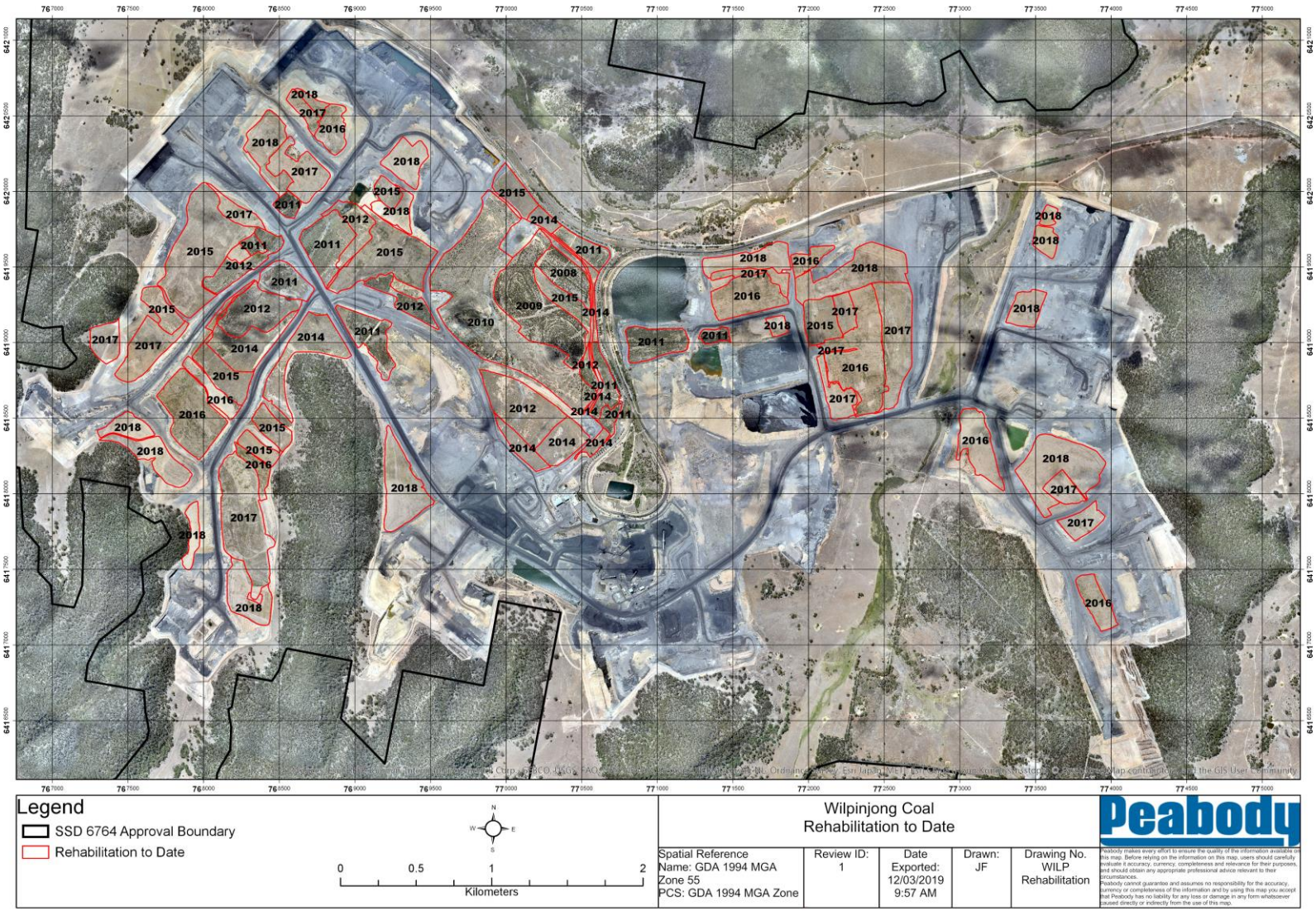
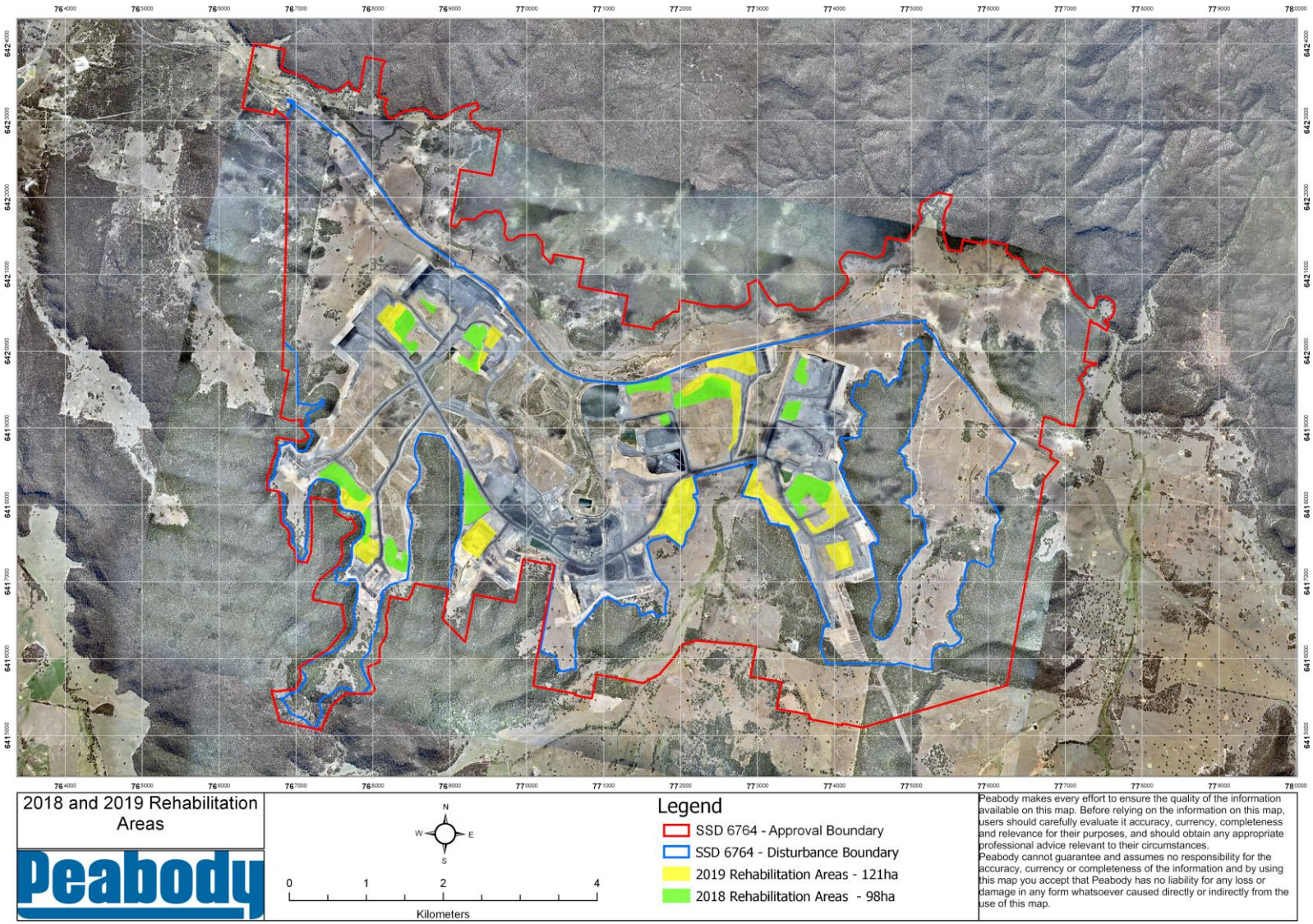


Figure 6 Rehabilitation Proposed and Completed in the MOP Term



Notes: ***2018 Rehabilitation Areas*** in Green are actual areas completed in 2018. ***2019 Rehabilitation Areas*** are proposed areas in 2019

There were only minor changes to rehabilitation areas completed in 2018, as proposed in Year 1 of the MOP. These changes relate to minor variances in the completed rehabilitated surface areas at several rehabilitation locations, which did not affect the total hectares completed against the hectares proposed in the MOP. These minor changes were considered generally consistent with the rehabilitation scheduled and targets proposed in the MOP for Year 1. WCPL consider the approved rehabilitation program proposed in the current approved MOP has been achieved for Year 1 and rehabilitation targets will be achieved for Year 2 of the MOP in 2019 (**Table 31** and **Table 32**).

As displayed in **Table 32**, approximately 556ha of completed landforms have been rehabilitated as of the 31 December 2018. No rehabilitated landforms are yet considered ready for formal sign off by the DRG in terms of meeting the relevant completion criteria as provided in the MOP.

As discussed in **Section 8.1**, WCPL are transitioning to a BVT performance and completion criteria relevant to the rehabilitation areas which are being developed in accordance with Schedule 3, Condition 37 of the Development Consent SSD-6764.

Table 32 Rehabilitation Status

Mine Area Type	2015 Reporting Period (Actual)	2016 Reporting Period (Actual)	2017 Reporting Period (Actual)	Next Reporting Period (Actual)	Next Reporting Period (Forecast)
	2015 (ha)	2016 (ha)	2017 (ha)	2018 (ha)	2019 (ha)
A. Total mine footprint	2857.34	2857.34	2857.34	2857.34	3550.88*
B. Total active disturbance	1148.6	1147.4	1297.4	1441.2	1584.2
C. Land being prepared for rehabilitation	43	70	82	98	121
D. Land under active rehabilitation	304	374	456	556	677
E. Completed rehabilitation	0	0	0	0	0

Notes: * Increase in total mine footprint now incorporates the additional hectares in ML1779.

Other rehabilitation commitments in the MOP term included:

- Construction of the Elevated Waste Dump in Pit 2 to RL450m then back down to RL430m;
- Temporarily vegetating a number of selected batters for several long term mine waste rock emplacement areas including Duffy Dump and Pit C Dump; and
- Commencing a series of upslope water diversion banks.

Due to changes in the long term mine plan, construction of Elevated Waste Dump in Pit 2 to RL450m then back down to RL430m is still unlikely to occur during this MOP term. However Elevated Waste Dump in Pit 2 will continue to receive lower than predicted volumes of overburden material during the MOP term.

Other commitments including temporarily vegetating a number of selected batters for several long term mine waste rock emplacement areas were scheduled to occur in 2018, however due to unfavourable drought conditions the temporary vegetation of the batters was postponed. WCPL are developing an action plan which includes studies such as soil testing on emplacement areas and identifying flora species required to be used in the temporary works, with works to commence in 2019.

In 2018, WCPL were scheduled to construct a series of upslope clean water diversions i.e. separation of undisturbed and disturbed area runoff using upslope diversions, in accordance with the approved SWMP. For more details refer to **Section 7.5**.

8.1.2 Summary of Rehabilitation Activities During the Reporting Period

The MOP describes the proposed rehabilitation phases within Primary Domains during the MOP term. In accordance with the MOP, landform establishment, growth medium development, ecosystem establishment was undertaken during 2018 in Domain 5 (i.e. Waste Rock Emplacement Areas) and Domain 6 (i.e. Tailings Emplacement Areas).

Photos of rehabilitation activities during the reporting period are provided in **Appendix 7**. Ecosystem Development in the form of monitoring and minor maintenance activities were completed in Domain 8 and Domain 9.

The following rehabilitation phases during 2018 within Domains 5 and 6 included:

8.1.2.1 Decommissioning

There were no decommissioning[6] of mining related infrastructure activites undertaken at the Mine in 2018.

8.1.2.2 Landform Establishment

- All 2018 rehabilitation landforms were designed in accordance with the approved MOP and Wilpinjong Final Technical Standards. All rehabilitation areas were developed with carbonaceous material being progressively placed back in-pit once the coal has been mined before a minimum of a 2m inert encapsulation layer is placed on top. This formation stage, Final Surface Layer (FSL) is -3m to previous landform contour. With the encapsulation layer placed, topsoil is then placed on top at a depth of 100mm to 300mm. This is followed by the spreading of initial vegetation cover species such as millet, clovers and sorghum.
- Mine waste dumps were constructed using existing mine equipment including truck dumped material before being shaped using the Mine dozer fleet using Lecia technology to design. Overburden and interburden material was progressively placed back into mined out voids. This included reject material from the CHPP being hauled back into the mine and deposited below the natural surface in the mined-out voids as close to the pit floor as practically possible. Reject material is dispersed throughout the overburden within the mine waste rock emplacements to manage its geochemical characteristics.
- Capping of Tailings Dam 3 (TD3) commenced in 2016 and was scheduled to be completed in February 2017. However the capping and creating the landform was delayed due to the availability of suitable material for creating the final landform over TD3. WCPL completed the final landform and rehabilitated TD3 in 2018.
- Keylah Dump removal was completed during 2017 with approximately 130,000m^3 of material removed. In 2018 the former site of Keylah Dump become an active mining area and incorporated into Pit 5.
- All rehabilitated slopes constructed during the 2018 reporting period were shaped to no greater than 1:6 (10 degrees or 17%) across areas. The surface of mine waste rock emplacements were constructed to approximate the existing topographic form of the shallow valleys which drain the Mine area. Mine waste rock emplacement surfaces are ripped to a depth of approx. 150mm to ensure the topsoil was bound with the underlying inert material and allow infiltration of water into the constructed landform.
- During 2018, a combination of approximately 98ha across Domain 5 and Domain 6 of final landforms were completed in preparation for topsoil placement, ripping and seeding.

[6] However, works were completed in 2018 for demolition of disused and vacant farm buildings situated in offset areas. Asbestos removal was undertaken prior to demolition by licensed contractors. All demolition activities were undertaken in compliance with WCPL *Waste Management Plan –WI-ENV-MNP-0030 Version 1 – January 2016.* Refer to **Section 6.5** for further details.

8.1.2.3 Growth Medium Development

- Topsoil placement involved utilising dozers and graders to spread to the desired depth, as well as direct placement by scrapers. Topsoil is to be placed on top of the final landform to act as germination medium for vegetation and as a seed source from the natural seed bank present at the time of topsoil stripping. Topsoil placement shall only proceed once the final landform and major drainage works (i.e. graded banks, drainage channels and rock waterways if required) have been completed. All topsoil was sourced from existing topsoil stockpiles or via direct placement during topsoil stripping activities.
- In consideration for soil ameliorates required for rehabilitation areas, topsoil sampling was undertaken across all proposed rehabilitation area with results indicating the requirement for ameliorates in all areas.
- Soil results in 2018 indicated a deficiency in P, K, Mg, K, Ca, Mn, B and organic matter. Appropriate recommendations have been received including the application of lime, organic matter and fertiliser at the following approximate rates:
    - Cow manue @ 5tonnes/ha; Lime @ 1.2tonnes/ha; Fertiliser @ 0.1tonnes/ha

8.1.2.4 Ecosystem Establishment

- During 2018, a combination of approximately 98ha across Domain 5 and Domain 6 were seeded under a cover crop (**Figure 6**). The cover crops include various combination of legumes (cow peas, clover), sorghum, millet, and oats. Typically species and sowing rates are shown in **Table 33**.
- Subject to approval in regards to the BVT performance and completion criteria, species to be planted in the rehabilitated landforms will be a mixture of native trees, shrubs and grasses selected to align with the final and approved BVT classifications.
- WCPL maintains a native seed inventory which was collected from locally native seed sources carried out by suitably qualified personnel which will be used in rehabilitation activities. The progress of the revised rehabilitation strategy will be provided in the next Annual Review.

Table 33 Typical Cover Crop Species and Rates

Pasture Species	Rates (kg/ha)
Chicory	4kg
Cowpea	12kg
Sorghum	6kg
Jap Millet	6kg
Sudan Grass	10kg
Oates	60kg
Clovers	15kg

The use of the cover crop provides the following benefits:

- Stability of the landforms;
- Increased organic matter and soil nutrients;
- Nitrogen fixation;
- Soil cover (erosion, dust etc);
- Improved soil moisture;
- Low cost (reduction in agrochemicals, transportation, labour etc); and
- Weed control.

8.1.2.5 Ecosystem Development

- During 2018, Ecosystem Develop activities occurred across Domain 8 (i.e. Rehabilitation Areas Pre-MOP) which primarily included monitoring, applying Biometric assessments as described below and minor maintenance activities.
- Monitoring and maintenance activities are ongoing with the results assessed and used to refine rehabilitation techniques. WCPL has developed measurable, quantitative interim Completion Criteria that will support the agreed final land use for the Mine.
- Interim Performance Targets (IPT) have been developed to ensure that the Mine is progressing towards the Completion Criteria and overall mine closure objectives and are outlined in the Biodiversity Management Plan (BMP).
- Progress towards the IPT is measured using Landscape Function Analysis (Tongway & Hindley 2004) and the BioMetric methodology (WCPL 2014).
- During 2018, Wilpinjong undertook monitoring in accordance with the current BMP. The complete report and result are attached as **Appendix 5**, a summary of the LFA results from 2018 include:
    - *Landscape Organisation Index scores, developed through analysis of the LFA monitoring data, remain consistently high across the monitoring program, despite decreasing at most sites compared to 2017 results. Similarly, low levels of erosion observed throughout previous monitoring seasons (2007-2013) can be correlated with the high Soil Surface Assessment (SSA) Stability scores and the lack of any substantial erosion (as recorded in the erosion SSA assessment) recorded since 2015. This is consistent with 2018 results, with only one failing to meet the Stability Completion Criteria. Overall these combined data sets demonstrate that consistently stable landforms occur across the Wilpinjong Coal Mine Domains.*
    - *Six LFA monitoring sites are located within the Rehabilitation Areas, including R6; R8; R9; R10; R11 and R13. The LOI and SSA results for the sites are presented in Table 3 9.*
    - *Spring 2018 monitoring results indicate that all Rehabilitation Area transects experienced a drop in LOI scores compared to spring 2017 results. Sites R6 and R10 have decreased to below 0.8, due to increase in patches of bare soil at these sites.*
    - *The Soil Stability scores recorded at sites R6, R9, R10, R11 and R13 exceeded the Completion Criteria, however no sites achieved the annual incremental increase, with five of the six sites experiencing a reduction in Soil Stability.*
    - *Site R8 experienced a decline of -5.2 from spring 2017 results and has now dropped under the Completion Criteria. The Soil Infiltration and Nutrients scores for all the Rehabilitation Area transects were below the Completion Criteria and the incremental increase target.*
    - *Sites within the Rehabilitation Areas failing to meet their IPT have triggering Landscape Stability (LFA) TARP in the BMP (i.e. <5% annual improvement or significant decline in LFA Score (from previous monitoring round).*

Table 34: LOI and SSA results for Rehabilitation Area transects

Site	Monitoring Season	Landscape Organisation Index	Soil Surface Assessment		
			Stability	Infiltration	Nutrient cycling
R6	Spring 2018	0.70	58.5	28.9	28.3
	Spring 2017	0.80	56.9	30.8	25.8
	Annual incremental increase		1.6	-1.9	2.5
R8	Spring 2018	0.93	48.0	35.3	28.3
	Spring 2017	0.95	53.2	31.4	24.2
	Annual incremental increase		-5.2	3.9	4.1
R9	Spring 2018	0.87	56.1	26.4	24.8
	Spring 2017	0.98	58.1	42.7	38.1
	Annual incremental increase		-2	-16.3	-13.3
R10	Spring 2018	0.64	52.0	25.1	22.8
	Spring 2017	0.69	56.6	28.8	22.1
	Annual incremental increase		-4.6	-3.7	0.7
R11	Spring 2018	0.95	52.9	34.4	31.9
	Spring 2017	0.98	60.9	40.6	36.9
	Annual incremental increase		-8	-6.2	-5
R13	Spring 2018	0.87	51.5	32.0	30.7
	Spring 2017	0.91	57.9	33.7	28.1
	Annual incremental increase		-6.4	-1.7	2.6

8.1.3 Summary of Activities Next Reporting Period

WCPL are scheduled to complete and rehabilitate a total of 121ha of mine waste rock emplacements during Year 2 (Domain 5) within Pit 1, Pit 2, Pit 3, Pit4, Pit 5 and Pit 7 (**Figure 6** and **Appendix 8**).

As discussed in **Section 8.1.1**, WCPL have completed MOP rehabilitation targets for Year 1 as of the end of December 2018 and are scheduled to complete the remaining rehabilitation target on 121ha for Year 2 in 2019 (**Figure 6**).

WCPL are currently preparing a new MOP to replace the existing MOP which expires in June 2019 to accommodate the recently grated mining lease ML1779. The new MOP will have a revised mining and rehabilitation schedule for 2019 and 2020. The rehabilitation progress against the new MOP will provided in the next Annual Review.

8.2 Other Rehabilitation Activities

Ozothamnus tesselatus

WCPL commenced undertaking a seed collection campaign in late 2018 to harvest *Ozothamnus tesselatus* seed from areas within WCPL owned land. *Ozothamnus tesselatus* is listed as 'Vulnerable' under both the TSC Act and EPBC Act. Seeds of the threatened *Ozothamnus tesselatus* will be collected and propagated for use in the Rehabilitation and Regeneration Areas in accordance with the BMP. Propagation trials are expected to commence in 2019 by WCPL in germination trays with various soils and treatments. As this species produces thistle-type seeds, tube stock is anticipated to be the most appropriate method for propagation.

WCPL also collaborated with the University of Wollongong (UoW) to assist with seed collection and research on this data deficient species. UoW was contracted by the Australian Botanic Garden to assist with seed collection of this species and to undertake scientific research on the species such as

propagation trials and viability testing. WCPL will continue to assist UoW in this study. Further updates will be proved in the next Annual Review.

Visual Bunds

During the 2018 reporting period, hydromulching of Pit 5N visual bund was completed.

Exploration

Following the completion of drilling, rehabilitation of exploration site are in accordance with *WI-EXP-PRO-0031 Wilpinjong Exploration Site Rehabilitation Procedure*. Inspections of drill sites are approximately every 6 months until the site has reached a stable state. During 2018, a number of drill sites were inspected for rehabilitation progress, including:

- Return of vegetation;
- Any evidence of weed or pest invasion; and

Microbes

WCPL is now investigating the use of microbes within 5 areas which have had green manure crops established. WCPL believes this be a natural beneficial process to assist in breaking down this newly created organic matter leading to building improved soil structure. Initial testing has been completed with results indicating close to low indication of activity. This application activity will be undertaken by the Operational Support Team (OST) with the application via a spray unit.

8.3 Land Management Activities

Pest and Weed Management

WCPL completed pest management works on WCPL owned properties during 2018 including BOA's, Regeneration and ECA areas. Works included:

- Targeted pest species management included feral pig trapping in ECA 'A' and 'D', fox and wild dog control was undertaken in Spring and Autumn in conjunction with the local wild dog group;
- Aerial dog bating. This program was coordinated by Local Land Services (LLS) as a result of know wild dog activity in the local area; and
- Lessees across the broader company landholdings also undertake ongoing vertebrate pest management.

WCPL has undertaken extensive weed spraying in response to regular internal inspections and annual MWRC inspections using selective herbicides (**Appendix 7**).

9.0 COMMUNITY

A protocol for the management and reporting of community complaints has been developed as a component of the Mine's EMS. In accordance with Condition M6.1 of EPL 12425, a dedicated telephone number (ph.: **1300 606 625**) for the provision of comments or complaints is maintained by WCPL. In addition, a separate hotline for blasting information is also maintained by WCPL (ph.: **1800 649 783**).

In accordance with Condition M6.2 of EPL 12425, these telephone lines are advertised in local newspapers quarterly, via the Wilpinjong Community Newsletter, via the Wilpinjong Community Consultative Committee and on the Peabody website:

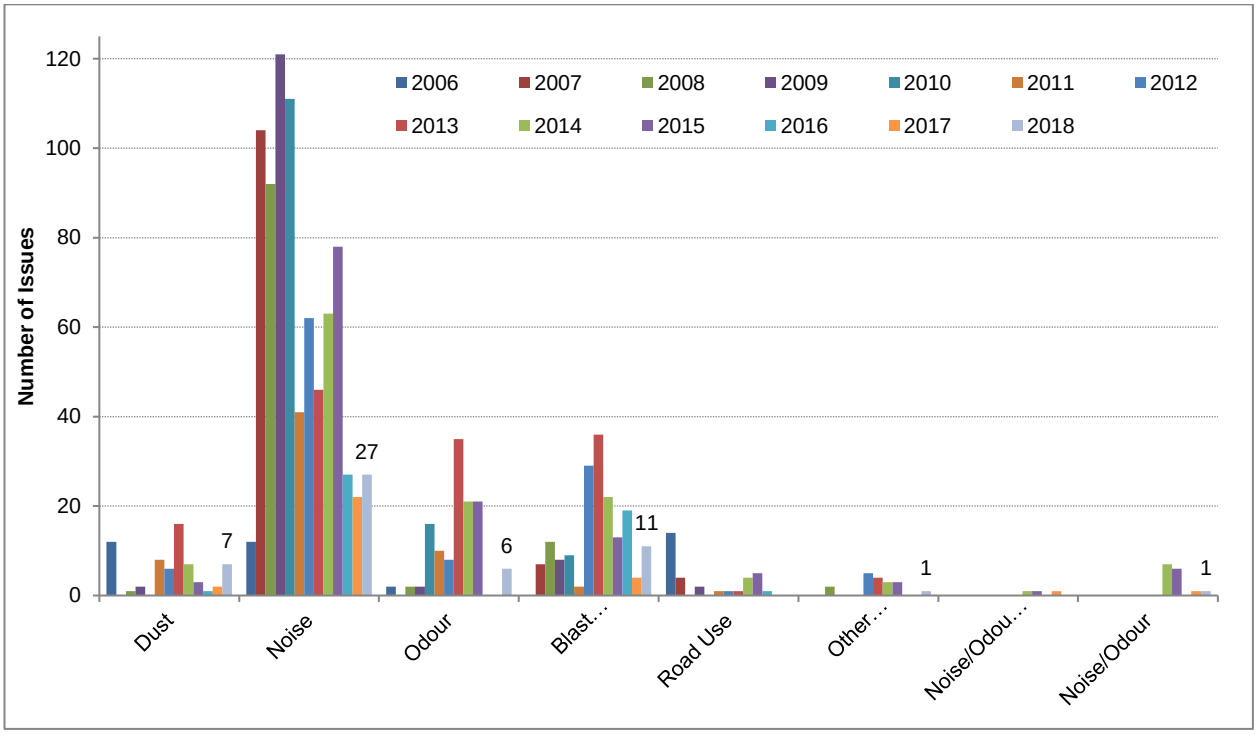
https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wilpinjong-Mine

WCPL records and responds to all complaints and maintains a complaints register on its website. The complaints are managed in accordance with the WCPL Complaints Management Procedure. The Complaints Management Procedure outlines WCPL reporting requirements as follows:

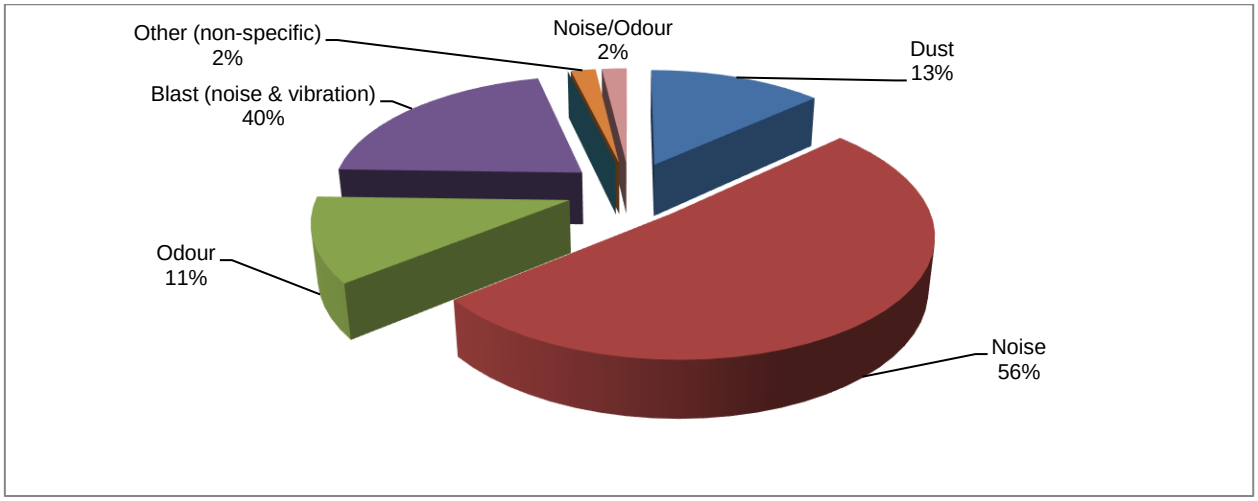
- A summary of complaints received is reported monthly on the Peabody website;
- A summary of complaints received and actions taken is presented to the WCPL CCC as part of the operational performance review;
- A summary of complaints received and actions taken is included in the Annual Review and the Annual Return to the EPA.

During the 2018 review period, 53 community complaints were received by WCPL (**Appendix 6**) as opposed to 30 community complaints in 2017. **Graph 22** presents a comparison of the environmental complaints received by WCPL over the period 2006 to 2018. **Graph 24** indicates an overall declining trend in community complaints from 2006 to 2018.

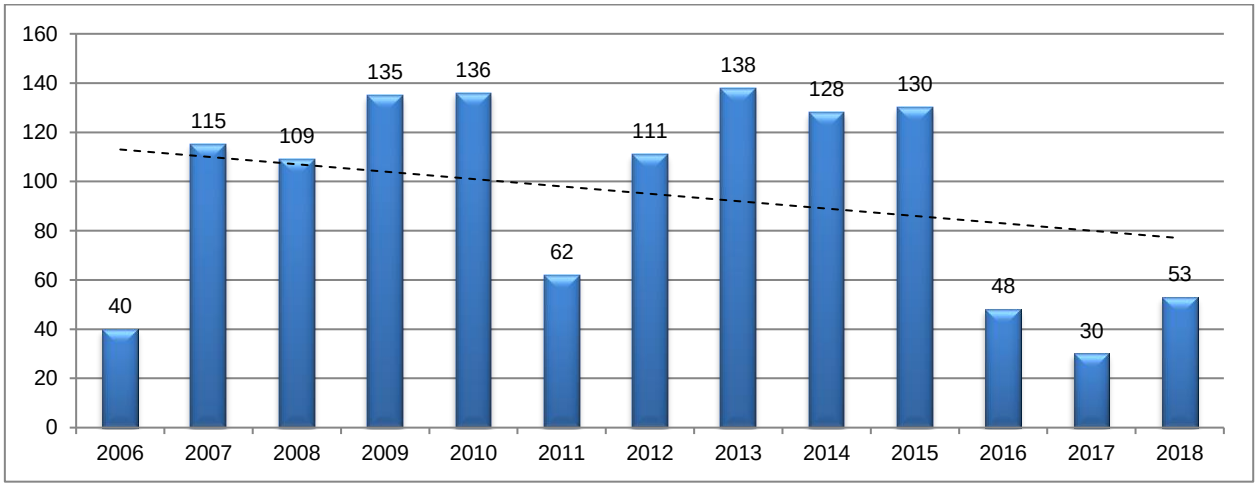
Graph 24 Summary of Community Complaints and Issues Raised by Complainants 2006 – 2018



Graph 25 Percentage Breakdown of Community Complaints in 2018



Graph 26 Total Annual Complaints 2006 - 2018



Community Consultative Committee

In accordance with Condition 7, Schedule 5 of SSD-6764, the Community Consultative Committee (CCC) (**Table 35**) continued to meet during the 2018 review period.

The CCC for the Mine is operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007).

Consistent with the requirements of the CCC Guidelines, the committee is comprised of one independent chairperson, and representatives of the MWRC, NPWS, WCPL and members of the general community.

Consultation regarding the WEP was undertaken at the CCC meetings in March, June, September and December 2018.

An additional CCC was held on 23 April 2018 to provide a summary and overview of the draft Social Impact Management Plan (SIMP) for Wilpinjong Coal Mine (WCM).

WCPL has undertaken individual consultation with private landholders and lessees that reside in the vicinity of the mine to discuss the ongoing development of the Wilpinjong Coal Mine and the WEP. **Table 36** provides a summary of the CCC meetings held during the 2018 review period.

Table 35 CCC Members for the 2018

Name	Organisation
Des Kennedy	Mid Western Regional Council
Lisa Andrews	CCC Independent Chair Person
Colin Faulkner	Community Representative
Scott Lillis	Community Representative
Brian McDermott	Community Representative
Bev Smiles	Community Representative and Mudgee District Environmental Group Representative
Bruce Hughes	Community Representative
Kim Peach	Community Representative
Lisa Menke	NSW National Parks and Wildlife Service Representative

Table 36 Summary of CCC Meetings in 2018

Date	Key Outcomes
12 March	Environmental monitoring results, reviewed complaints since last CCC, operational downtime, EMS & Management Plan Update, Rehabilitation, 2018 Exploration Program and Community Donations and Consultation.
23 April	Provide a summary and overview of the draft Social Impact Management Plan (SIMP) for Wilpinjong Coal Mine (WCM).
4 June	Environmental monitoring results, reviewed complaints since last CCC, operational downtime, EMS & Management Plan Update, Rehabilitation, 2018 Exploration Program and Community Donations and Consultation.
10 September	Environmental monitoring results, reviewed complaints since last CCC, operational downtime, Rehabilitation, 2018 Exploration Program and Community Donations and Consultation.
13 December	Environmental monitoring results, reviewed complaints since last CCC, operational downtime, Rehabilitation, 2018 Exploration Program and Community Donations and Consultation.

Community Support Program

During the 2018 reporting period, WCPL continued its support of local community groups and sporting associations, schools and charitable organisations (total amount in 2018 was approximately $120,000.00), including local schools, Community Groups, Charities and sporting groups. More information regarding WCPL's community support program is provided in **Appendix 6**.

Have a Chat Meeting

WCPL also provided an information newsletter regarding upcoming 'have a chat' sessions, held at the Wollar Store 1st Thursday of the month from 1:30pm to 4:30pm. The initiative aims at providing the community a casual setting to ask questions or raise concerns relation to the Mine's operations.

Access to Information

Condition 12, Schedule 5 of SSD-6764 details the requirements for access to information applicable to the Mine, and outlines the documents required by the Project Approval to be made publicly available on the Peabody website www.peabodyenergy.com

Employment Status

At the end of the 2018 reporting period there were 432 full time equivalent employees at WCPL, 87 staff and 146 full time equivalent contractors.

10.0 INDEPENDENT AUDIT

10.1 Independent Environmental Audit

As required by Condition 10, Schedule 5 of SSD-6764, Wilpinjong Coal Pty Limited (WCPL) are required to complete an Independent Environmental Audit (the IEA) of the development within a year of commencing the development.

The Notice of Commencement to the DP&E, as required by Condition 8, Schedule, 2 of SSD-6764 was confirmed by WCPL with its intention to commence the approved development on the 19 September 2017.

In consultation with the DP&E, AECOM Australia (AECOM) were endorsed by the Secretary on the 12 June 2018 to undertake the IEA in accordance with Condition 10, Schedule 5 of SSD-6764.

AECOM were officially commissioned by WCPL to carry out the IEA on the 27 July 2018. The site inspection component of the IEA was completed on the 22nd, 23rd and 24th August 2018 by AECOM's endorsed audit team and relevant specialist.

As required by Condition 11, Schedule 5 of SSD-6764, WCPL submitted a copy of the IEA to the Secretary (**Appendix 9**) and a response to any recommendations contained in the IEA, with a timetable for implementation (**Appendix 9**) within 3 months of commissioning the IEA on the 26 October 2018.

Additional opportunities for improvement (OFIs) that were identified in the IEA will be reviewed on a case by case basis for constructiveness and incorporated as necessary, into the relevant management plan as required under SSD-6764.

The IEA methodology included:

- Initial discussions with WCPL to organise the audit, including the provision of documentation, the site visit and timing;
- Review of documentation provided by WCPL and preparation of compliance assessment checklists that included a list of conditions of key regulatory approvals to be assessed for compliance;
- Three-day site inspection including review of documentation and interviews with key site personnel and contractors on 22-24 August 2018. The site inspection was attended by the Lead Auditor, Auditor and specialists in the areas of; Noise, Air Quality, Rehabilitation, Surface Water and Groundwater;
- Consultation with key government agencies as presented in this report;
- Review of additional documentation provided by WCPL after the site inspection;
- An assessment of environmental management performance through review of; the implementation of key environmental management strategies, plans and programs; non-compliances documented in annual reporting; regulatory actions; incidents; and complaints.
- An assessment of compliance was undertaken for each condition within the selected regulatory approvals based on a review of documentation, observations during site inspections, interviews, implementation of management plans, incidents, complaints and regulatory action.
- Submission of a draft audit report to WCPL to provide an opportunity for additional information and / or correction of fact; and,
- Finalisation of the report.

In summary four non-compliances were identified against development consent SSD 6764, three non-compliances were identified against EPL 12425 and one non-compliance was identified against WCPL's ML 1573 (**Appendix 9**). Non-compliances identified against relevant approvals are discussed in **Section 11.2.**

11.0 INCIDENTS & NON-COMPLIANCES

11.1 Reportable Incidents

There were no reportable incidents during the 2018 review period. However, the DP&E and EPA were notified as outlined in **Table 37.**

Table 37 Summary of Elevated 24-hour average PM_{10} Levels Notified During 2018

Date	Monitor(s) affected	Likely cause of elevated reading
19/3/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
11/4/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
15/4/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels - Regional dust event
29/5/18	TEOM 4	Notification by WCPL. Local dust from unsealed Araluen Road
4/8/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
21/11/18	TEOM 3, TEOM 4, HV1, HV4 & HV5	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
22/11/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
23/11/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
14/12/18	TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
15/12/18	TEOM 3, TEOM 4, HV1, HV4 & HV5	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event
16/12/18	TEOM 3 & TEOM 4	Notification by WCPL of high regional PM_{10} dust levels – Regional dust event

11.2 Non-Compliances

There were a total of thirteen non-compliances as identified in **Table 37** to **Table 40**, identified during the 2018 review period.

- Six non-compliances were identified against development consent SSD 6764:
  - Four non-compliance relate to administrative non-compliance
  - One non-compliance relate to implementation with low environmental consequence
  - One non-compliance relates to dust management with low environmental consequence
- Seven non-compliances were identified against EPL 12425:
  - Four non-compliances relate to instrument failure with low environmental consequence
  - One non-compliances relate to power outage with low environmental consequence
  - One non-compliances relate to equipment damage with low environmental consequence
  - One non-compliance relates to dust management with low environmental consequence
- One non-compliance was identified against WCPL's ML 1573.
  - One non-compliance relates to administrative non-compliance

Table 38 Details of Non-Compliances (SSD-6764)

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
* Schedule 3 Condition 19(a)	22/08/2018	WCPL received a formal warning letter on 08 February 2018 from the EPA following an unannounced visit to site on 17 January 2018. The EPA officer identified excessive dust emissions from the mine as a result of activities being undertaken in pit 7 and pit 4. The inspection also identified a dust haze in the area around the mine when compared to that of the Ulan area.	This condition was found to be non-compliant on the basis that the EPA found WCPL to be in breach of EPL 12425 requirements O3.1 which requires the following, "*All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises*".	Although no recommendations were made by the Auditors based on WCPL's current dust management measures considered satisfactory during the IEA, WCPL do however proposed the following additional actions to ensure ongoing improvements in relation to air quality management. These actions include: A review of the existing Air Quality Management Plan (AQMP) and Spontaneous Combustion Management Plan (SCMP) to reflect the current monitoring conducted in relation to spontaneous combustion. Remove reference to monitoring requirements relating to the Keylah Dump Removal. Refresher training for operational personnel in the form of Tool Box Talks regarding dust management and responsibilities
*Schedule 3, Condition 31	22/08/2018	The audit team's surface water specialist reviewed management measures in place on site at WCPL during the audit site inspection. The surface water specialist concluded that there are some discrepancies between the approved SWMP, and its implementation on site. In particular relating to sediment basins and up-stream diversions that are depicted in the SWMP but have not been constructed.	Operations on site appeared to manage water effectively with minimal risk for offsite transport of water, however on the basis that the approved SWMP did not reflect the current operations, this Condition has been assessed as non-compliant.	WCPL propose the following actions to the Water Management Plan (WMP). These actions include: A review of the existing Surface Water Management Plan (SWMP) to include a detailed description of the assessment process for not adopting clean water diversions, based on further specialist reviews that can clearly identify when a clean water diversion is not adopted by WCPL , this decision can demonstrate the least net impact on the environment or presents the lowest longer term risk; and A review of the Site Water Balance if diversions are not adopted to account for in each annual review of the site water balance and calculation of harvestable right.
*Schedule 3, Condition 37	22/08/2018	WCPL submitted Draft BVT Performance and Completion Criteria for the BVTs listed in Tables 8 and 9 of the Development Consent and Regent Honeyeater Habitat to OEH, DoEE for consultation on the 19.02.18. DoEE responded by email dated 13.03.18 that it was not commenting on the Draft Performance and Completion Criteria at this time.	On the basis that confirmation of the satisfaction of the DPE was not received within 6 months of the commencement of the development (March 2018), this condition is considered noncompliant. It is noted that the DPE has had the revised Draft Criteria for seven months and has not provided further feedback or approval of the Criteria and this has led to the timeframe not being met.	WCPL propose the following actions to the Biodiversity Management Plan (BMP). These actions include: Continue to work with DP&E and OEH to finalise the BVT Performance and Completion Criteria; Update the BMP accordingly to reflect the final and agreed BVT Performance and Completion Criteria once approved by the Secretary; and Review the Mining Operations Plan (the MOP) to align with the BVT Performance and Completion Criteria once approved by the Secretary and

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
		OEH provided comments on the Draft Performance and Completion Criteria including recommendations by letter dated 14.03.18. WCPL made amendments to its Proposed BVT Performance and Completion Criteria and provided this together with its response to each of the OEH comments to the DPE by letter dated 19.03.18 (within six months of the commencement of development). At the time of writing (October 2018) the DPE was yet to respond.	WCPL personnel indicated they believed the intent of this Condition was to submit the Draft BVT Performance and Completion Criteria within six months of the commencement of development.	resubmit the MOP for approval by the DRG.
*Schedule 3, Condition 61	22/08/2018	A Rehabilitation Strategy (March 2018) was prepared and submitted to the DPE for approval on the 19 March 2018. At the time of writing, (October 2018) WCPL was yet to receive confirmation from the DPE that the Strategy was prepared to its satisfaction. and on this basis, this Condition has been assessed as non-compliant.	WCPL was yet to receive confirmation from the DPE that the Strategy was prepared to its satisfaction. and on this basis, this Condition has been assessed as non-compliant. WCPL personnel indicated they believed the intent of this Condition was to submit the Draft Rehabilitation Strategy within six months of the commencement of development.	WCPL propose the following actions to the Rehabilitation Strategy. These actions include: Continue to work with the DP&E to obtain feedback on whether the Rehabilitation Strategy has been prepared to the DP&E's satisfaction; and Review the Mining Operations Plan (the MOP) to align with the Rehabilitation Strategy, once approved by the Secretary, and resubmit the MOP for approval by the DRG.
Con 30(d)(iii), Sch 3		Climatic conditions have resulted in exceedances of the trigger levels and/or performance criteria (surface water).	Notification to relevant government agencies not in accordance with TARP.	Review TARP in the SWMP regarding notification to government stakeholders, to include provision that notification only occurs if the investigation concludes mining related impacts are the cause of the trigger excedences.
Con 30(d)(iv), Sch 3		Climatic conditions have resulted in exceedances of the trigger levels and/or performance criteria (groundwater).	Notification to relevant government agencies not in accordance with TARP.	Review TARP in the SWMP regarding notification to government stakeholders, to include provision that notification only occurs if the investigation concludes mining related impacts are the cause of the trigger excedences

Notes: * Identified during the 2018 IEA

Table 39 Details of Non-Compliances (EPL12425)

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
O3.1	8/02/2018	WCPL received a formal warning letter on 08 February 2018 from the EPA following an unannounced visit to site on 17 January 2018. The EPA officer identified excessive dust emissions from the mine as a result of activities being undertaken in pit 7 and pit 4. The inspection also identified a dust haze in the area around the mine when compared to that of the Ulan area.	This condition was found to be non-compliant on the basis that the EPA found WCPL to be in breach of EPL 12425 requirements O3.1 which requires the following, "*All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises*".	Although no recommendations were made by the Auditors based on WCPL's current dust management measures considered satisfactory during the IEA, WCPL do however proposed the following additional actions to ensure ongoing improvements in relation to air quality management. These actions include: A review of the existing Air Quality Management Plan (AQMP) and Spontaneous Combustion Management Plan (SCMP) to reflect the current monitoring conducted in relation to spontaneous combustion. Remove reference to monitoring requirements relating to the Keylah Dump Removal. Refresher training for operational personnel in the form of Tool Box Talks regarding dust management and responsibilities
M2.2	28/12/2018	One (1) Particulates – Deposited Matter sample not collected and analysed at monitoring point DG15.	Deposit gauge funnel broken from a severe hail storm that passed through the area on the 19/12/2018 causing significant damage to vehicles and office window.	Deposit gauge funnel replaced
M2.2	1/01/2018 12/02/2018 19/04/2018 25/04/2018 28/09/2018 21/12/2018 27/12/2018	Seven (7) PM10 dust samples were not collected and analysed at monitoring point 20 (HV4).	The high-volume air sampler (HV4) did not operate due to planned and unplanned power outages and equipment faults.	HV4 checked after every sample date and following power outage and/or repair.
M2.2	Within the period from 8 Feb 2018 - 7 Feb 2019	For the reporting period 4.3% of the continuous PM10 dust monitoring did not occur at monitoring point 25 (TEOM 3).	General maintenance (including calibrations), instrument failure/repair, and power outages.	TEOM3 checked: each month, remotely each day and following power outage and/or repair work.
M2.2	Within the period from 8 Feb 2018 - 7 Feb 2019	For the reporting period 6.9% of the continuous PM10 dust monitoring did not occur at monitoring point 28 (TEOM 4).	General maintenance (including calibrations), instrument failure/repair, and power outages.	TEOM4 checked: each month, remotely each day and following power outage and/or repair work.

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
M2.2	Within the period from 8 Feb 2018 - 7 Feb 2019	For the reporting period 5.1% of the continuous PM2.5 dust monitoring did not occur at monitoring point 29 (TEOM 2.5).	General maintenance (including calibrations), instrument failure/repair, and power outages.	TEOM2.5 checked: each month, remotely each day and following power outage and/or repair work.
M4.2	Within the period from 8 Feb 2018 - 7 Feb 2019	For the reporting period the percentage of continuous monitoring that did not occur for: (i) air temperature, and (ii) wind speed/direction, lapse rate, rainfall and humidity, was 2.7% and 0.6% respectively.	General maintenance (including calibrations), instrument failure/repair, and power outages.	Meteorological equipment checked remotely each day and following any repair work.

Table 40 Details of Non-Compliances (ML1573)

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
Condition 7	8/03/2018	The anniversary of the Mining Lease is 8 February each year and as such the report is due for lodgment by 07 March each year. The annual exploration report for ML 1573 for the reporting period 08.02.17 - 07.02.18 was lodged on 09 March 2018. On the basis that the exploration was not submitted within the required timeframe, this condition has been assessed as non-compliant.	The auditors reviewed the email trail with regards to the Annual Exploration Reports submission. WCPL stated that the time delay for submission was caused by the lengthy process associated with uploading the data for the 176 boreholes. The auditors were informed by the WCPL Mine Geologist that the site was yet to receive EROL Submission and acceptance report notifications from the Director-General. WCPL were informed by RR that the Department has a large backlog of reports to be examined.	In future, account for the time taken to upload borehole data to ensure the annual exploration report is lodged by the due date.

12.0 ACTIVITES FOR NEXT REPORTING PERIOD

Activities proposed to be carried out by WCPL at the Mine during the 2019 review period (i.e. 1 January 2019 to 31 December 2019) include the following:

- Construction of the WEP related infrastructure;
- Finalise BVT performance and completion criteria;
- Finalise Rehabilitation Strategy;
- Revise the BMP accordingly;
- Finalise Social Impact Management Plan
- Completion of the DPI Recommendations within the revision of the SWMP;
- Continued exploration activities in EL 6169 and EL 7091;
- Continued exploration drilling within ML 1573 (including both infill drilling and lower density drilling).
- Continuation of rehabilitation works in completed mined areas;
- Inspection and review of rehabilitation areas to assess maintenance requirements;
- Continued weed and animal pest control across WCPL-owned land.
- Continued stock exclusion in the ECAs to promote regeneration.
- Ongoing demolition of derelict houses, including in-pit disposal of inert building material.
- Continued consultation with surrounding landholders.
- Ongoing CCC meetings, including continued publication of the meeting minutes on the Peabody website.
- Continuation of Wollar “Have-a-chat” sessions on a monthly basis;
- Undertake geochemical analysis through the geological profile;
- Continue the Spontaneous Combustion Propensity testing regime;
- Complete 121ha of rehabilitation in 2019 – in accordance with approved Mine Operations Plan.
- In accordance with Condition 5, Schedule 5 of Development Consent SSD-6764 WCPL will review, and if necessary, revise the strategies, plans and programs required under the Project Approval within three months following submission of this Annual Review and Environmental Management Report or as otherwise specified in the Project Approval.

13.0 REFERENCES

- *Wilpinjong Coal Mine – 2018 Annual Biodiversity Monitoring Report, Eco Logical Australia Pty Ltd (March 2019)*
- *Wilpinjong Coal Mine – Stream Health Monitoring, Eco Logical Australia Pty Ltd (March 2019)*
- *Wilpinjong Coal Mine – 2018 Channel Stability Monitoring Report, Eco Logical Australia Pty Ltd (March 2019)*
- *Environmental Noise Monitoring (January 2018 to December 2018), Global Acoustics Pty Ltd*
- *Ambient Air Quality Monitoring Validate Report/s (January to April 2018), Ecotech Pty Ltd*
- *Air Quality Monitoring Data Review Wilpinjong 2018, Todoroski Air Sciences (March 2019)*
- *Wilpinjong Annual Review Groundwater Analysis HydroSimulations (March 2019)*
- *Wilpinjong Coal Mine – Surface Water Analysis HydroSimulations (March 2019)*
- *Wilpinjong Mine – Site Water Balance Review for 2018 Annual Review, WRM (February 2019)*

Appendices