




# **2017 Annual Review**

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**Wilpinjong Coal Mine**

**Table 1 Annual Review Title Block**

<b>Name of operation</b>	Wilpinjong Coal Mine
<b>Name of operator</b>	Wilpinjong Coal Pty Limited
<b>Development consent/project approval #</b>	SSD-6764
<b>Name of holder of development consent/project approval</b>	Wilpinjong Coal Pty Limited
<b>Mining lease #</b>	ML 1573
<b>Name of holder of mining lease</b>	Wilpinjong Coal Pty Limited
<b>Water licences #</b>	WAL21499, WAL19045, WL19055, WL19057, WL19058, WL19426, WAL19425, WAL19430, WAL36398, WAL9476, WAL39785, WAL41548, WAL41549, WAL41550, WAL41551
<b>Name of holder of water licence</b>	Wilpinjong Coal Pty Limited
<b>MOP start date</b>	01 July 2017
<b>MOP end date</b>	30 June 2019
<b>Annual review start date</b>	01 January 2017
<b>Annual review end date</b>	31 December 2017
<p><b>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 2017 to 31 December 2017 and that I am authorised to make this statement on behalf of Wilpinjong Coal Pty Limited.</b></p> <p><i>Note.</i></p> <p>a) <i>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.</i></p> <p>b) <i>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).</i></p>	
<b>Name of authorised reporting officer</b>	Kieren Bennetts
<b>Title of authorised reporting officer</b>	Environment & Community Manager
<b>Signature of authorised reporting officer</b>	
<b>Date</b>	30 March 2018

This 2017 Annual Review (AR) (this Report) presents a summary of regulatory compliance, environmental performance and community engagement activities for the *review period* from 1 January 2017 to 31 December 2017.

This Report provides the results and assessment of environmental performance relevant to both the former project approval PA05-0021 (for the period 1 January 2017 to 18 September 2017) and the current development consent approval SSD-6764 (for the period 19 September to 31 December 2017).

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. This AR has also been prepared to satisfy the reporting requirements of PA05-0021 and Mining Lease (ML) ML1573. 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; 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*
PA 05-0021	No
SSD-6764	No
ML 1573	Yes
EL 6169 & 7091	Yes
EPL 12425	No
Water Licences	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
PA 05-0021, Sch 3	Con. 54	The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director- General.	Non-compliance	No endorsement sought from DP&E Director General (i.e. Secretary).	<b>Section 11</b>
SSD-6764	Con.30(d)iii	WCPL did not reschedule an alternate agreed time in consultation with DPI-Water in regards to DPI Water Recommendations prior to the end of the 2017 reporting period.	Non-compliance	WCPL will seek an extension of time with the DPI Water to allow the completion of the relevant reports to address the DPI Recommendations in the SWMP in 2018.	<b>Section 11</b>
EPL 12425	L2.1	Laboratory reported Oil & Grease (O&G) concentration (17mg/L) above O&G limit specified in L2.4 of EPL on the 28 July 2017.	Non-compliance	Result likely the result of laboratory error or interference in the analysis method.	<b>Section 11</b>
EPL 12425	M2.2	Two (2) PM10 dust samples were not collected and analysed at monitoring point 13 (HV1) on the 11 and 17 February 2017.	Non-compliance	The high volume air sampler (HV1) did not operate due to a fault with HV1.	<b>Section 11</b>
EPL 12425	M2.2	Two (2) PM10 dust sample were not collected and analysed at monitoring point 20 (HV4) on the 11 June and 28 August 2017.	Non-compliance	The high volume air sampler (HV4) did not operate due to power failure.	<b>Section 11</b>



Relevant Approval	Condition	Condition Description	Compliance Status	Comment	Section in AR
EPL 12425	M2.2	For the reporting period 2.0% of the continuous PM10 dust monitoring did not occur at monitoring point 25 (TEOM 3).	Non-compliance	Instrument failure/repair, general maintenance (including calibrations) and power failure main causes.	<b>Section 11</b>
EPL 12425	M2.2	For the reporting period 1.1% of the continuous PM10 dust monitoring did not occur at monitoring point 28 (TEOM 4).	Non-compliance	General maintenance (including calibrations) or power failure main causes.	<b>Section 11</b>
EPL 12425	M4.2	For the reporting period 1.6% of the continuous monitoring for air temperature, wind speed/direction, lapse rate, rainfall and humidity did not occur.	Non-compliance	General maintenance (including calibrations) or equipment issues main causes.	<b>Section 11</b>

Table 4 Compliance Status Key

Risk Level	Colour Code	Description
<b>High</b>	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
<b>Medium</b>	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>• potential for serious environmental consequences, but is unlikely to occur; or</li> <li>• potential for moderate environmental consequences, but is likely to occur</li> </ul>
<b>Low</b>	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> <li>• potential for moderate environmental consequences, but is unlikely to occur; or</li> <li>• potential for low environmental consequences, but is likely to occur</li> </ul>
<b>Administrative non-compliance</b>	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)<sup>1</sup> has superseded the Project Approval (Project Approval 05-0021)<sup>2</sup>.

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 (in Mining Lease 1573) 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
<b>Blair Jackson</b>	General Manager	Email: <a href="mailto:bjackson@peabodyenergy.com">bjackson@peabodyenergy.com</a>
<b>Kieren Bennetts</b>	Environment & Community Manager	Email: <a href="mailto:kbennetts@peabodyenergy.com">kbennetts@peabodyenergy.com</a>
<b>Clark Potter</b>	Senior Environmental Advisor	Email: <a href="mailto:cpotter@peabodyenergy.com">cpotter@peabodyenergy.com</a>
<b>Vacant</b>	Environmental Advisor	Email: To be advised

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  
MUDGE E NSW 2850

**Phone Number**

Ph:(02) 6370 2500

<sup>1</sup> SSD-6764 commenced on the 19 September 2017. WCPL operated in accordance with PA05-0021 during the reporting period until the commencement of SSD-6764

<sup>2</sup> 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 December 2018.

Figure 1 Locality Plan



- LEGEND**
- Mining Lease Boundary
  - Exploration Licence Boundary
  - Authorisation Boundary
  - Local Government Boundary
  - NSW State Forest
  - National Park, Nature Reserve or State Conservation Area
  - ⚡ Mining Operation

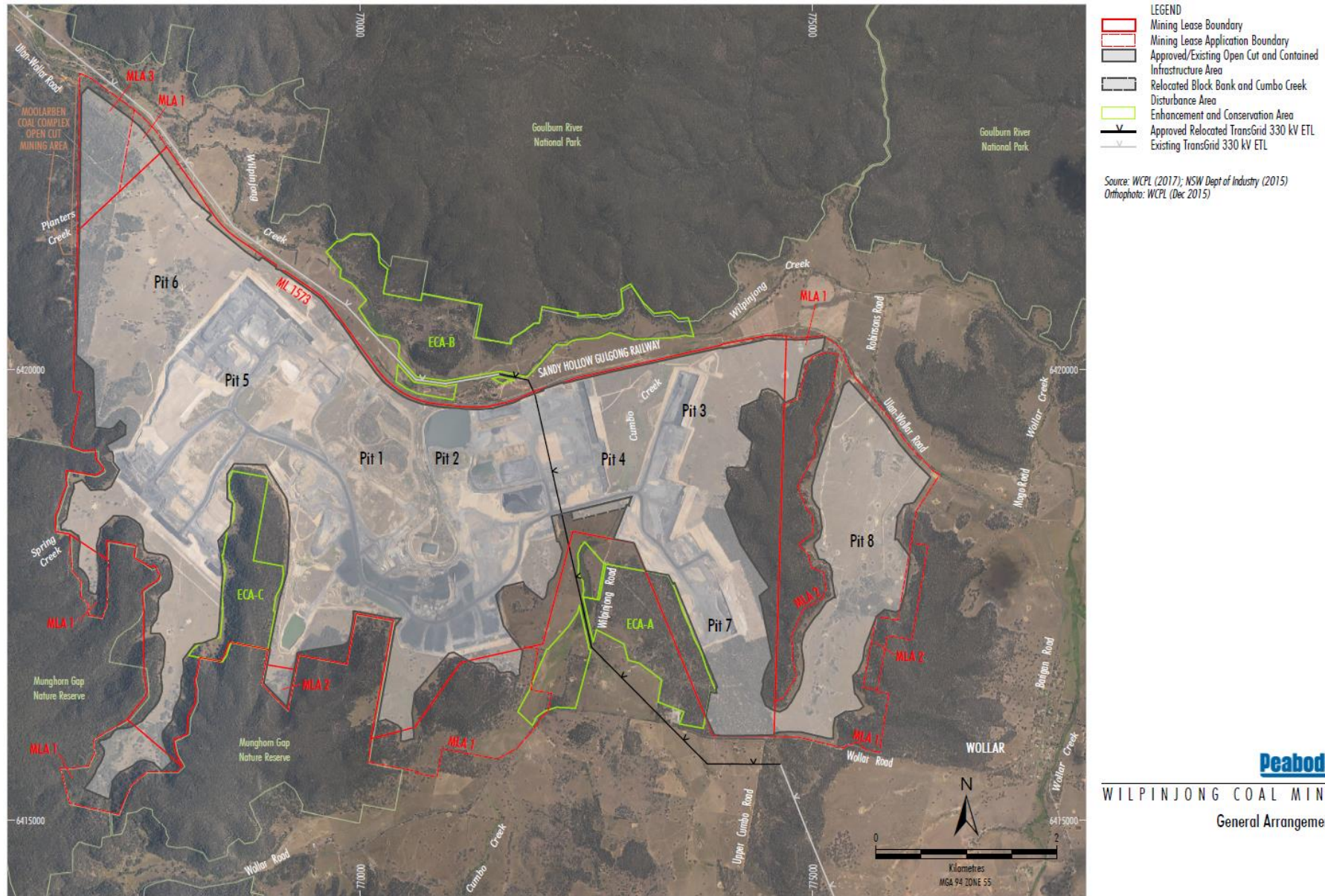
Source: NSW Land & Property Information (2015);  
NSW Dept of Industry (2015); Geoscience Australia (2011)



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 Application	MLA 510	Section 1.2.1
	Mining Lease Application	MLA 515	Section 1.2.1
	Mining Lease Application	(yet to be lodged)	(yet to be lodged)
	Exploration Licence	EL 6169	28/11/2017
		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 4 <sup>th</sup> 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)	
EPA	Environment Protection Licence (EPL)	EPL 12425	Until the licence is surrendered, suspended or revoked. The licence is subject to review every 3 years
	NSW Radiation Control Act 1990 Registration	Licence Number 5061384	02 January 2019
Work Cover NSW	Explosives Licence	NSW Explosives Act 2003 Part 3 Licence (Licence Number XSTR200024)	24 March 2018
DPI-Water	Water Licences	Refer to Table 19 & Table 20 in Section 7.1	Refer to Table 18 & Table 20 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 December 2018.

### 3.1 Ulan Road Strategy (Summary of Actions 2017)

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 continue in line with the Strategy and managed by MWRC.

#### Ulan Road Status

- Construction start date was 1 April 2014;
- Likely completion date August 2018; and
- Construction is approximately 90% complete.

#### Cope Road Status

- Construction start date was 1 July 2014; and
- Construction now complete.

### 3.2 Changes to Approvals

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). WCPL have sought approval from the DP&E to extend the extension to time for surrendering PA05\_0021 until 31 December 2018.

SSD-6764 commenced on the 19 September 2017. WCPL operated in accordance with PA05-0021 during the 2017 reporting period until the commencement of SSD-6764.

There was one variation to EPL 12425 during the review period. Licence variation notice 1547609 on the 16 January 2017 allowed water discharge increase from 5ML/day to 15ML/day from licensed discharge Point 24 and also included a pollution study and reduction program (PRP) relating to waste from the water treatment process. A variation application was lodged with the EPA during August 2017 to align with a number of consent condition requirements as a result of the Wilpinjong Extension Project. At the end of the 2017 reporting period the application had not been determined by the EPA.

The Mining Operations Plan (MOP) was revised and resubmitted on the 23 June 2017 to include all proposed mining and associated activities as described in the WEP EIS<sup>3</sup>, for the period 1 July 2017 to 30 June 2019 (the MOP term). The new MOP was approved by the DRG on the 4 July 2017 and replaced the previous MOP (as amended<sup>4</sup>) that was initially approved by the DRG on 11 June 2014.

### 3.3 Mining Lease Application

The WEP extends into three new Mining Lease Application (MLA) areas within both EL 6169 and EL 7091 (**Figure 2**). WCPL has lodged two MLAs with the DRG (within the NSW Department of Planning and Environment) for the WEP development areas outside of the existing ML1573. WCPL will also renew existing ELs and ML1573 as required during the life of the Mine. As discussed with the DRG on the 5 June 2017, WCPL will amend the current MOP and associated MOP Plans accordingly after receiving official confirmation from the DRG the MLAs have been converted into a Mining Lease (ML) and new MLs have been issued to WCPL. No mining activities will occur in the MLAs until the new MLs are issued and the current MOP is amended and approved by the DRG.

### 3.4 Management Plans

WCPL operates an Environmental Management System to manage compliance and advance continual improvement across the Mine. During the review period all management plans were revised and updated accordingly and submitted for re-approval as a result of 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 <sup>^</sup>	Condition 5	Approved on 4 August 2017
Blast Management Plan <sup>^</sup>	Condition 14	Approved on 4 August 2017
Air Quality Management Plan <sup>^</sup>	Condition 20,	Approved on 4 August 2017
Water Management Plan <sup>^</sup>	Condition 30	Approved on 4 August 2017
Site Water Balance <sup>^</sup>	Condition 30(d)(ii)	Approved on 4 August 2017
Surface Water Management Plan <sup>^</sup>	Condition 30(d)(iii)	Approved on 4 August 2017
Groundwater Management Plan <sup>^</sup>	Condition 30(d)(iv)	Approved on 4 August 2017
Biodiversity Management Plan <sup>^</sup>	Condition 42	Approved on 4 August 2017
Aboriginal Cultural Heritage Management Plan <sup>^</sup>	Condition 47	Approved on 4 August 2017
Waste Management Plan <sup>^</sup>	NA	NA

<sup>3</sup> Wilpinjong Extension Project Environmental Impact Statement (WCPL, 2016).

<sup>4</sup> MOP Amendment C was approved on the 5 October 2016.

Management Plan	Schedule 3 of SSD-6764	Approval Status
Spontaneous Combustion Management Plan <sup>^</sup>	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 <sup>^</sup>	Condition 1, Schedule 5	Approved on 4 August 2017

**Notes:** <sup>^</sup> Last approved on the 20 March 2017 under PA05-0021, NA = Not applicable under conditions of SSD-6764

During the reporting period, WCPL in consultation with the relevant agencies and stakeholders were 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; and
- The Rehabilitation Strategy as required by Condition 61, Condition 3 of the Development Consent SSD-6764; and
- BVT performance and completion criteria as required by Condition 37, Schedule 3 of Development Consent SSD-6764.

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](http://www.peabodyenergy.com)



## 4.0 OPERATIONS SUMMARY

**Table 8** displays the production summary for 2017, compared to the production for 2016 and the forecast production for 2018.

**Table 8 Production Summary**

Material	PA05-0021 Approved Limit	SSD-6764 Approved Limit	This Reporting Period (actual)	Next Reporting Period (forecast)
<b>Waste Rock/Overburden</b>	34.1Mbcm	NA	37.9Mbcm	47.2Mbcm
<b>ROM Coal</b>	16 Mtpa	16 Mtpa	13.68Mt	15.26Mt
<b>Coarse Reject &amp; Tailings (TFP)*</b>	NA	NA	1.56Mt	1.86Mt
<b>Fine Tailings</b>	NA	NA	0	0
<b>Product Coal</b>	12.5Mtpa <sup>^</sup>	NA <sup>#</sup>	12.19Mt <sup>#</sup>	13.05Mt <sup>#</sup>

**Notes:** \*Tailings Filter Press<sup>5</sup>, Million tonnes per annum = (Mtpa), Million bank cubic meters = (Mbcm) <sup>^</sup> MOD7 Production and raiiling of 13 Mtpa of product coal in 2016 (only). <sup>#</sup> Product coal railed.

### 4.1 Other Operational Conditions

At the end of the 2017 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 the previous MOP and Plan 3A of the new MOP (**Figure 2**).

In accordance with Condition 50, Schedule 3 of PA05-0021 and 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.

12.19Mt of product coal was transported from the Mine via rail during the 2017 Annual Review period and involved an average of approximately four train movements per day during 2017 (**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 PA05-0021 and 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 minor alterations to existing administration buildings and expansion and increased capacity of the water treatment facility.

### 4.2 Next Reporting Period

The proposed mining locations for the 2018 review period is Pit 1, Pit 2, Pit 3, Pit 4, Pit 5, Pit 6 and Pit 7.

Extraction in the Pit 2 area is being accelerated to allow for part relocation of the high voltage line, which is required as part of the WEP. A section of the Ulan-Wollar Road is also scheduled for part relocation in 2018 in accordance with the WEP. Other activities in 2018 include minor alterations to existing buildings, expansion to ablution facilities in the main administration area, relocation of remote crib huts from Pit 4 to Pit 3 and expansion of the existing car parking facilities.

<sup>5</sup> 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 the 2016 Annual Review. However, number of actions and improvements were identified by the DP&E from the 2016 Annual Review, for the 2017 Annual Review. These actions and where they are addressed in the 2017 Annual Review are summarised in **Table 9**. No actions were identified by the DRG in regards to the 2016 Annual Review.

**Table 9 Actions Required From Previous Annual Review**

Action required from previous Annual Review	Requested by	Action taken by WCPL	Where addressed in this Annual Review
Provide previous results and trends for noise monitoring and waste minimisation	DP&E	Noise trends and waste trends provided in Sections 6.2 and 6.5 respectively.	<b>Section 6.2</b> <b>Section 6.5</b>
Ensure all trends are reported over the life of the project in accordance with Condition 3(d) of Schedule 5.	DP&E	Data trends were applicable have been applied throughout this AR.	<b>Section 6.0</b> <b>Section 7.0</b> <b>Section 9.0</b>
Switch the vibration max. limit and vibration limit 5% total blasts in Appendix E	DP&E	Limits have been switched and rectified.	<b>Appendix 3E</b>
Ensure all non-compliances or reported incidents identified have been reported in the Annual Review.	DP&E	All non-compliances or reported incidents have been provided for in this AR.	<b>Section 6.2</b> <b>Section 6.3</b> <b>Section 11</b>

## 6.0 ENVIRONMENTAL PERFORMANCE

Environmental management measures undertaken during the 2017 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 PA 05-0021<sup>6</sup>, SSD-6764 and EPL12425. The 2017 Annual Review provides the results and assessment of environmental performance relevant to both the former project approval PA05-0021 (i.e. 1 January 2017 to 18 September 2017) and the current development consent approval SSD-6764 (i.e. 19 September to 31 December 2017). The locations of environmental monitoring undertaken throughout the 2017 review period are provided in **Appendix 3**.

### 6.1 Meteorological Monitoring

Local meteorological data for 2017 was recorded by the Mine's meteorological station and was operated in accordance with PA05-0021, 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 146mm in March. The least amount of rainfall was recorded in September with 3mm for the month. The total cumulative annual rainfall recorded for the year was 531.4mm, 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 815.6mm recorded in 2016. The total cumulative annual rainfall recorded for 2017 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 37.6°C (at 2m) was recorded in December. The lowest minimum temperature was -4.0°C (at 2m) recorded in May and July. The 2017 average minimum of 3.8°C was slightly higher than the short term (i.e. year 2006 to 2015) average minimum of 3.0°C. The 2017 average maximum of 26.4°C was lower than the short term average maximum of 31.7°C. Wind speed recorded during the 2017 review period showed an average monthly wind speed range between 1.6 metres per second (m/s) to 2.8m/s. A maximum wind speed of 20.7m/s was recorded in June.

### 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) were specified in Condition 17, Schedule 3 of PA05-0021 and are now specified in Condition 17, Schedule 3 of SSD-6764. During the 2017 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 <sup>^</sup> , DG11 & DG15 <sup>^</sup>	Monthly
	DG12, DG13 and DG14 <sup>#</sup>	Monthly (mining < 1 km of the site)
High-Volume Air Sampling	HV1, HV4 & HV5	Continuous six day cycle
TSP	HV3 <sup>^</sup>	Continuous six day cycle
TEOM (PM <sub>10</sub> )	TEOM 1 <sup>^</sup> , TEOM 3 & TEOM 4	Continuous (24 hour average)
TEOM (PM <sub>2.5</sub> )	TEOM 5	Continuous (24 hour average)*

**Notes:** <sup>^</sup> Data from DG10, DG15, HV3 and TEOM1 are not for compliance purposes but utilised for management purposes only.

<sup>#</sup> Aboriginal rock art site monitoring Sites 72, 152 and 153. Shaded cells indicate TEOM<sub>PM2.5</sub> added to the air quality monitoring network as a result of SSD-6764 and revised AQMP (Version 3). \* TEOM<sub>2.5</sub> installed and operating prior to 31/12/2017.

<sup>6</sup> SSD-6764 commenced on the 19 September 2017. WCPL operated in accordance with PA05-0021 during the reporting period until the commencement of SSD-6764.

**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 2017 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 (**Section 8.2**). There were no reportable incidents as a result of spontaneous combustion in 2017, however one unverified odour complaint was received in May (**Section 9**). 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 2018.

**Table 11 Assessment of Spontaneous Combustion Performance Indicators**

Performance Indicator	2017 Target	2017 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).

\*\* EPA reported to WCPL on the 7 June 2017 that spon com odours during unannounced surveys in April and May were detected. The surveys detected odour adjacent to the Mine from the Ulan-Wollar Road but no odour detectable in the Wollar Village. On the 25 May WCPL and the EPA conducted a joint inspection of the Mine in regards to odour management. The EPA concluded in correspondence from the 7 June 2017:

*The EPA would like to draw your attention to section 129 of the Protection of the Environment Operations Act 1997 (POEO Act) which states:*

*"The occupier of any premises at which scheduled activities are carried on under the authority conferred by a licence must not cause or permit the emission of any offensive odour from the premises to which the licence applies."*

*Taking into account that the action being undertaken by the Mine in relation to spon com, the EPA will not be taking any future action in relation to this matter. This letter however serves as a Formal Warning that should further odour emissions from the Mine occur in future, the EPA will consider appropriate regulatory action.*

Table 12 Air Quality Monitoring Environmental Performance


Aspect	Approved Criteria <sup>D</sup>	Predictions	Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
Deposited Dust <sup>C</sup>	<b>SSD-6764</b> 4 g/m <sup>2</sup> /month <sup>E</sup> <i>(at any residences on privately owned land)</i>	<b>WEP Predictions</b> 1.3g/m <sup>2</sup> /month <sup>J</sup>	Annual average dust deposition results for compliance purposes were below the approved criteria of 4 g/m <sup>2</sup> /month at compliance monitoring sites: <ul style="list-style-type: none"> <li>DG4 (Ave: 1.3 g/m<sup>2</sup>/month)</li> <li>DG5 (Ave: 1.4 g/m<sup>2</sup>/month)</li> <li>DG8 (Ave: 1.9 g/m<sup>2</sup>/month)</li> <li>DG11 (Ave: 1.8 g/m<sup>2</sup>/month)</li> </ul>	<ul style="list-style-type: none"> <li>Dust deposition results for DG5 and DG15 which are at locations nearest to private and mined owned land in the 2017 period were below relevant criteria (<b>Graph 1</b>);</li> <li>All other dust depositional results for management purposes were also below the approved criteria except for DG10 (<b>Graph 1</b>). DG10 is located in the WEP mining area of Pit 8; there are no private receivers at DG10.</li> <li>Annual average dust deposition at compliance sites for the past seven years (<b>Graph 2</b>) shows a minor 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.</li> </ul>	<ul style="list-style-type: none"> <li>In accordance SSD-6764, WCPL will review, and if necessary revise, the AQMP within three months of the submission of this Annual Review.</li> <li>All dust related complaints were responded to in accordance with the Complaints Management Procedure.</li> <li>During the review period the following control measures were implemented in accordance with the MOP and AQMP.                             <ul style="list-style-type: none"> <li>Mine managed in response to dust alarms from TEOMs;</li> <li>Metrological condition assessed prior to blasting;</li> <li>All active haul roads and traffic areas were watered on an appropriate basis using water carts; and</li> <li>Water sprays were utilised on the ROM coal bins, and recently stripped areas as required.</li> </ul> </li> <li>In 2017, approximately 127.14hrs lost time hours associated with implementation of dust management strategies.</li> </ul>
	<b>PA05-0021</b> 4 g/m <sup>2</sup> /month <sup>E</sup> <i>(at residences on privately owned land)</i>	<b>MOD6 Predictions</b> 1.2 - 1.3g/m <sup>2</sup> /month <sup>G</sup>	However, dust deposition results for the reporting period were slightly above MOD6 EA predictions and WEP predictions at private receivers nearest to DG5 in the Wollar Village.		
TSP	<b>SSD-6764</b> 90 µg/m <sup>3</sup> <sup>AE</sup> <i>(at any residences on privately owned land)</i>	<b>WEP Predictions</b> 25.9 – 26.3µg/m <sup>3</sup> <sup>K</sup>	Annual average results for the reporting period complied with the approved criteria of 90 µg/m <sup>3</sup> : <ul style="list-style-type: none"> <li>HV3 (Ave: 38.1 µg/m<sup>3</sup>)</li> </ul> Annual average TSP results for the reporting period where higher than 2016 results of 27.59µg/m <sup>3</sup> . The 2017 results at HV3 are above MOD6 EA 2015 predictions for that location.	<ul style="list-style-type: none"> <li>TSP results at HV3 (<b>Graph 3</b>) for review period were below approved TSP criteria.</li> <li>HV3 is located within the approved WEP area, but not as yet developed Pit 8 mining area. There are no private receivers at HV3.</li> <li>The annual average TSP results for the past 12 years, indicates a slightly increasing trend (<b>Graph 3</b>), although remaining below the applicable TSP criteria of 90 µg/m<sup>3</sup>.</li> </ul>	
	<b>PA05-0021</b> 90 µg/m <sup>3</sup> <sup>AE</sup> <i>(at any residences on privately owned land)</i>	<b>MOD6 Predictions</b> 29.5µg/m <sup>3</sup> <sup>H</sup>	There are no TSP predictions for the location of HV3 in the WEP i.e. HV3 is located in the approved mining area of Pit 8.  The WEP TSP predictions for the nearest private receivers in the Wollar Village (approx. 2.5km to the south-east) range between 25.9 - 26.3µg/m <sup>3</sup> .		

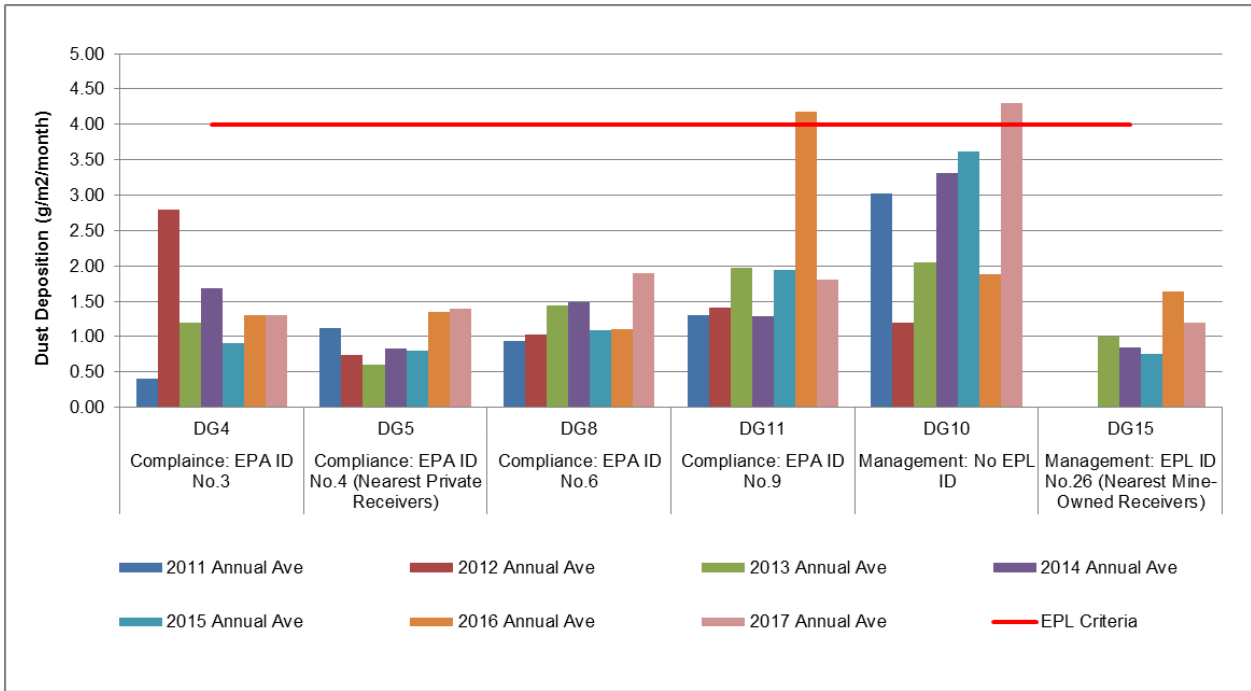
Table 12 Air Quality Monitoring Environmental Performance cont.

Aspect	Approved Criteria <sup>D</sup>	Predictions	Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions																												
PM <sub>10</sub>	<b>SSD-6764</b> 50 µg/m <sup>3</sup> AF	24hr total impact predictions not modelled	The maximum <sup>1</sup> 24hour average PM <sub>10</sub> results for the reporting period complied with the approved criteria of 50 µg/m <sup>3</sup> : <ul style="list-style-type: none"> <li>HV1 (Max: 28.2 µg/m<sup>3</sup>)</li> <li>HV4 (Max: 43.1 µg/m<sup>3</sup>)</li> <li>HV5 (Max: 38.2 µg/m<sup>3</sup>)</li> <li>TEOM 3 (Max: 34.4 µg/m<sup>3</sup>)</li> <li>TEOM 4 (Max: 43.4 µg/m<sup>3</sup>)</li> </ul> Notes: <sup>1</sup> The maximum 24hr average PM <sub>10</sub> was exceeded at HV4, HV5, TEOM3, TEOM4 (Max: 69.1µg/m <sup>3</sup> , 55.4µg/m <sup>3</sup> , 52.2µg/m <sup>3</sup> , 50.9µg/m <sup>3</sup> on the 17 to 18 February 2017), however the results were excluded <sup>d</sup> due to a bushfire event occurring at Kains Flat which started on the 17 February 2017. As reported to the DP&E on the 20 and 27 February 2017.	<ul style="list-style-type: none"> <li>The maximum 24hr average PM<sub>10</sub> results at HV1 compliance site in the Wollar Village and HV4 from 2007 – 2017 indicates a decreasing trend (<b>Graph 4</b>)</li> <li>The maximum 24hr average PM<sub>10</sub> results at compliance site HV5 indicate an increasing trend from 2007 - 2017 (<b>Graph 4</b>).</li> <li>Annual average PM<sub>10</sub> results for both HVAS and TEOMs for the 2017 period were below their approval criteria (<b>Graph 4</b> and <b>Graph 7</b>).</li> <li>This decreasing trend is also indicated by the TEOMs.</li> <li>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).</li> <li>Below average rainfall in 2017 may have also been a contributing factor for air quality in the region.</li> </ul>	<ul style="list-style-type: none"> <li>The Mine rehabilitated approximately 82ha of mine waste rock emplacement areas in 2017;</li> <li>The Mine is scheduled to complete approximately 95ha of mine waste rock rehabilitation in 2018.</li> <li>In 2017 complaints in response to dust were 2% of the overall complaints recorded by WCPL during the 2017 reporting period.</li> <li>During the 2017 reporting period, WCPL installed a new PM2.5 TEOM in the Village of Wollar in December 2017.</li> <li>All residents in the Village of Wollar and surrounds were advised by WCPL of their rights regarding air quality via letter in accordance with SSD-6764. This included the Mine Dust and You Fact Sheet.</li> <li>Due to 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.</li> </ul>																												
	<b>PA05-0021</b> 50 µg/m <sup>3</sup> AF																																
PM <sub>10</sub>	<b>SSD-6764</b> 30 µg/m <sup>3</sup> AE	<b>WEP Predictions</b> 15.4 – 15.7 µg/m <sup>3</sup> L	Annual average PM <sub>10</sub> results for the reporting period complied with the approved criteria of 30 µg/m <sup>3</sup> and where below MOD 6 and WEP EA predictions at relevant private residences: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>HV1</th> <th>HV4</th> <th>HV5</th> </tr> </thead> <tbody> <tr> <td>Ave. (µg/m<sup>3</sup>)</td> <td>12.2</td> <td>16.7</td> <td>16.6</td> </tr> <tr> <td>Min. (µg/m<sup>3</sup>)</td> <td>2.1</td> <td>4.5</td> <td>5.1</td> </tr> <tr> <td>Max. (µg/m<sup>3</sup>)</td> <td>28.2</td> <td>69.1</td> <td>55.4</td> </tr> </tbody> </table> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>TEOM 3</th> <th>TEOM 4</th> </tr> </thead> <tbody> <tr> <td>Ave. (µg/m<sup>3</sup>)</td> <td>9.5</td> <td>12.8</td> </tr> <tr> <td>Min. (µg/m<sup>3</sup>)</td> <td>0.9</td> <td>0.9</td> </tr> <tr> <td>Max. (µg/m<sup>3</sup>)</td> <td>34.4</td> <td>43.3</td> </tr> </tbody> </table>		HV1	HV4	HV5	Ave. (µg/m <sup>3</sup> )	12.2	16.7	16.6	Min. (µg/m <sup>3</sup> )	2.1	4.5	5.1	Max. (µg/m <sup>3</sup> )	28.2	69.1	55.4		TEOM 3	TEOM 4	Ave. (µg/m <sup>3</sup> )	9.5	12.8	Min. (µg/m <sup>3</sup> )	0.9	0.9	Max. (µg/m <sup>3</sup> )	34.4	43.3		
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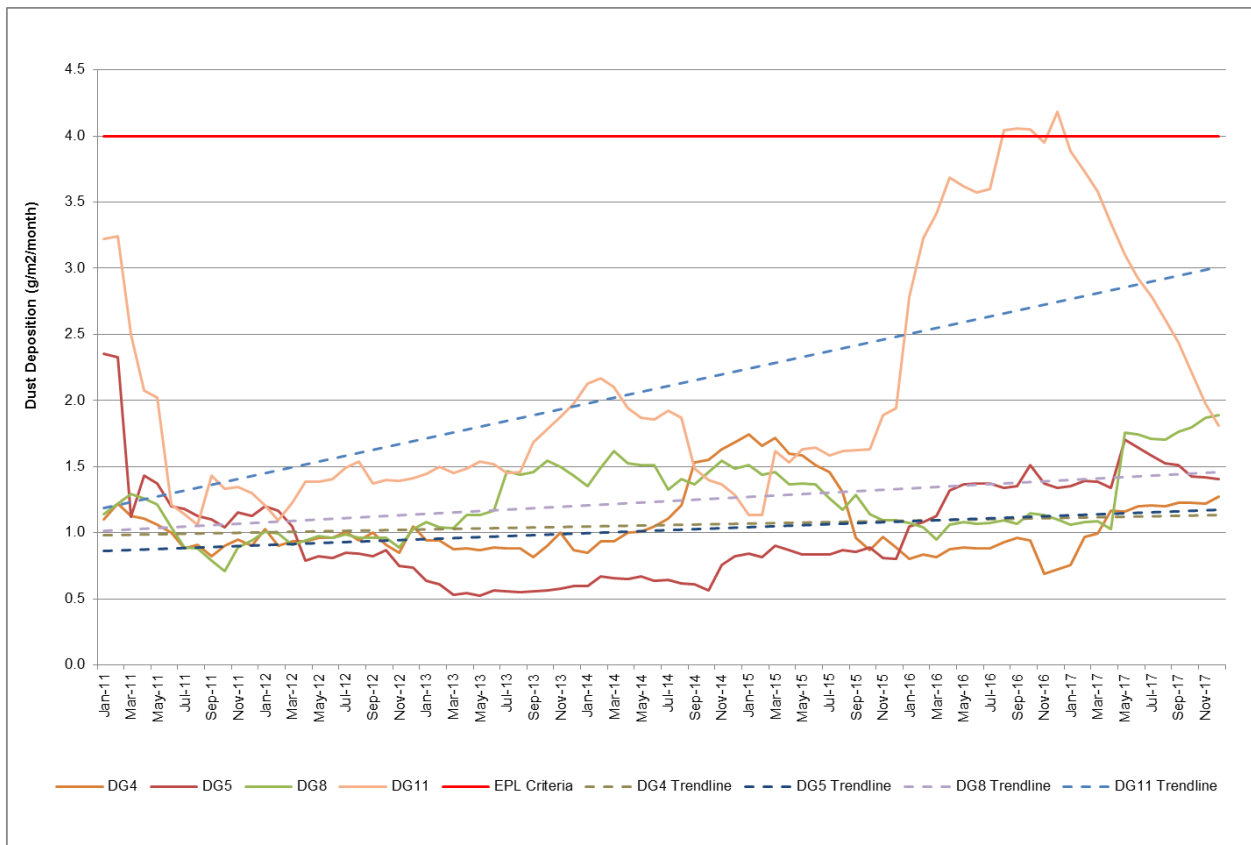
Aspect	Approved Criteria <sup>D</sup>	Predictions	Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
PM <sub>2.5</sub>	<p><b>SSD-7664</b></p> <p>No criteria established</p>	<p><b>WEP Predictions</b></p>	<p>On the 27 December 2017, the new TEOM<sub>2.5</sub> was commissioned in the Wollar Village at approximately 5.00pm. During the remaining period of 2017, the new TEOM i.e. TEOM 5 recorded the following data:</p> <ul style="list-style-type: none"> <li>• Min: 5.2 µg/m<sup>3</sup></li> <li>• Max: 10.3 µg/m<sup>3</sup></li> <li>• Ave: 7.7 µg/m<sup>3</sup></li> </ul>	<ul style="list-style-type: none"> <li>• In accordance with the AQMP, WCPL do not propose real-time response triggers for PM<sub>2.5</sub> as described for PM<sub>10</sub>, until there is sufficient PM<sub>2.5</sub> data to suggest the Mine’s activities correlate with PM<sub>2.5</sub> in the Village of Wollar.</li> <li>• This assessment will be undertaken annually by WCPL air quality monitoring specialist and the results of this assessment will be provided in the Annual Review.</li> <li>• As there was only 3 to 4 days of PM<sub>2.5</sub> data for 2017, the assessment as described in the AQMP was not determined sufficient for data analysis. This assessment will be undertaken and completed for the 2018 review period when sufficient data will be available.</li> </ul>	

**Notes:** g/m<sup>2</sup>/month = grams per square metre per month. µg/m<sup>3</sup> = 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. **(G)** Year 10 (i.e. 2015) Predicted Annual Average Dust Deposition (MOD6 Environmental Assessment) at relevant private residences. **(H)** Year 10 Predicted Annual Average TSP (MOD6 Environmental Assessment) at relevant private residences. **(I)** Year 10 Predicted Annual Average PM<sub>10</sub> (MOD6 Environmental Assessment) at relevant private residences. **(J)** Year 2018 Predicted Annual Average Dust Deposition (WEP). **(K)** Year 2018 Predicted Annual Average Results TSP (WEP). **(L)** Year 2018 Predicted Annual Average PM<sub>10</sub> (WEP).

Graph 1 - Annual Average Dust Deposition Results 2011 – 2107

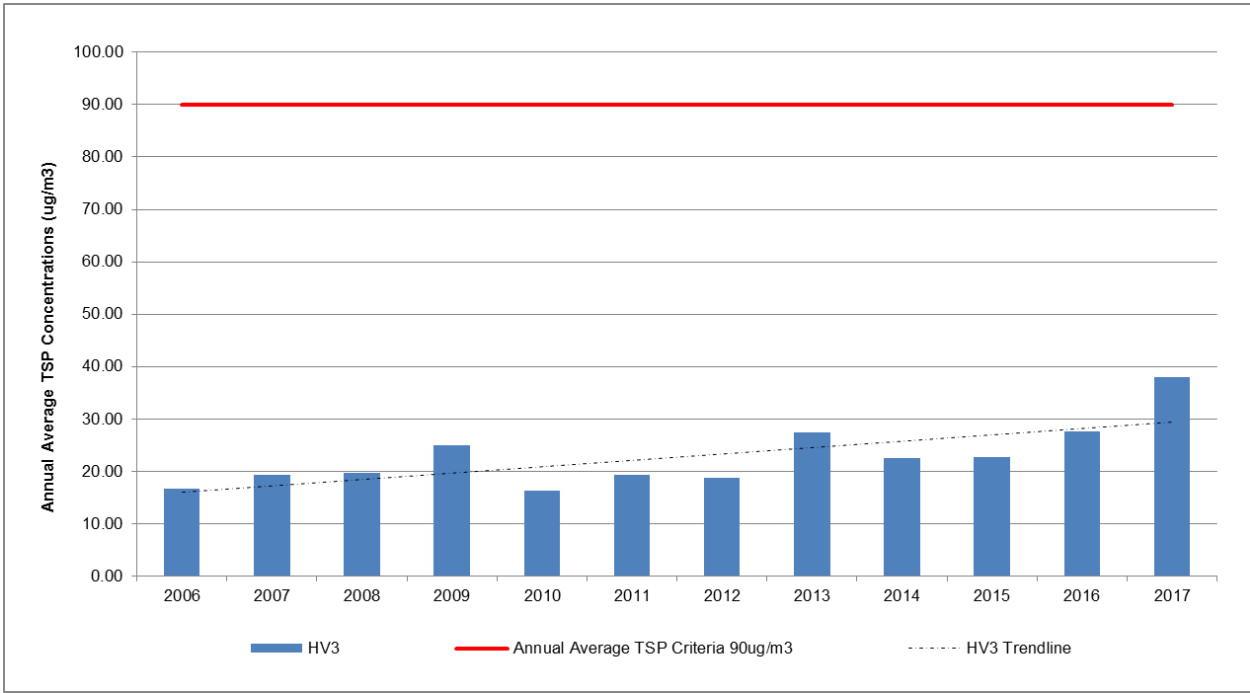


Graph 2 Compliance Dust Deposition Trends (Rolling Averages) 2011-2017

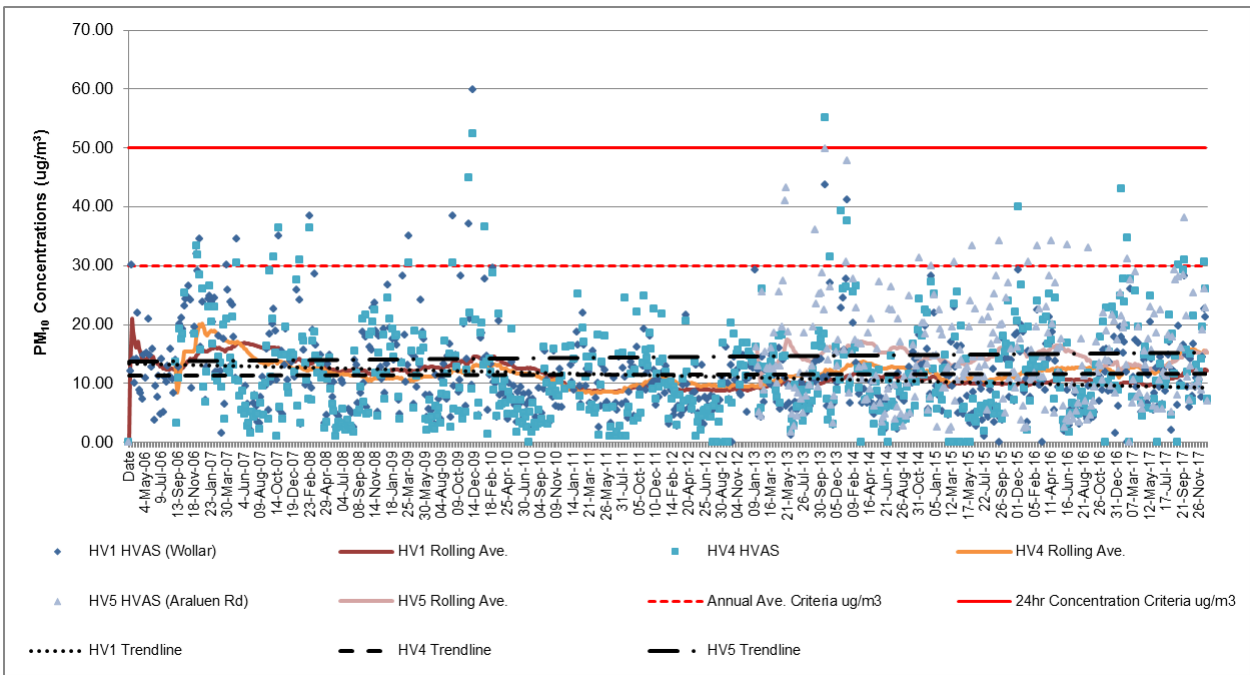




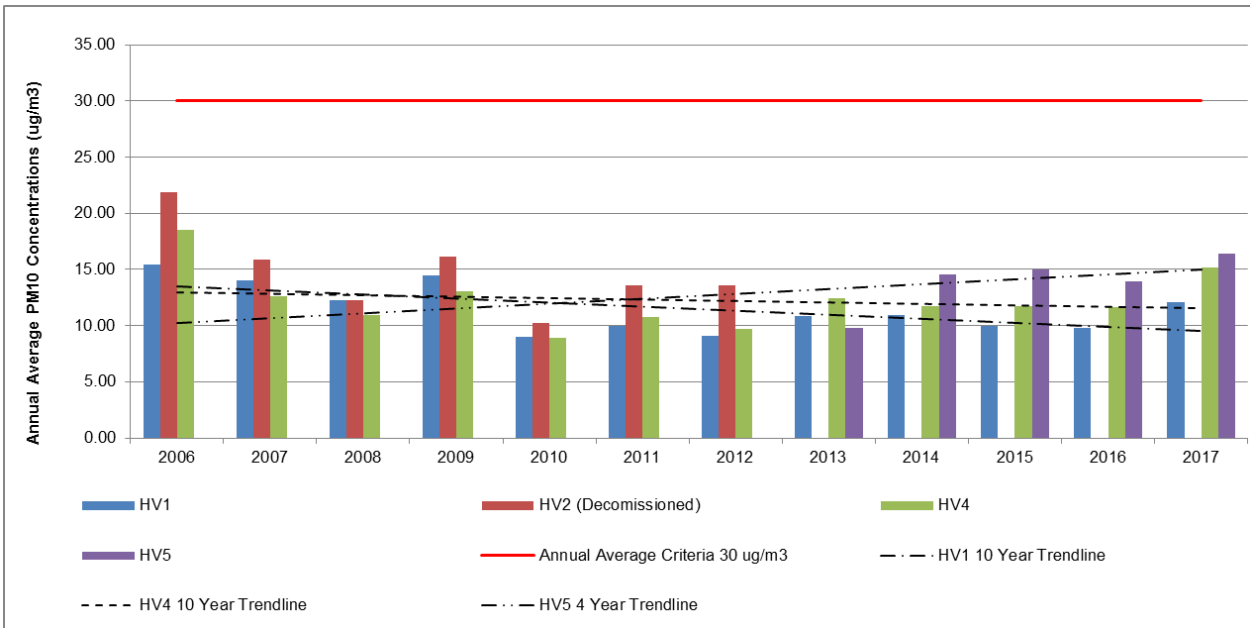
Graph 3 - Annual Average TSP Results and Trends 2006 - 2017



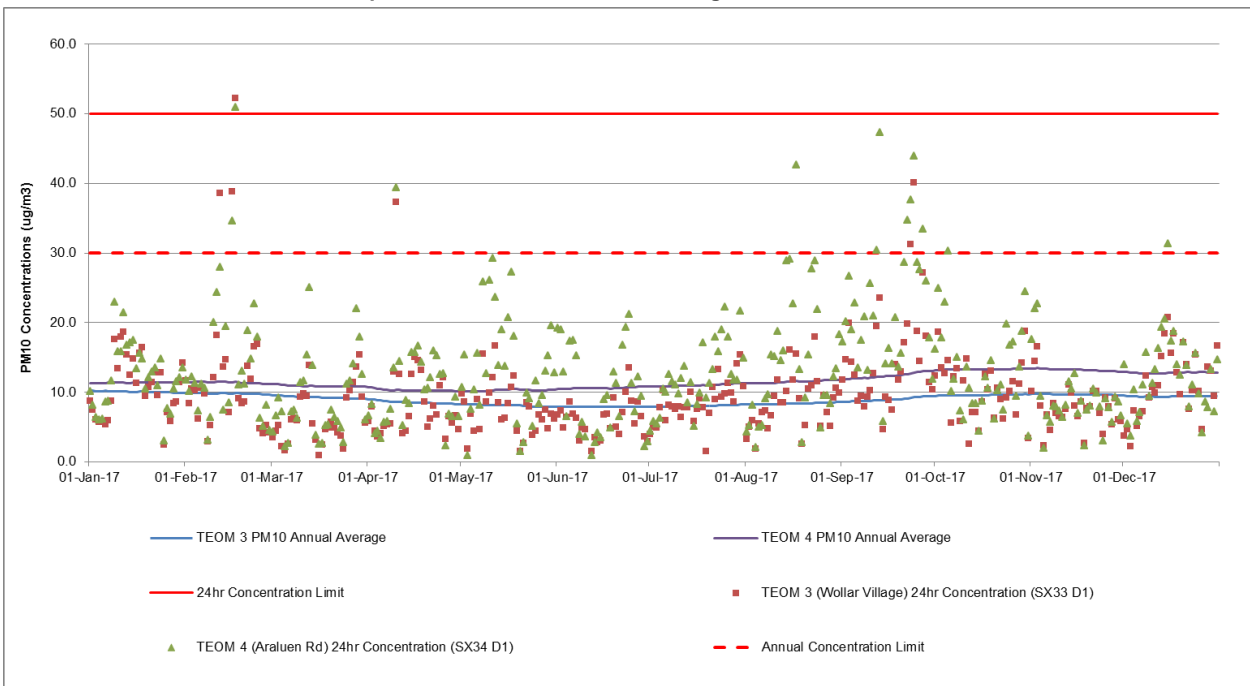
Graph 4 - HVAS PM<sub>10</sub> Results and Trends (Rolling Averages) 2006 - 2017



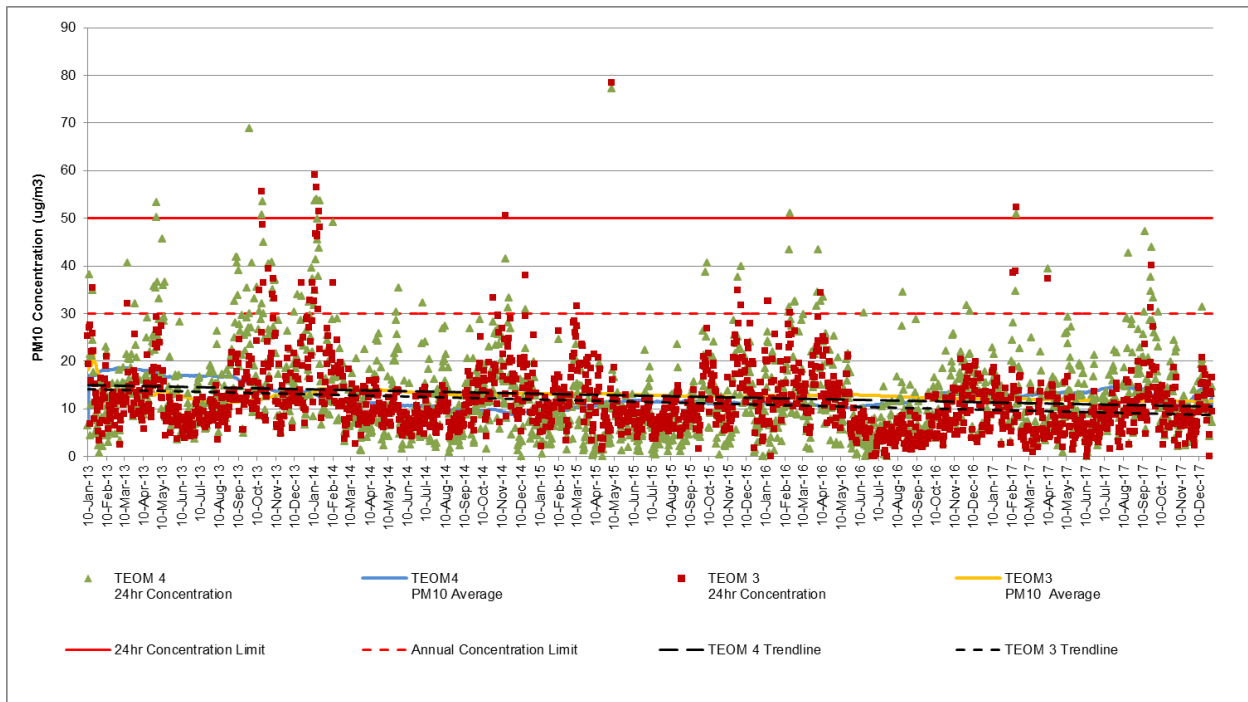
Graph 5 HVAS Annual Average PM<sub>10</sub> Results and Trends 2006 – 2017



Graph 6 - TEOM 24hr & Annual Average PM<sub>10</sub> Results 2017



Graph 7 TEOM PM<sub>10</sub> 24hr Results and Trends (Rolling Averages) 2013 - 2017



**Blast Monitoring**

The Mine has developed and implemented a Blast Management Plan (Table 7). Blasting vibration, overpressure limits, the time and frequency of blasting were specified in Conditions 6, 9 and 10, Schedule 3 of PA05-0021 respectively. Blasting criteria, hours and frequency are now specified in Conditions 7, 8 and 9, Schedule 3 of SSD-6764 respectively. During the 2017 review period, the Mine carried out vibration and overpressure monitoring in accordance with the Blast Management Plan at the locations in Appendix 3E and at the frequency displayed in Table 13.

Table 13 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 14 Blast Monitoring Environmental Performance

Aspect		Approved Criteria <sup>A</sup>			Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions									
Open Cut Blasting	Location	Air last overpressure (dB(Lin Peak)) <sup>1</sup>	Ground Vibration (mm/s) <sup>2</sup>	Allowable Exceedence	<p>Blast monitoring results for the reporting period complied (<b>Graph 8</b>) with the approved criteria of 115dB (&lt;120dB) and 5mm/s (&lt;10mm/s) at privately owned residences:</p> <ul style="list-style-type: none"> <li>Wollar Public School                             <ul style="list-style-type: none"> <li>Max. 117.9 dBL</li> <li>Max. 2.26 mm/s</li> </ul> </li> <li>No blasts exceeded the 120dBL</li> <li>One blast was greater than 115dBL or 0.4% of the allowable exceedence of 5%.</li> <li>The one recorded overpressure greater than 115dBL of 117.9dBL was on the 11 August 2017.</li> <li>The blast monitoring requirements complied during reporting period at public infrastructure:                                     <table border="1" style="margin-left: 20px;"> <tr> <td></td> <td>Pit 3 (Culvert)</td> <td>Pit 5 (Culvert)</td> </tr> <tr> <td>Max (mm/s)</td> <td>26.2</td> <td>28.2</td> </tr> <tr> <td>Ave (mm/s)</td> <td>7.9</td> <td>1.7</td> </tr> </table> </li> </ul>		Pit 3 (Culvert)	Pit 5 (Culvert)	Max (mm/s)	26.2	28.2	Ave (mm/s)	7.9	1.7	<ul style="list-style-type: none"> <li>There were 6 blasting related community complaints in 2017 compared to 19 complaints in 2016.</li> <li>All blasting events during the review period occurred during the approved times of 9.00am to 5.00pm.</li> <li>No blasting occurred on a Sunday or on a Public Holiday during the 2017 review period.</li> <li>There was no more than two blasts per day (max. of 2 allowed) and an average of 4.1 blasts per week (max. of 5 per week allowed)*</li> </ul> <p>*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.</p> <ul style="list-style-type: none"> <li>There were a total of 215 blasts for the 2017 reporting period.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>As discussed in <b>Section 9.0</b>, all blasting complaints were responded to in accordance with the Complaints Management Procedure.</li> <li>There was a decline in blasting related complaints in 2017 and the lowest since 2011 which recorded 2 blast related complaints.</li> <li>WCPL has complied with the blasting requirements of PA05-0021 and SD-6764 and on this basis will continue to implement the Blast Management Plan and review blasting performance in next review period.</li> </ul>
		Pit 3 (Culvert)	Pit 5 (Culvert)													
	Max (mm/s)	26.2	28.2													
	Ave (mm/s)	7.9	1.7													
Residence on privately owned land <sup>3</sup>	115	5	5% <sup>6</sup>													
	120	10	0%													
All Public infrastructure <sup>4</sup>	-	50	0%													

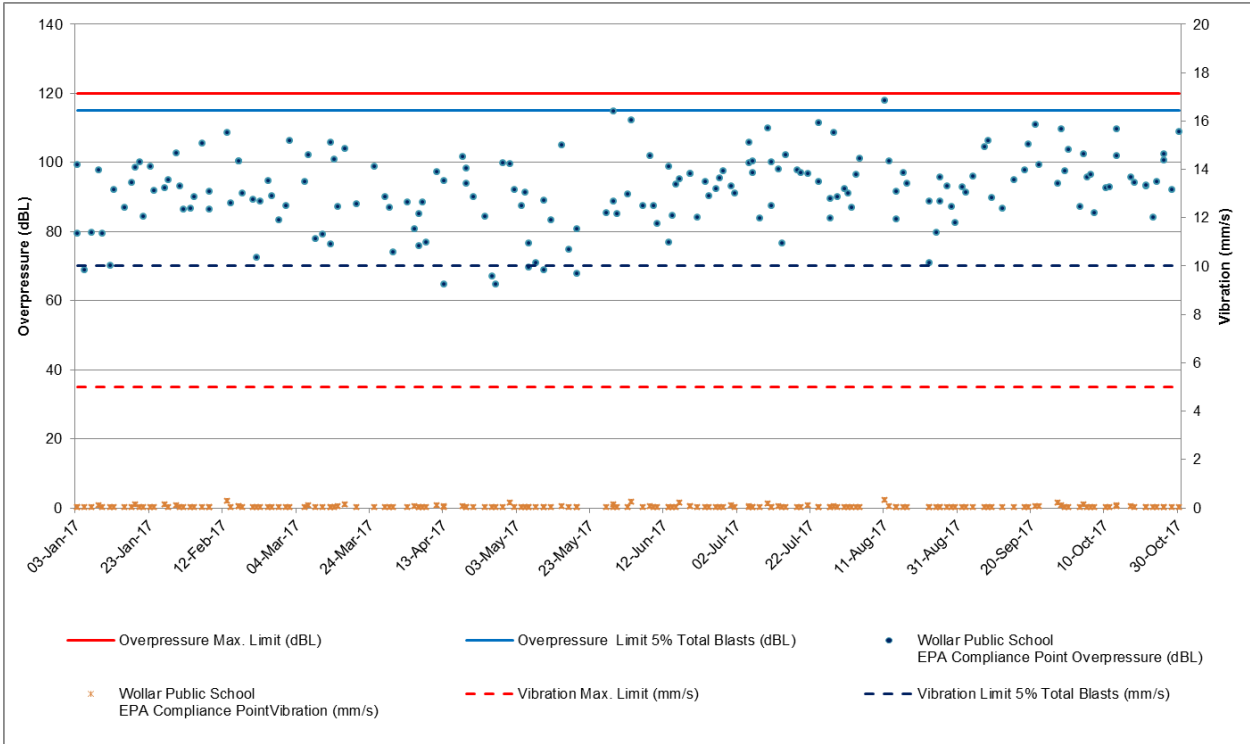
**Notes:** (1) dB (Lin Peak) = decibel linear in peak. (2) mm/s = millimetres per second. (3) These criteria do not apply if WCPL has a written agreement with the relevant owner to exceed these criteria, and has advised the DP&E in writing of the terms of this agreement. (4) The ground vibration criteria is 50 mm/s or a limit determined by the structural design methodology in AS2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Director-General)) (5) The criterion applies at any point on the dams. A minimum requirement is that monitoring of blast vibration occurs on the crest of TD3, TD4, TD5 and TD6. (6) 5% of the total number of blasts over a period of 12 months. (7) When blasting within 350m of railway culverts. (8) When blasting within 100m of railway lines. (9) No specific criteria. Adopted performance indicator when blasting within 1km. (10) No specific criteria. Potential for damage when blasting within 1km. (11) As agree with ARTC. (12) As agreed with ARTC. (13) Performance Indicator. (14) Damage Criteria. (A) Approved criteria for both PA05-0021 and SSD6764

Table 14 Blast Monitoring Environmental Performance (cont.)

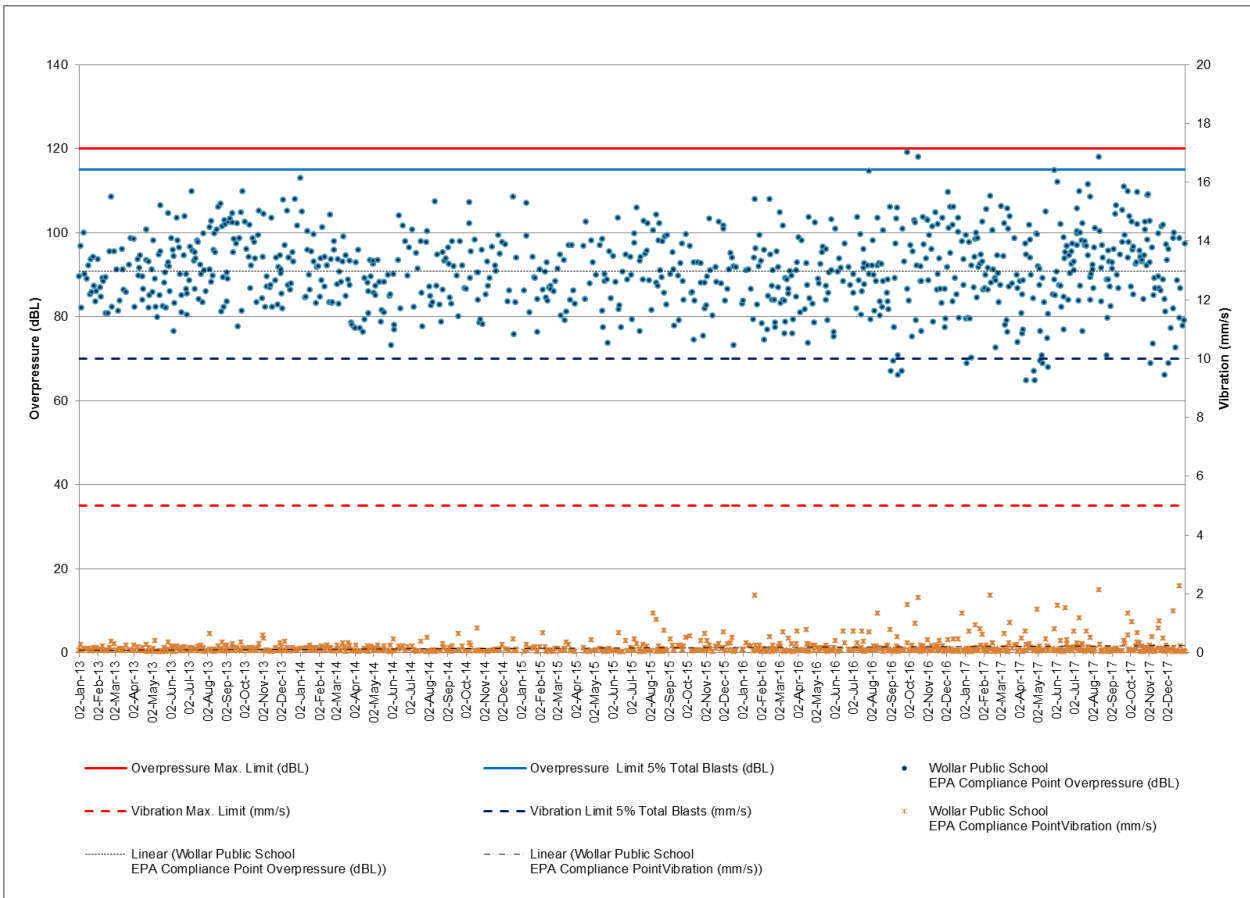
Aspect	Approved Management Plan Criteria				Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
Open Cut Blasting		Air Blast Overpressure (dB(Lin Peak) <sup>1</sup>	Ground Vibration (mm/s) <sup>2</sup>	Allowable Exceedence	The blast monitoring requirements were not triggered during reporting period for WCPL's tailings dams as no blasting occurred within the Dam Safety Committee (DSC) Approval area.	<ul style="list-style-type: none"> <li>There were no ground vibrations recorded at Site 152, Site 72 &amp; Site 153 greater than the maximum 280mm/s damage criteria.</li> <li>The one recorded overpressure greater than 115dBL of 117.9dBL was on the 11 August 2017 as a result of overcast weather conditions at the time of the blast. WCPL completed investigations and confirmed that blast could not be delayed due to these meteorological conditions.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>WCPL has complied with the blasting requirements of PA05-0021 and SD-6764 and on this basis will continue to implement the Blast Management Plan and review blasting performance in next review period.</li> <li>Updated notification process to include blast notice at Wollar Store.</li> <li>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.</li> </ul>
	Tailings Dam <sup>3</sup>	-	50	0%	Blast monitoring at sites 72,152 and 153 for the reporting period complied with the approved criteria of 250mm/s at sites: <ul style="list-style-type: none"> <li>Site 152 (Max. 38.15mm/s)</li> <li>Site 153 (Max. 34.36mm/s)</li> <li>Site 72 (Max. 18.2mm/s)</li> </ul>		
	Railway Lines <sup>8</sup>	-	200 <sup>11</sup>	-	No vibration results were above the performance criteria of 80mm/s for Sites 72,152 and 153.		
	Railway Culverts <sup>7</sup>	-	100 <sup>12</sup>	-	The blast monitoring requirements were not triggered during reporting period for the relocation of the Transgrid Powerline Suspension Towers had not commenced.		
	Arch.sites 72,152, 153	-	80 <sup>13</sup> 250 <sup>14</sup>	-	The blast monitoring requirements were not triggered during reporting period at sites WE7, WE10, WCP535, WE76 and WE77 as no blasting occurred: <ul style="list-style-type: none"> <li>Within 1km of representative sites.</li> </ul>		
	Transgrid Powerline Towers	-		-			

Aspect		Approved Management Plan Criteria			Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
		Air Blast Overpressure (dB(Lin Peak) <sup>1</sup>	Ground Vibration (mm/s) <sup>2</sup>	Allowable Exceedence	The blast monitoring requirements were not triggered during reporting period at the Historical Mine Adit as no blasting occurred: <ul style="list-style-type: none"> <li>• Within Pit 8.</li> </ul>		<ul style="list-style-type: none"> <li>• 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.</li> <li>• WCPL has complied with the blasting requirements of PA05-0021 and SD-6764 and on this basis will continue to implement the Blast Management Plan and review blasting performance in next review period.</li> </ul>
	Arch sites WE7, WE10, WCP535	-	80 <sup>13</sup> 250 <sup>14</sup>	-			
	Arch sites WE76, WE77	-	80 250	-			
	Historical Mine Adit	-	80	-			
<b>Notes:</b> Shaded cells indicate added to the blast monitoring program as a result of SSD-6764 and the revised Blast Management Plan.							

Graph 8 - Blasting Monitoring Results for 2017



Graph 9 - Blasting Monitoring Trends 2013 to 2017



### Noise Monitoring

The Mine has developed and implemented a Noise Management Plan (NMP) (**Table 7**). During the 2017 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 15**. A summary of noise monitoring results is provided in **Table 16**. Further noise monitoring results for 2017 review period, including figures with noise monitoring locations are provided in **Appendix 3F**.

**Table 15 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 accordingly. Shaded cells indicate added to the noise monitoring program as a result of SSD-6764 and the revised Noise Management Plan.

A Noise Warning letter dated 23 August 2017 from the NSW EPA for noise above criteria on the 17 July 2017 from 8.00am to 9.00am. On the day of the noise assessment by the EPA using data from WCPL’s real time noise monitoring network, WCPL Dispatch Operators trained in the importance of responding to alarms had not responded in a timely manner.

WCPL considered this was not a non-compliance in accordance with NMP as attended noise monitoring is utilised for compliance. However WCPL completed refresher training with Dispatch Operators to respond to alarms in accordance with NMP.



Table 16 Noise Monitoring Environmental Performance

Approved Criteria		Performance During the Period		Reporting	Trend/Key Management Implications	Implemented/proposed Management Actions	
Monitoring Locations	Day <sup>2</sup>	Evening <sup>3</sup>	Night <sup>4</sup>				
	L <sub>Aeq</sub> 15 Minute	L <sub>Aeq</sub> 15 Minute	L <sub>Aeq</sub> 15 Minute/ L <sub>A1</sub> , minute				
Attended Noise Monitoring	N6	36	35	33/45	<ul style="list-style-type: none"> <li>Attended noise monitoring during 2017 was undertaken monthly during: 22/23 January**, 22/23 February, 9/10 March*, 5/6 April*, 16/17 May*, 20/21 June 2017*, 12/13 July*, 9/10 August 2017*, 21/22 September*, 30/31 October*, 15/16 November*, 7/8 December^</li> <li>Attended monitoring noise levels from WCPL complied with Project Approval and EPL noise limits at all sites during attended noise monitoring undertaken in 2017 (<b>Appendix 3F</b>).</li> <li>*Complied with the relevant limits using the INP methods of assessing low frequency.</li> <li>^ Complied with the relevant limits where meteorological conditions applied using the NPfI method of assessing low frequency.</li> <li>**Complied with the relevant limits using the method of assessing low frequency. However, using the INP method of assessing low frequency, site only noise levels were above the relevant modifying factor trigger during the measurement at location N13. A 5 dB penalty was applied to the relevant site only L<sub>Aeq</sub> for this measurement. With the penalty applied, resulting noise levels remained in compliance with relevant noise limits at N13.</li> </ul>	<ul style="list-style-type: none"> <li>The frequency of attended monitoring was undertaken monthly during the 2017 review period.</li> <li>Attended monitoring at these locations indicated that the mine complied with noise consent limits during the 2017 review period.</li> <li>It is noted that wind speed and/or estimated temperature inversion conditions result in Project Approval criteria not always being applicable.</li> <li>In 2017 there was approximately 75.18 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.</li> <li>Validation report of real time noise monitoring is provided in <b>Appendix 3F</b>. Attended noise trend analysis from 2013 to 2017 was undertaken by WCPL noise specialist. The results are provided in Appendix 3F.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Continue to implement the Noise Management Plan (NMP) in accordance Condition 5, Schedule 3 of SSD-6764.</li> </ul>
		36	37	37/45			
	N13 <sup>7</sup>	36	36	36/45			
		35	35	35/45			
	N14	35	35	35/45			
		35	35	35/45			
	N15	36	35	35/45			
		36	37	37/45			
	N16	37	37	37/45			
		Removed <sup>8</sup>					
	N17	35	35	35/45			
		35	35	35/45			
N18	35	35	35/45				
	Removed <sup>9</sup>						
N19	35	35	35/45				
N20	35	35	35/45				
N21	35	35	35/45				



**Notes:** (1) To interpret the locations referred to in **Table 15**; refer to Figure in **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) Noise levels to be assessed at the most affected point at the boundary of the Goulburn River National Park/ Munghorn Gap Nature Reserve. (6) EPL daytime limit is currently 35dB(A<sub>Leq</sub>). (7) N13 receiver acquired by Moolarben Coal Mines in 2017. (8) N16 was removed from noise monitoring program as property was acquired by WCPL in 2017. (9) Removed from noise monitoring program as a result of revising the Noise Management Plan for the WEP.

### 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 2017 (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 2017 review period, a number of archaeological surveys and surface salvage works were carried out within the Project Approval area and due diligence surveys outside the approval boundary. For further details of Aboriginal heritage activities undertaken during 2017 refer to **Appendix 4**.

On the 9 June 2017, WCPL informed the OEHL when becoming aware of a single artefact being unintentionally collected by WCPL's contract archaeologist and Registered Aboriginal Parties (RAPs) just outside the PA05-0021 boundary. The single artefact was recorded and replaced back insitu at the original GPS position on the 26 July 2017. No further action was required by WCPL and no further response from the OEHL was received by the Mine.

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

In 2017 WCPL did not exceed the performance indicators 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 2017, 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.

### 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 2017 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 2018. Subject to approval from OEH, DoEE and DP&E, the BMP will comprehensively updated to reflect the new completion criteria and targets in 2018.

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<sup>7</sup>.

A summary of the 2017 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 2017 biodiversity monitoring reports, prepared by Ecological Australia (ELA) and Fly By Night Bat Surveys, refer to **Appendix 5**.

WCPL's Biodiversity Monitoring Program in 2017 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 during 2017 surveyed a total of 65 sites within all Management Domains and Reference sites. Whilst no sites achieved the Interim Performance Targets (IPTs) for all site attributes, both seasons show significant increases compared to the previous monitoring periods, with 17 of 19 sites in autumn and 20 of 22 sites in spring meeting their targets for over half of all site attributes. It should be noted that whilst data recorded in autumn 2017 monitoring shows significant trends, some results and variability are likely correlated to the variation in their relevant IPTs from Year 0 (Baseline) to Year 1 (Years 1-5).

The results collected at Reference Sites during both autumn and spring 2017 monitoring, continue to add to the dataset to be used for comparison with vegetation sites within the various 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.

Groundcover, in the form of living flora species, litter and rock material has been monitored within ECAs since 2007, Rehabilitation Areas since 2009 and Regeneration Areas (formerly Regrowth Areas) since 2011. This data can be correlated with the LFA data captured in 2015 - 2017, and both data sets demonstrate consistently high scores since monitoring commenced. Similarly, low levels of erosion observed throughout previous monitoring seasons (2007-2013) can be correlated with the high SSA Stability scores and the lack of any substantial erosion (as recorded in the erosion SSA assessment) recorded since 2015. Overall these combined data sets demonstrate that consistently stable landforms occur across the WCPL Management Domains.

Fauna monitoring undertaken in 2017 recorded 116 fauna species, comprising two amphibian, 12 mammal (including 10 positively identified microbat species), 14 reptile and 88 bird species. Four introduced species were recorded, and 12 fauna species listed as vulnerable under the BC Act and/or the EPBC Act were recorded. Bird species richness ranged from 39 species (R7\_101) to 14 species (R1\_101) with the Willy Wagtail being the most commonly occurring bird species, recorded at 22 of 25 of the bird monitoring sites. The Eastern Bentwing Bat was the most commonly occurring microbat species, recorded at all 12 bat monitoring sites. Microbat species richness ranged from two species (A\_104) to eleven species (E\_104).

<sup>7</sup> Mine closure or rehabilitation domains are identified in the WCPL's MOP.

Overall species diversity has decreased from 2016 monitoring; however, on-going monitoring will determine if the system is stabilising after a peak or if there is a continued downward trend.

### Slate Gully Mine Adit Monitoring

Three separate surveys were completed in Autumn, Winter and Summer during 2017 of the disused oil shale mine adit in Slate Gully. Counts of bats exiting the adit were conducted from dusk on the evening of 12th December 2017 using hand held counters. Only twelve individuals were counted exiting the adit from dusk, most of the individuals exiting were Eastern Horseshoe Bats (*Rhinolophus megaphyllus*) although a couple of individuals of the Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*) also appeared to be present. This is in stark contrast to the autumn and winter surveys of the adit when between 700 and 900 individuals of the Eastern Bent-wing Bat were present (Fly by Night 2017a&b). Harp trapping of the adit was undertaken on the evening of 13th December from dusk until 9.30pm. The only capture obtained was that of a male Eastern Horseshoe Bat.

Females would be expected to be present at a maternity roost at the time of survey and would have given birth. The capture of a male and the low numbers present during the December 2017 survey indicate that breeding by this species is not undertaken within the workings. At the time of survey it is likely that mainly males are present although some non-breeding females may also use the working to roost during the summer months.

Eastern Bent-wing females that were present within the workings during the autumn and winter surveys have moved to breeding sites. These would be located at known maternity roosts within limestone karst systems or may be present in other disused mine workings (Hoye & Hall 2008). The recording of post lactating females as well as recently free-flying young in late February 2014 (BMS 2015) may indicate when females and their young return to the shale mine at Slate Gully. Monitoring of the adit by Ecological Australia (2016) did not record significant numbers of Eastern Bentwing Bats during October 2016. This suggests that most of the Eastern Bent-wings have left the workings by October but return prior to late February. Monitoring of the roost following works to stabilise the adit opening would be worthy of consideration to ensure it has no detrimental effects on microbat roosting within the workings. A survey in early April 2018 would allow comparison with results obtained during the April 2017 survey.

### Conservation Bond

On the 23 August 2017, WCPL received confirmation from the DP&E the calculations to determine the conservation bond required in accordance with Condition 39, Schedule 3 of PA05-0021 was accepted. On the 5 October 2017, WCPL lodged the conservation bond with DP&E for the agreed amount.

## 6.5 Waste Management

The Mine has developed and implemented a Waste Management Plan (WMP) (**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 PA05-0021, SSD-6764 and 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 56(e), Schedule 3 of PA05-0021 and Condition 58(f), Schedule 3 of SSD-6764, WCPL are required to report on waste management and minimisation (**Table 17**) in the AR. During the reporting period approximately 80.2% of the total waste removed from the Mine was recycled. The percentage of waste recycled in 2017 was slightly less than the 82.1% in 2015 and the 86.60% in 2016. The lower rate of recycling may be a result of changing the waste contractor in early 2016 and the difference in recording data from volumes to tonnes. Approximately 26 tyres (or 24.27 tonnes) in Pit 7 were buried on the 11 August 2017. **Appendix 3G** has the complete summary of waste statistics for the 2017 annual review period.

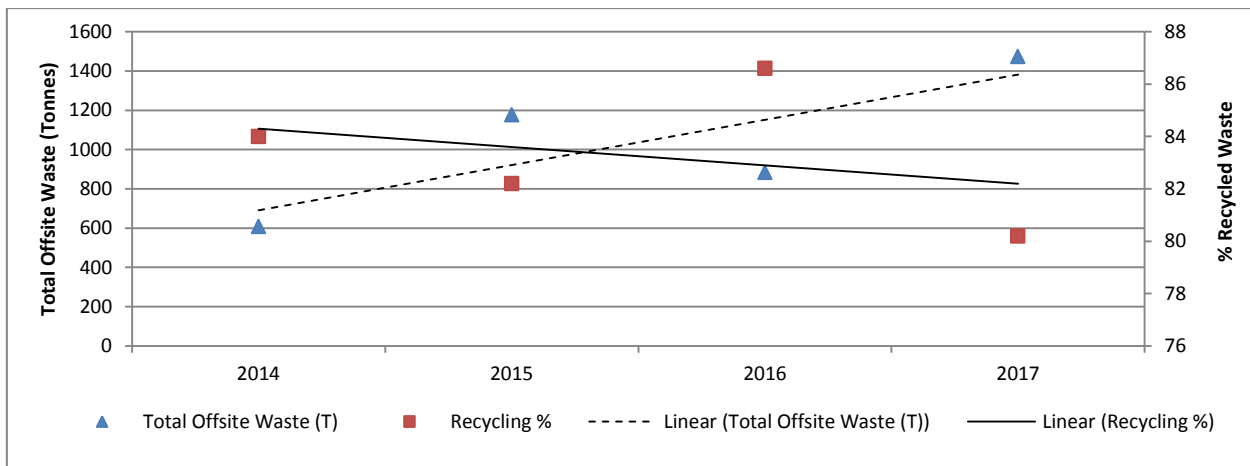
WCPL are permitted to dispose of building and demolition waste in-pit, in accordance with EPL 12425. In 2017 disposal of building and demolition waste was undertaken for several vacant farm houses including two grain silos in advanced of the approved open cut pit progression within ML1573. The building waste was buried in Pit 1 on the 28 September 2017. 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*.

No demolition waste from off site buildings (i.e. outside the mining lease) was disposed of in-pit during 2017.

**Table 17 Summary of Monthly Waste Statistics for 2017**

Totals	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Totals
<b>Total Offsite Waste (T)</b>	91.6	88.4	101.6	50.3	113.1	406.8	133.4	91.5	87.2	99.1	78.7	132.7	<b>1474.5</b>
<b>Recycled Waste</b>	79.7	74.1	85.6	41.6	98.2	280.1	113.2	70.9	73.9	86.9	60.3	118.6	<b>1183.3</b>
<b>Recycling %</b>	87.0	83.8	84.2	82.6	86.9	68.9	84.9	77.5	84.7	87.7	76.7	89.4	<b>80.2%</b>

**Graph 10 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 2017 review period, which allows for the calculation of carbon dioxide (CO<sub>2</sub>) equivalent emissions. The primary source (approximately 80%) of greenhouse gas emissions at the Mine is due to the release of carbon dioxide (CO<sub>2</sub>) and methane (CH<sub>4</sub>) during the combustion of diesel fuel during mining operations. Fugitive emissions of CH<sub>4</sub> and CO<sub>2</sub> from the coal seam as the coal is mined and CO<sub>2</sub> 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 2017 review period are presented in **Table 18**.

Table 18 Estimated Wilpinjong Coal Mine Greenhouse Gas Emissions

Year	ROM Coal (Mt)	Electricity Consumed (kWh)	Diesel Consumed (kL)	CO <sub>2</sub> -e Electricity Usage (t)	CO <sub>2</sub> -e Diesel Usage (t)	CO <sub>2</sub> -e Fugitive Emissions (t)	Total CO <sub>2</sub> -e Emissions (t)	Total CO <sub>2</sub> -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 <sup>#</sup>

**Notes:** kWh = kilowatt hours and kL = kilolitre. \* A NSW default factor was used to calculate these values. \*\* The change in tonnes CO<sub>2</sub>e 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.<sup>#</sup> Scope 1 and 2 predicted emissions from the WEP for 2017 based on 15.5Mt 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 2017 ambient air monitoring program, monitors for the following pollutants that can be released during spontaneous combustion events, including Oxides of Nitrogen (NO<sub>x</sub>), Sulfur Dioxide (SO<sub>2</sub>), Hydrogen Sulfide (H<sub>2</sub>S), Benzene, Toluene and *p*-Xylene.

The air quality monitoring station is situated in the Village of Wollar. The results of the 2017 ambient air monitoring program indicate no validated trigger of the above mentioned pollutants. **Appendix 3B** has the monthly ambient air monitoring program reports for 2017.

Spontaneous combustion propensity testing scheduled for 2018 in Pit 6 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 19** lists the water licences held by WCPL and provides a summary of performance for the 'water year' from 01 July 2016 to 30 June 2017. **Table 20** lists the converted water entitlement licenses to Water Access License (WAL) that occurred during October 2017.

**Table 19 Water Take Licence**

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

**Source:** HydroSimulations (2016)<sup>1</sup> Assigned to the Wollar Creek Water Source. <sup>2</sup> 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*.<sup>3</sup> 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*.<sup>4</sup> Renewal Application lodged with DPI-Water on the 25 June 2016. <sup>5</sup> Active pumping was not required as the mine was in water surplus during the review period (refer to Water Balance in **Section 7.7**).<sup>6</sup> WRM (2017) 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 20 Summary of WAL Held by WCPL

Water Access Licence (WAL)	AL	Water Source	Category	Entitlement	Holder
21499		Wollar Creek	Aquifer	474 Unit shares	Peabody Pastoral Holdings Pty Ltd/ Wilpinjong Coal Pty Limited as 100/374 share
19045		Upper Goulburn	Unregulated	183 Unit shares	Peabody Pastoral Holdings Pty Ltd
19055		Upper Goulburn	Unregulated	50 Unit shares	Peabody Pastoral Holdings Pty Ltd
19057		Upper Goulburn	Unregulated	110 Unit shares	Peabody Pastoral Holdings Pty Ltd
19058		Upper Goulburn	Unregulated	168 Unit shares	Peabody Pastoral Holdings Pty Ltd
19426		Wollar Creek	Unregulated	40 Unit shares	Peabody Pastoral Holdings Pty Ltd
19425		Wollar Creek	Domestic & Stock	1 ML	Peabody Pastoral Holdings Pty Ltd
19430		Wollar Creek	Domestic & Stock	5 ML	Peabody Pastoral Holdings Pty Ltd
36398		Wollar Creek	Domestic & Stock	1 ML	Peabody Pastoral Holdings Pty Ltd
9476		Macquarie/Cudgegong	Regulated	790 Unit shares	Wilpinjong Coal Pty Limited
39785		Sydney Basin - North Coast Groundwater	Aquifer	2021 Unit shares	Wilpinjong Coal Pty Limited
41548	20AL219010	Sydney Basin - North Coast Groundwater	Aquifer	770 Unit shares	Wilpinjong Coal Pty Limited
41549	20AL219011	Sydney Basin - North Coast Groundwater	Aquifer	110 Unit shares	Wilpinjong Coal Pty Limited
41550	20AL219012	Sydney Basin - North Coast Groundwater	Aquifer	110 Unit shares	Wilpinjong Coal Pty Limited
41551	20AL219013	Sydney Basin - North Coast Groundwater	Aquifer	110 Unit shares	Wilpinjong Coal Pty Limited

**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

A predictive water balance model for the 2016/2017 water year was completed by WRM (**Appendix 3C**). Using OPSIM water balance model, an estimated groundwater inflow of 1,009ML/year was predicted. The model also estimated the Mine was in water surplus of 1,505ML for the 2016/2017 water year.

## 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 2016 to 30 June 2016 (2016/17 Water Year), undertaken by Hydrosimulations. WCPL can demonstrate compliance against the relevant conditions, with actions to be developed in 2018 in regards to the groundwater trigger exceedances identified during 2017 (**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 which included: Drilling of deeper bores at alluvial locations that are frequently observed as dry (Gwa1, Gwa3, Gwa6) and re-instatement of trigger level within Groundwater Management Plan for Gwa6 now that correct bore depth can be used.



## 7.4 Water Management System

Water management activities were undertaken during the 2017 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 are:

- 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*;
- Operation of an evaporative spray system on the eastern bank of Pit 2 (West) for 2017; 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 developed (**Table 7**) for the Mine. During the 2017 review period water management structures e.g. diversion bunds, were constructed to divert potentially sediment laden water from mining activities in Pit 3, Pit 4, Pit 5, Pit 6, Pit 7 back into 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 sediment control in the 2017 review period. In 2018, WCPL are 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 Surface Water Management Plan (Version 2).

WCPL are scheduled to commence revegetation of the visual bunds currently under construction along the northern boundary of the Mine, once constructed in 2018.

## 7.6 Surface Water

A summary of the surface water monitoring program is presented in **Table 21**. A summary of the surface water monitoring results is provided in **Table 22**. Further water monitoring results for 2017 review period, including figures with surface water quality monitoring locations are provided in **Appendix 3C**.

Table 21 Surface Water Monitoring Program

Monitoring Locations		Frequency	Parameters <sup>1</sup>
Wilpinjong Creek	Licenced Discharge Point No. 24	Continuous (during discharge)	Volume of water discharged <sup>6</sup> , EC and pH
		Weekly (during discharge)	Oil & Grease and TSS <sup>7</sup>
	WIL-U, WIL-U2, WIL-PC, WIL-NC, WIL-D and WIL-D2 <sup>2</sup>	Monthly	Field pH and EC, turbidity <sup>3</sup> , and SO <sub>4</sub>
		Quarterly <sup>^</sup>	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	WILGSU and WILGSD (gauging stations) <sup>2</sup>	Continuous	Flow rate, pH, EC and temperature
		Monthly	Field pH and EC, turbidity <sup>3</sup> , and SO <sub>4</sub>
		Following significant rainfall events <sup>4</sup>	pH, EC, TDS, TSS and sulphate
	WC1, WC2, WC3, WC4, WC5, WC6, WC7, WC8 <sup>5</sup>	Annually	Stream health monitoring
Forty-nine survey points along Wilpinjong Creek <sup>5</sup>	Annually	Channel stability monitoring (photo-points, description, stability)	
Cumbo Creek	CC1, CC2 and CC3 <sup>2</sup>	Monthly	Field pH and EC, turbidity <sup>3</sup> , and SO <sub>4</sub>
		Quarterly <sup>^</sup>	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	CC3 <sup>2</sup>	Following significant rainfall events <sup>4</sup>	pH, EC, TDS, TSS and sulphate
	CCGSU and CCGSD (gauging station) <sup>2</sup>	Continuous	Flow rate, pH, EC and temperature
		monthly	Field pH and EC, turbidity <sup>3</sup> , and SO <sub>4</sub>
		Following significant rainfall events <sup>3</sup>	pH, EC, TDS, TSS and sulphate
	CC1, CC2 <sup>5</sup>	Annually	Stream health monitoring
Nine survey points along Cumbo Creek <sup>5</sup>	Annually	Channel stability monitoring	
Wollar Creek	WOL 1 and WOL 2 <sup>2</sup>	Monthly	Field pH and EC, turbidity, and SO <sub>4</sub>
		Quarterly <sup>^</sup>	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
	WO1, WO2, WO3 <sup>5</sup>	Annually	Stream health monitoring
Slate Gully Creek	SGC_1 <sup>2</sup>	Monthly	Field pH and EC, turbidity, and SO <sub>4</sub>
		Quarterly	Copper, Zinc, Iron, Aluminium, Nickel, Manganese, Barium, Strontium, Lead, Arsenic and Selenium
		Following significant rainfall events <sup>4</sup>	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 22 Surface Water Performance

Location		Approved Criteria*	Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
<b>Wilpinjong Creek Sites:</b> <ul style="list-style-type: none"> <li>• WIL_NC*</li> <li>• WIL_D*</li> <li>• WIL_D2*</li> </ul>	EC (µS/cm)	<b>PA-0021</b> If recorded value at the monitoring site is greater than <b>5,166 µS/cm</b> for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded EC values < 5,166 µS/cm and/or EC values <3,440 µS/cm for 3 consecutive readings at downstream sites. <b>WIL_NC:</b> (Max 410µS/cm ) (Ave 313.2µS/cm) <b>WIL_D2:</b> (Max 650µS/cm ) (Ave 386.8µS/cm) <b>WIL_D:</b> (Max 1480 µS/cm ) (Ave 493.5µS/cm)	A review of surface water data recorded from January 2012 to July 2017 at gauging stations WILGSU and WILGSD in the Wilpinjong Creek and Cumbo Creek gauging station CCGSU was completed by Hydro Simulations for the 2017 Annual Review ( <b>Appendix 3C</b> ). HydroSimulations concluded: <ul style="list-style-type: none"> <li>• The pH and EC values recorded at the Wilpinjong Creek site, even those around pH 6 or EC of 7,000 µS/cm, are consistent with those reported in Gilbert and Associates (2013).</li> <li>• Gilbert and Associates (2013) concluded that pH, EC (and other parameters) recorded in Wilpinjong Creek did not show any discernible changes due to mining.</li> <li>• The water quality parameters for EC and pH at the Cumbo Creek site are also within the parameters reported in Gilbert and Associates (2013) and do not indicate changes due to mining.</li> <li>• Two pronounced periods of below average rainfall associated with no-flow conditions at WILGSU make the assessment of a possible mining effect, that is discernible from climatic influence, difficult without more detailed analysis. This</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• Implementation of the Surface Water Management Measures (Section of the SWMP) to comply with the water management performance measures (<b>Appendix 3C</b>) in Table 6 of the Development Consent SSD-6764.</li> <li>• Completion of DPI-Water Recommendations refer to <b>Section 7.10</b>.</li> <li>• WCPL are 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 Surface Water Management Plan.</li> </ul>
		<b>SSD-6764</b> If recorded value at the monitoring site is greater than <b>3,440 µS/cm</b> for 3 consecutive readings at Wilpinjong Creek Downstream Sites			
	Turbidity (NTU)	<b>PA-0021 &amp; SSD-6764</b> If recorded value at the monitoring site is greater than <b>24 NTU</b> for 3 consecutive readings at Wilpinjong Creek Downstream Sites	No sites with the applicable water quality impact assessment criteria recorded NTU values > 24NTU for 3 consecutive readings at downstream sites. <b>WIL_NC:</b> (Max 15.2 NTU) (Ave 3.7 NTU) <b>WIL_D2:</b> (Max 31.9 NTU) (Ave 10.3) <b>WIL_D:</b> (Max 5.6 NTU) (Ave 3.8 NTU)		
	pH (lower)	<b>PA-0021 &amp; SSD-6764</b> If recorded value at the monitoring site is less than <b>6.9 pH</b> 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. <b>WIL_NC:</b> (Min 6.8 pH ) (Ave 7.3 pH) <b>WIL_D2:</b> (Min 7.3 pH) (Ave 7.5 pH) <b>WIL_D:</b> (Min 7.3 pH) (Ave 7.6 pH)		
	pH (upper)	<b>PA-0021 &amp; SSD-6764</b> If recorded value at the monitoring site is greater than <b>7.7 pH</b> 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. <b>WIL_NC:</b> (Max 8.3 pH ) (Ave 7.3pH) <b>WIL_D2:</b> (Max 7.9 pH) (Ave 7.5 pH) <b>WIL_D:</b> (Max 7.8 pH) (Ave 7.6 pH)		

Location		Approved Criteria*	Performance During the Reporting Period	Trend/Key Management Implications	Implemented/proposed Management Actions
<b>Cumbo Creek (Downstream)</b>  <b>Site:</b> <ul style="list-style-type: none"> <li>• <b>CC1*</b></li> </ul>	EC (µS/cm)	<p><b>PA-0021 &amp; SSD-6764</b></p> <p>If recorded value at the monitoring site is greater than <b>7,510 µS/cm</b> for 3 consecutive readings at Cumbo Creek Downstream Sites</p>	<p>CC1 did not recorded EC values &gt; 7,510 µS/cm for 3 consecutive readings.</p> <p><b>CC1:</b> (Max 5380 µS/cm ) (Ave 2392.3 µS/cm)</p> <p><b>CC2:</b> (Max 7540 µS/cm ) (Ave 5036.6 µS/cm)</p> <p><b>CC3:</b> (Max 4860 µS/cm ) (Ave 2771.7 µS/cm)</p>	<p>assessment indicates the current trends at WILGSU are likely caused by periods of below average rainfall.</p> <ul style="list-style-type: none"> <li>• The identification of a mining effect on stream flow at WILGSD is not possible without isolating the contribution of RO Plant discharge from rainfall derived flow. This has not been done in this assessment.</li> <li>• No mining impact on stream flow is apparent at the upstream site on Cumbo Creek.</li> </ul>	<ul style="list-style-type: none"> <li>• 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.</li> </ul>
	EC (µS/cm)	<p><b>PA-0021 &amp; SSD-6764</b></p> <p>If recorded value at the monitoring site is greater than <b>7,510 µS/cm</b> for 3 consecutive readings at Wilpinjong Creek Downstream Sites</p>	<p>No sites with the applicable water quality impact assessment criteria recorded EC values &lt;7,510µS/cm for 3 consecutive readings.</p> <p><b>CC1:</b> (Max 5380µS/cm ) (Ave 2392.3µS/cm)</p>		
	Turbidity (NTU)	<p><b>PA-0021 &amp; SSD-6764</b></p> <p>If recorded value at the monitoring site is greater than <b>77 NTU</b> for 3 consecutive readings at Cumbo Creek Downstream Sites</p>	<p>No sites with the applicable water quality impact assessment criteria recorded NTU values &gt; 77NTU for 3 consecutive readings.</p> <p><b>CC1:</b> (Max 1970.0 NTU) (Ave 600.9 NTU)</p>		
	pH (lower)	<p><b>PA-0021 &amp; SSD-6764</b></p> <p>If recorded value at the monitoring site is less than <b>7.5 pH</b> for 3 consecutive readings at Cumbo Creek Downstream Sites</p>	<p>No sites with the applicable water quality impact assessment criteria recorded pH values &lt;7.5 pH for 3 consecutive readings.</p> <p><b>CC1:</b> (Min 7.0 pH ) (Ave 7.6 pH)</p>		
	pH (upper)	<p><b>PA-0021 &amp; SSD-6764</b></p> <p>If recorded value at the monitoring site is greater than <b>8.2 pH</b> for 3 consecutive readings at Cumbo Creek Downstream Sites</p>	<p>No sites with the applicable water quality impact assessment criteria recorded pH values &gt; 8.2 pH for 3 consecutive readings.</p> <p><b>CC1:</b> (Max 8.3 pH ) (Ave 7.6pH)</p>		
<p><b>Notes:</b> Trigger is only triggered 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 80<sup>th</sup>/20<sup>th</sup> 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. Location CC1 turbidity readings affected by water runoff from unsealed section of Ulan-Wollar Road.</p>					

Table 23 Summary of Surface Water Monitoring Result 2017

SW Monitoring Point	EC (µS/cm)			pH			SO4 (mg/L)			Turbidity (NTU)		
	Min	Max	Ave.	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
CC1^	279.0	5380.0	2392.3	7.00	8.30	7.58	45.0	1790.0	787.0	4.4	1970.0	600.9
CC2	5470.0	8230.0	6306.0	7.70	8.30	7.99	1700.0	3170.0	2145.0	0.6	15.8	4.1
CC3	4100.0	4990.0	4520.0	8.30	8.50	8.40	1490.0	1920.0	1688.0	0.6	1.8	1.2
WIL (U)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (U2)	1360.0	3890.0	2851.7	5.40	8.00	6.58	13.0	121.0	20.9	2.4	70.8	20.9
WIL (PC)*	-	-	-	-	-	-	-	-	-	-	-	-
WIL (NC)^	230.0	411.0	313.2	6.80	8.30	7.27	10.0	85.0	48.1	0.2	15.2	3.7
WIL (D)^	248.0	1480.0	493.5	7.30	7.80	7.55	7.0	87.0	46.4	2.2	5.6	3.8
WIL (D2)^	256.0	650.0	386.8	7.30	7.90	7.53	2.0	83.0	47.7	1.7	31.9	10.3
WOL1	336.0	1490.0	872.4	8.10	8.60	8.25	19.0	184.0	97.2	0.9	6.1	2.9
WOL2	1800.0	2950.0	2133.6	7.40	8.00	7.82	184.0	440.0	304.2	0.4	21.1	3.2
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-

Notes: \* Dry, ^Surface Quality Impact Assessment Criteria “applicable” in accordance with the SWMP.

Table 24 Summary of Surface Water Monitoring Result 2016

SW Monitoring Point	EC (µS/cm)			pH			SO4 (mg/L)			Turbidity (NTU)		
	Min	Max	Ave.	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
CC1^	170.0	4470.0	2802.9	7.10	7.90	7.41	28.0	1710.0	978.9	4.6	6270.0	936.0
CC2	3020.0	7540.0	5036.3	7.50	8.00	7.84	920.0	2940.0	1738.8	0.5	26.4	5.0
CC3	80.0	4860.0	2771.7	7.40	8.40	8.18	8.0	1920.0	972.5	0.7	126.0	25.1
WIL (U)	520.0	950.0	632.0	6.20	7.40	6.94	13.0	83.0	36.8	5.8	43.5	21.2
WIL (U2)	440.0	4420.0	2140.0	6.50	7.60	7.04	14.0	102.0	34.8	3.3	153.0	34.8
WIL (PC)	260.0	1340.0	682.0	6.90	7.40	7.16	7.0	48.0	28.6	9.7	64.6	38.3
WIL (NC)^	240.0	1650.0	560.8	7.10	7.80	7.39	8.0	265.0	64.5	8.6	201.0	54.2
WIL (D)^	580.0	3030.0	1189.2	6.80	8.00	7.46	12.0	603.0	165.5	1.2	39.4	10.0
WIL (D2)^	390.0	1840.0	796.1	6.90	8.10	7.50	9.0	466.0	159.1	3.9	323.0	43.8
WOL1	780.0	2220.0	1226.3	7.80	8.30	8.11	104.0	475.0	205.8	1.3	11.2	5.0
WOL2	740.0	3160.0	1693.3	7.20	8.00	7.56	97.0	650.0	303.1	0.9	70.7	15.3
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-

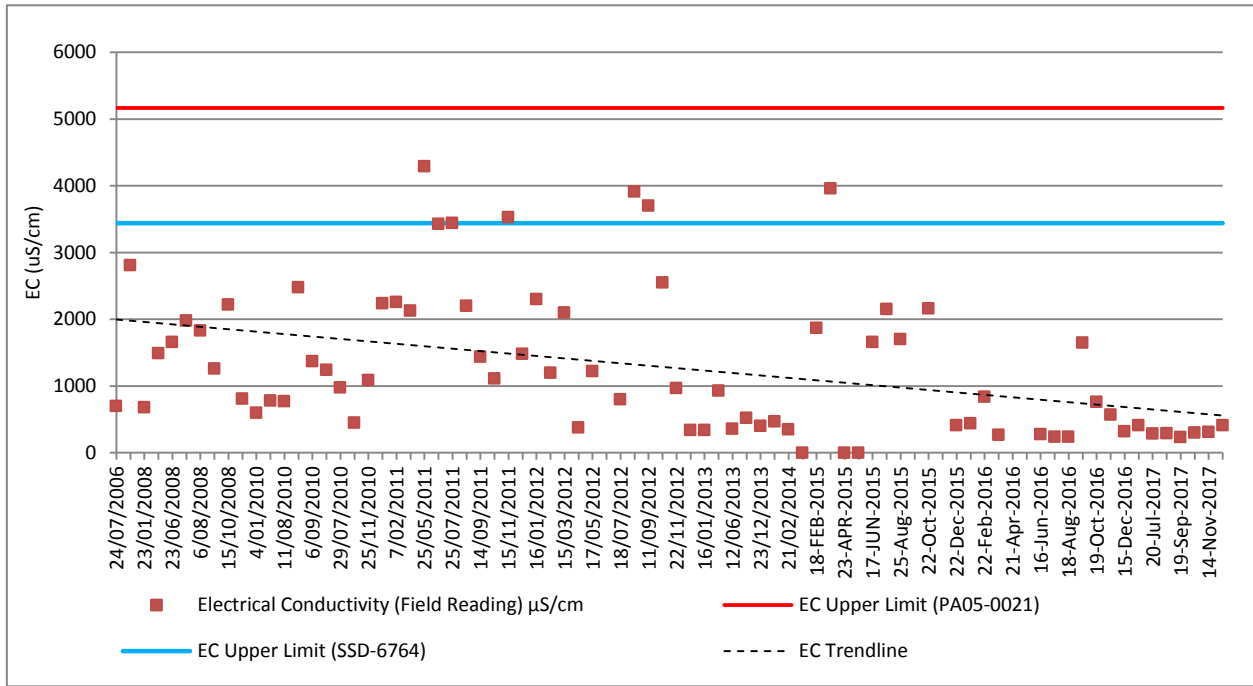
Notes: \* Dry, ^Surface Quality Impact Assessment Criteria “applicable” in accordance with the SWMP.

Table 25 Summary of Surface Water Monitoring Result 2015

SW Monitoring Point	EC (µS/cm)			pH			SO4 (mg/L)			Turbidity (NTU)		
	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave	Min	Max	Ave
CC1^	120.0	4380.0	2316.3	6.60	7.80	7.31	13.0	1660.0	237.7	3.3	13000.0	3415.4
CC2	350.0	5970.0	3591.4	7.30	7.90	7.67	1400.0	2290.0	1977.8	0.4	20.8	4.7
CC3	150.0	5130.0	2220.0	7.00	8.40	7.93	17.0	2100.0	946.0	1.2	359.0	93.7
WIL (U)	1650.0	7550.0	4306.7	4.80	6.80	5.93	38.0	146.0	99.0	7.4	263.0	77.0
WIL (U2)	790.0	5580.0	3353.8	5.60	7.40	6.71	22.0	118.0	41.9	1.5	158.0	41.9
WIL (PC)	1170.0	6100.0	3256.3	6.80	7.90	7.23	3.0	42.0	16.0	1.8	222.0	90.4
WIL (NC)^	410.0	3960.0	1987.1	6.60	7.80	7.31	4.0	106.0	43.0	1.2	1440.0	284.5
WIL (D)^	340.0	5880.0	2713.0	7.10	8.10	7.67	29.0	607.0	253.2	2.6	363.0	63.1
WIL (D2)^	500.0	6520.0	2457.5	7.50	8.20	7.73	16.0	693.0	148.4	7.5	557.0	113.2
WOL1	160.0	5540.0	2223.0	7.50	8.20	7.96	208.0	956.0	445.8	1.1	61.8	13.3
WOL2	400.0	5550.0	1830.0	7.30	7.80	7.54	262.0	822.0	532.8	0.6	486.0	53.9
SGC_1*	-	-	-	-	-	-	-	-	-	-	-	-

Notes: \* Dry, ^Surface Quality Impact Assessment Criteria “applicable” in accordance with the SWMP

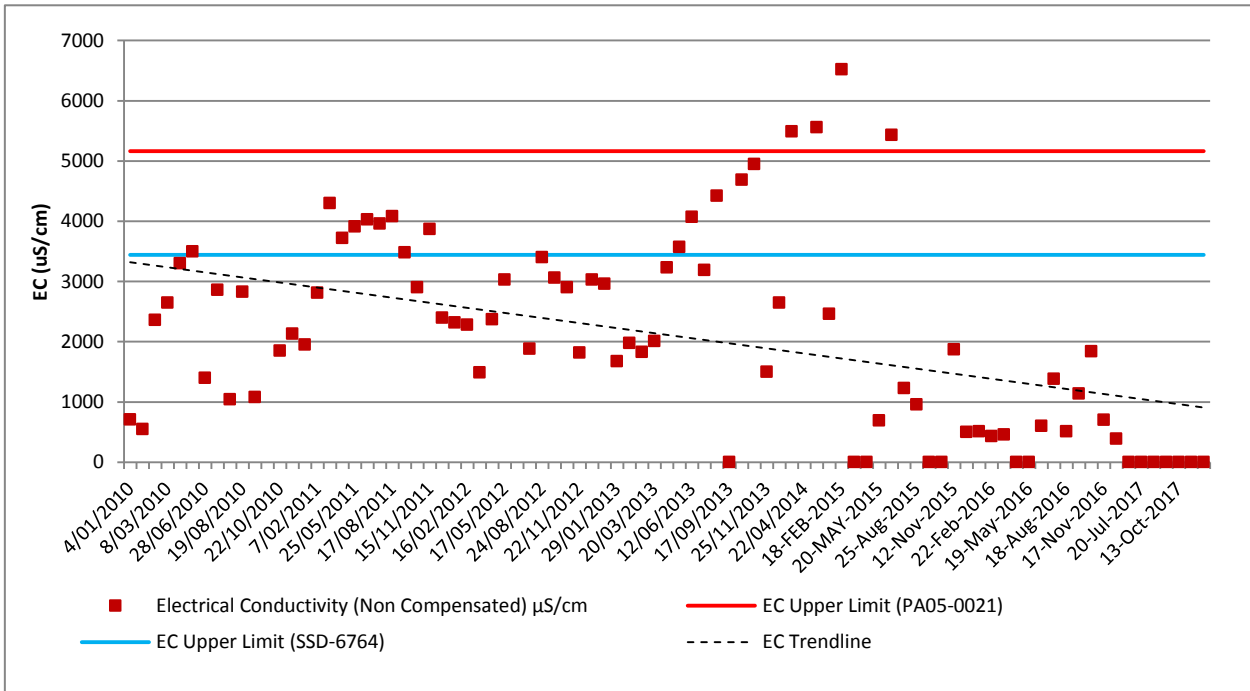
Graph 11 Longterm EC Water Quality Results at WIL\_NC



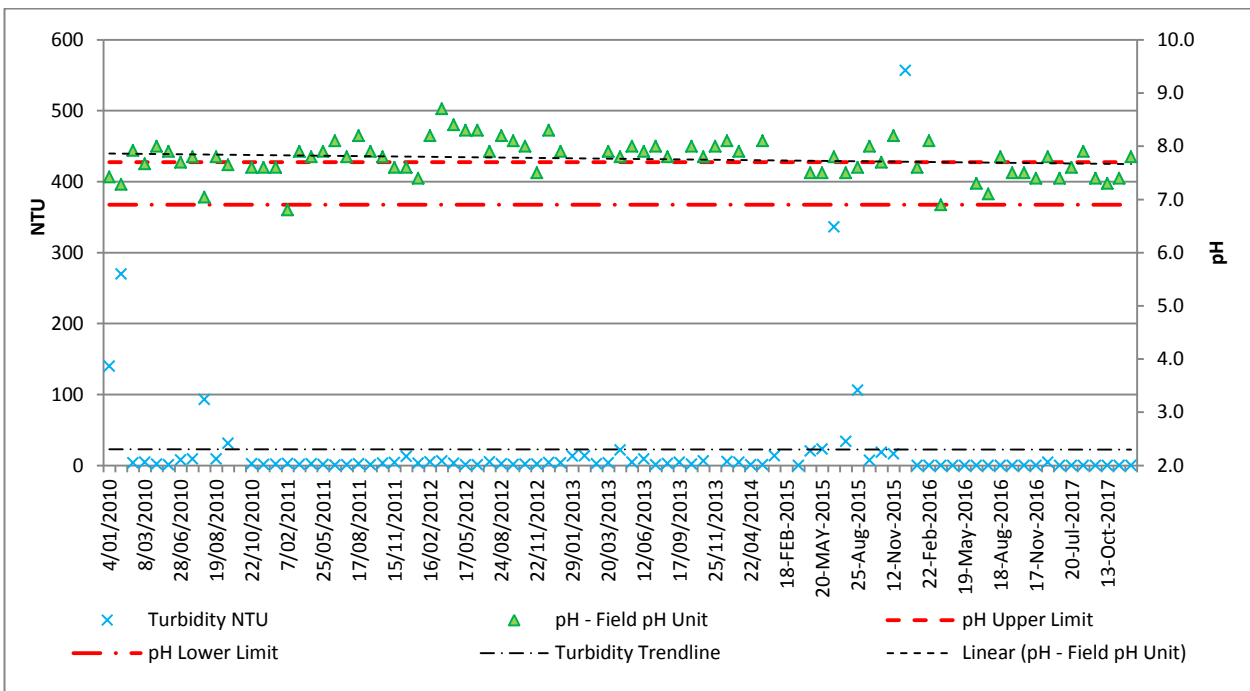
Graph 12 Longterm pH & NTU Water Quality Results at WIL\_NC



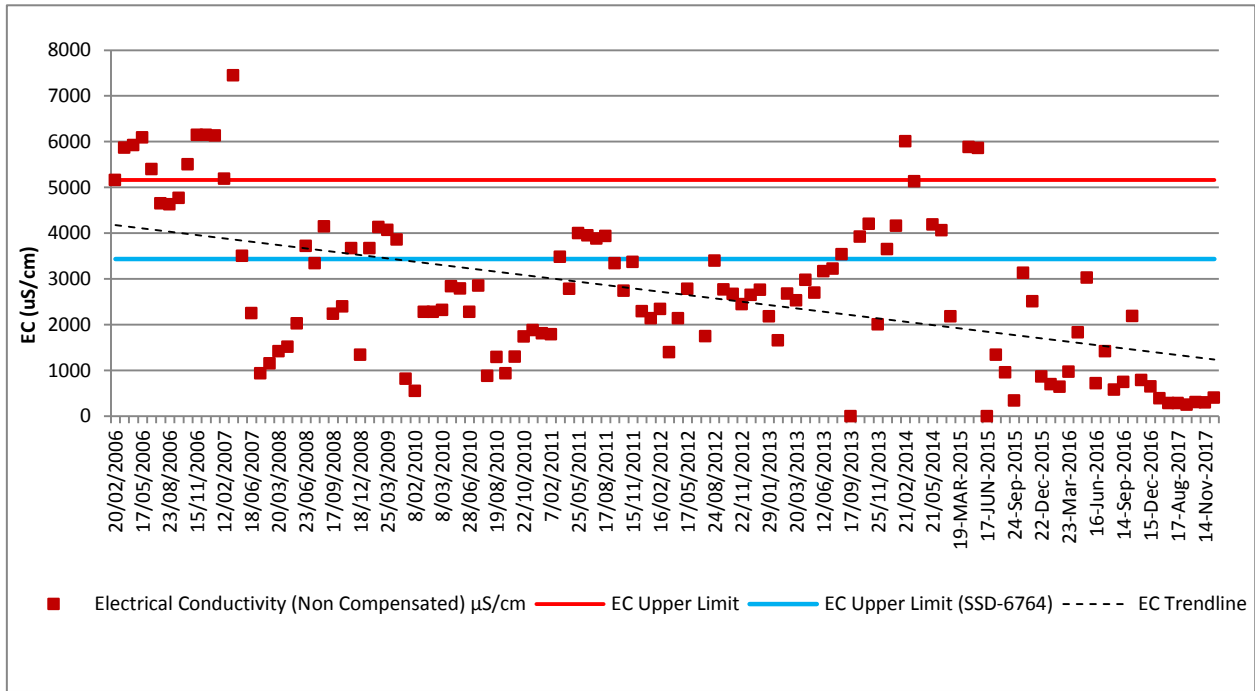
Graph 13 Longterm EC Water Quality Results at WIL\_D2



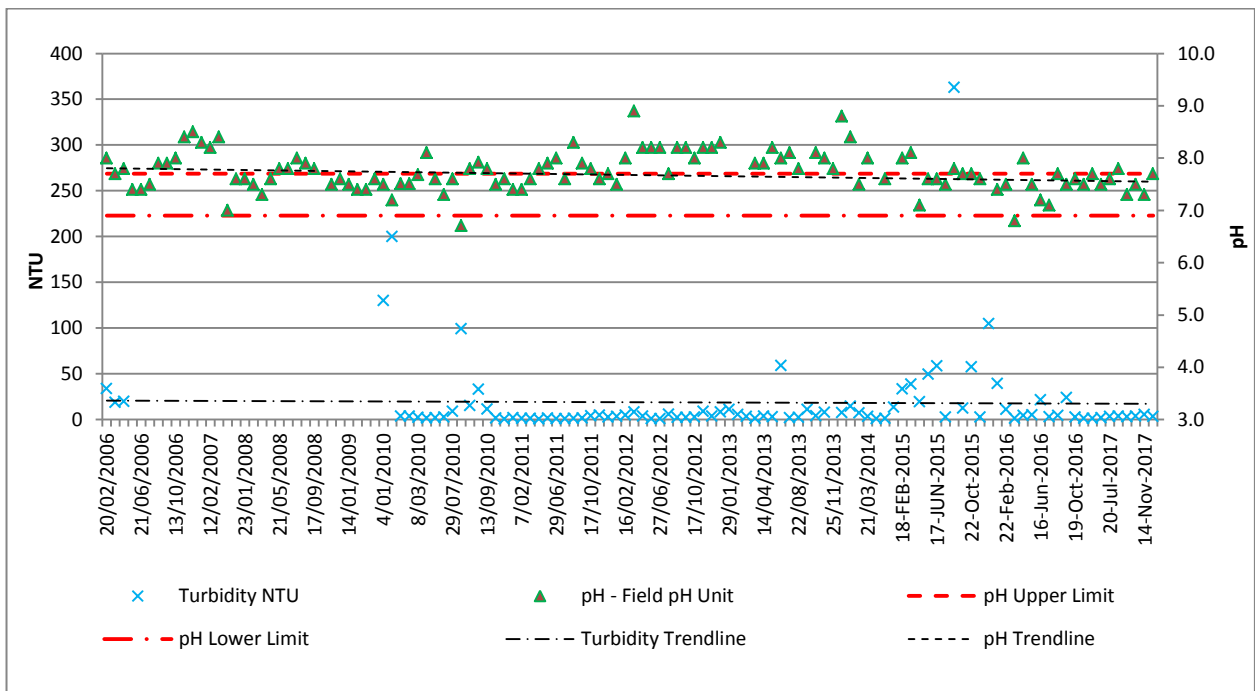
Graph 14 Longterm pH & NTU Water Quality Results at WIL\_D2



Graph 15 Longterm EC Water Quality Results at WIL\_D

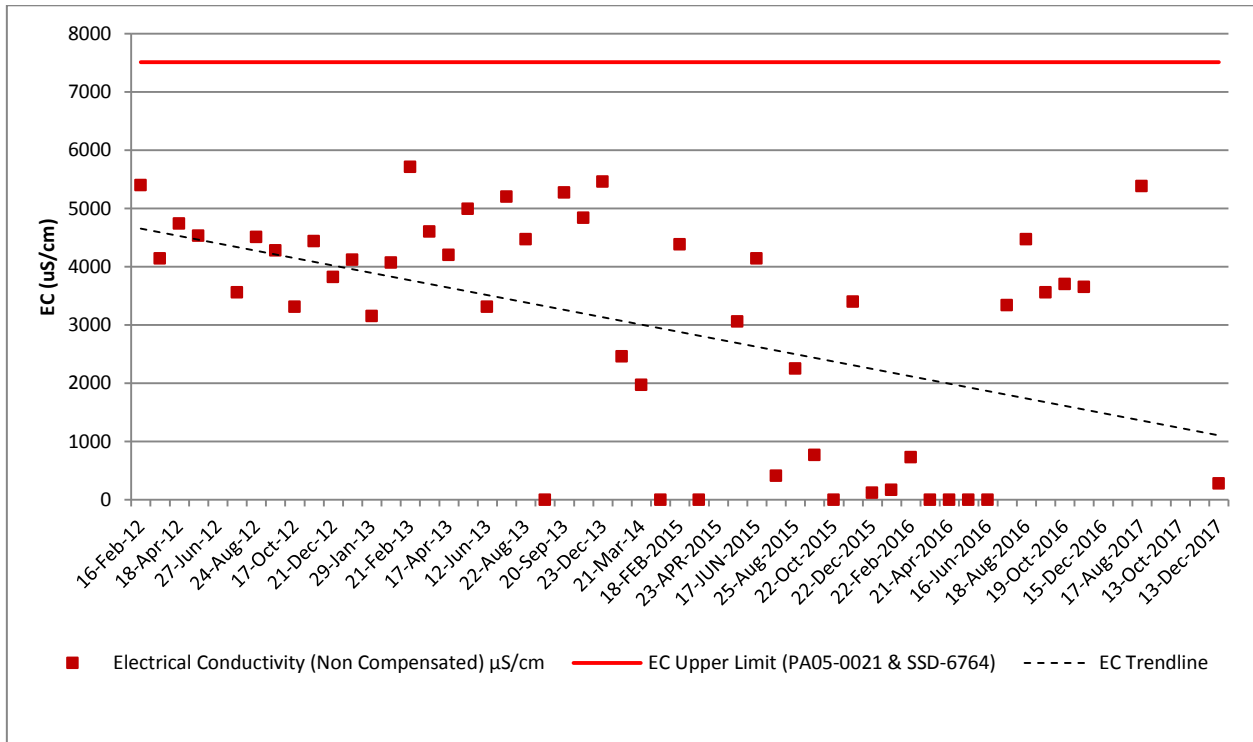


Graph 16 Longterm pH & NTU Water Quality Results at WIL\_D

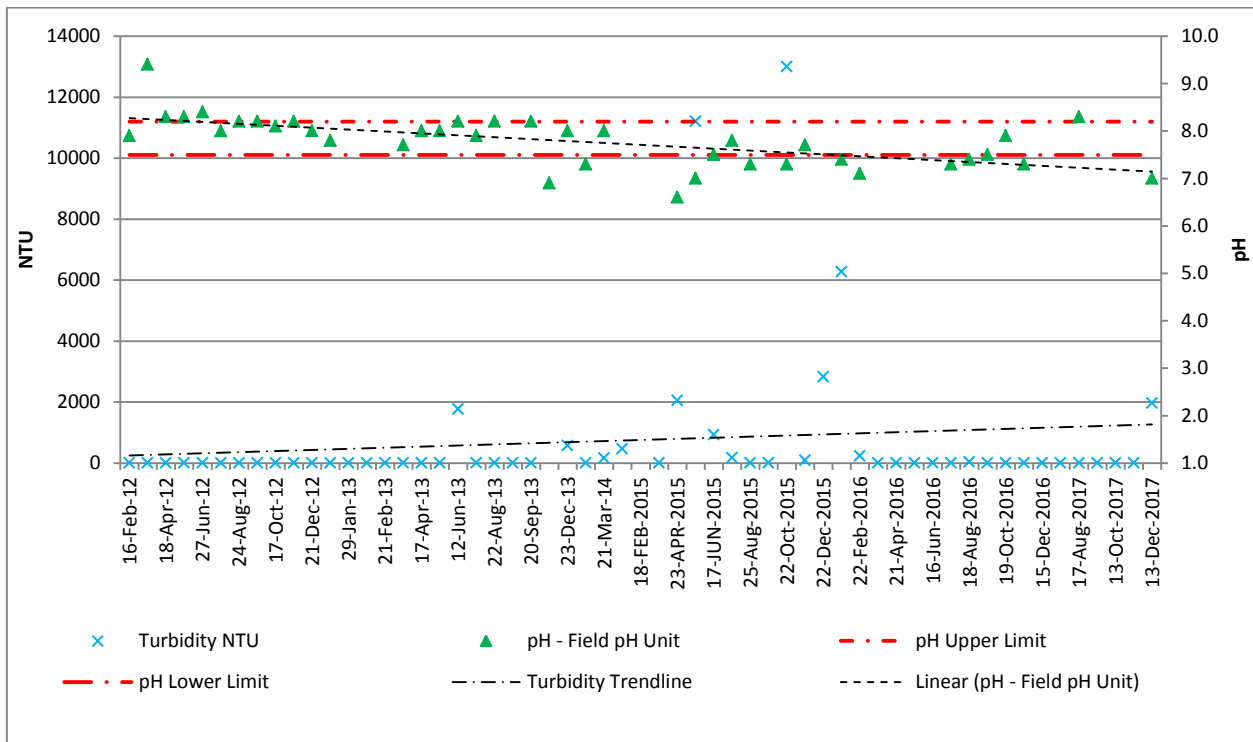




Graph 17 Longterm EC Water Quality Results at CC\_1



Graph 18 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. A review of the SWB in 2017 by WRM (**Appendix 3C**) concluded sufficient water was available for the Mine during the 2017 review period (i.e. no external water supply sources were required). A summary review of the site water balance undertaken by WRM for the July 2016 to June 2017 (the water year) is displayed in **Table 26**.

**Table 26 Water Balance 2016/2017**

Water Balance Summary June 2016 to July 2017	
<b>Inflow:</b> Groundwater into pits	1,009ML
Rainfall and runoff captured	3,436ML
<b>Sub Total</b>	<b>4,445ML</b>
<b>Outflow:</b> Evaporation	788ML
Seepage	-
Discharge for WTF	640ML
Dust suppression on haul roads	600ML
CHPP	912ML
<b>Sub Total</b>	<b>2,940ML</b>
<b>Change in Volume</b> (Increase in Inventory)	<b>+1,505ML</b>

## 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.

In 2017 Wilpinjong Coal undertook a project to increase the operational efficiency of the existing Water Treatment Facility through the installation of a submerged Ultra Filtration (UF). An additional temporary Water Treatment Facility was commissioned to increase site discharge capacity.

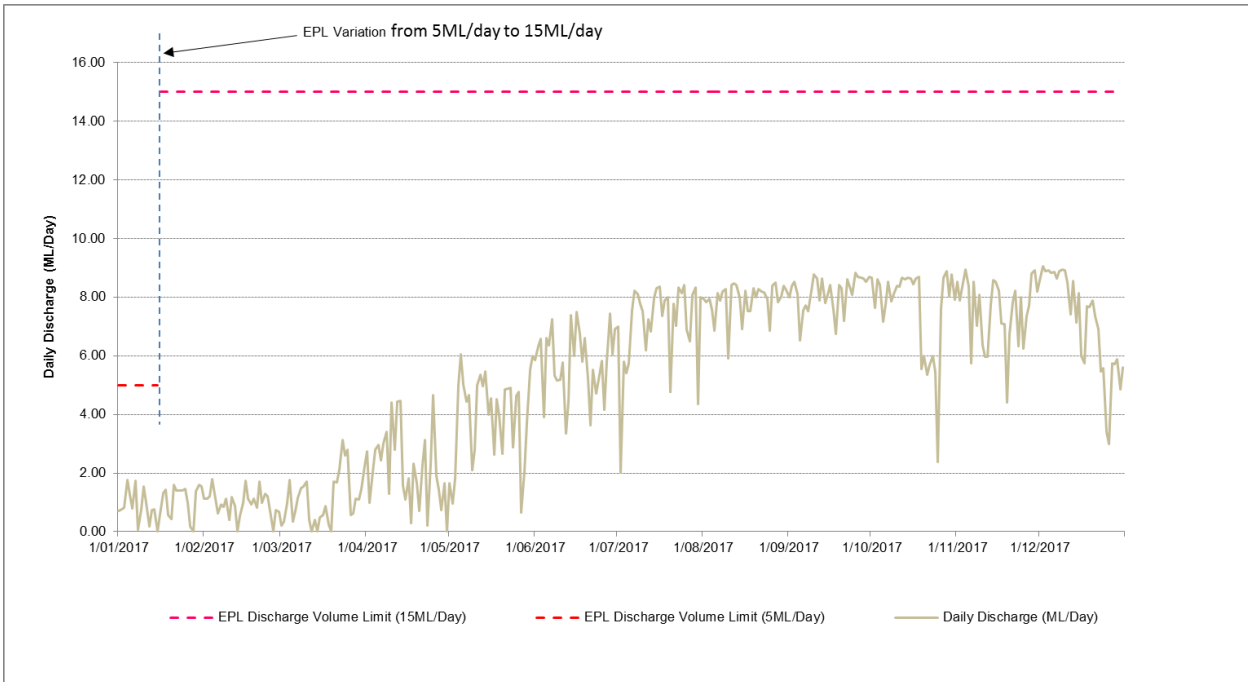
Water quality concentration limits (i.e. 100 percentile concentration limit) for LDP24 include:

- Electrical conductivity (EC) not to exceed 500  $\mu$ S/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).

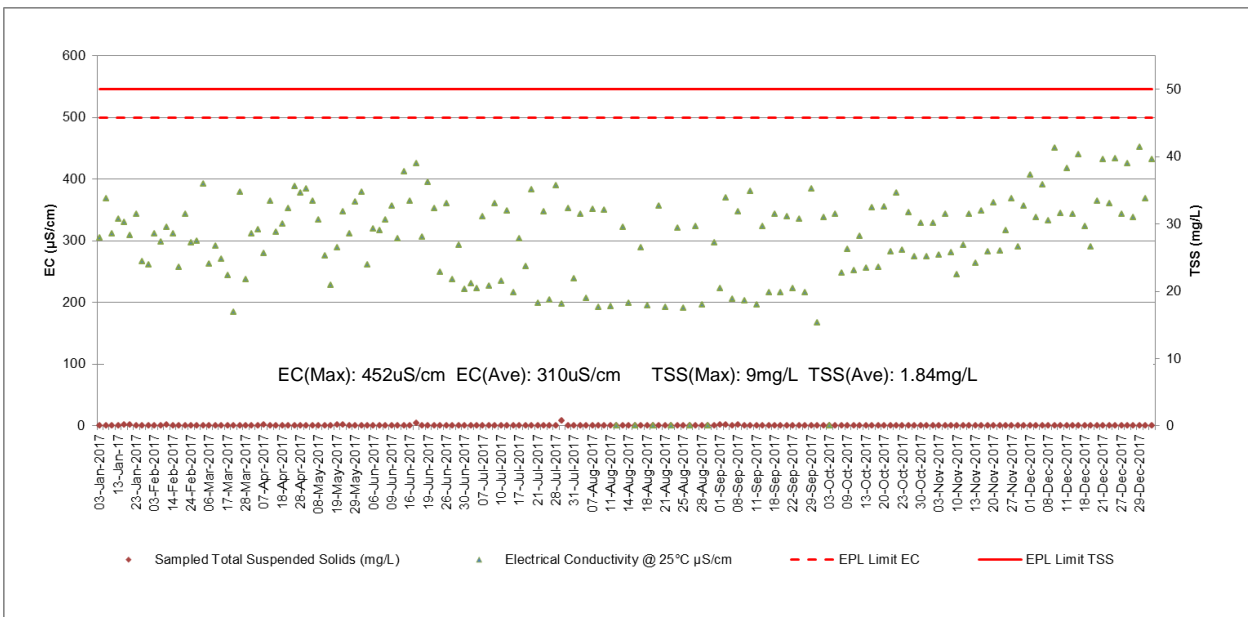
**Graph 19** presents the daily discharge (in ML/day) from the WTF during the 2017 review period. The total water discharged over the 2017 review period was 1846.6ML. WCPL did not exceed the daily volume criteria of 5ML/day and 15ML/day. **Graph 20** presents the EC results of the treated water discharged from the WTF during the 2017 review period. WCPL did not exceed the maximum criteria of 500 $\mu$ S/cm for EC. **Graph 21** presents the pH, TSS and O&G results of the treated water discharged from the WTF during the 2017 review period. WCPL did not exceed the pH maximum or minimum criteria (i.e. 6.5 - 8.5pH). WCPL achieved the water quality criteria for TSS and O&G (i.e. 50mg/L and 10mg/L respectively),

with the exception of one O&G result of 17mg/L analysed on the 28 July 2017. For further discussions and explanations please refer to footnote provided with **Graph 21**.

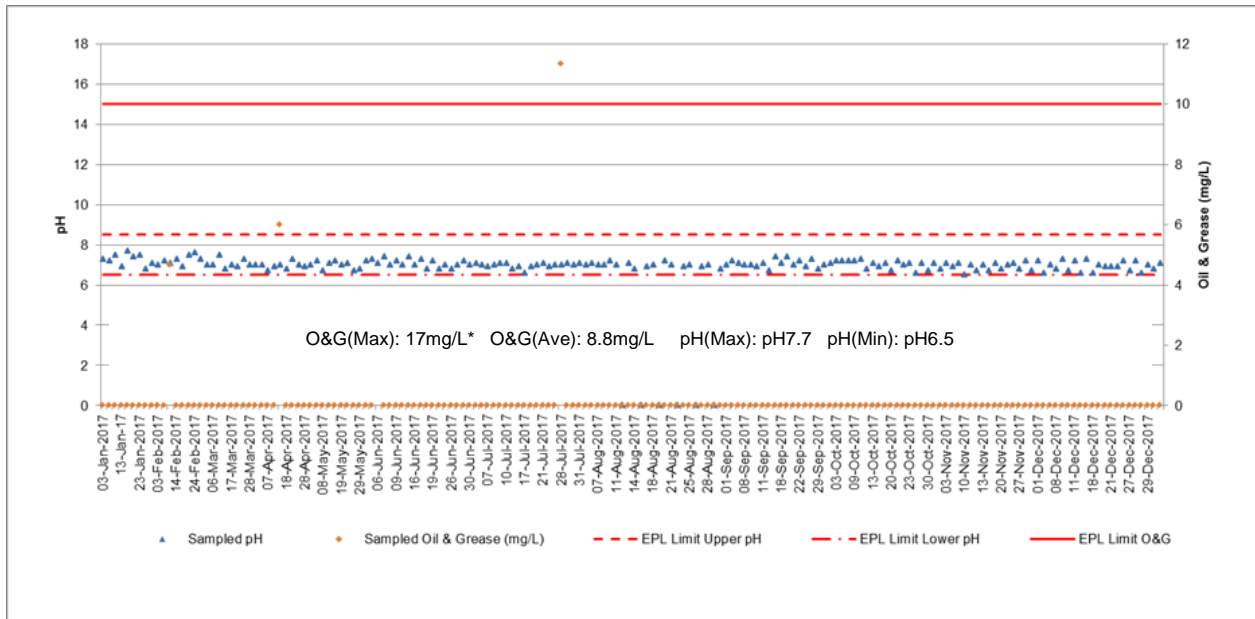
**Graph 19 Treated Water Discharged During 2017**



**Graph 20 Results for EC & TSS Discharged During 2017**



Graph 21 Results for pH & Oil/Grease Discharged During 2017



**Note:\*** Oil & grease result analyses on the 28 July 2017 was 17mg/L. After investigations it was determined the result of laboratory error or interference in the analysis method. Any oil and grease (O&G) in the Reverse Osmosis (RO) feedwater will be rejected at the RO membrane surface. On this basis O&G should not pass into the treated water. After O&G result reported additional water samples taken to confirm any future O&G result reported by laboratory. Since the 28/07/2017 result all water samples (numbering 105) have returned an O&G concentration of <5mg/L.

### 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 2017 channel stability monitoring by ELA (**Appendix 3C**) concluded the stability and physical health of both Wilpinjong and Cumbo Creeks are characteristic of ephemeral systems in agricultural landscapes consistent with other creeks in surrounding location and history, as evidenced by the following:

- Due to low rainfall, no recent downstream erosion is evident and overall susceptibility of the creeks to downstream erosion is low.
- Active lateral erosion is evident, creating lateral gully-erosion at several locations. This has formed due to high velocity runoff from adjacent cleared paddocks occurring at right angles to the creek line.
- There are several instances where cattle access is contributing to bank instability and reducing in-stream vegetation.
- Feral Pigs are active within the riparian zone of both creeks and should be managed.

Erosion and bank stability within the Wilpinjong and Cumbo Creeks is more likely to be directly linked to historic agricultural practices within the riparian zone than mining activities at Wilpinjong Mine. Additionally, mining activities do not appear to be accelerating natural erosional processes.

Surveys undertaken since 2010 have found that the Wilpinjong Creek remains a highly degraded creek as a result of past land management practices, however there are areas of natural regeneration occurring that are related to stock access restriction from the riparian corridors. Cumbo Creek continues to lack structure and riparian features however it remains relatively stable. There is no visible evidence that mining within the vicinity of the creeks or discharge of water from the mine has resulted in creek bed lowering or increased erosion (ELA, March 2018).

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**) the aquatic health at sites along Wilpinjong Creek was generally poor, with the macroinvertebrate communities characterised by low diversity, and SIGNAL2 scores indicating moderate or severe pollution<sup>8</sup>. Water quality improves downstream of the water discharge point, but at other sites contains high electrical conductivity. The condition of riparian zones along the creeks were poor, with erosion and sparse vegetation communities. Exceptions to this occurred at WC6, WO1, and WO3, which had well-connected riparian zones.

Compared to previous survey rounds, the November 2017 results indicate a slight increase in ecological health. This is likely a result of the high flow in 2016, then the subsequent period of regular rainfall events.

## 7.10 DPI Water Recommendations

DPI Water recommended a number of additional investigations as part its review of the updated SWMP in 2017. **Table 27** provides a status of these recommendations. At the end of the reporting period several recommendations were completed. However, due to data requirements to assist several other recommendations i.e. awaiting for the 2017 monitoring data to contribute to the reports, those outstanding recommendations are reported as ongoing for completion in 2018.

**Table 27 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.	<b>Ongoing for completion 2018</b>
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).	<b>Ongoing for completion 2018</b>
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	<b>Completed:</b> <i>Wilpinjong Mine – Water and Salt Balance for Adjoining Watercourses</i> (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) <i>National Industry Guidelines for Hydrometric Monitoring</i> . 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.	<b>Completed:</b> <i>Wilpinjong Creek Hydrometric Station Construction and Operation Review</i> (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.	<b>Ongoing for completion 2018</b>

<sup>8</sup> A standard reference term used to create a Stream Pollution Index (SPI) for creek, rivers etc. Pollution is used to describe high levels of salinity, turbidity, nutrients or a decrease in oxygen.

## 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 27**. A summary of the groundwater monitoring results is provided in **Table 28**. Further groundwater monitoring results for 2017 review period, including figures with groundwater monitoring locations are provided in **Appendix 3D**.

**Table 28 Groundwater Monitoring Program**

Monitoring Locations		Frequency	Parameters <sup>1,2</sup>
Open Cut Operations	<ul style="list-style-type: none"> <li>Main pit sump(s)</li> </ul>	Monthly	<ul style="list-style-type: none"> <li>Volume of water extracted.</li> </ul>
		Quarterly	<ul style="list-style-type: none"> <li>pH, EC, TDS, Na, K, Mg, Ca, Cl, HCO<sub>3</sub>, CaCO<sub>3</sub>, SO<sub>4</sub> and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).</li> </ul>
Water Supply Bores <sup>3</sup>	<ul style="list-style-type: none"> <li>GWs10, GwS11, GWs12, GWs14, GWs15</li> </ul>	Monthly (During Extraction)	<ul style="list-style-type: none"> <li>Water level, field pH and EC.</li> <li>Volume of water extracted.</li> </ul>
Alluvial Bores	<ul style="list-style-type: none"> <li>GWa10, GWa11, GWa12, GWa14, GWa15, GWa16, GWa22, GWa32</li> </ul>	12 Hr (logger)	<ul style="list-style-type: none"> <li>Water level, Pressure, Temperature</li> </ul>
	<ul style="list-style-type: none"> <li>GWa1, GWa2, GWa3, GWa4, GWa5, GWa6, GWa7<sup>5</sup>, GWa8<sup>5</sup>, GWa9, GWa10, GWa11, GWa12, GWa14, GWa15, GWa16, GWa22, GWa32, GWa33<sup>5</sup></li> </ul>	Monthly	<ul style="list-style-type: none"> <li>Water level, temperature field pH and EC.</li> </ul>
		Quarterly	<ul style="list-style-type: none"> <li>TDS, Na, K, Mg, Ca, Cl, HCO<sub>3</sub>, CaCO<sub>3</sub>, SO<sub>4</sub> and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).</li> </ul>
Coal Measures Bores	<ul style="list-style-type: none"> <li>GWc10, GWc11, GWc12, GWc14, GWc15, GWc16, GWc17, GWc18, GWc22, GWc23, GWc24, GWc25, GWc26, GWc27, GWc28, GWc29, GWc30, GWc31, GWc32<sup>5</sup></li> </ul>	Daily (logger)	<ul style="list-style-type: none"> <li>Water level, Pressure, Temperature</li> </ul>
		Monthly	<ul style="list-style-type: none"> <li>Water level, temperature, field pH and EC.</li> </ul>
	<ul style="list-style-type: none"> <li>GWc1, GWc2, GWc3, GWc4<sup>5</sup>, GWc5<sup>5</sup>, GWc10, GWc11, GWc12, GWc14, GWc15, GWc16, GWc17, GWc18, GWc19, GWc20, GWc22, GWc23, GWc24, GWc25, GWc26, GWc27, GWc28, GWc29, GWc30, GWc31, GWc33, GWc32<sup>5</sup>, GWc34, GWc35</li> </ul>	Quarterly	<ul style="list-style-type: none"> <li>TDS, Na, K, Mg, Ca, Cl, HCO<sub>3</sub>, CaCO<sub>3</sub>, SO<sub>4</sub> and Metals (Cu, Zn, Fe, Al, Ni, Mn, Ba, Sr, Pb, As and Se).</li> </ul>
Landholder bores, wells and waterholes <sup>4</sup>		As required	<ul style="list-style-type: none"> <li>To be determined</li> </ul>

**Notes:** 1) Parameters will be analysed provided sufficient volumes of water can be collected.

2) Na = Sodium, Ca = Calcium, HCO<sub>3</sub> = Bicarbonate, SO<sub>4</sub> = 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.

During 2017, WCPL installed three new monitoring piezometers which included GWa16 (a replacement monitoring bore), GWc36 and GWa36 within coal and alluvium measures respectively. WCPL resumed monitoring at four piezometers in the vicinity of the existing Tailings Dams (PZ13, PZ20, PZ21 and PZ26) during 2017.

## 7.12 Groundwater Monitoring Review

A review of groundwater data was undertaken by HydroSimulations for the 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 2017 review is provided below and in **Table 29**, with the complete report provided in **Appendix 3D**.

### Groundwater Level Data Review

For bores with sufficient record, groundwater levels around the WCM site have been investigated in detail to check for cause-and-effect responses in temporal water level changes which could result from rainfall recharge, creek dynamics, short-term dewatering/production pumping or a mining effect.

There was a pronounced dry period from July 2006 to March 2007 which coincided with the commencement of Pit 1. Pit 2 commenced under normal climatic conditions but within two months was exposed to a very wet period. Both pits were exposed to another very wet period that commenced in October 2007. The transition from a very dry period to a very wet period explains the initial experience of unexpectedly low pit inflows followed by excessive groundwater discharges. Additional wet periods are indicated by the rainfall trend, especially from 2010 onwards. Following the commencement of Pit 4, conditions had been drier than normal. This meant that groundwater levels were naturally lower, complicating the detection of possible mining effects due to Pit 4 and/or Pit 3. At the end 2016 wetter climatic conditions prevailed and all bores showed increases in water level, before a pronounced dry period, occurring for most of 2017, subsequently caused widespread decline in groundwater levels. Where mining effects are considered a possibility, the individual hydrographs in Attachment A are annotated to that effect.

The groundwater table in the alluvium varies from about 385 mAHD to about 345 mAHD over a distance of 8.4 km from GWa1 to GWa7, with hydraulic gradient 0.5% (0.005). Groundwater responds to this gradient by flowing to the east through the alluvium.

Water table rises are evident at most bores in correlation with rises in the rainfall trend. This confirms the expectation that rainfall is an important source of recharge for the alluvial aquifer. Given the proximity of the alluvium to the elevated Goulburn River National Park to the north, groundwater discharge from the Park's Narrabeen sediments will provide another stable source of recharge to the alluvium.

Based on the analysis of the hydrographs, some mining effects are considered to have occurred or be ongoing at the following bores located in the Wilpinjong alluvium and Cumbo Creek alluvium, albeit these effects are minor and therefore are difficult to discern from climatic variations. 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.

### Groundwater Quality Data Review

Groundwater electrical conductivity statistics have been computed from 1,595 measurements from April 2006 to December 2017. The median value of the measurements at the 13 monitoring sites is about 2,500 microSiemens per centimetre ( $\mu\text{S}/\text{cm}$ ). The average for all monitoring sites is approximately 4,100  $\mu\text{S}/\text{cm}$ , considerably higher than the median. However, the standard deviation of  $\sim 3,300$   $\mu\text{S}/\text{cm}$  is commensurate with the mean.

The lowest mean salinity in the alluvium holes is 1,500  $\mu\text{S}/\text{cm}$  at GWa2, whereas the highest mean is 10,500  $\mu\text{S}/\text{cm}$  at GWa5. The lowest mean salinity in the coal holes is 1,200  $\mu\text{S}/\text{cm}$  at GWc2, whereas the highest mean is 5,100  $\mu\text{S}/\text{cm}$  at GWc5. On the whole, 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.

The highest salinities occur on Cumbo Creek to the south of Pit 4, on Wilpinjong Creek near Pit 6 and on Wilpinjong Creek to the north-east of Slate Gully. The lowest salinities are along Wilpinjong Creek from Pit 1 to Pit 4, upstream of the Cumbo Creek junction, and on Wollar Creek.

Alluvial sites have a large range in salinities, from very high with large fluctuations to near fresh and stable that bear some apparent relationship with rainfall and mining. The salinities in the coal holes are consistently stable. The different signatures for shallow and deep waters reflect dynamic evapotranspiration acting preferentially on shallow groundwater.

Table 29 Groundwater Performance

Location		Approved Criteria			Performance During the Reporting Period			Trend/Key Management Implications	Implemented/proposed Management Actions
<b>Groundwater Monitoring (Alluvium)</b>									
	<b>Water Levels (mAHD)<sup>9</sup></b>	<b>EC (µS/cm)<sup>10</sup></b>	<b>pH<sup>11</sup></b>	<b>Water Level (mAHD)</b>	<b>EC (µS/cm)</b>	<b>pH</b>	<ul style="list-style-type: none"> <li>A review of groundwater data for 2017 was undertaken by Hydro Simulations.</li> <li>A summary of the Hydro Simulations 2017 review is provided in <b>Section 7.11</b>, with the complete report provided in <b>Appendix 3D</b>.</li> <li>There were Trigger Level Exceedances of Minimum Water Levels at GWA3, GWA4 and GWA5.</li> <li>There were Trigger Level Exceedances of EC at GWA3, GWA4, GWA6, GWA7, GWc1, GWc3, GWc4 and GWc5.</li> <li>There were no Trigger Level exceedances of pH.</li> <li>For detailed discussion of Trigger Level Exceedances during the 2016/2017 Water Year refer to <b>Appendix 3D</b>.</li> </ul>	<ul style="list-style-type: none"> <li>WCPL will continue to monitor and evaluate the groundwater system over the 2018 review period.</li> <li>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.</li> <li>Undertake the necessary investigations and/or review of the recommendations proposed by Hydro Simulations in 2018 as required, including but not limited to: <ul style="list-style-type: none"> <li>- Drilling of deeper bores at alluvial locations that are frequently observed as dry (GWA1, GWA3, GWA6); and</li> <li>- Re-instatement of trigger level within Groundwater Management Plan for GWA6 now that correct bore depth can be used.</li> </ul> </li> </ul>	
<b>GWa1</b>	383.9	12,272	7.2	Dry	Dry	Dry			
<b>GWa2</b>	370.6	2,280	7.0	Max: 375.4	Max: 1910	Max: 7.0			
<b>GWa3</b>	360.3	1,970	7.3	Max: 361.2	Max: 2580	Max: 7.4			
<b>GWa4</b>	353.8	2,596	7.1	Max: 353.7	Max: 3580	Max: 7.2			
<b>GWa5</b>	372.7	13,926	7.1	Max: 372.5	Max: 14200	Max: 7.6			
<b>GWa6</b>	357.8	6,720	7.6	Max: 360.1	Max: 13600	Max: 7.8			
<b>GWa7</b>	343.2	10,126	7.0	Max: 344.9	Max: 10800	Max: 7.8			
<b>GWa8<sup>3</sup></b>	353.1	2,898	7.4	Max: 355.4	Max: 2520	Max: 7.2			
<b>Groundwater Monitoring (Coal)</b>									
<b>GWc1</b>	-	2,844	7.2	-	Max: 3370	Max: 7.2			
<b>GWc2</b>	-	1,290	7.7	-	Max: 1290	Max: 7.2			
<b>GWc3</b>	-	3,304	7.3	-	Max: 4250	Max: 7.0			
<b>GWc4</b>	-	2,412	7.1	-	Max: 2470	Max: 7.0			
<b>GWc5</b>	-	4,798	7.0	-	Max: 5700	Max: 6.8			
<b>Groundwater Production Bores</b>									
<b>GWs10</b>	351.5	-	-	As reported in <b>Section 7.8</b> , the Mine was in water surplus for the 2016/2017 period. No water was extracted from the groundwater production bores during the 2017 review period.					
<b>GWs11</b>	353	-	-						
<b>GWs12</b>	338	-	-						
<b>GWs14</b>	328	-	-						
<b>GWs15</b>	324	-	-						
<b>Notes:</b>									

<sup>9</sup> Three consecutive monthly exceedances or two consecutive quarterly monitoring events to trigger and investigation.

<sup>10</sup> 80<sup>th</sup> percentile value must be triggered three consecutive monthly monitoring events or two consecutive quarterly monitoring events to trigger and investigation.

<sup>11</sup> 80<sup>th</sup> percentile value must be triggered three consecutive monthly monitoring events or two consecutive quarterly monitoring events to trigger and investigation.



### 7.13 Groundwater Model Verification & Refinement

Previous reporting (HydroSimulations, 2015a; Peabody, 2016) has utilised the HydroSimulations (2013) groundwater model to assess likely impacts of the Wilpinjong Coal Mine and ensure sufficient water licences are purchased prior to a water year. This model was converted from the original numerical groundwater model used by AGE (2005).

A more recent groundwater model has been constructed (HydroSimulations, 2015b) that has been used in this report. As is required by the Groundwater Monitoring Program HydroSimulations have prepared a report on the new model and presents the results of the model verification (**Appendix 3D**).

### 7.14 Compensatory Water Supply

In accordance with Condition 34(b), Schedule 3, PA05-021 and 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 2017 review period this condition was not triggered. There are no privately owned bores within this predicted impacted zone.

## 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, the current approved MOP will be revised accordingly in 2018 to incorporate the revised Rehabilitation Strategy.

Rehabilitation of disturbed areas is undertaken on a progressive basis in accordance with the approved MOP. 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 2016, approximately 374 ha of completed landforms have been rehabilitated.

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 outlines the forecasted rehabilitation commitments for each 12 month period. In the first 12 month period i.e. 01 July 2017 to 30 June 2018 the MOP and Plan 3A nominated a total area 85.5ha for rehabilitation. The proposed rehabilitation included a combination of approximately 75.5ha of waste rock emplacement areas in Domain 5 and approximately 10ha of decommission tailings dam area (TD3) in Domain 6.

During 2017, a combined total of approximately 82 ha of landforms were rehabilitated, of which 78.5ha was mine waste rock emplacements areas in Domain 5 and approximately 3.5ha of land between TD3 and TD4 in Domain 6. These areas were rehabilitated and seeded with a summer cover crop pasture mix<sup>12</sup> (Table 33) and are shown in Figure 4. The slight difference of areas actually rehabilitated during the 2017 reporting period against the scheduled MOP targets for 2017/2018 primarily relate to delays in the availability of suitable overburden material for creating the final landform over TD3. WCPL expect to complete the final landform and rehabilitate TD3 in 2018.

The locations and areas of mine waste rock emplacement rehabilitated during the 2017 reporting period were generally at the locations nominated in MOP Plan 3A, which included available areas of mine waste rock emplacements in Pit 1, Pit 2, Pit 4, Pit 5 and Pit 7, with the following exceptions:

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<sup>12</sup> Progressive revegetation to the BVT classification will be undertaken for all of WCPL's mine existing and proposed rehabilitation areas upon resolution of the performance and completion criteria, in accordance with Condition 65 of the Development Consent SSD-6764.

- **Pit 5 North:** Due to delays in Pit 6 operations regarding the availability of suitable overburden material required to complete the final landforms in Pit North 5, several alternate areas adjacent to the proposed MOP areas were rehabilitated in Pit 5 North;
- **Pit 5 South West:** The option to keep the mine haul road to allow an alternate access into Pit 5 reduced the rehabilitation target in this area by approximately 4.5ha. Landforms either side of the haul road were rehabilitated as identified in MOP Plan 3A; and
- **Pit 4 West:** To offset some of the rehabilitation shortfalls in Pit 5, WCPL were able to rehabilitate additional areas in Pit 4 which were not shown in MOP Plan 3A.

Although there were exceptions to the proposed 2017/2018 rehabilitation program, these changes were considered generally consistent with the rehabilitation scheduled and targets proposed in the MOP. As required by the MOP, any proposed amendments that would impact on the rehabilitation schedule, the DRG will be notified and consulted accordingly. WCPL consider the current rehabilitation program will meet the MOP commitments and schedule for 2018/2019<sup>13</sup>.

As displayed in **Table 30**, approximately 456ha of completed landforms have been rehabilitated to date. No rehabilitated landforms are yet considered ready for formal sign off by the DRG in terms of meeting the relevant completion criteria (**Table 30**). 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 30 Rehabilitation Status**

Mine Area Type	2015 Reporting Period (Actual)	2016 Reporting Period (Actual)	2017 Reporting Period (Actual)	Next Reporting Period (Forecast)
	2015 (ha)	2016 (ha)	2017 (ha)	2018 (ha)
<b>A. Total mine footprint</b>	2857.34	2857.34	2857.34	2857.34
<b>B. Total active disturbance</b>	1148.6	1147.4	1297.4	1,520.3
<b>C. Land being prepared for rehabilitation</b>	43	70	82	95
<b>D. Land under active rehabilitation</b>	304	374	456	551
<b>E. Completed rehabilitation</b>	0	0	0	0

Other rehabilitation commitments in the MOP term include removal of Keylah Dump, construction of the Elevated Waste Dump in Pit 2 to RL450m then back down to RL430m, commencing a series of upslope water diversion banks and temporarily vegetating a number of selected batters for several long term mine waste rock emplacement areas including Duffy Dump and Pit C Dump.

At the end of 2017, Keylah Dump was completely removed (**Section 8.2**). Other commitments including construction of upslope diversion banks and temporarily vegetating a number of selected batters for several long term mine waste rock emplacement areas are scheduled to occur in 2018. 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 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.

<sup>13</sup> Subject to the Land and Environment Court ruling of SSD-6764 (refer to **Section 8.1.2** for further details)

### 8.1.2 8.1.2 Summary of Activities Next Reporting Period

As described in the MOP, WCPL are scheduled to rehabilitate a total of 95.0ha of mine waste rock emplacements in Domain 5, within Pit 1, Pit 2, Pit 3, Pit4, Pit 5 and Pit 7 and complete rehabilitation of TD3. However, there may be a need to revise the mine plan subject to the Land and Environment's Court decision in 2018. If the WEP is determined invalid by the Land and Environment Court, WCPL will need to revise the mine plan back to the former Project Approval PA05-0021. This situation would see lower than expected volumes of material and require a new mining and rehabilitation sequence. Any changes as a result of the WEP determined invalid will be in consultation with the DRG.

## 8.2 Domains Rehabilitated

The MOP describes the proposed rehabilitation phases within Primary Domains during the term of the MOP. In accordance with the MOP, landform establishment, growth medium development, ecosystem establishment was undertaken during 2017 in Domain 5 (i.e. Waste Rock Emplacement Areas) and Domain 6 (i.e. Tailings Emplacement Areas). A photographic recording of the Keylah Dump removal is provided in **Figure 3**. Other photos of rehabilitation activities during the reporting period are provided in **Appendix 7**. Ecosystem development phases were completed in Domain 8 and Domain 9. The following rehabilitation phases within Domains 5 and 6 are described below.

### 8.2.1 Decommissioning

There were no decommissioning<sup>14</sup> of mining related infrastructure undertaken at the Mine in 2017.

### 8.2.2 Landform Establishment

All 2017 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 2m of encapsulation using inert material.

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 expect to complete the final landform and rehabilitate TD3 in 2018.

Keylah Dump removal was completed during 2017 with approximately 130,000m<sup>3</sup> of material removed (refer to the photos in **Figure 3**). The removal of the dump was undertaken in accordance with the Keylah Dump Management Plan with any hot material placed in identified voids in Pit P5 and Pit P1 in layers of approximately 2.5m (average) thickness. These layers were then capped with at least 3m of inert material and track rolled prior to the next layer of hot material being placed. This process was monitored by WCPL's Open Cut Examiner (OCE) (or delegate) until reaching the limit of 5m below the final surface level. These dumps have not reached final landform however the dump locations have been captured in the Spontaneous Combustion Management Plan for future reference.

<sup>14</sup> However, works were completed in 2017 for demolition of disused and vacant farm buildings situated within ML1573. 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.

Figure 3 Completion of Keylah Dump Removal



All rehabilitated slopes constructed during the 2017 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 2017, a combination of approximately 82ha across Domain 5 and Domain 6 of final landforms were completed in preparation for topsoil placement, ripping and seeding.

### 8.2.3 Growth Medium Development

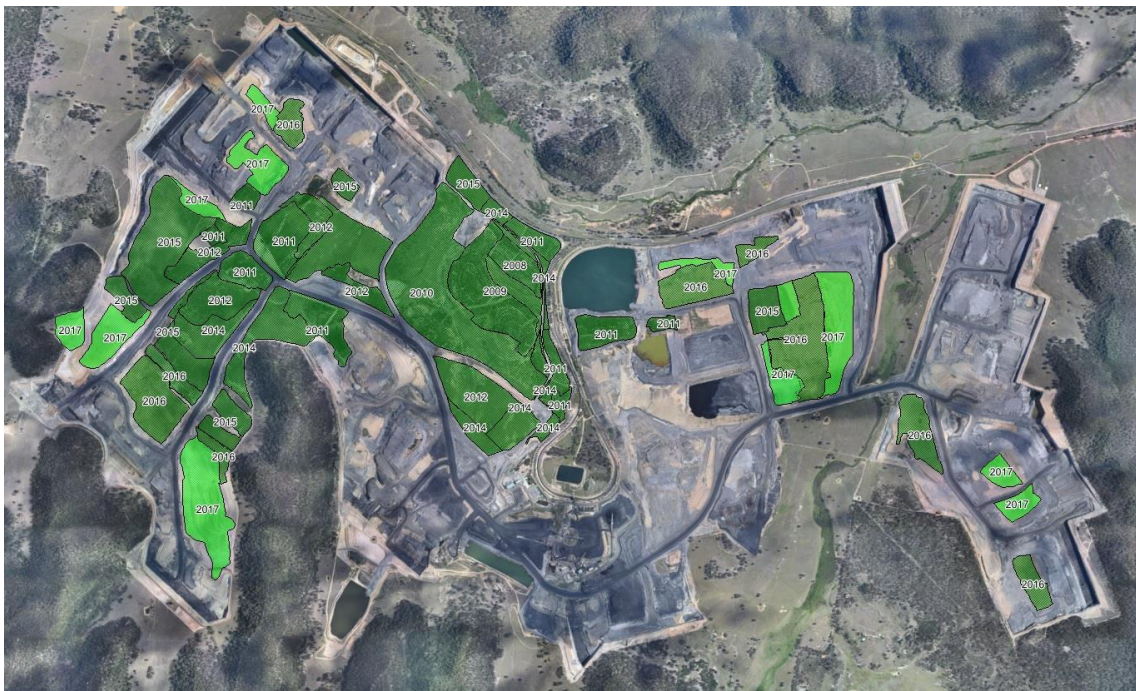
Topsoil placement involved utilising dozers and graders to spread to the desired depth, as well as direct placement by scrapers. Topsoil is to be placed on top of the final landform to act as germination medium for vegetation and as a seed source from the natural seed bank present at the time of topsoil 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, a specialist agronomist was engaged. Topsoil sampling was undertaken across all proposed rehabilitation area with results indicating the requirement for ameliorates in all areas. Results indicate a deficiency in P, K, CA, B, Cu, Zn, Cl and organic matter. Appropriate recommendations have been received including the application of lime, organic matter and fertiliser.

### 8.2.4 Ecosystem Establishment

During 2017, a combination of approximately 82ha across Domain 5 and Domain 6 were seeded under a summer cover crop (**Figure 4**). The cover crops include various combination of legumes (cow peas, clover), sorghum, millet, sudan grass, oats. Typically combinations and rates are shown in **Table 33** of the different pasture species and rates. 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 AR.

Figure 3 2017 Seeded Areas (light green areas)



### 8.2.5 Ecosystem Development

During 2017, Ecosystem Develop activities occurred across Domain 8 (i.e. Rehabilitation Areas Pre-MOP) which primarily included monitoring, applying Biometric assessments as described below.

Monitoring and maintenance activities are ongoing with the results assessed and used to refine rehabilitation techniques. WCPL has developed measurable, quantitative interim Completion Criteria (**Section 6.4**) that will support the agreed final land use for the Mine. Interim Performance Targets 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 Interim Performance Targets (IPT) will be measured using Landscape Function Analysis (Tongway & Hindley 2004) and the BioMetric methodology (WCPL 2014). During 2017, Wilpinjong undertook monitoring in accordance with the current BMP. Results are attached as **Appendix 5**.

Seven LFA monitoring sites are located within Pre-MOP Rehabilitation Areas (Domain 8), including R5; R6; R8; R9; R10; R11 and R13. The LOI and SSA results for the sites are presented in **Table 31**.

Spring 2017 monitoring results indicate that all Rehabilitation Area transects had high LOI scores (above 0.8). Transects R5\_C, R8 and R9 experienced a decline in LOI compared to spring 2016 monitoring, while all other sites increased or remained stable. The Soil Stability scores recorded at all the Rehabilitation Area transects exceeded the Completion Criteria, however no sites achieved the annual incremental increase, with five of the seven sites experiencing a reduction in Soil Stability. The Soil Infiltration and Nutrients scores for all the Rehabilitation Area transects were below the Completion Criteria and the incremental increase target. With the exception of R9, all sites experienced a reduction from the 2016 monitoring results for at least one of the SSA indices.

**Table 31: LOI and SSA results for Rehabilitation Area transects**

Site	Monitoring Season	Landscape Organisation Index	Soil Surface Assessment		
			Stability	Infiltration	Nutrient cycling
R5_C	Spring 2017	0.81	58.0	30.1	25.0
	Spring 2016	0.96	58.2	33.5	28.3
	Annual incremental increase		-0.2	-3.4	-3.3
R6	Spring 2017	0.80	56.9	30.8	25.8
	Spring 2016	0.78	62.5	35.6	28.0
	Annual incremental increase		-5.6	-4.8	-2.2
R8	Spring 2017	0.95	53.2	31.4	24.2
	Spring 2016	0.96	58.8	41.5	33.3
	Annual incremental increase		-5.6	-10.1	9.1
R9	Spring 2017	0.98	58.1	42.7	38.1
	Spring 2016	1.00	57.4	41.0	34.7
	Annual incremental increase		0.7	1.7	3.4
R10	Spring 2017	0.69	56.6	28.8	22.1
	Spring 2016	0.63	59.2	30.0	21.7
	Annual incremental increase		-2.6	-1.2	0.4
R11	Spring 2017	0.98	60.9	40.6	36.9
	Spring 2016	0.98	65.2	40.8	34.3
	Annual incremental increase		-4.3	-0.2	2.6
R13	Spring 2017	0.91	57.9	33.7	28.1
	Spring 2016	0.87	56.3	36.6	29.3
	Annual incremental increase		1.6	-2.9	-1.2

## Reference Sites

During spring 2017 monitoring, ten LFA transects were undertaken at Reference Sites to provide comparative data to assist in guiding management of WCPLs Management Domains (see Error! eference source not found.). The LOI and SSA scores for the Reference Site transects are presented in **Table 32**.

During spring 2017 monitoring, high LOI scores (above 0.8) were recorded at all the Reference sites, with the exception of site Ref\_4, indicating that most the sites were close to being entirely occupied with patches and have a stable landform. The Soil Surface Stability scores recorded at all Reference sites were above the Completion Criteria. Soil Infiltration and Nutrient Cycling for all Reference Sites were below the Completion Criteria and did not achieve the incremental increase target. All sites, except Ref\_13b, experienced a reduction from the 2016 monitoring results in one or more SSA indices.

**Table 32: Spring 2016 LOI and SSA results - Reference Sites**

SITE	Monitoring Season	Landscape Organisation Index	Soil Surface Assessment		
			Stability	Infiltration	Nutrient cycling
Ref_1	Spring 2017	0.80	56.7	39.6	32.1
	Spring 2016	0.95	59.3	41.9	32.2
	Annual incremental increase		-2.6	-2.3	-0.1
Ref_2	Spring 2017	1.00	54.3	40.5	35.2
	Spring 2016	0.98	55.3	45.8	35.6
	Annual incremental increase		-1.0	-5.3	-0.4
Ref_3	Spring 2017	0.97	56.9	39.6	34.7
	Spring 2016	0.96	54.1	45.2	34.8
	Annual incremental increase		2.8	-5.6	-0.1
Ref_4	Spring 2017	0.78	50.0	35.3	25.5
	Spring 2016	1.00	61.2	43.4	35.3
	Annual incremental increase		-11.2	-8.1	-9.8
Ref_5	Spring 2017	0.82	54.4	45.7	33.4
	Spring 2016	0.98	56.6	55.3	38.0
	Annual incremental increase		-2.2	-9.6	-4.6
Ref_6	Spring 2017	0.96	54.3	42.3	32.8
	Spring 2016	0.99	53.2	48.8	35.8
	Annual incremental increase		1.1	-6.5	-3.0
Ref_7	Spring 2017	0.89	54.3	45.1	34.1
	Spring 2016	0.98	55.7	44.9	37.5
	Annual incremental increase		-1.4	0.2	-3.24
Ref_8	Spring 2017	1.00	55.7	39.1	33.6
	Spring 2016	0.89	55.7	48.9	33.1
	Annual incremental increase		0	-9.8	0.5
Ref_13b*	Spring 2017	0.98	54.4	42.7	35.2
	Spring 2016	1.00	57.9	38.2	31.7
	Annual incremental increase		-3.8	4.5	3.5
Ref_14	Spring 2017	1.00	59.3	43.1	38.8
	Spring 2016	0.88	55.3	54.1	39.7
	Annual incremental increase		4	-11	-0.9

Note: Ref\_13b was established in spring 2016. The original Ref\_13 site was impacted by fire from a NPWS controlled burn.



## Discussion of LFA monitoring results

All the sites recorded relatively high LOI scores, indicating stable, functioning landform covered by patches. However, LOI should be considered as an indicator only and correlation of these scores against vegetation and non-vascular ground cover data (for example, fallen logs) is important to gain a more detailed understanding of the overall functioning of the monitoring sites.

Within the Management Domains, the dominant patch types were groundcover, litter (with litter consisting of exotic annual species and/or leaf litter) and a mixture of groundcover and litter. The dense perennial groundcover at many monitoring sites is reflective of their vegetation type and condition, including regenerating DNG of grassy woodland communities.

All sites met the Completion Criteria target for Stability, despite 15 of the 22 sites experiencing a decrease from the 2016 monitoring results. The Stability scores across the Management Domains monitoring sites were comparable to the Reference site scores. The decrease in Stability scores may be attributed to a range of factors, including changed soil moisture levels affecting individual indicators, for example, surface resistances and slake tests, or observer variation of field conditions.

While Infiltration and Nutrient Cycling indices were lower and did not meet the annual incremental increase targets for the majority of sites, this pattern was similarly recorded in Reference sites. Variations from the 2016 monitoring results may be a result of a reduction in grass cover due to drier field conditions in 2017. Nutrient Cycling may be affected by perennial vegetation cover, litter cover and extent of decomposition, cryptogam cover and soil surface roughness. While many LFA sites have moderate to dense cover of perennial vegetation (grasses) and/or high litter cover, there was limited litter decomposition observed and largely flat soil micro topography. Low Soil Infiltration and Nutrient Cycling scores may be due to historical clearing and livestock usage across the BOAs, ECAs and Regeneration Sites. Low scores recorded within the Rehabilitation Sites may be due to the compacted soils on which the Rehabilitation areas are located.

This decline in SSA scores within the Management Domains and Reference Sites is consistent with results from the 2015 to 2016 monitoring periods, suggesting there may be a downward trend. Longer term data would be required to assess whether this reduction represents a short-term change (for example due to a reduction in grass cover from seasonal variance, data collection and calculation, observer variation) or an ongoing trend requiring management action.

## 8.3 Other Rehabilitation Activities

### 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 2017, a number of drill sites were inspected for rehabilitation progress, including:

- Return of vegetation;
- Any evidence of weed or pest invasion; and
- Active erosion issues or slumping.

### Burn Trial

A burn trial was undertaken on a small portion of existing mine waste rock rehabilitation in 2017 to:

- Investigate the effectiveness of burning as a tool to reduce exotic pasture cover;
- Assess effects of burning on canopy species (eucalypts);
- Assess impact of burning on flora species compositions; and
- Investigate fire to create conditions suitable for native species germination & establishment.

The results from this trial will be provided in the 2018 Annual Review.

### Typical Cover Crop

Cover crop includes various combination of legumes (cow peas, clover), sorghum, millet, sudan grass, oats. Combinations and rates are shown in **Table 33**.

**Table 33 Typical Cover Crop Combinations and Rates**

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

The use of the cover crop will provide 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.

### 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.

## 8.4 Land Management Activities

### Pest and Weed Management

WCPL completed pest management works on WCPL owned properties during 2017 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 and trapping campaign between Pit 3/7 and Slate Gully in December 2017. This program was undertaken in consultation with 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 (refer to Figure in **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:

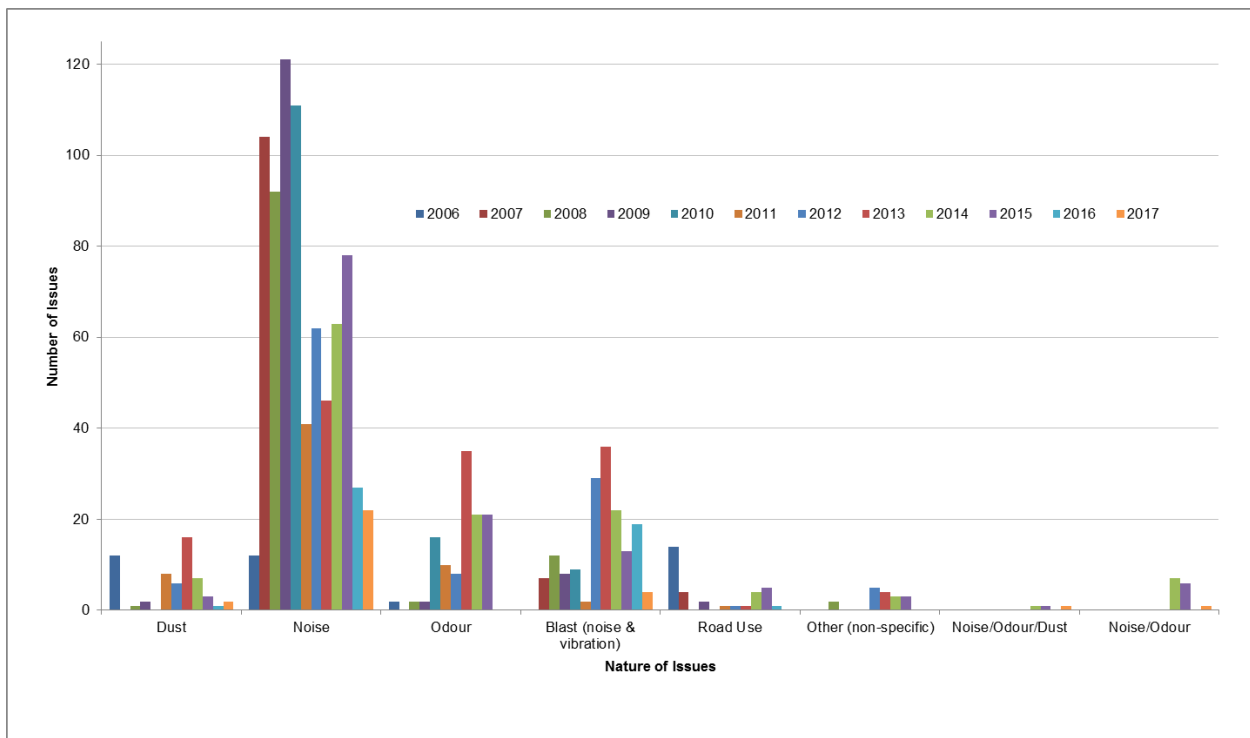
<https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wilpinjong-Mine>

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:

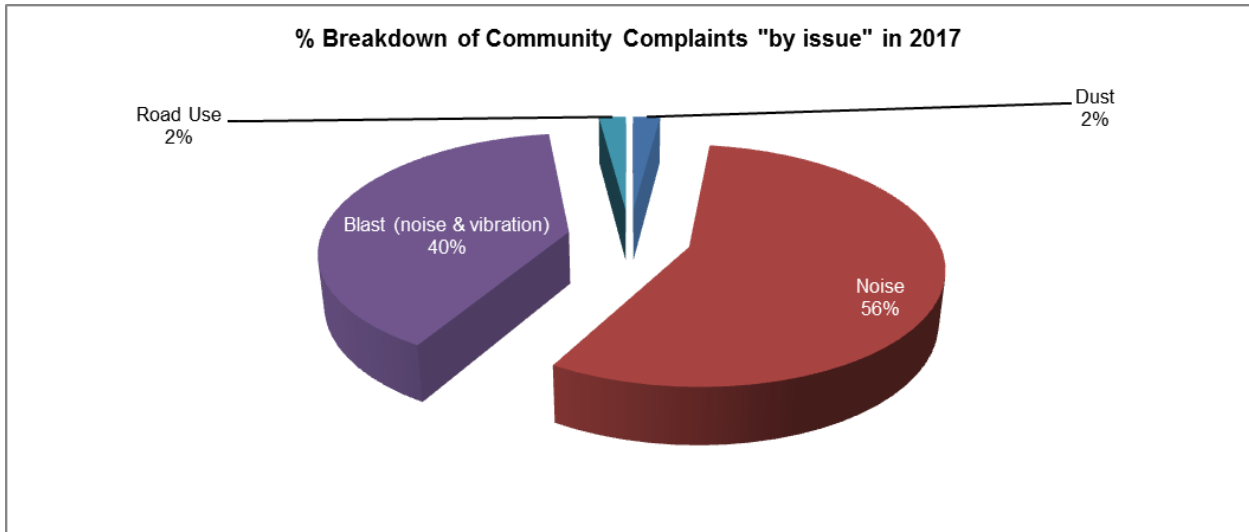
- A summary of complaints received is reported monthly on the Peabody website;
- A summary of complaints received and actions taken is presented to the WCPL CCC as part of the operational performance review;
- A summary of complaints received and actions taken is included in the Annual Review and Environmental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

During the 2017 review period, 30 environmental-related complaints were received by WCPL (**Appendix 6**) as opposed to 48 complaints in 2016. **Graph 22** presents a comparison of the environmental complaints received by WCPL over the period 2006 to 2017. **Graph 24** indicates a declining trend in community complaints from 2006 to 2017.

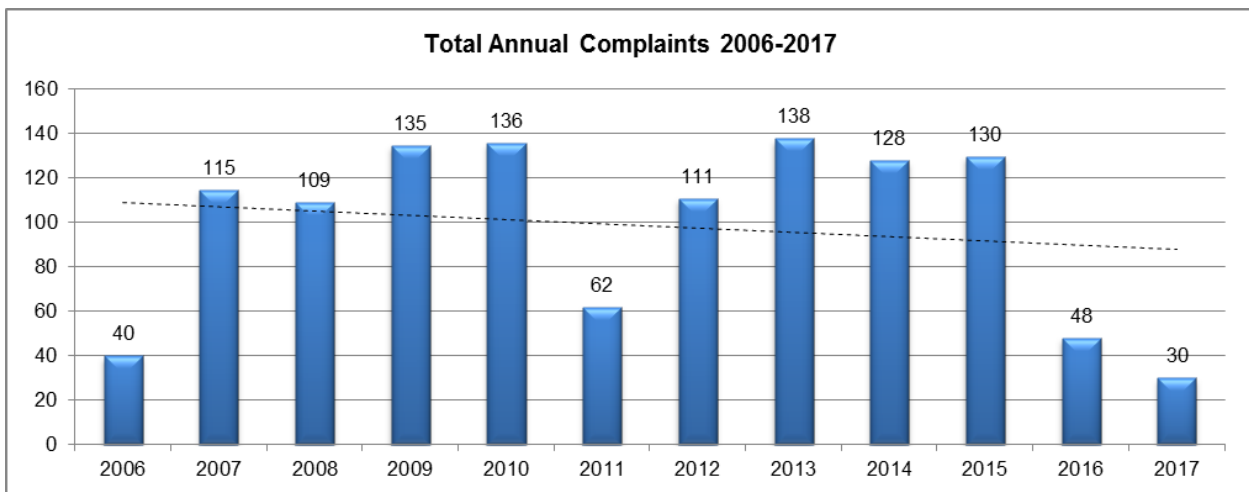
**Graph 22 Summary of Community Complaints and Issues Raised by Complainants 2006 – 2017**



Graph 23 Percentage Breakdown of Community Complaints in 2017



Graph 24 Total Annual Complaints 2006 - 2017



**Community Consultative Committee**

In accordance with Condition 5, Schedule 5 of Project Approval (05-0021) and Condition 7, Schedule 5 of SSD-6764, the Community Consultative Committee (CCC) (Table 34) continued to meet during the 2017 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 February, May, August and December 2017. 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 35 provides a summary of the CCC meetings held during the 2017 review period.

Table 34 CCC Members for the 2017

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
David Crust / Lisa Menke	NSW National Parks and Wildlife Service Representative

Table 35 Summary of CCC Meetings in 2017

Date	Key Outcomes
27 February 2017	Environmental monitoring results, MOP and WEP update, reviewed complaints since last CCC, discussed incidents, rehabilitation, EPL update, 2017 exploration program, community donations and management plan update.
15 May 2017	Environmental monitoring results, EMS update, reviewed complaints since last CCC, discussed incidents, rehabilitation, asbestos removal program, community donations and management plan update. Also included regular WEP and property updates.
21 August 2017	Environmental monitoring results, EMS update, reviewed complaints since last CCC, discussed incidents, rehabilitation, asbestos removal program, community donations and management plan update. Also included regular WEP and property updates.
4 December 2017	Environmental monitoring results, EMS update, reviewed complaints since last CCC, discussed incidents, rehabilitation, community donations and management plan update. Also included regular WEP and property updates.

### **Community Support Program**

During the 2017 reporting period, WCPL continued its support of local community groups and sporting associations, schools and charitable organisations (total amount in 2017 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](http://www.peabodyenergy.com)

### **Employment Status**

At the end of the 2017 reporting period there were 595 full time equivalent employees at WCPL (i.e. 471 employees and 124 contractors). An increase of 71 full time equivalent employees, when compared to the end of the 2016 reporting period.

## 10.0 INDEPENDENT AUDIT

### 10.1 Independent Environmental Audit

WCPL are required to complete an independent environmental audit (IEA) of the development as required under both Project Approval 05-0021 (PA 05-0021) and Development Consent SSD 6764 (SSD 6764). Both approvals require the completion of an IEA, however the timing for completion of each respective IEA nominated through these approvals does not align.

With reference to PA 05-0021, Schedule 5, Condition 9 requires that WCPL undertake an independent environmental audit by the end of December 2011, and every 3 years thereafter, unless the Director-General directs otherwise. Therefore under PA 05-0021 WCPL is required to complete an independent audit in December 2017.

WCPL was granted approval for the Wilpinjong Extension Project (SSD 6764) on the 24th April 2017. Schedule 5, Condition 10 of this Development Consent (SSD 6764) requires that WCPL undertake an independent environmental audit within a year of commencing development and every three years thereafter, unless the Secretary directs otherwise. Therefore under SSD 6764 WCPL is required to complete an independent audit by 19 September 2018, being 12 months after the nominated commencement date for the Project (19 September 2017).

In accordance with both Condition 10 (Schedule 5) and Condition 9 (Schedule 2) of SSD 6764, WCPL have been in consultation with the DP&E since late 2017 to undertake the required IEA of the development in mid-2018 which allows for clarity of scope in the audit process as all required environmental management plans have been updated, approved and implemented under SSD-6764. The results and any recommendations from the IEA will be reported in the 2018 Annual Review.

Updates of the remaining recommendations from the previous IEA are provided below:

- Include bushfire management in the AEMR:
  - Bushfire management plan was reviewed by specialist bushfire consultant in 2017. Update of bushfire related activities for 2018 will be provide in the next AR.
- Include all required information into email template to satisfy ARTC's Deed of Agreement (DoA):
  - Required details as per the ARTC's DoA are contained in the notifications.
- Report on the status of coffer dams and associated Cumbo Creek culverts in AEMR:
  - Cofferd dams now removed and rehabilitated. Previously reporting slopes have been rehabilitated and stabilised.
- Measures to remediate batters associated with Keylah Dump and Rail Loop:
  - Keylah Dump now removed. Upslope diversions in place for the Rail Loop which include drainage and allow for natural regeneration and stabilisation to occur.
- Cumbo Creek Relocation Plan (CCRP):
  - The timings for the CCRP are contained in the approved Water Management Plan.
- Document opportunistic rehabilitation inspections:
  - Opportunistic rehabilitation inspection documented in 2017 and included weed management actions.

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## 11.0 INCIDENTS & NON-COMPLIANCES

### 11.1 Reportable Incidents

There were no reportable incidents during the 2017 review period.

However, the DP&E and EPA were notified on the 19 February 2016, that PM<sub>10</sub> levels had exceeded the 24hr average criterion of 50ug/m<sup>3</sup> at HV4, HV5, TEOM3, TEOM4 (Max: 69.1µg/m<sup>3</sup>, 55.4µg/m<sup>3</sup>, 52.2µg/m<sup>3</sup>, 50.9µg/m<sup>3</sup> on the 17 to18 February 2017), however the results were excluded due to a bushfire event occurring at Kains Flat which started on the 17 February 2017. This event was initially reported to the DP&E on the 20 February 2017.

### 11.2 Non-Compliances

There were a total of eight non-compliances as identified in **Table 3**, identified during the 2017 review period. One non-compliance was recorded against the PA05-0021, one non-compliance was against SSD-6764 and six non-compliances were recorded against EPL12425. A summary of the non-compliances, the cause of the non-compliances and actions to address the non-compliances are provided in **Table 36**.

Table 36 Details of Non-Compliances

Relevant Approval	Date of	Details of Non-Compliance	Cause of Non-Compliance	Action to Address Non-Compliance
PA 05-0021, Sch 3 Condition 54	N/A	The Proponent shall minimise the visual impacts of the project to the satisfaction of the Director- General.	Failure to consult and seek the approval of the DP&E Director – General regarding the minimisation of visual impacts of the project.	Consultation and formal approval from DP&E Director – General entered into WCPL compliance management system for completion in 2016. WCPL to seek satisfaction from the DG in 2018.
SSD-6764 Sch 3 Condition 30(d)iii	31/12/2017	WCPL did not reschedule an alternate agreed time in consultation with DPI-Water in regards to DPI Water Recommendations in Section 10.1 of the SWMP.	WCPL did not reschedule an alternate agreed time in consultation with DPI-Water in regards to DPI Water Recommendations prior to the end of the 2017 reporting period.	WCPL will seek an extension of time with the DPI Water to allow the completion of the relevant reports to address the DPI Recommendations in the SWMP in 2018.
EPL 12425	28/7/2017	Laboratory reported Oil & Grease (O&G) concentration (17mg/L) above O&G limit specified in L2.4 of EPL on the 28 July 2017.	Result determined to be laboratory error or interference in the analysis method.	No immediate action was taken as there were no adverse effects from the non-compliance. Any O&G in the Reverse Osmosis (RO) feedwater will be rejected at the RO membrane surface. On this basis O&G should not pass into the treated water. After O&G result reported additional water samples taken to confirm any future O&G result reported by laboratory. Since the 28/07/2017 result all water samples (105) have returned an O&G concentration of <5mg/L.
EPL 12425	11 & 17 February 2017	Two (2) PM10 dust samples were not collected and analysed at monitoring point 13 (HV1) on the 11 and 17 February 2017.	The high volume air sampler (HV1) did not operate due to a fault with HV1.	No adverse effects occurred from this non-compliance HV1 replaced until repairs were made to unit
EPL 12425	11 June 2017, 28 August 2017	Two (2) PM10 dust sample were not collected and analysed at monitoring point 20 (HV4) on the 11 June and 28 August 2017.	The high volume air sampler (HV4) did not operate due to power failure.	No adverse effects occurred from this non-compliance HV4 checked after every sample date. Electrician also checked power to HV4.
EPL 12425	Within the 2017 AR period	For the reporting period 2.0% of the continuous PM10 dust monitoring did not occur at monitoring point 25 (TEOM 3).	Instrument failure/repair, general maintenance (including calibrations) and power failure main causes.	No adverse effects occurred from this non-compliance TEOM3 checked: monthly onsite, remotely each day and as soon as possible when equipment issues identified.
EPL 12425	Within the 2017 AR period	For the reporting period 1.1% of the continuous PM10 dust monitoring did not occur at monitoring point 28 (TEOM 4).	General maintenance (including calibrations) or power failure main causes.	No adverse effects occurred from this non-compliance TEOM4 checked: monthly onsite, remotely each day and as soon as possible when equipment issues identified.
EPL 12425	Within the 2017 AR period	For the reporting period 1.6% of the continuous monitoring for air temperature, wind speed/direction, lapse rate, rainfall and humidity did not occur.	General maintenance (including calibrations) or equipment issues main causes.	No adverse effects occurred from this non-compliance Meteorological equipment checked remotely each day and as soon as possible when equipment issues identified.



## 12.0 ACTIVITES FOR NEXT REPORTING PERIOD

Activities proposed to be carried out by WCPL at the Mine during the 2018 review period (i.e. 1 January 2018 to 31 December 2018) include the following:

- Construction of the WEP related infrastructure;
- Clean water diversions as required by the SWMP;
- Increases to car parking area and ablution facilities;
- Undertake Independent Environmental Audit (IEA);
- Finalise BVT performance and completion criteria;
- Finalise Rehabilitation Strategy;
- Revised the BMP accordingly;
- Completion of the DPI Recommendations within 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;
- Rehabilitation of Tailings Dam 3 (TD3).
- 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;
- Expand real time surface water flow meter system throughout the mine;
- Undertake geochemical analysis through the geological profile;
- Continue the Spontaneous Combustion Propensity testing regime;
- Complete 95ha of rehabilitation in 2018 – 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.

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## 13.0 REFERENCES

- *Wilpinjong Coal Mine – 2017 Annual Biodiversity Monitoring Report, Eco Logical Australia Pty Ltd (April 2017)*
- *Wilpinjong & Cumbo Creek Stability Assessment, 2016 – Barnson Pty Ltd (March 2017)*
- *Environmental Noise Monitoring (January 2016 to December 2016), Global Acoustics Pty Ltd*
- *Ambient Air Quality Monitoring Validate Report/s (January to December 2016), Ecotech Pty Ltd*
- *Wilpinjong Annual Review Groundwater Analysis HydroSimulations (March 2017)*
- *Wilpinjong Coal Pty Ltd - 2016 Water Balance Model Update Baseline OPSIM Model Setup - 31 Mar 2017, Hatch Pty Ltd*

## **Appendices**

<b>Appendix 1</b>	<b>Rail Haulage</b>
<b>Appendix 2</b>	<b>Exploration</b>
<b>Appendix 3</b>	<b>Environmental Performance</b>
Appendix 3A	Meteorological Data
Appendix 3B	Air Quality Monitoring Data
Appendix 3C	Surface Water Monitoring Data
Appendix 3D	Groundwater Monitoring Data
Appendix 3E	Blast Monitoring Data
Appendix 3F	Noise Monitoring Data
<b>Appendix 4</b>	<b>Heritage</b>
<b>Appendix 5</b>	<b>Biodiversity</b>
<b>Appendix 6</b>	<b>Community</b>
<b>Appendix 7</b>	<b>Land Management</b>
<b>Appendix 8</b>	<b>Plans</b>