MOOLARBEN COAL COMPLEX ANNUAL REVIEW 2015

Document	Version	Issue	Author	Approved
ENV_RPT_ANNUAL REVIEW 2015	2	April 2016	MCO	G Chase

Name of operation	Moolarben Coal Complex
Name of operator	Moolarben Coal Operations Pty Ltd
Development consent / project approval #	05_0117 and 08_0135
Name of holder of development consent / project approval	Moolarben Coal Mines Pty Limited
Mining lease #	ML 1605, 1606, 1628, 1691, 1715
Name of holder of mining lease	Moolarben Coal Mines Pty Limited
Water licence #	Refer Table 4
Name of holder of water licence	Moolarben Coal Operations Pty Ltd
MOP/RMP start date	3 September 2015
MOP/RMP end date	31 December 2016
Annual Review start date	01 January 2015
Annual Review end date	31 December 2015

I, Graham Chase, certify that this audit report is a true and accurate record of the compliance status of Moolarben Coal Complex for the period January 1st 2015 to December 31 2015 and that I am authorised to make this statement on behalf of Moolarben Coal Operations.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer	Graham Chase
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	8 April 2016

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1.0 STATEMENT OF COMPLIANCE

The Annual Review is required to incorporate a statement of compliance which includes a summary table that highlights the compliance status of the operation with its relevant approval conditions, as at the end of the reporting period (Table 1).

Table 1: Statement of compliance

Approval	Compliance Status (Excluding Administrative Non-compliances)	Compliance Status (Including Administrative Non-compliances)
PA 05_0117	Yes	No
PA 08_0135	Yes	No
ML 1605	Yes	Yes
ML 1606	Yes	Yes
ML 1628	Yes	Yes
ML 1691	Yes	Yes
ML 1715	Yes	Yes
20BL172002	Yes	Yes
20BL173923	Yes	Yes
20BL173935	Yes	Yes

Minor administrative non-compliances are discussed throughout the document and in Section 11.0.

2.0 INTRODUCTION

The Moolarben Coal Complex (MCC) is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfield of New South Wales **(Figure 1)** within the Mid-Western Regional Local Government Area (LGA.). Local relevant land ownership within the immediate vicinity of the MCC is provided in **Appendix 1**.

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex (MCC) on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Sojitz Moolarben Resources Pty Ltd and a consortium of Korean power companies). MCO and MCM are wholly owned subsidiaries of Yancoal Australia Limited (Yancoal).

Current mining operations undertaken across MCC have approval until 31 December 2038. All mining operations are conducted in accordance with NSW Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified, and NSW Project Approval (08_0135) (Moolarben Coal Project Stage 2) as modified.

The current Stage 1 mining operations are also undertaken in accordance with Approval Decision (EPBC 2007/3297) granted on 24 October 2007 (and varied by notice on 25 February 2009 and 11 May 2010) and (EPBC 2013/6926) granted on 13 November 2014 under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The current Stage 2 mining operations are being undertaken in accordance with Approval decision (EPBC 2008/4444) granted on 18 May 2015.

Current mining operations at the MCC are conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1605, ML 1606, ML 1628, ML 1691, and ML1715 granted under the *Mining Act, 1992*.

2.1 SCOPE

This Annual Review has been prepared by MCO (with input from experienced and qualified experts) to satisfy the reporting requirements under NSW Project Approval (05_0117) (as modified), NSW Project Approval (08_0135) (as modified), rehabilitation reporting requirements of mining leases ML 1605, ML 1606, ML1628, ML1691 and ML1715, reporting requirements of EPBC approvals (2007/3297 and 2008/4444) and reporting requirements of water licences. The report presents a summary of the regulatory compliance, environmental performance, and community engagement activities for MCO.

The following key agencies shall be provided with a copy of this report:

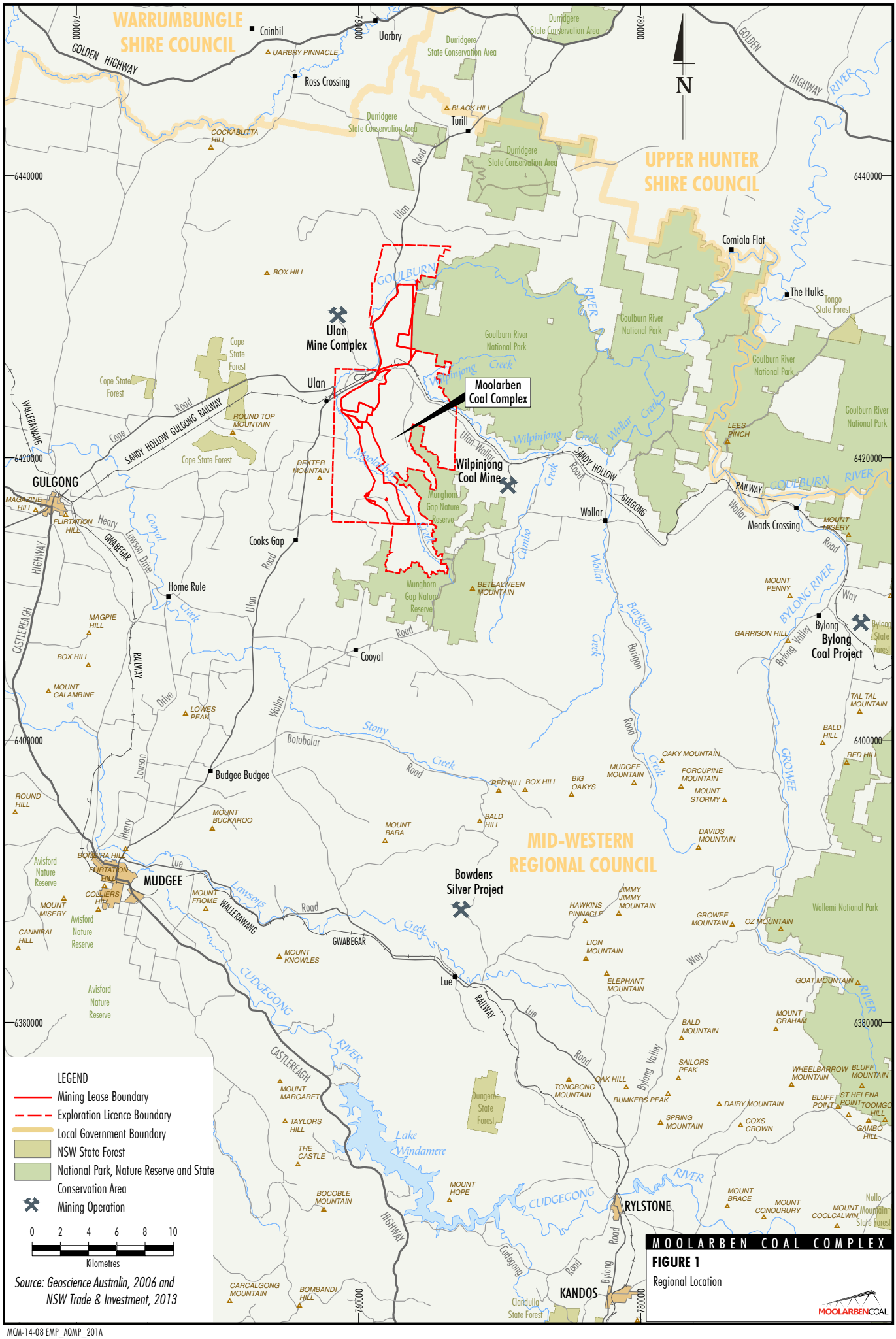
- NSW Department of Planning and Environment (DP&E);
- NSW Department of Primary Industries – Division of Water (DPI-Water);
- Commonwealth Department of the Environment (DoE);
- NSW Trade & Investment – Division of Resources & Energy (DRE);
- NSW Office of Environment and Heritage (OEH);
- NSW Environment Protection Authority (EPA);
- Mid-Western Regional Council (MWRC); and
- Members of the MCO Community Consultative Committee (CCC).

In addition, an electronic copy will be made publicly available on the Moolarben Coal website (http://www.moolarbencoal.com.au/) in accordance with Schedule 5, Condition 11 (a).

2.2 STRUCTURE OF THIS ANNUAL REVIEW

The remainder of the Annual Review is structured as follows and is based on the *October 2015 Annual Review Guidelines – Post-approval requirements for State significant mining developments* (NSW Department of Planning and Environment):

Section 3: Outlines the relevant statutory approvals.
Section 4: Outlines the activities undertaken at Moolarben Coal Complex for the period and those proposed for the next period.
Section 5: Actions required from previous Annual Review
Section 6: Outlines environmental performance including noise, blasting, air quality, biodiversity and heritage.
Section 7: Outlines the water management performance
Section 8: Outlines the rehabilitation management performance
Section 9: Outlines the community performance
Section 10: Describes the independent audit outcomes
Section 11: Provides a summary of incidents and non-compliances
Section 12: Outlines activities to be completed in the next reporting period
Appendices: Supporting information and monitoring data


WARRUMBUNGLE SHIRE COUNCIL
UPPER HUNTER SHIRE COUNCIL
MID-WESTERN REGIONAL COUNCIL
Cainbil
Uarbry
Ross Crossing
Turill
Comiala Flat
The Hulks
Ulan
Ulan Mine Complex
Moolarben Coal Complex
Wilpinjong Coal Mine
GULGONG
Cooks Gap
Home Rule
Cooyal
Wollar
Meads Crossing
Bylong
Bylong Coal Project
Budgee Budgee
MUDGEE
Bowdens Silver Project
Lue
RYLSTONE
KANDOS
GOLDEN HIGHWAY
SANDY HOLLOW GULGONG RAILWAY
GULGONG RAILWAY
CASTLEREAGH HIGHWAY
GWABEGAR
WALLERAWANG
Goulburn River National Park
Munghorn Gap Nature Reserve
Avisford Nature Reserve
Wollemi National Park
Dungeree State Forest
Clandulla State Forest
Mount Coolcalwin State Forest
Lake Windamere
GOULBURN RIVER
CUDGEGONG RIVER
BYLONG RIVER
CROWEE
KRUI
Wilpinjong Creek
Wollar Creek
Munghorn Creek
Cumbo Creek
Barigan Creek
Botobolar Creek
Stony Creek
Coxs Creek
Lawsons Creek
Henry Creek
Coxyal Creek
Ulan Road
Sandy Hollow Road
Cope Road
Lawson Drive
Bylong Valley Way
Bylong Valley Road
Cudgegong Road
Barigan Road
Mudgee Road
Gwabegar Road
Wollar Road
Cope State Forest
Tongo State Forest
Durridgere State Conservation Area
Goulburn River National Park
COCKABUTTA HILL
BOX HILL
ROUND TOP MOUNTAIN
DEXTER MOUNTAIN
BETEALWEEN MOUNTAIN
MAGAZINE HILL
FLIRTATION HILL
MAGPIE HILL
MOUNT GALAMBINE
LOWES PEAK
ROUND HILL
MOUNT BUCKAROO
BOMBURA HILL
COLLIERS HILL
MOUNT MISERY
CANNIBAL HILL
MOUNT FROME
MOUNT KNOWLES
MOUNT BARA
BALD HILL
RED HILL
BIG OAKYS
MUDGEE MOUNTAIN
OAKY MOUNTAIN
PORCUPINE MOUNTAIN
MOUNT STORMY
DAVIDS MOUNTAIN
HAWKINS PINNACLE
JIMMY JIMMY MOUNTAIN
GROWEE MOUNTAIN
OZ MOUNTAIN
LION MOUNTAIN
ELEPHANT MOUNTAIN
GOAT MOUNTAIN
MOUNT GRAHAM
BALD MOUNTAIN
SAILORS PEAK
WHEELBARROW MOUNTAIN
BLUFF MOUNTAIN
BLUFF POINT
ST HELENA POINT
TOOMGO HILL
GAMBO HILL
DAIRY MOUNTAIN
COXS CROWN
SPRING MOUNTAIN
OAK HILL
TONGBONG MOUNTAIN
RUMKERS PEAK
MOUNT MARGARET
TAYLORS HILL
THE CASTLE
BOCOBLE MOUNTAIN
MOUNT HOPE
CARCALGONG MOUNTAIN
BOMBANDI HILL
MOUNT BRACE
MOUNT CONOURURY
Nullo Mountain
MOUNT PENNY
MOUNT MISERY
GARRISON HILL
TAL TAL MOUNTAIN
BALD HILL
RED HILL
6440000
6420000
6400000
6380000
6360000
760000
780000
800000
820000
N
LEGEND
Mining Lease Boundary
Exploration Licence Boundary
Local Government Boundary
NSW State Forest
National Park, Nature Reserve and State Conservation Area
Mining Operation
0 2 4 6 8 10
Kilometres
Source: Geoscience Australia, 2006 and NSW Trade & Investment, 2013
MOOLARBEN COAL COMPLEX
FIGURE 1
Regional Location
MOOLARBENCCAL

2.3 PROJECT DESCRIPTION

MCC comprises the Moolarben Stage 1 and Stage 2 Projects. An overview of the complex is provided in **Figure 2**. The Stage 1 and Stage 2 operations are summarised in **Table 2** below.

Stage 1 has commenced and at full development will comprise:

- the construction and operation of three open cut mines (OC1, OC2 and OC3);
- construction and operation of one longwall underground mine (UG4);
- construction and operation of a Coal Handling and Preparation Plant (CHPP);
- road and rail works – including rail loop, train load-out and closure and diversion of Carrs Gap Road, and Moolarben Road; and,
- Other infrastructure areas – including administration offices and workshops.

Stage 2 of the MCC development and operation commenced in 2015 and at full development will comprise:

- construction and operation of one open cut mining operation (OC4) and two underground mine operations (UG1 and UG2);
- construction and operation of the Stage 2 ROM coal facilities and conveyors and associated facilities between the Stage 2 ROM coal facilities and Stage 1 CHPP;
- extension of the use of the existing approved Stage 1 Coal Handling and Preparation Plant (CHPP) to Year 24 of Stage 2;
- development of an out-of-pit emplacement area;
- construction and operation of administration offices, workshops, supporting power and communications infrastructure and related facilities;
- diversions of Murragamba and Eastern Creeks;
- development of water management infrastructure; and,
- other associated minor infrastructure, plant, equipment and activities, including ancillary works, minor modifications and alterations to existing infrastructure as required.

Table 2: Moolarben Coal Complex production overview

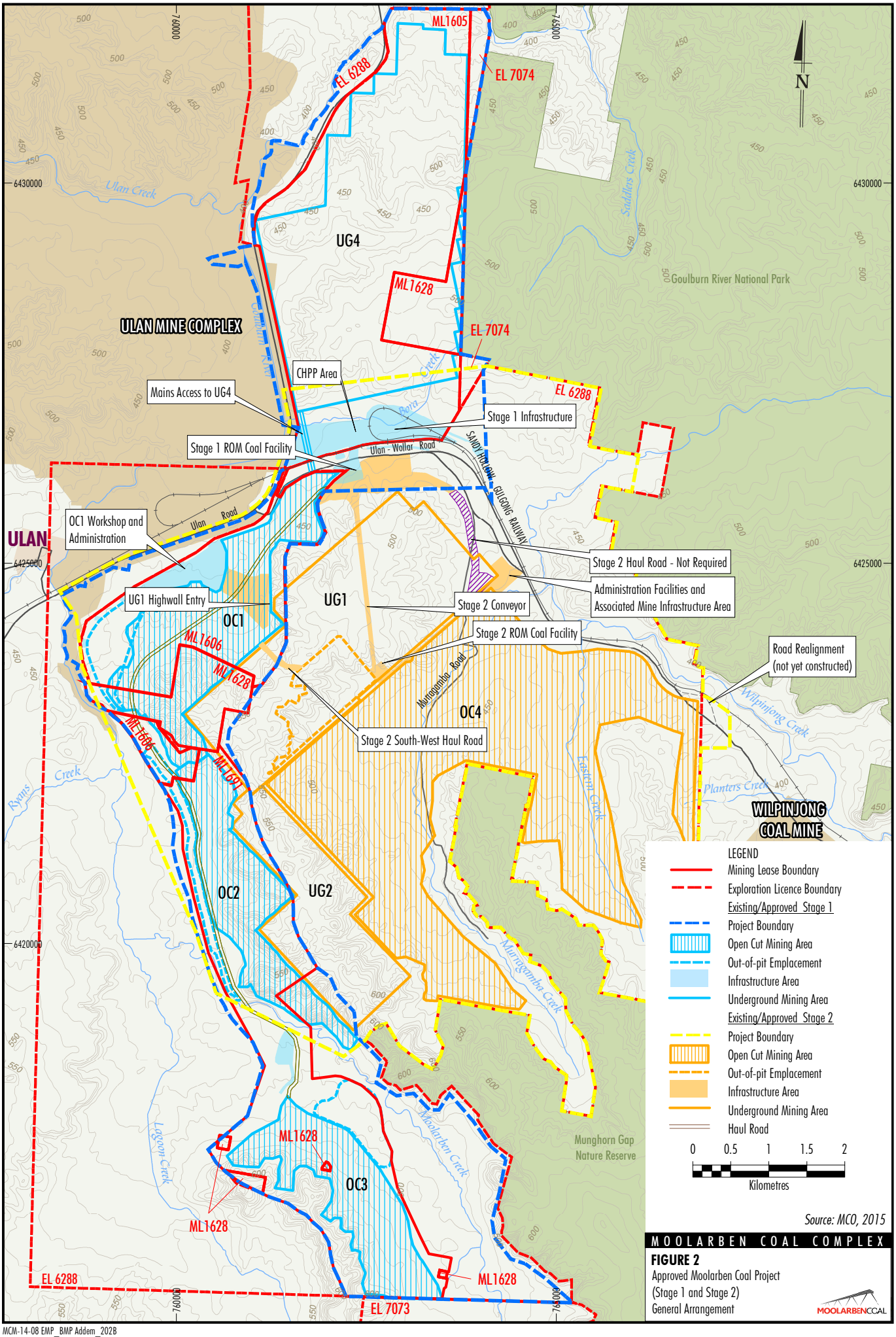
Relevant Approval Component	Moolarben Coal Project	
	Stage 1 **Project Approval (05_0117)**	**Stage 2** **Project Approval (08_0135)**
Operational Mine Life	Mining operations can be carried out until 31 December 2038.	
Hours of Operation	Mining operations can be carried out 24 hours a day, 7 days a week.	
Coal Extraction Limits	Up to 9 Mtpa of ROM coal can be extracted from the open cut mining operations in calendar years 2015 and 2016, and 8 Mtpa thereafter, from Stage 1.	Up to 12 Mtpa of ROM coal can be extracted from the open cut mining operations in any calendar year from Stage 2.
	Up to 4 Mtpa (total) of ROM coal can be extracted from the underground mining operations at the Moolarben Coal Complex in any calendar year.	
Coal Processing and Offsite Transport	Up to 13 Mtpa (total) of ROM coal from the Moolarben Coal Complex can be processed in any calendar year from Stages 1 and 2. Not more than 5 laden trains to leave the complex per day.	
Coal Processing and Offsite Transport (Cont.)	All coal is to be transported from the Moolarben Coal Complex by rail.	All coal extracted from the site is sent to the Moolarben Stage 1 mine surface infrastructure area for processing and/or transport to market.

2.4 KEY MINE CONTACT PERSONNEL

The following table provides contact details for key personnel responsible for environmental management across the Moolarben Coal Complex.

Table 3 : Mine Contact Personnel

Position/Area of Responsibility	Name	Contact Number(s)	Email Address
General Manager	Steve Archinal	02 6376 1500	steve.archinal@yancoal.com.au
Environment and Community Manager	Graham Chase	02 6376 1407 0447 348 736	graham.chase@yancoal.com.au
Environmental and Community Coordinator	Trent Cini	02 6376 1436	trent.cini@yancoal.com.au
Environmental and Community Coordinator	Michelle Cavanagh	02 6376 1492	michelle.cavanagh@yancoal.com.au
Environment and Community Complaints Line	1800 556 484		
Postal Address	Locked Bag 2003, Mudgee, NSW, 2850		


ML1605
EL 6288
EL 7074
UG4
ML1628
ULAN MINE COMPLEX
EL 7074
CHPP Area
Mains Access to UG4
EL 6288
Stage 1 Infrastructure
Stage 1 ROM Coal Facility
Ulan - Wollar Road
SANDY HOLLOW - GULGONG RAILWAY
OC1 Workshop and Administration
ULAN
Ulan Road
Stage 2 Haul Road - Not Required
Administration Facilities and Associated Mine Infrastructure Area
UG1 Highwall Entry
OC1
UG1
Stage 2 Conveyor
Stage 2 ROM Coal Facility
ML1606
ML1628
ML1691
ML1686
Munagamba Road
OC4
Road Realignment (not yet constructed)
Stage 2 South-West Haul Road
Wilpinjong Creek
Planters Creek
WILPINJONG COAL MINE
OC2
UG2
Munagamba Creek
Goulburn River National Park
Munghorn Gap Nature Reserve
Moolarben Creek
Lagoon Creek
ML1628
OC3
ML1628
EL 6288
ML1628
EL 7073
LEGEND
Mining Lease Boundary
Exploration Licence Boundary
Existing/Approved Stage 1
Project Boundary
Open Cut Mining Area
Out-of-pit Emplacement
Infrastructure Area
Underground Mining Area
Existing/Approved Stage 2
Project Boundary
Open Cut Mining Area
Out-of-pit Emplacement
Infrastructure Area
Underground Mining Area
Haul Road
0 0.5 1 1.5 2
Kilometres
Source: MCO, 2015
MOOLARBEN COAL COMPLEX
FIGURE 2
Approved Moolarben Coal Project
(Stage 1 and Stage 2)
General Arrangement
MOOLARBENCOAL

3.0 APPROVALS

3.1 SUMMARY OF APPROVALS

Project Approvals, Mining Leases, and other Licences relevant to MCO are provided in **Table 4**. Current Project Approvals, EPBC Approvals, Exploration Licences, and Mining Leases are available at www.moolarbencoal.com.au.

Table 4: Relevant Approvals, Leases and Licences

Approval	Description	Expiry Date
Project Approval – NSW Department to Planning and Environment		
05_0117	Stage 1 as modified	31 December 2038
08_0135	Stage 2 as modified	31 December 2038
Mining Lease - NSW Department of Industry –Resources & Energy		
ML1605	Underground 4 and CHPP infrastructure area	20 December 2028
ML1606	OC1 and associated infrastructure area	20 December 2028
ML1628	OC1, OC2 and OC3 (260.5 ha)	24 February 2030
ML1691	OC1, OC2 and OC3 (900.6 ha)	23 September 2034
ML1715	OC4, UG1 and UG2	31 August 2036
Mining Operation Plan- NSW Department of Industry –Resources & Energy		
MOP	Stage 1 and Stage 2 operations	31 December 2016
Exploration Licences- NSW Department of Industry –Resources & Energy		
EL6288	Coal Exploration Licence	22 August 2017
EL7073	Coal Exploration Licence	12 February 2020
EL7074	Coal Exploration Licence	12 February 2020
Environmental Protection Licence – NSW Environment Protection Agency		
EPL12932	Licence authorising the carrying out of scheduled activities	N/A
Environment Protection and Biodiversity Conservation - Commonwealth Department of the Environment		
2007/3297	Extend the area of approved mining into land adjacent to Open Cut 1 and 2, to allow the construction and operation of additional water management infrastructure and to make minor changes to the rehabilitation sequencing and final landform.	31 December 2027
2008/4444	Stage 2 operations	31 December 2065
2013/6926	To Modify and extend the Moolarben Coal Project.	31 December 2064
Water Licences – NSW Department of Primary Industries – Water		
20BL172002	Porous Rock Aquifer Licence	26 November 2019
20BL173923	Porous Rock Aquifer Licence	25 November 2020
20BL173925	Monitoring Bore Licence	Perpetuity
WAL36340	Wollar Creek Water Source	N/A
20AL213311	Upper Goulburn River Water Source	N/A
20WA210797	Water Supply Works Approval (Water Management Act 2000)	03 September 2022

During the reporting period the following approvals were granted:

- Stage 1 Mod 3, Mod 10 and Mod 11
- Stage 2, and Stage 2 Mod 1
- Mining Lease 1715
- EPBC 2008/4444
- Approval to undertake drilling within EL6288 in accordance with Surface Disturbance Notice dated 20th April 2015, 13th May 2015 and 10th June 2015.

An application to modify Project Approval (05_0117) and Project Approval (08_0135) for the optimisation of Underground 1 (Stage 1 Mod 12/Stage 2 Mod 2) was submitted during the reporting period and is under assessment at the time of report submission.

3.2 ANNUAL REPORTING

Table 5 provides a checklist of Annual Reporting requirements and performance conditions along with the relevant sections within this report.

Table 5: Annual Review Requirements

Approval Type & Reference		Annual Review Section
Project Approval 05_0117 Condition 4 Schedule 5	By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must: a. describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year; b. include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the • the relevant statutory requirements, limits or performance measures/criteria; • the monitoring results of previous years; and • the relevant predictions in the EA; c. identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance; d. identify any trends in the monitoring data over the life of the project; e. identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and f. describe what measures will be implemented over the next year to improve the environmental performance of the project.	4.2 & 4.3 6, 7 & 8 6, 7, 8 & 11 6, 7, 8 & 9 6 6, 7, 8 & 12
Project Approval 08_0135 Condition 4 Schedule 6	*By the end of March each year, or other timing as may be agreed by the Secretary, the Proponent shall review the environmental performance of the project to the satisfaction of the Secretary. This review must:* *a. describe the development that was carried out in the previous calendar year, and the development that is proposed to be carried out over the next year;* *b. include a comprehensive review of the monitoring results and complaints records of the project over the previous calendar year, which includes a comparison of these results against the* • *the relevant statutory requirements, limits or performance measures/criteria;* • *the monitoring results of previous years; and* • *the relevant predictions in the EA;* *c. identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;* *d. identify any trends in the monitoring data over the life of the project;* *e. identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and* *f. describe what measures will be implemented over the next year to improve the environmental performance of the project.*	4.2 & 4.3 6, 7 & 8 6, 7, 8 & 11 6, 7, 8 & 9 6 6, 7, 8 & 12
Mining Lease 1605, 1606 & 1628 Condition 4 & 5	*The lease holder must lodge Environmental Management Reports (EMR) with The Director-General annually or at dates otherwise directed by the Director-General.* *The EMR must:* *- report against compliance with the MOP;* *- report on progress in respect of rehabilitation completion criteria;* *- report on the extent of compliance with regulatory requirements; and*	This Report & Section 8

Approval Type & Reference		Annual Review Section
	- have regard to any relevant guidelines adopted by the Director-General;	
Mining Lease 1691 Condition 4	*(a) The lease holder must lodge Environmental Management Reports (EMR) with the Director-General annually or at dates otherwise directed by the Director-General.* *(b) The EMR must:* *I. Report against compliance with the MOP;* *II. Report on progress in respect of rehabilitation completion criteria;* *III. Report on the extent of compliance with regulatory requirements; and* *IV. Have regard to any relevant guidelines adopted by the Director-General.*	This Report & Section 8
Mining Lease 1715 Condition 4	*a) The lease holder must submit a Compliance Report to the satisfaction of the Minister. The report must be prepared in accordance with any relevant guidelines or requirements published by the Minister for compliance reporting.* *(b) The Compliance Report must include:* *I. The extent to which the conditions of this mining lease or any provisions of the Act or the regulations applicable to activities under the mining lease, have or have not been complied with;* *II. Particulars of any non-compliance with any such conditions or provisions;* *III. The reasons for any such non-compliances;* *IV. Any action taken, or to be taken, to prevent any recurrence, or to mitigate the effects, of that non-compliance.* *(c) The Compliance Report must be lodge with the Department annually on the grant anniversary date for the life of this mining lease.*	This Report & Section 8
Water Licences 20BL172002 Condition 5 and 20BL173923 Condition 4	*The Licence holder must include in the Annual Review required to be prepared on an annual basis under the development consent:* *1. The total volume of groundwater extracted from the bores during the relevant period of reporting;* *2. An estimate of the total volume of groundwater taken from the alluvial water source(s)* *Note – Any estimate or report of water extracted can be amended by notice to the department if at the time the licence holder believes previous estimates or reports are not correct. The Licence holder must hold sufficient shares of aquifer category access licence to account for any water taken from the alluvial aquifer.*	This Report & Section 7
EPBC 2007/3297 Condition	*In order to protect the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland listed ecological community, the person taking the action must, by 1 July each year after the commencement of operations, provide a certificate stating that they have complied with the conditions of approval.*	This Report Section 6 and Appendix 3
EPBC 2008/4444 Condition 10	*Within three months of every 12 month anniversary of the commencement of the action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of the BOMP and VCPLMP as specified in the conditions. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the compliance report is published.*	This Report Section 6 and Appendix 3

4.0 OPERATIONS SUMMARY

4.1 MINING OPERATIONS

Details of production and associated waste generated by the site for the current and next reporting period are provided in **Table 6**.

Table 6 : Production Summary

Material	Approved Limit (as per Project Approvals 05_0117 & 08_0135)	Reporting Period		
		Previous Sep 13-Dec 14/2014 (actual)	Current 2015 (actual)	Next 2016 (forecast)
Waste Rock/ Overburden (BCM)	N/A	22,579,239/ 17,374,786	27,295,594	38,500,000
Open Cut ROM Coal (t) (OC1, 2 & 3)	9,000,000	10,952,742 / 8,277,860	8,999,963	8,500,000
Open Cut ROM Coal (t) (OC4)	12,000,000	0/0	0	2,700,000
Underground ROM Coal (t)	4,000,000	0/0	1,000	425,000
Coal Processing (t)	13,000,000	11,030,377 / 8,289,371	9,004,711	11,625,000
Coarse Rejects (Co Disposal)	N/A	2,539,542 / 1,928,139	2,105,532	2,900,000
Product Coal (t)	N/A	8,490,644 / 6,361,232	6,899,179	8,800,000

4.2 REPORTING PERIOD ACTIVITIES

This section provides further detail on the activities completed in the current reporting period. Works were carried out in accordance with the relevant Mining Operations Plan. **Figure 4** presents the areas of activity.

4.2.1 EXPLORATION

Exploration activities were undertaken in EL6288 and EL7073, including a total of 27 exploration holes primarily focusing on the OC4 and UG1 areas of EL6288.

All drilling programs use existing tracks to access sites were possible, when existing tracks are unavailable a 4m wide track is created using a slasher if possible. Drill sites are generally 50m x50m to allow suitable room to safely undertake drilling activities.

4.2.2 LAND DISTURBANCE

During the reporting period 353 ha was disturbed for Stage 2 project construction and open-cut mining across OC1, OC1 Mod 9 area, OC2 and OC4. The area disturbed was greater than predicted in the previous annual review due to the approval and commencement of Stage 2 operations. The majority associated with the construction of Open Cut 4 and associated infrastructure. The areas disturbed this reporting period are shown in **Figure 3**.

All land disturbance is undertaken in accordance with the Ground Disturbance Permit (GDP) process. This includes pre-clearance surveys, heritage clearance, erosion and sediment control plans, confirmation of

land ownership and disturbance extents reviewed to ensure compliance with relevant management plans (Biodiversity Management Plan, Vegetation Clearance Protocol and Landscape Management Plan and Rehabilitation Management Plan).

Topsoil, mulch and select salvageable hollows were reclaimed for use in rehabilitation areas, or stockpiled for future use.

4.2.3 CONSTRUCTION

Construction works during the reporting period have focused on the Open Cut Expansion Project and the Underground 1 project.

Open Cut Expansion Project activities undertaken in the period include:

- Construction of ROM coal conveyor (OC4 to OC1 ROM)
- Construction of materials handling system.
- Construction of mine water and sediment dams.
- Construction of clean water drains.
- Construction of belt press filter and stores buildings at the CHPP.
- Construction of bathhouse, offices, and workshop extension.
- Installation of electrical works (transformers and switch rooms) at OC1 and OC4.
- Construction of the CHPP water management upgrade works.

Underground 1 Project construction activities undertaken in the period include:

- Stabilisation of the proposed UG 1 highwall area and installation of precast portal entires;
- Civil works for the MIA, hardstands, ROM, ramp conveyor areas and roads;
- Construction of haul road under pass tunnel
- Installation of the 11kV power supply to the portal area adjacent the mine entries.

During the period the CHPP water management upgrade works were completed.

4.2.4 MINING OPERATIONS

Mining activities were undertaken in accordance with relevant project approvals and approved Mining Operations Plan (MOP). During the current reporting period general mining activities included:

- Overburden removal from OC1, OC1 mod 9, OC2 and OC4 using excavator and truck fleets.
- Coal extraction from OC1, OC1 Mod 9 and OC2
- Drilling and blasting select overburden and coal.
- Spoil emplacement in-pit in OC1 and OC2, and within Out of pit dumps in OC4.
- Bulk spoil reshaping and rehabilitation.
- Construction and operation of water management works

4.2.5 COAL PROCESSING AND TRANSPORT

ROM coal was transported from the ROM stockpile via conveyor to the CHPP for processing. Product coal is stored on the product coal stockpile prior to transport. Coarse rejects was co-mingled with dewatered fine rejects and transported by conveyor to the Rejects Bin from where it was trucked back to the open pit for selective placement with at least 5m cover over the rejects in the final landform.

All product coal is loaded onto trains in the Moolarben rail loop and transported via rail. MCO monitors the amount of coal transported from site each year and the date/time of each movement. During 2015, the maximum number of train movements per day was 5 with an average of 2.2 calculated per day.

4.2.6 REHABILITATION

Rehabilitation works during the reporting period were undertaken within Open Cut 1, Open Cut 2, areas associated with the CHPP water management upgrade works and progressive rehabilitation of construction areas. More detail of rehabilitation activities during the reporting period is provided in **Section 8.0**.

4.3 NEXT REPORTING PERIOD

The proposed mining sequence for 2016 is detailed in the currently approved MOP dated November 2015. The proposed activities at the end of 2016 are provided in **Figure 5**.

MCO will continue to operate 24 hours per day, 7 days per week with blasting limited to the hours and frequency detailed in PA 05_0117 Schedule 3, Condition 9 & 10 and PA 08_0135 Schedule 3, Condition 10 & 11.

4.3.1 EXPLORATION

Proposed exploration activities during 2016 will primarily focus on OC4, OC3 and UG1 areas. All exploration carried out on MCO Exploration Licence areas will be approved through the Department of Industry Resources and Energy's application to Conduct Exploration Activities, including all required environmental assessments.

4.3.2 LAND DISTURBANCE

During the next reporting period approximately 320ha will be disturbed for open-cut mining across OC1, OC1 Mod 9 area, OC2 and OC4 with the majority of land disturbance associated with the construction of Open Cut 4 and associated infrastructure. The areas to be disturbed are shown in **Figure 3**.

4.3.3 CONSTRUCTION

Proposed construction works during the next reporting period focus on the Open Cut Expansion Project and the Underground 1 project.

Open Cut Expansion Project works include:

- Installation and commissioning of the materials handling system and coal processing upgrades, including ROM dump hopper, sizers, surge bin, conveyors, transfers, Flocc plant, Belt Press Filter, and CHPP workshop/stores upgrades.
- Completion of Temp MIA area, reload, magazine areas, workshop, stores expansion, new administration offices, OC1 Workshop and stores expansion; and mine water dams.

Proposed Underground Project works include:

- Construction of coal handling and transfer infrastructure in the boxcut, conveyor trace, UG ROM and CHPP;
- Installation of the MIA buildings, fire water tanks and associated services.
- Civil construction of the product coal bypass stockpile and associated infrastructure.
- Construction of surface facilities.

4.3.4 MINING OPERATIONS

Mining operations for the next period are shown in **Figure 5** and include:

- Overburden removal from OC1 mod 9, OC2 and OC4 using excavator and truck fleets;
- Coal extraction from OC1, OC1 Mod 9 and OC2;
- Drilling and blasting select overburden and coal;
- Spoil emplacement in-pit in OC1 and OC2, and ;thin out of pit dumps in OC4.
- Bulk spoil reshaping and rehabilitation;
- Groundwater take from excavations and bores;
- Construction and operation of water management works; and,
- Introduction of new mining fleet including trucks, dozers and ancillary equipment.

4.3.5 COAL PROCESSING AND TRANSPORT

Open Cut ROM coal is transported from the ROM stockpiles at OC1 and OC4 via conveyor to the CHPP for processing. Underground coal will be transferred within the existing coal handling system until the completion of the dedicated UG1 coal handling system. Product coal is stored on the product coal stockpile prior to transport. Coarse rejects is co-mingled with dewatered fine rejects and transported by conveyor to the Rejects Bin from where it is trucked back to the open pit for selective placement with at least 5m cover over the rejects in the final landform. Increased production rates are planned with commencement of mining of OC4.

All product coal will be loaded onto trains in the Moolarben rail loop and transported via rail. All train movements will be conducted in accordance with the conditions of approval.

4.3.6 REHABILITATION

Rehabilitation works proposed for the next reporting period includes rehabilitation within Open Cut 1, Open Cut 2, Open Cut 4 out of pit emplacement, and progressive rehabilitation of construction areas.

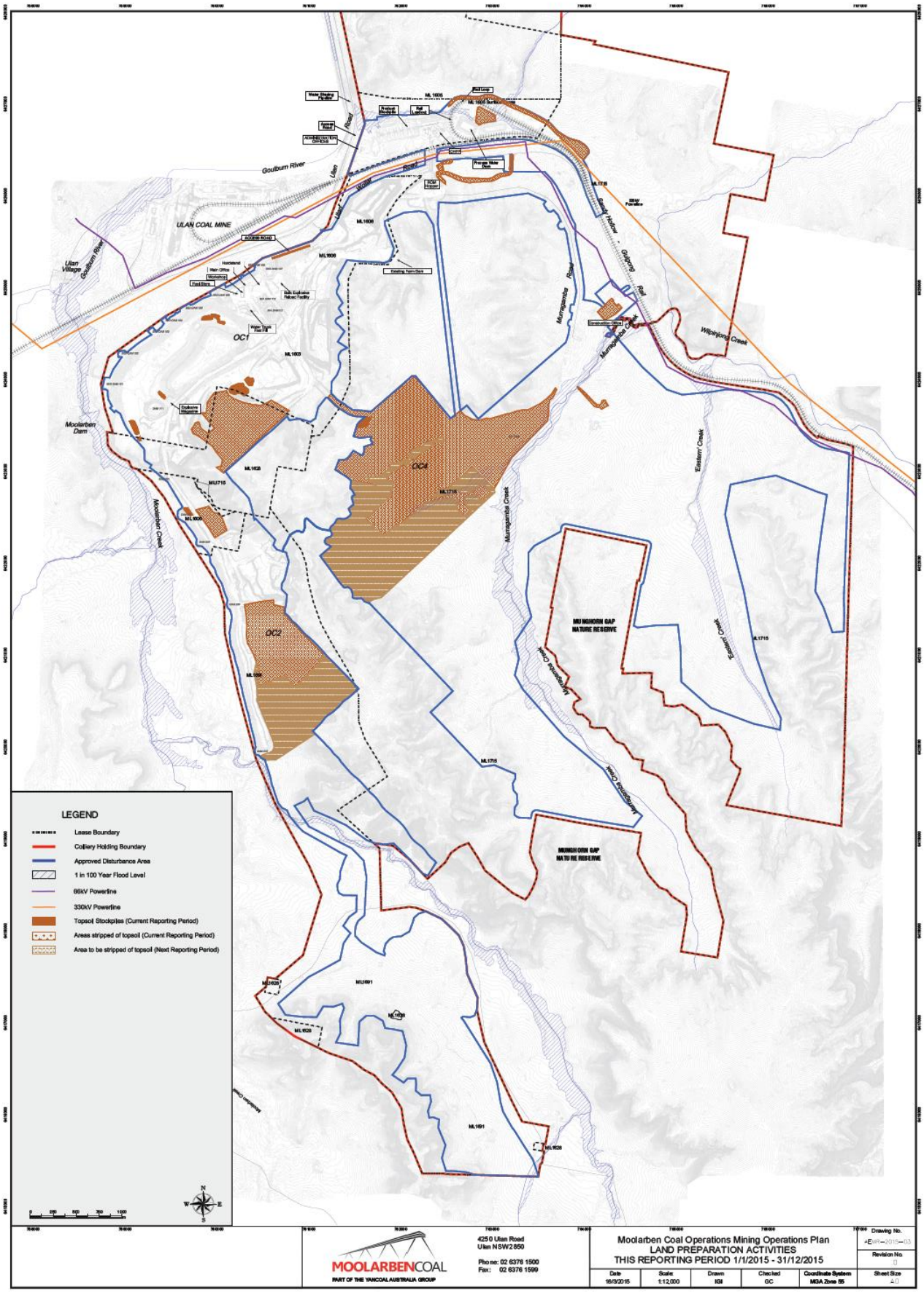


Figure 3: Land preparation areas

Document	Version	Issue	Author	Approved
ENV_RPT_ANNUAL REVIEW 2015	1	April 2016	MCO	G Chase

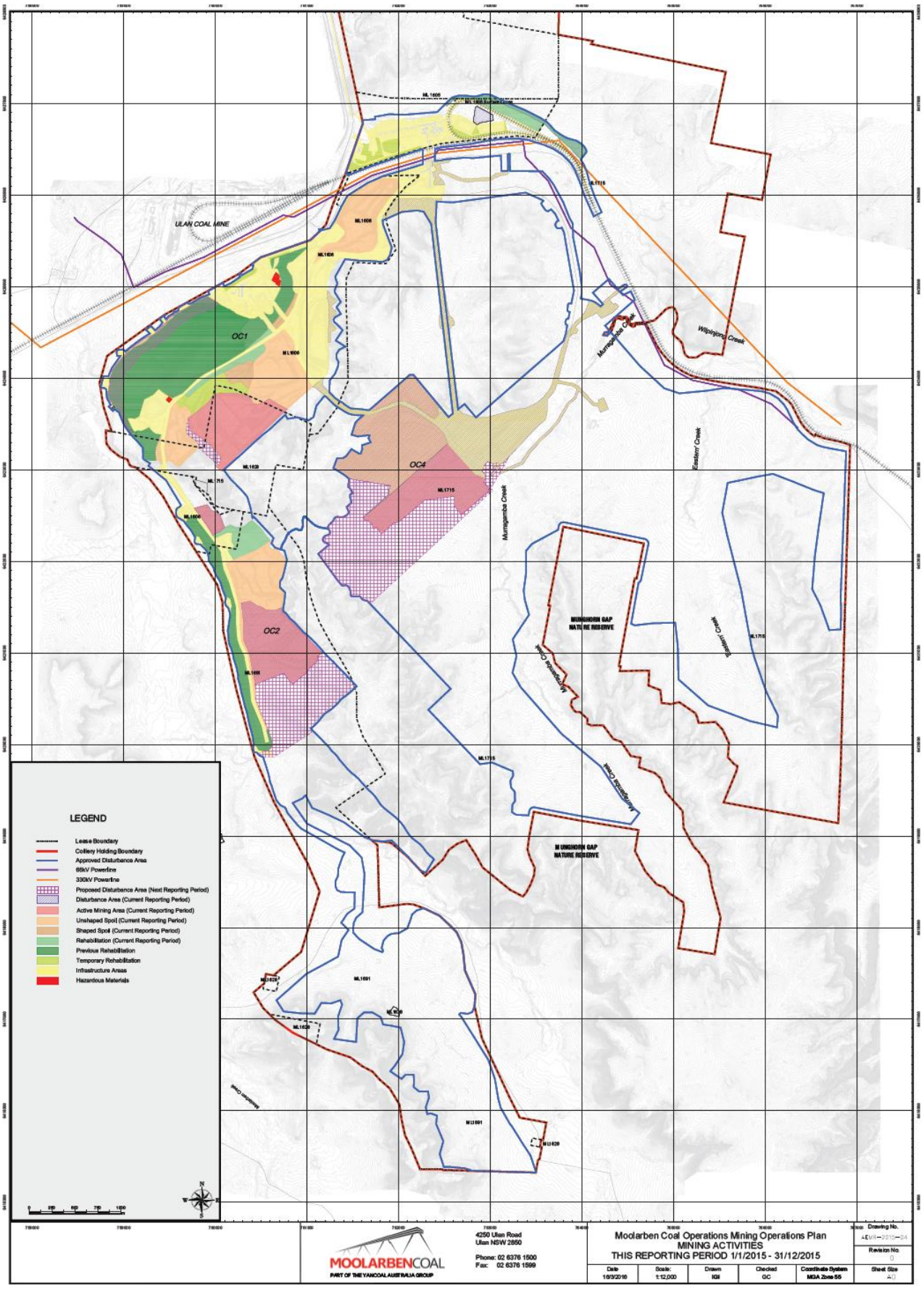


Figure 4: Mining activity areas during the reporting period

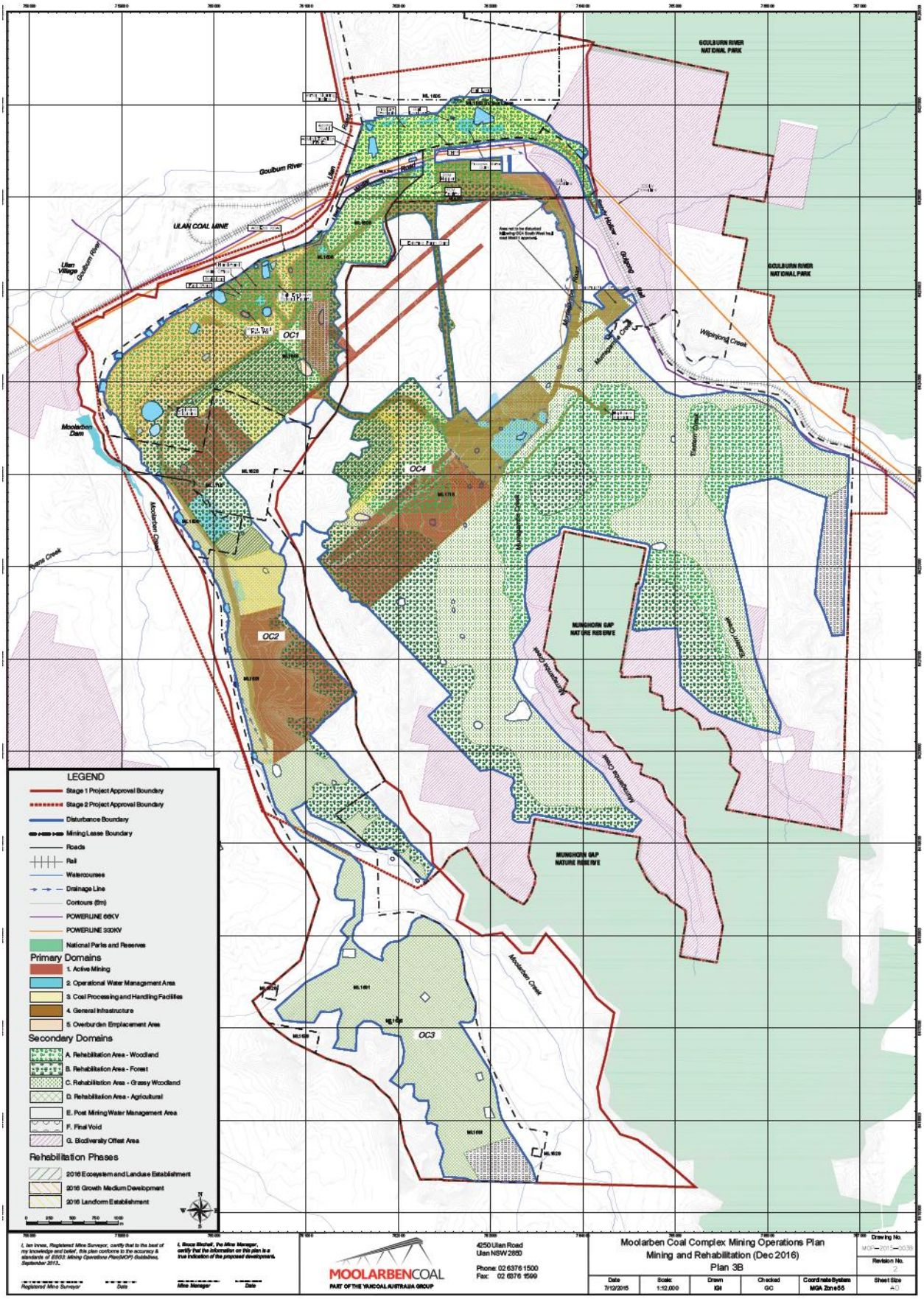


Figure 5: Mining Activities for the next reporting period (MOP Plan 3B)

Document	Version	Issue	Author	Approved
ENV_RPT_ANNUAL REVIEW 2015	1	April 2016	MCO	G Chase

5.0 ACTIONS REQUIRED FROM PREVIOUS REPORTING PERIOD

Actions in response to the 2013-2014 Annual Review are provided in **Table 7**.

Table 7 : Actions from Previous Annual Review

Action Required from previous Annual Review	Requested by	Action Taken by MCO	Section of AR addressing this action
Continuous improvement of the environmental management system	MCO	Action complete. Management plans updated	6, 7 and 8
Completion of the water infrastructure upgrades within the CHPP	MCO	Action complete EPA advised 11th December 2015	4 & 7
The flora and fauna monitoring program will expand into additional offset areas during the next reporting period	MCO	Action complete Additional offset areas monitored during the previous reporting period	6.5
MCO will also undertake predictive blast modelling on rock shelters near Open Cut 2 and Open Cut 4 with results to be provided in next year's AEMR	MCO	Action Complete Assessment of the rock shelters completed during the reporting period	6.3
In accordance with Schedule 5, Condition 4 (b) of Project Approval 05_0117 and Schedule 6, Condition 4 (b) of Project Approval 08_0135, provide a compressive review of monitoring results and complaints records of the project over the previous calendar year, this includes a comparison of these results against the relevant statutory requirements, identifying trends, monitoring results of the previous year and comparison against the Environmental Assessment predictions. Monitoring results are generally best provided as an appendix to the Annual Return.	Department of Planning and Environment	Action Complete This report.	This report.
In accordance with Schedule 5, Condition 4 (a) of Project Approval 05_0117 and Schedule 6, Condition 4 (a) (b) of Project Approval 08_0135, describe the works carried out in the last 12 months and works that will be carried out in the next 12 months. These activities should be compared with activities identified in the approved Mine Operations Plan	Department of Planning and Environment	Action Complete. This report.	This report.

6.0 ENVIRONMENTAL PERFORMANCE

In order to comply with the Project Approvals of the site, MCO have developed – in conjunction with the relevant government agencies, a series of site Management Plans. Currently approved plans are available for review via the MCO website - http://www.moolarbencoal.com.au/page/licences-and-approvals/environmental-management-plans/

In order to measure compliance with the project approvals, various licences, and site management plans, MCO undertakes a comprehensive environmental monitoring program. The locations of environmental monitoring undertaken during the 2015 reporting period are identified in **Appendix 2**.

Specifically, this section provides summary details on:

- **Section 6.1** - Meteorological Overview
- **Section 6.2** - Noise;
- **Section 6.3** – Blasting;
- **Section 6.4** – Air Quality;
- **Section 6.5** – Biodiversity; and,
- **Section 6.6** – Heritage.

Water, Rehabilitation and Community are reported in **Sections 7.0, 8.0** and **9.0** respectively.

6.1 METEOROLOGICAL OVERVIEW

MCO utilises two permanent meteorological monitoring stations – WS01 – (MCO Administration Office), WS03 – (Ulan Road), and one mobile unit, WS05. The localities of the permanent locations are illustrated in **Appendix 2**. WS03 is linked to the real time monitoring system and is the principle weather station for reporting purpose, with WS01 and WS05 used to supplement weather data as required

Meteorological parameters recorded by WS03 include:

- wind speed at 10 m, wind direction at 10 m, and standard deviation of wind direction (sigma-theta) at 10 m;
- temperature at 2 m and 10 m;
- relative humidity at 2 m;
- solar radiation at 2 m;
- temperature difference between 2 m and 10 m; and,
- Rainfall (gauge at ground-level).

Table 8 summaries rainfall and temperature data obtained from WS03 for 2015. Total rainfall for 2015 was calculated as 768.2mm, with January 2015 being the wettest month (131mm) and September being the driest (11.6mm). Rainfall at MCO was greater than the annual rainfall obtained from the Bureau of Meteorology website for the Gulgong Post Office, which recorded 651.6mm for 2015. In 2014, MCO recorded 667.2mm, making 2015 a wetter season. In terms of temperature the WS03 recorded a range of - 4.5 ^{o}C in July 2015, to 37.2^{o}C in November 2015. In comparison to 2014, the 2015 year at MCO was not as cold (in 2014, MCO reached -6.8^{o}C), or as hot (in 2014, MCO reached 42.3^{o}C in November). Meteorological data is presented in **Appendix 3A**.

Table 8: Meteorological Summary – MCO WS03

Month	Rainfall (mm)	Cumulative Rainfall (mm)	Long-term Rainfall (mm)	Cumulative Long-term Rainfall (mm)	Max Temp (°C)	Min Temp (°C)
Jan-15	131.0	131.0	70.7	70.7	34.9	7.3
Feb-15	40.2	171.2	61.9	132.6	34.4	10.1
Mar-15	43.6	214.8	54.3	186.9	35.0	2.7
Apr-15	93.6	308.4	44.4	231.3	29.3	2.0
May-15	54.8	363.2	45.4	276.7	24.1	-0.7
Jun-15	57.8	421.0	51.1	327.8	19.1	-3.8
Jul-15	45.0	466.0	49.0	376.8	16.8	-4.5
Aug-15	48.2	514.2	46.4	423.2	23.2	-2.9
Sep-15	11.6	525.8	46.1	469.3	25.6	-1.8
Oct-15	90.4	616.2	56.3	525.6	33.2	4.6
Nov-15	51.0	667.2	59.0	584.6	37.2	7.4
Dec-15	101.0	768.2	64.8	649.4	36.2	7.8
Total	**768.2**	**667.2**	**649.4**	**649.4**		

6.2 NOISE

MCO manages noise in accordance with the MCO Noise Management Plan (NMP). The NMP was updated and approved in July 2015. The plan was developed by MCO with advice from experienced and qualified experts (SLR Consulting Australia Pty Ltd) to satisfy Condition 7, Schedule 3 of PA 05_0117 (as modified) and Condition 8, Schedule 3 of PA 08-0135.

The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project. While continuing to undertake monthly attended noise monitoring, additional quarterly monitoring locations were included in the program.

During the reporting period, major noise producing activities included:

- The operation of OC1, OC2 and OC4, the the CHPP and rail load-out facilities;
- Construction activities in OC4, Underground 1, CHPP, and Open Cut Admin/Workshop mine infrastructure areas.

Operational processes for MCO to reduce noise emissions included:

- Use of sound attenuated equipment;
- Separate day and night dumping areas when deemed necessary;
- Use of shielded areas in adverse weather conditions;
- Use of real-time noise monitoring data and mine production environmental assistants to assist operational personnel in proactive management of noise impacts;
- Use of interactive predictive noise models to assess predicted noise risks associated with meteorological influences;
- Regular maintenance of equipment, including sound attenuation components; and,
- Sound power testing equipment.

6.2.1 REAL- TIME NOISE MONITORING

The NMP identifies response triggers for the real-time noise via three monitoring stations (refer **Appendix 2** for localities).When a trigger has been reached, an SMS alarm is sent to operational personnel and members of the Environment and Community Department. The real-time response triggers and management actions were updated in the NMP for 2015 to include Ridge Road.

6.2.2 ATTENDED NOISE MONITORING

During the 2015 reporting period, attended environmental noise monitoring was conducted monthly. Additional locations were included in the program during the reporting period requiring quarterly monitoring. The purpose of attended noise monitoring is to quantify and describe the existing acoustic environment around the site and compare results with relevant approval limits.

Noise Impact Criteria are specified for day, evening, and night period to protect the amenity of neighbouring residence. Impact Assessment Criteria are expressed as LA1eq (15min). and LA1eq (1min). **Table 9** provides a summary of environmental noise monitoring performance relating to attended noise monitoring for 2015, together with the approved criteria at various sites as well as management implications and proposed actions.

In summary, Project Approval limits were not applicable at one site (NA9) on one occasion in February 2015 as a result of meteorological conditions outside those described in *Appendix 6* of Project Approvals 05_0117 and 08_0135. MCO complied with project specific criteria at all monitoring sites during attended noise monitoring undertaken between January and December 2015. In accordance with Condition R4.2 of the EPL, no exceedances were recorded during 2015. A summary report for attended noise monitoring for the reporting period has been prepared, and is included at **Appendix 3B**. A review of validation monitoring will be undertaken in the next period following completion of 12 months of monitoring.

During the reporting period an independent review of noise was conducted at two properties during September and October 2015. The review was conducted by a DP&E approved independent expert and concluded that the operations was achieving sustained compliance and no additional management measures were required.

Table 9 : Attended Noise Monitoring Summary

Aspect	Approved Criteria					Performance During the Reporting Period	Key Management implications	Implemented/ proposed management Actions
Attended Noise Monitoring	**Land No.**	**Day** [1] L_{A1eq} **(15min).**	**Evening**[2] L_{A1eq} **(15min).**	**Night**[3] L_{A1eq} **(15min).**	**Night**[3] L_{A1eq} **(1min).**	Monthly attended monitoring was undertaken at four locations between January and June 2015. Following approval of an updated Noise Management Plan, monthly monitoring was undertaken at six locations between July and December 2015 and quarterly monitoring undertaken at a further 3 sites in September and November. MCO complied with criteria during all attended monitoring. ***Note*** *approved monitoring locations were selected as representative of residences* and are shown in **Appendix 2**.	The MCO NMP was updated in July 2015 to incorporate Stage 2.	Review Noise Management plan following Annual Review, Independent Audit and any Modification approvals and revise as necessary.
	30,63	39	39	39	45			
	70	37	37	37	45			
	75	36	36	36	45			
	31	36	35	35	45			
	All other privately owned land residences	35	35	35	45			
	Ulan School	35 (internal) when in use			-			
	Ulan Anglican Church Ulan Catholic Church	35 (internal) when in use			-			
	Goulburn River National Park Munghorn Gap Nature Reserve	50			-			

[1] Day is defined as the period between 7am-6pm Monday to Saturday, and 8am-6pm on Sundays and Public Holidays
2 Evening is defined as the period 6pm-10pm
3 Night is defined as the period from 10pm-7am Monday to Saturday, and 10pm-8am on Sundays and Public Holidays.

6.2.3 COMPARISON TO PREDICTED LEVELS

Noise modelling completed for the OC4 South-West Haulroad Modification (year 2016) has been chosen as the basis for comparative assessment, as it is the most reflective stage of current mining operations at the MCC.

Measured operational levels are compared to predicted levels in **Table 10**. In this table, a 'positive' difference is where the measured level is greater than the predicted level. A 'negative' difference is where the measured levels are less than the predicted levels. The comparison shows monitoring results are in accordance with predicted results.

A summary report for attended noise monitoring and comparison against predicted results is included in **Appendix 3B.**

Table 10: EA Predictions– Attended Noise Monitoring, Various Weather Conditions dB(A)$_{Leq\ (15min)}$

Location	NA1 Ulan School	NA6 Lower Ridge Rd	NA8 South Ridge Rd	NA9 Winchester Cres	NA12 Winchester Cres
	Day	Night	Night	Night	Night
January	NR	-13	>-1	>-12[5]	NA
February	NR	>-7	IA	-9[5]	NA
March	NR	IA[5]	IA[5]	IA[5]	NA
April	NR	NR	IA[5]	NR	NA
May	NR	NR	NR	NR	NA
June	NR	-3	>-1	-11	NA
July	NR	-7	NA	NA	NR
August	NR	IA	NA	NA	NR
September	NR	>-12	NA	NA	-8
October	NR	-9	NA	NA	>-9
November	NR	>-17	NA	NA	IA
December	IA	>-12	NA	NA	NR

[1] NR denotes met conditions not relevant, NA denotes not applicable, IA denotes conditions relevant but MCO inaudible during monitoring, NM denotes conditions relevant but MCO not measurable during monitoring.
[2] Wind conditions assumes winds at speeds between 0.1 and 3 m/s during monitoring;
[3] f Assumes the following possible predicted wind directions for day time monitoring: WSW from 236.25 to 258.75 degrees; W from 258.75 to 281.25 degrees.
[4] Assumes the following possible predicted wind directions for night time monitoring: ENE from 56.25 to 78.75 degrees, E from 78.75 to 101.25 degrees, SSW from 191.25 to 213.75 degrees, SW from 213.75 to 236.25 degrees and WSW from 236.25 to 258.75 degrees; and
[5] Conditions relevant, however, temperature gradient greater than 0 degrees C per 100 metres during monitoring.

6.3 BLASTING

MCO manages blasting in accordance with the Blast Management Plan (BMP). The BMP was updated and approved in June 2015. The plan was developed by MCO with advice from experienced and qualified experts (SLR Consulting Australia Pty Ltd) to satisfy Condition 15, Schedule 3 of PA 05_0117 (as modified) and Condition 16, Schedule 3 of PA 08-0135 (as modified). The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project.

Blasting criteria, blasting hours, blasting frequency, property inspection requirements and operating conditions are provided in Conditions 8 to 14, Schedule 3 and Conditions 9 to 15, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135, respectively).

The blast monitoring locations are shown identified in **Appendix 2**. During the reporting period blast monitoring included airblast overpressure and ground vibration at locations representative of privately owned residence, churches and schools, and Aboriginal Rock Shelters where required. A summary of the blast monitoring parameters is provided in **Table 11**.

Table 11: Blast Monitoring Parameters

Parameter	Units of Measure	Frequency	Sampling Method
Overpressure	dB (Lin Peak)	Every blast	Type 1 noise blast logger
Ground Vibration	mm/s	Every blast	Geophone logger or similar
Fume	AEISG Code of Practice Fume Rating System	Every blast	Observation and video recording

Note - Full meteorological complement of monitoring is undertaken via WS1 (MCO Admin), WS3 (Ulan Road) and WS5 (Mobile Unit), as described in Section 6.1 of this report. .

6.3.1 SUMMARY OF BLAST MONITORING RESULTS

Table 12 illustrates monitoring compliance for the reporting period, and a summary of blast monitoring results for the period is provided in **Table 14**. Individual blast results are provided in full at **Appendix 3C**.

Table 12 : Blast Summary – Compliance Monitoring (BM1 & BM5)

Blast Summary	Number	Compliance (% Of Blasts)
Total Blasts	99	
Days with >2 blasts	0	Compliant
Annual average blasts per week	1.9	Compliant
Blasts outside blasting hours	0	Compliant
Airblast Overpressure >115 dB(Lin Peak)	4[1]	Compliant (2%)
Airblast Overpressure >120 dB(Lin Peak)	0[2]	Compliant
Ground Vibration >5 mm/s)	0	Compliant (0%)
Ground Vibration >10 mm/s)	0	Compliant (0%)
Reportable Fume Events	0	Compliant (0%)

[1]Four blasts recorded in exceedance of 115 dBL for the reporting period – two at BM1 (30/4/15 & 23/12/15), and two at BM5 (22/9/15 & 11/12/15) with environmental effects influencing results for at least 3 of the 4 results.
[2] Three blasts on 3/12/15-4/12/15 at BM5 recorded in excess of 120 dBL. An investigation into the results found the microphone was faulty and the results invalid.

6.3.2 COMPARISON TO PREVIOUS BLAST MONITORING AND PREDICTED LEVELS

A comparison of the 2015 blast results to 2014 results and predications in the EA are outlined in Table 13 below.

Table 13 : Comparison to Blasting Results - BM1 & BM5, 2014 and EA

Site	Vibration Predictions in EA (mm/s)	2014 vibration range (mm/s)	2015 vibration range (mm/s)	Comment on results
BM1 Ulan School	2.3	0.08-1.17	0.08-3.2	Generally consistent with previous results, slightly higher than predicted during larger blasts.
BM5 Ridge Rd	Site not originally modelled	0.01 – 0.61	0.01 – 1.76	Generally consistent with previous results,
Site	**Overpressure in EA (dBL)**	**2014 Overpressure Range (dBL)**	**2015 Overpressure Range (dBL)**	**Comment on results**
BM1 Ulan School	114.0	81.9-116.6	88.0-115.9	Generally consistent with previous results, slightly higher than predicted.
BM5 Ridge Rd	Site not originally modelled	88.0-120.0	81.9-115.4*	Invalid results due to faulty microphone excluded.

** Three blasts on 3/12/15-4/12/15 at BM5 recorded in excess of 120 dBL. An investigation into the results found the microphone was faulty and the results invalid.*

6.3.3 ROCK SHELTER PREDICTIVE MODELLING

Predictive modelling on rock shelters near Open Cut 2 and Open Cut 4 was completed in May 2015. Terrock Consulting Engineers analysed blast vibration levels generated by blasting at the Moolarben Coal mine to determine site factors. These factors were then used to assist in predicting levels of ground vibration on known rock shelters from future blasting operations.

Analysis of close proximity blasting results together with the specific measurements at the rock shelters concluded that basting in close proximity to shelter S2MC229 presented a risk to the site.

To remove the risk of damaging the cultural heritage artefacts associated with several of the rock shelters MCO undertook a comprehensive recording and salvage program in conjunction with the Registered Aboriginal Parties and Niche Environment and Heritage Consulting. All salvages works were completed in accordance with the approved HMP.

Table 14 : Blast Monitoring Summary

Aspect	Approved Criteria				Performance During the Reporting Period	Trend/ Key Management Implications	Implemented/ proposed actions
Blast	Receiver	Air Blast Overpressure Level dB (Linear Peak) dBL[1]	Peak Particle Velocity – Ground Vibration mm/s[2]	Allowable Exceedance	Due to the localities of the blasts, compliance monitoring was undertaken at the following locations for the 2015 reporting period • **BM1 - Ulan School** ○ Max. Overpressure =115.9 dBL. On two occasions OP exceeded >115 dBL, which is less than 5% of the total blasts for the year. The.>120 criterion was not exceeded. ○ Max Ground Vibration =3.2 mm/s therefore less than the 5mm/s (and 10mm/s) criterion. Average was calculated as 0.63 mm/s. *Monitor results were not captured for one blast on 7/7/15 at BM1 due to loss of power supply.* • **BM5 – Ridge Road** ○ Max. Overpressure =115.4 dBL. – Less than criterion. On two occasions, the >115 criterion was exceeded, which is less than 5% of the total blasts for the year. Both readings were wind effected. ○ Three invalid overpressure readings occurred due to failure of the microphone. The incident was investigated and reported. EPA accepted the investigation. ○ Max Ground Vibration =1.76 mm/S therefore less than the 5mm/s (and 10mm/s) criterion. Average was calculated as 0.35 mm/s. A full blast summary is contained at **Appendix 3C.**	The MCO BMP was updated in June 2015 to incorporate Stage 2.	Review Blast Management plan following Annual Review, Independent Audit and any Modification approvals and revise as necessary. Relocate BM1 to improve power security.
	Residence Privately Owned	120	10	0%			
		115	5	5% of the total number of blasts over a 12 month period			
	All Public Infrastructure[3]	-	50	0%			

Notes -1- dB (Linear Peak) dBL = decibel linear peak 2- mm/s = millimetres per second 3 - However, these criteria do not apply if the Proponent has a written agreement with the relevant owner, and has advised the Department in writing of the terms of this agreement. MCO has written agreements with TransGrid and Australian Rail Track Corporation (ARTC) to undertake blasting within 500 metres (m) of the Wollar-Wellington 330 kV transmission line and within 500 m of ARTC infrastructure, respectively.

6.4 AIR QUALITY

MCO manages air quality in accordance with Air Quality Management Plan (AQMP). The AQMP was updated and approved in August 2015. The plan was developed by MCO with advice from experienced and qualified experts (Todoroski Air Sciences) to satisfy Condition 19, Schedule 3 of PA 05_0117 (as modified) and Condition 20A, Schedule 3 of PA 08-0135. The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project.

During the reporting period, MCO undertook air quality monitoring in accordance with the AQMP. This included:

- Deposited particulate matter is monitored via Dust Depositional (DD) gauges at eleven locations around the Moolarben Coal Complex;
- PM_{10} – High Volume Sampling (HVAS) monitoring is undertaken at two sites – Ulan Village (PM01) and south-west of Open Cut 1 and west of Open Cut 2 (PM02);
- PM_{10} – Real Time Monitoring via Tampered Element Oscillating Mass Balance's (TEOMs) is undertaken at four locations around the Moolarben Coal Complex; and
- Total Suspended Particulate (TSP) matter is calculated from the results obtained from TEOM PM_{10} monitoring;
- Meteorological monitoring is undertaken via Automatic Weather Stations (AWSs), with WS3 (located on Ulan Road) the principle station for reporting purposes.

The AQMP monitoring locations are identified in **Appendix 2**. The air quality monitoring program is outlined in **Appendix 3D**. A summary of air quality monitoring results for the reporting period is provided in **Table 15** and **Table 16**.

Table 15: Air Quality Monitoring Summary

Aspect		Approved Criteria	Performance during the Monitoring Period	Trend/ Key Management Implications	Implemented/proposed Management Action
	Monitoring Form				
Air Quality	Dust Deposition	4/g/m^2/month (max total) 2g/m^2/month above background average (Incremental increase)	Annual averages for each unit is reported in **Table 17**. All units complied with the 4/g/m^2/month criterion. The 2g/m^2/month criterion was not triggered. :	Dust depositional results indicate a decline in dust levels at most locations from the previous year.	Nil
	PM 10	50µg/m^3 (Daily limit)	The maximum PM10 results for the reporting period are outlined below. • TEOM01 –106.6µg/m^3 with 5 exceedances • TEOM 04 – 63µg/m^3 with 2 exceedances • TEOM05- 87.7 µg/m^3 with 1 exceedance • TEOM06 - 38.4 µg/m^3 with no exceedances • PM01= 45µg/m^3, with no exceedances • PM02= 29 µg/m^3, with no exceedances	Exceedances discussed below.	Nil
	PM10	30µg/m^3 (Annual limit)	The average PM10 results for the reporting period are presented in **Table 18**. All sites were within compliance of the 30µg/m^3 (Annual limit)	Long-term PM10 averages for 2015 are below the levels obtained in 2014.	Nil
	Total Suspended Particulate	90µg/m^3(Annual limit)	The TSP results as calculated using the methodology specified in the approved MCO AQMP are presented in **Table 19**. The calculation is based on the accepted relationship that PM10 constitutes 40% of the total TSP. During the reporting period, all sites where calculated as being below the 90µg/m^3 criterion.	Long-term TSP levels were below 2014.	NIl

An explanation of exceedances of the TEOM 50µg/m^3 (Daily limit) criterion is outlined below:

- 5 March 2015 – TEOM01 recorded 62.3µg/m^3. An investigation indicated MWRC were conducting works on the private access road. This resulted in elevated localised dust levels.
- 30 March 2015 – TEOM02 recorded 73µg/m^3. An investigation indicated MWRC were conducting road works in close proximity to the meter. This resulted in elevated localised dust levels.
- 13 May 2015 – TEOM01 recorded 51.3µg/m^3. An investigation indicated MWRC road works within the vicinity resulted in elevated localised dust levels.
- 6 May 2015 – TEOM01 recorded 106.6µg/m^3, TEOM04 recorded 63.1µg/m^3, and TEOM05 recorded 85.76µg/m^3. An investigation indicated that a regional dust event occurred on that day creating a data spike.
- 6 October 2015 TEOM04 recorded 52.3µg/m^3. An investigation indicated MWRC road works upwind of the monitor resulted in elevated localised dust levels.
- 1 December 2015 – TEOM01 recorded 52.2µg/m^3. An investigation indicated that westerly winds were dominate trending SW to NW. A general haze was noted and visible dust from road works in Ulan Village and Ulan Road was evident. This resulted in elevated localised dust levels,

Occurrences of power failures resulting in either a data gap, or data loss are provided below:

- 18 January 2015 – TEOM01 - experienced a power outages
- 22 July 2015 – TEOM 05 - experienced a power outage and relocation
- 22 December 2015 –TEOM 06 – experienced power outages;
- 22 -30 December 2015– TEOM 06 – experienced intermittent power outages.

6.4.1 DATA CAPTURE RATE

The following table (**Table 16**) provides details on the data capture rates for the reporting period.

Table 16 Data Capture Rate for PM10 Averages

Location	Reporting Period Annual Average (µg/m^3)	Criteria (µg/m^3)	Data Capture Rate
TEOM 01 (Ulan School)	13.2	30	99.7%
TEOM04 (Ulan Road)	8.5	30	100%
TEOM05 (Ridge Road)	9	30	99.7%
TEOM06 (Ulan-Wollar Road)	38.4	30	96.5% (since relocation)
PM01 (Ulan Village	13.2	30	100%
PM02 (Ridge Road)	10.8	30	100%

6.4.2 COMPARISON TO PREVIOUS AIR QUALITY MONITORING AND BACKGROUND LEVELS

Dust Deposition

Year 2 of the Stage 1 Optimisation Modification (Mod 9) has been chosen for EIS comparison, as it is the most reflective of the current mining operations at MCO. All deposition results are within criteria and generally in accordance with predicted results (**Table 17**).

Table 17: Comparison of Depositional Dust results

Dust Gauge	Annual Average (g/m2/month)						
	Back-ground	2011	2012	2013	2014	2015	Yr 2
DG01	1.2	0.4	0.3	0.5	0.8	0.6	0.9
DG04	2.0	1.6	1.3	1.3	1.6	1.0	1.1
DG05	1.8	1.5	0.8	1.0	2.0	0.8	0.7
DG06	1.2	0.6	0.4	0.7	1.0	0.6	0.6
DG07	1.7	0.7	0.8	1.0	0.9	0.9	0.6
DG08	1.4	0.8	0.7	0.7	0.8	0.6	0.7
DG09		0.5	0.4	0.7	2.0	0.6	0.6
DG11		-	-	0.6	0.8	0.6	0.7
DG12		-	-	-	-	1.5	<1.0
DG13		-	-	-	-	0.7	0.7
DG14		-	-	-	-	1.1	1.0

PM10

Year 2 of the Stage 1 Optimisation Modification (Mod 9) has been chosen for EIS comparison, as it is the most reflective of the current mining operations at MCO. Results are within criteria and in accordance with predicted results (**Table 18**) indicating that current air quality management practices are effective.

Table 18: Comparison of annual average PM10 Results

Unit	Annual Average (µg/m^3)						
	Back-ground	2011	2012	2013	2014	2015	Yr 2
Ulan School (TEOM01)	15.1	9.3	10.2	12.4	11.4	13.2	24.7
Murragamba Road (TEOM02)	11.8	10.3	11.0	12.7	13.9	#	-
Ulan Road (TEOM04)	-*	8.9	8.9	10.8	12.7	9.0	9.5
Ridge Road (TEOM05)	-*	-**	**-	16.6	11.2	8.5	6.0
Ulan-Wollar Road (TEOM06)	-*	-**	-**	**-	-**	9.0	12
Ulan Village HVAS (PM01)	17.9	12.4	11.9	12.2	13.8	13.2	9.5
Ridge Road HVAS (PM02)	-*	10.5	9.7	10.0	11.7	10.8	13.2

* No background values as site established after 2009. ** No previous data as site not established.
# Removed from monitoring program

Total Suspended Particulates

TSP results (**Table 19**) are within criteria and generally in accordance with predicted results.

Table 19: Comparison of annual average TSP results

Unit	Annual Average Calculated TSP (µg/m³)					
	Background	2011	2012	2013	2014	2015
TEOM01(Ulan School)	37.75	23.25	25.5	31	28.5	33
TEOM 02 (Murragamba Rd)	29.5	25.75	27.5	31.75	34.75	#
TEOM04 (Ulan Road)	0	22.25	22.25	27	31.75	22.5
TEOM05 (Ridge Road)	*	**	**	41.5	28	21.25
TEOM06 (Ulan-Wollar Road)	*	**	**	**	**	22.5
PM01(Ulan Village HVAS)	44.75	31	29.75	30.5	34.5	33
PM02 (Ridge Road HVAS)	*	26.25	24.25	26.25	29.25	27

* No background values as site established after 2009. ** No previous data as site not established.
# Removed from monitoring program

6.4.3 SPONTANEOUS COMBUSTION

No spontaneous combustion events occurred during the period.

6.4.4 GREENHOUSE GAS REPORTING

Yancoal's Australian operations reported under the National Greenhouse and Energy Reporting Scheme for the 2014-15 financial year. Overall MCO emitted 108,222t CO_2-e, a 5% increase when compared with the 2013-2014 data due to the increase in operational activity during the period.
The Energy Savings Action Plan will be reviewed and revised if necessary in the next period.

6.5 BIODIVERSITY

MCO manages biodiversity in accordance with the Biodiversity Management Plan (BioMP).The MCO BioMP was updated and approved in December 2015. The plan was developed by MCO with advice from experienced and qualified experts (EcoLogical Australia) to satisfy Condition 36, Schedule 3 of PA 05_0117 (as modified) and Condition 39, Schedule 3 of PA 08-0135 (as modified). The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project. In accordance with Condition 13(a), Schedule 2 of the Project Approvals (05_0117 and 08_0135), the BioMP is being staged and revisions of the plan will be submitted on a progressive basis.

The objectives of the BioMP are to provide procedures and strategies to be implemented during the life of the Project to minimise biodiversity impacts on site (albeit in consideration of the approved impacts) and enhance biodiversity values on the offset areas. In addition to monitoring, the BioMP describes the necessity of and procedures for:

- Vegetation Clearance Protocol – including Ground Disturbance Permits (GDPs), Pre-clearance surveys, habitat features, identification of suitable release locations;
- Collection and use of locally sourced native seed and supplementary tubetock;

- Strategies to manage vegetation onsite and improve vegetation connectivity;
- Additional biodiversity measures – rehabilitation of the environmental bund, management of salinity, weeds and pests, surface water management and erosion control, management of grazing and agriculture, access restrictions, and bushfire management.

The objective of biodiversity monitoring is to evaluate the vegetation and fauna habitat condition at the Moolarben Coal Complex (including recovery and or enhancement of native vegetation) and to identify appropriate management actions to be applied, where required. Biodiversity monitoring relating to the vegetation management zones includes noxious weed monitoring and vertebrate pest monitoring. This monitoring will be used to measure success against the short, medium and long term targets described in Section 10 (Table 4) of the BioMP and also the need for corrective actions

Monitoring of mine rehabilitation areas is described in the Rehabilitation Management Plan.

6.5.1 LAND PREPARATION

Pre-Clearance Survey

During the reporting period, MCO continued to prepare land for the advancement of Open Cut 1 Mod 9, Open Cut 2 and Open Cut 4 and stage 2 construction works in accordance with the sites approved management plans and GDP. Pre-clearing surveys were undertaken across 368.2 ha of land during the reporting period.

Two flora species, *Acacia ausfeldii* (Ausfeld's Wattle) and *Pomaderris queenslandica* (Scarlet Pomaderris) listed as vulnerable and endangered under the *Threatened Species Conservation Act NSW 1995* (TSC) were found during the pre-clearing surveys for Open Cut 4.

Six threatened fauna species listed as vulnerable under the TSC Act were identified during the pre-clearing surveys. These were:

- *Calyptorhynchus lathami* (Glossy-black Cockatoo) – vulnerable (TSC Act)
- *Chthonicola sagittata* (Speckled Warbler) - vulnerable (TSC Act)
- *Climacteris picumnus* (Brown Treecreeper) – vulnerable (TSC Act)
- *Daphoenositta chrysoptera* (Varied Sittella) – vulnerable (TSC Act)
- *Melithreptus gularis gularis* (Black-chinned Honeyeater) – vulnerable (TSC Act)
- *Stagonopleura guttata* (Diamond Firetail) – vulnerable (TSC Act)

Clearing Supervision

During all land disturbance activities for Open Cut 2 and Open Cut 4, fauna species searches were completed with fauna identified either observed evacuating during clearing or were relocated by appropriately qualified ecologists prior to disturbance. One flora species *Pomaderis queenslandica* (Scant Pomaderis), listed as endangered under the NSW TSC Act, was identified within Open Cut 4. Six specimens in good health were excavated and transported to a nursery for propagation.

Four Brown Treecreeper (*Climacteris picumnus)* nests were identified during clearing activities. Trees with nests identified were demarcated and left undisturbed until the end of the breeding season. Felling of all identified nested trees and identified habitat trees was undertaken under the supervision a suitably qualified ecologist. A single *Phascolarctos cinereus* (Koala) was observed during clearing activities. All works in the vicinity ceased immediately and a walk through of the area was conducted the following day to confirm the presence or absence of the individual by a suitably qualified ecologist prior to activities resuming.

6.5.2 BIODIVERSITY OFFSET WORKS UNDERTAKEN

Weed and feral animal inspection and control works were undertaken throughout the reporting period. Wild dog baiting was undertaken in conjunction with the NSW Local Land Service (LLS) within biodiversity offset properties. Weed control spraying was undertaken throughout the offset areas focusing on Serrated Tussock, Blackberries, Sweet Briar, Blue Heliotrope, St Johns Wort, Prickly Pear, and Tree of Heaven.

Stock has been excluded from the Clarke, Clifford and Elward properties. Fencing renewal and maintenance of portions of the Bobadeen and Elward offset properties was completed during the reporting period.

A cultural heritage values assessment of Dun Dun East offset area in the vicinity of Pyramul Creek was completed in December in accordance with Schedule 3 Condition 43 of Project Approval 08_0135.

6.5.3 BIODIVERSITY OFFSET MONITORING

Flora and fauna monitoring during 2015 included the Stage 1 and EPBC (2007/3297) Biodiversity Offset Areas (BOAs) Area 1, Area 2, Area 3, Bora Creek and spring baseline flora and fauna monitoring of the EPBC (2013/6929) offset areas. Flora monitoring included monitoring of analogue sites located in National Parks or State Conservation Areas. Monitoring locations are provided in **Appendix 2**.

Stage 1 and EPBC (2007/3297) offset monitoring included:

- Full floristic surveys (72 sites in autumn, 48 sites in spring)
- Rapid assessments (24 sites in spring)
- Fauna surveys (16 sites in spring) targeting diurnal and nocturnal birds, reptiles, amphibians, mammals, microbats and habitat assessment

EPBC (2013/6929) spring baseline monitoring included vegetation validation, full floristic survey (28 sites), fauna surveys (18 sites) and natural regeneration monitoring.

6.5.3.1 Offset Monitoring Results – Offset Areas 1, 2 and 3

Floristic Monitoring

A total of 434 flora species (363 native species, 58 exotic species, and 13 species unable to be identified as native or exotic) were recorded across all floristic monitoring sites during the 2015 monitoring surveys.

While this is a reduction of almost 150 species compared to 2014, the reduction in full floristic monitoring sites (24 remnant sites undergoing rapid assessment only in spring 2015) may have largely contributed to this change in overall results.

A total of 324 species (285 native species, 27 exotic species, and 12 species unable to be identified as native or exotic) were recorded across all floristic monitoring sites during autumn 2015 monitoring surveys. A total of 368 species (309 native species, 50 exotic species, and nine species unable to be identified as native or exotic) were recorded during the Spring 2015 survey.

Within individual sites, total species richness ranged between 14 and 52 species in Autumn (sites 9b and 24b, and 2b respectively) and between 14 and 49 species in Spring (sites 9b and 24b, and 13h respectively). Native species richness ranged between 14 and 50 species in autumn 2015 (sites 9b and 7a respectively), and between 12 and 49 species in spring 2015 (sites 9b and 13h respectively). Median native species richness per revegetation/regeneration site was 30 species; closely approaching the median of 34 native species per remnant site.

The exotic species burden across remnant areas remains very low, with the majority of remnant sites containing no exotic species. Exotic species formed a minimal component (less than 5% cover) of the ground cover in all except three sites (4e, 7b and 25a), all of which are revegetation/regeneration sites.

The majority of sites showed evidence of ongoing recruitment and regeneration of at least one canopy species. Supplementary plantings and placement of large woody debris is to be considered where feasible.

Fauna Monitoring

Fauna species richness data collected during the Spring 2015 survey is presented in **Figure 6**. Avian species formed the dominant component of species richness, and were the most abundant fauna assemblage at each site. Total fauna species richness ranged from 13 species (site Fa2a) to 51 species (site Fa14).

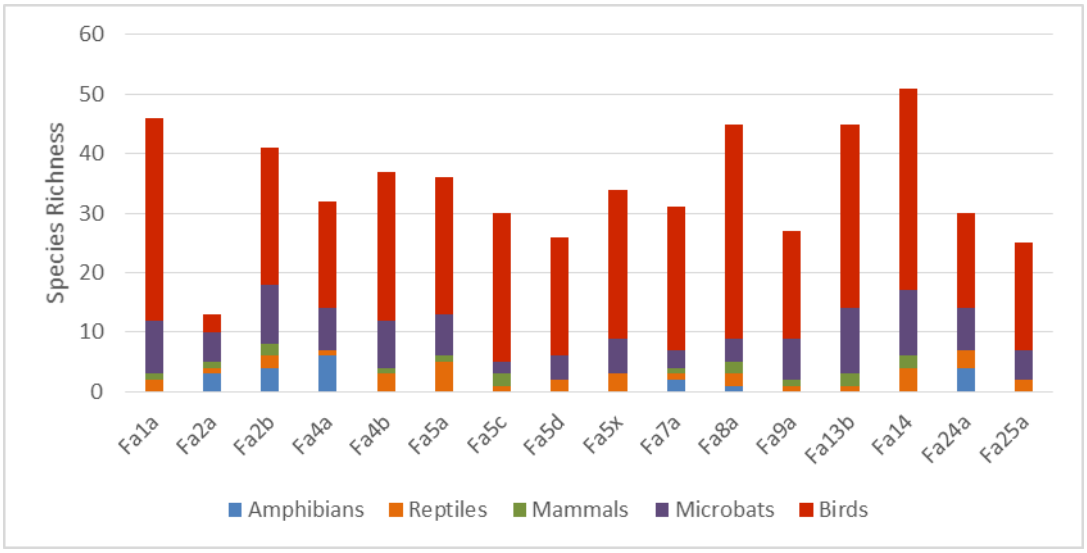


Figure 6: Fauna species richness per Stage 1 monitoring site, spring 2015

A total of 16 threatened fauna species listed under either the NSW TSC Act and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified within the BOAs during the 2015 spring survey period. These consisted of 11 avian species listed as Vulnerable under the TSC Act and five microbat species listed as Vulnerable under the TSC Act and/or EPBC Act; in addition, one avian species listed as migratory under the EPBC Act was observed within the BOAs. A full list is provided in **Appendix 3E**.

Three introduced mammal species, one introduced avian species and one introduced fish were recorded during the spring 2015 monitoring. All three introduced mammals are declared pests in NSW; namely *Vulpes vulpes* (Fox), *Oryctolagus cuniculus* (Rabbit) and *Sus scrofa* (Pig). *Cyprinus carpio* (Common Carp) was recorded for the first time in the BOAs during the monitoring period, observed opportunistically at site Fa24a. Continuing weed and vertebrate pest animal control will be required.

6.5.3.2 Offset Monitoring Results – EPBC (2013/6929) offset areas.

Floristic Monitoring

A total of 316 flora species (222 native species, 83 exotic species, and 11 species unable to be identified as native or exotic) were recorded across all floristic monitoring sites during the Spring 2015 monitoring survey.

Within individual sites, native species richness ranged between 10 (Mod9_Fl2) and 54 (Mod9_Fl28). Average native species richness in MZ1 (remnant) sites was 34, contrasting with an average of 22 native species per site across MZ2 (DNG/regeneration). Exotic species, where present, were only found in the ground layer. Exotic ground cover was less than 5% in all MZ1 sites, and ranged from zero to 84% across MZ2 sites (average exotic ground cover in MZ2 of 44%). The most common exotic species were the annual *Carthamus lanatus* (Spear Thistle), and perennial herbs and grasses including *Hypochaeris radicata* (Catsear), *Trifolium* spp. (Clovers) and *Lolium perenne* (Perennial Ryegrass).

Biometric monitoring results for each plot, including native species diversity (richness; NSD), native tree cover (NTC), native mid-storey cover (NMC), native ground cover (NGC), exotic cover, number of hollow-bearing trees (HBTs), length of fallen logs, and presence of native canopy species regeneration (regen), are presented in **Appendix 3E**.

Natural Regeneration Monitoring

Natural regeneration of target canopy species was recorded in varying densities across all surveyed BOAs. In the Bobadeen BOAs, regeneration of Blakely's Red Gum (*Eucalyptus blakelyi*) and White Box (*Eucalyptus albens)* was recorded, however this was largely concentrated towards the boundaries of the BOA, moving out from adjacent woodland (seed source).

This pattern of regeneration was particularly apparent on the Elward BOA, where regeneration of species including Blakely's Red Gum were almost entirely concentrated at the boundary between DNG and remnant woodland.

Regeneration of Rough-barked Apple (*Angophora floribunda*), Blakely's Red Gum and Yellow Box (*Eucalyptus melliodora*) was recorded along the length of the surveyed transects within the Clarkes BOA.

Fauna Monitoring

Fauna species richness recorded at each site in the Spring 2015 survey is presented in **Figure 7**. Avian species formed the dominant component of species richness, and were the most abundant fauna, at each site. Total fauna species richness ranged from 12 species (site Fa11) to 55 species (site Fa1), however it should be noted that Anabat echolocation recording malfunctioned at site Fa11 and as such species richness does not include microbats at this site.

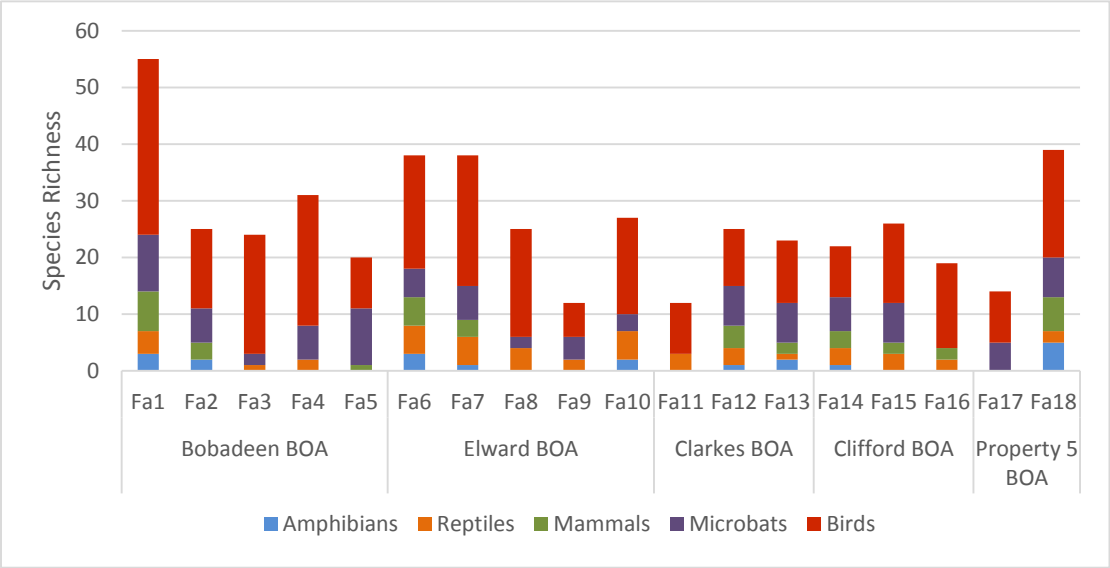


Figure 7: Fauna species richness per EPBC (2013/6929) monitoring site, spring 2015

A total of 18 threatened fauna species, consisting of 12 threatened avian species, one threated mammal (non-bat) and five threatened microbat species listed under the NSW TSC Act and/or the Commonwealth EPBC Act were identified within the BOAs during the 2015 spring survey period. Additionally, one migratory bird listed under the EPBC Act were observed within the BOAs. A full list is presented in **Appendix 3E**.

Five introduced fauna species were recorded including three declared vertebrate pests. These species were not recorded in a high abundance, though ongoing monitoring is recommended to gain further understanding regarding their distribution and abundance and to determine management actions. Continuing weed and vertebrate pest animal control will be required.

6.5.4 BUSHFIRE

There were no major outbreaks of fire at MCC during the reporting period. NSW National Parks and Wildlife Service (NPWs) are proposing a Hazard Reduction Burn (Prescribed burn) adjacent to and including MCO lands in 2016.

6.5.5 ACTIONS FOR NEXT REPORTING PERIOD

During the next period activities to be undertaken include baseline weed and feral mapping of vegetation management zones 1 & 2, continued monitoring, including autumn baseline monitoring of EPBC (2007/3297) offsets and assistance to NPWS with the proposed hazard reduction burn.

6.6 HERITAGE

MCO manages Heritage in accordance with the Heritage Management Plan (HMP).The MCO HMP was updated, combining Aboriginal and European heritage, and approved in June 2015. A further revision was approved in December 2015. The plan was developed by MCO with advice from experienced and qualified experts (University of Queensland Culture and Heritage Unit) to satisfy Condition 39, Schedule 3 of PA 05_0117 (as modified) and Condition 46, Schedule 3 of PA 08-0135. The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project.

The purpose of the HMP is to describe the management of Aboriginal and European heritage at the MCC.

During the reporting period MCO commenced the salvage and management of Aboriginal heritage sites associated with the Stage 2 project. This consisted of the salvage of over 98 sites. MCO also continued with the survey and salvage of OC2 and adjacent areas.

During the reporting period archival recording of historical structures and objects that will be impacted by approved mining operations was completed. The following sites and objects were recorded in accordance with Project Approval 08_0135:

- Site 8 – Murragamba School Site;
- Site 9 – Farm Site;
- Site 11 – Farm Site;
- Site 36a – House Site;
- Site 37 – House Site;
- Item 55 – Water trough and spring fed well;
- Item 56 – Water trough and spring fed well; and,
- Item 57 – Feed trough.

Site 36B (European burial site) underwent historical research and archival recording. Archaeological assessment and research design and exhumation management and risk management plans were then developed in consultation with the NSW Department of Health for approval. Exhumation of the site was conducted by experienced and qualified experts (University of Queensland Culture and Heritage Unit) with the NSW Department of Health observing. No human remains were able to be recovered during the exhumation. The site included three graves of infants postulated to date from between 1879 and 1890.

6.6.1 ACTIONS FOR NEXT REPORTING PERIOD

Further salvage and management of Aboriginal and European heritage sites associated with stage 2 will be completed during the next reporting period. Registered Aboriginal Party (RAP) groups will continue to be involved in due diligence works associated with disturbance activities in accordance with the Heritage Management Plan.

Prior to June 2017, MCO will engage an appropriately qualified and experienced archaeologist to conduct an archaeological survey of the portion of the Powers Conservation Area, in consultation with the RAPs.

7.0 WATER MANAGEMENT

MCO manages water in accordance with the Water Management Plan (WAMP). The WAMP was updated and approved in August 2015. The plan was developed by MCO with input from DP&E endorsed experienced and qualified experts (WRM Water & Environment and Dundon Consulting) in accordance with Condition 33, Schedule 3 of PA 05_0117 (as modified) and Condition 29, Schedule 3 of PA 08-0135. The WAMP incorporates an updated Site Water Balance, Surface Water Management Plan and Groundwater Management Plan. The key updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project.

During the reporting period, MCO undertook water monitoring and data review in accordance with the WAMP. Surface water and groundwater monitoring sites are provided in **Appendix 2.** Surface water monitoring includes:

- Surface water quality and Flows (monthly/6 monthly/Event based);
- Stream health (annual);
- Channel stability (annually);
- Licensed discharge points; and,
- Water take from Ulan Coal Mine.

Groundwater related monitoring includes:

- Groundwater levels/pressure (monthly);
- Groundwater quality (6 monthly);
- Groundwater take; and,
- Potential seepage from mine water storages.

The groundwater monitoring includes the following lithological units:

- Quaternary alluvium;
- Tertiary aged unconsolidated sediments;
- Triassic sandstones;
- Permian coal measures;
- Ulan seam coal;
- Marrangaroo formation; and
- Basement units (consisting mostly of granites and metavolcanics).

During the period MCO constructed water storages (mine water and sediment), clean-water diversions, extended the water transfer network, installed operational and construction related erosion and sediment controls including the CHPP water management upgrade and installed three piezometers within the main trunk of the paleochannel between the boundary of OC4 and Wilpinjong Creek in accordance with Condition 26, Schedule 3 of NSW project approval (08_0135).

MCO, in consultation with DPI Water reviewed the monitoring bores and associated licensing with the outcome that all monitoring bore licences have now been amalgamated into one licence. An initial review of monitoring bore locations identified that no current monitoring bores within the mining footprint will be removed by mining prior to 2019.

Details of water licensing and associated take are provide in **Section 7.1**. A summary of surface water monitoring groundwater monitoring results for the reporting period are provided in **Section 7.3** and

Section 7.4 respectively. Detailed surface water and groundwater monitoring results for the reporting period provided at **Appendix 3F** and **Appendix 3G** respectively.

7.1 WATER LICENCES

NSW Government requirements are for water take to be reported over a financial period (i.e. 1 July 2014 to 30 June 2015). Consequently, water take has been reported in a manner consistent with this requirement. MCO measures water take in accordance with the approved Water Management Plan. Water take is either groundwater inflow removed from operation, or water extracted from licenced bores. During the period, no water was extracted from licensed bores.

Water licenses and associated take in the period is summarised in **Table 20**.

Table 20: Water Licences and Take

Licence #	Description	Entitlement	2014-15 Water Year			2015-16
			Excavation Inflows (ML)	Bore extraction (ML)	Total (ML)	Predicted (ML)
Licences under the Water Management Act, 2000[1]						
WAL36340	Wollar Creek Water Source	218 Units[2]	0	0	0	0
20AL213310[3]	Wollar Creek Water Source	0 Units	0	0	0	0
20AL213311[3]	Upper Goulburn River Water Source	9 Units[4]	0	0	0	0
Licences under the Water Act, 1912[1]						
20BL172002	Porous Rock Aquifer Licence – Mining Bores	2950 ML/year[5]	0	0	228	600
20BL173923	Porous Rock Aquifer Licence - Mining		228	0		
20BL173935	Monitoring and Test Bores	N/A	N/A	N/A	N/A	N/A

[1] In accordance with Condition 29, Schedule 3 and Condition 25, Schedule 3 of the NSW Project Approvals (05_0117 and 08_0135 respectively), MCO would obtain additional licences under the Water Management Act, 2000 and Water Act, 1912 as they are required for activities at the Moolarben Coal Complex.

[2] One unit is currently equivalent to 1.0 ML as per the *Available Water Determination Order for Various NSW Unregulated and Alluvial Water Sources (No. 1) 2014*.

[3] Water Access Number to be confirmed.

[4] Subject to trade registration.

[5] All porous rock aquifer licenses 20BL1722003 and 20BL173923 share a combined 2950 Units.

7.2 WATER BALANCE

MCO monitors the water balance for the operation to assists forecasting and managing site water management. The site water balance (**Table 21**) for the reporting period was prepared with input from suitably qualified and experienced consultants WRM. Site water storage increased by 22ML during the reporting period. The main demands were coal processing and dust suppression.

Table 21: Site Water Balance

Water Sources (Inflows)	Volume (ML)
UCML Water	116
Northern Borefield	0
Southern Borefield	0
Rainfall / runoff	906
Groundwater inflows	371
ROM feed	648
Total	2,041
Water Loss (Outflows)	
Evaporation	223
Seepage	0
Construction & dust suppression	869
Licensed Discharge	0
Unlicensed Discharge	0
CHPP Demand	900
Underground Demand	0
Change in inventory	22
Total	2,014
Water Balance	
Inflows minus outflows	27

7.3 SURFACE WATER

7.3.1 SURFACE WATER QUALITY AND FLOWS

7.3.1.1 Surface Water Flows

Stream flow was recorded in Wilpinjong, Murragamba, Eastern, Bora and Moolarben Creeks. During the reporting period the Bora creek stream gauge was relocated down stream.

The recorded stream gauging is provided in **Figure 8**. The flow in the creeks was directly in response to rain. Additionally Moolarben Creek flows were influenced by Moolarben Dam located upstream of the gauge. Stream gauge cease to flow conditions require review where gauges are located in pools with record stream gauge during no flow conditions reflecting pool level, rather than flow.

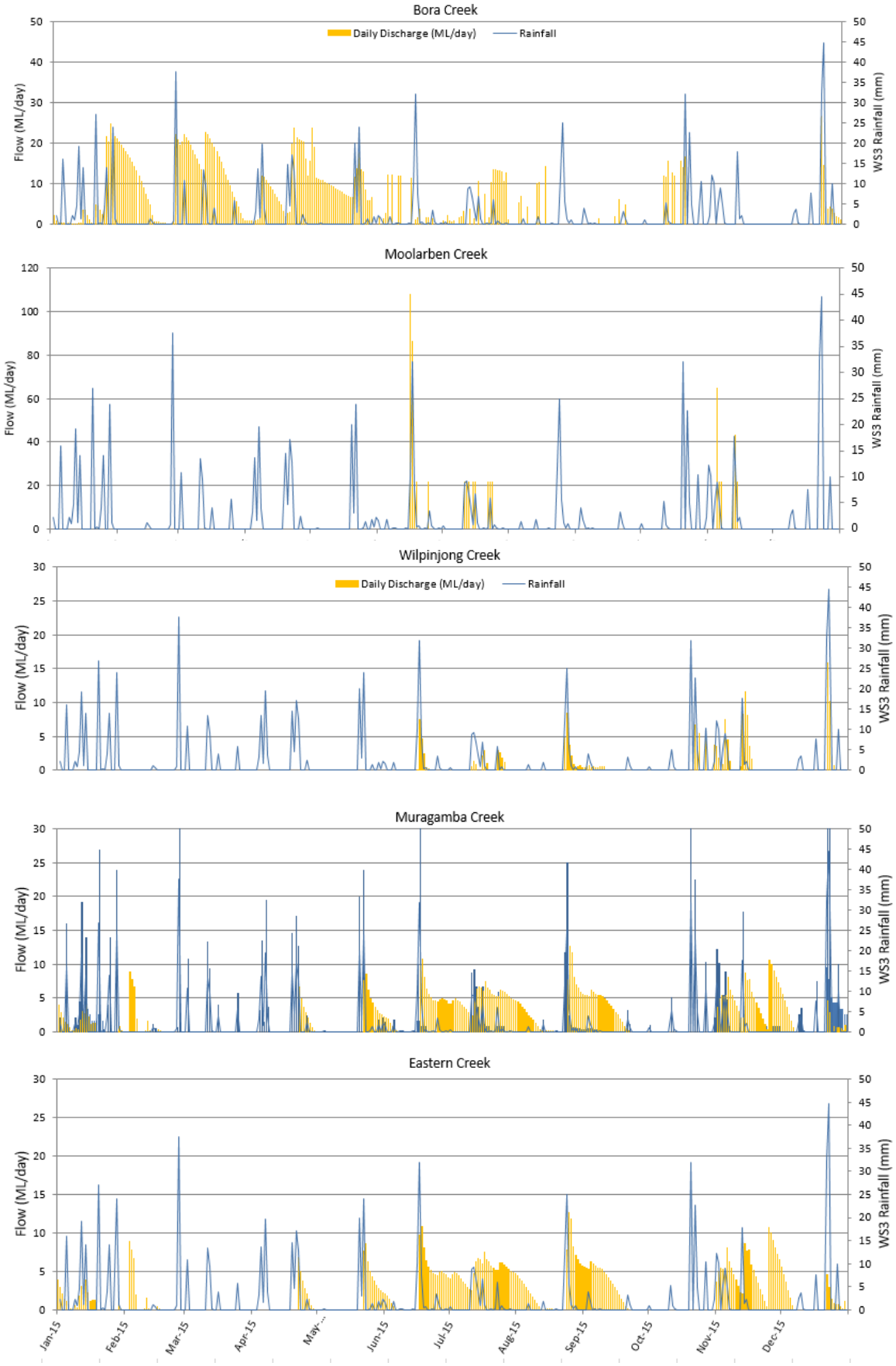


Figure 8: Stream flow and rainfall

7.3.1.2 Surface Water Quality

Surface water monitoring was undertaken in the Goulburn River, Bora Creek, Moolarben Creek and Murragamba Creek in accordance with the SWMP. Results varied both spatially and temporarily due to stochastic fluctuations bought about by rainfall events in ephemeral waterways. A number of locations were dry during monitoring rounds. Monitoring identified readings outside the $20^{th}/80^{th}$ percentile range at both upstream and downstream locations. The findings are described in **Section 7.3.1.5** below. The Monitoring Data is provided in **Appendix 3F**.

7.3.1.3 Rainfall Event Sampling

As per MCO's approved WMP rainfall sampling is undertaken where rainfall exceeds 30mm in 24 hours. During the reporting period there were six occasions where rainfall events triggered the requirement to collect additional water samples. Results for the reporting period are provided in **Appendix 3F**.

7.3.1.4 Water Discharges

No water discharges occurred from MCO during the reporting period.

7.3.1.5 Comparison to baseline

Surface water pH in the Goulburn River was neutral to slightly alkaline ranging from 6.6 to 8.7. Readings were generally within the historical range, though above the 80%ile levels. All EC readings were within the 80%ile concentrations whilst the NTU and suspended solids were variable with increased concentrations upstream and during rain event sampling. Goulburn River water quality is presented in **Figure 9**.

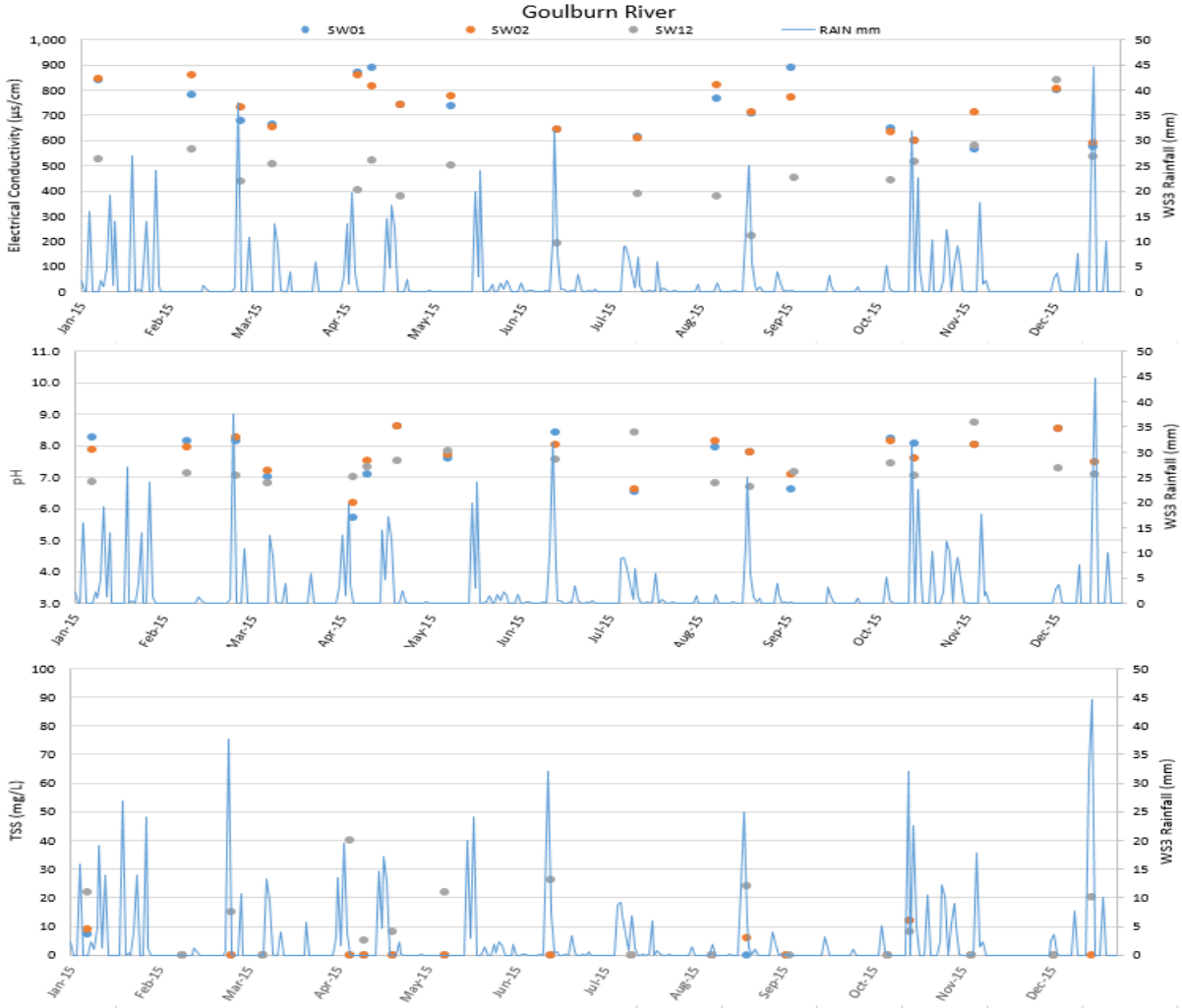


Figure 9: Goulburn River Water Quality

Bora Creek is an ephemeral creek. Sampling at SW10 was only successfully undertaken once and was dry during all other sampling events. Surface water pH was neutral to slightly alkaline ranging from 6.1 to 8.7. Readings were generally within the historical range with two exceptions with increased alkalinity. EC increased from June to August peaking before trending lower for the remainder of the year. TSS and NTU were generally within the historical range with higher readings associated with flow events. Bora Creek water quality is presented in **Figure 10**.

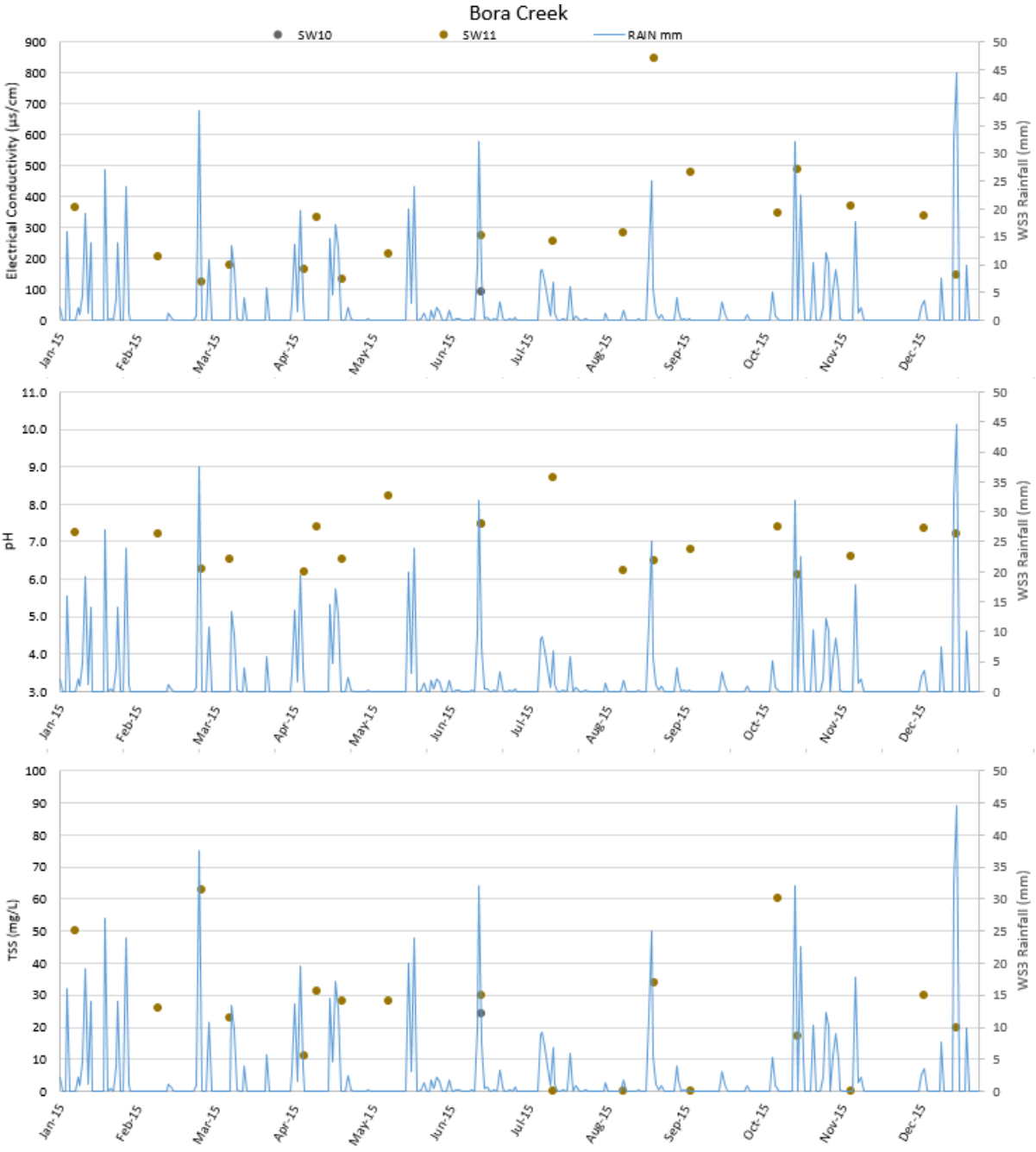


Figure 10: Bora Creek Water Quality

Moolarben Creek is located to the west of the operation and includes Ulan Coal's Moolarben Dam. Surface water pH was neutral to slightly alkaline ranging from 6.6 to 8.7. Readings were generally within the historical range, though above the 80%ile levels. All EC readings at SW05 were within the 80%ile concentrations while upstream (non-mine impacted) EC readings continued to be elevated, consistent with historical records. NTU and suspended solids were generally consistent with historical data, with the exception of SW09 upstream of the site, which had one elevated TSS reading.

Lagoons creek is a tributary of Moolarben Creek, upstream and not impacted by MCO. pH, EC and TSS results were within the historical range . Moolarben and Lagoon Creek water quality is presents in **Figure 11**.

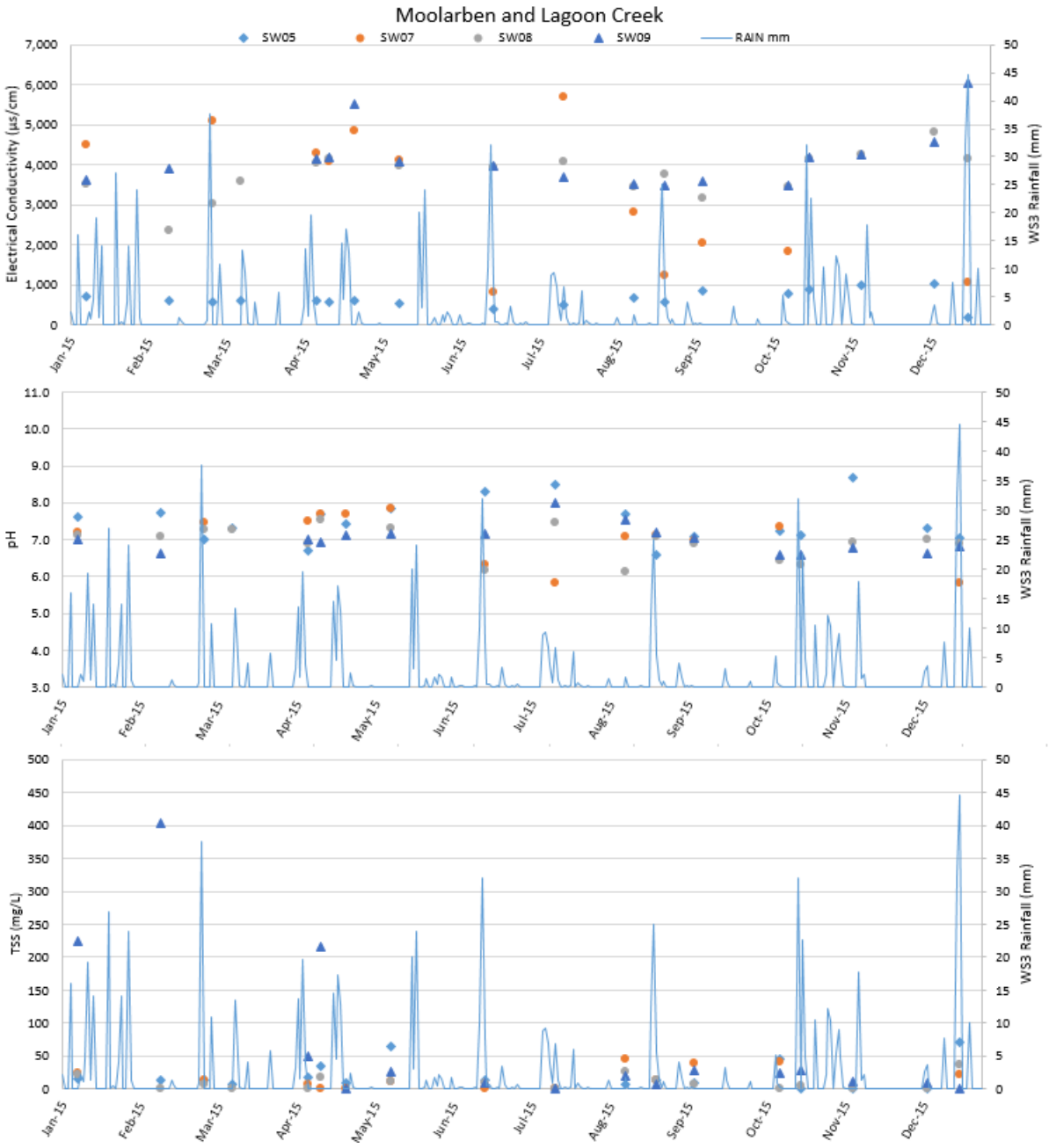


Figure 11: Moolarben and Lagoon Creek Water Quality

Murragamba Creek is an ephemeral creek. Surface water pH was neutral to slightly alkaline ranging from 6.1 to 8.8. EC ranged from 202 to 1986µs/cm, which were generally consistent with historical readings, as was TSS.

Eastern Creek is an ephemeral creek not currently impacted by MCO operations. SW20 was dry during all sampling events. Surface water pH ranged from 4.4 to 7.6, EC ranged from 122 to 687 µs/cm and TSS ranged from 5 to 59.

Wilpinjong Creek is located to the east of the site. Surface water pH was generally neutral to slightly alkaline ranging from 6.0 to 7.8 except for SW18, which exhibited low pH readings of 3.4. EC results ranged from 143 to 1654µs/cm. TSS results were generally below 72mg/L with two elevated readings during/after rain events of up to 920mg/L. Results are indicative of the ephemeral nature and mixed catchment properties. Murragamba, Eastern and Wilpinjong Creek water quality is presents in **Figure 12**.

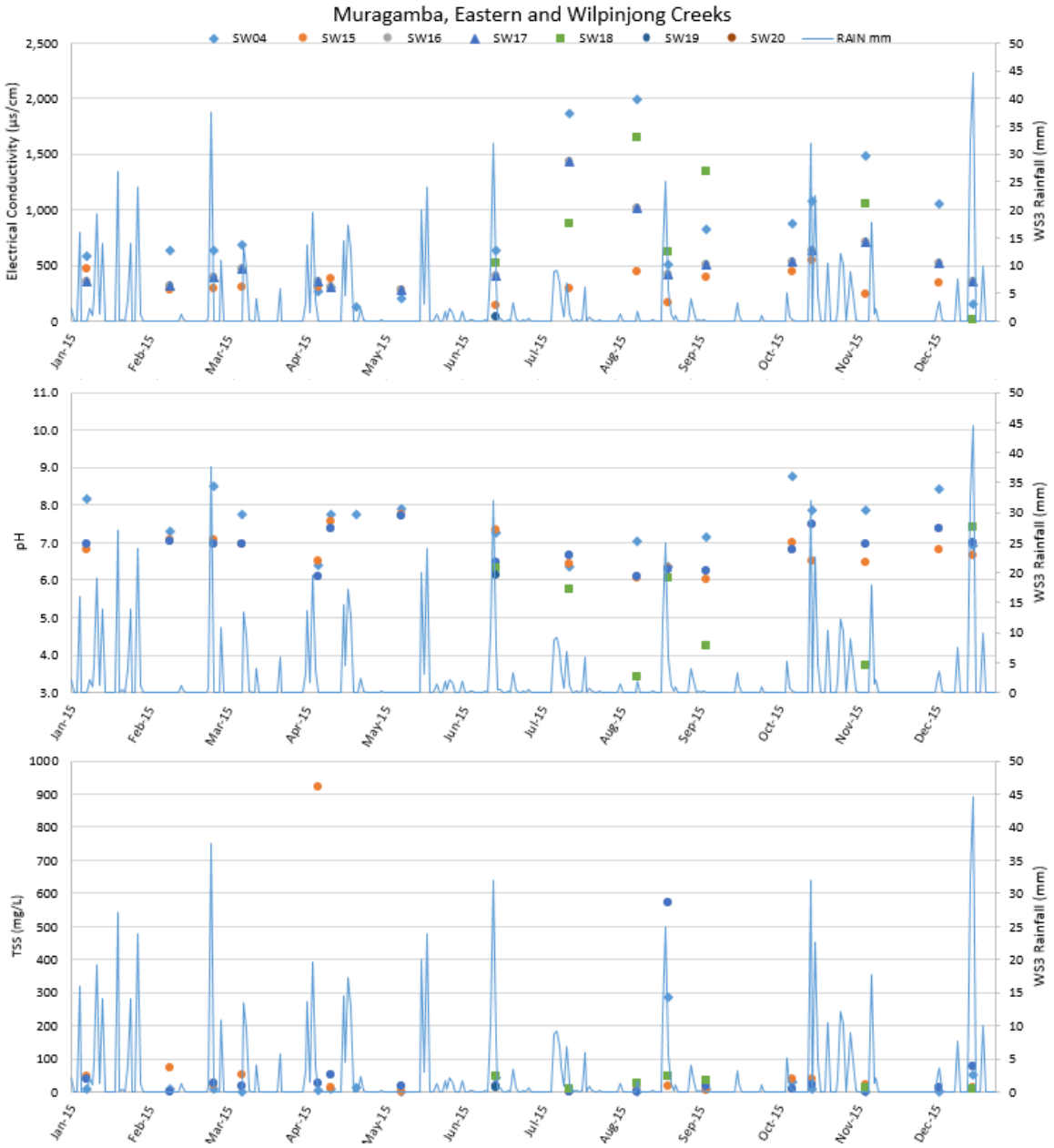


Figure 12: Murragamba, Eastern and Wilpinjong Creek Water Quality

7.3.2 STREAM HEALTH MONITORING

7.3.2.1 Autumn 2015

Autumn stream health monitoring was undertaken from 23 to 26 March 2015. SH03, SH08, SH15, SH18 and SH19 were dry during this monitoring period so no water quality or macroinvertebrate data was collected. Water levels were low at the remaining sites. The monitoring locations are illustrated in **Appendix 2**. *Note monitoring sites SH14 to SH19 were established for the collection of baseline data prior to mining in OC4.*

- Aquatic Habitat Condition (RCE Index) - There was a decline in RCE scores between monitoring periods at impact sites SH04 and SH05 and control sites SH14, SH16 and SH17. However all sites remained at or above established trigger values. Where fluctuation did occur, these can mostly be attributed to relatively quick response biological components such as aquatic vegetation and in-stream retention devices. The reduced RCE score at SH04 is because the score for land use has been changed to appropriately reflect the existing land use.
- Aquatic Macroinvertebrate Diversity - Taxa diversity remained above established trigger values at all sites except impact site SH01. Mean taxa diversity has been declining at both control and impact sites since spring 2013 monitoring. However, during this round of monitoring there has been a slight improvement in mean diversity at the control sites, whilst mean diversity at the impact sites has continued to decline. Despite this, mean diversity remains higher at the impact sites than at the controls. It is likely that taxa diversity has remained comparatively low due to a prolonged period of below average rainfall and concomitant low discharge in the Goulburn River.
- Pollution Tolerance SIGNAL2 Scores - SIGNAL2 scores were above established trigger values at all sites where data was collected Improvements in SIGNAL2 scores were recorded at impact sites SH02 and SH05, and at control sites SH10, SH12, SH14, SH16 and SH17 from spring 2014 monitoring.
- Water Quality - Electrical Conductivity (EC) was below the approved trigger value for all sampled sites except SH10, a control site in the Moolarben catchment, and SH17 a control site in the Wilpinjong catchment. The pH exceeded the upper limit of acceptable ranges at all sampled sites except SH17, a control site in the Wilpinjong catchment and SH16, a control site in the Eastern Creek catchment. All sampled sites had an increase in pH, however pH was within the range of previous records for all monitoring sites. Turbidity was below the trigger value at all sampled sites except SH17 and SH16. Impact sites SH01, SH02 and SH13 all have a similar pattern of decline in turbidity since monitoring began. Impact sites SH04 and SH05 and control site SH08 were also below the range of previous records. This is consistent with a prolonged dry spell which has allowed suspended matter to settle, thereby reducing turbidity.

7.3.2.2 Spring 2015

Spring stream health monitoring was undertaken from 19 to 22 October 2015. SH03, SH08, SH18 and SH19 were dry during this round of monitoring, so no water quality or macroinvertebrate data were collected. Water levels were low at the remaining sites. The monitoring locations are illustrated in **Appendix 2**. *Note monitoring sites SH14 to SH19 were established for the collection of baseline data prior to mining in OC4.*

- Aquatic Habitat Condition (RCE Index) - All site scores were at or above established trigger values. Note that sites established in 2014 have no established trigger values but condition has been stable at all four sites. It is also noted that riparian condition is improving at SH04 and SH05 following rehabilitation works alongside Bora Creek and the Goulburn River. It is expected that future surveys will show an improvement in RCE scores for these sites.
- Aquatic Macroinvertebrate Diversity - Taxonomic diversity declined steadily at all impact sites between autumn 2013 and autumn 2015 however all sites except impact site SH13 were at or above established trigger values. There was no similar declining trend at the two control sites where data were collected for the same period. Instead, taxonomic diversity fluctuated. The gradual decline in diversity at impact sites may have been reversed in the latest round of sampling but for slight increases in richness at four of the six sites. Sites established in spring 2014 have no established trigger values however taxa diversity at these sites was below the average for any of the existing sites. This may be due to conditions at time of sampling such as no flow and high temperatures. Diversity has remained low across sites due to a prolonged period of low rainfall and associated low flow in the Goulburn River.
- Pollution Tolerance SIGNAL2 Scores - SIGNAL2 scores were higher in spring 2015 than in autumn for half of the impact sites. SIGNAL2 scores were above established trigger values for all sites. Indicative condition changed at SH04 and SH12 from moderately to severely disturbed, and at SH02 from mild disturbance to moderate disturbance. Sites established in spring 2014 (SH14, SH15, SH16 and SH17) have no established trigger values however SIGNAL2 scores at these sites have shown an improvement, with all sites now having a SIGNAL2 score higher than 3. Increased water flow and lower water temperatures are likely to have resulted in the improvement in macroinvertebrate diversity.
- Water Quality - Electrical Conductivity (EC) was below the approved trigger value for all sampled sites except SH04 an impact site in the Bora Creek catchment, SH10, a control site in the Moolarben catchment, SH15 and SH17, control sites in the Wilpinjong catchment and SH16 a control site in the Eastern Creek catchment. pH was not recorded for all sampled sites due to equipment malfunction, however of those sites recorded, pH exceeded the trigger value at all but one site (SH13, an impact site in the Goulburn River catchment). All sites except SH10, SH14 and SH17 increased in turbidity compared to the previous monitoring period, with SH01, SH02, SH5 and SH3 in the Goulburn River catchment and SH12, SH16 and SH17 in the Ryan's Creek, Wilpinjong and Eastern Creek catchments exceeding trigger values. These results are likely due to a rainfall event occurring the previous afternoon, generating high levels of runoff from nearby road works.

7.3.3 CHANNEL STABILITY MONITORING

Channel stability monitoring was undertaken during April 2015 at locations in **Appendix 2**. Monitoring involved visual and written observational surveys of erosive and depositional features, cross sections at strategic locations and photographic records of each stream reach which included:

- Monitoring the reach of Bora Creek and a tributary from the western culvert of the MCO rail loop and its confluence with Goulburn River;
- Monitoring the reach of Moolarben Creek between Moolarben Dam and its confluence with Ryan's Creek;
- Monitoring the reach of Murragamba Creek;

- Monitoring the reach of Eastern Creek; and,
- Monitoring the reach of Wilpinjong Creek.

Moolarben Creek remains vulnerable to erosion downstream of the confluence with Ryan's Creek with areas of steep banks, exposed dispersive subsoils and a lack of vegetation cover. Where improvements in activity scores were recorded these have been attributed to changes in vegetation type and condition. The survey recognised some sections of Moolarben Creek displaying stable to very stable environments, generally in areas with lower gradient creek banks and heavily lined with Cumbungi. Since the 2013 baseline study, the mid-reaches of the creek have stabilised due to low flow.

Bora Creek has experienced increased instability since 2014 with areas of active erosion in the upper reaches. These changes were caused by exposed dispersive subsoils, reduced vegetation cover on channel banks and higher stream energy resulting in incised channels. Lateral inflow from neighbouring cleared paddocks has caused gully erosion at BC-pt9 in the downstream reaches of the creek. The lower reaches were more spatially variable where locations were classified as active to very stable.

Bora Creek Tributary was spatially variable. Active erosion was present in the upper reach of Bora Creek Tributary, where the channel was characterised by a lack of vegetation on the channel banks and floor, and an incised channel bed with unconsolidated sediments forming the floor. However, the downstream reach was stable, where a greater extent of perennial vegetation was present and past stabilisation works consisting of 18 m of riprap have slowed flow.

Monitoring program results indicate that channel stability fluctuates along the lengths of Murragamba Creek and Eastern Creek, but have remained relatively unchanged since baseline surveys undertaken prior to mining disturbance. Both creeks, in the upper reaches, are characterised by steep banks and exposed dispersive soil which is preventing vegetation establishment, and subsequently both creeks are vulnerable to erosion. Gully eroded inlets into the main creek line were recorded in the upstream reaches of Murragamba Creek. The gully erosion can be attributed to lateral flows from neighbouring cleared paddocks that subsequently dissolve dispersive soils during flow events. Downstream reaches of Murragamba Creek were generally stable environments with lower gradient creek banks and greater vegetation cover. However, along the downstream reaches of Eastern Creek, there has been an increase in the number of locations that are now experiencing active erosion. Whilst the downstream reach of the channel is well vegetated, isolated areas of bare ground, incised low flow paths and scour holes were observed at some locations. At some locations vertical cut channel walls with exposed dispersive soil were recorded.

Wilpinjong Creek is spatially variable, moving from areas of very high activity through to stable areas. Since the 2014 baseline study there has been a decrease in activity score in the lowest reach to potentially stabilising resulting from an increase in channel depth and hence a reduced likelihood of flow overtopping the banks. Along the length of Wilpinjong Creek there is a lack of vegetation on the channel floor and walls, leaving the dispersive soil exposed to flow events. Feral pig activity and livestock access have impacted the banks and channel shape at several locations along the length of the creek. The high level of erosion activity in the upstream reaches is likely the result of strong bedrock control, exacerbated by post-European land use and agricultural practices which has preconditioned rivers to erosion susceptibility.

Channel stability within each creek was variable. Locations vulnerable to erosion were characterised by steep banks, with little vegetative cover and exposed dispersive subsoil. More stable locations were characterised by vegetated banks with low gradient slopes. Where active erosion was recorded at

sites along each creek, this was predominantly the result of natural influences exacerbated by past land use and agricultural practices that exposed dispersive subsoils. The impact of creek stability within these creeks due to mining operations is considered negligible over the past 12 months.

7.3.4 WATER DISCHARGES

No water discharges occurred from MCO during the reporting period.

7.3.5 EFFLUENT

Three sewerage treatment plants were in operation during the reporting period. An upgrade of the Open-cut system associated with Stage 2 commenced in the reporting period. Discharge quantity was within design limits during the period. Discharge quantities and quality is presented in **Appendix 3F**.

7.4 GROUNDWATER

7.4.1 GROUNDWATER LEVELS

Trigger values were established to determine the need for investigation and possible response actions for potential impacts to groundwater levels in the alluvial and Triassic aquifers. The Permian strata is already extensively affected by past mining, and is predicted to undergo further impact from ongoing mining at the Moolarben Coal Complex, the Ulan Mine Complex and the Wilpinjong Coal Mine and contains groundwater of generally poor quality. Accordingly, trigger levels have not been set for the majority of monitoring piezometers screened in the Permian.

Response triggers for groundwater levels within Quaternary alluvium and Triassic sandstone aquifers are based on the minimal impact considerations in the Aquifer Interference Policy (DPI, 2012). Monitoring frequency and response triggers have been implemented to identify trends that could potentially lead to a private bore being impacted above the Aquifer Interference Policy considerations (i.e. greater than 2 m drawdown). Response triggers, along with monitored groundwater levels in the current reporting period are presented in **Table 22** and **Table 23**.

During the reporting period no impact associated with the MCC has been observed to have occurred on private groundwater users . Groundwater level response triggers were not activated within any of the Triassic strata monitoring bores. However, PZ105C recorded a reduced level of about 0.15m below its baseline range – PZ105C is not impacted by current MCC operations. An obstruction was also observed in PZ101C, preventing groundwater level monitoring during the reporting period and will require rectification in the next reporting period.

During the reporting period the response triggers for groundwater levels within Quaternary alluvium and paleochannel (unconsolidated Tertiary sediments) monitoring bores were not triggered with the exception of PZ058 which was dry for the period. Further investigation of these trends will be undertaken in the next reporting period.

Table 22: Trigger Levels – Triassic Bores

Triassic Piezometer Number	Base of Triassic (mAHD)	Interval/Level Monitored (mbgl)	Minimum Observed Groundwater Level/Pressure (mAHD)		Trigger Level (mAHD)
			Baseline	2015	
PZ101C	371.5	24-30	380.7	381.54	378.7
PZ105C	360.6	22-28	376.9	376.75	374.9
PZ129 (35m)*	387.0	35	388.4	391.27	387.0 (dry)

** PZ129 is a vibrating wire piezometer drilled in Triassic strata to a depth of 74 m. Pressure transducers have been installed at 35 m, 53 m and 74 m (refer Table 7 of GWMP)*

Table 23: Trigger Levels – Alluvium and Palaeochannel Bores

Alluvium Piezometer Number	Interval/Level Monitored (mbgl)	Minimum Observed Groundwater Level/Pressure (mAHD)		Trigger Level (mAHD)
		Baseline	2015	
PZ55	11-14	421.8	423.05	419.8
PZ58	8-11	467.5	Dry	465.8 (dry)
PZ184	6-9	412.0	411.74	410.4 (dry)
PZ187	15-21	415.7	416.32	413.7
PZ188	12-18	415.2	415.80	413.2
PZ201*	7-10	409.5	409.5	TBC
PZ202*	7-10	411.6	411.6	TBC
PZ203*	14-20	403.4	403.4	TBC

**PZ201, 202 and 203 baseline to be developed.*

A comparison of groundwater levels to the previous reporting period and baseline levels is presented in **Table 24**. Continued monitoring of locations not impacted by mining is considered to contribute to the baseline. Standing water level/pressures for all piezometers for the period (including vibrating wire piezometers) are presented in **Appendix 3G** and graphically in **Appendix 3H**.

A regional reduction in standing water levels was observed in Permian overburden and the Ulan seam, consistent with the mining of the Ulan seam at MCO and adjacent operations. Shallow groundwater bores also indicated a reduction in groundwater levels. This was most noticeable in the Murragamba, Eastern creek and Moolarben valleys. Further investigation of these trends will be undertaken in the next reporting period. A number of vibrating wire piezometers (VWP) recording failures have occurred and require further rectification works to return them to service in the next reporting in next period.

Table 24: Comparison of Groundwater Levels to Baseline Levels

Bore	Lithology screened	Baseline Standing Water range (mbtoc)	Minimum Level (mbtoc)		Comments
			Previous Period	2015	
PZ003	Ulan seam	3.13-4.72	3.95	4.27	Consistent with previous monitoring.
PZ39	Siltstones above Ulan seam	8.64-11.16	10.27	10.7	Consistent with previous monitoring.

Bore	Lithology screened	Baseline Standing Water range (mbtoc)	Minimum Level (mbtoc)		Comments
			Previous Period	2015	
PZ40B	Permian OB	6.06-9.17	8.53	8.85	Consistent with previous monitoring.
PZ44	Ulan Granite	7.84-12.60	11.95	11.28	Consistent with previous monitoring.
PZ55	Quaternary Alluvium	3.33-7.63	6.58	6.41	Consistent with previous monitoring.
PZ58	Tertiary Aged Sediment	9.04-10.59	Dry	Dry	Consistent with previous monitoring.
PZ101C	Lower Triassic	21.34-22.25	21.44	21.46	Consistent with previous monitoring. Borehole partially obstructed from 2015.
PZ101B	Permian OB	27.29-39.8	30.34	32.19	Consistent with previous monitoring.
PZ102B	Ulan seam	32.96-53.46	38.8	40.96	Consistent with previous monitoring.
PZ102A	Marrangaroo Conglomerate	33.27-52.91	39.9	41.23	Consistent with previous monitoring.
PZ103C	Lower Triassic	22.70-27.78	26.59	26.76	Consistent with previous monitoring.
PZ103B	Permian OB	24.55-58.03	44.79	49.69	Consistent with previous monitoring.
PZ103A	Ulan seam	50.66-69.22	56.31	58.33	Consistent with previous monitoring.
PZ104	Ulan seam	50.22-58.76	57.08	57.65	Consistent with previous monitoring.
PZ105C	Lower Triassic	10.86-12.09	12.09	12.25	Generally consistent with previous monitoring.
PZ105B	Permian OB	11.17-14.00	12.58	12.74	Consistent with previous monitoring.
PZ105A	Permian OB	16.36-29.72	18.5	19.68	Consistent with previous monitoring.
TB105	Permian OB and Ulan Seam	16.31-29.59	18.38	19.55	Consistent with previous monitoring.
PZ106B	Permian OB	7.90-11.01	11.01	12.57	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam and natural variation.
PZ106A	Permian OB	58.89-87.07	83.48	83.01	Consistent with previous monitoring.
PZ107	Ulan seam	65.28-66.35	65.53	65.49	Consistent with previous monitoring.
PZ109	Permian OB	52.68-54.78	54.58	54.62	Consistent with previous monitoring.
PZ111	Ulan seam	23.67-28.01	28.01	29.5	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
PZ112B	Permian OB	3.71-6.51	5.64	6.01	Consistent with previous monitoring
PZ127	Triassic	Dry	Dry	Dry	Consistent with previous monitoring
	Permian OB	47.2-52.1	52.07	52.27	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
	Permian OB	84.7-101.3	87	89.12	Consistent with previous monitoring.
	Ulan seam	103.4-126.1	109.62	104.6	Consistent with previous monitoring.
PZ128	Triassic	Dry	Dry	Dry	Consistent with previous monitoring.
	Permian OB	28.6-29.8	29.77	29.91	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
	Permian OB	28.6-33.6	33.36	34.04	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
PZ129	Triassic	25.2-29.6	26.35	26.68	Consistent with previous monitoring.

Bore	Lithology screened	Baseline Standing Water range (mbtoc)	Minimum Level (mbtoc)		Comments
			Previous Period	2015	
	Permian OB	27.1-41.2	28.60	29.63	Consistent with previous monitoring.
	Permian OB	36.0-38.8	38.83	38.48	Consistent with previous monitoring.
PZ130	Permian OB	37.7-40.4	37.90	37.76	Consistent with previous monitoring.
	Permian OB	51.6-58.9	58.89	59.19	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
	Ulan seam	79.3-88.2	88.14	88.41	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
PZ133	Permian OB	18.5-20.2	18.88	18.93	Consistent with previous monitoring.
	Permian OB	19.0-20.3	20.30	20.25	Consistent with previous monitoring.
	Ulan seam	58.3-62.4	62.32	61.36	Consistent with previous monitoring.
PZ137	Permian OB	16.38-18.93	18.93	18.45	Consistent with previous monitoring.
PZ149	Permian OB	8.09-11.47	Dry	Dry	Generally consistent with previous monitoring.
PZ151	Ulan seam	60.30-70.49	64.49	66.11	Consistent with previous monitoring.
PZ152	Permian OB	9.40-10.86	10.86	11.01	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.
PZ156	Ulan seam	73.02-83.95	79.88	81.71	Consistent with previous monitoring.
PZ157	Ulan seam	63.52-73.40	68.8	70.37	Consistent with previous monitoring.
PZ170	Permian OB	14.68-16.56	16.17	16.6	Generally consistent with previous monitoring.
PZ174	Permian OB	6.10-7.92	7.33	7.77	Consistent with previous monitoring.
PZ175	Permian OB	3.27-7.03	7.03	6.95	Consistent with previous monitoring.
PZ176	Permian OB	2.24-3.74	3.74	3.48	Consistent with previous monitoring.
PZ177	Permian OB	2.00-4.00	4.0	4.02	Generally consistent with previous monitoring.
PZ179	Triassic	24.6-28.0	25.40	25.98	Consistent with previous monitoring.
	Permian OB	25.8-32.7	26.90	27.57	Consistent with previous monitoring.
	Permian OB	4.3-9.3	6.96	5.25	Consistent with previous monitoring.
	Ulan seam	64.5 - 71.4	69.51	71.12	Consistent with previous monitoring.
PZ184	Tertiary paleochannel	6.19-7.43	7.43	7.65	Generally consistent with previous monitoring. A 0.25m reduction in SWL over the period.
PZ186	Permian OB	8.47-17.21	10.36	11.57	Consistent with previous monitoring.
PZ187	Wilpinjong Creek Alluvium	0.78-2.88	2.88	2.22	Consistent with previous monitoring.
PZ188	Wilpinjong Creek Alluvium	7.29-8.40	7.62	7.82	Consistent with previous monitoring.
PZ189	Permian OB	10.41-14.90	11.45	12.87	Consistent with previous monitoring.
PZ191	Ulan seam	30.96-42.16	42.16	44.79	Generally consistent with previous monitoring. Lowering trend indicative of regional depressurisation of Ulan Seam.

7.4.2 GROUNDWATER QUALITY

Site specific trigger levels for pH and electrical conductivity have been developed for the Moolarben Coal Complex. A comparison of the monitoring results for the period, and a comparison to the previous period and baseline is provided in **Table 25**. Water quality for the period is generally consistent with baseline data and previous monitoring results. Some isolated, not repeated variances were observed and will continue to be monitored. Baseline water quality will be reviewed in the next reporting period. Water quality results from all piezometers are provided in **Appendix 3G**.

Table 25: Comparison of Groundwater pH to Background pH

Bore	Lithology screened	Results Data Range (pH)			Data Range (µS/cm)			Comments
		Baseline	Previous Period	2015	Baseline	Previous Period	2015	
PZ003	Ulan seam	5.7 - 7.2	6.4 – 6.7	6.6-7.1	680-3290	1,684 – 1,807	915-1343	Consistent with previous monitoring.
PZ39	Siltstones above Ulan seam	5.5 - 7.3	6.1 – 7.1	5.7-5.8	480-2190	637 – 867	479-732	Consistent with previous monitoring.
PZ40B	Permian OB	5.5 - 7.1	4.4 – 5.7	4.73-5.4	590-1470	1,188 – 1,216	1013-1165	Consistent with previous monitoring.
PZ44	Ulan Granite	5.6 - 7.5	6.4 – 6.9	6.7-7.2	2430-3660	2,430 – 2,780	1957-2820	Consistent with previous monitoring.
PZ55	Quaternary Alluvium	5.2 - 7.1	5.1 – 5.5	5.2-6.9	240-2291	1,965 – 2,291	1992-2109	Generally consistent with previous monitoring with increasing trend
PZ58	Tertiary Aged Sediment	2.5 - 4.9	3.8 – 3.9	Insufficient water to sample	8120-16580	10,250 – 10,760	Insufficient water to sample	Insufficient water to collect representative sample.
PZ101C*	Lower Triassic	5.9 7.52	7.2– 7.5	No sample - obstruction	530-1010	579 – 605	No sample - obstruction	Obstruction prevented sampling.
PZ101B	Permian OB	6.0 - 8.0	6.3 – 7.2	7.4-7.8	620-1140	720 – 752	663-799	Consistent with recent monitoring.
PZ102B	Ulan seam	5.9 - 7.9	6.6 – 6.8	6.6-7.4	1170-3040	2,430 – 2,530	2073-2156	Consistent with previous monitoring.
PZ102A	Marrangaroo Conglomerate	6.1 - 8.3	6.9 – 7.0	6.8-7.2	620-3160	2,166 – 2,316	1770-2340	Consistent with previous monitoring.
PZ103C*	Lower Triassic	5.1 - 6.8	5.4 – 6.8	5.1-6.6	304-570	304 – 633	278-324	Consistent with previous monitoring.
PZ103B*	Permian OB	5.1 - 7.3	6.2 – 6.3	6.0-6.9	300-710	438 – 460	449-461	Consistent with previous monitoring.
PZ103A	Ulan seam	5.4 - 8.1	6.7 – 7.0	6.5-7.4	380-1070	594 – 641	571-657	Consistent with previous monitoring.
PZ104	Ulan seam	5.9 - 13.1	12.2 – 13.0	12.4-12.7	670-8340	7,370 – 7,510	6680-7740	Consistent with previous monitoring.

Bore	Lithology screened	Results Data Range (pH)			Data Range (µS/cm)			Comments
		Baseline	Previous Period	2015	Baseline	Previous Period	2015	
PZ105C	Lower Triassic	5.1 - 6.8	6.2 – 7.4	5.8-7.6	193-693	193 – 693	183-266	Generally consistent with previous monitoring. Isolated elevated pH reading not repeated. Continue to monitor
PZ105B	Permian OB	5.3 - 7.9	5.2 – 6.4	4.8-6.2	191-660	191 – 255	167-292	Generally consistent with previous monitoring.
PZ105A	Permian OB	5.3 - 7.8	5.8 – 7.3	5.3-6.6	246-810	271 – 291	212-290	Consistent with previous monitoring.
TB105	Permian OB and Ulan Seam	6.8 - 7.8	7.1 – 8.1	7.2-7.9	540-1310	701 – 742	620-719	Consistent with previous monitoring.
PZ106B	Permian OB	4.9 - 8.2	5.1 – 5.9	5.0-5.9	660-6020	1,500 – 2,350	1899-2180	Consistent with previous monitoring.
PZ106A	Permian OB	5.8 - 12.3	8.7 – 9.8	8.6-10.5	630-3530	630 – 734	627-688	Consistent with previous monitoring.
PZ107	Ulan seam	4.7 - 7.1	6.3 – 7.1	6.0-7.2	600–950	665 – 701	600-690	Generally consistent with previous monitoring. Isolated elevated pH reading not repeated. Continue to monitor
PZ109*	Permian OB	6.1 - 7.63	7.3 – 7.5	7.1-7.6	690-1680	1,018 – 1,111	884-1078	Consistent with previous monitoring.
PZ111	Ulan seam	5.8 - 7.0	6.0 – 6.2	6.1-6.7	640-1730	817 – 997	698-752	Consistent with previous monitoring.
PZ112B	Permian OB	4.3 - 6.7	5.1 – 5.4	5.1-5.8	1800-8240	1,895 – 2,190	1804-1806	Consistent with previous monitoring.
PZ137	Permian OB	5.1 - 6.7	4.5 – 5.0	5.5-6.4	780-2285	1,337 – 1,704	1100-1359	Consistent with previous monitoring.
PZ149	Permian OB	5.1 - 6.7	Insufficient water to sample	Insufficient water to sample	N/A	Insufficient water to sample	Insufficient water to sample	Insufficient water to collect representative sample. Has been dry intermittently
PZ151	Ulan seam	5.7 - 7.0	6.2 – 6.5	6.5-7.0	480-1550	670 – 1,268	1314-1340	Consistent with previous monitoring.
PZ152	Permian OB	5.1 - 6.4	5.5 – 5.6	Insufficient water to sample	4840-7020	5,780 – 6,250	Insufficient water to sample	Insufficient water to collect representative sample.
PZ156	Ulan seam	4.3 - 7.1	6.6 – 7.3	5.9-6.8	440-1020	785 – 800	617-811	Consistent with previous monitoring.

Bore	Lithology screened	Results Data Range (pH)			Data Range (µS/cm)			Comments
		Baseline	Previous Period	2015	Baseline	Previous Period	2015	
PZ157	Ulan seam	5.9 - 7.6	6.5 – 7.4	6.4-7.2	470-855	804 – 855	720-891	Generally consistent with previous monitoring. Isolated elevated EC reading in 2015. Not repeated.
PZ170	Permian OB	5.4 - 6.7	6.5 – 7.0	6.2-6.3	2200-6920	4,810 – 6,920	4390-5290	Consistent with previous monitoring
PZ174	Permian OB	5.4 - 6.5	6.2 – 7.2	5.8-6.3	7110-13440	9,950 – 13,440	8270-10950	Generally consistent with previous monitoring.
PZ175	Permian OB	5.3 - 7.0	6.5 – 7.3	6.5-7.1	1120-17380	3,840 – 15,870	6050-17570	Generally consistent with previous monitoring. Isolated elevated EC reading in 2015. Not repeated
PZ176	Permian OB	5.0 - 7.8	6.0 – 6.3	6.4-6.4	650-1260	664 – 738	289-520	Consistent with previous monitoring
PZ177	Permian OB	5.8 - 6.7	6.6 – 7.2	6.6-7.3	1620-8130	5,830 – 6,160	2710-7800	Generally consistent with previous monitoring. Recent slight increase in pH.
PZ184	Tertiary paleochannel	3.9 - 5.6	3.3 – 3.8	3.0-3.6	3700-6950	5,050 – 6,950	4770-7600	Generally consistent with previous monitoring. pH has fallen below range. Not impacted by MCO operations.
PZ186	Permian OB	5.8 - 8.2	6.3 – 8.2	6.3-7.1	345-520	345 – 354	293-483	Consistent with previous monitoring
PZ187	Wilpinjong Creek Alluvium	5.3 - 8.2	5.6 – 8.2	5.5-6.4	150-430	151 – 241	168-189	Consistent with previous monitoring
PZ188	Wilpinjong Creek Alluvium	4.6 - 8.4	5.5 – 8.4	6.0-6.7	149-1020	170 – 266	182-265	Consistent with previous monitoring
PZ189	Permian OB	5.6 - 7.2	5.6 – 7.2	6.2-6.9	340-530	340 – 477	305-340	Consistent with previous monitoring
PZ191	Ulan seam	3.9 - 6.9	4.2 – 6.8	5.9-6.2	210-620	388 – 505	442-535	Consistent with previous monitoring

* Level reduced below current trigger.

7.4.3 ACTIONS FOR NEXT REPORTING PERIOD

During the next reporting period the following actions are proposed:

- The Groundwater Management Plan will be reviewed;
- The future monitoring network will be reviewed for the conceptual life of the mine,
- Piezometers that are out of order will be investigated with a view to returning them to service where practicable;
- A spring and seep census survey will be completed, including the upper reaches of Eastern Creek and Goulburn River around the northern and north-western boundary of UG4; and,
- Baseline monitoring of PZ201, 202 and 203 to develop SWL, pH and electrical conductivity triggers.

8.0 REHABILITATION

The MCO Rehabilitation Management Plan (RMP) was updated and approved in September 2015. The RMP was developed by MCO with input from experienced and qualified expert (Dr Fruendenberger of the Australian National University) and in consultation with the NSW Department of Planning and Environment (DP&E), the Department of Primary Industries Water (DPI Water)), NSW Office of Environment and Heritage (OEH), the Mid-Western Regional Council (MWRC) and the Community Consultative Committee (CCC) for the Moolarben Coal Complex. in accordance with Condition 68, Schedule 3 of PA 05_0117 (as modified) and Condition 56, Schedule 3 of PA 08-0135.

The approved MOP was progressively updated during the reporting period. MOP replacement was developed by MCO consistent with environmental approval documentation, Mining Lease Conditions and *ESG3: Mining Operations Plan (MOP) Guidelines September 2013* (DTIRIS-DRE, 2013) and approved in September 2015. A further minor MOP amendment was approved in December 2015 to reflect amendments in active mining and infrastructure areas.

The key RMP and MOP updates to the plan include the inclusion of management and mitigation measures for Stage 2 of the project.

Table 26 provides a summary of rehabilitation activities during the reporting period. MCO undertook the following rehabilitation activities in accordance with the RMP and MOP:

- Vegetation Clearance and topsoil stripping;
- Seed collection;
- Rehabilitation Monitoring; and,
- Rehabilitation works.

8.1 MINING AND REHABILITATION STATUS

The mining and rehabilitation status is presented in **Table 26**. The land preparation activities undertaken in the period and proposed areas in the next period are presented in **Figure 3**. The status of mining and rehabilitation is presented in **Figure 4**. The status of mining and rehabilitation, and the agreed post rehabilitation land-use is presented in **Figure 5**.

Table 26: Mining and Rehabilitation Status

Mine Area Type	Previous Reporting Period (2014)	This Reporting Period (2015)	Next Reporting Period (2016)
Total Mine Footprint	499	921	1241
Total Active Disturbance	379	714	981
Temporary Rehabilitation	25	56	56
Land being Prepared for Rehabilitation	15	0	61
Land under active Rehabilitation	105	151	199
Completed Rehabilitation	0	0	0

8.2 VEGETATION CLEARANCE AND TOPSOIL STRIPPING

Vegetation clearance was undertaken in accordance with the Vegetation Clearance Protocol Landscape Management Plan and GDPs within the OC2, OC4 and infrastructure areas (**Figure 3**) as described in **Section 6.5.1**. Stripped topsoil was either placed in temporary stockpiles for later use, or placed directly on areas prepared for rehabilitation.

8.3 SEED COLLECTION

Native seed collection continued throughout the period with seed harvested from MCO owned lands. All activities were undertaken in accordance with the requirements of the Florabank Guidelines (2000). At December 2015 MCO's seed bank contained 454,655 grams of native seed for use in rehabilitation activities across the MCC.

8.4 REHABILIATION MONITORING

8.4.1 ECOSYSTEM FUNCTION ANALYSIS

Landscape Function Analysis

Landscape organisation (LO), a measure of the proportion of the landscape occupied by resource accumulating patches, ranged from 0.47 (site R5) to 0.91 (site R6); average 0.69 across all rehabilitation sites. Analogue sites ranged from 0.83 to 0.99 for analogue sites (average LO 0.934) (**Figure 13**). Bare soil percentages have reduced across all sites. Trees/shrubs, and microhabitat features such as logs and rocks, continue to contribute to a limited proportion of the rehabilitation landscape. Five of the seven rehabilitation sites previously monitored, showed an increase in total site stability between spring 2014 and spring 2015. Stability in the newly established sites (R9 to R16) was roughly equal to, or already exceeding, that in the respective Ironbark analogue sites. Monitoring sites are presented in **Appendix 2**.

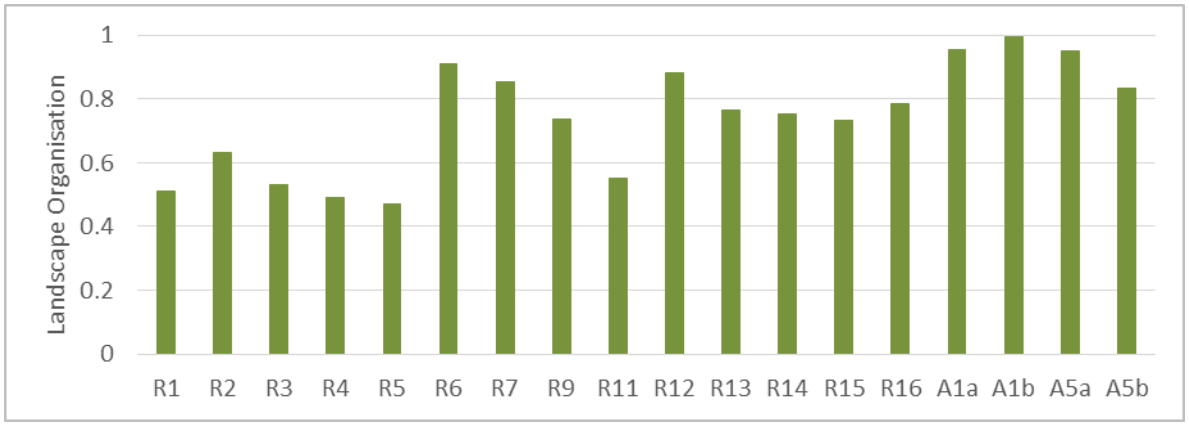


Figure 13: Landscape Organisation for each LFA transect, spring 2015 (analogues: spring 2014)

Vegetation Dynamics

Sites R1 and R2 (2010 rehabilitation) continue to have low densities (less than 50 stems per hectare) of tree species (*Eucalyptus* and *Angophora*); as do the newly established sites R11, R12, R13 and R15. In contrast, sites R3, R5, R6 and R9 have particularly high stem densities that are expected to naturally self-thin as the rehabilitation matures. The majority of sites appear to be developing towards shrubby Box – Gum, Box – Ironbark, or Grey Gum dominated woodland/forest.

Floristic Monitoring

Autumn native species richness continues to increase in all of the previously monitored (R1-R7) sites. Spring native species richness has either increased or remained consistent between 2014 and 2015 except at R1 (which decreased from 34 to 32 native species over this time period) (**Figure 14**).

A number of individuals of *Leucochrysum albicans* var. *tricolor* (Hoary Sunray), listed as endangered under the EPBC Act, have been observed growing within the March 2012 rehabilitation area.

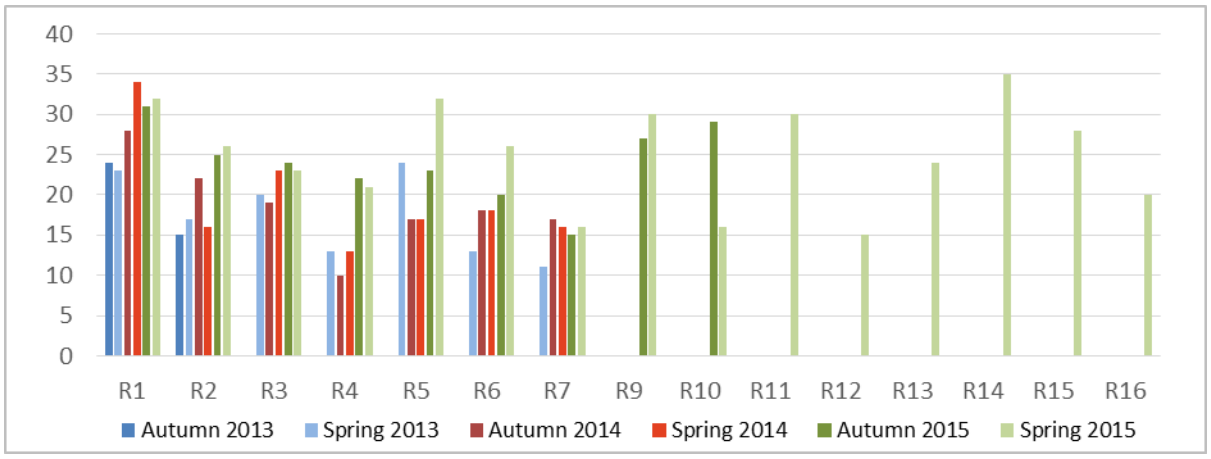


Figure 14: Species Richness (autumn 2013 – spring 2015)

Vegetation Structure and Growth

Noticeable growth of eucalypt species has occurred across much of the February 2012 rehabilitation area between spring 2014 and spring 2015, particularly on the previously sparser lower slopes, and around piles of large woody debris (LWD). *Acacia* dominated understoreys continue to develop and in some areas, senescence of these short lived species has already begun. The November 2010 rehabilitation areas have consistently strong growth and high densities of understorey *Acacia* species, however these areas have low densities of overstorey (eucalypt) species. The suite of eucalypt species that has established within the OC1 rehabilitation areas lacks a strong component of target Box Gum Woodland species.

Ground cover is less than 10% across the majority of November 2010, highly variable in February 2012 rehabilitation areas, and is dominated by *Cynodon dactylon* (Couch). Macropod grazing pressure may have contributed to this low grass cover. Sites in the more recently established rehabilitation areas (sites R10 – R16) generally had higher ground cover, largely due to the persistence of sown cover crop species.

Fauna Monitoring

Overall fauna species richness recorded was lower during spring 2015 than spring 2014 despite the additional survey effort, however higher compared to spring 2013 monitoring. Birds were the most abundant species observed onsite during the spring 2015 monitoring (**Figure 15**). The presence of both grassland and woodland associated bird species reflects the mosaic of vegetation structure and development stages across the rehabilitation area, and that areas of the rehabilitation are maturing and potentially trending towards woodland communities. Furthermore, the presence of the EPBC listed migratory species Latham's Snipe, a freshwater wetland species, highlights the importance of facilitating the development of diverse habitat features (and associated topography and drainage patterns) such as ephemeral wetlands.

The threatened microbat species *Miniopterus schreibersii oceanensis* (Eastern Bentwing-bat), listed as vulnerable under the NSW *Threatened Species Conservation Act 1995* (TSC Act), was recorded within the rehabilitation area for the third year in a row. Spring 2015 was the first monitoring period in which this species was recorded at all monitoring sites (a total of 10 positive recordings).

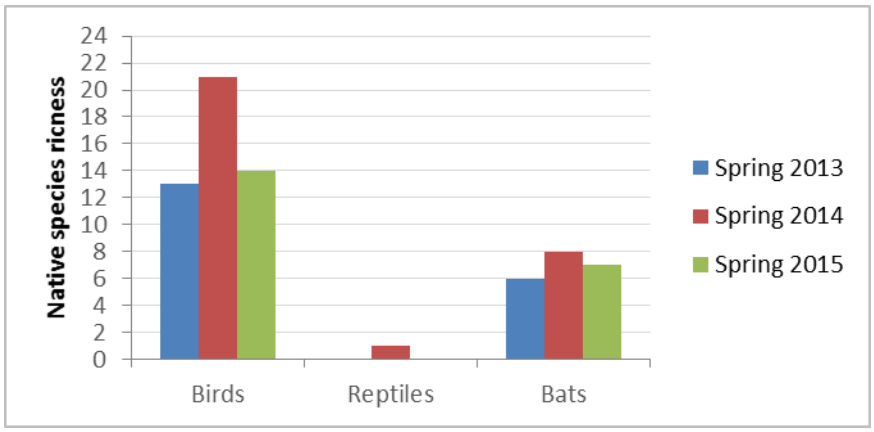


Figure 15: Comparison of target fauna species

Visual Monitoring

Visual monitoring observed that generally the OC1 rehabilitation area has limited to no disturbances, with weeds occurring as individual plants or small patches rather than strong infestations. The noxious weed *Senecio madagascariensis* (Fireweed) and *Hypericum perforatum* (St John's Wort) were observed. Numerous occurrences of Feral Pig activity was incidentally recorded. No rabbit or fox were observed. Minor to moderate sheet erosion and rills were observed on steeper areas. Despite this, and low ground cover in numerous areas, the majority of visual transects scored 'good' for soil stability, surface nature and erosion. Microhabitat was generally poor across the site. LWD has been placed in various locations across the rehabilitation area, and consistent with previous years, this tends to be associated with greater floristic and fauna diversity.

Rehabilitation performance and changes since 2014 are presented in **Figure 16** below.

Geochemical Monitoring

Surface soil pH (0-100mm) in the majority of plots was within the range of the commonly occurring Yellow Podzolic soil of the Moolarben mine area (Jammel, 2006) (4.5 – 5.5 pH), however site R10 (pH 7.3) is tending towards slightly alkaline. Sub-surface pH was slightly acidic (< 5.0) in sites R11 and R12. Electrical conductivity, a measure of soil salinity, indicates moderate to high salinity in four sites: R10 (surface only), R11, R12, and R16 (surface only). Surface salinity was particularly high in sites R11, R12 and R16.

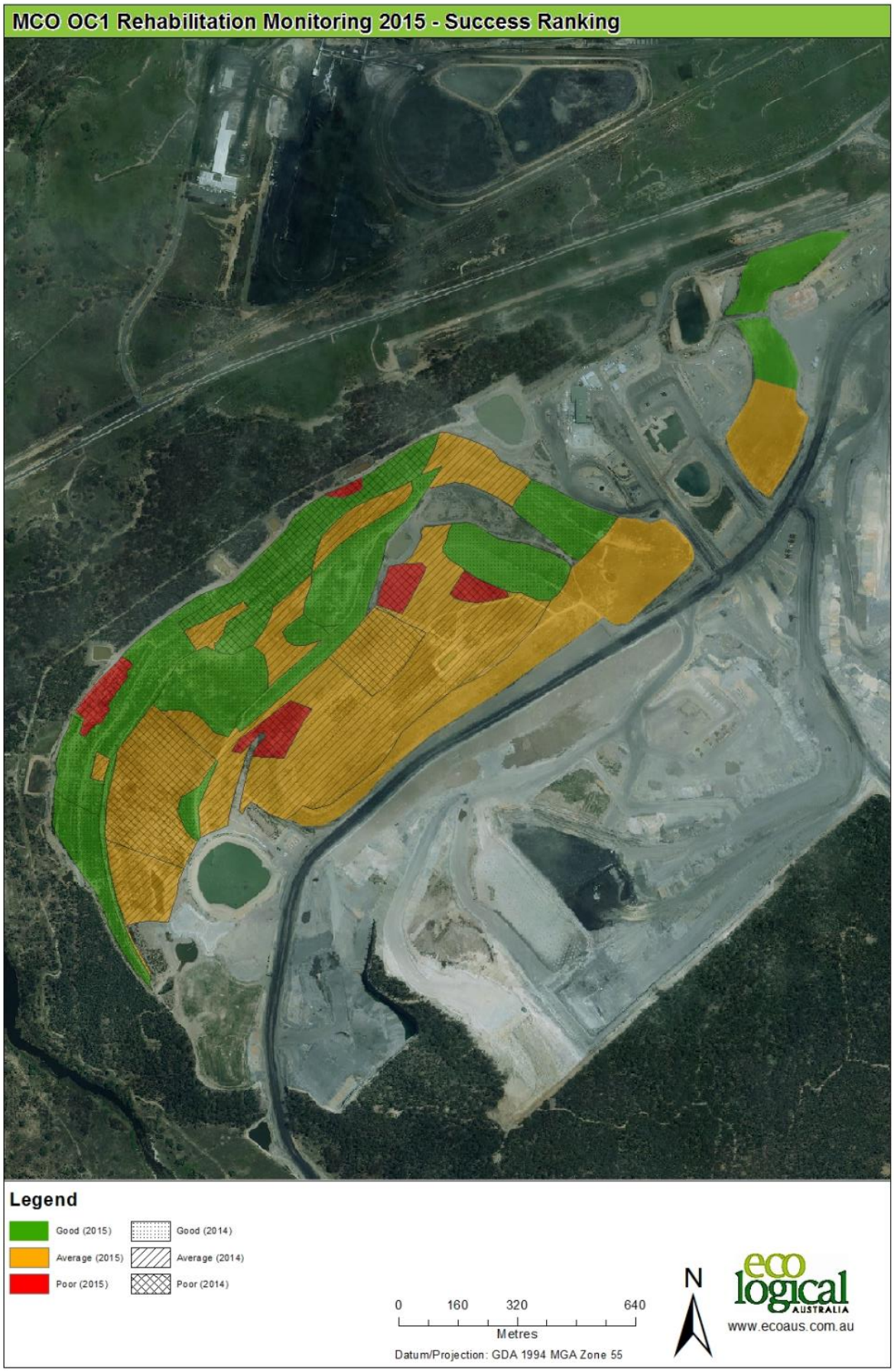


Figure 16: Rehabilitation Progress 2014 to 2015.

8.5 REHBILITATION WORKS

During the period landform shaping, topsoiling and seeding was conducted on 18ha of land in OC1 and OC2. In addition, 15ha was temporary rehabilitation following the completion of the CHPP water upgrade works. Construction areas associated with the Stage 2 project were progressively rehabilitated minimise the disturbance areas. Rehabilitation of many of these areas will be temporary with future disturbance to occur with mine progression.

Areas within the stage 2 project have been destocked, including areas proposed to be mined and areas not to be mined. This included the entire Murragamba, Eastern, and Wilpinjong creeks within MCO controlled land.

8.6 DECOMMISIONING WORKS

During the period the Main administration office, first aid facility and toilet block was decommissioned in accordance with AS 2601-2001.

8.7 ACTIONS DURING NEXT PERIOD

Rehabilitation actions to be progressed in the next period include:

- Continued progressive rehabilitation;
- Continued weed and feral animal control, particularly feral pigs, fireweed and St John's Wort; and,
- Continued monitoring of rehabilitation areas with poor cover or density with consideration of follow-up seeding and/or wood debris placement.

9.0 COMMUNITY

9.1 COMMUNITY ENGAGEMENT

During 2015, MCO continued to foster positive relationships with the local community through ongoing financial support provided to a range of community groups and events – including – local schools, Mudgee Little Athletics, Windeyer Rural Fire Service, Watershed Landcare Group, Mudgee Catholic Playgroup, MudFest, Mudgee Rotary, Rylstone Show, Cudgegong Cruisers, and Sculptures in the Gardens. In total, MCO provided $**144,550** in community donations during 2015 to 53 community groups and events (**Appendix 5**).

Community/stakeholder related activities undertaken during the reporting period include:

- Moolarben Spirit Awards Program;
- Mine tour/career talks with each of the 5 local High Schools and University of NSW students;
- Mine visit/tour with a local aged care facility;
- Vocational student placement from Wollongong University;
- Provide use of MCO training facilities to RFS and other local mines;
- Presentation to Mudgee Chamber of Commerce;
- Careers information evening for 2016 apprentices; and,
- Direct engagement with nearby landholders.

Moolarben continued to provide the community with information on its website (www.moolarbencoal.com.au). Information available included project approvals, CCC meeting minutes, community complaint records, environmental monitoring information, environmental audits, environmental management plans and annual environmental management reports.

MCO continued to operate a free-call 24-hour Environment and Community Complaints Hotline (1800 657 639) during the reporting period to allow the community to contact the operation directly to ask questions or raise concerns about mining activities.

9.2 COMMUNITY COMPLAINTS

In accordance with Condition M6.2 of EPL 12932, MCO maintains a 24 hour Environment and Community Complaints Hotline (1800 556 484). This Hotline is to respond to any complaint from neighbouring residents or interested stakeholders. The Hotline is advertised in the local media and is also available on the MCO website and in the community newsletters.

MCO has developed a Community Complaints Procedure which details how to receive, respond to and record and action any community complaint received to site. This procedure also outlines the reporting requirements relating to community complaints, including:

- Monthly reporting of community complaints on the MCO website;
- Discussion of community complaints as part of the operational performance provided during CCC meetings; and,
- A summary of complaints is provided in the Annual Review and Annual Return (as part of EPL reporting).

During 2015, a total of 286 complaints were received in relation to MCO Operations by 21 complainants. All complaints are investigated and reported on the Moolarben Coal website (www.moolarbencoal.com.au). 70% of complaints were received by three complainants. Noise remained the primary issue of concern (96% of complaints) (**Figure 17**).

A comparison of complaints to previous years is presented in **Table 27**. The increase in noise complaints can be attributed to a progression of mining activity to the south and the approval and commencement of the Stage 2 project. A reduction in blast related complaints was recorded during the period. A register of complaints is provided in **Appendix 6**.

The ongoing use of Mining and Production Environmental Assistance continues to provide real-time feedback to the mining operation, and mine planning to allow for protected work areas to be developed. Ongoing community liaison and consultation has continued.

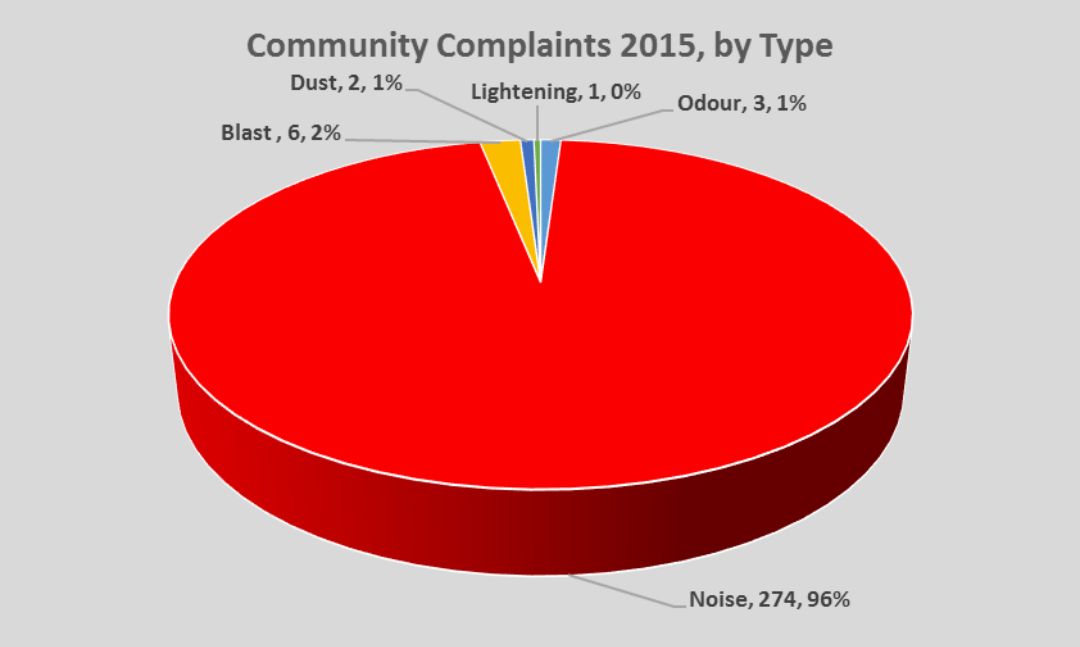


Figure 17 : Community Complaints 2015 – Breakdown by Type

Table 27: Comparison of Community Complaints

Reporting Period	Noise	Blasting	Dust	Lighting	Water	Other	Total
2010-2011	110	3	0	0	0	0	**113**
2011-2012	334	17	2	0	3	3	**359**
2012-2013	117	0	1	0	0	2	**120**
2013-2014	239	12	2	0	0	3	**256**
2015	274	6	2	1	0	3	**286**

9.3 COMMUNITY CONSULTATIVE COMMITTEE (CCC)

During 2015, the Community Consultation Committee was reconstituted following the approval of Stage 2 project (Project Approval (08_0135)).

Members of the reconstituted MCO CCC for 2015 were approved by the NSW Department of Planning and Environment and are presented in **Table 28**. MCO conducted three CCC meetings during the reporting period with summaries provided in **Table 29.** Meetings were chaired by an independent chairperson with the minutes being available on the MCO website.

Table 28: CCC Members 2015

Name	Representing	Name	Representing
Aleshia Lonsdale	Mudgee Local Aboriginal Land Council	Annette Riley	Ulan Public School (Principal)
Andrew Palmer	Mudgee Chamber of Commerce	David Stokes	Local Landholder
Julia Imrie	Local Landholder and Business Owner	Max Walker	Councillor, Mid-Western Regional Council
Bev Smiles	Mudgee District Environment Group	Mr John Turner	Independent Endorsed by DP&E in March 2014 as CCC Chairperson
MCO – Environment and Community Manager (and/or representative)	Moolarben Coal Operations	MCO – Environmental Coordinator	Moolarben Coal Operations

Table 29: CCC Meeting Summary

Date	Meeting Summary
6 May	CCC meeting. First meeting of reconstituted committee following the approval of Stage 2 Project. Presentation of 2013-2014 AEMR Presentation of The Drip Deed General update
4 Aug	Update on Ulan-Wollar Road, stage 2 development General update
10 Nov	Tour of Open Cut areas 1, 2 and 4 General update Christmas dinner was provided by MCO

10.0 INDEPENDENT AUDIT

In accordance with Condition 9, Schedule 5 of PA 05_0117 (as modified) and Condition 9, Schedule 6 of PA 08_0135, MCO were to commission and pay the full cost of an Independent Environmental Audit of the project, by 31 December 2015, (and every 3 years thereafter, unless the Secretary directs otherwise). In December 2015, MCO commissioned Trevor Brown and Associated to conduct the required Independent Audit in accordance with the Project Approvals. The next Independent Audit will be required by December 2018 (unless otherwise directed by DP&E).

In summary, the Independent Environmental Audit found that Moolarben Coal had generally achieved a high level of compliance with the conditions of Project Approval 05_0117, Project Approval 08_0135, EPL 12932, Water Licences and Mining Lease environmental conditions. A review of the Environmental Assessments and Modifications prepared for the project found that the development is being constructed and operated generally in accordance with the project described in the Environmental Assessments.

Table 30 provides a summary of MCO's response to the Audit Action list.

Table 30: Independent Audit Action List and MCO Response.

IEA Reference	Recommendation	*Response*
Recommendations		
Project Approval 05_0117 Schedule 5 condition 4 and Project Approval 08_0135 Schedule 6 condition 4,	It is recommended that future Annual Reviews be prepared with consideration of the format and content of the recently released Annual Review Guidelines (October 2015).	*MCO will prepare future Annual Reviews in consideration of the Annual Review Guideline and requirements of consents, Mining leases and licences.*
Blast Management Plan	It is recommended that management of blasts to reduce potential of fume generation should be reviewed in relation to the Blast Fume Management Strategy by ensuring the quality of product used for the blasts is checked before the blast is initiated and meets the gassing specifications provided by the supplier.	*No reportable blast fume events have occurred since September 2014. Explosives type and density are checked during loading.* *The Blast Management Plan will be reviewed and where required revised to the satisfaction of the Secretary (DP&E).*
Project Approval 05_0117 Schedule 3 condition 70 Energy Savings Action Plan	It is recommended that the Energy Saving s Action Plan be reviewed to identify any energy saving measures which may be implemented on site to reduce the energy use in relation to the mining operations. The ESAP is also to include a program to monitor the effectiveness of the measures to reduce energy use.	*A range of energy efficiency activities have been undertaken by MCO including the progressive move to LED lighting (fixed and mobile), maintenance regime for fixed and mobile plant to improve operational efficiently, mine planning review to improve operational efficiencies. MCO will revise the Stage 1 Project Approval (05_0117) required ESAP*
Biodiversity Offset	It is recommended that the staged development of the Biodiversity Management Plan and offset management to meet the long term security requirements of the Project Approval and the EPBC Approvals conditions, be progressed in general accordance with the correspondence submitted to DP&E on 8 December 2015 to secure the biodiversity offset areas.	*MCO agrees that the Biodiversity Management Plan, including offset management, will be progressed as proposed.*
Improvement Opportunities		
Opportunity 1	As development of rehabilitation performance indicators and completion criteria is an iterative process, the completion criteria should be reviewed and revised where necessary using monitoring results to refine the completion criteria in future revisions of the Rehabilitation Management Plan and the Mining Operations Plan in accordance with clause (i) Explanatory Note 2 – Rehabilitation and Mine Closure in ESG3: Mining Operations Plan (MOP) Guidelines September 2013 NSW Trade and Investment	*The Rehabilitation Management Plan and Mining Operations Plan will be reviewed and revised where necessary in consideration of the Mining Operations Plan Guidelines (NSW T&I 2013)*
Opportunity 2	The testing of subsoil and spoils should be refined to identify reactive soils and guide amelioration requirements to reduce the risk of tunnel and gully erosion in rehabilitated areas and creek line restoration.	*MCO will revise the Rehabilitation Management Plan to include representative sampling of subsoils and spoil to identify reactive soils and amelioration requirements.*

IEA Reference	Recommendation	*Response*
Recommendations		
Opportunity 3	As the final design of the Murragamba and Eastern Creek diversions are being developed, consideration should be given to removing the channel banks from rehabilitated areas once adequate grass cover has been established (≥ 70%), to re-establish sheet flow conditions to minimise the potential for tunnel and subsequent gully erosion. Landform stability using this approach can be verified via spoil characterisation, the use of an erosion prediction model and landform evolution models (such as WEPP and SIBERIA) can be useful relatively low cost tools for assisting landform design planning.	*MCO will develop detailed diversion design plans in consultation with technical experts and relevant government authorities and be finalised prior to the commencement of the diversion works.* *As part of the detailed design, MCO will consider removing channel banks, where topography allows, once sufficient cover is established to establish sheet flow.*
Opportunity 4	In future revisions of the Rehabilitation Management Plan, Biodiversity Management Plan and Mining Operations Plan the management and mitigation measures to be undertaken on site should be refined to provide clear direction as to what management and mitigation measures will be implemented to the various areas of the site as the nature of the rehabilitation and restoration of the final landform and land uses are determined.	*MCO considers the Rehabilitation Management Plan and Mining Operations plan provide appropriate management and mitigation measures. The Biodiversity Management Plan will be developed in a staged process as agreed with the DP&E.* *In correspondence (dated 25 May 2015), the OEH advised Yancoal that the RMP:"is comprehensive and detailed, providing the necessary guidance for restoring potentially ecologically sound vegetation communities and threatened species habitat to mined areas within the Moolarben Coal Complex".* *The RMP was also independently reviewed by Dr David Freudenberger, an expert in landscape restoration, ecosystem management and wildlife ecology with the Australian National University and former scientist with the Commonwealth Scientific and Industrial Research Organisation's (CSIRO) Wildlife and Ecology division. Dr Freudenberger concluded that the RMP: "should prove to be a highly useful long term guide for restoring the ecological function, structure and composition of the mined surfaces".* *Also that "performance indicators are readily measurable and the completion criteria are achievable and ecological robust".* *MCO will progressively review and where necessary revise the Rehabilitation Management Plan, Biodiversity Management Plan and Mining Operations Plan to refine the management and mitigation measures to include learnings from rehabilitation performance whilst reflecting development consent commitments*

11.0 INCIDENTS & NON COMPLIANCES

There was one reportable incident during the period.

- On 6 June, a portion of the OC1 highwall collapsed into an area of the Moolarben Coal open cut pit. Road blocks were established as a precautionary measure and local authorities, the Council and government agencies were notified in accordance with MCO reporting requirements. The road was closed by Council to allow necessary geotechnical and safety studies to be conducted. A bypass was elected to be constructed by Council at MCO's expense until the area adjacent to the slip was backfilled. The failure mechanism was localised liquefaction causing overstressing of existing, localised fissured clays and infill sands. Moolarben backfilled the area and on 28 July the original road was re-opened by Council. An investigation by DRE was conducted.

Minor administrative non-compliances during the reporting period were:

- Non-continuous monitoring of TEOMs due to power supply interruption and relocation. No adverse impacts occurred.
- Blast Monitor (BM01) did not record vibration or overpressure results for a blast due to a power supply failure. No adverse impacts occurred.
- One round of dust monitoring was not completed at DG12 following approval of the revised Air Quality Management Plan. No adverse impacts occurred.
- The Energy Savings Actin Plan has not been updated to include Stage 2.

No official cautions, warning letters, or penalty infringement notices were received or prosecution proceedings undertaken by any regulatory agency during the period.

12.0 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following is a summary of measures to be implemented in the next reporting period.

- Review and revise as necessary all environmental management plans;
- Review real-time validation monitoring results following 12 months of data collection;
- Modify Ulan School blast monitor to include mains power connection;
- Relocation of TEOM05 further north, including updated EPL;
- Update the Energy Savings Action Plan;
- Baseline weed and feral mapping of vegetation management zones 1 & 2;
- Continued monitoring, including autumn baseline monitoring of EPBC (2007/3297) offsets;
- Assist NPWS with the proposed hazard reduction burn;
- Review and revise the groundwater monitoring triggers;
- The future monitoring network reviewed for the conceptual life of the mine;
- Investigate and repair as necessary out of service piezoemeters;
- Baseline monitoring of PZ201, PZ202 and PZ203 to establish triggers;
- Spring and seep census including the upper reaches of Eastern Creek and Goulburn River around the northern and north-western boundary of UG4; and,
- Survey of the Powers Creek Conservation Area by June 2017.