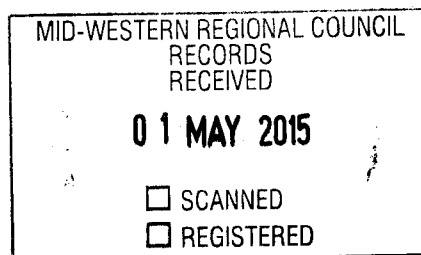


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30 April 2015

Mr Brad Cam
General Manager
Mid-Western Regional Council
86 Market Street
MUDGEES NSW 2850

Attention: Ms Catherine Van Lauren



Dear Brad,

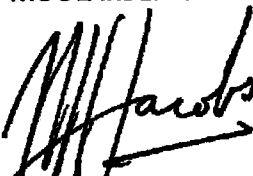
MOOLARBEN COAL COMPLEX: OC4 SOUTH-WEST MODIFICATION - STAGE 1 PROJECT APPROVAL (05_0117) AND STAGE 2 PROJECT APPROVAL (08_0135)

Please find enclosed two (2) hard copies and fifteen (15) electronic copies of the Moolarben Coal Complex OC4 South-West Modification Environmental Assessment.

We understand the Department of Planning and Environment (DP&E) has contacted you with regard to the forthcoming exhibition of the Environmental Assessment.

Please do not hesitate to contact me on (02) 8583 5910 should you wish to discuss further.

Yours sincerely
MOOLARBEN COAL OPERATIONS PTY LTD



MARK JACOBS
General Manager - Environment and Community



Moolarben Coal Complex OC4 South-West Modification

Environmental Assessment

Environmental Assessment

Attachment 1 - Stage 1 Project Approval (05_0117)

Attachment 2 - Stage 2 Project Approval (08_0135)

Attachment 3 - Site Verification Certificate

Appendix A - Noise Assessment

Appendix B - Air Quality Assessment

Appendix C - Flora and Fauna Impact Assessment

Appendix D - Surface Water Assessment Review

Appendix E - Aboriginal Cultural Heritage Assessment



**MOOLARBEN COAL COMPLEX
OC4 SOUTH-WEST MODIFICATION**

ENVIRONMENTAL ASSESSMENT

MOOLARBEN COAL PROJECT STAGE 1
PROJECT APPROVAL (05_0117) [MOD 11]

MOOLARBEN COAL PROJECT STAGE 2
PROJECT APPROVAL (08_0135) [MOD 1]



APRIL 2015
Project No. MCM-13-02
Document No. 00670386.docx

EXECUTIVE SUMMARY

ES1 BACKGROUND

The Moolarben Coal Complex is located approximately 40 kilometres north of Mudgee in the Western Coalfields of New South Wales (NSW) (Figure ES1).

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

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified and Project Approval (08_0135) (Moolarben Coal Project Stage 2).

Environmental management and monitoring at the Moolarben Coal Complex is conducted in accordance with a range of management plans required in accordance with Project Approvals (05_0117) and (08_0135).

ES2 MODIFICATION OVERVIEW

This Environmental Assessment has been prepared by MCO to support a request to modify Project Approvals (05_0117) and (08_0135) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (the OC4 South-West Modification).

Following a review of the mining sequence and associated infrastructure layout requirements, MCO has identified opportunities to enable more efficient access to the OC4 resource and management of waste rock in OC1.

As such, the OC4 South-West Modification proposes the following:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure ES2);
- adjustments to the site water management system to contain surface water runoff from the OC4 south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint) (Figure ES2); and
- backfilling of the northern OC1 final void to approximate pre-mining elevations (Figure ES2).

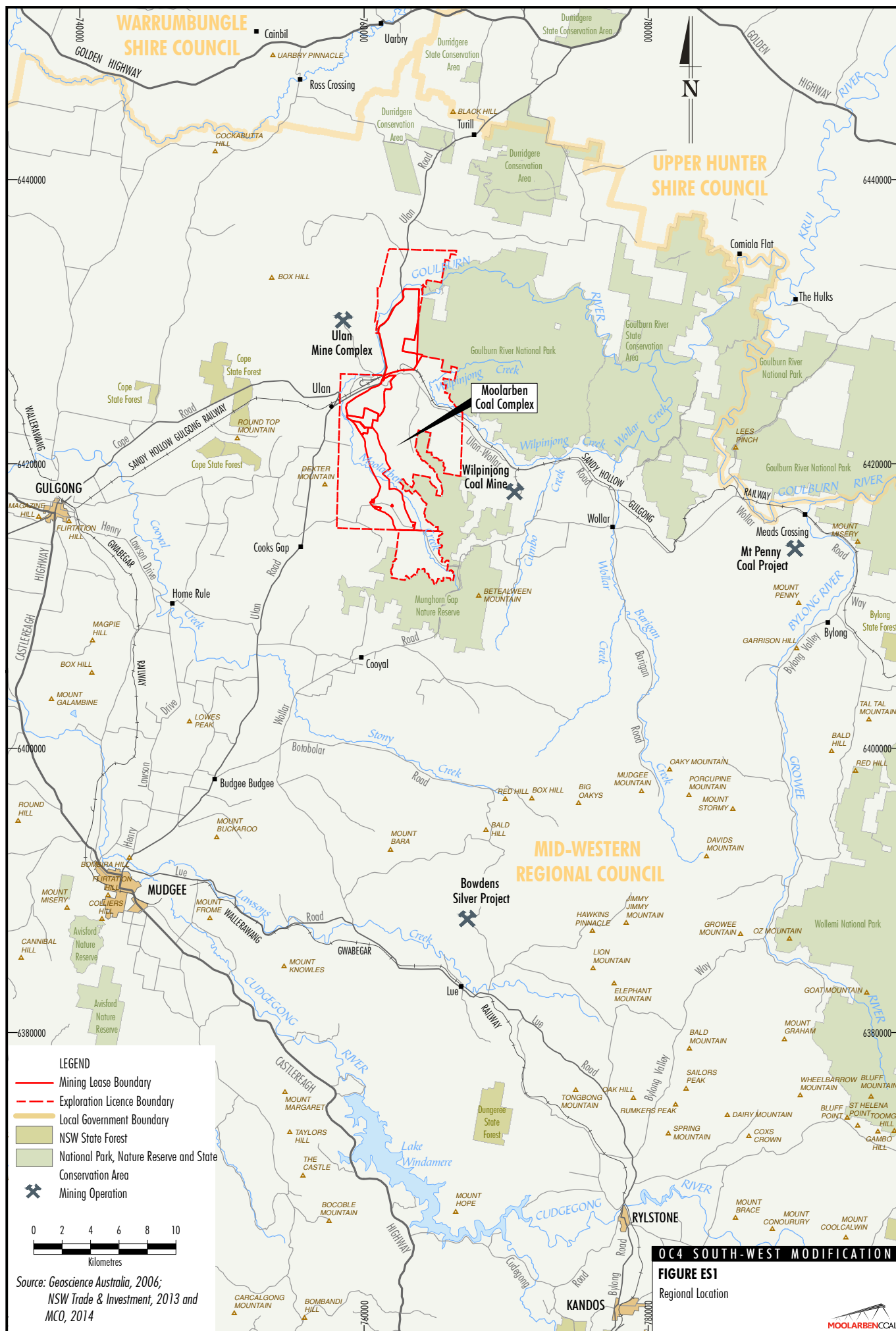
Other components of the approved Moolarben Coal Complex would **not change** as a result of the OC4 South-West Modification, including:

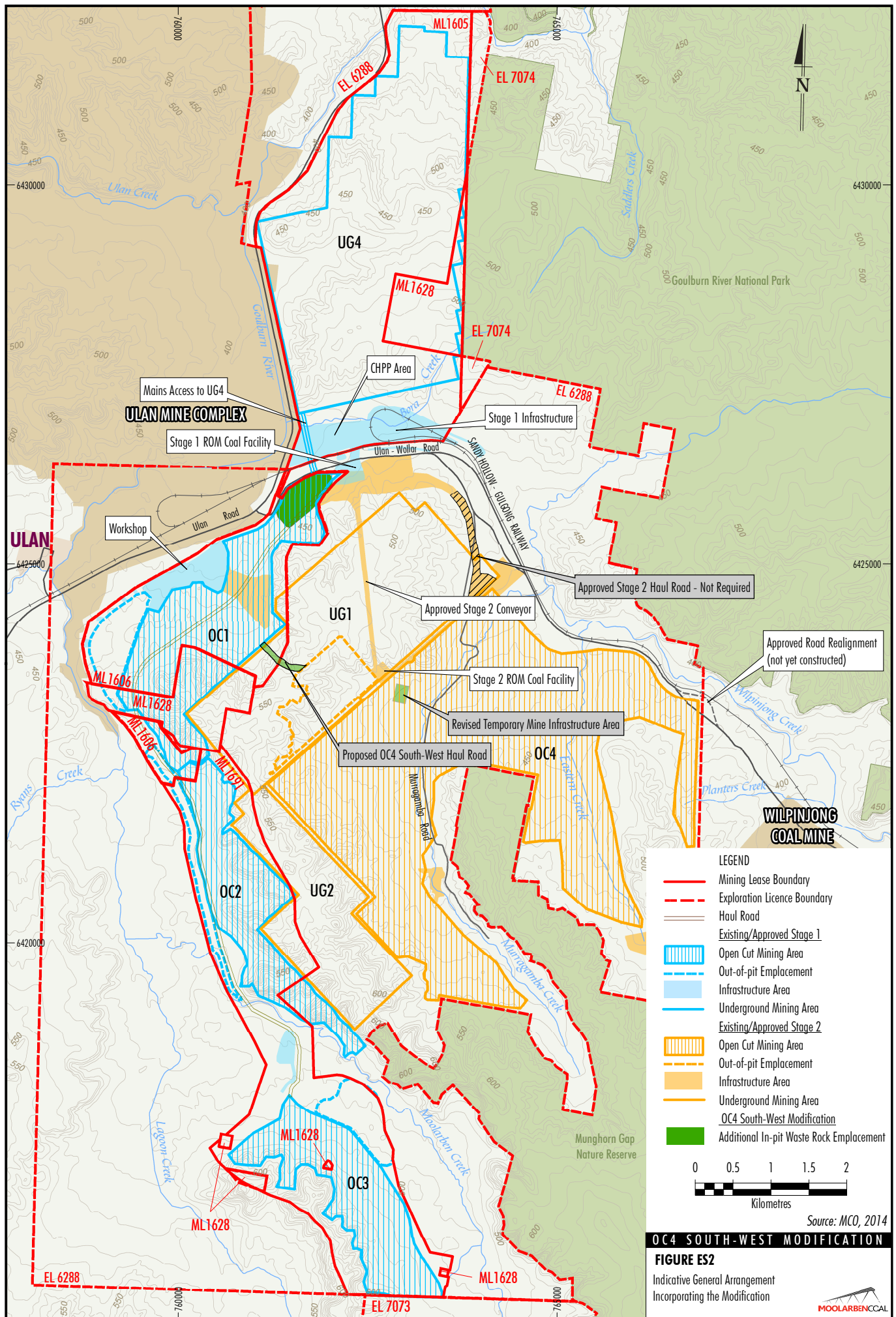
- operational mine life;
- hours of operation;
- blasting limits;
- coal extraction limits;
- coal processing, production and transport limits;
- number of full-time employees; or
- Ulan-Wollar Road site access.

ES3 ENVIRONMENTAL REVIEW AND MODIFICATION JUSTIFICATION

To assess the potential environmental impacts of the OC4 South-West Modification, a number of environmental reviews were completed, along with the following supporting specialist reports:

- Noise Assessment (prepared by SLR Consulting);
- Air Quality Assessment (prepared by Todoroski Air Sciences);
- Flora and Fauna Impact Assessment (prepared by EcoLogical Australia);
- Surface Water Assessment Review (prepared by WRM Water & Environment); and
- Aboriginal Cultural Heritage Assessment (prepared by Niche Environment & Heritage).





The environmental reviews indicate that, with the continued implementation of management and monitoring measures, potential environmental impacts could be managed within the currently approved environmental performance limits specified in Project Approvals (05_0117) and (08_0135).

In addition, there would be potential environmental benefits resulting from the OC4 South-West Modification associated with:

- Replacement of the approved haul road with the shorter proposed OC4 south-west haul road, resulting in:
 - reduction in total surface disturbance of approximately 13.4 ha;
 - reduction in catchment excision; and
 - avoidance of impacts to an Aboriginal artefact.

- Backfill of the OC1 final void, resulting in:
 - one less void in the final landform;
 - reduction in catchment excision (following rehabilitation); and
 - improved compatibility with surrounding land-uses in the long-term.

A summary of the key findings of the environmental reviews is provided in Table ES-1.

Table ES-1
Key Outcomes of the OC4 South-West Modification Environmental Reviews

Environmental Aspect	Summary of Environmental Assessment	Key Management, Mitigation or Monitoring Measures
Noise	Compliance with existing Project Approval noise limits.	Continued implementation of: <ul style="list-style-type: none"> • At source noise controls. • Predictive meteorological forecasting. • Real-time noise monitoring and performance indicators. • Attended noise monitoring.
Air Quality	Compliance with existing Project Approval air quality limits.	Continued implementation of: <ul style="list-style-type: none"> • At source dust controls. • Predictive meteorological forecasting. • Real-time monitoring and performance.
Ecology	Reduction in total surface disturbance. No significant impacts to threatened species, populations or communities.	Existing Stage 2 Biodiversity Offset Strategy adequately compensates potential impacts, with surplus area. Continued implementation of vegetation clearance protocols.
Surface Water Resources	No significant change to site water balance expected. Reduction in catchment excision following rehabilitation.	Continued implementation of water management system and water monitoring network.
Groundwater Resources	No change to potential groundwater impacts. No change to groundwater licensing requirements.	Continued implementation of groundwater monitoring and management would continue to be conducted in accordance with the Water Management Plan. Holding of adequate groundwater licenses.
Visual	Negligible change in potential visual impacts from sensitive viewpoints.	Rehabilitation of the OC4 south-west haul road and backfilled OC1 final void.
Aboriginal Heritage	Avoidance of impacts to one Aboriginal artefact. No impact to known Aboriginal artefacts or cultural heritage values.	Continued implementation of monitoring and management measures.

TABLE OF CONTENTS

1	INTRODUCTION	1	3.5	MANAGEMENT OF DANGEROUS GOODS	25
1.1	BACKGROUND	1	3.6	WORKFORCE	25
1.1.1	Moolarben Coal Complex History	1	3.7	CONSTRUCTION ACTIVITIES	25
1.1.2	Neighbouring Mine Operations/Projects	5	3.8	REHABILITATION AND FINAL LANDFORM	25
1.2	MODIFICATION OVERVIEW	5	3.8.1	Northern OC1 Final Void	25
1.2.1	Project Justification and Consideration of Alternatives	8	3.8.2	OC4 South-West Haul Road	27
1.3	SITE LOCATION AND TENURE	9	4	ENVIRONMENTAL ASSESSMENT	29
1.4	CONSULTATION	12	4.1	NOISE	29
1.4.1	Public Consultation	12	4.1.1	Background	29
1.5	STRUCTURE OF THE EA	12	4.1.2	Environmental Review	32
2	SUMMARY DESCRIPTION OF EXISTING/APPROVED MOOLARBEN COAL COMPLEX	14	4.1.3	Mitigation Measures, Management and Monitoring	33
2.1	APPROVALS HISTORY	14	4.2	AIR QUALITY	33
2.2	CONSTRUCTION	15	4.2.1	Background	33
2.3	MINING OPERATIONS	15	4.2.2	Environmental Review	37
2.4	COAL HANDLING AND PREPARATION	15	4.2.3	Mitigation Measures, Management and Monitoring	38
2.5	PRODUCT COAL TRANSPORT	15	4.3	ECOLOGY	38
2.6	WASTE ROCK MANAGEMENT	16	4.3.1	Background	38
2.7	DRILL AND BLAST	16	4.3.2	Environmental Review	41
2.8	COAL REJECT MANAGEMENT	16	4.3.3	Mitigation Measures, Management, Monitoring and Offset	42
2.9	GENERAL INFRASTRUCTURE	16	4.4	SURFACE WATER RESOURCES	42
2.9.1	Site Access and Infrastructure Areas	16	4.4.1	Background	42
2.9.2	Haul Roads	17	4.4.2	Environmental Review	44
2.9.3	Electricity Supply and Distribution	17	4.4.3	Mitigation Measures, Management and Monitoring	44
2.9.4	Potable Water	17	4.5	GROUNDWATER RESOURCES	44
2.9.5	Ancillary Infrastructure	17	4.5.1	Background	44
2.10	WATER MANAGEMENT	17	4.5.2	Environmental Review	45
2.11	WASTE MANAGEMENT	18	4.5.3	Mitigation Measures, Management and Monitoring	45
2.12	MANAGEMENT OF DANGEROUS GOODS	18	4.6	VISUAL	45
2.12.1	Hydrocarbon Storages	18	4.6.1	Background	45
2.12.2	Explosives Storage	18	4.6.2	Environmental Review	47
2.13	WORKFORCE	18	4.6.3	Mitigation Measures, Management and Monitoring	49
2.14	REHABILITATION AND FINAL LANDFORM	18	4.7	ABORIGINAL HERITAGE	49
2.14.1	Rehabilitation Objectives	19	4.7.1	Background	49
2.14.2	Final Landform	20	4.7.2	Environmental Review	49
2.14.3	Rehabilitation Monitoring	20	4.7.3	Management and Mitigation Measures	50
2.15	ENVIRONMENTAL MANAGEMENT AND MONITORING	20	4.8	OTHER ENVIRONMENTAL ASPECTS	50
2.16	COMMUNITY CONTRIBUTIONS	20	4.8.1	LAND RESOURCES	50
2.17	COMPLAINTS	22	4.8.2	Blasting	50
3	DESCRIPTION OF THE PROPOSED MODIFICATION	22	4.8.3	Greenhouse Gas Emissions	51
3.1	MINING OPERATIONS	22	4.8.4	Non-Aboriginal Heritage	51
3.1.1	Mining Extent	22	4.8.5	Road Transport	51
3.1.2	Mine Schedule	22	4.8.6	Aquatic Ecology	51
3.1.3	OC4 South-West Haul Road	23	4.8.7	Hazard and Risk	51
3.1.4	Mobile Fleet	23	5	STATUTORY CONTEXT	52
3.1.5	Waste Rock Management	23	5.1	GENERAL STATUTORY CONSIDERATIONS	52
3.1.6	Underground Access to UG4	23	5.1.1	State Legislation	52
3.1.7	Drill and Blast	23	5.1.2	Other State Legislation	53
3.1.8	Product Coal Transport	23	5.1.3	Environmental Planning Instruments	54
3.2	GENERAL INFRASTRUCTURE	25	5.1.4	Commonwealth Legislation	57
3.2	GENERAL INFRASTRUCTURE	25	5.2	NSW GOVERNMENT POLICY	58
3.3	WATER MANAGEMENT	25	5.2.1	Strategic Regional Land Use Plan	58
3.4	WASTE MANAGEMENT	25	5.2.2	Aquifer Interference Policy	58
			5.3	APPROVALS, LICENCES AND PLANS	58

TABLE OF CONTENTS (Continued)

5.3.1	Project Approval Conditions	58
5.3.2	Management/Monitoring Plans	59
5.3.3	Mining Operations Plan	59
6	REFERENCES	60

LIST OF TABLES

Table 1	Summary Comparison of Approved and Modified Moolarben Coal Project
Table 2	Indicative Mine Schedule
Table 3	Native Vegetation Communities Recorded in the OC4 South-West Modification Disturbance Area
Table 4	Summary of Visual Impacts

LIST OF FIGURES

Figure 1	Regional Location
Figure 2	Approved Moolarben Coal Project (Stage 1 and Stage 2) General Arrangement
Figure 3	Aerial Photo of the Moolarben Coal Complex at May 2014
Figure 4	Indicative General Arrangement Incorporating the Modification
Figure 5a	Relevant Land Ownership Plan
Figure 5b	Relevant Landholder List
Figure 6	Moolarben Coal Complex Environmental Monitoring Sites
Figure 7	Indicative Alternate Access to UG4
Figure 8	Final Voids at the Moolarben Coal Complex Incorporating the Modification
Figure 9	Conceptual Final Landform Cross Section of the Northern OC1 Final Void
Figure 10	Moolarben Coal Project Relevant Noise, Blasting and Dust Monitoring Site Locations
Figure 11	Current Noise Management Measures
Figure 12	Modification Year 2016 Night-time Operational Noise Contours
Figure 13	Modification Year 2018 Night-time Operational Noise Contours
Figure 14	Modification Year 2016 Project Only 24 hour PM ₁₀ Air Quality Contours
Figure 15	Vegetation Mapping of the Disturbance Area
Figure 16	Sub-catchments at the Moolarben Coal Complex and Relevant Surface Water Monitoring Locations
Figure 17	Previously Assessed Sensitive Viewpoints and Proposed Surface Infrastructure

LIST OF ATTACHMENTS

Attachment 1	Stage 1 Project Approval (05_0117)
Attachment 2	Stage 2 Project Approval (08_0135)
Attachment 3	Site Verification Certificate

LIST OF APPENDICES

Appendix A	Noise Assessment
Appendix B	Air Quality Assessment
Appendix C	Flora and Fauna Impact Assessment
Appendix D	Surface Water Assessment Review
Appendix E	Aboriginal Cultural Heritage Assessment

1 INTRODUCTION

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfields of New South Wales (NSW) (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex 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).

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities) (Figure 2).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) (as modified) and Project Approval (08_0135) (Moolarben Coal Project Stage 2).

Stage 1 mining operations are also undertaken in accordance with Approval Decisions EPBC 2007/3297 granted on 24 October 2007 (and varied by notice on 25 February 2009 and 11 May 2010) and EPBC 2013/6296 granted on 13 November 2014 under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The current mining operations are also conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1605, ML 1606, ML 1628 and ML 1691 granted under the *Mining Act, 1992*.

Since commencement of coal mining operations in 2010, mining activities have occurred within OC1 and OC2 (Figure 3). Subject to all necessary approvals being in place (both State and Commonwealth), development of the OC4 pit (Stage 2) is planned to commence during 2015. The development of the UG1 (i.e. highwall stabilisation, portal construction and drivage development) would also commence in 2015.

This Environmental Assessment (EA) has been prepared by MCO to support a request to modify both the Stage 1 and Stage 2 Project Approvals (05_0117 and 08_0135, respectively) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) (the OC4 South-West Modification).

The OC4 South-West Modification includes construction of the OC4 south-west haul road (located south-west of the approved Stage 2 Haul Road), adjustments to the site water management system, refinements to the early stages of mining and associated infrastructure layout at OC4, and backfilling of the northern OC1 final void.

A copy of Project Approval (05_0117) and Project Approval (08_0135) are provided as Attachments 1 and 2.

1.1 BACKGROUND

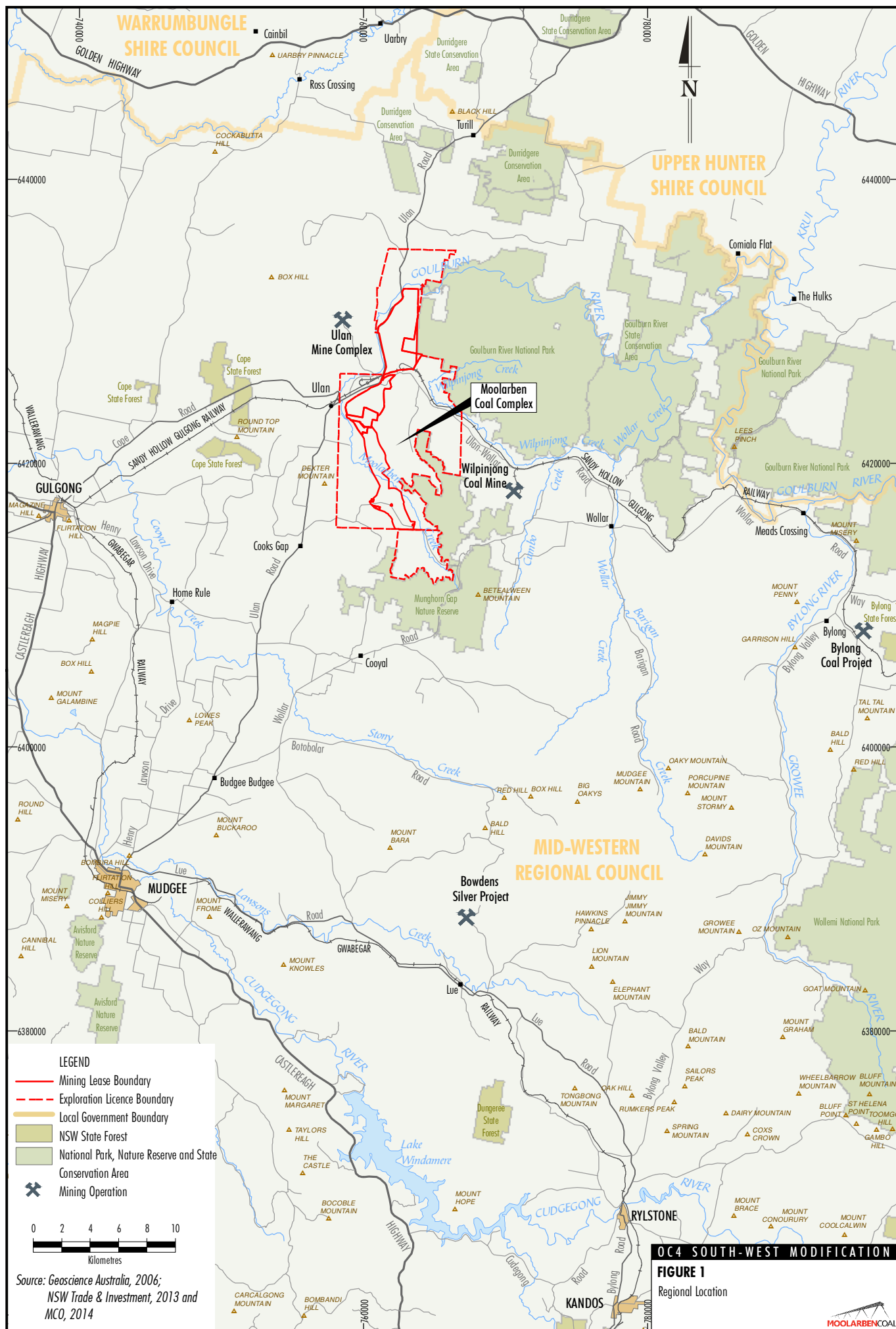
1.1.1 Moolarben Coal Complex History

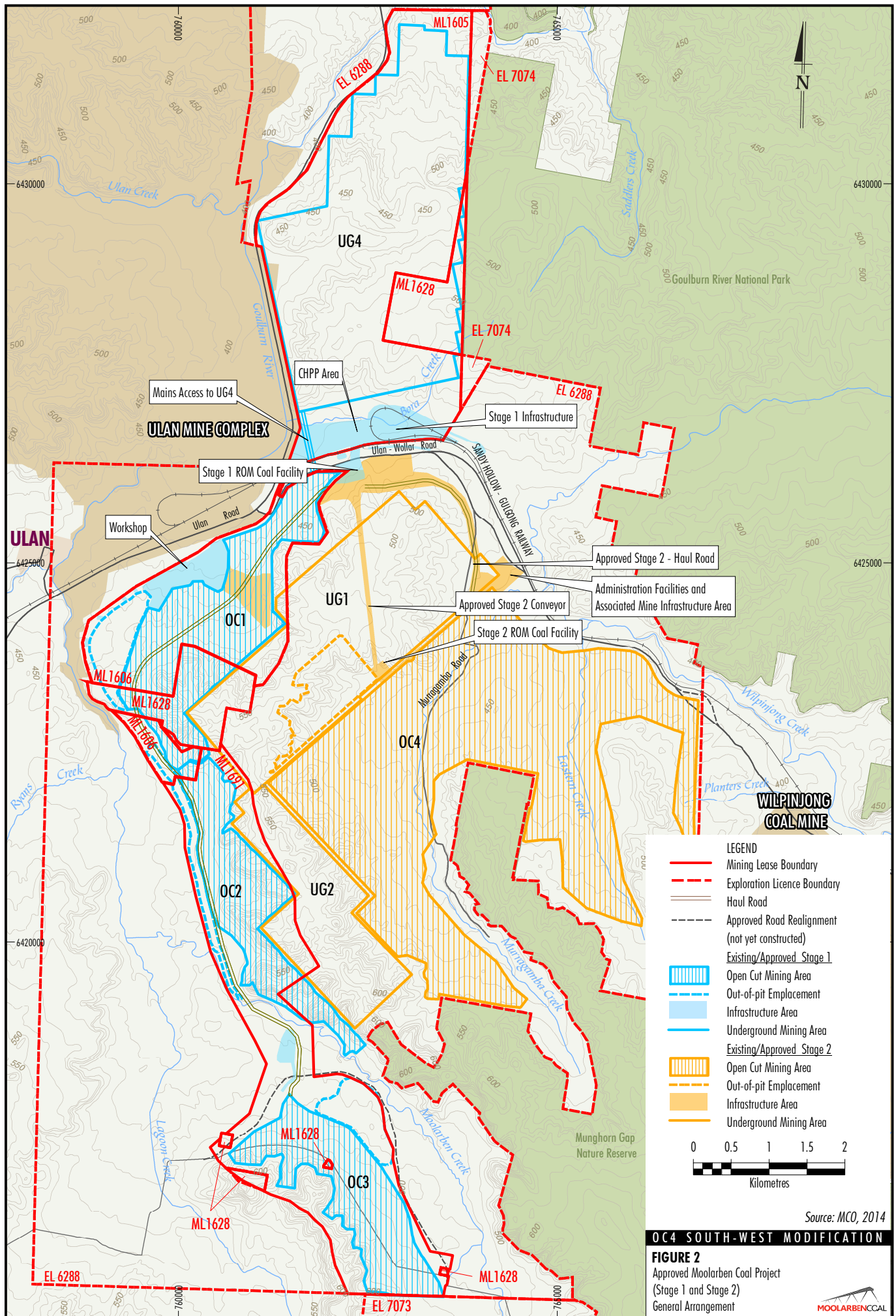
The Moolarben Coal Project (Stage 1) was assessed in the *Moolarben Coal Project Environmental Assessment Report* (Moolarben Coal Mines Limited, 2006) (Stage 1 EA) and was approved by the NSW Minister for Planning on 6 September 2007 (Stage 1 Project Approval [05_0117]).

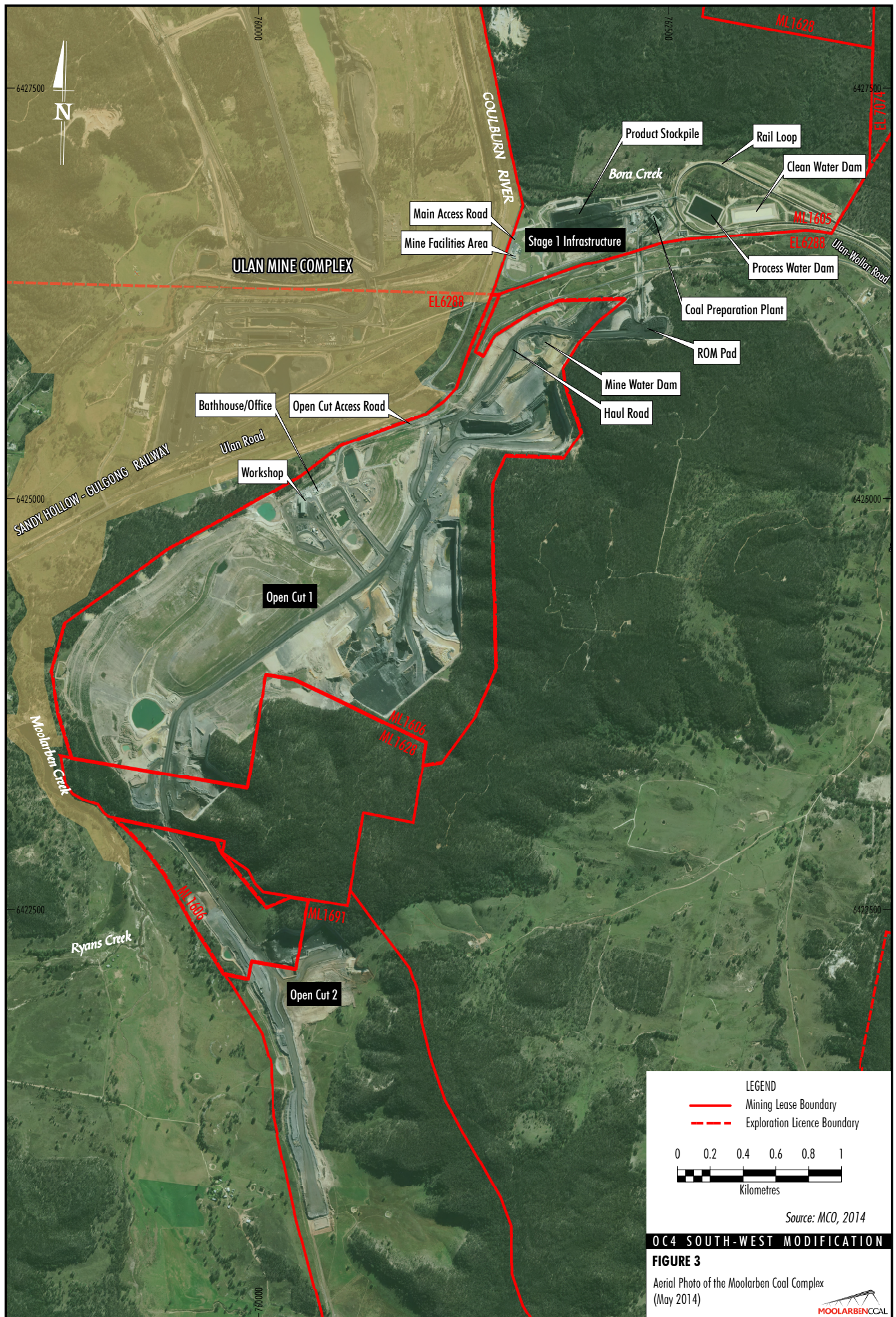
Stage 1 Project Approval (05_0117) has been subject to ten modifications. The modifications were generally required to reconfigure the mine layout (e.g. extension to mining areas, relocation of coal handling infrastructure and water infrastructure) and were aimed to improve the efficiency and operation of the Moolarben Coal Complex and enable access to additional economically viable coal reserves.

A Major Project Application for the Moolarben Coal Project (Stage 2) was lodged with the NSW Minister for Planning on 1 May 2008. Following exhibition of the Moolarben Coal Project Stage 2 Environmental Assessment (Stage 2 EA), MCM made a number of changes to the proposed layout and design of the Moolarben Coal Project Stage 2 in order to address issues raised by the Department of Planning and Infrastructure (DP&I) (now Department of Planning and Environment [DP&E]) and its independent technical reviewers, introduce additional impact avoidance measures and to enable the effective integration of Stage 2 with Stage 1. Changes to the Moolarben Coal Project Stage 2 were described in a Preferred Project Report (Stage 2 PPR) which was exhibited from 31 January 2012 to 24 February 2012.

The Moolarben Coal Project Stage 2 was approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015 (Stage 2 Project Approval [08_0135]).







A Variation of Proposal to take Action (EPBC 2008/4444) under the EPBC Act for Moolarben Coal Project (Stage 2) was accepted on 26 April 2012. The Variation of Proposal to take Action (EPBC 2008/4444) will require separate approval under the EPBC Act.

The most recently approved modification of Stage 1 of the Moolarben Coal Project (Modification 3) was approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015.

Modification 3 allows for Stage 1 infrastructure to receive, handle and process Stage 2 coal for the life of Stage 2 (to 31 December 2038) and aligns approved mine operation timeframes between Stage 1 and Stage 2. An additional void at the northern end of OC1 was also approved to allow access to UG4.

A summary description of the existing/approved Moolarben Coal Complex is provided in Section 2. The general arrangement of the existing/approved Moolarben Coal Complex is shown on Figure 2.

1.1.2 Neighbouring Mine Operations/Projects

Potential interactions with neighbouring mine operations/projects to the Moolarben Coal Complex have been considered where relevant in this EA, including the Ulan Mine Complex and the Wilpinjong Coal Mine.

Ulan Mine Complex

The Ulan Mine Complex is located adjacent to and north-west of the Moolarben Coal Complex (Figure 1) and is operated by Ulan Coal Mines Limited (UCML) and managed by Glencore.

Operations at the Ulan Mine Complex are undertaken in accordance with Project Approval (08_0184) for the Ulan Continued Operations Project. The Ulan Mine Complex is approved to operate up to a maximum coal export capacity (from the site) of 20 million tonnes per annum (Mtpa) and all product coal is transported from the site by rail.

The location and extent of the approved Ulan Mine Complex are shown on Figure 2.

Wilpinjong Coal Mine

The Wilpinjong Coal Mine is located adjacent to and east of the Moolarben Coal Complex (Figures 1 and 2) and is owned and operated by Wilpinjong Coal Pty Ltd (WCPL), a wholly owned subsidiary of Peabody Energy Australia Pty Limited.

Operations at the Wilpinjong Coal Mine are undertaken in accordance with Project Approval (05_0021) for the Wilpinjong Coal Project. The Wilpinjong Coal Mine is approved to operate up to a maximum coal export capacity (from the site) of 12.5 Mtpa and all product coal is transported from the site by rail.

The location and extent of the approved Wilpinjong Coal Mine are shown on Figure 2.

1.2 MODIFICATION OVERVIEW

The OC4 South-West Modification includes the following key components:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure 4);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint) (Figure 4); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations (Figure 4).

Table 1 provides a summary comparison of the currently approved Moolarben Coal Complex under the Stage 1 Project Approval (05_0117) and Stage 2 Project Approval (08_0135), and the Moolarben Coal Complex incorporating the OC4 South-West Modification.

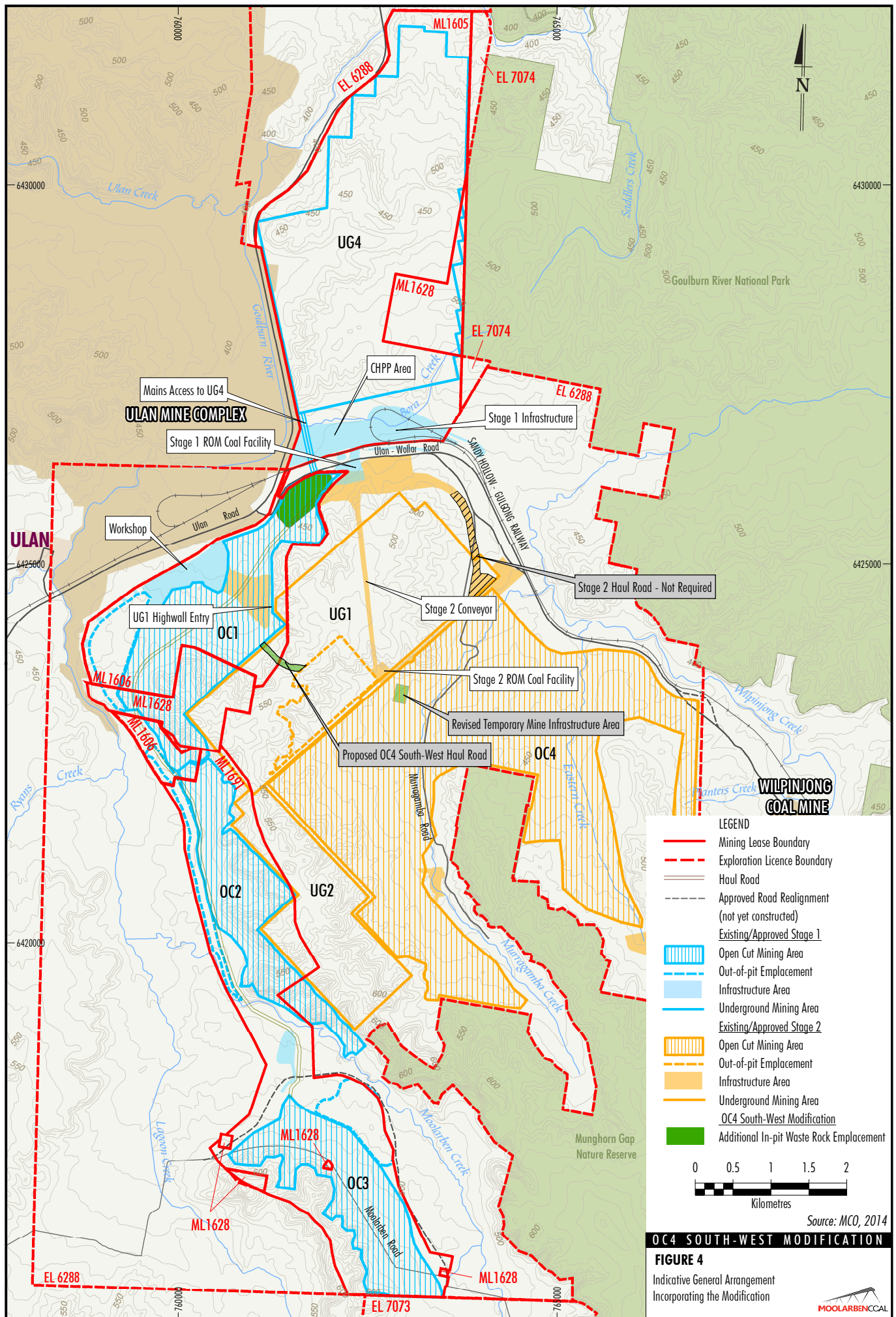


Table 1
Summary Comparison of Approved and Modified Moolarben Coal Project

Relevant Approval Component	Moolarben Coal Project		Moolarben Coal Project (including the OC4 South-West Modification)
	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.		Unchanged.
Hours of Operation	Mining operations can be carried out 24 hours a day, 7 days a week.		Unchanged.
Blasting Limits	A maximum of 2 blasts a day and up to 9 blasts a week (averaged over a calendar year), can be carried out at the Moolarben Coal Complex.		Unchanged.
	Blasting can be carried out on site between 9.00 am and 5.00 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.		Unchanged.
Coal Extraction Limits	Up to 9 Mtpa of run-of-mine (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.	Unchanged.
	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.		Unchanged.
Coal Processing and Offsite Transport	Up to 13 Mt (total) of ROM coal from the Moolarben Coal Complex can be processed in any calendar year from Stages 1 and 2.		Unchanged.
	All coal is to be transported from the site by rail.	The Proponent shall ensure that all coal extracted from the site is sent to the Moolarben Stage 1 mine surface infrastructure area for processing and/or transport to market.	Unchanged.
General Layout	The general layout is shown in Appendix 2A of Project Approval (05_0117).	The general layout is shown in Appendix 2 of Project Approval (08_0135).	<p>The revised general layout is shown on Figure 4 and includes the following changes:</p> <ul style="list-style-type: none"> Revised Stage 2 Haul Road between the Stage 1 infrastructure and OC4. Revised final landform in OC1 (including backfilling of the northern final void to approximately pre-mining elevations).
Biodiversity Offset Strategy	The Biodiversity Offset Strategy is shown conceptually in Appendix 8 of Project Approval (05_0117).	The Biodiversity Offset Strategy is shown conceptually in Appendix 7 of Project Approval (08_0135).	No change required.
Northern Section of the Approved Stage 2 Haul Road	N/A	Additional archaeological survey work is to be carried out prior to carrying out the development.	The approved Stage 2 Haul Road route is being avoided and therefore the additional archaeological survey is no longer required. Archaeological survey of the south-west haul road has been conducted as described in Section 4.7.
Ulan-Wollar Road Site Access	N/A	The site access intersection off Ulan-Wollar Road is to be designed, constructed, and maintained to the satisfaction of Mid-Western Regional Council (MWRC).	Unchanged.

Table 1 (Continued)
Summary Comparison of Approved and Modified Moolarben Coal Project

Relevant Approval Component	Moolarben Coal Project		Moolarben Coal Project (including the OC4 South-West Modification)
	Stage 1 Project Approval (05_0117)	Stage 2 Project Approval (08_0135)	
Water Management Design and Objectives	Design, install and maintain the dams generally in accordance with the series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries</i> .		Unchanged. A change to the general location of some of the sediment dams would be required.
	Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site.		Unchanged. A change to the general location of some of the up-catchment water diversions would be required.
	Mine water storage infrastructure is designed to store a 50 year average recurrence interval 72 hour storm event.	Mine water storage infrastructure is designed to store a 100 year average recurrence interval 72 hour storm event.	Water management objectives remain unchanged.
	On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams), and the Ulan Seam sub-crop line of the most northerly final void are suitably lined to comply with a permeability standard of less than 1×10^{-9} metres per second (m/s).	On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams) are suitably lined to comply with a permeability standard of less than 1×10^{-9} m/s.	The requirement to line the Ulan Seam sub-crop line of the most northerly final void in OC1 would be made redundant as it would be backfilled to approximately pre-mining elevations (Figure 4). Other water management objectives for tailings dams, mine infrastructure dams, groundwater storage and treatment dams remain unchanged.

As shown in Table 1, the OC4 South-West Modification **does not** involve any change to the Moolarben Coal Project (Stages 1 and 2) for the following relevant approval components:

- operational mine life;
- hours of operation;
- blasting limits;
- coal extraction limits;
- coal processing, production and transport limits;
- Biodiversity Offset Strategy;
- coal conveyors between OC4 and Stage 1 ROM coal facility;
- number of full-time employees; or
- Ulan-Wollar Road site access.

A detailed description of the proposed OC4 South-West Modification is provided in Section 3.

Section 4 describes the potential environmental impacts of the OC4 South-West Modification and discusses how existing requirements in environmental management and monitoring programs at the Moolarben Coal Complex would be applied to manage potential environmental impacts.

1.2.1 Project Justification and Consideration of Alternatives

OC4 South-West Haul Route

Justification

The approved haul road (Figure 4) was included in the 2009 Stage 2 Environmental Assessment and 2012 Stage 2 PPR. The purpose of the haul road was to transport ROM coal from OC4 to Stage 1 infrastructure (e.g. CHPP area) (Figure 4).

The Moolarben Coal Complex mine layout has changed since the approved haul road was proposed. In particular, approved Stage 1 mining operations have progressed in OC1.

Recent review of the mine sequence and infrastructure layout has identified it would be more efficient to relocate the haul road from OC4 to the south-west (i.e. the OC4 south-west haul road). This would enable the use of established haul roads in OC1 to transport ROM coal from OC4 to the Stage 1 infrastructure and transport waste rock from OC4 to OC1 (e.g. as part of backfill of OC1 final void).

In comparison to the approved haul road location, the OC4 south-west haul road would involve:

- a shorter, more direct haul road, resulting in lower construction and operating costs;
- less disturbance (i.e. net reduction of approximately 13.4 hectares [ha]);
- reduced water management and sediment control requirements, as runoff from the OC4 south-west haul road catchment would report to water storages in either OC1 or OC4, whereas the approved haul road requires dedicated water management structure to prevent runoff from disturbed areas entering Murrumbidgee Creek; and
- removal of the requirement for supporting administration facilities in the OC4 area associated with the temporary mine infrastructure area.

Based on the above, the OC4 south-west haul road would result in environmental and operational benefits in comparison to the approved haul road location.

Consideration of Alternatives

Several alternative haul road options were considered by MCO. The relative costs and environmental benefits of each option were considered and refinements made to the proposed south-west haul road route to minimise environmental impacts and capital and operating costs.

In comparison to these other alternative routes, the OC4 south-west haul road would result in:

- reduced potential noise impacts on Cooks Gap residences (compared to alternative options considered that were located further to the west);
- avoidance of impacts to Aboriginal cultural heritage sites; and
- reduced haul distance between OC1 and OC4 (e.g. resulting in lower potential dust and noise emissions).

Backfilling OC1 Final Void

Justification

Two final voids are approved in OC1. The northernmost of these voids was proposed to provide access to the Stage 1 UG4 underground mining area (Figure 4).

Following approval of Stage 2, mining in UG4 is not proposed to commence until mining in the Stage 2 UG1 underground mining area is completed. The preferred access to UG4 is now from UG1 (note that approval for access to UG4 via UG1 would be sought as part of a separate EA and approval application).

Therefore, the northern OC1 final void is no longer required to provide access to UG4, and would be backfilled with waste rock during mining operations to approximately pre-mining elevations, providing additional in-pit waste rock emplacement storage for the open cut operations.

Backfill of the OC1 final void would result in the following environmental benefits:

- one less void in the final landform;
- reduction in catchment excision (following rehabilitation); and
- improved compatibility with surrounding land-uses in the long-term.

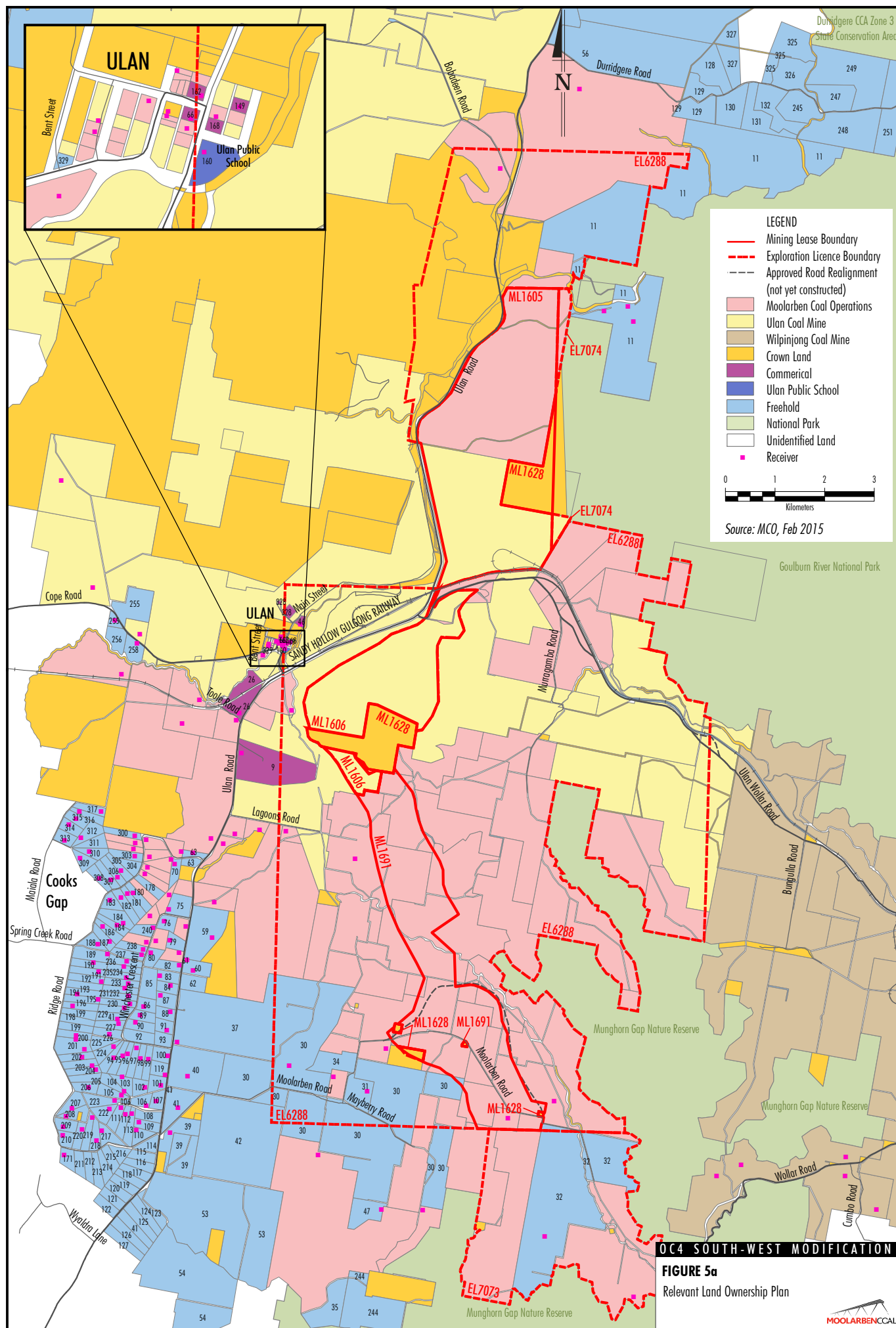
1.3 SITE LOCATION AND TENURE

The Moolarben Coal Complex is located within ML 1605, ML 1606, ML 1628, ML 1691 and Mining Lease Application (MLA) Area 458 and within Exploration Licence (EL) 6288 and EL 7074.

The Project Application Areas and the real property descriptions are provided in Appendix 1 of the Stage 1 and 2 Project Approvals, which are provided as Attachments 1 and 2 to this EA.

Relevant land ownership information within the immediate vicinity of the Moolarben Coal Complex is provided on Figures 5a and 5b.

The Moolarben Coal Complex is located within the Mid-Western Regional Local Government Area (LGA).



Ref No	Landholder	Ref No	Landholder	Ref No	Landholder
9	Orica Australia Pty Limited	112	MJ & LM Croft	215	SG & PM Green
11	JE Mullins & CD Imrie	113	CPG Ratcliff	216	G Holland & FA Handicott
26	Forty North Pty Limited	114	TF & K Holland	217	RP & JL Patterson
30	RB Cox	115	AK & BH Quinn	218	GF & GEL Soady
31	MB Cox	116	DJ & SM Reid	219	T & S Riger
32	DJ & JG Stokes	117	JM Dick	220	SJ Rusten & NJ Smith
34	J Asztalos	118	A Scott	222	BJ Purtell
35	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny	119	PJ Kearns	223	EW Palmer & JM Stewart
37	J Szymkarczuk	120	PS & DR Ord	224	RS & PCC Dupond
39	RM & DJ Sprigg	121	EJ Cullen	225	G & RF Doualetas
40	JM Devenish	122	WF Wirth	226	LAA & FC Muscat
41	PP Libertis	123	ND Sullivan	227	WP & JA Hughes
42	C & L Schmidt	124	WJ & HE Bailey	229	JJ & BA Lowe
46	North Eastern Wiradjuri Wilpinjong Community Fund Limited	125	DB McBride	230	DA Hoole & DT Rawlinson
47	SF & MR Andrews	126	MP Julian	231	T Morrison & SM Benny
53	WD & MS Bryant	127	BKT & SA Bracken	232	L & JA Haaring
54	MA & C Harris	128	AW Sims	233	K & D Boal
56	MJ & V Cundy	129	M Yelds	234	D & L Gaw
59	G & GM Szymkarczuk	130	GP McEwen	235	LM & RS Wilson
60	CL Rayner & DM Munday	131	GR & RA King	236	RG & CA Donovan
61	MA Miller	132	N Atkins	237	A Puskaric
62	R Menchin	149	Mid-Western Regional Council	238	B Powell
63	BF & B Whiticker	151	AI Cunningham (Land entrusted to Catholic Church)	240	GJ & DM Hartley
66	Rostherne Pty Limited	160	Minister For Education And Training	244	JT & YR Jones
70	DJ & A Coventry	162	DM Harrison	245	MP & KLE Cresham
75	P Ban	168	PJL Constructions Pty Limited	247	J & K Batshon
76	SR & PC Carbone	171	AD & SA McGregor	248	G Boustani
79	PTJ & SE Nagle	178	PR Stone	249	CJ & JJ Eldridge
80	W & D Sebelic	180	CD & LL Barrett	251	NF Potter & CE Selley
82	SC Hungerford & MC Clemens	181	SM Forster	255	HJ & H Schmitz
83	CF & CR Wall	182	J Dutoitcook	256	RC Campbell
84	DS Sebelic	183	R & EA Steines	258	PM & CD Elias
85	J & Z Nikolovski	184	LA Stevenson	300	CM Collins & CY Marshall
86	NW Harris	186	RW & IJ Adamson	303	HJ Ungaro
87	BJ & K Howe	187	BT & KM Feeney	304	G Balajan
88	BC Meyers	188	KR & T Fielding	305	L Barisic & M Aul
89	MV & HM Glover & E & BJ Tomlinson	189	M, M, D & A Gaggin & J, A, P & R Hyde	306	E Armstrong
90	SA Powell	190	T & LK Sahyoun	307	M Chant & NK Young
91	HM Graham	191	BW & TS Lasham	308	NA Dower
92	VA Pulicino & J & S & G Bonnici	192	D Williams	309	GS Maher
93	F & M Fenech	193	DJ Maloney	310	KI Death
94	LK Mittemayer	194	PM & K Potts	311	BJ & LC Williamson
95	BJ Wrihtington	195	R Cottam	312	MS & JJ Ioannou
96	D Lazicic	196	F Saxberg & M Weir	313	NJ & BDE Pracy
97	DJ & MD Smith	198	GR & ME Metcalfe	314	SL Ford
98	ME & JJ Piper	199	PGG & I Nielsen	315	WJ Richards & BJ Uzelac
99	DE Jenner & WB Jensen	200	VK Grimshaw	316	CR Vassel & CM Williams
100	A Kapista	201	KR & GM Towerton	317	RJ Hore & V Bingham
101	RD & DMZ Hull	202	H & VF Butler	325	S & T Fevale
102	KA Roberts	203	DJ Miller	326	AW & LM Murray
103	SB Burnett & SL Grant	204	RB & JE Donnan	327	CA Tanner
104	RA & LA Deeben	205	DW Sparrow & M Tallan	328	Essential Energy
105	DJ & N Katsikaris	206	CA Marshall & R Vella	329	Tuck-Lee
106	TB & JH Reid	207	AA & DM Smith		
107	ZJ & M & AA Raso	208	SA & CR Hasaart		
108	R Varga	209	F Mawson		
109	DA Evans	210	JM & AM Tebutt		
110	JT Thompson & HT Evans	211	SA McGregor & WJ Gray		
111	GJ & NJ McEwan	212	E & M Lepik		
		213	D & J Parsonage		
		214	RK & EG O'Neil		

Source: MCQ, Feb 2015

OC4 SOUTH-WEST MODIFICATION

FIGURE 5b
Relevant Landholder List



1.4 CONSULTATION

MCO consults with relevant State Government agencies on a regular basis in relation to the approved Moolarben Coal Complex.

Consultation has been conducted with key State Government agencies, local councils, the local community and Aboriginal stakeholders during the preparation of this EA. A summary of this consultation to date is provided below. Consultation would continue during the public exhibition of this EA and the assessment of the OC4 South-West Modification.

Department of Planning & Environment

Briefings with the DP&E were conducted in May 2014 and February 2015 to provide an overview of the proposed OC4 South-West Modification and the proposed scope of environmental assessment.

Regulatory Agencies and Local Council

MCO sent briefing letters (dated April 2015) providing an overview description of the OC4 South-West Modification and proposed scope of environmental assessment to the following regulatory agencies:

- Office of Environment and Heritage (OEH);
- Environment Protection Authority (EPA);
- Department of Primary Industries – NSW Office of Water;
- NSW Division of Resource and Energy (within Department of Trade, Investment, Regional Infrastructure and Services); and
- Mid-Western Regional Council (MWRC).

Local Community

The Community Consultative Committee was established for the Moolarben Coal Complex in accordance with Project Approval (05_0117). The operation of the Community Consultative Committee was updated in March 2015 in accordance with Project Approval (08_0135).

The Community Consultative Committee provides a mechanism for ongoing communication between MCO and the local community. MCO sent a briefing letter (dated April 2015) to the Community Consultative Committee providing an overview description of the OC4 South-West Modification and proposed scope of environmental assessment.

Other Mines

MCO works closely with the operations of Ulan Mine Complex and Wilpinjong Coal Mine managing cumulative impacts associated with mining operations. The mining operations share their extensive environmental databases through a formal data sharing agreement to support relevant EAs or incident investigations and co-operate in the implementation of joint programs such as the Ulan Road Strategy.

Both UCML and WCPL were consulted in relation to the OC4 South-West Modification in April 2015.

1.4.1 Public Consultation

The Moolarben Coal website (www.moolarbencoal.com.au) provides regular updates on the Moolarben Coal Complex and provides access to relevant environment and community information, including EA documents, compliance reports and approval documents.

An environmental enquiry phone line (1800 556 484) allows members of the public to contact MCO with enquiries or complaints.

A copy of this EA would be made available on the Moolarben Coal website.

1.5 STRUCTURE OF THE EA

This EA is structured as follows:

Section 1	Provides an overview of the existing/approved Moolarben Coal Complex, the OC4 South-West Modification and a summary of the consultation undertaken in relation to the OC4 South-West Modification.
Section 2	Provides a description of the existing/approved Moolarben Coal Complex.
Section 3	Provides a description of the OC4 South-West Modification.
Section 4	Provides a review of the existing environment, assesses the potential impacts associated with the OC4 South-West Modification and describes the existing MCO environmental management systems and measures in place to manage and monitor any potential impacts.

Section 5 Provides the planning framework and statutory context.

Section 6 References.

Attachments 1 to 3 and Appendices A to E provide supporting information as follows:

Attachment 1 Stage 1 Project Approval (05_0117)

Attachment 2 Stage 2 Project Approval (08_0135)

Attachment 3 Site Verification Certificate

Appendix A Noise Assessment

Appendix B Air Quality Assessment

Appendix C Flora and Fauna Impact Assessment

Appendix D Surface Water Assessment Review

Appendix E Aboriginal Cultural Heritage Assessment

2 SUMMARY DESCRIPTION OF EXISTING/APPROVED MOOLARBEN COAL COMPLEX

2.1 APPROVALS HISTORY

Moolarben Coal Project (Stage 1)

The Moolarben Coal Project Stage 1 was approved under Part 3A of the EP&A Act by the NSW Minister for Planning on 6 September 2007 (Project Approval [05_0117]). Ten modifications to Project Approval (05_0117) have since been approved as summarised below:

- **MOD 1:** In August 2008, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to reconfigure the Coal Preparation Plant, emergency tailings dam, transfer stations and conveyors, rail loop, coal stockpiles, UG4 conveyor, groundwater treatment ponds and a water storage dam as well as amend the wording of three clauses in the Project Approval. The modification was approved by the NSW Minister for Planning on 26 November 2008.
- **MOD 2:** In December 2008, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to permit minor construction activities to commence at the site prior to completion of the main mine site access intersection off Ulan-Cassilis Road. The modification was approved by the NSW Minister for Planning on 18 December 2008.
- **MOD 3:** In February 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to allow for Stage 1 infrastructure to receive, handle and process Stage 2 coal for the life of Stage 2 (to 31 December 2038). An additional void in OC1 was also proposed to allow access to UG4. The modification was approved by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015.
- **MOD 4:** In April 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to change the configuration of the rail loop from a figure-8 to a balloon loop layout. The modification was approved by the NSW Minister for Planning on 30 June 2009.
- **MOD 5:** In July 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to relocate the ROM coal facility and develop a water sharing pipeline from the Ulan Mine Complex. The modification was approved by the NSW Minister for Planning on 5 October 2009.
- **MOD 6:** In December 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to relocate the rejects bin to a preferred location about 250 m north-west of its previously approved location. The modification was approved by the NSW Minister for Planning on 11 January 2010.
- **MOD 7:** In March 2010, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act for the development and operation of a water supply and dewatering borefield and associated ancillary facilities. The modification was approved by the NSW Minister for Planning on 3 February 2011.
- **MOD 8:** In April 2010, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to establish and operate a ROM coal stockpile adjacent to the ROM coal dump hopper. The modification was approved by the NSW Minister for Planning on 27 May 2010.
- **MOD 9:** In May 2013, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to increase the extents of the approved Stage 1 open cuts. The modification was approved by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 16 June 2014.
- **MOD 10:** In February 2015, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to increase the Stage 1 ROM coal production rate from 8 to 9 Mtpa for calendar years 2015 and 2016. The modification was approved by the NSW Minister for Planning on 17 April 2015.

Moolarben Coal Project (Stage 2)

The Stage 2 EA was originally prepared by MCM under Part 3A of the EP&A Act. MCM made a number of changes to the proposed layout and design of the Moolarben Coal Project Stage 2 in order to address issues raised by the DP&I (now DP&E) and its independent technical reviewers, introduce additional impact avoidance measures and to enable the effective integration of Stage 2 with Stage 1.

Changes to the Moolarben Coal Project Stage 2 were described in the Stage 2 PPR which was exhibited from 31 January 2012 to 24 February 2012.

The Moolarben Coal Project Stage 2 was approved under Part 3A of the EP&A Act by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015 (Project Approval 08_0135).

2.2 CONSTRUCTION

The majority of Moolarben Coal Project Stage 1 facilities were constructed in 2009, including the office administration complex, ROM pad, Coal Handling and Preparation Plant (CHPP), rail spur, rail loop and rail loading infrastructure. Additional infrastructure construction activities have occurred as required over the life of the mine (Figure 3).

Construction of Moolarben Coal Project Stage 2 facilities is yet to commence.

2.3 MINING OPERATIONS

Four open cut pits (OC1, OC2, OC3 and OC4) are approved at the Moolarben Coal Complex. MCM is currently approved to mine up to 9 Mtpa of ROM coal from OC1, OC2 and OC3 combined in calendar years 2015 and 2016, and 8 Mtpa thereafter (i.e. Stage 1), and up to 12 Mtpa of ROM coal from OC4 (i.e. Stage 2) using conventional open cut coal mining methods. A combined total of 13 Mtpa of ROM coal from Stages 1 and 2 is approved to be processed (i.e. the maximum ROM coal extraction rates from Stages 1 and 2 do not occur simultaneously).

MCO is currently conducting open pit mining at the Moolarben Coal Complex in the OC1 and OC2 pits (Figure 3).

Three underground mining areas (UG1, UG2 and UG4) targeting the Ulan Seam are approved to be mined at a combined rate of up to 4 Mtpa. Coal would be recovered using conventional longwall mining and transferred to surface by conveyors. Highwall entries for UG1 and UG4 mines are approved in the OC1 highwall but have not yet been constructed. Access to UG2 would be via UG1.

Mining is approved 24 hours per day, seven days per week.

2.4 COAL HANDLING AND PREPARATION

The Moolarben Coal Complex produces washed coal products from the open cut operations and would produce unwashed coal products from the underground operations. The coal handling and preparation infrastructure has been designed to accommodate the processing of raw coal and the handling of washed product coal. The coal handling and preparation infrastructure would be upgraded once underground operations commence to handle raw (bypass) coal.

ROM coal from the open cut operations is transferred to the Stage 1 ROM coal facility or ROM stockpile by internal haul roads. ROM coal from the underground operations would be transferred to the Stage 1 ROM coal facility or ROM stockpile by conveyor and internal haul roads.

Coal at the Stage 1 ROM coal facility is conveyed to the Coal Preparation Plant. Crushing and sizing facilities are included at the Stage 1 ROM coal facility and the Coal Preparation Plant. The Moolarben Coal Complex is approved to handle up to 17 Mtpa of ROM coal.

The CHPP area includes an existing 400,000 tonne (t) open cut (washed) product coal stockpile. An approved 200,000 t underground (unwashed) product coal stockpile is yet to be constructed.

Approved conveyors connecting the Stage 1 ROM coal facility to the OC4 pit are yet to be constructed (Figure 2). Once constructed, these conveyors would allow transfer of OC4 ROM coal to the Stage 1 ROM coal facility and Coal Preparation Plant rejects from the Stage 1 ROM coal facility to OC4.

The CHPP operates up to 24 hours per day, seven days per week.

2.5 PRODUCT COAL TRANSPORT

The Moolarben Coal Complex is approved to export up to 13 million tonnes (Mt) of product coal from site each year. Product coal is loaded onto trains using a dedicated rail loop and rail load out facility, and transported to the Port of Newcastle.

Product coal is loaded onto trains 24 hours per day, seven days per week. Trains arrive and depart the Moolarben Coal Complex 24 hours per day, seven days per week.

The approved Moolarben Coal Complex requires the dispatch of up to five product coal trains per day.

2.6 WASTE ROCK MANAGEMENT

With the exception of the initial boxcut development, overburden and interburden or partings material is progressively placed back in-pit once the coal has been mined.

A combination of temporary and permanent out-of-pit waste rock emplacements are located adjacent to the open cut mining operations (Figure 2).

2.7 DRILL AND BLAST

Overburden and coal material at the Moolarben Coal Complex is blasted where necessary to achieve optimal fragmentation while complying with relevant impact assessment criteria of Project Approval (05_0117) and Project Approval (08_0135).

Blasting is approved to occur between the hours of 9.00 am and 5.00 pm, six days per week (excluding public holidays or Sundays).

The approved blast frequency is nine blasts per week on average over any 12 month period with a maximum of two blasts on any day. These restrictions do not apply to blasts that generate ground vibration of 0.5 mm/s or less at any privately-owned land, blasts misfires or blasts required to ensure the safety of the mine or its workers.

2.8 COAL REJECT MANAGEMENT

The Moolarben Coal Complex generates coarse reject and tailings in the coal preparation process.

Reject and tailings are conveyed from the CHPP to the Stage 1 ROM coal facility and then hauled or conveyed to an open pit void for emplacement.

An emergency tailings storage dam has been constructed adjacent to the Coal Preparation Plant to cater for emergency tailings storage (if required). The dam is also used for runoff and dirty water collection. Tailings in the emergency storage dam are periodically removed and transported for disposal within the open cuts.

2.9 GENERAL INFRASTRUCTURE

2.9.1 Site Access and Infrastructure Areas

The main infrastructure areas approved at the Moolarben Coal Complex include the CHPP area and rail loading facilities, Stage 1 mine infrastructure area, Stage 2 mine infrastructure area, Stage 1 ROM coal facility and Stage 2 ROM coal facility. Access to these areas is via Ulan Road or Ulan-Wollar Road (Figure 2).

The Moolarben Coal Complex CHPP area and rail loading facilities comprise the Coal Preparation Plant, rail loop, rail loadout, conveyors, hoppers, coal stockpiles, mine water dams, fuel store, workshop, sump, B-double turning loop, office, bathhouse, stores, main substation, hardstand areas, crib shed, car park and a number of service facilities (i.e. potable water, sewerage, electricity, fire services and hydrocarbon management) (Figure 3).

The Stage 1 open cut mine infrastructure area includes a workshop, bathhouse, offices, fuel store, light and heavy vehicle parking and other minor infrastructure and supporting facilities (Figures 2 and 3). An approved underground Mine Infrastructure Area in the OC1 void adjacent to the UG1 entry (Figure 2), which would comprise offices, bath house, substation, sump and ventilation fan (among other ancillary facilities), is yet to be constructed.

The Stage 2 open cut mine infrastructure area would include offices, bathhouses, workshops, final storages, explosive facility and magazine storage. Temporary facilities would be established in advance of mining in OC4.

The Stage 1 and Stage 2 infrastructure would be integrated where possible to allow services and facilities to be shared between Stage 1 and Stage 2 operations.

The Stage 1 ROM coal facility includes sizing stations, crushers, conveyors, dump hoppers and other associated infrastructure (Figure 2).

The Stage 2 mine infrastructure area and ROM coal facility have not yet been constructed.

Minor disturbance associated with approved ancillary works would continue to be developed outside of open cut pit and infrastructure disturbance boundaries, including (but not limited to) firebreaks, water diversion structures, minor contour banks, tracks, pipelines, explosives/magazine storage facilities, power supply for rope shovel, powerlines, fences and sediment and erosion control structures as required.

2.9.2 Haul Roads

All coal is hauled on internal roads or conveyed, and all product coal is transported by rail. All waste rock is hauled on internal haul roads. Internal haul roads are progressively constructed between the open cut operations, mine waste rock emplacements and ROM coal stockpiles within approved development areas as required.

Haul roads are regularly watered to minimise dust generation.

2.9.3 Electricity Supply and Distribution

Power is supplied to the Moolarben Coal Complex at 66 kilovolt (kV) from the existing Essential Energy Ulan Switchyard. The 66 kV powerline runs adjacent to the road and rail corridor to the CHPP area where a 66/11 kV substation is located. Power is distributed around the site by overhead cable or underground cable where necessary.

MCM has approval to realign the existing 66 kV powerline along the old Ulan-Wollar Road. This realignment has not yet been undertaken.

2.9.4 Potable Water

Potable water for all facilities is sourced from a combination of rainwater captured from roofs of facilities, suitably treated bore water or imported from external sources. The potable water supply reticulation system services the appropriate areas around the site.

2.9.5 Ancillary Infrastructure

The Moolarben Coal Complex is supported by a range of ancillary infrastructure that are periodically relocated, modified or expanded as mining operations progress. Such components include water management features (e.g. bores, pipelines, pumps, drains, contour banks, diversion channels and dams), environmental monitoring equipment, electricity supply, access tracks, equipment such as communication towers, in-pit facilities including bulk fuel handling and personnel crib huts/ablution facilities (among other things).

2.10 WATER MANAGEMENT

The water management strategy for the Moolarben Coal Complex is based on the containment and re-use of mine water as well as the control of sediment that may be potentially carried with runoff from disturbed areas such as the waste rock emplacements or areas cleared in advance of mining.

The existing water management system at the Moolarben Coal Complex comprises the following:

- water management storages;
- diversion of runoff from catchment areas upslope of the mine disturbance area;
- runoff control on disturbed and rehabilitated areas at the mine;
- runoff control on infrastructure areas;
- sedimentation control;
- water transfer pumps and piping;
- open pit dewatering; and
- sewage treatment and disposal of effluent.

Water is required to operate the Coal Preparation Plant, for washdown of mobile equipment, dust suppression on haul roads and for dust emission control sprays in the ROM and product coal stockpile areas. Water would also be used in the underground mines once developed (e.g. dust suppression). The main water sources for the operation are:

- recovery from coal processing;
- groundwater inflows into the open cut voids;
- catchment runoff (from disturbed areas) and infiltration;
- incidental rainfall over water storages;
- water sharing arrangements with UCML; and
- groundwater extraction from licensed bores.

If stored water volumes are excessive, MCO can release water off-site in accordance with the requirements of Environment Protection Licence (EPL) 12932, subject to stringent release criteria and conditions being met.

The water balance of the system fluctuates with climatic conditions and as the extent of the mining operations changes over time. The water management system is progressively developed as water management requirements evolve in accordance with the approved Water Management Plan.

2.11 WASTE MANAGEMENT

MCO operates the Moolarben Coal Complex waste management system in accordance with the Waste Management Plan (MCO, 2013).

MCO waste disposal systems are designed to minimise the amount of waste generated by the mine that goes to landfill.

Waste generated at the Moolarben Coal Complex includes general rubbish, sewage, scrap timber; batteries, tyres, waste oil and filters and other hydrocarbons, empty drums and scrap metals.

Operation of the mining fleet generates waste hydrocarbons such as oils, greases and hydraulic fluids. These waste hydrocarbons are placed in suitable containers and removed from the site for disposal at either an EPA-approved hydrocarbon waste site or a recycling depot.

Treated effluent is discharged in accordance with EPL 12932.

Suppliers are encouraged to supply recyclable products and products that have the capacity for reuse in accordance with the specified 70% waste reduction target.

2.12 MANAGEMENT OF DANGEROUS GOODS

The transportation, handling and storage of all dangerous goods at the Moolarben Coal Complex is conducted in accordance with *Storage and Handling of Dangerous Goods – Code of Practice 2005* (Workcover, 2005).

2.12.1 Hydrocarbon Storages

A fuel and lubrication store contains above-ground bunded diesel-storage tanks in accordance with the requirements of Australian Standard (AS) 1940: *The Storage and Handling of Flammable and Combustible Liquids*.

Runoff water from mobile equipment service areas is directed to an interceptor trap to extract hydrocarbons, prior to it being discharged into the mine water management system. The trap is routinely emptied of hydrocarbons by a licensed contractor.

2.12.2 Explosives Storage

Explosives required for the Moolarben Coal Complex include initiating products and detonators, ammonium nitrate fuel oil and emulsion explosives.

Explosives on-site are stored, transported and used in accordance with the requirements of AS 2187.2:2006 *Explosives – Storage, Transport and Use – Use of Explosives*.

2.13 WORKFORCE

At full development, the Moolarben Coal Complex requires an average workforce of approximately 439 people. Stage 2 would require a construction workforce of 220 workers.

2.14 REHABILITATION AND FINAL LANDFORM

The Mining Operations Plan (MOP) for the Moolarben Coal Complex describes site activities and the progress toward environmental and rehabilitation outcomes required under the ML conditions and the Project Approvals (05_0117 and 08_0135).

Rehabilitation of the Moolarben Coal Complex Stage 1 has been undertaken in accordance with the Rehabilitation and Offset Management Plan¹. To December 2014, approximately 157 ha of the backfilled OC1 pit has been rehabilitated in accordance with the Rehabilitation and Offset Management Plan. Ongoing monitoring and maintenance is undertaken in accordance with the Rehabilitation and Offset Management Plan.

Rehabilitation of the Moolarben Coal Complex Stage 2 would be undertaken in accordance with a Rehabilitation Management Plan to be prepared for the Moolarben Coal Complex incorporating Stage 2. The proposed Stage 2 rehabilitation strategy is outlined in Appendix K of the Stage 2 PPR.

¹ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Biodiversity Management Plan and Rehabilitation Management Plan which will supersede the Landscape Management Plan (including the Rehabilitation and Offset Management Plan).

2.14.1 Rehabilitation Objectives

Stage 1 Rehabilitation

The rehabilitation objectives for Stage 1 of the Moolarben Coal Project are described in the Rehabilitation and Offset Management Plan and are as follows:

- Create a safe, stable, adequately drained post-mining landform that is consistent with the local surrounding landscape within the operational area to minimise visual impacts.
- Rehabilitate the OC1 footprint using native vegetation to create Box Gum Woodlands and Sedimentary Ironbark Forests with stands of *Allocasuarina*.
- Revegetate lands adjoining the northern part of the OC2 area and haul road linkage with OC1 that are under the control of MCO, to enhance vegetation cover and connectivity.
- Enhance Grassy White Box Woodland on basalt soils, in close proximity to Carrs Gap, that are located within the Moolarben Coal Complex Stage 1 application area.
- Improve the ecological integrity of the aquatic habitats through revegetation using native species identified in the Rehabilitation Management Plan.
- Revegetate the riparian zone of the Moolarben Creek to the east of OC3 to improve stream health and enhance the Alluvial Apple Forest.
- Manage the riparian zone of the Bora Creek to improve stream health.
- Rehabilitate mined land to a comparable standard as the relative analogue sites and completion criteria.
- Minimise site access by vehicles which can result in the compaction of soil (which can reduce the infiltration of water into the soil and restrict root growth, and consequently reduce natural regeneration), the spread of weeds and disturbance to vegetation.
- Conduct works associated with UG4 in accordance with an approved Extraction Plan to minimise subsidence impacts on vegetation.
- Protect portions of the lands located above UG4 with an appropriate conservation mechanism for the long-term security of this ecosystem.
- Separate clean and dirty water across the Moolarben Coal Complex Stage 1 application area.
- Promote biodiversity through weed and feral animal control programs.

- Rehabilitate OC2 and OC3 footprints principally for agricultural outcomes.

The OC4 South-West Modification proposes to backfill the northern OC1 final void to approximately pre-mining elevations and revegetate with woodland species.

Stage 2 Rehabilitation

Rehabilitation of Stage 2 is described in the Stage 2 Moolarben Coal Project Rehabilitation Strategy (MCO, 2011). The specific rehabilitation objectives for Stage 2 are:

- Create a natural looking, stable and well drained post-mining landform that is visually consistent with surrounding areas.
- Create a self-sustaining and ecologically diverse post-mining landscape that is compatible with the conservation values of the adjacent Munghorn Gap Nature Reserve and Goulburn River National Park.
- Revegetate and enhance remnant vegetation on non-mine owned land that is under the control of MCO with endemic native species.
- Create wildlife corridors and habitat links, where feasible, between existing remnant vegetation in the Munghorn Gap Nature Reserve, Goulburn River National Park and other surrounding areas by increasing the continuity of woodland vegetation.
- Maintain the diversity and genetic resource of flora currently existing within the locality.
- Maintain and enhance habitat for native fauna.
- Realign and rehabilitate Murragamba and Eastern creeks to be hydraulically and geomorphologically stable and ecologically diverse.
- Rehabilitate degraded riparian areas along Wilpinjong Creek and along Murragamba and Eastern creeks downstream from mined areas within the Moolarben Coal Complex Stage 2 application area.
- Reinstate subsidiary surface drainage.
- Improve soil condition and native seed bank.
- Prevent soil erosion and sedimentation.
- Provide access for monitoring and adaptive management, control of exotic flora and fauna species and suppression of fires.
- Progress towards meeting closure and post-mining land use objectives (to be developed in consultation with stakeholders and described in a Mine Closure Plan) in a timely and cost effective manner.

2.14.2 Final Landform

The approved final landform for the Moolarben Coal Complex includes final voids in the south of OC3, east of OC4 and two voids in the OC1. The currently approved mine plan provides underground access to UG4 via the northern OC1 void and underground access to UG1 and UG2 via the southern OC1 void (Figure 2).

In accordance with Condition 32 of Schedule 3 of the Stage 1 Project Approval (05_0117) (Attachment 1), MCO is required to line the Ulan Seam outcrop in the northern OC1 final void with a low permeable material. The intention of this condition is to reduce the potential recirculation of stored water in the northern OC1 void through the Ulan Seam and into the underground workings.

2.14.3 Rehabilitation Monitoring

In accordance with the MOP and Rehabilitation and Offset Management Plan, MCO currently conducts annual Ecosystem Function Analysis (EFA) monitoring and reporting which comprises:

- Landscape Function Analysis;
- Landscape Organisation Index;
- Soil Surface Assessment (producing stability, infiltration and nutrient indices); and
- Vegetation Dynamics (for woodland areas).

The EFA is used to assess the progress of rehabilitation sites against relevant reference sites located outside the disturbance footprint and is used to assess whether rehabilitation areas are satisfying rehabilitation objectives and are on a trajectory toward self-sustainability. Rehabilitation monitoring results are reported in the Annual Review.

2.15 ENVIRONMENTAL MANAGEMENT AND MONITORING

Environmental management and monitoring at the Moolarben Coal Complex is conducted in accordance with a range of plans required by Project Approvals (05_0117 and 08_0135) and EPBC 2013/6926.

Following the approval of Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project, the following environmental management plans are required under the state and federal approvals for the Moolarben Coal Complex²:

- Environmental Management Strategy.
- Noise Management Plan.
- Blast Management Plan.
- Air Quality Management Plan.
- Water Management Plan (including Site Water Balance, Surface Water Management Plan and Groundwater Management Plan).
- Biodiversity Management Plan.
- Heritage Management Plan.
- Rehabilitation Management Plan.
- Extraction Plan.
- Greenhouse Gas Minimisation Plan.
- Vegetation Clearance Protocol and Landscape Management Plan.
- Biodiversity Offset Management Plan.

The Moolarben Coal Complex has an extensive environmental monitoring regime. Environmental monitoring locations are shown on Figure 6.

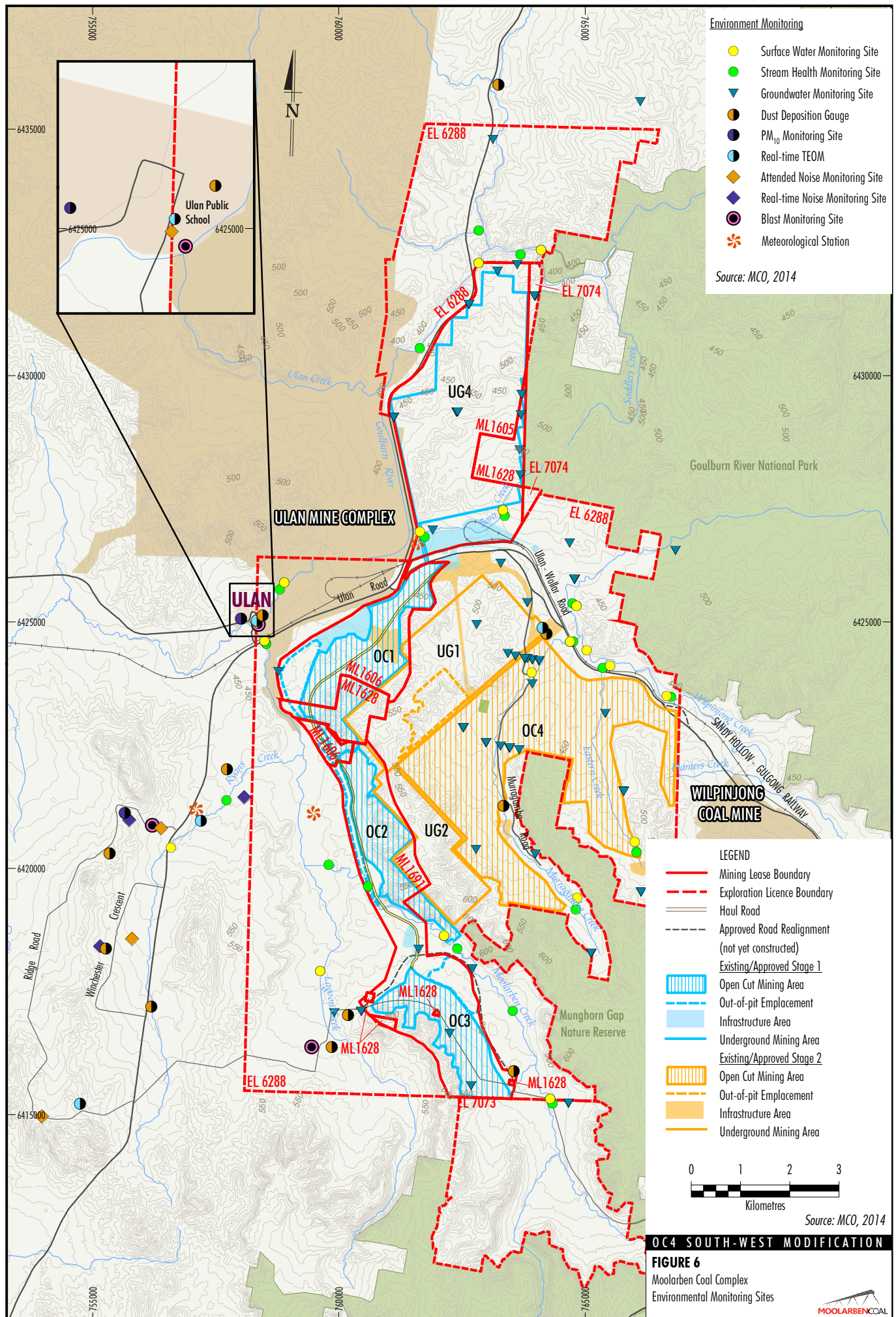
2.16 COMMUNITY CONTRIBUTIONS

MCO financial contributions to the MWRC are made in accordance with Moolarben Coal Complex Planning Agreements, Project Approval (05_0117) and Project Approval (08_0135).

UCML, WCPL, MCO and MWRC are also co-funding implementation of the Ulan Road Strategy that will result in significant upgrades to Ulan Road.

MCO also makes financial contributions to a number of non-Government and community organisations in the region. MCO financial contributions (in the form of sponsorships and donations) to various education, community development, health, environmental, arts, culture, and youth services in the region in the 2014 calendar year has totalled approximately \$215,000.

² On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing complex-wide environmental management plans.



Examples of recent financial contributions have included support for the following groups:

- Mudgee Readers Festival;
- Ulan Public School;
- Mudgee Rugby Club;
- Gulgong Historical Society;
- Mudgee Gymnastics;
- Gulgong Prince of Wales Eisteddfod;
- Ulan Public School;
- Rotary Club Of Rylstone – Kandos;
- Life Skills;
- Gulgong Heritage Festival Committee;
- Mudgee District Netball;
- Pioneer Auxiliary Ladies;
- Westpac Helicopter;
- Mudgee Rescue Volunteer Association;
- Mudgee Junior Rugby league;
- Riding for the disabled – Mudgee;
- Gulgong Rural Fire Brigade;
- Mudgee District Tennis Club;
- Mudgee High School;
- Mudgee Basketball Association;
- Gulgong District Pony Club;
- Mudgee Amateur Softball Association;
- Rylstone and Kandos volunteer search and rescue; and
- Mudgee Police.

2.17 COMPLAINTS

In accordance with the requirements of the Environmental Management Strategy, MCO records and responds to all complaints and provides a complaints register summary in the Annual Review each year.

In the 2012-2013 reporting period, a total of 120 complaints were received (MCO, 2013) from some 18 complainants with 55% of the 120 complaints coming from a single resident. The majority of complaints were related to noise impacts. The total number of complaints (120) was a significant reduction from the 2011-2012 reporting period which had a total of 359 complaints.

Mine-related complaints are managed in accordance with the Community Complaints Procedure as outlined in the Environmental Management Strategy.

3 DESCRIPTION OF THE PROPOSED MODIFICATION

Following a review of mine planning, MCO has identified opportunities to streamline the coordination and integration of Stage 2 mining activities with the existing Stage 1.

The OC4 South-West Modification includes the following key components:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure 4);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations with waste rock from OC1 (Figure 4).

3.1 MINING OPERATIONS

There would be no change to the open cut mining method due to the OC4 South-West Modification. (Section 2.3).

There would be no change to the approved underground longwall mining method (Section 2.3) due to the OC4 South-West Modification.

Mining activities at the Moolarben Coal Complex would continue to occur 24 hours per day.

3.1.1 Mining Extent

The OC4 South-West Modification does not include any alteration to the approved extent of open cut or underground mining (Figure 4).

3.1.2 Mine Schedule

The OC4 South-West Modification would not change the currently approved mine life (i.e. to 2038).

There would be no increase to the currently approved maximum annual ROM coal production or waste rock extraction rates for the OC4 South-West Modification.

An indicative mine schedule for the Moolarben Coal Complex incorporating the OC4 South-West Modification is provided in Table 2.

Table 2
Indicative Mine Schedule

Year	Waste Rock (Mbcm)	Open Cut ROM Coal (Mtpa)	Underground ROM coal (Mtpa)
2015	42.4	9.0	0
2016	55.0	13.0	4.0
2017	52.6	13.0	4.0
2018	52.6	13.0	4.0
2019	52.4	13.0	4.0
2020 to 2038	55.0*	13.0*	4.0*

* Anticipated maximum production rate per annum.

3.1.3 OC4 South-West Haul Road

The OC4 South-West Modification would involve the construction of the south-west haul road between OC4 and OC1 (Figure 4). As a result, the approved Stage 2 Haul Road would not be needed and consequently would not be constructed (Figure 4).

Approximately 5.1 ha of surface disturbance would be required for the OC4 south-west haul road.

Removal of the approved Stage 2 Haul Road would result in the following environmental benefits:

- up to approximately 18.5 ha of approved surface disturbance being avoided associated with the Stage 2 Haul Road, and therefore, a total net reduction in surface disturbance of 13.4 ha; and
- improved water management and reduced risk of uncontrolled sediment discharge due to the reduction in disturbed surface catchment.

The proposed south-west haul road route also provides significant operational benefits, including:

- shorter travel distances to the OC1 Workshop Facilities; and
- removal of the requirement for supporting administration facilities in the OC4 area associated with the temporary mine infrastructure area.

3.1.4 Mobile Fleet

Additional fleet items would be required to meet expected production

The additional fleet items would be of low noise emission standard (e.g. all new fleet would be XQ [extra quiet] models). An indicative revised mine fleet has been assessed and is provided in the Noise and Blasting Assessment (Appendix A).

3.1.5 Waste Rock Management

During the initial development of OC4, waste rock would either be placed in the approved out-of-pit emplacement area. Waste rock from OC4 would then be placed in-pit behind the advancing open cut.

There would be minor changes to the shape of the OC4 out-of-pit waste rock emplacement to accommodate the OC4 south-west haul road. There would be no increase to the extent or maximum height of the OC4 out-of-pit waste emplacement due to the OC4 South-West Modification.

3.1.6 Underground Access to UG4

The northern OC1 void would be backfilled to approximately pre-mining elevations with waste rock from OC1 (Figure 4) reducing the number of voids in the final landform to three.

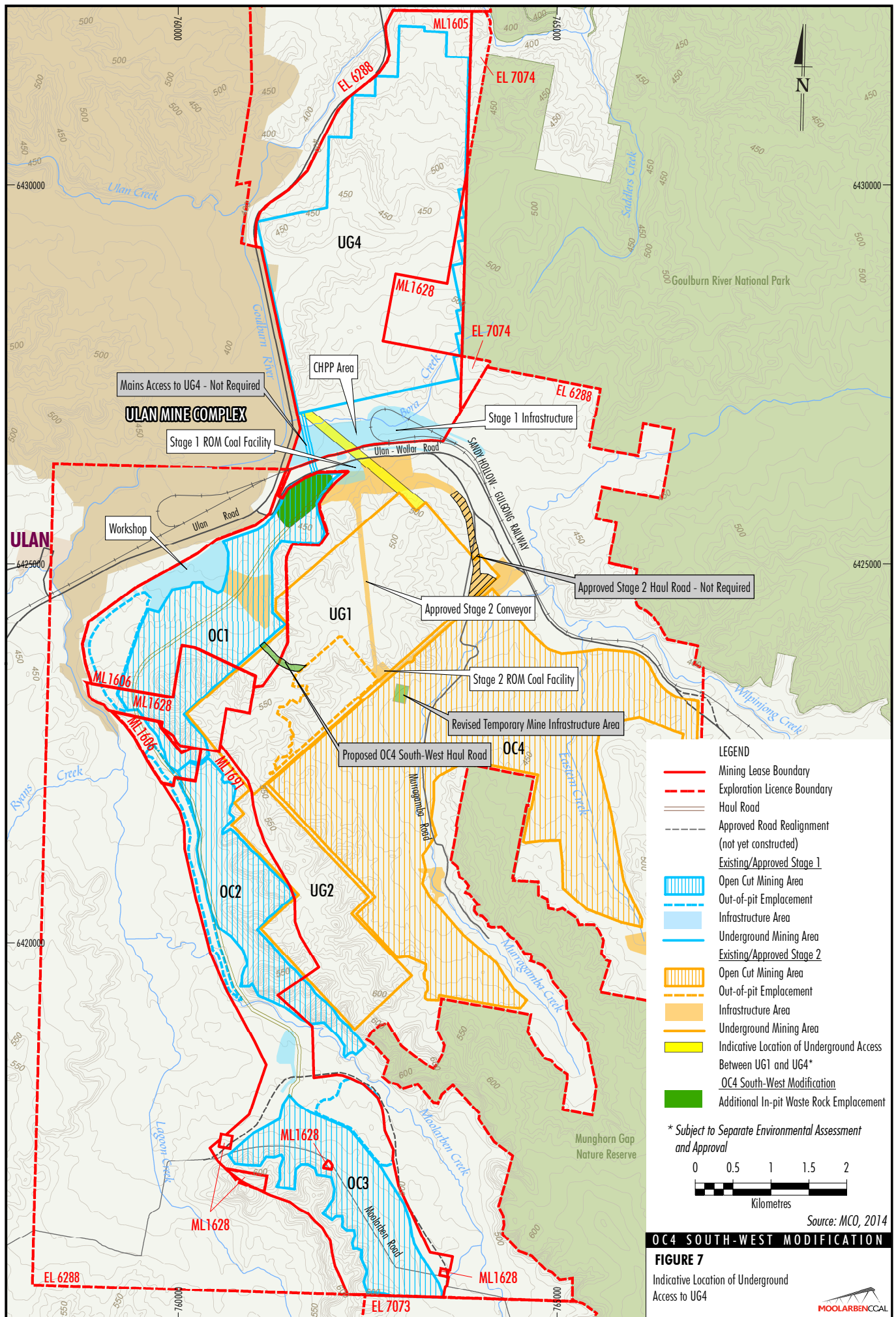
The backfilling of the northern OC1 void would result in the loss of access from the OC1 highwall to the approved UG4 which is scheduled to commence following the completion of UG1 and UG2. A revised access for UG4 would be sought as part of a separate EA and approval application. An indicative alternate access is shown on Figure 7.

3.1.7 Drill and Blast

There would be no change to the existing blasting technique, frequency or hours (Section 2.7) due to the OC4 South-West Modification.

3.1.8 Product Coal Transport

The OC4 South-West Modification would not change approved rates of maximum product transport (13 Mtpa) or the approved number of daily laden trains dispatched from site (up to five).



3.2 GENERAL INFRASTRUCTURE

Coal Handling and Preparation Infrastructure

There would be no change to the approved CHPP process or infrastructure (including Stage 1 ROM coal facility) or approved overland conveyors between OC4 and the Stage 1 ROM coal facility due to the OC4 South-West Modification.

Mine Infrastructure Area

Some Stage 2 administration facilities and mine infrastructure (e.g. muster area, crib room, car park and fuel farm) would be relocated to a temporary mine infrastructure area within the existing OC4 footprint (Figure 4).

Due to the shorter travel distance, mobile fleet operating within OC4 would use the OC1 Workshop Facilities.

The access road to OC4 off Ulan-Wollar Road would be retained.

3.3 WATER MANAGEMENT

Drainage structures would be constructed along the OC4 south-west haul road to capture and re-direct water from the haul road to mine water storages.

Runoff from the proposed OC4 south-west haul road would be captured in two water storages located within the currently approved disturbance area. The surface water management system already captures runoff from the OC4 south-west haul road area. In addition, the OC1 final void is not used as a water storage in the existing site water balance, and therefore backfilling the OC1 final void would not result in a loss of water storage capacity. Consequently negligible change to the water balance is anticipated (Appendix D). Notwithstanding, MCO would continue to undertake regular reviews of the water balance.

If stored water volume falls, MCO can source water through sharing arrangements with adjoining mines and/or from licensed water supply bores.

MCO can also manage excess water via off-site release in accordance with the requirements of EPL 12932, subject to stringent release criteria and conditions being met.

3.4 WASTE MANAGEMENT

The OC4 South-West Modification would not change the existing waste streams (Section 2.11) and accordingly, no changes to existing waste management practices at the Moolarben Coal Complex would be required.

3.5 MANAGEMENT OF DANGEROUS GOODS

The OC4 South-West Modification would not change the dangerous goods handled at the Moolarben Coal Complex (Section 2.12) and accordingly, no changes to the management of dangerous goods (e.g. hydrocarbons, explosives and chemicals) would be required.

3.6 WORKFORCE

The OC4 South-West Modification would not change the Moolarben Coal Complex operational workforce (Section 2.13).

3.7 CONSTRUCTION ACTIVITIES

There would be no additional construction activities associated with the OC4 South-West Modification.

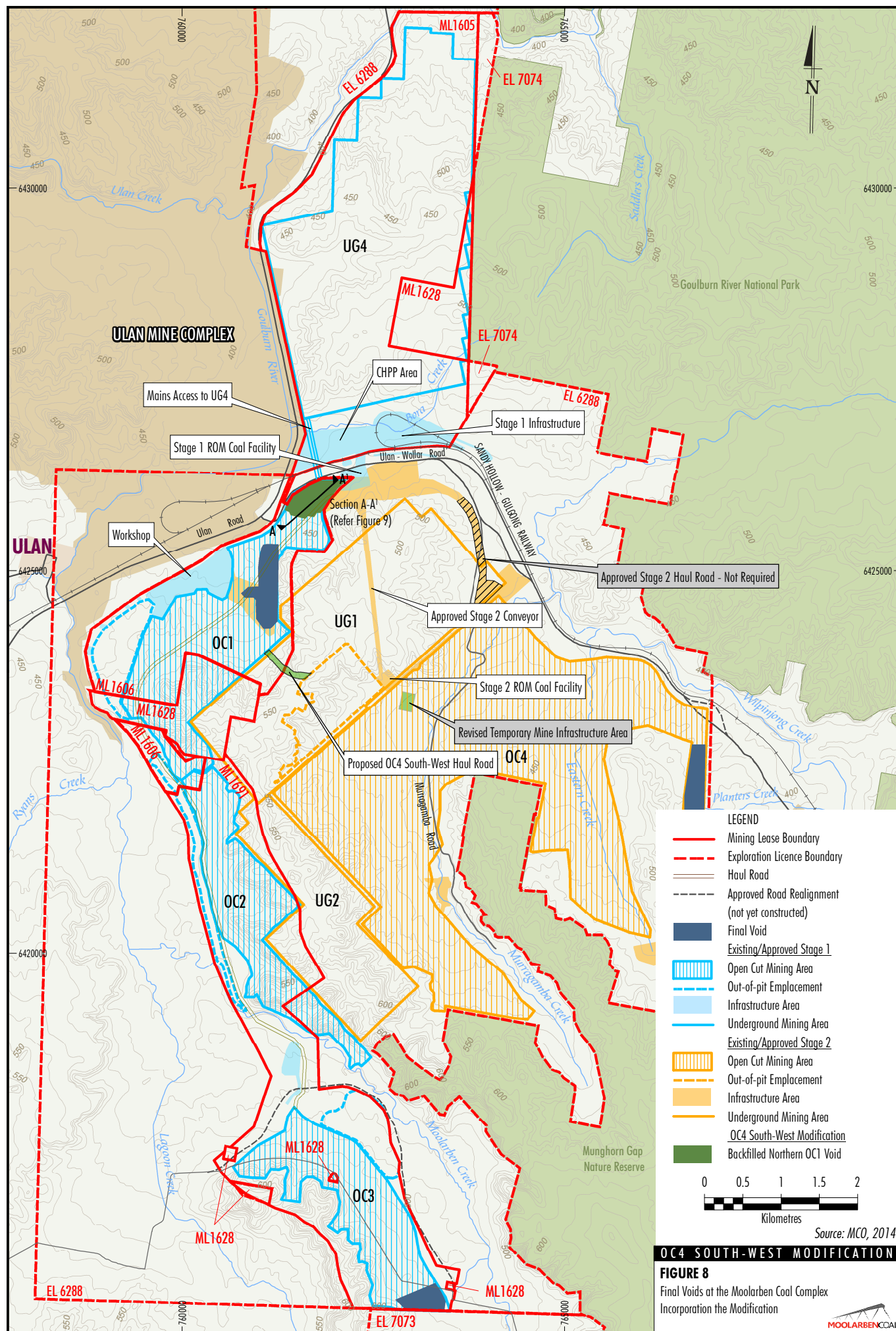
The proposed change to the haul road is considered to be part of the OC4 mining operations, as opposed to construction activities.

3.8 REHABILITATION AND FINAL LANDFORM

The approved rehabilitation objectives and concepts for the OC4 South-West Modification would remain generally unchanged with the exception of the following elements. Notwithstanding, a Rehabilitation Management Plan and MOP would be prepared to incorporate the OC4 South-West Modification.

3.8.1 Northern OC1 Final Void

The northern OC1 void would be backfilled to approximately pre-mining elevations with waste rock reducing the number of voids in the final landform across the Moolarben Coal Complex to three (Figure 8).

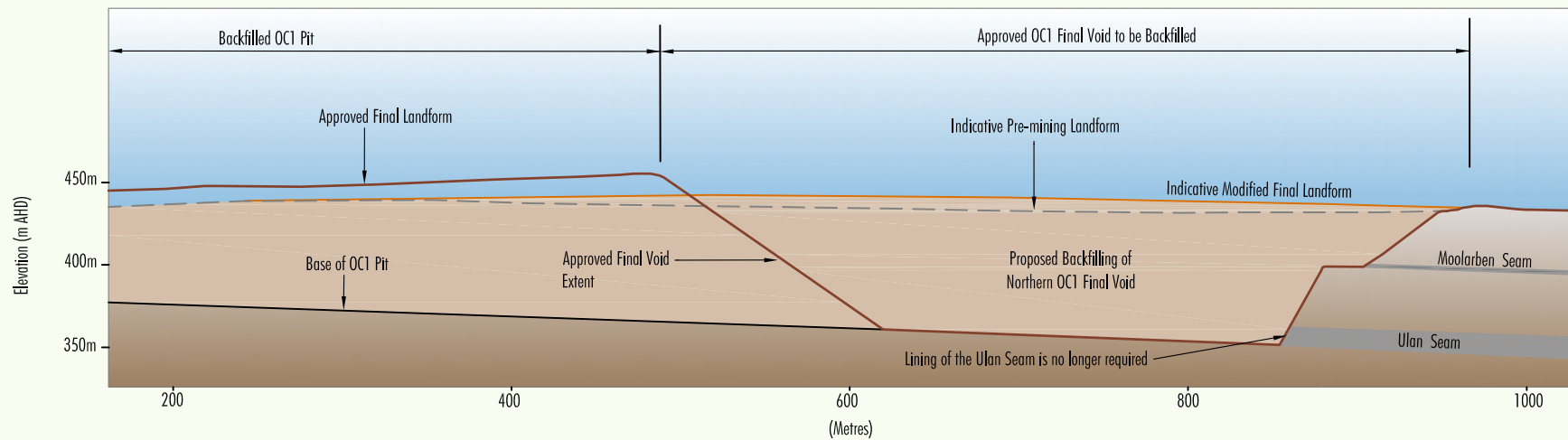


The backfilling of the northern OC1 final void would provide a beneficial post-mining rehabilitation outcome by integrating with the surrounding pre-mining landforms and reducing the amount of surface water that would be captured on-site by the post-mining landform. An indicative cross-section of the approved and proposed northern OC1 final landforms is shown on Figure 9.

As a consequence of backfilling the northern OC1 final void, there would no longer be a requirement to line the Ulan Seam as required by Condition 32 of Schedule 3 of the Stage 1 Project Approval (05_0117) (Attachment 1). MCO is seeking to remove this condition as part of the OC4 South-West Modification (Section 5.3.1).

3.8.2 OC4 South-West Haul Road

Rehabilitation of the OC4 south-west haul road would be undertaken prior to closure of the Moolarben Coal Complex. Following the cessation of mining, the OC4 south-west haul road would be re-profiled to free draining landforms, ripped and revegetated with woodland species.



Source: MCO, 2014

Section A-A¹
(Refer Figure 8)

OC4 SOUTH-WEST MODIFICATION

FIGURE 9

Conceptual Final Landform-Cross
Section of the Northern OC1 Final Void



4 ENVIRONMENTAL ASSESSMENT

The following sub-sections present the EA for the OC4 South-West Modification, including a description of the existing environment, an assessment of the potential impacts of the OC4 South-West Modification on the environment, and where relevant, a description of the measures that would be implemented to avoid, minimise, mitigate and/or offset the potential impacts.

4.1 NOISE

A Noise Assessment for the OC4 South-West Modification was undertaken by SLR Consulting (2015) (Appendix A).

Aspects relating to noise emissions are discussed in the subsections below.

Potential blasting impacts are discussed separately in Section 4.8.2.

4.1.1 Background

Project Approval Noise Limits

A number of noise assessments have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Project. The most recent assessment of operational noise impacts for the approved Moolarben Coal Complex (incorporating Stages 1 and 2) was conducted by EMGA Mitchell McLennan (EMM) (2013a).

The assessment predicted that six privately-owned residences would experience noise levels above the Project-specific noise limit (PSNL) of 35 A-weighted decibels (dBA) equivalent continuous noise level (dBA $L_{Aeq}(15\text{minute})$) (EMM, 2013a). MCO has since purchased one of these properties and a further property (Receiver 63) is subject to a private agreement with MCO.

These exceedances of the PSNL were approved, subject to the management, mitigation and monitoring of noise impacts from the Moolarben Coal Complex in accordance with the requirements of Project Approvals (05_0117 and 08_0135). This includes:

- the right to request property acquisition for Receiver 32 or where noise exceeds the Project Approval Land Acquisition Criteria at privately-owned residences or over 25% or more of privately-owned land;
- Project Approval noise limits for privately-owned residences;
- the right to request mitigation measures for residences where noise levels are greater than the Project Approval Noise Mitigation Criteria; and
- the right for the NSW Department of Education and Communities to request reasonable and feasible noise (and dust) mitigation measures to be implemented at the Ulan Public School or for MCO to contribute to or meet reasonable costs towards relocating the Ulan Public School.

Noise Management and Monitoring

The approved Noise Management Plan³ has been prepared to manage Project-specific and cumulative noise impacts associated with the Moolarben Coal Complex. The Noise Management Plan describes the noise monitoring program, which consists of a combination of operator-attended and continuous real-time noise monitoring, as well as two Automatic Weather Stations (AWS) (Figure 10). An additional AWS not described in the Noise Management Plan has been established near OC2 (Figure 10).

MCO implements a range of noise control and management measures at the Moolarben Coal Complex, including mine planning controls, operational controls, engineering controls, a real-time response protocol, meteorological forecasting and continuous improvement to identify and manage noise impacts aimed to achieve compliance with the approved noise criteria.

Reasonable and feasible on-site noise controls implemented to minimise noise emissions from the Moolarben Coal Complex include:

- attenuation of mobile equipment such as haul trucks, shovels and excavators, dozers and drills;
- fitting of a number of haul trucks with Dura-Trays to reduce the noise emissions associated with loading and unloading (Figure 11);
- locating mobile fleet (e.g. excavators) behind pit walls and at low elevations to shield noise emissions during adverse weather conditions (Figure 11);

³ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Noise Management Plan.

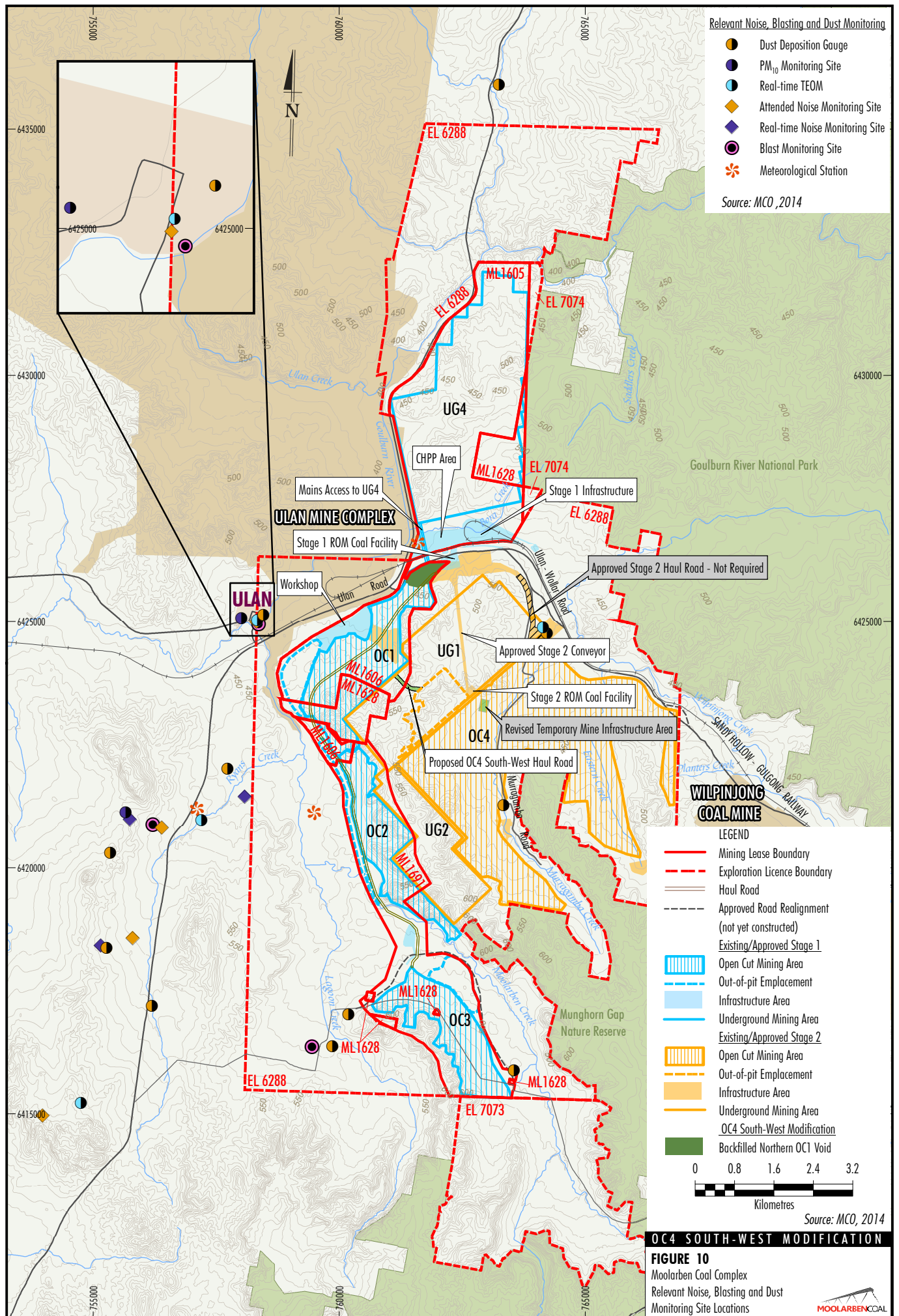




Plate 1 Haul truck fitted with Duratray



Plate 2 Excavator shielded by pit wall



Plate 3 Overburden dump area shielded by side of waste emplacement



Plate 4 Typical berms/bunding along haul roads

Source: MCO, 2014

OC4 SOUTH-WEST MODIFICATION

FIGURE 11

Current Noise Management Measures



- construction of steps in waste emplacements to allow dumping to occur at lower elevations during adverse weather conditions (Figure 11);
- construction of berms/bunds along haul roads which are exposed to receivers (Figure 11);
- implementation of meteorological forecasting to inform daily operations;
- use of real-time noise monitoring data that incorporate automatic noise alarms to assist operational personnel in proactive management of noise impacts; and
- use of operational personnel to monitor real time noise data to assist production supervisors in proactive management of noise impact.

Operator-attended noise monitoring is used to demonstrate compliance with Project Approval noise criteria, whilst continuous real-time monitoring is used as a noise management tool to assist MCO to take pre-emptive noise management actions to avoid potential non-compliances.

MCO has also recently implemented new software that assists in pro-active management of noise (and dust) emissions. The system provides daily reports and predictions of upcoming meteorological conditions and potential noise risks. Based on prevailing wind conditions, MCO can strategically alter its operations to reduce these impacts.

A description of these management measures is provided in Appendix A.

MCO maintains a complaints register in accordance with its Project Approvals (05_0117 and 08_0135). All noise related complaints received by MCO are responded to and investigated in accordance with the Community Complaints Procedure detailed in the Noise Management Plan. A review of noise related complaints is provided in Appendix A.

MCO reports noise monitoring results in its Monthly Environmental Monitoring Report, Quarterly Environmental Noise Monitoring Report and Annual Environmental Management Report (AEMR)/Annual Review. A review of the noise monitoring reports is provided in Appendix A.

4.1.2 Environmental Review

Noise modelling was conducted by SLR Consulting (2015) to predict potential noise impacts from the Moolarben Coal Complex incorporating the OC4 South-West Modification.

SLR Consulting conducted a noise investigation survey in July and August 2014 to validate the Moolarben Coal Complex noise model, reflect as-built features and to review the model calibration (Appendix A).

Assessable Meteorological Conditions

The NSW *Industrial Noise Policy* assessable meteorological noise modelling parameters are presented in Appendix A, and are generally consistent with the previously assessed meteorological conditions.

The Stage 1 Modification 9 noise assessment for the approved Moolarben Coal Complex assessed noise impacts during temperature inversions up to 3.9 degrees Celsius (°C) per 100 m.

Direct temperature gradient measurement at the 60 m high temperature tower at the Wilpinjong Coal Mine has provided additional data regarding temperature gradients that occur in the area (Appendix A).

Based on analysis of available data between August 2011 and July 2014, SLR Consulting identified that noise impacts during temperature gradients up to 5.2°C per 100 m were assessable under the NSW *Industrial Noise Policy*.

Modelling Scenarios

The OC4 south-west haul road would bring OC4-related haul truck movements closer to potential private receivers to the west of the Moolarben Coal Complex, in particular during the early years of the OC4 South-West Modification (Figure 4).

Therefore, SLR Consulting (2015) modelled two key scenarios in the early years of the OC4 South-West Modification to assess potential noise impacts associated with the modified Moolarben Coal Complex (2016 and 2018 mine scenarios). These scenarios are representative of potential maximum noise impacts at Ulan and Cooks Gap (Appendix A). Further justification for the scenario years is provided in Appendix A.

Reasonable and Feasible Mitigation Measures

Where relevant, existing mitigation measures (Section 4.1.1) were incorporated into the noise modelling conducted for the OC4 South-West Modification.

In addition, the following reasonable and feasible noise mitigation measures would be implemented for the OC4 South-West Modification (Appendix A):

- Extra-quiet (XQ or similar) mobile equipment fleet and “low noise” fixed plant (i.e. conveyor drives and conveyor idlers) would be purchased.
- Acoustic bunding would be established at selected locations around the site, targeting haul roads.
- From 2018, waste rock emplacement in OC4 during evening and night-time would occur at relatively lower elevations, using the main waste rock emplacement to shield receivers from Cooks Gap from potential noise impacts.
- In-pit hauling of waste rock in OC1 would be maximised (i.e. restricting fleet to lower elevations).

Potential Impacts

Noise modelling for the Moolarben Coal Complex incorporating the OC4 South-West Modification shows that, with the implementation of reasonable and feasible mitigation measures and the continued implementation of the noise management strategy, no exceedances of the current Project Approval noise limits are predicted at any privately-owned receiver.

Indicative noise contours for night-time operations under adverse meteorological conditions for the Moolarben Coal Complex incorporating the OC4 South-West Modification in Years 2016 and 2018 are shown on Figures 12 and 13, respectively.

4.1.3 Mitigation Measures, Management and Monitoring

MCO will continue to mitigate, monitor and manage potential noise impacts from the Moolarben Coal Complex in accordance with the Noise Management Plan, which would be updated to incorporate the OC4 South-West Modification, via a combination of the following:

- reasonable and feasible mitigation measures;
- predictive meteorological forecasting, and associated pre-emptive noise management measures when adverse meteorological conditions are predicted;
- real-time noise monitoring and associated pre-emptive noise management measures when trigger levels (set below Project Approval noise limits) are exceeded; and

- attended noise monitoring to confirm ongoing compliance with Project Approval noise limits.

Ulan Public School

In accordance with the requirements of the Project Approvals (Attachments 1 and 2), MCO would:

- consult with Department of Education and Communities and, if requested, implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or
- on a reasonable basis relating to the adverse effect of noise and/or dust from the Moolarben Coal Complex, negotiate with Department of Education and Communities to contribute to or meet reasonable costs toward relocating the Ulan Public School.

4.2 AIR QUALITY

An Air Quality Assessment for the OC4 South-West Modification was undertaken by Todoroski Air Sciences (2015) (Appendix B).

Aspects relating to dust emissions are discussed in the subsections below.

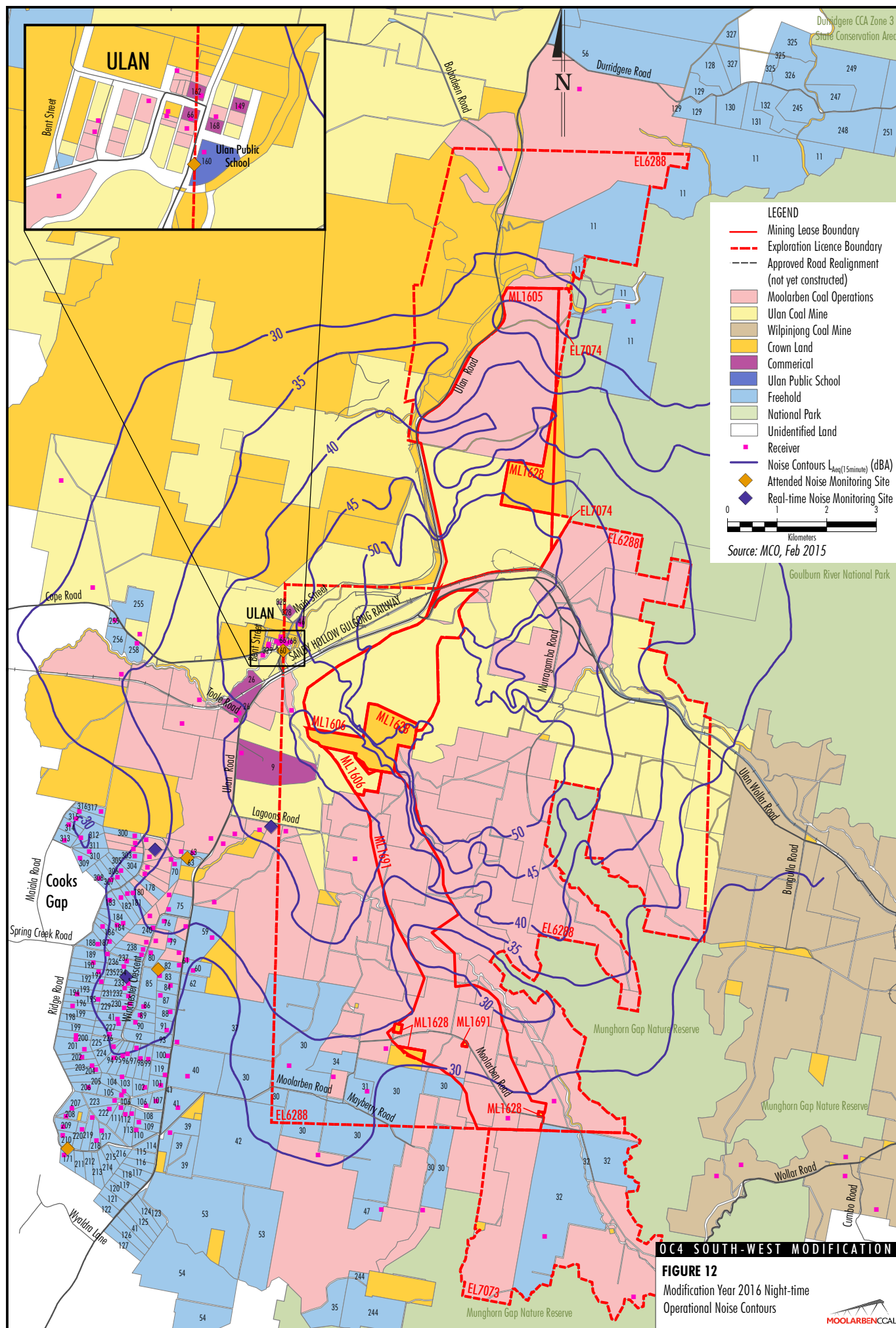
Greenhouse gas emissions are discussed separately in Section 4.8.3.

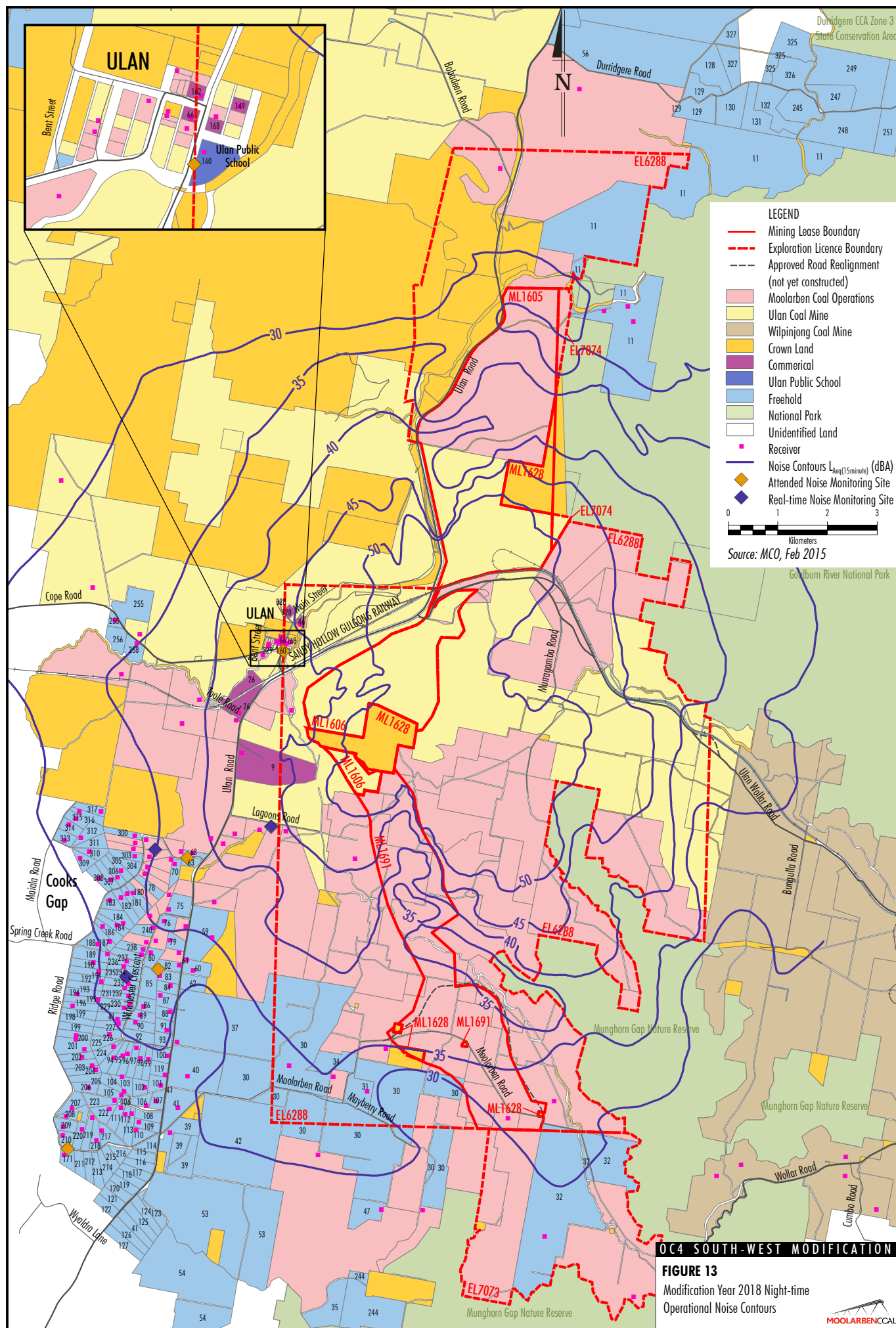
4.2.1 Background

Previous Assessment

A number of air quality assessments have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Project. The most recent assessment of the potential air quality impacts associated with the approved Moolarben Coal Complex (incorporating Stages 1 and 2) was undertaken by Todoroski Air Sciences (2013).

The assessment predicted there would be no exceedances of annual average criteria for particulate matter with diameter less than 10 microns (PM₁₀), total suspended particulate (TSP) or dust deposition levels due to emissions from the project only.





An exceedance of 24-hour average PM₁₀ criterion was predicted at one private-owned receiver on one day (Receiver 46⁴). An exceedance of the cumulative annual average PM₁₀ criterion was also predicted at Receiver 46 when emissions from the Moolarben Coal Complex were considered cumulatively with background sources (Todoroski Air Sciences, 2013).

Previous assessment of cumulative 24-hour average PM₁₀ impacts found there would be a low potential risk for cumulative 24-hour average PM₁₀ impacts due to the Moolarben Coal Complex (i.e. an exceedance for one day only was predicted when emissions from Moolarben Coal Complex were considered cumulatively with background sources) (Todoroski Air Sciences, 2013).

Air Quality Management and Monitoring

The approved Air Quality Management Plan (MCO, 2013)⁵ describes the air quality management and monitoring regime at the Moolarben Coal Complex.

The Air Quality Management Plan describes:

- Project Approval air quality criteria.
 - Dust monitoring locations and frequency, comprising (Figure 10):
 - TEOMs measuring PM₁₀ continuously (i.e. real-time monitoring);
 - High Volume Air Samplers (HVAS) measuring PM₁₀ on a one day in six cycle; and
 - dust deposition gauges.
 - Ongoing dust management measures.
 - Performance indicators (i.e. real-time response triggers set below Project Approval air quality criteria) which, if exceeded, trigger the implementation of additional dust management measures.
- limiting clearing and topsoil stripping activities as far as practicable during the drier months;
 - adoption of progressive rehabilitation of mining operations, to minimise exposed soils;
 - use of water carts on all trafficked areas to minimise dust generation as necessary and practicable;
 - use of constructed roads only, minimisation of access roads and removal of obsolete access roads;
 - employing appropriate dust suppression methods at the coal handling facilities;
 - maintaining coal handling areas and stockpiles in a moist condition using water carts and/or water sprays;
 - relocation, modification and/or temporarily ceasing mining operations in adverse meteorological conditions to minimise short term air quality impacts;
 - use of dust suppression systems on stationary and mobile plant (such as the dump hopper, transfer stations, drill rigs);
 - long term topsoil stockpiles, not used for over 6 months are revegetated with grass;
 - use of dust aprons and water injection systems on drills;
 - partial enclosure of coal transfer conveyors where possible;
 - watering of out-of-pit emplacement areas that would remain inactive for prolonged period where practicable creating a dry crust layer to reduce dust emissions associated with wind erosion; and
 - increasing excavator bench height when working on drier weathered rock near the surface to allow blending with underlying overburden which contains more moisture.

Air quality controls currently implemented at the Moolarben Coal Complex include:

- disturbance of only the minimum area necessary for mining (e.g. typically only one strip ahead of the active mining operations);

MCO has also recently implemented new software that assists in pro-active management of dust (and noise) emissions. The system provides daily reports and predictions of upcoming meteorological conditions and potential dust risks. Based on prevailing wind conditions, MCO can strategically alter its operations to reduce these impacts.

In accordance with the requirements of Project Approvals (05_0117 and 08_0135), MCO co-ordinates the air quality management on-site with air quality management at the Ulan and Wilpinjong Coal Mines to minimise cumulative air quality impacts.

⁴ Receiver 46 is a commercial property and is listed as a property that can request acquisition in the Ulan Coal Mine Development Consent (08_0184).

⁵ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Air Quality Management Plan.

MCO reports air quality monitoring results in its Monthly Environmental Monitoring Report and AEMR/Annual Review.

Pollution Reduction Programs

Pollution Reduction Programs (PRPs) are included as requirements of EPL 12932. As such, MCO implements dust control measures in accordance with the conditions of EPL 12932 described below:

- PRP U1: *Particulate Matter Control Best Practice Implementation - Wheel Generated Dust*, which requires a haul road dust control efficiency of 80% or more to be achieved and maintained at the Moolarben Coal Complex. A monitoring program demonstrated a control efficiency of 93 to 99% was achieved through the use of watering of haul roads, and that a control efficiency of 90% could be maintained on a day-to-day basis (Appendix B).
- PRP U2: *Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions*, which requires MCO to alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions.
- PRP U3: *Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden*, which requires MCO to assess the effectiveness of implementing dust management controls while loading and dumping overburden.

Existing Air Quality

Air quality monitoring results reported in the 2012 - 2013 AEMR and 2013 - 2014 AEMR show cumulative dust levels were below Project Approval criteria, with the exception of isolated exceedances of the 24-hour PM₁₀ criterion, which were attributable to regional smoke haze events and/or local background sources not associated with the Moolarben Mine Complex.

Complaints

MCO maintains a complaints register in accordance with its Project Approvals (05_0117 and 08_0135). All dust related complaints received by MCO are responded to and investigated in accordance with the Community Complaints Procedure detailed in the Air Quality Management Plan.

There was one complaint reported in the 2012-2013 AEMR relating to dust. There have been a total of three complaints reported over the last three AEMR reporting periods (i.e. 2010 to 2013). There have been two dust related complaints between 1 January 2014 and 30 November 2014.

4.2.2 Environmental Review

Modelling Methodology

Air quality dispersion modelling has been conducted by Todoroski Air Sciences (2015) to assess potential impacts for the operational scenario representative of maximum potential air quality impacts for the Moolarben Coal Complex incorporating the OC4 South-West Modification, particularly for receivers to the west.

Relevant to potential air quality impacts, 2016 was chosen for the air quality modelling scenario as this year includes (Appendix B):

- maximum ROM coal and waste rock extraction;
- first year of maximum fleet operations in OC4;
- maximum fleet using the proposed OC4 south-west haul road;
- fleet in OC4 focused in the west (i.e. potential maximum impacts at Ulan and Cooks Gap); and
- emplacement of waste rock on the OC4 out-of-pit waste emplacement.

Emissions Estimation

Emissions of TSP (i.e. dust) associated with the 2016 modelling were estimated by Todoroski Air Sciences (2015) using contemporary emission estimation methodologies.

Annual emissions of TSP for the Moolarben Coal Complex incorporating the OC4 South-West Modification were estimated to be generally similar or marginally lower than those estimated for the approved Moolarben Coal Complex in the previous assessment (Appendix B).

Meteorological Conditions

The CALMET meteorological model developed by Todoroski Air Sciences for the Stage 1 Modification 9 assessment was revised to incorporate changes in topography for the Year 2016 mine plan (Appendix B).

Predicted Impacts

Project Only

Concentrations of TSP, PM₁₀ and particulate matter 2.5 microns or less in diameter (PM_{2.5}) as well as dust deposition levels were predicted by Todoroski Air Sciences (2015).

With the implementation of proactive and reactive management measures, there were no predicted exceedances of the 24-hour average PM₁₀ criteria, or annual average TSP, PM₁₀ or dust deposition criteria at any privately-owned residence due to emissions from the project only (i.e. the Moolarben Coal Complex incorporating the OC4 South-West Modification) (Appendix B).

In addition, 24-hour average and annual average PM_{2.5} concentrations were predicted to be below reporting guidelines at all privately-owned residences (Appendix B).

Contours showing predicted project only 24-hour PM₁₀ concentrations are provided on Figure 14.

Cumulative

Given annual dust emissions are estimated to be similar or lower than those previously assessed for the Moolarben Coal Complex, and no additional project only exceedances of air quality criteria are predicted, Todoroski Air Sciences (2015) concluded it is unlikely there would be any increase in potential cumulative air quality impacts due to the OC4 South-West Modification (Appendix B).

4.2.3 Mitigation Measures, Management and Monitoring

MCO would continue to implement the existing air quality management measures described in the Air Quality Management Plan and required by the PRPs to minimise dust emissions and comply with relevant dust criteria in Project Approvals (05_0117 and 08_0135). The Air Quality Management Plan would be updated, where necessary, to incorporate the OC4 South-West Modification.

Ulan Public School

In accordance with the requirements of the Project Approvals (Attachments 1 and 2), MCO would:

- consult with Department of Education and Communities and, if requested, implement agreed reasonable and feasible measures to ameliorate potential dust and/or noise impacts to Ulan Public School; or
- on a reasonable basis relating to the adverse effect of dust and/or noise from the Moolarben Coal Complex, negotiate with Department of Education and Communities to contribute to or meet reasonable costs toward relocating the Ulan Public School.

4.3 ECOLOGY

A Flora and Fauna Impact Assessment was prepared for the OC4 South-West Modification by EcoLogical Australia (2015) and is presented in Appendix C.

4.3.1 Background

Detailed ecological impact assessments were prepared by Moolarben Biota (2006) and Ecovision (2008) for Stages 1 and 2 of the Moolarben Coal Project respectively. An ecological impact assessment was also undertaken in 2012 for the Moolarben Coal Project Stage 1 Modification 9 EA (EMM, 2013b).

In addition to the above, specific flora and fauna field surveys were conducted in the OC4 South-West Modification disturbance area (i.e. associated with the OC4 south-west haul road) and surrounds in July 2014 by EcoLogical Australia (Appendix C).

The 2014 surveys consisted of validating BioMetric vegetation types, identifying floristic structure, targeting threatened flora and fauna searches and undertaking habitat assessment. Whilst some threatened species were out of season for survey (e.g. *Diuris tricolor*), potential habitat for these species was targeted during the field survey (Appendix C).

Vegetation Communities

Vegetation communities were mapped within the OC4 South-West Modification disturbance area by EcoLogical Australia (2015) based on BioMetric vegetation types. Vegetation communities mapped by EcoLogical (Appendix C) are shown on Figure 15 and described in Table 3.

Vegetation Communities

- Grey Gum - Narrow-leaved Stringybark - Ironbark Woodland on ridges of the upper Hunter Valley, Sydney Basin (HU552)
- White Box - Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin (HU653)

Source: Ecological, 2014 and MCO, 2014

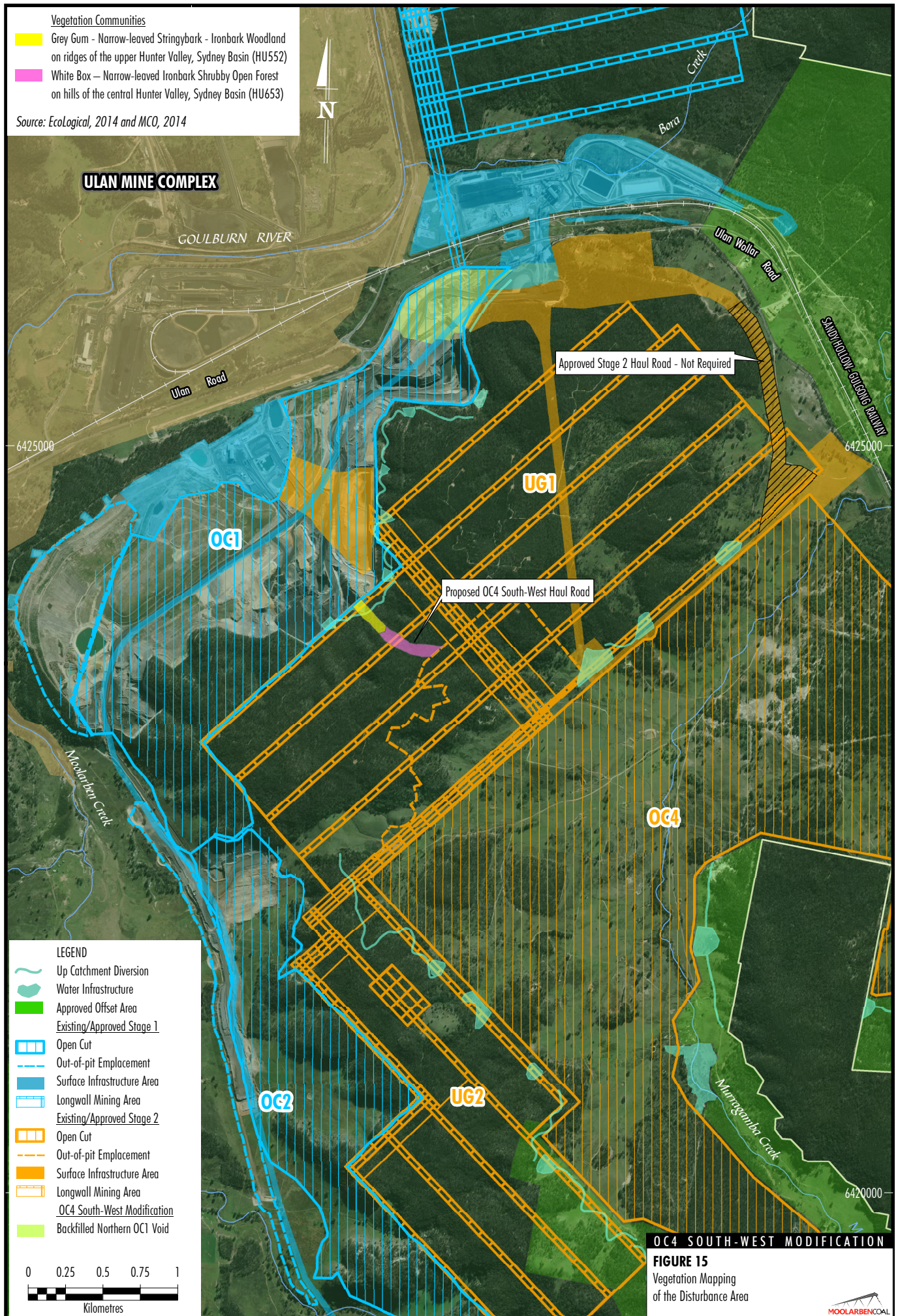


Table 3
Native Vegetation Communities Recorded in the
OC4 South-West Modification Disturbance Area

Biometric Vegetation Types	Approximate Area (ha)
Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland on ridges of the upper Hunter Valley, Sydney Basin (HU552)	1.8
White Box – Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin (HU653)	3.3
Total	5.1

Source: Appendix C.

Threatened Flora Species and Populations

No threatened flora species or populations listed under the TSC or EPBC Acts were recorded within the OC4 South-West Modification disturbance area by the 2014 surveys undertaken by EcoLogical. Nor have they been recorded in this area by any other surveys conducted at the Moolarben Coal Complex for past assessments (Appendix C).

The OC4 South-West Modification disturbance area is not considered potential habitat for *Diuris tricolor* or any other threatened flora species (Appendix C).

Threatened Fauna Species and Populations

No threatened fauna species or populations listed under the TSC Act and/or the EPBC Act were recorded within the OC4 South-West Modification disturbance area by the 2014 surveys undertaken by EcoLogical. Nor have they been previously recorded in this area by any of the other surveys conducted at the Moolarben Coal Complex for past assessments (Appendix C).

Fauna Habitat

Fauna habitat in the vicinity of OC4 South-West Modification disturbance area consists of a suite of broad habitat elements including:

- derived native grasslands;
- shrubbery;
- mature woodland and paddock trees (flower, lerp and mistletoe bearing);
- hollow-bearing live trees and dead trees (stags);
- large woody debris (log and bark on the ground);
- sandstone outcrops and overhangs; and

- water impoundments (dams and ponds).

A detailed description of each habitat element is provided in Appendix C.

4.3.2 Environmental Review

Potential Impacts

Vegetation and Fauna Habitat Clearance

The approved Stage 2 haul road requires the clearance of approximately 18.5 ha of native vegetation (including woodland and derived native grassland). The proposed OC4 south-west haul road requires clearing of approximately 5.1 ha of native vegetation, some 13.4 ha less than the approved clearance. Therefore, the OC4 South-West Modification would result in a net reduction of native vegetation required to be cleared at the Moolarben Coal Complex.

Fragmentation of habitat occurs where areas that were once continuous become divided into separate, isolated fragments by non-woodland areas. The approved Stage 2 disturbance footprint includes a conveyor (and associated access track) through the same vegetation and parallel with the proposed OC4 south-west haul road. The approved Stage 2 disturbance footprint also includes a haul road around the north east edge of the woodland vegetation as well as clearance for ancillary works. Therefore, the proposed OC4 south-west haul road would not significantly alter potential disturbance/fragmentation impacts (i.e. in comparison to the currently approved Moolarben Coal Complex).

Threatened Species, Populations and Communities

Given no threatened species, populations or communities have been identified in the OC4 South-West Modification disturbance area, and given there would be a total net reduction in disturbance, EcoLogical Australia (2015) concluded there would be no significant impact on threatened species, populations and communities and migratory species listed under the EPBC Act and/or TSC Act (Appendix C).

Pest Species

MCO would continue to implement mitigation measures including feral animal management and control in accordance with the Biodiversity Management Plan.

Cumulative Impacts

No additional ecological impacts are expected as a result of the OC4 South-West Modification, and therefore, no additional cumulative impacts are expected.

4.3.3 Mitigation Measures, Management, Monitoring and Offset

The nature and scale of the vegetation to be cleared as part of the OC4 South-West Modification is considered minor when compared with the native vegetation within the currently approved Stage 2 disturbance footprint, and the significant Biodiversity Offset Strategy developed for Stage 2.

In addition, the OC4 South-West Modification would result in a reduction (i.e. of 13.4 ha) in the total approved native vegetation disturbance area at the Moolarben Coal Complex (Section 4.3.2).

Therefore, the Biodiversity Offset Strategy developed for Stage 2 adequately offsets the proposed impacts from the OC4 South-West Modification, with surplus area (Appendix C).

Notwithstanding, MCO would continue to implement management and mitigation measures at the Moolarben Coal Complex in accordance with the Biodiversity Management Plan, including:

- implementation of a vegetation clearance protocol including delineation of areas to be cleared, pre-clearing surveys, management of impacts to fauna, vegetation clearance procedures, collection and reuse of habitat features, where feasible;
- clear demarcation of clearing zones to restrict access;
- preparation of Ground Disturbance Permits to be approved by the Environment and Community Manager prior to the commencement of clearing activities;
- management measures for weeds and pests; and
- topsoil removed during construction works would be stockpiled and used in rehabilitation areas.

The Biodiversity Management Plan would be updated, where necessary, to incorporate the OC4 South-West Modification.

4.4 SURFACE WATER RESOURCES

A Surface Water Assessment Review for the OC4 South-West Modification was undertaken by WRM Water & Environment (2015). The Surface Water Assessment Review is presented in Appendix D.

4.4.1 Background

Regional Hydrology

The Moolarben Coal Complex is located in the Upper Goulburn River and Wollar Creek sub-catchments, which have catchment areas of approximately 2,455 square kilometres (km²) and 532 km², respectively. Both sub-catchments drain to the Goulburn River which flows in an easterly direction, eventually joining the Hunter River approximately 150 km downstream of the Moolarben Coal Complex.

Moolarben Creek and Bora Creek are tributaries of the Upper Goulburn River sub-catchment and flow along the western and northern boundaries of the Moolarben Coal Complex (Figure 16).

Wilpinjong Creek is a tributary of Wollar Creek sub-catchment and flows along the east and north-eastern boundaries of the Moolarben Coal Complex into Wollar Creek, before joining the Goulburn River approximately 26 km downstream of the Moolarben Coal Complex (Figure 1).

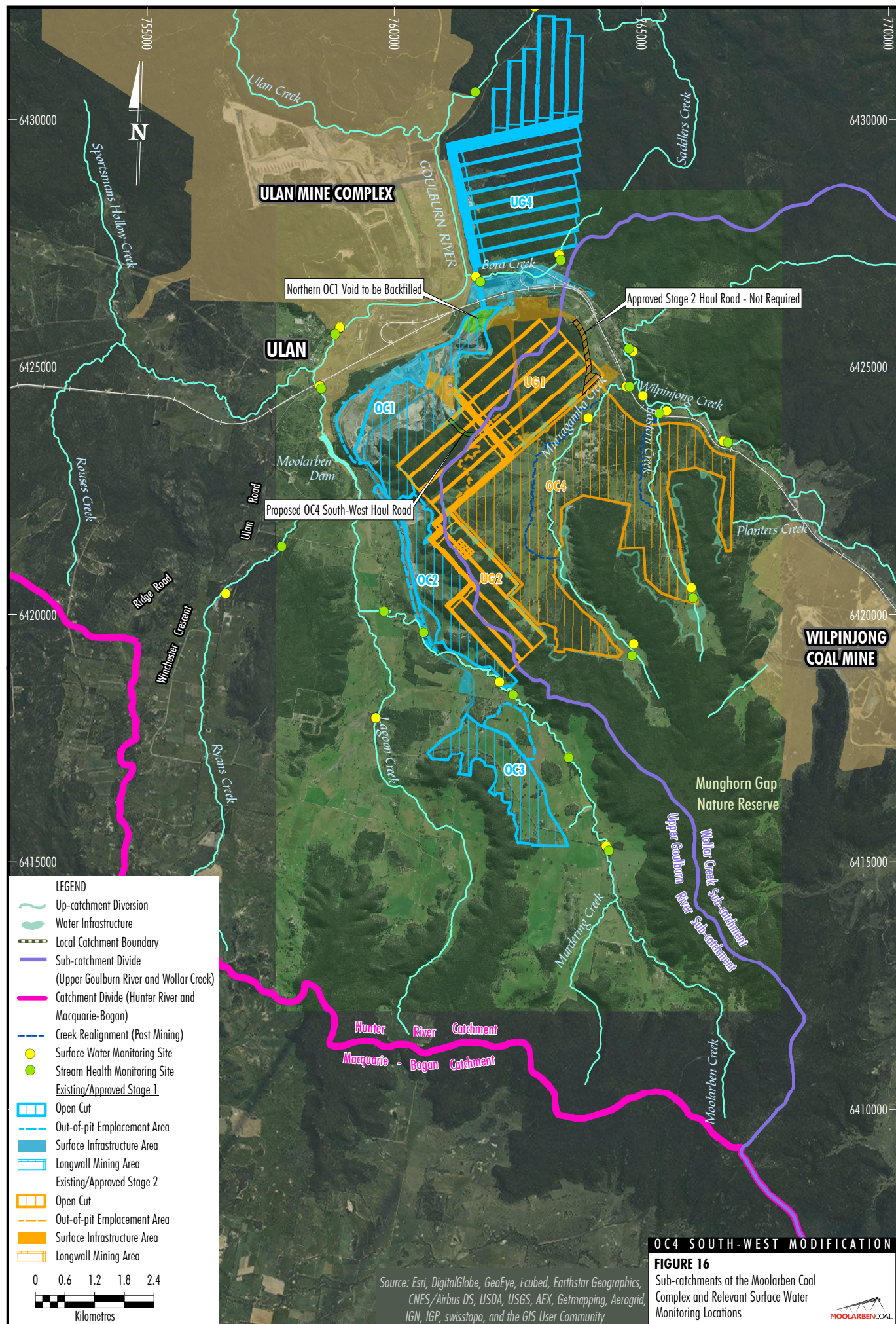
Site Water Management and Monitoring

Surface water monitoring and management at the Moolarben Coal Complex is conducted in accordance with the Water Management Plan, including Erosion and Sediment Control Plan, Surface Water Monitoring Program and Surface and Ground Water Response Plan⁶.

A review of the available surface water monitoring data conducted by WRM Water & Environment in 2013 concluded that the existing operations were not adversely affecting the quality of receiving waters (WRM Water & Environment, 2013).

The Moolarben Coal Complex surface water monitoring sites are shown on Figure 16.

⁶ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Water Management Plan.



4.4.2 Environmental Review

Site Water Management

A description of the water management system for the OC4 South-West Modification is described in Section 3.3.

WRM Water & Environment (2015) reviewed the site water balance for the OC4 South-West Modification. It was concluded there would be no significant change to the site water balance, given (Appendix D):

- The OC4 south-west haul road is located within a catchment area currently reporting to water storages in the approved water management system (i.e. there would be no increase in catchment area reporting to the water management system).
- The OC1 final void (to be backfilled) was not proposed to be used as a water storage in the currently approved water management system, and therefore, there would be no loss of water storage.

Stream Flows

The disturbance associated with the approved Stage 2 haul road would not be required as a result of the OC4 South-West Modification (i.e. 18.5 ha of disturbance would be avoided). Runoff from this area would no longer be required to be collected in the water management system. Therefore, the OC4 South-West Modification would result in a reduction in potential impacts to flows in Wilpinjong Creek (i.e. in comparison to the currently approved Moolarben Coal Complex) due to the reduction in catchment excision.

The OC1 final void would be backfilled to approximately pre-mining elevations creating a final landform that, following rehabilitation, would drain to Bora Creek and the Goulburn River. Therefore, the OC4 South-West Modification would also result in a reduction in potential impacts to flows in Bora Creek and the Goulburn River (i.e. in comparison to the currently approved Moolarben Coal Complex) due to the reduction in catchment excision in the long-term.

Surface Water Quality

Given no significant change to the site water balance is expected as a result of the OC4 South-West Modification (Appendix D), no change to the existing controlled release limits specified in EPL 12932 would be required. Therefore, no additional potential impacts to surface water quality in the receiving environment are expected as a result of the OC4 South-West Modification (Appendix D).

4.4.3 Mitigation Measures, Management and Monitoring

Surface water monitoring and management for the Moolarben Coal Complex would continue to be conducted in accordance with the Water Management Plan.

The Water Management Plan would be reviewed and, where necessary, updated to incorporate the OC4 South-West Modification. Regular reviews of the site water balance would continue to be undertaken over the life of the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.5 GROUNDWATER RESOURCES

4.5.1 Background

A number of groundwater investigations, assessments and reviews have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Complex. Recent groundwater assessments undertaken for the approved Moolarben Coal Complex include:

- Moolarben Coal Complex Stage 2 PPR Groundwater Impact Assessment November 2011 (RPS Aquaterra, 2012);
- Moolarben Coal Complex Stage 2 PPR Response to Submissions Additional Groundwater Impact Assessment (RPS Aquaterra, 2012); and
- Moolarben Coal Project Stage 1 Optimisation Modification Groundwater Assessment (AGE, 2013).

RPS Aquaterra (2012) predicted that drawdown impacts on privately-owned bores from the approved Moolarben Coal Complex would not exceed 0.6 m and therefore potential impacts to groundwater users would be minimal.

Groundwater monitoring and management at the Moolarben Coal Complex is conducted in accordance with the Water Management Plan, including the approved Surface and Ground Water Response Plan⁷.

The Moolarben Coal Complex groundwater monitoring sites are shown on Figure 6.

4.5.2 Environmental Review

The OC4 South-West Modification would not change the approved extent of the open cut pits or underground mines, or increase the maximum mining rate. Therefore, no increase in previously predicted groundwater inflow or drawdown is expected as a result of the OC4 South-West Modification.

Given the above, no additional water licence entitlements would be required as a result of the OC4 South-West Modification.

4.5.3 Mitigation Measures, Management and Monitoring

Groundwater monitoring and management for the Moolarben Coal Complex would continue to be conducted in accordance with the Water Management Plan.

4.6 VISUAL

4.6.1 Background

A number of visual impact assessments have been prepared for the approved Moolarben Coal Complex including:

- Moolarben Coal Project Stage 1 Optimisation Modification Visual Impact Assessment (EMM, 2013c) which assessed the impacts of Stage 1 Modification 9.

Key potential viewpoints assessed in previous visual impact assessments for the Moolarben Coal Complex included Ulan, Ulan Road, Ulan-Wollar Road, Ridge Road, Moolarben Road, Winchester Crescent and Cope Road (Figure 17).

The level of visual impact of the approved mine from potential viewpoints varies with the progress of the open cuts. Views of the Moolarben Coal Complex are unimpeded from Ulan Road and Ulan-Wollar Road and include the approved out-of-pit emplacements, open cut pits, infrastructure and progressively rehabilitated mine landforms.

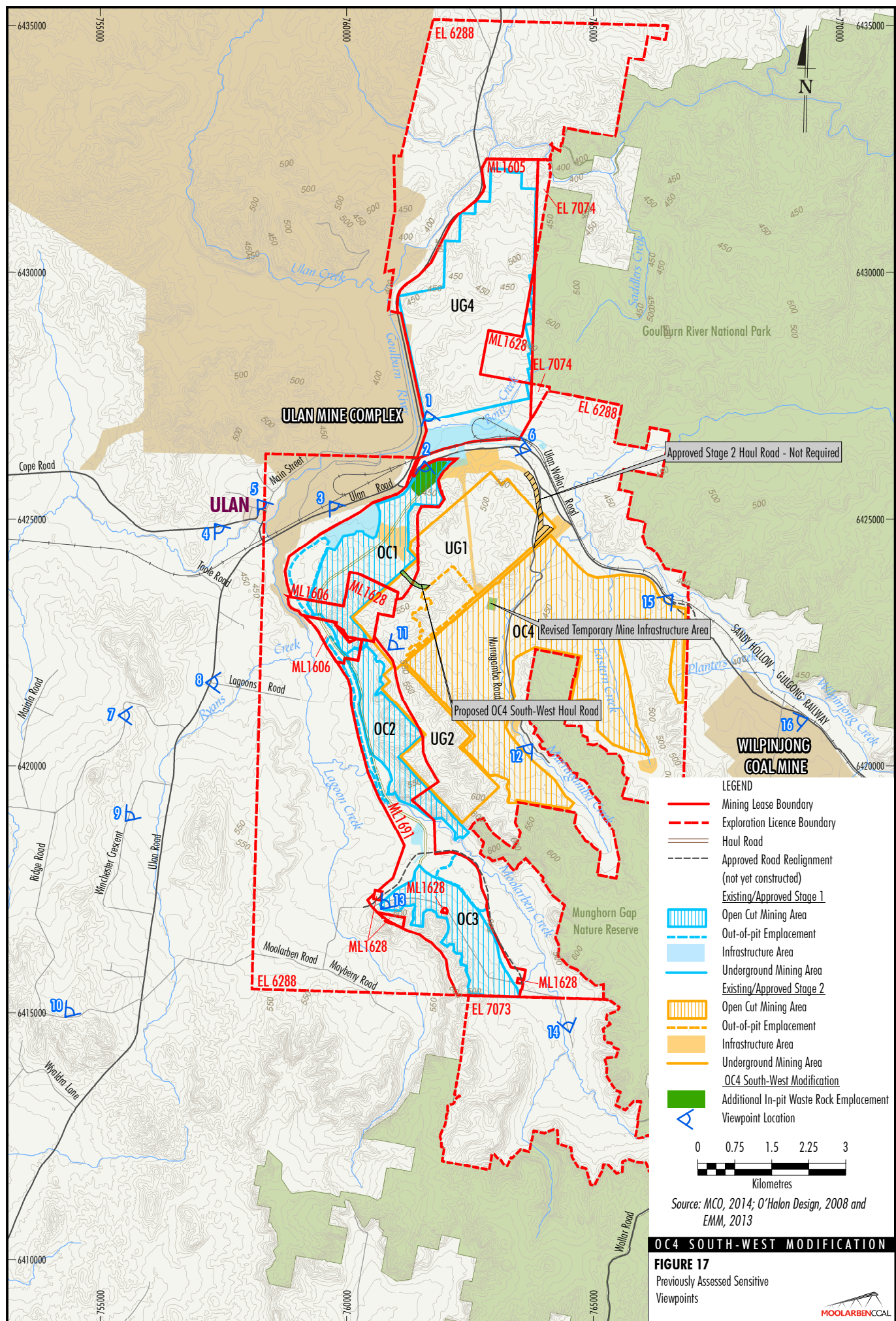
O'Hanlon Design (2006) concluded that viewpoints around the Stage 1 infrastructure area (e.g. from Ulan Road and Ulan-Wollar Road) would be significantly impacted by Stage 1 of the Moolarben Coal Complex (Figure 17). O'Hanlon Design (2006) concluded that potential impacts at viewpoints located further south and into the rural residential areas would be significantly lower due to the distance between the mine and receiver and shorter duration of impact.

O'Hanlon Design (2008) predicted that visual impacts from Stage 2 of the Moolarben Coal Complex would be generally equivalent of those predicted for Stage 1 with the exception of views of the OC4 pit from Ulan-Wollar Road.

EMM (2013c) predicted that the potential visual impacts of the approved Moolarben Coal Complex prior to the implementation of any management and mitigation measures would be slight to moderate at the majority of the 12 viewpoints assessed (Figure 17), with some residents along Ridge Road predicted to experience moderate to substantial potential visual impacts (EMM, 2013c). However, the assessment concluded that with the implementation of mitigation measures (e.g. vegetative screening), the potential visual impact would be reduced to an acceptable level at relevant sensitive receivers (EMM, 2013c).

A total of 16 viewpoints were assessed for Stages 1 and 2 of the Moolarben Coal Complex (Figure 17).

⁷ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Water Management Plan.



To ameliorate the visual impacts of Stage 1 of the Moolarben Coal Complex the following visual management measures have/will be implemented in accordance with the Stage 1 Project Approval Statement of Commitments (Attachment 1):

- Trees and shrubs would be planted to provide a visual screen:
 - to the switch and bore pads located adjacent to Saddlers Creek Road, where required.
 - along the southern edge of Cope Road, where views of OC1 Stage 1 Modification 9 extension areas would be possible, subject to landowner consent.
- The Rehabilitation Management Plan would be reviewed and updated to describe the measures that would be implemented to manage visual impacts associated with the OC1 and OC2 Stage 1 Modification 9 extension areas, such as:
 - vegetation screen planting, subject to landowner's consent, along the southern edge of Cope Road, in areas visually affected by direct views of the OC1 Stage 1 Modification 9 extension areas;
 - investigating the feasibility of targeted vegetation screen planting for affected properties along Ridge Road (with direct views from the residence to both OC1 and OC2 Stage 1 Modification 9 extension areas), to mitigate the visual and lighting impacts of OC1 and OC2 Stage 1 Modification 9 extension areas, subject to landowner consent;
 - building-up out-of-pit embankments first so that continued operations are obscured by the embankment. Wherever possible out-of-pit emplacements around the perimeter would be established first, providing a visual screen while work is undertaken in the central part of the emplacement;
 - seeding and grassing embankment outer faces visually exposed to private residents as soon as practically possible to soften the view;
 - where possible, maintaining a strip of vegetation along the leading face of the ridgeline associated with the OC1 Stage 1 Modification 9 extension area to provide a visual screen to workings for as long as practical;
- use of operational screening measures such as landform re-establishment sequencing and lighting management; and
- progressive rehabilitation.
- As far as practically possible, and where mine safety allows, management protocols would be established and implemented to:
 - locate mobile lighting plant to be directed away from private residences;
 - direct stationary lighting sources below the horizontal to minimise potential light spill;
 - design lighting systems that minimise light spillage; and
 - avoid lighting of light coloured surfaces that have greater reflectivity.

The following mitigation and management measures will also be implemented for Stage 2 of the Moolarben Coal Complex:

- progressive rehabilitation of disturbed areas;
- revegetation of existing cleared lands to increase the vegetation within the existing landscape;
- retaining existing vegetation around Stage 2 infrastructure areas and on road fringes of OC4 where it is not required to be cleared for safety purposes;
- construction of bunding and planting along the edge of Ulan-Wollar Road in areas where it abuts OC4; and
- operation of night lighting in accordance with AS 4282: 1997 - *Control of the Obtrusive Effects of Outdoor Lighting* and AS/NZS 1158: 2010 – *Lighting for Roads and Public Spaces*.

The progressive rehabilitation of disturbed areas and revegetation species selection would be described in the Rehabilitation Management Plan.

4.6.2 Environmental Review

A review of the potential visual impacts from the previously assessed sensitive viewpoints was undertaken for the OC4 South-West Modification (Figure 17). For each viewpoint, an assessment of intervening topography and vegetation was undertaken based on previous viewpoint simulations, landform contours and photos to determine whether there would be any views of the components of the OC4 South-West Modification from public or private vantage points.

A summary of potential visual impacts from the previously assessed viewpoints for the OC4 South-West Modification is provided in Table 4.

South-West Haul Road

The OC4 south-west haul road would be cut (up to approximately 5 m) into the ridgeline along the majority of its length, which would minimise direct views of the OC4 south-west haul road.

Therefore, it is unlikely that any previously assessed viewpoints or privately owned residences would have direct views of the proposed OC4 south-west haul road (Table 4 and Figure 17).

However, potential views of the proposed OC4 south-west haul road would likely be available from a small section of Ulan Road that is south of Ulan-Wollar Road and north of the OC1 Pit. The northern end of the OC4 south-west haul road disturbance area would be located approximately 1.6 km from the closest section of Ulan Road.

Where the limited views of the OC4 south-west haul road may be available, there would also be views of existing/approved mining infrastructure (e.g. OC1 pit and out-of-pit waste emplacement, OC1 workshop and ancillary infrastructure, Ulan Coal Mine CHPP and product stockpiles). As such, in consideration of this existing mining infrastructure, the level of visual modification associated with the OC4 south-west haul road would be minimal.

The OC4 south-west haul road connects two open cut mining areas approved to operate 24 hours per day (i.e. OC1 and OC4). As such, additional lighting requirements for the OC4 south-west haul road would be minor in comparison to the lighting requirements for the open pits and associated waste rock emplacement areas. As such, the scale and intensity of night-lighting for the OC4 South-West Modification would be similar to the approved Moolarben Coal Complex.

Following the completion of mining, the OC4 south-west haul road would be revegetated with woodland species, which would reduce any potential visual impacts in the long-term.

**Table 4
Summary of Visual Impacts**

Figure ID	Viewpoint Location	Significance of Approved Visual Impact (maximum during operations) ¹	Visual Impact with the OC4 South-West Modification
1	Ulan Road	High	Unchanged – direct views unlikely.
2	Ulan-Wollar Road (west)	High to very high	Unchanged.
3	Ulan Road	Moderate to high	Views of the OC4 south-west haul road from a small section of Ulan Road between VP2 and VP3 are likely.
4	Cope Road	Moderate	Unchanged – direct views unlikely.
5	Ulan	Moderate to high	Unchanged – direct views unlikely.
6	Ulan-Wollar Road (rail loop and CHPP area)	High to very high	Unchanged – direct views unlikely.
7	Ridge Road (north)	Moderate to very high	Unchanged – direct views unlikely.
8	Ulan Road (at Lagoons Road)	Slight	Unchanged – direct views unlikely.
9	Winchester Avenue	Moderate	Unchanged – direct views unlikely.
10	Ridge Road (south)	Low	Unchanged – direct views unlikely.
11	Carrs Gap Road ²	High	N/A
12	Murragamba Valley ²	High to very high	N/A
13	Moolarben Road (west)	High to very high	Unchanged – direct views unlikely.
14	Moolarben Road (south)	High to very high	Unchanged – direct views unlikely.
15	Ulan-Wollar Road (OC4 pit)	Moderate to high	Unchanged – direct views unlikely.
16	Ulan-Wollar Road (south)	Moderate to high	Unchanged – direct views unlikely.

Note 1: Maximum visual impact assessed under the Stage 1 and Stage 2 Moolarben Coal Project Visual & Lighting Impact Assessment (O'Hanlon Design, 2006; 2008) and/or Stage 1 Modification 9 Visual Impact Assessment (EMM, 2013c).

Note 2: Road currently subject to road closure application.

Backfilled OC1 Pit

The OC1 pit final void would be backfilled to approximately pre-mine levels and revegetated with Box Gum Woodlands and Sedimentary Ironbark Forests with stands of *Allocasurina*. As such, the backfilling of the OC1 final void would reduce potential visual impacts in the long-term (i.e. in comparison to the currently approved OC1 final void).

4.6.3 Mitigation Measures, Management and Monitoring

The mitigation and management measures described in Section 4.6.1 would continue to be implemented at the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.7 ABORIGINAL HERITAGE

4.7.1 Background

An Aboriginal Cultural Heritage Assessment (ACHA) was prepared for the OC4 South-West Modification by Niche Environment and Heritage (2015) and is presented in Appendix E.

The ACHA for the OC4 South-West Modification has been undertaken in consideration of the following codes and guidelines (Appendix E):

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b).
- *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

Previous Archaeological Investigations

A number of Aboriginal cultural heritage surveys, assessments and salvage programmes have been undertaken within the Moolarben Coal Complex and surrounds.

Key Aboriginal cultural heritage surveys and assessments were undertaken for Stages 1 and 2 of the Moolarben Coal Project in 2006, 2008, 2011 and 2012 (Archaeological Risk Assessment Services, 2006, 2008; AECOM, 2011; South East Archaeology, 2013). Various other minor surveys and assessment have also been undertaken.

A detailed description of previous archaeological assessments and surveys undertaken at the Moolarben Coal Complex and surrounds is provided in Appendix E.

At the time of drafting the ACHA (Appendix E), a total of 531 Aboriginal sites had been identified at the Moolarben Coal Complex and surrounds, including artefact scatters, isolated finds, potential archaeological deposits, grinding grooves, ochre quarries, scarred trees and rock shelters (with or without artefacts, art and/or grinding grooves) (Appendix E).

The management of Aboriginal heritage at the Moolarben Coal Complex is currently conducted in accordance with the measures outlined in the Aboriginal Heritage Management Plan (Stage 1)⁸.

4.7.2 Environmental Review

Consultation

The ACHA included consultation with eight Registered Aboriginal Parties, identified via a registration process consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) (Appendix E). Participation of Registered Aboriginal Parties in the field surveys was in accordance with the existing engagement system in place at the Moolarben Coal Complex.

Consultation with Registered Aboriginal Parties regarding the existing Moolarben Coal Complex has been extensive and involved various methods of communication including public notices, meetings, written and verbal correspondence, archaeological survey attendance and site inspections.

A detailed description of the consultation undertaken for the OC4 South-West Modification is provided in Appendix E.

Desktop Review

An AHIMS search was undertaken in February 2014 (Appendix E) for the OC4 South-West Modification disturbance area and surrounds. This search identified no Aboriginal sites located within the OC4 South-West Modification disturbance area.

⁸ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Heritage Management Plan.

Archaeological Survey Design

Archaeological surveys of the OC4 South-West Modification disturbance area were undertaken in consultation with the Registered Aboriginal Parties in March and July 2014.

Archaeological Findings

No Aboriginal objects were identified during either the March 2014 or July 2014 surveys.

Archaeological and Cultural Heritage Values

There were no specific areas or places of cultural value identified by the Registered Aboriginal Parties during the archaeological survey undertaken for the OC4 South-West Modification. Previous assessments and surveys have identified and documented cultural values for the Moolarben Coal Complex and surrounds, which are documented in Appendix E.

Potential Impacts

The OC4 South-West Modification would not impact known Aboriginal archaeological or cultural heritage values (Appendix E).

The approved Stage 2 haul road that would be avoided as a result of the OC4 South-West Modification would have impacted a single Aboriginal site (AECOM, 2011). As a result of the OC4 South-West Modification, this site would no longer be impacted.

4.7.3 Management and Mitigation Measures

MCO would implement the management and mitigation measures described in Appendix E and the Heritage Management Plan, including monitoring and management measures to be implemented during the construction of the OC4 South-West Modification.

4.8 OTHER ENVIRONMENTAL ASPECTS

4.8.1 LAND RESOURCES

Site Inspection and Surveys

Site inspections and soil surveys were conducted in May and October 2014 and January 2015 to support a site verification certificate application for an area that included the OC4 South-West Modification disturbance area. Twenty-two soil test pits were surveyed, including nine detailed soil samples which were sent for laboratory analysis (Attachment 3).

The soil samples were assessed against the BSAL criteria in accordance with the *NSW Government Interim Protocol for Site Verification and Mapping of BSAL* (Interim Protocol) (NSW Government, 2013) and lodged in July 2014, November 2014 and February 2015. The soil sampling, visual observations and laboratory analysis indicated no sites met the BSAL criteria.

Therefore, Dr McKenzie (McKenzie Soil Management, 2014) concluded that the site verification certificate application area, which included the OC4 South-West Modification disturbance area, is not BSAL.

A site verification certificate was granted on 31 March 2015 verifying that the OC4 South-West Modification disturbance area is not BSAL. The site verification certificate is provided in Attachment 3.

Potential Impacts

The OC4 South-West Modification would result in the disturbance of approximately 5.1 ha of woodland. The disturbed areas would be rehabilitated with woodland vegetation.

As no BSAL is located within the OC4 South-West Modification disturbance area, and given no agricultural activities are currently undertaken in this area, there would be no impact to agricultural productivity as a result of the OC4 South-West Modification.

Mitigation Measures, Management and Monitoring

Land resource mitigation measures, management and monitoring would be conducted in accordance with an approved MOP and Rehabilitation and Offset Management Plan.

Rehabilitation of the Moolarben Coal Complex incorporating the OC4 South-West Modification is described in Section 3.8.

4.8.2 Blasting

As there would be no change to blast locations, sizes or frequencies as a result of the OC4 South-West Modification, there would be no additional blast impacts. Blasting would continue to be managed and monitored in accordance with the Blast Management Plan.

4.8.3 Greenhouse Gas Emissions

MCO calculates and reports annual greenhouse gas emissions and energy consumption from the Moolarben Coal Complex in accordance with the existing requirements of the Commonwealth National Greenhouse and Energy Reporting System (NGERS).

No material change to annual greenhouse gas emissions from the Moolarben Coal Complex is expected as a result of the OC4 South-West Modification.

Annual reporting of greenhouse gas emissions from the Moolarben Coal Complex would continue in accordance with the NGERS requirements, and the existing abatement measures would continue to be implemented.

4.8.4 Non-Aboriginal Heritage

Non-Aboriginal Heritage Assessments were prepared for Stages 1 and 2 of the Moolarben Coal Project. Collectively, these studies assessed the impacts associated with the Moolarben Coal Complex disturbance areas, including the OC4 South-West Modification disturbance area.

Previous surveys conducted in 2005 and 2008 (Wells Environmental Services, 2006 & 2008) did not identify any non-Aboriginal heritage sites in the OC4 South-West Modification disturbance area. Therefore, the OC4 South-West Modification is not considered likely to impact on non-Aboriginal heritage.

MCO would continue to implement its approved Heritage Management Plan⁹ at the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.8.5 Road Transport

There would be no change to the Moolarben Coal Complex operational workforce or ongoing deliveries to the Moolarben Coal Complex due to the OC4 South-West Modification. Accordingly there would be no change to road traffic movements generated by the Moolarben Coal Complex, and there would be no additional impacts on the capacity, condition, safety or efficiency of the surrounding road network due to the OC4 South-West Modification.

4.8.6 Aquatic Ecology

No threatened fauna listed under the NSW *Fisheries Management Act, 1994* are likely to be affected by the OC4 South-West Modification as there is no aquatic habitat within the OC4 South-West Modification disturbance area, and ephemeral watercourses nearby the OC4 South-West Modification disturbance area are unlikely to provide potential aquatic habitat.

4.8.7 Hazard and Risk

Preliminary Hazard Analyses (PHAs) were conducted for the Stage 1 Modification 9 EA and the Stage 2 PPR to assess the potential hazard and risk associated with the approved Moolarben Coal Complex. It is considered that the OC4 South-West Modification would not change the existing potential risks or hazard consequences identified in the PHAs as the proposed activities associated with the OC4 South-West Modification (e.g. open cut mining activities, transport to site and on-site storage) are consistent with those for the approved Moolarben Coal Complex.

⁹ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Heritage Management Plan.

5 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the OC4 South-West Modification. It also provides a consideration of the OC4 South-West Modification against the objects of the EP&A Act.

5.1 GENERAL STATUTORY CONSIDERATIONS

5.1.1 State Legislation

Environmental Planning and Assessment Act, 1979

The Moolarben Coal Project Stage 1 was approved under Part 3A of the EP&A Act by the NSW Minister for Planning on 24 October 2007 (Project Approval (05_0117) [Attachment 1]). The Moolarben Coal Project Stage 2 was approved under Part 3A of the EP&A Act by the Planning Assessment Commission (as a delegate to the NSW Minister for Planning) on 30 January 2015 (Project Approval 08_0135 [Attachment 2]).

The Moolarben Coal Project Stage 1 and Stage 2 are 'transitional Part 3A projects' under clause 2 of Schedule 6A of the EP&A Act and therefore section 75W of the EP&A Act continues to apply to modifications to Project Approvals (05_0117 and 08_0135), despite its repeal¹⁰.

As outlined in Section 1.4, MCO consulted with the DP&E in May 2014 with regards to seeking the necessary approvals for the OC4 South-West Modification and based on this consultation, this EA has been prepared under section 75W of the EP&A Act.

Section 75W of the EP&A Act states:

75W Modification of Minister's Approval

(1) *In this section:*

Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.

Modification of approval means changing the terms of a Minister's approval, including:

(a) *revoking or varying a condition of the approval or imposing an additional condition of the approval, and*

(b) *changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*

(2) *The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*

(3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*

(4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification.*

...

The EP&A Act and the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) set the framework for planning and environmental assessment in NSW. As noted above, the OC4 South-West Modification is to be assessed under section 75W (Part 3A) of the EP&A Act.

Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) *to encourage:*

(i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*

(ii) *the promotion and co-ordination of the orderly and economic use and development of land,*

(iii) *the protection, provision and coordination of communication and utility services,*

(iv) *the provision of land for public purposes,*

(v) *the provision and co-ordination of community services and facilities, and*

(vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*

¹⁰ Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Moolarben Coal Complex. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

- (vii) *ecologically sustainable development, and*
- (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The OC4 South-West Modification is considered to be generally consistent with the objects of the EP&A Act, because it is a modification that:

- incorporates measures for the management and conservation of natural resources (Section 4);
- would enable more efficient integration of mining operations across the complex;
- would not affect the ongoing provision of community services and facilities;
- would result in no significant impact on threatened species, population and ecological communities or their habitats;
- allows continued development of the State's mineral resources (i.e. coal resources) in a manner that minimises environmental impacts through the implementation of the Moolarben Coal Complex Environmental Management Strategy (Section 2.15) and other measures (Section 4); and
- involves public involvement and participation through consultation activities (Section 1.4), which would be ongoing following the public exhibition of this EA document and DP&E assessment of the OC4 South-West Modification in accordance with the requirements of the EP&A Act.

5.1.2 Other State Legislation

In addition to the EP&A Act, the following NSW Acts may be applicable to the Moolarben Coal Complex, incorporating the OC4 South-West Modification:

- *Crown Lands Act, 1989;*
- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Mine Subsidence Compensation Act, 1961;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974 (NPW Act);*

- *Native Vegetation Act, 2003;*
- *Protection of the Environment Operations Act, 1997 (PoEO Act);*
- *Roads Act, 1993;*
- *TSC Act;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011; and*
- *Work Health and Safety (Mines) Act, 2013.*

Relevant licences or approvals required under these Acts would continue to be obtained for the Moolarben Coal Complex as required. Key plans, licences and agreements that would require revision to incorporate the OC4 South-West Modification are outlined in Section 5.3.

Additional detail on the likely requirements under some of these key Acts is provided in the subsections below.

Mining Act, 1992

MCO applied for Mining Lease Application (MLA) 327 on 20 March 2009. MCO applied for MLA 331 on 21 April 2009. The grant of MLA 327 and MLA 331 would be required for the OC4 South-West Modification.

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions of MLs, including requirements for the submission of a MOP prior to the commencement of operations, and subsequent AEMRs (or Annual Reviews).

The Moolarben Coal Complex MOP would be updated to include the proposed layout of the OC4 South-West Modification prior to the commencement of OC4 (Section 5.3).

Protection of the Environment Operations Act, 1997

Construction and operations at the Moolarben Coal Complex are currently undertaken in accordance with an existing EPL 12932 issued under the PoEO Act.

If required, any variations to existing EPL 12932 for the OC4 South-West Modification would be undertaken in consultation with the EPA.

Water Management Act, 2000 and Water Act, 1912

The *Water Management Act, 2000* and the *Water Act, 1912* contain provisions for the licensing, allocation, capture and use of water resources. Under the *Water Management Act, 2000*, water sharing plans are being introduced for water sources. Water sharing plans establish rules for sharing water between different users (including the environment).

Licensing requirements under the *Water Management Act, 2000* and *Water Act, 1912* were evaluated as a component of the Stage 1 Modification 9 EA and Stage 2 PPR EA.

The OC4 South-West Modification would not involve any increase in pit inflows, water demand or mining rate, and hence no additional water licence entitlements would be required as a result of the OC4 South-West Modification (Section 4.5).

MCO would continue to obtain and hold sufficient licences required under the *Water Management Act, 2000* and *Water Act, 1912*.

National Parks and Wildlife Act, 1974

The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage in NSW.

Section 75U(1) of the EP&A Act outlines authorisations that are not required for a transitional Part 3A project, such as the Moolarben Coal Complex. An Aboriginal heritage impact permit under section 90 of the NPW Act is not required for the Moolarben Coal Complex, including the OC4 South-West Modification.

Notwithstanding, an ACHA for the OC4 South-West Modification has been undertaken in consultation with Registered Aboriginal Parties in accordance with the existing engagement system in place at the Moolarben Coal Complex (Section 4.7).

Heritage Act, 1977

The *Heritage Act, 1977* regulates the conservation of items listed on the State Heritage Register or subject to an interim heritage order.

No items on the State Heritage Register or subject to an interim heritage order have been identified within the OC4 South-West Modification development areas (Section 4.8.4), therefore the *Heritage Act, 1977* is not relevant to the OC4 South-West Modification.

Threatened Species Conservation Act, 1995

The TSC Act protects threatened species and provides a framework for the assessment of a development's impacts on threatened species and ecological communities.

The potential impact of the OC4 South-West Modification on threatened species, populations and ecological communities was assessed as part of the Flora and Fauna Impact Assessment (Appendix C). Ecological (2015) concluded the OC4 South-West Modification would not have a significant impact on threatened species, populations and ecological communities with the implementation of the proposed management measures (Sections 4.3).

There would be an overall reduction in the disturbance area of approximately 13.4 ha due to the OC4 South-West Modification (Section 4.3.2).

5.1.3 Environmental Planning Instruments

The Stage 1 EA and Stage 2 PPR EA provided a detailed consideration of the Moolarben Coal Complex against State environmental planning policies and local environmental plans.

State environmental planning policies and local environmental plans that may be relevant to the OC4 South-West Modification are discussed below.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) regularises the various environmental planning instruments that previously controlled mining activities.

Part 3 of the Mining SEPP outlines the matters to be considered when determining development applications. Relevant clauses are discussed further below.

Clause 12

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

- (a) consider:
 - (i) the existing uses and approved uses of land in the vicinity of the development, and

- (ii) *whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
- (iii) *any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*
- (b) *evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
- (c) *evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*
- (b) *any advice by the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services as to the relative significance of the resource in comparison with other mineral resources across the State.*
- (2) *The following matters are (without limitation) taken to be relevant for the purposes of subclause (1) (a):*
 - (a) *employment generation,*
 - (b) *expenditure, including capital investment,*
 - (c) *the payment of royalties to the State.*
- (3) *The Director-General of the Department of Trade and Investment, Regional Infrastructure and Services is, in providing advice under subclause (1) (b), to have regard to such matters as that Director-General considers relevant, including (without limitation):*
 - (a) *the size, quality and availability of the resource that is the subject of the application, and*
 - (b) *the proximity and access of the land to which the application relates to existing or proposed infrastructure, and*
 - (c) *the relationship of the resource to any existing mine, and*
 - (d) *whether other industries or projects are dependent on the development of the resource.*

The OC4 south-west haul road is located within the Application Areas in Project Approvals (05_0117 and 08_0135), and connects to approved open pits (i.e. OC1 and OC4). As such, the OC4 south-west haul road is compatible with the existing land use (i.e. coal mining).

The backfilling of the northern OC1 final void would improve compatibility with surrounding land-uses, as this area would be returned to approximately pre-mining levels.

No additional potential impacts to land-uses outside the Application Areas in Project Approvals (05_0117 and 08_0135) are expected due to the OC4 South-West Modification (e.g. no additional impacts associated with noise, air quality, visual amenity or groundwater [Section 4]).

Clause 12AA

Clause 12AA of the Mining SEPP requires:

- (1) *In determining an application for consent for development for the purposes of mining, the consent authority must consider the significance of the resource that is the subject of the application, having regard to:*
 - (a) *the economic benefits, both to the State and the region in which the development is proposed to be carried out, of developing the resource, and*
- (4) *In determining whether to grant consent to the proposed development, the significance of the resource is to be the consent authority's principal consideration under this Part.*
- (5) *Accordingly, the weight to be given by the consent authority to any other matter for consideration under this Part is to be proportionate to the importance of that other matter in comparison with the significance of the resource.*
- (6) *To avoid doubt, the obligations of a consent authority under this clause extend to any application to modify a development consent.*

The proposed OC4 South-West Modification would enable more efficient integration of mining operations at the Moolarben Mining Complex.

Clause 14

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

- (a) *that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
- (b) *that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
- (c) *that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programmes or guidelines concerning greenhouse gas emissions.

The potential impacts of the OC4 South-West Modification on groundwater and surface water resources are discussed in Sections 4.4 and 4.5, including measures to minimise potential impacts which are described in Sections 4.4.3 and 4.5.3. The potential impacts of the OC4 South-West Modification on threatened species and biodiversity are described in Section 4.3, including measures to minimise potential impacts which are described in Sections 4.3.3.

Existing greenhouse gas abatement measures at the Moolarben Coal Complex and the potential increase in greenhouse gas emissions associated with the OC4 South-West Modification are described in Section 4.8.3.

Clause 15

Clause 15 of the Mining SEPP requires that:

- (1) *Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*

- (2) *Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*
- (3) *The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

The proposed OC4 South-West Modification would enable more efficient integration of mining operations across at the Moolarben Mining Complex.

Clause 17

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. In particular, the consent authority must consider whether conditions of the consent should:

- (a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*
- (b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*
- (c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*
- (d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

The approved rehabilitation objectives and concepts for the OC4 South-West Modification would remain generally unchanged.

Backfilling of the OC1 final void to approximately pre-mine levels would provide a beneficial post-mining rehabilitation outcome as the backfilled final void would improve compatibility with the surrounding landform and reduce the amount of surface water captured on-site post-mining.

The Rehabilitation Management Plan and MOP would be revised to incorporate the OC4 South-West Modification.

**State Environmental Planning Policy No. 33
(Hazardous and Offensive Development)**

Clause 13 of SEPP 33 requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

- (c) *in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)...*

The OC4 South-West Modification would not change existing potential risks or hazard consequences as the proposed activities associated with the OC4 South-West Modification are consistent with those for the approved Moolarben Coal Complex (Section 4.8.7).

Notwithstanding, environmental management plans and monitoring programs would be reviewed, and if necessary, revised by MCO to include the OC4 South-West Modification and manage any associated environmental risks.

**State Environmental Planning Policy No. 44
(Koala Habitat Protection)**

SEPP 44 requires the consent authority for any Development Application in certain LGAs to consider whether land subject to a Development Application is "potential Koala habitat" or "core Koala habitat".

EcoLogical Australia (Appendix C) considers the OC4 South-West Modification disturbance area comprises potential Koala habitat, but does not comprise core Koala habitat.

**State Environmental Planning Policy No. 55
(Remediation of Land)**

SEPP 55 aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

Under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

Because the OC4 South-West Modification is within the Project Application Areas in Project Approvals (05_0117 and 08_0135), no change of use is proposed and no preliminary land contamination investigation is required.

Mid-Western Regional Local Environmental Plan 2012

The Moolarben Coal Complex is located wholly within the Mid-Western Regional LGA and is covered by the *Mid-Western Regional Local Environmental Plan 2012* (MWR LEP).

Clause 2.3(2) of the MWR LEP relevantly provides:

The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.

As outlined above, the consent authority for transitional Part 3A projects is the Minister for Planning.

The approved Stage 1 and Stage 2 of the Moolarben Coal Complex were considered by the relevant consent authorities to be consistent with the land-use objectives of the MWR LEP.

The OC4 South-West Modification would not change land-use within the Application Areas in Project Approvals (05_0117 and 08_0135), and therefore, would also be consistent with the land-use objectives of the MWR LEP.

5.1.4 Commonwealth Legislation

The current Stage 1 mining operations are undertaken in accordance with Approval Decisions (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 EPBC Act.

A Variation of Proposal to take Action (EPBC 2008/4444) under the EPBC Act for Moolarben Coal Project (Stage 2) was accepted on 26 April 2012. The Variation of Proposal to take Action (EPBC 2008/4444) requires separate approval under the EPBC Act.

The potential impacts of the OC4 South-West Modification on flora and fauna have been assessed in Appendix C and summarised in Section 4.3. The assessment indicates that there would be no significant impact on threatened species, populations and communities and migratory species listed under the EPBC Act as a result of the OC4 South-West Modification.

The OC4 South-West Modification would result in a reduction to the total surface disturbance footprint (i.e. the proposed area to be avoided [18.5 ha] would be larger than the new surface disturbance [5.1 ha]).

It is expected the OC4 South-West Modification would reduce potential impacts to water resources (i.e. in comparison to the currently approved Moolarben Coal Complex) (Sections 4.4 and 4.5).

5.2 NSW GOVERNMENT POLICY

5.2.1 Strategic Regional Land Use Plan

As part of the Strategic Regional Land Use Policy, the NSW Government has introduced a 'Gateway Process' for the upfront assessment of the impacts of State Significant mining and coal seam gas proposals on Strategic Agricultural Land (NSW Government, 2012b).

The Strategic Regional Land Use Policy and the 'Gateway Process' apply to new State Significant Development applications or modifications for mining projects located outside of existing mining lease areas (NSW Government, 2012b).

MLA 327 and MLA 331 have not been granted for the area that covers the OC4 South-West Modification disturbance area and therefore the Gateway Process and Strategic Regional Land Use Policy have been considered for the OC4 South-West Modification.

The Upper Hunter Strategic Regional Land Use Plan does not map any Strategic Agricultural Land in the OC4 South-West Modification disturbance area.

Soil surveys in the OC4 South-West Modification disturbance area were undertaken in May and October 2014 and January 2015 to assess the land against the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government, 2013).

A site verification certificate issued on 31 March 2015 (Attachment 3) verified the OC4 South-West Modification disturbance area as non-BSAL.

5.2.2 Aquifer Interference Policy

The AIP (NSW Government, 2012c) has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy. The AIP applies Statewide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP will also enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *Water Management Act, 2000* defines an aquifer interference activity as that which involves any of the following:

- *the penetration of an aquifer;*
- *the interference with water in an aquifer;*
- *the obstruction of the flow of water in an aquifer;*
- *the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and*
- *the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.*

The OC4 South-West Modification would not involve any increase in pit inflows, water demand or mining rate, and hence no additional water licence entitlements would be required as a result of the OC4 South-West Modification (Section 4.5). One of the two approved voids within OC1 would be backfilled under the OC4 South-West Modification. The OC4 South-West Modification would not result in any additional interference with the groundwater aquifers (Section 4.5) and therefore the AIP has not been considered any further.

MCO would continue to hold licence entitlements to account for the water-take as required.

5.3 APPROVALS, LICENCES AND PLANS

5.3.1 Project Approval Conditions

Condition 32, Schedule 3 of Project Approval (05_0117) (Attachment 1) includes a water management performance measure to line the Ulan Seam sub-crop of the northern OC1 final void with a suitably lined material to comply with a permeability standard of less than 1×10^{-9} m/s.

MCO is seeking to remove Condition 32, Schedule 3 of Project Approval (05_0117) as a component of the OC4 South-West Modification (Section 3.8.1).

In addition to the above, the following components of the Project Approvals would require amendment to incorporate the proposed layout of the OC4 South-West Modification:

- Appendix 2 (General Layout of Project) of Project Approval (05_0117);
- Appendix 2 (General Layout of Project) of Project Approval (08_0135);
- Appendix 8 (Aboriginal Heritage) of Project Approval (08_0135); and
- Appendix 10 (Rehabilitation Plan) of Project Approval (08_0135).

5.3.2 Management/Monitoring Plans

Some management plans may require revision to reflect updated environmental management measures or changes to Project Approval conditions resulting from the OC4 South-West Modification.

These are expected to include the Rehabilitation Management Plan, Water Management Plan, Heritage Management Plan, Noise Management Plan and Air Quality Management Plan.

5.3.3 Mining Operations Plan

The Moolarben Coal Complex MOP would be updated to include the proposed layout of the OC4 South-West Modification prior to the commencement of OC4 (Section 5.3.1).

6 REFERENCES

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- McKenzie Soil Management Pty Ltd (2014) *Site Verification Report: “Moolarben Coal Mine”, Ulan, NSW*.
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global environmental solutions

Moolarben Coal Complex
OC4 South-West Modification
Noise Assessment

Report Number 610.13549-R1

16 April 2015

Yancoal Australia Limited
Level 25, 363 George Street
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Version: Revision 1

Moolarben Coal Complex

OC4 South-West Modification

Noise Assessment

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This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Table of Contents

1	INTRODUCTION	6
1.1	Background	6
1.2	Assessment Requirements	6
2	EXISTING MOOLARBEN COAL COMPLEX	7
2.1	Overview	7
2.2	Land Ownership	8
2.3	Approvals	8
2.4	Noise Management Strategy	8
2.4.1	Noise Management Plan	9
2.4.2	Noise Control and Management Measures	9
2.5	Noise Compliance	12
2.5.1	Noise Monitoring Program	12
2.5.2	Operator-attended Noise Compliance Results	12
2.5.3	Continuous Noise Monitoring Results	12
2.6	Noise Complaints Summary	13
3	PROPOSED MODIFICATION	14
3.1	Hours of Operation	14
3.2	On-site Mining Operation	14
3.3	On-site Blasting	14
3.4	Off-site Rail Transport	14
3.5	Off-site Road Transport	15
4	EXISTING METEOROLOGICAL AND NOISE ENVIRONMENT	15
4.1	Meteorological Environment	15
4.1.1	Prevailing Winds	15
4.1.2	Temperature Inversions	16
4.1.3	Noise Model Meteorological Parameters	17
4.2	Noise Environment	17
5	NOISE ASSESSMENT CRITERIA	18
5.1	Intrusive and Amenity Noise Assessment Criteria	18
5.2	Low Frequency Noise Modifying Adjustment Factors	19
5.3	Sleep Disturbance Assessment Criteria	20
5.4	Modification and Cumulative Noise Impact Assessment Methodology	22
5.4.1	Noise Impact Assessment Methodology	22
5.4.2	Noise Management Zone	22
5.4.3	Noise Affection Zone	22

Table of Contents

6	NOISE MODELLING METHODOLOGY	23
6.1	Noise Control and Management Measures	23
6.1.1	Moolarben Coal Complex Existing Operations	23
6.1.2	Moolarben Coal Complex Incorporating the Modification	23
6.2	Mobile Equipment and Fixed Plant Sound Power Levels	24
6.3	Noise Model Validation	26
6.4	Noise Modelling Scenarios	26
6.4.1	Year 2016 Scenario	27
6.4.2	Year 2018 Scenario	28
7	INTRUSIVE NOISE IMPACT ASSESSMENT	29
7.1	Daytime Operating Intrusive Noise Levels	29
7.2	Evening Operating Intrusive Noise Levels	31
7.3	Night-time Operating Intrusive Noise and Sleep Disturbance	34
7.4	Impact Assessment Summary and Comparison with Approved Moolarben Coal Complex	37
7.5	Privately Owned Vacant Land Impact Assessment	38
8	NOISE AMENITY IMPACT ASSESSMENT	38
8.1	Modification Operating Noise Amenity Levels	38
8.2	Impact Assessment Summary	42
9	CUMULATIVE NOISE AMENITY ASSESSMENT	42
10	SUMMARY OF FINDINGS	43
10.1	Noise Assessment Criteria	43
10.1.1	Operating Assessment Criteria	43
10.1.2	Sleep Disturbance Assessment Criteria	43
10.1.3	INP Assessable Meteorological Conditions	44
10.1.4	Noise Impact Assessment Methodology	44
10.1.5	Noise Control and Management Measures	44
10.2	Modification and Cumulative Mine Operating Noise Impact Assessment	45
10.2.1	Privately Owned Receivers and Vacant Land	45
10.2.2	Review of the Noise Management Measures	45

FIGURES

Figure 1	Complaints Register Summary 2007 to 2014	13
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Table of Contents

TABLES

Table 1	Noise Impact Assessment Procedure Guidelines	7
Table 2	Other Approved or Proposed Projects	7
Table 3	Real-Time Response Trigger Levels	10
Table 4	Real-Time Response Management Actions	11
Table 5	Recent Noise Monitoring Programme Summary	12
Table 6	Approved Moolarben Coal Complex and Modification Hours of Operation	14
Table 7	Prevailing Seasonal 10 m Wind Velocities In Accordance with the INP	15
Table 8	Prevailing Seasonal Temperature Gradients in Accordance with the INP	16
Table 9	Calm (Neutral) and Noise Enhancing Meteorological Modelling Parameters	17
Table 10	Background Noise and Amenity Levels for Assessment Purposes	17
Table 11	INP Acceptable and Maximum Noise Amenity Levels	18
Table 12	Project-specific Noise Levels and Assessment Criteria	19
Table 13	Criteria for Assessment of Low Frequency Noise	20
Table 14	Night-time LA1(1minute) Sleep Disturbance Assessment Criteria	21
Table 15	Measured Night-time LAeq(15minute) and LA1(1minute) Noise Levels	21
Table 16	Modification and Cumulative Noise Impact Assessment	22
Table 17	Comparative Fixed Plant and Mobile Equipment Fleets SWLs	25
Table 18	Year 2016 Scenario Typical Mobile Equipment Fleet Distribution ¹	27
Table 19	Year 2018 Scenario Typical Mobile Equipment Fleet Distribution ¹	28
Table 20	Daytime Years 2016 and 2018 LAeq(15minute) Intrusive Noise Levels	29
Table 21	Evening Years 2016 and 2018 Intrusive LAeq(15minute) Noise Levels	32
Table 22	Night-time 2016 & 2018 Intrusive LAeq(15minute) & LA1(1minute) Noise	34
Table 23	Daytime, Evening and Night-time Noise Amenity Years 2016 & 2018	39
Table 24	Project Specific Noise Levels and Assessment Criteria	43
Table 25	Night-time LA1(1minute) Sleep Disturbance Noise Levels	43
Table 26	Modification and Cumulative Mine Noise Impact Assessment	44
Table 27	Summary of Criteria Exceedances at Privately Owned Receivers and Vacant Land	45

APPENDICES

Appendix A1	Extract Stage 1 Project Approval (05_0117) dated 6 September 2007 (as modified)
Appendix A2	Extract Stage 2 Project Approval (08_0135) dated 30 January 2015
Appendix B1	Noise Monitoring Location Plan
Appendix B2	General Arrangement Plan Stage 1 and Stage 2
Appendix B3	Proposed General Arrangement Plan Incorporating the Modification
Appendix C1	Land Ownership Plan
Appendix C2	Relevant Land Ownership List
Appendix C3	Land Ownership Details
Appendix D	Moolarben Coal Complex Meteorological Summary
Appendix E	Photos of Existing Reasonable and Feasible Noise Controls
Appendix F1	Year 2016 Night-time Operating Intrusive LAeq(15minute) Noise Contour
Appendix F2	Year 2018 Night-time Operating Intrusive LAeq(15minute) Noise Contour
Appendix G1	Evening Cumulative Noise Assessment
Appendix G2	Night-Time Cumulative Noise Assessment

1 INTRODUCTION

1.1 Background

Moolarben Coal Operations Pty Ltd (MCO), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), operates the Moolarben Coal Complex, which is located approximately 40 kilometres north of Mudgee in the Western Coalfields of New South Wales (NSW).

The Moolarben Coal Complex comprises four approved open cut coal mining areas (OC1 to OC4), three approved underground coal mining areas (UG1, UG2 and UG4) and other mining related infrastructure including coal processing and transport facilities. Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 and will continue to be carried out in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) dated 6 September 2007 (as modified) (**Appendix A1**) and Project Approval (08_0135) (Moolarben Coal Project Stage 2) dated 30 January 2015 (**Appendix A2**).

MCO has reviewed the mining sequence and associated infrastructure layout requirements at the Moolarben Coal Complex to enable more efficient access to the OC4 coal resource. As a consequence, the approved Stage 2 Haul Road (to the north of OC4) would no longer be required, and would be replaced by a shorter, more direct, haul road route from OC4 to OC1 (to the south-west of the approved Stage 2 haul road), which forms the major component of the proposed OC4 South-West Modification (the Modification).

SLR Consulting Australia Pty Ltd (SLR) has been engaged by MCO to evaluate and assess the potential noise impacts associated with the Modification. In preparing this assessment SLR has considered several documents including the following:

- *Moolarben Coal Project Appendix 4 Noise and Vibration Impact Assessment* (MCP Stage 1 NIA) (Spectrum Acoustics, August 2006);
- *Moolarben Coal Project Stage 1 Optimisation Modification Appendix C Noise and Vibration Impact Assessment* (MCP Stage 1 Mod 9 NIA) (EMM, May 2013);
- *Moolarben Coal Project Stage 2 Preferred Project Report Appendix D Environmental Noise Assessment* (MCP Stage 2 PPR NIA) (Global Acoustics, January 2012);
- *Noise Management Plan* (NMP) (MCO, 2013);
- *Annual Environmental Management Report 2012-2013* (AEMR 2013) (MCO, 2013);
- *Monthly Environmental Noise Monitoring Reports September 2013 to September 2014* (MENMRs) (MCO, 2013/2014); and
- *Quarterly Environmental Noise Assessment Reports March 2013 to August 2014* (QENARs) (Advitech Environmental, 2013/2014).

1.2 Assessment Requirements

The noise impacts for the Modification have been guided by the assessment guidelines as presented in **Table 1**.

Table 1 Noise Impact Assessment Procedure Guidelines

Assessment Guideline	Criteria	Impact
Modification Maximum, Intrusive and Amenity Noise Guided by the requirements of the NSW <i>Industrial Noise Policy</i> (INP) (EPA ¹ , 2000) and associated Application Notes dated 12 June 2013 in relation to setting acceptable project specific noise levels (PSNLs) and assessing any impacts.	Section 5	Section 7, Section 8
Cumulative Amenity Noise Guided by the requirements of the INP in relation to existing and successive industrial development by setting acceptable (and maximum) cumulative equivalent continuous noise level (LAeq [period]) amenity levels for all industrial (ie non-transport related) noise in a receiver area.	Section 5	Section 9

Note 1: EPA - Environment Protection Authority

Other approved or proposed projects in the vicinity of Moolarben Coal Complex are presented in **Table 2**. The Wilpinjong Coal Project and Ulan Continued Operations Project are considered cumulatively for operational noise (**Section 9**) in this assessment.

Table 2 Other Approved or Proposed Projects

Proponent	Project	Status
Wilpinjong Coal Pty Ltd (WCPL)	Wilpinjong Coal Project (Modification 6)	Project Approval (MP 05_0021) dated 1 February 2006 (as modified), which was last modified on the 21 November 2014 (Modification 6). The Wilpinjong Coal Project is approved to operate up to a maximum coal export capacity (from the site) of 12.5 million tonnes per annum (Mtpa).
Ulan Coal Mines Ltd (UCML)	Ulan (Mine Complex) Continued Operations Project (Modification 2)	Project Approval (MP 08_0184) dated 15 November 2010 (as modified), which was last modified in May 2012 (Modification 2). The Ulan Mine Complex is approved to operate up to a maximum coal export capacity (from the site) of 20 Mtpa.

2 EXISTING MOOLARBEN COAL COMPLEX

2.1 Overview

Since commencement of coal mining operations in 2010, mining activities have only occurred within OC1 and OC2 (**Appendix B2**). Subject to all necessary approvals being in place, mining activities within OC4 are currently planned to commence during 2015. The Moolarben Coal Project Preferred Project Report (MCP Stage 2 PPR) (MCO, 2012) described a maximum (total site) product coal rate of up to 13 Mtpa.

Run-of-mine (ROM) coal from the open cuts is transferred to the Stage 1 ROM coal facility or ROM stockpile by internal haul roads (**Appendix B2**). ROM coal from the undergrounds will be transferred to the Stage 1 ROM coal facility or ROM stockpile by conveyor and internal haul roads.

Approved conveyors connecting the Stage 1 ROM coal facility to the OC4 pit are yet to be constructed (**Appendix B2**). Once constructed, these conveyors would allow transfer of OC4 ROM coal to the Stage 1 ROM coal facility and Coal Handling and Preparation Plant (CHPP) rejects from the CHPP to OC4.

Coal at the Stage 1 ROM coal facility is conveyed to the coal handling and preparation plant (CHPP) in the Stage 1 Infrastructure Area. Crushing and sizing facilities are included at the Stage 1 ROM coal facility and the CHPP (**Appendix B2**). The Moolarben Coal Complex is approved to process up to 13 Mtpa of ROM coal.

Product coal is loaded onto trains for export to the Port of Newcastle up to 24 hours per day, seven days per week.

2.2 Land Ownership

The Land Ownership Plan (**Appendix C1**) identifies the nearest receivers together with the Land Ownership Details (**Appendices C2 and C3**) including a list of property ID numbers, landowners and dwelling co-ordinates.

2.3 Approvals

The Moolarben Coal Project Stage 1 was assessed in the *Moolarben Coal Project Environmental Assessment Report* (MCO, 2006) (MCP Stage 1 EA) and was approved on 6 September 2007. The MCP Stage 1 Project Approval (05_0117) was last modified in January 2015 (Modification 3).

A Major Project Application for the Moolarben Coal Project Stage 2 was lodged with the then Department of Planning and Infrastructure on 1 May 2008. Subsequently, MCO prepared the MCP Stage 2 PPR that was approved in early 2015 (MCP Stage 2 Project Approval [08_0135]). The General Arrangement Plan for the approved Stages 1 and 2 of the Moolarben Coal Project is presented as **Appendix B2**.

With respect to noise emissions, MCO operate in accordance with the following project approval and licence conditions:

- MCP Stage 1 Project Approval (05_0117) dated 6 September 2007 (as modified) with the relevant sections attached as **Appendix A1**.
- MCP Stage 2 Project Approval (08_0135) dated 30 January 2015 with the relevant sections attached as **Appendix A2**.
- EPA Environment Protection Licence (EPL) No 12932 anniversary date 18 August.

It is noted that MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) have identical noise conditions and include conditions relating to acquisition upon request, mitigation upon request and noise assessment criteria (ie the Project Approval noise limits). Note, the Project Approval noise limits are presented as external noise levels, except for the school and church which are nominated as 35 A weighted decibels (dBA) (internal when in use). The internal noise levels can be conservatively transposed to an external noise level by adding 10 dBA. It follows that, the Project Approval noise limits in relation to the school and church would have equivalent external noise levels of 45 dBA equivalent continuous noise level (LAeq(1 hour)) and 45 dBA LAeq(period) respectively (generally consistent with the INP).

2.4 Noise Management Strategy

MCO has adopted an Environmental Management Strategy (EMS) which establishes the overarching framework for environmental management and monitoring of activities undertaken at the Moolarben Coal Complex. The EMS has been prepared in accordance with the MCP Stage 1 Project Approval (05_0117) and provides the strategic framework for environmental management at the Moolarben Coal Complex. Accordingly, MCO has prepared and implemented the Noise Management Plan (NMP) and Environmental Monitoring Program (EMP) in accordance with the EMS.

The existing EMS is currently being updated to incorporate the Stage 2 Project Approval (08_0135).

2.4.1 Noise Management Plan

The approved NMP dated 29 October 2013 has been prepared to manage project specific, cumulative and traffic noise impacts associated with Stage 1 of the Moolarben Coal Complex. The NMP describes the current noise management regime, which consists of five off-site operator-attended monitoring sites, three off-site continuous real-time monitors and with two on-site Automatic Weather Stations (AWS) (**Appendix B1**). In accordance with the NMP, operator-attended noise monitoring is used for demonstrating compliance with noise criteria, whilst continuous real-time monitoring is used as a noise management tool to assist MCO to take pre-emptive noise management actions to avoid potential non-compliances.

The existing NMP is currently being updated to incorporate the Stage 2 Project Approval (08_0135).

2.4.2 Noise Control and Management Measures

MCO implements a range of noise control and management measures at the Moolarben Coal Complex that includes planning controls, operational controls, engineering controls, a real-time response protocol, meteorological forecasting and continuous improvement, as described in the NMP, to identify and manage noise impacts aimed to achieve compliance with the approved noise criteria (refer **Section 2.3**).

Planning Controls - during mine planning, consideration is given to:

- Weather forecasting;
- Seasonal influences on noise impacts, including prevailing winds and temperature inversions;
- Sound power levels of mobile equipment during equipment procurement and scheduling;
- The location of fixed infrastructure;
- The location and design of mine site haul roads; and
- Noise monitoring results.

Operational Controls - including the following:

- Separate day and night dumping areas when deemed necessary;
- Use of shielded areas during adverse (ie noise enhancing) weather conditions;
- Use of real-time noise monitoring data that incorporate automatic noise alarms to assist operational personnel in proactive management of noise impacts;
- Use of operational personnel to monitor real time noise data to assist production supervisors in proactive management of noise impacts;
- Regular maintenance of equipment, including sound attenuation components;
- Conducting noise management training with relevant personnel to re-enforce the importance of noise mitigation; and
- Sound power testing of mobile and stationary equipment.

Engineering Controls - engineering controls are fitted to higher risk mobile and stationary equipment where noise levels are predicted, or demonstrated to exceed the relevant noise criteria and include:

- Enclosure of higher risk stationary equipment at the CHPP;
- Attenuation of mobile equipment such as haul trucks, shovels and excavators, dozers and drills;
- Development of an equipment noise specification which details equipment Sound Power Levels (SWLs) to be met, which have been determined via noise modelling in previous noise impact assessments, subsequent commitments and associated approvals; and
- Where applicable, the use of rubber lined truck bodies (Dura-Tray) on haul trucks.

Continuous Improvement - implementation of feasible and reasonable mitigation measures:

MCO is committed to maintaining an awareness of best practice noise mitigation technologies and alternative operating methodologies. MCO implements noise control and management measures that are found to be feasible, reasonable and effective in the context of a safe and economic mining operation; and where there is a clear community benefit with their application. Available best practice mitigation technologies and alternative operating methodologies are reviewed on an ongoing basis, reported in the Annual Environmental Monitoring Report (AEMR)/Annual Review and considered from the results of Independent Environmental Audits.

Real-time Response Protocols - are implemented where reasonable and feasible, involving:

Noise control and management measures are implemented under the real-time noise conditions presented in **Table 3** with the responses shown in **Table 4**.

Table 3 Real-Time Response Trigger Levels

Time Period	Location	Green Low pass LAeq ¹	Amber Low pass LAeq ¹	Red Low pass LAeq ¹
Day (7am-6pm)	Lagoons Road	>34dBA for 24 consecutive 5 minute periods	>36dBA for 24 consecutive 5 minute periods	>38dBA for 12 consecutive 5 minute periods
	Winchester Crescent	>31dBA for 24 consecutive 5 minute periods	>33dBA for 24 consecutive 5 minute periods	>35dBA for 12 consecutive 5 minute periods
Evening (6pm-10pm)	Lagoons Road	>34dBA for 12 consecutive 5 minute periods	>36dBA for 6 consecutive 5 minute periods	>38dBA for 6 consecutive 5 minute periods
	Winchester Crescent	>31dBA for 12 consecutive 5 minute periods	>33dBA for 6 consecutive 5 minute periods	>35dBA for 6 consecutive 5 minute periods
Night (10pm-7am)	Lagoons Road	>33dBA for 12 consecutive 5 minute periods	>35dBA for 6 consecutive 5 minute periods	>37dBA for 6 consecutive 5 minute periods
	Winchester Crescent	>31dBA for 12 consecutive 5 minute periods	>33dBA for 6 consecutive 5 minute periods	>35dBA for 6 consecutive 5 minute periods

Source: Table 8 Noise Management Plan (NMP) (MCO, 2013)

Note 1: 630 hertz (Hz) Low pass filter frequency applied.

The real-time response measures evolve over time as a result of greater understanding of the weather patterns and mine operating conditions. The real-time response measures are based on algorithms which are written within the real-time noise software to post-process noise and meteorological data. The algorithms have been based upon noise modelling conducted for the MCP Stage 1 EA and actual noise and meteorological results recorded since commencement of operations in 2010.

The Moolarben Coal Complex Production and the Environment and Community departments are automatically notified when these triggers have been met through SMS alarming. The response trigger levels adequacies are reviewed on an annual basis with any changes reported in the AEMR/Annual Review.

Table 4 Real-Time Response Management Actions

Colour	Management/Control Action
Green	<ul style="list-style-type: none"> • Confirm prevailing weather conditions are acceptable as per approval requirements. • Review the audio to determine noise source and record observations. • If MCO noise is audible: <ul style="list-style-type: none"> - review predicted weather conditions to identify if noise enhancing conditions are forecast for the rest of the shift - rerun the model if forecast has changed - review predicted noise impacts for the shift against actual observations - rerun the model if predictions have changed. • Monitor changes in noise levels. • Record management strategies, including details of investigation, type of response (if any required), real-time monitoring results and actions taken.
Amber	<ul style="list-style-type: none"> • Confirm prevailing weather conditions are acceptable as per approval requirements. • Drive to alarm location to determine noise source and record observations. • If MCO noise is audible: <ul style="list-style-type: none"> - alert the Open Cut Examiner (OCE) of the noise observations - review noise generating activities and make preparations for moving into a protected area or shutting down equipment if noise levels remain elevated - review predicted weather conditions to identify if noise enhancing conditions are forecast for the rest of the shift - rerun the model if forecast has changed - review predicted noise impacts for the shift against actual observations - rerun the model if predictions have changed. • Monitor changes in noise levels • Record management strategies, including details of investigation, type of response (if any required), real-time monitoring results and actions taken.
Red	<ul style="list-style-type: none"> • Confirm prevailing weather conditions are acceptable as per approval requirements. • Drive to alarm location to determine noise source and record observations. • If MCO noise is audible: <ul style="list-style-type: none"> - alert the OCE of the noise observations - commence moving equipment into protected areas or shutting down equipment. • Monitor changes in noise levels against operational changes: <ul style="list-style-type: none"> - review predicted weather conditions to identify if noise enhancing conditions are forecast for the rest of the shift - rerun the model if forecast has changed - review predicted noise impacts for the shift against actual observations - rerun the model if predictions have changed. • Record management strategies, including details of investigation, type of response (if any required), real time monitoring results and actions taken.

Source: Table 9 Noise Management Plan (NMP) (MCO, 2013)

2.5 Noise Compliance

2.5.1 Noise Monitoring Program

A summary of recent noise monitoring locations and associated monitoring frequency are presented in **Table 5** together with a cross reference to the Noise Monitoring Location Plan (**Appendix B1**).

Table 5 Recent Noise Monitoring Programme Summary

Locality	Location ID ¹	Parameter	Frequency
Ulan	NA1 Ulan Public School	Operator-attended monitoring	Every month
Cooks Gap (North)	NA6 Lower Ridge Road ³		
Cooks Gap (South)	NA8 Southern Ridge Road		
Cooks Gap (Central)	NA9 Winchester Crescent		
Cooks Gap (South)	NA10 Moolarben Road ²	Real-time monitoring	Continuous
Cooks Gap (North)	NR5 Upper Northern Ridge Road ³		
Cooks Gap (North)	NR3 Lagoons Road ⁴		
Cooks Gap (Central)	NR4 Winchester Crescent		

Note 1: ID = Identification, refer **Appendix B1**. NA = Attended noise monitoring site. NR = Real-time noise monitoring site.

Note 2: Attended monitoring site to be established prior to commencement of mining in OC3.

Note 3: Real-time monitoring site moved from NR1 Ulan Public School to NR5 Upper Northern Ridge Road in Q4 2014.

Note 4: NR3 and NA6 MCO owned land.

2.5.2 Operator-attended Noise Compliance Results

A review of the AEMR 2013 and MENMRs between September 2013 and September 2014 presents monthly operator-attended noise monitoring at four locations during the period of November 2012 to September 2014, including NA1 Ulan Public School, NA6 Lower Ridge Road (MCO owned Receiver 64, Cooks Gap north), NA8 Southern Ridge Road (Receiver 268, Cooks Gap south) and NA9 Winchester Crescent (Receiver 83, Cooks Gap central).

Largely due to the implementation of the proactive noise control and management measures described in **Section 2.4.2**, MCO has maintained a strong record of recent compliance with the approved noise criteria, with no exceedances at privately owned receivers recorded during the November 2012 to September 2014 reporting period.

2.5.3 Continuous Noise Monitoring Results

The real-time noise monitoring system and response protocols form an integral part of the noise management of Moolarben Coal Complex operations. All data recorded by the real-time noise monitoring system is compiled into QENARs. The QENARs present an analysis of the long term continuous noise monitoring data to assist MCO with evaluation of the performance of mine noise management practices.

A review of the QENARs from March 2013 to August 2014 presents the real-time noise monitoring results recorded at 3 locations, including NR1 Ulan Public School, NR3 Lagoons Road (MCO owned Receiver 6, Cooks Gap north,) and NR4 Winchester Crescent (Receiver 234C, Cooks Gap central).

The LAeq descriptor is influenced by extraneous noise sources including livestock, traffic, early morning bird activity and insects, and often represents an over-estimate of the contribution from mining operations. Accordingly, the QENARs include the results of the 630 hertz (Hz) low pass filter frequency (ie LAeqLF(15min)), which aim to represent the intrusive mine noise level as accurately as possible.

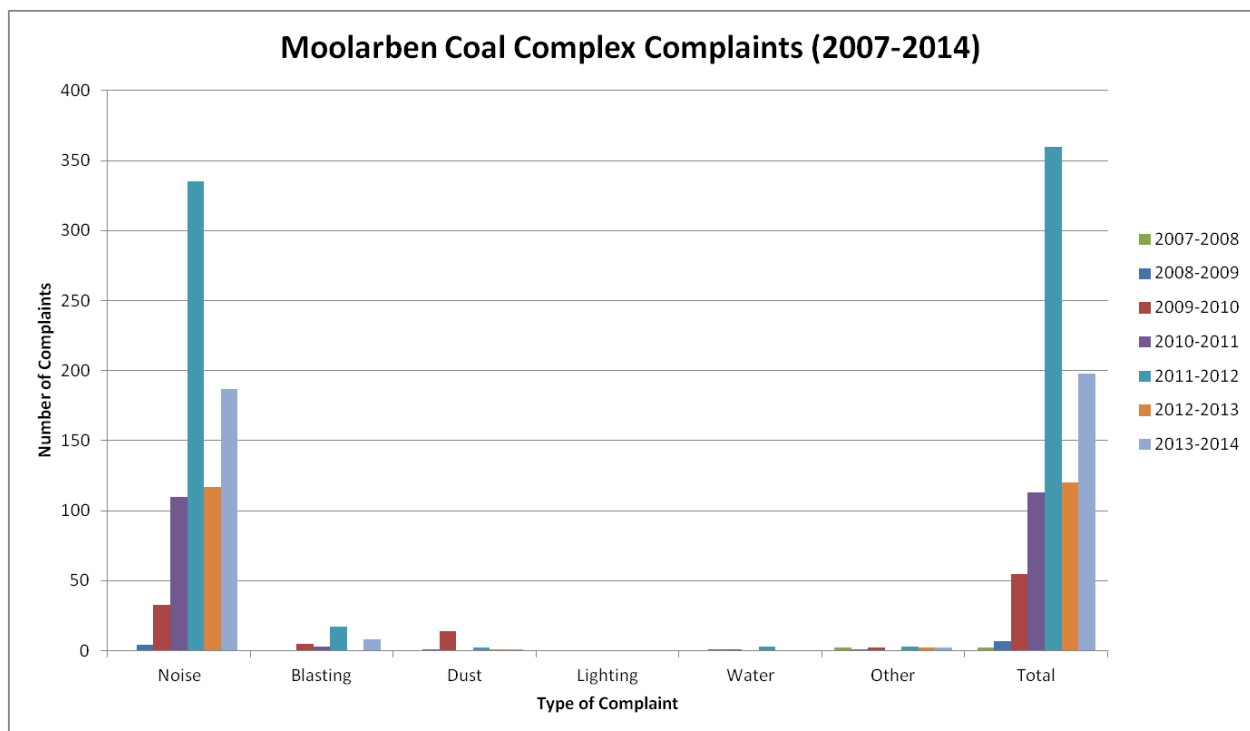
It is noted that in each instance that the Real-Time Response Trigger Levels were exceeded, the Real-time Response Protocols identified in **Section 2.4.2** were implemented, indicating the effectiveness of the Real-time Response Protocol.

2.6 Noise Complaints Summary

MCO maintains a complaints register in accordance with approval requirements. A summary of the complaint records from 2007 to 31 August 2014 are presented in **Figure 1**, including operating noise complaints. **Figure 1** shows the number of noise related complaints has diminished from the peak recorded in 2011/2012. The reduction in noise-related complaints coincides with the continued implementation of MCO's proactive noise control and management measures described in **Section 2.4.2** including the introduction of the Dura-Tray haul trucks, ongoing noise attenuation to mining fleet, the use of dedicated Mining and Production Environmental Assistants to provide real-time feedback to the mining operations, mine planning to allow for protected work areas to be developed, ongoing community consultation and land acquisitions.

All complaints received by MCO relating to noise were responded to in accordance with the Community Complaints Procedure detailed in the NMP. Following each noise related complaint the source and noise levels were determined or verified. In some instances, mining operations were altered in response to a complaint lodged with MCO during adverse weather conditions. However, there were no reportable environmental incidents (ie reportable non-compliances) relating to noise in the 2013-2014 reporting period.

Figure 1 Complaints Register Summary 2007 to 2014



Source: MCO (2014)

3 PROPOSED MODIFICATION

3.1 Hours of Operation

There would be no change in the approved operating hours of the Moolarben Coal Complex due to the Modification as presented in **Table 6**.

Table 6 Approved Moolarben Coal Complex and Modification Hours of Operation

Operation	Description	Currently Approved ¹	Modification
On-Site	Mine maintenance, operation, coal handling	24 hours, 7 days per week	Unchanged
	Blasting	0900 hours to 1700 hours A maximum of 2 blasts per day and 9 blasts per week on average over any 12 month period	Unchanged
Off-Site	Train Traffic	24 hours, 7 days per week	Unchanged
	Road Traffic	24 hours, 7 days per week	Unchanged

Note 1: As per MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135).

3.2 On-site Mining Operation

MCO has reviewed the mining sequence and associated infrastructure layout requirements at the Moolarben Coal Complex to enable more efficient access to the OC4 resource. As a consequence, the approved Stage 2 Haul Road (to the north of OC4) would no longer be required, and would be replaced by a shorter, more direct, haul road route to OC1 (to the south-west of the approved Stage 2 haul road).

The OC4 South-West Modification includes the following key components:

- Construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed);
- Adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- Refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- Backfilling of the northern OC1 final void to approximately pre-mining elevations.

The General Arrangement Plan Incorporating the Modification is attached as **Appendix B3**.

More detailed mine planning that has been undertaken since the lodgement of the Stage 2 PPR EA indicates that additional fleet would be required to meet expected production while maintaining compliance with noise limits. An indicative Moolarben Coal Complex mobile equipment fleet is presented in **Table 17**.

3.3 On-site Blasting

There would be no change in the approved Moolarben Coal Complex blasting regime due to the Modification and, therefore, blasting is not further considered in this report.

3.4 Off-site Rail Transport

There would be no change to the approved rail movements or rail loading hours and, therefore, off-site rail transport noise is not further considered in this report.

3.5 Off-site Road Transport

There would be no material change in the approved daily road traffic generation due to the Modification and, therefore, off-site road transport noise is not further considered in this report.

4 EXISTING METEOROLOGICAL AND NOISE ENVIRONMENT

4.1 Meteorological Environment

As discussed in **Section 2.4.1**, MCO maintains two on-site AWSs as shown in **Appendix B1**. An assessment of prevailing wind conditions was derived from the EPA approved AWS located at WS3. The dominant seasonal wind speeds and directions recorded for the 42 month period from January 2011 to June 2014 are presented in **Appendix D** for daytime (0700 hours to 1800 hours), evening (1800 hours to 2200 hours) and night-time (2200 hours to 0700 hours) in accordance with a methodology consistent with the requirements of the INP.

An assessment of winter temperature gradients and atmospheric stability has been derived from the on-site Temperature Tower located at Wilpinjong Coal Mine. Presented in **Appendix D** is the winter Temperature Gradient Exceedance Levels summary, winter Temperature Gradient Exceedance Levels 24 hour profile and winter Temperature Gradient Cumulative Frequency Distribution for the 34 month period (August 2011 to July 2014) in accordance with a methodology consistent with the requirements of the INP Appendix E (E2).

4.1.1 Prevailing Winds

Section 5.3 of the INP, Wind Effects, states:

“Wind effects need to be assessed where wind is a feature of the area. Wind is considered to be a feature where source to receiver wind speeds (at 10 m height) of 3 m/s or below occur for 30 percent of the time or more in any assessment period in any season.”

The prevailing winds less than (or equal to) 3 metres per second (m/s) with a frequency of occurrence greater than (or equal to) 30% are presented in **Table 7** and considered to be relevant to the Moolarben Coal Complex in accordance with the INP.

Table 7 Prevailing Seasonal 10 m Wind Velocities In Accordance with the INP

Season	Winds ± 45 degrees ≤ 3 m/s with Frequency of Occurrence $\geq 30\%$		
	Daytime	Evening	Night-Time
Annual	Nil	SW (33%), WSW (30.8%)	Nil
Summer	Nil	ENE (30.6%)	ENE (37.1%), E (36.3%)
Autumn	Nil	SSW (31.6%), SW (34.7%), WSW (30.3%)	Nil
Winter	WSW (30.8%), W (30%)	SSW (32.3%), SW (40.5%), WSW (40.4%), W (30.5%)	SW (32.7%), WSW (33.1%)
Spring	Nil	SSW (37.3%), SW (44.4%), WSW (42.1%)	SSW (36.1%), SW (37.5%), WSW (30.6%)

4.1.2 Temperature Inversions

Section 5.2 of the INP, Temperature Inversions, states:

“Assessment of impacts is confined to the night noise assessment period (10.00 pm to 7.00 am), as this is the time likely to have the greatest impact - that is, when temperature inversions usually occur and disturbance to sleep is possible.”

“Where inversion conditions are predicted for at least 30% (or approximately two nights per week) of total night-time in winter, then inversion effects are considered to be significant and should be taken into account in the noise assessment”.

The seasonal combined evening/night-time temperature gradients and atmospheric stability are presented in **Table 8** and considered to be relevant to Moolarben Coal Complex in accordance with the INP.

Table 8 Prevailing Seasonal Temperature Gradients in Accordance with the INP

Stability Class	Frequency of Occurrence - Evening/Night-time					Temperature Gradient °C/100 m ¹	Qualitative Description
	Annual	Summer	Autumn	Winter	Spring		
A	0.3%	0.7%	0.0%	0.0%	0.3%	<-1.9	Lapse
B	0.5%	1.3%	0.1%	0.0%	0.5%	-1.9 to -1.7	Lapse
C	0.9%	2.3%	0.2%	0.0%	0.9%	-1.7 to -1.5	Lapse
D	34.6%	58.1%	26.9%	17.4%	33.2%	-1.5 to -0.5	Neutral
E	25.0%	24.7%	28.6%	22.6%	23.5%	-0.5 to 1.5	Weak inversion
F	25.1%	9.5%	31.0%	39.1%	22.8%	1.5 to 4	Moderate inversion
G	13.7%	3.4%	13.1%	20.9%	18.7%	>4.0	Strong inversion
F+G	38.8%	12.9%	44.1%	59.9%	41.6%	>1.5	Moderate to Strong

Note 1: °C/100 m = Degrees Celsius per 100 metres.

In accordance with **Table 8**, the combined frequency of occurrence of moderate to strong (ie >1.5°C/100 m) winter temperature inversions is greater than 30% (actually 59.9%) during the combined evening/night-time period and therefore requires assessment, in accordance with the INP. The assessment of winter temperature gradients and atmospheric stability derived from the Wilpinjong Coal Mine Temperature Tower data has provided additional data regarding the characterisation of temperature gradients that occur in the area.

Based on analysis of available data (**Appendix D**), it was determined that noise impacts coinciding with temperature gradients up to 5.2°C/100 were assessable, in accordance with the INP, as these temperature inversions occur for up to 90% of the time during the evening/night periods during winter.

In addition, the INP Section 5.2 *Temperature Inversions* also states:

“The drainage-flow wind default value should generally be applied where a development is at a higher altitude than a residential receiver, with no intervening higher ground (for example, hills). In these cases, both the specified wind and temperature inversion default values should be used in the noise assessment for receivers at the lower altitude.”

Some of the Cooks Gap privately owned receivers are positioned at lower elevation relative to the Moolarben Coal Complex with minimal intervening topography between the site and the nearest receivers. A site specific 1.0 m/s east-northeast drainage flow has been adopted in this assessment (which is generally consistent with the MCP Stage 1 Mod 9 NIA).

4.1.3 Noise Model Meteorological Parameters

The Environmental Noise Model (ENM) noise modelling meteorological parameters are presented in **Table 9** based on foregoing analysis of the Moolarben Coal Complex AWS meteorological data set together with the Wilpinjong Coal Mine winter temperature gradients.

Table 9 Calm (Neutral) and Noise Enhancing Meteorological Modelling Parameters

Period	Meteorological Parameter	Air Temperature	Relative Humidity	Wind Velocity	Temperature Gradient
Daytime	Calm	18°C	55%	0 m/s	0°C/100 m
	Wind only	19°C	55%	WSW and W 3 m/s	0°C/100 m
Evening	Calm	16°C	66%	0 m/s	0°C/100 m
	Wind only	16°C	65%	ENE, SSW, SW, WSW and W 3 m/s	0°C/100 m
Night-time	Calm	12°C	75%	0 m/s	0°C/100 m
	Wind only	12°C	75%	ENE, E, SSW, SW and WSW 3 m/s	0°C/100 m
	Strong Inversion	6°C	70%	0 m/s	5.2°C/100 m
	Strong Inversion plus Drainage	6°C	70%	ENE 1.0 m/s	5.2°C/100 m

4.2 Noise Environment

Although the Moolarben Coal Complex has approved noise limits for privately owned receivers in its Stages 1 and 2 Project Approvals, the INP procedures and Application Notes (12 June 2013) require noise impact assessments to review the pre-mining background noise data to determine the relevant Rating Background Levels (RBLs) and noise amenity levels ($L_{Aeq(period)}$). Background noise monitoring results to characterise and quantify the pre-mine noise environment in the area surrounding Moolarben Coal Complex were conducted in July 2005 for the *Noise and Vibration Impact Assessment Proposed Moolarben Coal Mine Ulan, NSW* (Spectrum Acoustics, 2006).

The measurement methodology and analysis procedures are described in the MCP Stage 1 NIA. The relevant estimated RBLs and noise amenity levels ($L_{Aeq(period)}$) are presented in **Table 10**, which form the basis of establishing the Project-specific noise assessment criteria (**Section 5**).

Table 10 Background Noise and Amenity Levels for Assessment Purposes

Locality	Estimated RBL ^{1,2} All Noise Sources			Estimated $L_{Aeq(period)}$ ^{1,2} Industrial Noise Only		
	Daytime	Evening	Night-time	Daytime	Evening	Night-time
Privately Owned Land	30	30	30	<44	<39	<34

Source: *Spectrum Acoustics (2006)*

Note 1: Estimated RBLs and noise amenity levels in the absence of Moolarben Coal Complex operation.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

5 NOISE ASSESSMENT CRITERIA

The Moolarben Coal Complex operates in accordance with the Project Approval noise limits (**Section 2.3 and Appendices A1 and A2**). The Project Approval noise limit for privately owned receivers is 35 dBA LAeq(15minute) during the daytime, evening and night-time with the exception of five receivers (30, 31, 63¹, 70, 75) as shown in Appendices A1 and A2. Notwithstanding, in accordance with the INP Application Notes (12 June 2013), PSNLs and Sleep Disturbance Noise Levels (SDNLs) for the Moolarben Coal Complex incorporating the Modification determined in accordance with the INP are described below.

5.1 Intrusive and Amenity Noise Assessment Criteria

The EPA has regulatory responsibility for the control of noise from “scheduled premises” under the *Protection of the Environment Operations Act, 1997*. In implementing the INP, the EPA has two broad objectives:

- Controlling intrusive noise levels in the short-term; and
- Maintaining noise amenity levels for particular land uses over the medium to long-term.

The INP prescribes detailed calculation routines for establishing PSNLs (ie LAeq[15minute] intrusive criteria and LAeq[period] amenity criteria) at potentially affected receivers for an industrial development. Ideally, the intrusive noise level should not exceed the background level by more than 5 dBA. Similarly, the noise amenity level should not exceed the specified INP “acceptable” or “maximum” noise level appropriate for the particular land use. The applicable acceptable and maximum noise amenity levels for receivers in the vicinity of the Moolarben Coal Complex are shown in **Table 11**.

Table 11 INP Acceptable and Maximum Noise Amenity Levels (dBA re 20 µPa)

Locality	INP Noise Amenity Zone	Amenity LAeq(period) ¹ Acceptable			Amenity LAeq(period) ¹ Maximum		
		Day	Evening	Night	Day	Evening	Night
Privately Owned Land	Rural Residential	50	45	40	55	50	45
Any	School ²	External 45 when in use			External 50 when in use		
Any	Church ²	External 50 when in use			External 55 when in use		
Any	Passive Recreation	External 50 when in use			External 55 when in use		
Any	Commercial	External 65 when in use			External 70 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: External criteria equivalent to internal criteria plus 10 dBA.

In addition, the DP&E has released the Voluntary Land Acquisition and Mitigation Policy (VLA&MP) (DP&E, 2014) which formalises existing NSW Government practice in relation to land acquisition and mitigation associated with State Significant (mining, petroleum and extractive) Developments.

With regard to vacant land the VLA&MP indicates that the consent authority should only grant voluntary land acquisition rights where the noise generated by the development would contribute exceedances of the recommended maximum noise levels in Table 2.1 of the INP on more than 25% of any privately owned land, and a dwelling could be built on that land under existing planning controls. Based on the VLA&MP guidance, the residential rural night-time maximum recommended (LAeq(9hour)) noise amenity level would be 45 dBA.

¹ Receiver 63 is subject to a private agreement with MCO and therefore the Project Approval noise criteria do not apply to this property.

In accordance with the INP's Chapter 2 Industrial Noise Criteria and relevant Application Notes, the PSNLs for the residential and other localities in the vicinity of the Moolarben Coal Complex are presented **Table 12** for both intrusive noise and amenity. These criteria are nominated for the purposes of assessing potential noise impacts from the Moolarben Coal Complex incorporating the Modification.

Table 12 Project-specific Noise Levels and Assessment Criteria (dBA re 20 µPa)

Locality	Land Use	Intrusive LAeq(15minute) ¹			Amenity LAeq(period) ¹		
		Day	Evening	Night	Day	Evening	Night
Privately Owned Land	Rural Residential ²	35	35	35	50	45	40
Any	School ³	Intrusive noise criteria not applicable			External 45 when in use (daytime/evening only)		
Any	Church ³	Intrusive noise criteria not applicable			External 50 when in use (daytime/evening only)		
Any	Passive Recreation	Intrusive noise criteria not applicable			External 50 when in use		
Any	Commercial	Intrusive noise criteria not applicable			External 65 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: At the most-affected point within 30 m of the residential area.

Note 3: External criteria equivalent to internal criteria plus 10 dBA.

The intrusiveness criterion is met if the LAeq(15minute) is less than or equal to the RBL plus 5 dBA, where the RBL is described in **Section 4.2**. Thus, the most stringent PSNLs for Moolarben Coal Complex incorporating the Modification at rural residential receivers (and vacant land) would be the intrusiveness criterion (ie 35 dBA LAeq(15minute)) for daytime, evening and night-time periods.

The Privately Owned Land amenity criteria nominated in **Table 12** are reflective of the general rural area generally consistent with Local Environmental Plan zoning. Cumulative noise impacts from the Moolarben Coal Complex incorporating the Modification are assessed against the amenity LAeq(period) acceptable noise levels specified in **Table 11** being the total noise level from all industrial sources.

The INP states that the PSNLs are based on preserving the amenity of at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the PSNLs are achieved, then most people would consider the resultant noise levels acceptable. In those cases where the PSNLs are not achieved, it does not automatically follow that all people exposed to the noise would find the noise unacceptable. In subjective terms, exceedances of the PSNLs can be described as follows:

- Negligible noise level increase <1 dBA - not noticeable by all people.
- Marginal noise level increase 1 dBA to 2 dBA - not noticeable by most people.
- Moderate noise level increase 3 dBA to 5 dBA - not noticeable by some people but may be noticeable by others.
- Appreciable noise level increase >5 dBA - noticeable by most people.

5.2 Low Frequency Noise Modifying Adjustment Factors

In accordance with the INP's Chapter 4 Modifying factor adjustments, where a noise source contains certain characteristics, such as a dominant low frequency content, the INP states that there is evidence to suggest that it can cause greater annoyance than other noise at the same noise level. The modifying factors (if applicable) are to be applied to the measured or predicted noise level at the receiver and then assessed against the PSNLs. In the case of low frequency (20 Hz to 250 Hz) noise, the INP requires a 5 decibel (dB) correction to be applied to the measured or predicted noise levels where the difference between the A and C weighted level is 15 dB (or more) at the receiver.

Noise measurements of the existing Moolarben Coal Complex noise emissions (coinciding with temperature inversions) were conducted by SLR for a duration of one week in August 2014 using a full spectrum noise monitor (ie capacity to measure low frequency noise) located at the receiver 175 (MCO) being generally representative of the nearest Cooks Gap receivers to the Moolarben Coal Complex.

The noise data were then analysed in accordance with the INP requirements to estimate the $L_{eq}(15\text{minute})$ A and C weighted noise levels of the Moolarben Coal Complex operations and this coincided with strong temperature inversions (average approximately $5.6^{\circ}\text{C}/100\text{ m}$) between 0000 hours to 0500 hours. The measurement results at the receiver 175 (MCO) show a mean difference of 13.3 dB between the estimated (mine-contributed) intrusive $L_{Aeq}(15\text{minute})$ and the $L_{Ceq}(15\text{minute})$ noise levels (ie below the INP's low frequency modifying threshold of 15 dB).

On review of this data and operator-attended noise monitoring results presented in the MENMRs, it is concluded that Moolarben Coal Complex noise emissions do not contain "dominant low frequency content" in accordance with the INP's assessment procedures.

In addition, recent research presented in the technical paper entitled *A Simple Outdoor Criterion for Assessment of Low Frequency Noise Emission* (Broner, 2011) indicates that a greater difference may be permissible at low A weighted noise levels, as the difference between A and C weighted noise levels for low background noise levels may exceed 20 dB to 25 dB without causing complaints. Furthermore, the INP's low frequency assessment approach does not involve an absolute noise level criterion and may not provide an appropriate assessment of annoyance. Based on a comprehensive review of many case histories and literature, the technical paper recommends criteria for the assessment of low frequency noise as presented in **Table 13**.

Table 13 Criteria for Assessment of Low Frequency Noise (dBC re 20 μPa)

Sensitive Receiver	Period	Range	Criteria L_{eq}
Residential	Night-time or Plant Operation 24/7	Desirable	60
		Maximum	65
	Daytime or Intermittent (1-2 hours)	Desirable	65
		Maximum	70
Commercial/Office/Industrial	Night-time or Plant Operation 24/7	Desirable	70
		Maximum	75
	Daytime or Intermittent (1-2 hours)	Desirable	75
		Maximum	80

Source: Broner, 2011

5.3 Sleep Disturbance Assessment Criteria

The INP Application Notes dated 12 June 2013 recognise that the current $LA_{1(1\text{minute})}$ sleep disturbance criterion of 15 dBA above the prevailing $LA_{90(15\text{minute})}$ level is not ideal. The assessment of potential sleep disturbance is complex and not fully understood; however the EPA believes that there is insufficient information to determine a suitable alternative criterion.

Appendix B (Technical Background to Road Traffic Noise Criteria) of the *Environmental Criteria for Road Traffic Noise* (EPA, 1999) contains a comprehensive review of research into to sleep disturbance and traffic noise. The review has been more recently updated in The NSW Road Noise Policy (Department of Environment, Climate Change and Water [DECCW], 2011) (Section 5.3 Sleep Disturbance) however the EPA's conclusion remains unchanged as follows:

- Maximum *internal* noise levels below 50 to 55 dBA are unlikely to cause awakening reactions; and

- One or two noise events per night, with maximum *internal* noise level of 65 to 70 dBA, are not likely to affect health and wellbeing significantly.

It is noteworthy that conditions of approval generally include external noise limits. The internal noise levels (presented above) can be conservatively transposed to an external noise level by adding 10 dBA (or 12.5 dBA when measured 1 m from the dwelling facade). It follows, that an external LA1(1minute) noise criteria of 60 dBA would appear to be consistent with the current research in relation to this matter.

The EPA continues to review research on sleep disturbance as it becomes available and in the interim, the EPA suggests that the LA1(1minute) level of 15 dBA above the RBL is a suitable screening criterion for sleep disturbance for the night-time period. This approach is generally consistent with the MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135).

The Modification night-time LA1(1minute) SDNLs are presented in **Table 14** together with the comparable approved LA1(1minute) noise limit.

Table 14 Night-time LA1(1minute) Sleep Disturbance Assessment Criteria (dBA re 20 µPa)

Locality	Project Approval LA1(1minute) Limit ¹	Proposed Modification LA1(1minute) Criteria ¹
Privately Owned Land	45	45

Note 1: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0800 hours.

Night-time operations would involve a larger proportion of the mobile equipment being operated in repeatable routines and a relatively smaller proportion of continuous fixed plant. Noise emissions from the mobile equipment are typically variable, whereas fixed plant noise emissions are relatively continuous (or steady) levels. When mobile equipment and fixed plant operate simultaneously, some noise sources (including the operation of coal trains) have the potential to emerge audibly above the overall mine noise.

The monthly operator-attended noise monitoring results as presented in the MENMRs from monitoring locations NA6, NA8 and NA9 have been reviewed to determine the mean difference between the intrusive LAeq(15minute) and the corresponding LA1(1minute) noise levels. The results are summarised in **Table 15** including the mean (mine-contributed) intrusive LAeq(15minute) and the LA1(1minute) noise levels.

Table 15 Measured Night-time LAeq(15minute) and LA1(1minute) Noise Levels (dBA re 20 µPa)

Locality	Location ID ¹	Mean LAeq(15minute)	Mean LA1(1minute)	Mean Difference
Cooks Gap (North)	NA6 Lower Ridge Road ²	27 dBA	31 dBA	3.9 dBA
Cooks Gap (South)	NA8 Southern Ridge Road	23 dBA	25 dBA	2.0 dBA
Cooks Gap (Central)	NA9 Winchester Crescent	27 dBA	30 dBA	3.0 dBA
Overall		26 dBA	29 dBA	3.0 dBA

Note 1: ID = Identification, refer **Appendix B1**.

Note 2: NA6 MCO owned land.

The measured results at locations NA6, NA8 and NA9 show a mean difference of approximately 3 dBA between the (mine-contributed) intrusive LAeq(15minute) and the LA1(1minute) noise levels and are therefore consistent with similar mining operations where the difference is typically <10 dBA. Hence, if the intrusive PSNLs (**Section 5.1**) (ie RBL plus 5 dBA) are achieved, then the SDNLs (ie RBL plus 15 dBA) would also be met. This relationship enables the noise assessment process to focus on the setting and assessment of INP-based intrusive noise and amenity levels which aim to minimise annoyance at noise sensitive receiver locations.

Notwithstanding the foregoing, the predicted LA1(1minute) night-time noise levels are presented in **Section 7.3** together with an assessment of potential sleep disturbance impacts from Moolarben Coal Complex incorporating the Modification.

5.4 Modification and Cumulative Noise Impact Assessment Methodology

5.4.1 Noise Impact Assessment Methodology

In view of the foregoing, **Table 16** presents the methodology for assessing the Modification operating noise levels against the intrusive and amenity PSNLs (**Table 12**) and the LA1(1minute) SDNLs (**Table 14**) together with cumulative amenity noise levels (**Table 11**) for assessing operating noise levels from existing, approved and proposed mining developments in the vicinity of Moolarben Coal Complex.

Table 16 Modification and Cumulative Noise Impact Assessment (dBA re 20 µPa)

Assessment Source	Assessment Parameter	Assessment Criteria	Noise Management Zone ¹		Noise Affection Zone
			Marginal	Moderate	
Modification	PSNL Intrusive	RBL plus 5 dBA	1 to 2 dBA above assessment criteria	3 to 5 dBA above assessment criteria	> 5 dBA above assessment criteria ²
	PSNL Amenity	INP acceptable			
	SDNL LA1(1minute)	RBL plus 15 dBA			
Mine Developments	Cumulative Amenity	INP acceptable	1 to 2 dBA above assessment criteria	3 dBA above assessment criteria	> 3 dBA above assessment criteria ³
Note 1: Depending on the degree of predicted exceedance of the relevant assessment parameter potential noise impacts in the noise management zone could range from marginal to moderate (in terms of the perceived noise increase).					
Note 2: Exposure to Project noise levels greater than 5 dBA above the relevant PSNL and or SDNL may be considered unacceptable by some landowners.					
Note 3: Exposure to cumulative mine noise levels greater than 3 dBA above the relevant INP acceptable noise level may be considered unacceptable by some landowners.					

For the purposes of assessing any potential Modification noise impacts, the noise management and affection zones are further defined as follows.

5.4.2 Noise Management Zone

Depending on the degree of predicted exceedance of the PSNL and or SDNL (1 to 5 dBA), potential noise impacts in the noise management zone could range from marginal to moderate (in terms of the perceived noise increase). In addition to the noise mitigation measures included in the predictive modelling (**Section 6.1**), noise management procedures would include:

- Noise monitoring on-site and within the community.
- Prompt response to any community issues of concern.
- Refinement of on-site noise mitigation measures and operating procedures where practicable.
- Implementation of reasonable and feasible acoustical mitigation at receivers (which may include measures such as enhanced glazing, insulation and/or air-conditioning) at receivers where noise monitoring shows mine noise levels are 3 to 5 dBA above the relevant criteria.

5.4.3 Noise Affection Zone

Exposure to Moolarben Coal Complex incorporating the Modification noise levels greater than 5 dBA above the relevant PSNL and or SDNL may be considered unacceptable by some landowners. These landowners are typically afforded rights for acquisition upon request in the relevant approval documentation. Management procedures for the Noise Affection Zone would include:

- Discussions with relevant land owners to assess concerns and define responses.

- Implementation of reasonable and feasible acoustical mitigation at receivers (which may include measures such as enhanced glazing, insulation and/or air-conditioning) at receivers where noise monitoring shows mine noise levels are >5 dBA above the relevant criteria.
- Negotiated agreements with land owners where required.

6 NOISE MODELLING METHODOLOGY

6.1 Noise Control and Management Measures

6.1.1 Moolarben Coal Complex Existing Operations

MCO is obligated to manage noise levels from the Moolarben Coal Complex in accordance with the noise limits specified in MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) using reasonable and feasible mitigation measures. The obligation to meet the Project Approval noise limits has been achieved through a combination of the following:

- For the majority of private landowners, the implementation of the noise management strategy as per the NMP including the use of real-time noise monitoring to manage noise levels during the night.
- For a minority of private landowners, property acquisitions and private compensation agreements and which has had the effect of reducing the number of privately owned receivers that could potentially be affected by noise impacts from the Moolarben Coal Complex.

An appreciable level of effort has been applied by MCO to identify and implement reasonable and feasible on-site noise controls since the commencement of mining, particularly to minimise the impact of night-time noise emissions from the Moolarben Coal Complex (**Appendix E**) including:

- Fitting of large haul trucks with Dura-Trays to reduce the noise emissions associated with loading and unloading.
- Locating mobile fleet (eg excavators) behind pit walls and at low elevations to shield noise emissions during adverse weather conditions.
- Construction of steps in waste emplacements to allow dumping to occur at lower elevations during adverse weather conditions.
- Construction of berms/bunds along haul roads which are exposed to receivers.

Further detail regarding the Moolarben Coal Complex noise management strategy and MCO's recent compliance with the noise limits specified in MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) is provided in **Section 2.3**. MCO would continue to meet its obligation to comply with the noise limits specified in MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) through the continued implementation of the noise management strategy. This would include the continuation of real-time monitoring, and the stand-down of equipment, as required, as part of the response to an exceedance of the Real-Time Response Trigger Levels.

6.1.2 Moolarben Coal Complex Incorporating the Modification

Given the successful implementation of the noise management strategy for the existing operations, MCO has made allowances for noise attenuated mobile equipment and fixed plant associated with the Modification in order to comply with the Project Approval noise limits.

However, further investigation of reasonable and feasible noise mitigation measures for the proposed Modification was necessary and was conducted in consultation with MCO particularly in relation to evening and night-time operations. A number of iterative steps were undertaken to develop noise mitigation measures for the Modification, including:

- Extensive preliminary noise modelling scenarios representative of the predicted maximum Modification noise emissions to identify any potential noise exceedances.
- Ranking the highest noise contributors and progressively introducing noise mitigation measures to appreciably reduce noise associated with the Modification.
- Revision of detailed mine planning to reschedule intrusive activities to less sensitive times of the day where possible and to optimise acoustic benefit of mine landforms (eg shielding of noise sources by out-of-pit waste rock emplacements). This was an ongoing, iterative process requiring both acoustic (provided by SLR) and mine planning input (provided by MCO).
- Evaluating various combinations of noise control and management measures to assess their relative effectiveness.
- Agreement by MCO to adopt a range of noise control and management measures (including low noise equipment and operational controls) to appreciably reduce noise emissions associated with the proposed Modification.

The noise control and management measures have had the effect of appreciably reducing noise levels at nearby privately owned receivers. In particular, noise reduction at receivers to levels at or below the Project Approval noise limits in Cooks Gap has been targeted through the implementation of the above measures. This has been achieved in particular by:

- Operation of some support fleet during the daytime only.
- Procuring of extra-quiet (XQ) mobile equipment fleet and “low noise” fixed plant (ie conveyor drives and conveyor idlers).
- Establishing extensive acoustic bunding around the site, targeting haul roads.
- From 2018, OC4 emplacement of waste rock operations during evening and night-time at relatively lower elevations, utilizing main dump shielding toward the Cooks Gap receivers.
- Maximising in-pit hauling of OC1 waste rock (ie restricting fleet to lower elevations).
- Minimising out-of-pit rock emplacement of OC1 waste rock.

Given the optimised mine plan for the Modification and other operational restrictions, it is considered that the measures presented above are reasonable and feasible.

6.2 Mobile Equipment and Fixed Plant Sound Power Levels

The potential for machinery to emit noise is quantified as the SWL expressed in dBA re 1 pico watt (pW). At the receptor, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 micro pascals (μPa). In general terms, any variation in the on-site plant and equipment SWLs will produce a similar variation in the off-site SPL at the receiver (ie an increase of 5 dBA in the SWL of equipment operating at a site would result in a corresponding 5 dBA increase in SPL of intrusive noise at the receiver, when averaged over the same 15 minute period).

Equipment SWLs at the Moolarben Coal Complex are the subject of ongoing measurements in accordance with the NMP, and MCO have refined the SWLs for individual fleet items. Comparative mobile equipment, fixed plant and total SWLs are presented in **Table 17** as determined from the MCP Stage 1 Mod 9 NIA and the proposed Modification. Based on the MCP Stage 1 Mod 9 NIA the site SWL was approximately 134 dBA and for the proposed Modification, the (total) site SWL is approximately 135 dBA. As shown in **Table 17**, due to the additional mobile equipment and fixed plant the proposed Modification site SWL is approximately 1.2 dBA higher by comparison to the approved Moolarben Coal Complex.

Table 17 Comparative Fixed Plant and Mobile Equipment Fleets SWLs (dBA re 1 pW)

Equipment	Type/ Capacity	MCP Stage 1 Mod 9 NIA ^{1,2}			Proposed Modification ³		
		No. Items	SWL per Item	Total SWL	No. Items	SWL per Item	Total SWL
Drill	Atlas Copco DML60	3	120	125	2	117	120
	Pit Viper 275				2	115	118
Excavator	Liebherr 996	6	118	126	2	117	120
	Liebherr 996B				1	111	111
	Liebherr 9800				1	114	114
	CAT 6050				2	118	121
Front-end Loader	Komatsu WA1200	1	120	120	2	121	124
	Komatsu WD900				1	120	120
	CAT 854				1	114	114
Truck	Komatsu 830E	25	115	129	29	115	130
	Komatsu 730E/CAT 789				9	114	124
Dozer	Komatsu D475	15	114	126	7	113	121
	Komatsu D375				3	113	118
	CAT D11T				8	116	125
	CAT D10T				4	114	120
Water Truck	Komatsu HD785	4	114	120	4	115	121
Grader	Komatsu GD825	4	112	118	2	110	113
	CAT 24M				2	110	113
	CAT 16M				2	108	111
Support Loader	Komatsu WA580-6	-	-	-	1	115	115
Support Excavator	Komatsu PC450	-	-	-	2	105	108
Support Scraper	CAT 657G	-	-	-	1	117	117
Service Truck	Komatsu HD785	-	-	-	1	115	115
Service Truck	CAT 773F	-	-	-	1	114	114
Mobile Equipment				133.2			134.6
CHPP		1	117	117	1	118	118
Reject Bin		1	104	104	1	104	104
Feeder		1	114	114	1	114	114
Crusher		1	113	113	1	114	114
Transfer Station		2	115	118	2	115	118
Sizing Station		1	114	114	1	116	116
Stacker		1	105	105	1	105	105
Conveyor			101 (per 100m)	120		101 (per 100m)	120
Conveyor Drive		6	102-107	113	11	98	108
Ventilation Fans		2	112	112	2	112	115
Loadout Bin		1	113	113	1	113	113
Locomotive		3	108	113	3	109	114
Fixed Plant				125.8			125.9
Estimated Mine Site				134.0			135.2

Note 1: Estimated mobile equipment SWLs based on demonstrated noise controls. Estimated fixed plant SWLs based on achievable low noise emission standards and NIA acoustic design requirements.

Note 2: As modelled in the MCP Stage 1 Mod 9 NIA (including the Stage 2 operations) based on an approximate 85% mobile equipment utilisation.

Note 3: Estimated mobile equipment SWLs based on existing performance and demonstrated noise controls. Estimated fixed plant SWLs based on achievable low noise emission standards and NIA acoustic design requirements. The number of items stated is the total excluding any utilisation rate.

The LAeq SWLs given for each item of mobile equipment or fixed plant do not include noise emissions which emanate from alarms or communication “horns”. It is noted that MCO have installed broad-band “quacker” reversing alarms on all of the Moolarben Coal Complex mobile equipment fleet. Further, implementation of “silent horns” which uses radio to communicate between mobile plant is used on-site. External horns are used in emergency situations only.

6.3 Noise Model Validation

The noise model for the Moolarben Coal Complex was prepared using RTA Software's Environmental Noise Model (ENM for Windows, Version 3.06), a commercial software system developed in conjunction with the NSW EPA. The acoustical algorithms utilised by this software have been endorsed by the Australian and New Zealand Environment Council and all State Environmental Authorities throughout Australia as representing one of the most appropriate predictive methodologies currently available. The ENM algorithm has been used for all major noise assessments at the Moolarben Coal Complex including the MCP Stage 1 Mod 9 NIA and MCP Stage 2 PPR NIA.

SLR conducted a noise investigation survey in July and August 2014 to update and validate the Moolarben Coal Complex noise model and reflect as-built noise emissions, as follows:

- On-site noise measurements to determine fixed plant SWLs including CHPP, conveyors and drives, ROM bin, sizing station as well as locomotives operating on the rail loop.
- On-site noise measurements to determine and/or verify mobile equipment SWLs including dozers, excavators, haul trucks and drills.
- The digital terrain was updated to include latest high resolution landforms, particularly extensive noise wall bunding on the western extent of OC2 as well as incorporating the proposed Modification mine plans and significant mobile equipment.
- Additional noise sources were added into the model to more accurately reflect the noise emissions from mobile equipment, particularly haul trucks on the OC4 South-West haul route.
- Far-field operator-attended and unattended noise surveys (3 validation locations) were conducted to determine Moolarben Coal Complex's noise level contribution at each location. For each survey the prevailing weather conditions as well as the number and location of operating plant and equipment were recorded.
- The outcome of the validation exercise resulted in a noise model calibration factor (of negative 2.1 dBA) which has been included in the Modification noise assessment (while noting that the validation outcomes are generally consistent with field measurement and modelling results from similar large scale resource developments).

The two operational noise modelling scenarios (described below) include all existing and proposed plant and equipment items operating concurrently to simulate the overall maximum energy equivalent (ie LAeq(15minute)) intrusive noise level. A large proportion of the mobile equipment is operated in repeatable routines and a relatively smaller proportion of the emissions emanate from continuous fixed plant items. Mobile fleet undergo regular maintenance on-site, resulting in a portion of the total mobile fleet (refer **Table 17**) being out of service at any given time. This has been reflected in the two operational noise modelling scenarios which assume a mobile fleet utilisation of approximately 83% and 82% for 2016 and 2018 respectively. Generally, 80% to 85% mobile equipment utilisation (and driver availability) is consistent with large scale open-cut mining operations.

6.4 Noise Modelling Scenarios

In accordance with INP requirements, the Modification description was reviewed to determine representative scenarios to assess potential noise impacts. Scenarios representing typical operations of Moolarben Coal Complex incorporating the Modification in 2016 and 2018 were selected. Justification for these scenarios is provided below.

6.4.1 Year 2016 Scenario

The 2016 scenario represents potential worst case noise impacts at the Cooks Gap privately owned receivers, as in this year operations for Moolarben Coal Complex incorporating the Modification would include:

- OC4 operations (where the majority of the fleet is located) focussed in the west (ie closer to the nearest private receivers in Cooks Gap);
- Operation of the proposed OC4 south-west haul road between OC4 and OC1 (**Appendix B3**). By comparison with the approved Stage 2 (overland) conveyor, the operation of the proposed OC4 south-west haul road has the greater potential noise impact at the nearest private receivers;
- The development of the OC4 out-of-pit waste emplacement to its maximum elevation;
- OC1 operations near to the Ulan Village;
- Open Cut operations at the maximum open cut ROM coal production rate (13 Mtpa) and waste rock production rate (55 Million bank cubic metres [Mbcm] per annum); and
- The operation of the maximum number of mobile equipment items (**Table 18**) in addition to CHPP, coal stockpiling, rail loading and maintenance operations.

Table 18 Year 2016 Scenario Typical Mobile Equipment Fleet Distribution¹

Open Cut 1 Area	Open Cut 4 Area	CHPP/ROM Area	Drill / Preparation Area
Overburden Fleet: 1 x Atlas Copco DML 60 Drill 1 x Komatsu D375 Dozer 1 x Liebherr 996B Excavator 5 x Komatsu 830E Trucks	Coal Fleet: 1 x Atlas Copco DML 60 Drill 2 x CAT D11 Dozers 1 x CAT 6050 Shovel 2 x Komatsu WD900 Dozers 8 x Komatsu 730E/CAT 789D Haul Trucks	3 x Komatsu D475 Dozers (S/Pile) (ROM) 1 x Komatsu WA1200 Loader (ROM) 1 x Komatsu 730E /CAT 789D Haul Trucks (Reject)	2 x PitViper 275 Drills 1 x Komatsu PC450 Excavator 2 x CAT D10 Dozers 1 x CAT 16M Grader 1 x CAT 657 Scraper
	Overburden Fleet 1: 1 x Liebherr 9800 Excavator 2 x CAT D11 Dozers 6 x Komatsu 830E Trucks 1 x Komatsu WA580 Loader 1 x Komatsu D475 Dozer		
	Overburden Fleet 2: 1 x Liebherr 996 Excavator 2 x CAT D11 Dozers 5 x Komatsu 830E Trucks		
	Overburden Fleet 3: 1 x CAT 6050 Shovel 1 x CAT D10 Dozer 1 x CAT 854 Dozer 4 x Komatsu 830E Trucks		
	Overburden Fleet 4: 1 x Liebherr 996 Excavator 1 x Komatsu D375 Dozer 1 x Komatsu D475 Dozer 4 x Komatsu 830E Trucks		
Support Fleet: 1 x Komatsu GD825 Grader	Support Fleet: 3 x Komatsu HD785 Water Trucks 1 x CAT 16M Grader 2 x CAT 24M Grader 1 x CAT 773F Service Trucks		

Note 1: Based on approximate 83% mobile equipment utilisation by comparison with the total Modification fleet presented in **Table 17**.

6.4.2 Year 2018 Scenario

The 2018 scenario represents potential worst case noise impacts at the Cooks Gap privately owned receivers, as in this year operations for Moolarben Coal Complex incorporating the Modification would include:

- OC1 and OC4 operations would be focussed in the west (ie closer to the nearest private receivers in Cooks Gap);
- Operation of the proposed OC4 south-west haul road between OC4 and OC1 (**Appendix B3**). By comparison with the approved Stage 2 (overland) conveyor, the operation of the proposed OC4 south-west haul road has the greater potential noise impact at the nearest private receivers.;
- Open cut operations at the maximum ROM coal production rate (13 Mtpa) and waste rock production rate would be near maximum (up to approximately 53 Mbcm per annum); and
- The operation of the maximum number of mobile equipment items (**Table 19**) in addition to CHPP, coal stockpiling, rail loading and maintenance operations.

Table 19 Year 2018 Scenario Typical Mobile Equipment Fleet Distribution¹

Open Cut 1 Area	Open Cut 4 Area	CHPP/ROM Area	Drill / Preparation Area
Overburden Fleet:	Coal Fleet:	3 x Komatsu D475 Dozers (S/Pile)	2 x PitViper 275 Drills
1 x Atlas Copco DML 60 Drill	1 x Atlas Copco DML 60 Drill	(ROM)	1 x Komatsu PC450
1 x Komatsu D375 Dozer	2 x CAT D11 Dozers	1 x Komatsu WA1200 Loader (ROM)	Excavator
1 x Liebherr 996B Excavator	1 x CAT 6050 Shovel	1 x Komatsu 730E /CAT 789D Haul	2 x CAT D10 Dozers
4 x Komatsu 830E Trucks	2 x Komatsu WD900 Dozers	Trucks (Reject)	1 x CAT 16M Grader
	8 x Komatsu 730E/CAT 789D		1 x CAT 657 Scraper
	Haul Trucks		
	Overburden Fleet 1:		
	1 x Liebherr 9800 Excavator		
	2 x CAT D11 Dozers		
	8 x Komatsu 830E Trucks		
	1 x Komatsu WA580 Loader		
	1 x Komatsu D475 Dozer		
	Overburden Fleet 2:		
	1 x Liebherr 996 Excavator		
	2 x CAT D11 Dozers		
	5 x Komatsu 830E Trucks		
	Overburden Fleet 3:		
	1 x Liebherr 996 Excavator		
	1 x CAT D10 Dozer		
	1 x CAT 854 Dozer		
	8 x Komatsu 830E Trucks		
Support Fleet:	Support Fleet:		
1 x Komatsu GD825 Grader	3 x Komatsu HD785 Water		
	Trucks		
	1 x CAT 16M Grader		
	2 x CAT 24M Grader		
	1 x CAT 773F Service Trucks		

Note 1: Based on approximate 82% mobile equipment utilisation by comparison with the total Modification fleet presented in **Table 17**.

7 INTRUSIVE NOISE IMPACT ASSESSMENT

7.1 Daytime Operating Intrusive Noise Levels

The predicted daytime operating LAeq(15minute) intrusive noise levels for the 2016 and 2018 operating scenarios are presented in **Table 20** for privately owned receivers together with the relevant PSNLs and Project Approval noise limits (**Appendices A1** and **A2**).

Table 20 Daytime Years 2016 and 2018 LAeq(15minute) Intrusive Noise Levels (dBA re 20 µPa)

ID No and Landholder		Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
		Calm	Wind	Calm	Wind		
Cooks Gap							
37	Szymkarczuk	10	6	9	6	35	35
39	Sprigg	12	8	12	9	35	35
40	Devenish	11	7	11	8	35	35
41(a)	Libertis	12	8	12	8	35	35
41(b)	Libertis	15	11	20	16	35	35
59	Szymkarczuk	17	13	23	19	35	35
60	Rayner & Munday	13	9	16	12	35	35
61	Miller	16	12	19	15	35	35
63 ^{1, 2}	Whiticker	20	15	27	22	39	35
70 ²	Coventry	20	16	26	22	37	35
75 ²	Ban	18	13	25	21	36	35
76	Carbone	17	13	21	17	35	35
79	Nagle	16	12	23	19	35	35
80	Sebelic	16	12	22	18	35	35
82	Hungerford & Clemens	16	11	20	16	35	35
83	Wall	16	11	20	16	35	35
84	Sebelic	14	10	18	14	35	35
86	Harris	15	10	19	15	35	35
87	Howe	14	10	18	14	35	35
88	Meyers	11	8	13	10	35	35
89	Glover & Tomlinson	14	10	19	14	35	35
90	Powell	14	10	18	14	35	35
91	Graham	10	7	11	7	35	35
94	Mittmayer	13	9	18	13	35	35
95	Withington	13	9	17	13	35	35
96	Lazicic	12	8	17	13	35	35
97	Smith	12	8	16	12	35	35
98	Piper	12	8	14	10	35	35
99	Jenner & Jensen	11	7	12	8	35	35
100	Kapista	10	7	10	6	35	35
101	Hull	11	7	11	7	35	35
102	Roberts	11	7	10	7	35	35
103	Burnett & Grant	12	8	15	11	35	35
104	Deeben	12	8	13	9	35	35
105	Katsikaris	12	8	13	9	35	35
106	Reid	12	8	11	8	35	35
107	Raso	11	8	11	7	35	35
109	Evans	12	8	12	8	35	35

ID No and Landholder	Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
	Calm	Wind	Calm	Wind		
110 Thompson & Evans	11	8	12	8	35	35
111 McEwan	11	8	12	8	35	35
112 Croft	11	7	11	7	35	35
113 Ratcliff	11	8	11	8	35	35
119 Kearns	11	7	10	7	35	35
171 McGregor	12	8	14	10	35	35
180 Barrett	20	15	24	20	35	35
181 Forster	20	15	22	17	35	35
182 Dutoitcook	19	15	24	19	35	35
183 Steines	20	15	23	18	35	35
184 (a) Stevenson	19	14	23	19	35	35
184 (b) Stevenson	19	14	23	19	35	35
186 Adamson	18	13	19	15	35	35
187 Feeney	18	14	22	18	35	35
188 Fielding	14	9	14	10	35	35
189 Goggin & Hyde	17	13	22	17	35	35
190 Sahyoun	14	10	15	10	35	35
191 Lasham	18	14	19	15	35	35
192 Williams	16	12	21	16	35	35
194 Potts	14	10	15	10	35	35
195 Cottam	16	12	19	15	35	35
196 Saxberg & Weir	15	10	16	12	35	35
200 Grimshaw	14	10	15	11	35	35
201(a) Towerton	13	9	14	9	35	35
201(b) Towerton	13	9	15	10	35	35
202 Butler	13	9	16	11	35	35
203 Miller	14	10	16	12	35	35
204 Donnan	14	10	18	14	35	35
206 Marshall & Vella	14	10	17	13	35	35
207 Smith	12	8	15	11	35	35
208 Hasaart	12	8	15	11	35	35
209 Mawson	12	8	15	11	35	35
210 Tebutt	12	8	15	11	35	35
217 Patterson	12	8	14	10	35	35
218 Soady	12	8	14	10	35	35
219 Riger	12	8	15	11	35	35
220 Rusten & Smith	12	9	15	11	35	35
222 Purtell	12	8	14	11	35	35
223 Palmer & Stewart	12	8	14	10	35	35
224 Dupond	14	10	19	15	35	35
226 Muscat	14	10	19	15	35	35
227 Hughes	15	10	20	16	35	35
229 Lowe	15	11	20	16	35	35
230 Hoole & Rawlinson	15	11	21	16	35	35
231 Morrison & Benny	15	11	21	17	35	35
232 Haaring	16	11	21	17	35	35
233 Boal	16	11	21	17	35	35
234 Gaw	16	12	22	17	35	35

ID No and Landholder		Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
		Calm	Wind	Calm	Wind		
235	Wilson	16	12	22	17	35	35
236	Donovan	17	12	22	18	35	35
237	Puskaric	16	12	23	18	35	35
238	Powell	16	12	23	19	35	35
240	Hartley	17	13	23	18	35	35
300	Collins & Marshall	12	7	12	7	35	35
303	Ungaro	17	12	21	16	35	35
305	Barisic & Aul	18	13	20	15	35	35
306	Armstrong	19	14	21	16	35	35
307	Chant & Young	18	13	20	15	35	35
308	Dower	15	10	17	12	35	35
309	Maher	12	7	14	8	35	35
310	Death	12	7	12	7	35	35
312	Ioannou	10	5	10	4	35	35
313	Pracy	9	4	9	4	35	35
314	Ford	9	4	8	3	35	35
315	Richards & Uzelac	9	4	8	3	35	35
316	Vassel & Williams	9	4	8	3	35	35
317	Hore & Bingham	9	4	9	4	35	35
Moolarben Road							
30 ^{2, 3}	Cox	12	10	15	13	39	35
31 ²	Cox	13	11	18	16	36	35
32	Stokes	5	6	4	6	35	35
35	Johnson & Thompson & Debreczeny	11	9	17	16	35	35
47	Andrews	10	8	15	15	35	35
Ulan							
11(b)	Mullins & Imrie	10	22	10	23	35	35
255	Schmitz	15	11	18	14	35	35
258	Elias	18	14	21	17	35	35

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer **Appendices A1** and **A2**).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (**Table 9**) for each receiver.

Note 5: Predicted intrusive noise level complies with the intrusive PSNL.

7.2 Evening Operating Intrusive Noise Levels

The predicted evening operating LAeq(15minute) intrusive noise levels for the 2016 and 2018 operating scenarios are presented in **Table 21** for privately owned receivers together with the relevant PSNLs and Project Approval noise limits (**Appendix A1**).

Table 21 Evening Years 2016 and 2018 Intrusive LAeq(15minute) Noise Levels (dBA re 20 µPa)

ID No and Landholder		Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
		Calm	Wind	Calm	Wind		
Cooks Gap							
37	Szymkarczuk	10	27	10	27	35	35
39	Sprigg	12	27	12	27	35	35
40	Devenish	11	27	11	26	35	35
41(a)	Libertis	12	28	12	27	35	35
41(b)	Libertis	15	29	21	29	35	35
59	Szymkarczuk	17	31	24	32	35	35
60	Rayner & Munday	14	25	16	28	35	35
61	Miller	16	30	20	30	35	35
63 ^{1,2}	Whiticker	20	36	27	36	39	35
70 ²	Coventry	20	35	27	35	37	35
75 ²	Ban	18	34	25	33	36	35
76	Carbone	17	33	22	33	35	35
79	Nagle	16	33	24	33	35	35
80	Sebelic	17	32	23	31	35	35
82	Hungerford & Clemens	16	30	20	30	35	35
83	Wall	16	30	20	30	35	35
84	Sebelic	14	30	19	29	35	35
86	Harris	15	29	20	29	35	35
87	Howe	14	29	19	29	35	35
88	Meyers	12	28	14	28	35	35
89	Glover & Tomlinson	14	29	19	28	35	35
90	Powell	14	28	19	28	35	35
91	Graham	11	28	11	28	35	35
94	Mittmayer	14	28	18	27	35	35
95	Withington	13	28	17	27	35	35
96	Lazicic	13	28	17	27	35	35
97	Smith	12	28	16	27	35	35
98	Piper	12	28	14	27	35	35
99	Jenner & Jensen	11	27	12	27	35	35
100	Kapista	11	27	10	27	35	35
101	Hull	11	27	11	26	35	35
102	Roberts	11	27	11	26	35	35
103	Burnett & Grant	12	27	15	27	35	35
104	Deeben	12	27	13	26	35	35
105	Katsikaris	12	27	13	26	35	35
106	Reid	12	26	12	26	35	35
107	Raso	12	26	11	26	35	35
109	Evans	12	26	12	26	35	35
110	Thompson & Evans	12	26	12	26	35	35
111	McEwan	12	26	12	26	35	35
112	Croft	12	26	11	26	35	35
113	Ratcliff	12	26	11	26	35	35
119	Kearns	11	27	10	26	35	35
171	McGregor	12	20	14	21	35	35
180	Barrett	21	33	25	32	35	35
181	Forster	20	28	22	30	35	35

ID No and Landholder		Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
		Calm	Wind	Calm	Wind		
182	Dutoitcook	20	32	24	32	35	35
183	Steines	20	32	23	31	35	35
184(a)	Stevenson	19	32	24	31	35	35
184(b)	Stevenson	19	31	24	31	35	35
186	Adamson	18	26	20	28	35	35
187	Feeney	19	31	23	30	35	35
188	Fielding	14	24	15	27	35	35
189	Goggin & Hyde	18	31	22	30	35	35
190	Sahyoun	15	24	15	26	35	35
191	Lasham	18	25	20	27	35	35
192	Williams	17	30	21	29	35	35
194	Potts	14	25	15	26	35	35
195	Cottam	17	30	19	29	35	35
196	Saxberg & Weir	15	26	17	26	35	35
200	Grimshaw	14	22	16	24	35	35
201(a)	Towerton	13	22	14	24	35	35
201(b)	Towerton	13	24	15	26	35	35
202	Butler	14	23	16	24	35	35
203	Miller	14	27	17	26	35	35
204	Donnan	14	27	19	27	35	35
206	Marshall & Vella	15	22	17	24	35	35
207	Smith	13	26	15	25	35	35
208	Hasaart	13	26	16	25	35	35
209	Mawson	12	26	15	25	35	35
210	Tebutt	12	26	15	25	35	35
217	Patterson	13	27	15	26	35	35
218	Soady	12	26	14	25	35	35
219	Riger	13	26	15	26	35	35
220	Rusten & Smith	13	23	15	22	35	35
222	Purtell	13	27	15	26	35	35
223	Palmer & Stewart	12	27	15	26	35	35
224	Dupond	14	28	20	27	35	35
226	Muscat	15	28	20	28	35	35
227	Hughes	15	29	20	28	35	35
229	Lowe	15	30	21	29	35	35
230	Hoole & Rawlinson	15	30	21	29	35	35
231	Morrison & Benny	15	30	21	29	35	35
232	Haaring	16	30	22	30	35	35
233	Boal	16	31	22	30	35	35
234	Gaw	16	31	22	30	35	35
235	Wilson	17	31	22	30	35	35
236	Donovan	17	31	22	30	35	35
237	Puskaric	17	32	23	31	35	35
238	Powell	17	32	23	31	35	35
240	Hartley	17	33	23	32	35	35
300	Collins & Marshall	12	27	12	30	35	35
303	Ungaro	18	28	21	30	35	35
305	Barisic & Aul	18	29	21	29	35	35

ID No and Landholder		Year 2016 ⁴		Year 2018 ⁴		Project Approval Noise Limit	Intrusive PSNL
		Calm	Wind	Calm	Wind		
306	Armstrong	19	29	21	30	35	35
307	Chant & Young	18	28	21	29	35	35
308	Dower	15	26	18	28	35	35
309	Maher	12	26	14	28	35	35
310	Death	12	28	13	29	35	35
312	Ioannou	10	27	10	28	35	35
313	Pracy	10	27	9	28	35	35
314	Ford	9	27	9	28	35	35
315	Richards & Uzelac	9	27	8	29	35	35
316	Vassel & Williams	9	27	8	29	35	35
317	Hore & Bingham	10	26	9	29	35	35
Moolarben Road							
30 ^{2, 3}	Cox	13	31	15	31	39	35
31 ²	Cox	13	30	18	29	35	35
32	Stokes	5	7	4	7	35	35
35	Johnson & Thompson & Debreczeny	12	29	17	28	35	35
47	Andrews	10	25	15	25	35	35
Ulan							
11(b)	Mullins & Imrie	10	6	10	7	35	35
255	Schmitz	16	29	18	30	35	35
258	Elias	19	32	21	32	35	35

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer Appendices A1 and A2).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (Table 9) for each receiver.

Note 5: Predicted intrusive noise level complies with the intrusive PSNL.

Note 6: Predicted intrusive noise level marginal 1 to 2 dBA above intrusive PSNL.

7.3 Night-time Operating Intrusive Noise and Sleep Disturbance

The predicted night-time LAeq(15minute) intrusive and sleep disturbance LA1(1minute) noise levels for the 2016 and 2018 operating scenarios for privately owned receivers are presented in Table 22 together with the relevant PSNLs, SDNLs and Project Approval noise limits (Appendix A1).

Table 22 Night-time 2016 & 2018 Intrusive LAeq(15minute) & LA1(1minute) Noise (dBA re 20 µPa)

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴			Project Approval Noise Limit	Intrusive PSNL/ SDNL
		Calm	Wind or Inversion	LA1(1min)	Calm	Wind or Inversion	LA1(1min)		
Cooks Gap									
37	Szymkarczuk	10	30	33	10	30	33	35/45	35/45
39	Sprigg	12	29	32	12	29	32	35/45	35/45
40	Devenish	11	29	32	12	29	32	35/45	35/45
41(a)	Libertis	12	30	33	12	29	32	35/45	35/45
41(b)	Libertis	15	31	34	21	31	34	35/45	35/45
59	Szymkarczuk	18	34	37	24	35	38	35/45	35/45
60	Rayner & Munday	14	28	31	16	31	34	35/45	35/45
61	Miller	16	33	36	20	32	35	35/45	35/45
63 ^{1, 2}	Whiticker	21	38	41	28	38	41	39/45	35/45
70 ²	Coventry	21	37	40	27	37	40	37/45	35/45

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴			Project Approval Noise Limit	Intrusive PSNL/SDNL
		Calm	Wind or Inversion	LA1(1min)	Calm	Wind or Inversion	LA1(1min)		
75 ²	Ban	18	36	39	26	36	39	36/45	35/45
76	Carbone	17	35	38	22	35	38	35/45	35/45
79	Nagle	17	35	38	24	35	38	35/45	35/45
80	Sebelic	17	34	37	23	34	37	35/45	35/45
82	Hungerford & Clemens	16	33	36	20	32	35	35/45	35/45
83	Wall	16	32	35	21	32	35	35/45	35/45
84	Sebelic	14	32	35	19	32	35	35/45	35/45
86	Harris	15	31	34	20	31	34	35/45	35/45
87	Howe	15	32	35	19	31	34	35/45	35/45
88	Meyers	12	31	34	14	31	34	35/45	35/45
89	Glover & Tomlinson	15	31	34	19	31	34	35/45	35/45
90	Powell	14	31	34	19	30	33	35/45	35/45
91	Graham	11	30	33	11	30	33	35/45	35/45
94	Mittermayer	14	30	33	18	29	32	35/45	35/45
95	Withington	13	30	33	18	29	32	35/45	35/45
96	Lazicic	13	30	33	17	29	32	35/45	35/45
97	Smith	12	30	33	16	29	32	35/45	35/45
98	Piper	12	30	33	15	29	32	35/45	35/45
99	Jenner & Jensen	12	29	32	12	29	32	35/45	35/45
100	Kapista	11	29	32	10	29	32	35/45	35/45
101	Hull	11	29	32	11	28	31	35/45	35/45
102	Roberts	11	29	32	11	28	31	35/45	35/45
103	Burnett & Grant	12	29	32	16	29	32	35/45	35/45
104	Deeben	12	29	32	13	28	31	35/45	35/45
105	Katsikaris	12	29	31	14	28	31	35/45	35/45
106	Reid	12	28	31	12	28	31	35/45	35/45
107	Raso	12	28	31	12	28	31	35/45	35/45
109	Evans	12	28	31	13	28	31	35/45	35/45
110	Thompson & Evans	12	28	31	12	28	31	35/45	35/45
111	McEwan	12	28	31	12	28	31	35/45	35/45
112	Croft	12	28	31	12	28	31	35/45	35/45
113	Ratcliff	12	28	31	12	28	31	35/45	35/45
119	Kearns	11	29	32	11	29	31	35/45	35/45
171	McGregor	13	21	24	14	22	25	35/45	35/45
180	Barrett	21	35	38	25	35	38	35/45	35/45
181	Forster	21	30	33	23	32	35	35/45	35/45
182	Dutoitcook	20	34	37	24	34	37	35/45	35/45
183	Steines	20	34	37	24	34	37	35/45	35/45
184(a)	Stevenson	19	34	37	24	34	37	35/45	35/45
184(b)	Stevenson	20	34	37	24	33	36	35/45	35/45
186	Adamson	18	28	31	20	30	33	35/45	35/45
187	Feeney	19	33	36	23	33	36	35/45	35/45
188	Fielding	14	26	29	15	29	32	35/45	35/45
189	Goggin & Hyde	18	33	36	23	32	35	35/45	35/45

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴			Project Approval Noise Limit	Intrusive PSNL/SDNL
		Calm	Wind or Inversion	LA1(1min)	Calm	Wind or Inversion	LA1(1min)		
190	Sahyoun	15	26	29	16	28	31	35/45	35/45
191	Lasham	18	27	30	20	29	32	35/45	35/45
192	Williams	17	32	35	22	32	35	35/45	35/45
194	Potts	14	28	31	16	28	31	35/45	35/45
195	Cottam	17	31	34	20	31	34	35/45	35/45
196	Saxberg & Weir	15	28	31	17	28	31	35/45	35/45
200	Grimshaw	15	24	27	16	26	29	35/45	35/45
201(a)	Towerton	13	24	26	14	26	29	35/45	35/45
201(b)	Towerton	13	27	30	15	28	31	35/45	35/45
202	Butler	14	25	28	16	26	29	35/45	35/45
203	Miller	15	29	32	17	28	31	35/45	35/45
204	Donnan	14	29	32	19	28	31	35/45	35/45
206	Marshall & Vella	15	24	27	17	26	29	35/45	35/45
207	Smith	13	27	30	16	27	30	35/45	35/45
208	Hasaart	13	27	30	16	27	30	35/45	35/45
209	Mawson	12	27	30	16	27	30	35/45	35/45
210	Tebutt	13	27	30	16	26	29	35/45	35/45
217	Patterson	13	28	31	15	27	30	35/45	35/45
218	Soady	13	28	31	14	27	30	35/45	35/45
219	Riger	13	28	31	15	27	30	35/45	35/45
220	Rusten & Smith	13	25	28	15	24	27	35/45	35/45
222	Purtell	13	28	31	15	28	31	35/45	35/45
223	Palmer & Stewart	12	29	32	15	28	31	35/45	35/45
224	Dupond	14	30	33	20	29	32	35/45	35/45
226	Muscat	15	30	33	20	30	33	35/45	35/45
227	Hughes	15	31	34	21	30	33	35/45	35/45
229	Lowe	16	32	35	21	31	34	35/45	35/45
230	Hoole & Rawlinson	16	32	35	22	31	34	35/45	35/45
231	Morrison & Benny	16	32	35	22	32	35	35/45	35/45
232	Haaring	16	33	35	22	32	35	35/45	35/45
233	Boal	16	33	36	22	32	35	35/45	35/45
234	Gaw	17	33	36	22	32	35	35/45	35/45
235	Wilson	17	33	36	23	33	36	35/45	35/45
236	Donovan	17	33	36	23	33	36	35/45	35/45
237	Puskaric	17	34	37	23	34	36	35/45	35/45
238	Powell	17	34	37	24	34	37	35/45	35/45
240	Hartley	18	35	38	24	35	38	35/45	35/45
300	Collins & Marshall	12	29	32	12	33	36	35/45	35/45
303	Ungaro	18	31	34	22	33	36	35/45	35/45
305	Barisic & Aul	18	31	34	21	32	35	35/45	35/45
306	Armstrong	19	31	34	21	32	35	35/45	35/45
307	Chant & Young	19	30	33	21	32	35	35/45	35/45
308	Dower	16	29	32	18	31	34	35/45	35/45
309	Maher	12	29	32	14	30	33	35/45	35/45

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴			Project Approval Noise Limit	Intrusive PSNL/ SDNL
		Calm	Wind or Inversion	LA1(1min)	Calm	Wind or Inversion	LA1(1min)		
310	Death	12	30	33	13	31	34	35/45	35/45
312	Ioannou	10	30	33	10	31	34	35/45	35/45
313	Pracy	10	29	32	10	30	33	35/45	35/45
314	Ford	9	30	33	9	31	34	35/45	35/45
315	Richards & Uzelac	9	30	33	9	31	34	35/45	35/45
316	Vassel & Williams	9	30	33	9	31	34	35/45	35/45
317	Hore & Bingham	10	29	32	9	32	35	35/45	35/45
Moolarben Road									
30 ^{2, 3}	Cox	13	34	37	16	34	37	39/45	35/45
31 ²	Cox	13	34	37	19	33	36	35/45	35/45
32	Stokes	5	14	17	5	16	19	35/45	35/45
35	Johnson & Thompson & Debreczeny	12	31	34	18	31	34	35/45	35/45
47	Andrews	10	28	31	15	28	31	35/45	35/45
Ulan									
11(b)	Mullins & Imrie	10	23	26	10	24	27	35/45	35/45
255	Schmitz	16	32	35	19	33	36	35/45	35/45
258	Elias	19	35	38	22	35	38	35/45	35/45

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer **Appendices A1** and **A2**).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (**Table 9**) for each receiver.

Note 5: Predicted intrusive noise level complies with the intrusive PSNL and maximum SDNL.

Note 6: Predicted intrusive noise level marginal 1 to 2 dBA above intrusive PSNL or maximum SDNL.

Note 7: Predicted intrusive noise level moderate 3 to 5 dBA above intrusive PSNL or maximum SDNL.

7.4 Impact Assessment Summary and Comparison with Approved Moolarben Coal Complex

In summary, the predicted daytime, evening and night-time intrusive and maximum noise levels show that:

- No exceedance of the Project Approval noise limits are predicted during the daytime, evening and night-time in 2016 or 2018 (**Table 20** to **Table 22**) at any privately owned receivers.
- A marginal exceedance of 1 dBA above the intrusive PSNL (35 dBA) at 63 Whiticker is predicted during adverse weather conditions in the evening (**Table 21**).
- A marginal exceedances of 1 dBA to 2 dBA above the intrusive PSNL (35 dBA) at 75 Ban and 70 Coventry are predicted during adverse weather conditions in the night-time (**Table 22**).
- A moderate exceedance of 3 dBA above the intrusive PSNL (35 dBA) at 63 Whiticker is predicted during adverse weather conditions in the night-time (**Table 22**).
- No exceedance of the intrusive PSNL 35 dBA at all other privately owned receivers.
- No exceedance of the maximum SDNL 45 dBA at all privately owned receivers.

The Modification would not result in new predicted exceedances of the Project Approval Noise Limits.

By comparison with the outcomes of the MCP Stage 1 Mod 9 NIA, all of the privately owned receivers with predicted exceedances of the intrusive PSNLs listed above were previously identified in the MCP Stage 1 Mod 9 NIA as being the noise management zone (and therefore are already eligible to request additional noise mitigation measures). As a result of the Modification, there are no additional privately owned receivers predicted to be within the noise management or affectation zones.

7.5 Privately Owned Vacant Land Impact Assessment

The outer envelope night-time $L_{Aeq(15\text{minute})}$ intrusive noise contours for Years 2016 and 2018 are presented in **Appendices F1** and **F2** respectively. The calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to approximately ± 2 dBA. This means that in some cases the noise contours will differ slightly from the values in **Table 22**.

The noise impacts on vacant land have been assessed in accordance with **Section 5.1** on the basis that the subject vacant land is permitted to have a dwelling. The Year 2018 night-time $L_{Aeq(15\text{minute})}$ intrusive noise contour of 35 dBA is predicted to dissect two vacant properties (ie 34 and 178) and therefore remain below the VLA&MP residential rural night-time maximum recommended ($L_{Aeq(9\text{hour})}$) noise amenity level of 45 dBA. Similarly, both vacant properties also remain below the Project Approval noise limit with regard to the land acquisition of 45 dBA where more than 25% of the vacant land area is affected.

8 NOISE AMENITY IMPACT ASSESSMENT

8.1 Modification Operating Noise Amenity Levels

The predicted daytime, evening and night-time $L_{Aeq(\text{period})}$ noise amenity levels for the operating scenarios in Years 2016 and 2018 are presented in **Table 23** for privately owned receivers as well as schools, churches and commercial receivers in Ulan Village.

Table 23 Daytime, Evening and Night-time Noise Amenity Years 2016 & 2018 (dBA re 20 µPa)

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴		
		Day	Evening	Night	Day	Evening	Night
Cooks Gap							
37	Szymkarczuk	8	25	27	7	24	27
39	Sprigg	10	25	27	10	24	27
40	Devenish	9	24	27	9	23	26
41(a)	Libertis	10	25	27	10	24	27
41(b)	Libertis	12	26	29	18	26	29
59	Szymkarczuk	15	28	31	21	30	33
60	Rayner & Munday	11	22	25	13	25	28
61	Miller	13	27	30	17	27	30
63 ^{1, 2}	Whiticker	17	33	36	24	33	36
70 ²	Coventry	17	32	35	24	32	35
75 ²	Ban	15	31	34	22	31	34
76	Carbone	14	30	33	19	30	33
79	Nagle	13	30	33	21	30	33
80	Sebelic	14	29	32	20	29	32
82	Hungerford & Clemens	13	27	30	17	27	30
83	Wall	13	27	30	18	27	30
84	Sebelic	11	27	29	16	26	29
86	Harris	12	26	29	17	26	29
87	Howe	12	26	29	16	26	29
88	Meyers	9	25	28	11	26	28
89	Glover & Tomlinson	11	26	29	16	26	28
90	Powell	11	26	28	16	26	28
91	Graham	8	25	28	9	25	28
94	Mittmayer	11	25	27	15	25	27
95	Withington	10	25	28	15	25	27
96	Lazicic	10	25	28	14	25	27
97	Smith	9	25	28	13	25	27
98	Piper	9	25	27	12	24	27
99	Jenner & Jensen	9	24	27	9	24	27
100	Kapista	8	24	27	7	24	27
101	Hull	8	24	26	8	23	26
102	Roberts	8	24	26	8	23	26
103	Burnett & Grant	9	24	27	12	24	26
104	Deeben	9	24	26	10	23	26
105	Katsikaris	9	24	26	11	23	26
106	Reid	9	24	26	9	23	26
107	Raso	9	24	26	9	23	26
109	Evans	10	23	26	10	23	26
110	Thompson & Evans	9	23	26	9	23	26
111	McEwan	9	24	26	10	23	25
112	Croft	9	23	26	9	23	25
113	Ratcliff	9	23	26	9	23	25
119	Kearns	8	24	26	8	23	26
171	McGregor	10	18	20	11	18	20

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴		
		Day	Evening	Night	Day	Evening	Night
180	Barrett	17	30	33	22	30	33
181	Forster	17	25	28	19	28	30
182	Dutoitcook	17	29	32	21	29	32
183	Steines	17	29	32	20	29	32
184(a)	Stevenson	16	29	32	21	29	32
184(b)	Stevenson	16	29	32	21	29	31
186	Adamson	15	24	26	17	26	28
187	Feeney	16	28	31	20	28	31
188	Fielding	11	22	24	12	24	27
189	Goggin & Hyde	15	28	31	19	28	30
190	Sahyoun	12	22	24	12	23	26
191	Lasham	15	23	25	17	25	27
192	Williams	14	27	30	18	27	30
194	Potts	11	23	25	12	23	26
195	Cottam	14	27	30	16	26	29
196	Saxberg & Weir	12	23	25	13	23	26
200	Grimshaw	12	20	22	13	22	24
201(a)	Towerton	10	19	21	11	21	23
201(b)	Towerton	10	22	24	12	23	26
202	Butler	11	21	23	13	22	24
203	Miller	12	24	27	14	24	26
204	Donnan	11	25	27	16	24	26
206	Marshall & Vella	12	20	22	14	22	24
207	Smith	10	23	25	12	23	25
208	Hasaart	10	23	26	13	23	25
209	Mawson	9	23	25	12	23	25
210	Tebutt	10	23	25	12	22	25
217	Patterson	10	24	26	12	23	25
218	Soady	10	23	26	11	23	25
219	Riger	10	23	26	12	23	26
220	Rusten & Smith	10	21	23	12	20	22
222	Purtell	10	24	26	12	23	26
223	Palmer & Stewart	10	24	26	12	23	26
224	Dupond	11	25	28	17	25	27
226	Muscat	12	25	28	17	25	28
227	Hughes	12	26	28	18	26	28
229	Lowe	12	27	30	18	27	29
230	Hoole & Rawlinson	13	27	30	18	27	29
231	Morrison & Benny	12	27	30	19	27	29
232	Haaring	13	27	30	19	27	30
233	Boal	13	28	31	19	28	30
234	Gaw	13	28	31	19	28	30
235	Wilson	14	28	31	19	28	31
236	Donovan	14	28	31	19	28	31
237	Puskaric	14	29	32	20	29	31
238	Powell	14	29	32	20	29	32

ID No and Landholder		Year 2016 ⁴			Year 2018 ⁴		
		Day	Evening	Night	Day	Evening	Night
240	Hartley	15	30	33	20	30	33
300	Collins & Marshall	9	24	27	9	27	31
303	Ungaro	15	26	29	18	28	31
305	Barisic & Aul	15	26	29	17	27	30
306	Armstrong	16	26	29	18	27	30
307	Chant & Young	15	25	28	17	27	30
308	Dower	13	24	26	15	26	28
309	Maher	9	23	26	11	25	28
310	Death	9	25	28	9	26	29
312	Ioannou	7	24	27	7	26	29
313	Pracy	7	24	27	6	25	28
314	Ford	6	24	27	6	25	29
315	Richards & Uzelac	6	24	27	5	26	29
316	Vassel & Williams	6	24	27	5	26	29
317	Hore & Bingham	7	23	27	6	26	29
Moolarben Road							
30 ^{2, 3}	Cox	11	28	32	13	28	31
31 ²	Cox	11	28	31	16	27	30
32	Stokes	5	6	10	4	6	12
35	Johnson & Thompson & Debreczeny	10	26	29	16	26	28
47	Andrews	8	22	25	14	23	25
Ulan							
11(a)	Mullins & Imrie	23	9	22	23	9	23
11(b)	Mullins & Imrie	18	9	18	19	9	19
11(c)	Mullins & Imrie	21	10	21	21	10	21
255	Schmitz	13	27	30	16	28	31
258	Elias	16	29	33	19	30	33
Ulan Village Non-residential							
9	Orica Australia Pty Limited	21	36	39	27	37	40
26	Forty North P/L	22	32	36	16	16	34
46B	North Eastern Wiradjuri Wilpinjong Community Fund Limited	30	40	44	25	35	40
66	Rostherne P/L	27	38	42	16	16	38
149	Mid Western Regional Council	27	39	42	30	39	43
160 ⁵	Minister for Education and Training (Ulan Public School)	27	38	-	28	38	-
162	Rowmint P/L	28	39	42	16	16	38
168 ⁵	PJL Constructions Pty Limited (Church)	27	39	-	29	39	-

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer **Appendices A1** and **A2**).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (**Table 9**) for each receiver.

Note 5: In use daytime and evening only.

Note 6: Predicted amenity level complies with the relevant amenity PSNL (**Table 12**).

8.2 Impact Assessment Summary

In summary, the predicted daytime, evening and night-time noise amenity levels show that:

- No exceedance of the Project Approval noise limits are predicted during the daytime, evening and night-time in 2016 or 2018 (**Table 23**) at any school or church.
- No exceedance of the relevant amenity PSNL (**Table 12**) at all privately owned receivers.
- No exceedance of the relevant amenity PSNL (**Table 12**) at all commercial receivers.

Based on the outer envelope night-time $L_{Aeq(15\text{minute})}$ intrusive noise contours for Years 2016 and 2018 are presented in **Appendices F1** and **F2** respectively, the noise levels at Goulburn River National Park and Munghorn Gap Nature Reserve are unlikely to exceed the relevant PNSL (and Project Approval noise limit) of $L_{Aeq(\text{period})}$ 50 dBA.

9 CUMULATIVE NOISE AMENITY ASSESSMENT

The INP provides non-mandatory cumulative noise assessment guidelines that address existing and successive industrial development by setting acceptable (and maximum) cumulative $L_{Aeq(\text{period})}$ noise amenity levels for all industrial noise sources only (ie non-transport related) for a particular land use. It is noted that the INP does not set acceptable cumulative $L_{Aeq(15\text{minute})}$ intrusive criteria for all industrial noise sources, but rather seeks to control cumulative noise via the $L_{Aeq(\text{period})}$ noise amenity criterion (**Section 5.1**).

A summary of the major existing, approved and proposed industrial developments in the vicinity of Moolarben Coal Complex are presented in **Table 2**. The predicted noise amenity levels from the Moolarben Coal Complex incorporating the Modification, Ulan Continued Operations Project and Wilpinjong Coal Project (Modification 6) were also conservatively considered. The estimated mine operating evening and night-time $L_{Aeq(\text{period})}$ noise amenity levels from each these developments have been established by reviewing the relevant EAs (where available). These are then used for the purposes of the cumulative evening and night-time noise amenity assessment.

It should be noted that for each of the developments noted above, the likelihood of the existing, approved and proposed developments emitting simultaneous maximum noise emissions is remote, due to the range of development locations and directional and other differences in the noise enhancing weather effects. This cumulative assessment is therefore considered to be conservative.

In accordance with the INP Chapter 2 Industrial Noise Criteria, the evening cumulative sum of the existing, approved and proposed developments $L_{Aeq(4\text{hour})}$ noise amenity levels have been determined (**Appendix G1**). Similarly, the night-time cumulative sum of the existing, approved and proposed developments $L_{Aeq(9\text{hour})}$ noise amenity levels have been determined (**Appendix G2**). In summary, the predicted daytime, evening and night-time (cumulative) noise amenity levels show that:

- No exceedance of the INP acceptable evening and night-time noise amenity levels (**Table 11**) are predicted at any privately owned receivers due to potential cumulative impacts.
- No exceedance of the INP acceptable evening and night-time noise amenity levels (**Table 11**) are predicted at any school, church or commercial receivers due to potential cumulative impacts.

10 SUMMARY OF FINDINGS

10.1 Noise Assessment Criteria

10.1.1 Operating Assessment Criteria

The NSW EPA has regulatory responsibility for the control of noise from “scheduled premises” under the *Protection of the Environment Operations Act 1997*. In implementing the INP, the EPA has two broad objectives.

- Controlling intrusive noise levels in the short-term; and
- Maintaining noise amenity levels for particular land uses over the medium to long-term.

In accordance with the INP’s Chapter 2 Industrial Noise Criteria and associated Application Notes dated 12 June 2013, the PSNLs for the residential, industrial and other localities are presented in **Table 24** for intrusive noise and amenity levels. These criteria are nominated for the purposes of assessing potential noise impacts from the Modification.

Table 24 Project Specific Noise Levels and Assessment Criteria (dBA re 20 µPa)

Locality	Land Use	Intrusive LAeq(15minute) ¹			Amenity LAeq(period) ¹		
		Day	Evening	Night	Day	Evening	Night
Privately Owned Land	Rural Residential ²	35	35	35	50	45	40
Any	School ³	Intrusive noise criteria not applicable			External 45 when in use		
Any	Church, Hall ³	Intrusive noise criteria not applicable			External 50 when in use		
Any	Passive Recreation	Intrusive noise criteria not applicable			External 50 when in use		
Any	Commercial	Intrusive noise criteria not applicable			External 65 when in use		

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

Note 2: At the most-affected point within 30 m of the residential area.

Note 3: External criteria equivalent to internal criteria plus 10 dBA.

The INP states that the PSNLs have been selected to preserve the amenity of at least 90% of the population living in the vicinity of industrial noise sources from the adverse effects of noise for at least 90% of the time. Provided the PSNLs are achieved, then most people would consider the resultant noise levels acceptable. In those cases where the PSNLs are not achieved, it does not automatically follow that all people exposed to the noise would find the noise unacceptable.

10.1.2 Sleep Disturbance Assessment Criteria

The INP Application Notes dated 12 June 2013 suggest that the LA1(1minute) level of 15 dBA above the RBL is a suitable criterion for assessing sleep disturbance for the night-time period. The Modification night-time LA1(1minute) SDNLs are presented in **Table 25** together with the comparable approved LA1(1minute) noise limit.

Table 25 Night-time LA1(1minute) Sleep Disturbance Noise Levels (dBA re 20 µPa)

Locality	Project Approval LA1(1minute) Limit ¹	Proposed Modification LA1(1minute) Criteria ¹
Privately Owned Land	45	45

Note 1: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0800 hours.

10.1.3 INP Assessable Meteorological Conditions

An assessment of the Site Meteorological Measurement Methodology was prepared for the Modification (**Appendix D**) based on the analysis of the wind velocity from the EPA approved AWS located at WS3. An assessment of winter temperature gradients and atmospheric stability has been derived from the on-site Temperature Tower located at Wilpinjong Coal Mine. The INP assessable meteorological noise modelling parameters are presented **Table 9**.

10.1.4 Noise Impact Assessment Methodology

Table 26 presents the methodology for assessing the Modification operating noise levels against the intrusive and amenity PSNLs and the LA1(1minute) SDNLs together with cumulative amenity noise levels (**Table 11**) for assessing operating noise levels from existing, approved and proposed mining developments in the vicinity of the Modification.

Table 26 Modification and Cumulative Mine Noise Impact Assessment (dBA re 20 µPa)

Assessment Source	Assessment Parameter	Assessment Criteria	Noise Management Zone ¹		Noise Affection Zone
			Marginal	Moderate	
Modification	PSNL Intrusive	RBL plus 5 dBA	1 to 2 dBA above assessment criteria	3 to 5 dBA above assessment criteria	> 5 dBA above assessment criteria ²
	PSNL Amenity	INP acceptable			
	SDNL LA1(1minute)	RBL plus 15 dBA			
Mine Developments	Cumulative Amenity	INP acceptable	1 to 2 dBA above assessment criteria	3 dBA above assessment criteria	> 3 dBA above assessment criteria ³

Note 1: Depending on the degree of predicted exceedance of the relevant assessment parameter potential noise impacts in the noise management zone could range from marginal to moderate (in terms of the perceived noise increase).

Note 2: Exposure to Project noise levels greater than 5 dBA above the relevant PSNL and or SDNL may be considered unacceptable by some landowners.

Note 3: Exposure to cumulative mine noise levels greater than 3 dBA above the relevant INP acceptable noise level may be considered unacceptable by some landowners.

10.1.5 Noise Control and Management Measures

MCO is obligated to manage noise levels from the Moolarben Coal Complex in accordance with the Project Approval noise limits using reasonable and feasible mitigation measures. The obligation to meet the Project Approval noise limits has been achieved through a combination of the following:

- For the majority of private landowners, the implementation of the noise management strategy as per the NMP including the use of real-time noise monitoring to manage noise levels during the night.
- For a minority of private landowners, property acquisitions and private compensation agreements and which has had the effect of reducing the number of privately owned receivers that could potentially be affected by noise impacts from the Moolarben Coal Complex.

Further detail regarding the Moolarben Coal Complex noise management strategy and MCO's recent compliance with the noise limits specified in MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) is provided in **Section 2**. MCO would continue to meet its obligation to comply with the noise limits specified in MCP Stage 1 Project Approval (05_0117) and MCP Stage 2 Project Approval (08_0135) through the continued implementation of the noise management strategy. This would include the continuation of real-time monitoring, and the stand-down of equipment, as required, as part of the response to an exceedance of the Real-Time Response Trigger Levels.

10.2 Modification and Cumulative Mine Operating Noise Impact Assessment

10.2.1 Privately Owned Receivers and Vacant Land

The exceedances at privately owned receivers of the PSNLs, SDNLs, and INP's acceptable noise amenity levels are presented in **Table 27** together with the Project Approval noise limits.

Table 27 Summary of Criteria Exceedances at Privately Owned Receivers¹ and Vacant Land

Exceedance Range	1 to 2 dBA above PSNL	3 to 5 dBA above PSNL	> 5 dBA above PSNL	
Intrusive LAeq(15minute)	70 Coventry 75 Ban	63 Whiticker ²	-	
Exceedance Range	1 to 2 dBA above SDNL	3 to 5 dBA above SDNL	> 5 dBA above SDNL	
Sleep Disturbance LA1(1minute)	-	-	-	
Exceedance Range	1 to 2 dBA above PSNL	3 to 5 dBA above PSNL	> 5 dBA above PSNL	
Amenity LAeq(period)	-	-	-	
Exceedance Range	1 to 2 dBA above INP Acceptable	3 dBA above INP Acceptable	> 3 dBA above INP Acceptable	
Cumulative Amenity LAeq(period)	-	-	-	
Exceedance Range	Intrusive LAeq(15minute)	Sleep Disturbance LA1(1minute)	Amenity LAeq(period) (ie school, hall, church)	Land Acquisition LAeq(15minute)
Project Approval Noise Limits	-	-	-	-

Note 1: Refer **Appendix C3**.

Note 2: Receiver subject to a private agreement with MCO.

In summary, during the daytime, evening and night-time, no privately owned receivers are predicted to exceed the relevant amenity PSNL, intrusive PSNL or maximum SDNL, except for three privately owned receivers (**Table 27**).

Marginal noise exceedances of 1 to 2 dBA above intrusive PSNL 35 dBA are predicted at privately owned receivers 70 Coventry and 75 Ban and a moderate noise exceedance of 3 dBA above intrusive PSNL 35 dBA is predicted at privately owned receiver 63 Whiticker. Receiver 63 is subject to a private agreement with MCO.

No exceedance of the current Project Approval noise limits are predicted at any privately owned receivers or vacant land in 2016 or 2018 based on the continued implementation of the noise management strategy.

10.2.2 Review of the Noise Management Measures

MCO is committed to maintaining an awareness of best practice noise mitigation technologies and alternative operating methodologies. MCO implement noise control and management measures that are found to be feasible, reasonable and effective in the context of a safe and economic mining operation; and where there is a clear community benefit with their application. Available best practice mitigation technologies and alternative operating methodologies are reviewed on an ongoing basis.

The existing EMS and NMP are currently being updated to incorporate the Stage 2 Project Approval (08_0135). The NMP would be updated as necessary to incorporate the Modification.

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

NOISE

Noise Criteria

Acquisition Upon Request

- 1A. Upon receiving a written request for acquisition from an owner of the land listed in Table 1A, the Applicant shall acquire the land in accordance with the procedures in conditions 10 and 11 of Schedule 4.

Table 1A: Land subject to acquisition upon request

Receiver ID
32

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

Transitional Acquisition and Mitigation Arrangements

- 1B. Any receiver that had made a written request for acquisition or mitigation prior to the determination of Modification 3, on 30 January 2015 shall be granted the acquisition or mitigation options in accordance with the condition that applied at the date of that request.

Note: Receivers 30, 63, 70, 75 and 31 were granted acquisition and mitigation rights with the approval of Modification 9 in June 2014. A new Voluntary Land Acquisition and Mitigation Policy was gazetted on 19 December 2014, consequently the conditions have been updated to reflect the new policy, however transitional arrangements are provided for the owners of any privately owned land, if a written request for acquisition or mitigation had already been made, prior to the determination of Modification 3.

1. The Proponent shall ensure that the noise generated by the Moolarben mine complex does not exceed the noise criteria in Table 1 at any residence on privately-owned land or the other specified locations.

Table 1: Noise criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{A1}(1min)$
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 residences	35	35	35	45
Ulan Primary School	35 (internal) when in use			-
Ulan Anglican Church	35 (internal) when in use			-
Ulan Catholic Church	35 (internal) when in use			-
Goulburn River National Park	50			-
Munghorn Gap Nature Reserve	50			-

Note: To interpret the land referred to in Table 1 see the applicable figures in Appendix 5.

Noise generated by the complex is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Land Acquisition Criteria

2. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 2A at any residence on privately-owned land, then upon receiving a written request for acquisition from an owner of the land listed in Table 2A, the Proponent shall acquire the land in accordance with the procedures in conditions 10 and 11 of Schedule 4.

Table 2A: Acquisition criteria dB(A) $L_{Aeq}(15min)$

Receiver ID	Day ($L_{Aeq}(15min)$)	Evening ($L_{Aeq}(15min)$)	Night ($L_{Aeq}(15min)$)
63	43	43	42

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

Receiver ID	Day (<i>L_{Aeq} (15min)</i>)	Evening (<i>L_{Aeq} (15min)</i>)	Night (<i>L_{Aeq} (15min)</i>)
All other privately-owned residences	40	40	40

Note: To interpret the land referred to Table 2A, see the applicable figures in Appendix 5.

3. If the noise generated by the Moolarben mine complex contributes to exceedances of the relevant criteria in Table 2 on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 10-11 of Schedule 4.

Table 2: Land acquisition criteria

Day/Evening/Night <i>L_{Aeq}(period)</i>	Receiver
55/50/45	All privately-owned land

Note: Noise generated by the complex is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Mitigation Criteria

4. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 3A at any privately owned residence, then upon receiving a written request the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 3A: Mitigation criteria dB(A) *L_{Aeq} (15min)*

Receiver ID	Day (<i>L_{Aeq} (period)</i>)	Evening (<i>L_{Aeq} (15min)</i>)	Night (<i>L_{Aeq} (15min)</i>)
63	40	40	39
All other privately owned residences	37	37	37

Note: To interpret the land referred to Table 3A, see the applicable figures in Appendix 5.

Mitigation Upon Request

5. Upon receiving a written request from the owner of the residence on the land listed in Table 3, the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the complex on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 3: Land subject to additional noise mitigation upon request

Receiver ID
30

Note: To interpret the land referred to in Table 3 see the applicable figures in Appendix 5.

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

Operating Conditions

6. The Proponent shall:
- implement best management practice to minimise the operational, road and rail noise of the project;
 - operate a comprehensive noise management system on site that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
 - minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply (see Appendix 6);
 - only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
 - co-ordinate noise management with the noise management at Ulan and Wilpinjong mines to minimise cumulative noise impacts; and
 - carry out regular monitoring to determine whether the project is complying with the relevant conditions of this approval, to the satisfaction of the Secretary.

Noise Management Plan

7. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;
 - describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval;
 - describe the proposed noise management system in detail;
 - include a monitoring program that:
 - uses attended noise monitoring to evaluate compliance of the project against the noise criteria in this approval;
 - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this approval and trigger for further attended monitoring);
 - evaluates and reports on:
 - the effectiveness of the noise management system; and
 - compliance against the noise operating conditions; and
 - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

BLASTING**Blasting Criteria**

8. The Proponent shall ensure that the blasting on the Moolarben mine complex does not cause exceedances of the criteria in Table 4.

Table 4: Blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land, churches and schools	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%

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.

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

Blasting Hours

9. The Proponent shall only carry out blasting on the site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

Blasting Frequency

10. The Proponent may carry out a maximum of:
- (a) 2 blasts a day; and
 - (b) 9 blasts a week, averaged over a calendar year, at the Moolarben mine complex.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, blasts misfires or blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Property Inspections

11. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent shall:
- (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:
 - establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and
 - identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
 - (b) give the landowner a copy of the new or updated property inspection report.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.

Property Investigations

12. If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent shall:
- (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

Operating Conditions

13. The Proponent shall:
- (a) implement best practice blasting management to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private infrastructure/property in the surrounding area from any damage; and
 - minimise the dust and fume emissions of any blasting;
 - (b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting Schedule on site; and
 - (c) co-ordinate the timing of blasting on site with the timing of blasting at the Ulan and Wilpinjong mines to minimise cumulative blasting impacts, to the satisfaction of the Secretary.

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

14. The Proponent shall not undertake blasting on site within 500 metres of:
- (a) any public road;
 - (b) the Gulgong to Sandy Hollow Railway Line;
 - (c) the Wollar-Wellington 330kV Transmission Line; or
 - (d) any land outside the site not owned by the Proponent,
- unless the Proponent has:
- demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and
 - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or
 - a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised the Department in writing of the terms of this agreement.

Blast Management Plan

15. The Proponent shall prepare and implement a Blast Management Plan for the project prior to undertaking any blasting on site to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;
 - (b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
 - (c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and
 - (d) include a monitoring program for evaluating compliance with the blasting criteria and operating conditions of this approval.

METEOROLOGICAL MONITORING

- 20B. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:
- (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and
 - (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.

EXTRACT STAGE 1 PROJECT APPROVAL (05_0117) DATED 6 SEPTEMBER 2007 (AS MODIFIED)

**APPENDIX 6:
NOISE COMPLIANCE ASSESSMENT****Applicable Meteorological Conditions**

1. The noise criteria in Table 2 of the conditions are to apply under all meteorological conditions except the following:
 - (a) during periods of rain or hail;
 - (b) average wind speed at microphone height exceeds 5 m/s;
 - (c) wind speeds greater than 3 m/s measured at 10 m above ground level; or
 - (d) temperature inversion conditions greater than 3°C/100 m.

Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station located on the site.

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

EXTRACT STAGE 2 PROJECT APPROVAL (08_0135) DATED 30 JANUARY 2015

NOISE**Acquisition Upon Request**

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 1: Land subject to acquisition upon request

Receiver ID
32

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

Mitigation Upon Request

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Residence subject to additional noise mitigation upon request

Receiver ID
30

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

Noise Criteria

3. The Proponent shall ensure that the noise generated by the Moolarben mine complex does not exceed the criteria in Table 3 at any residence on privately-owned land or the other specified locations.

Table 3: Noise criteria dB(A)

Receiver ID	Day	Evening	Night	
	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{A1}(1min)$
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 residences	35	35	35	45
Ulan Primary 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			-

Note: To interpret the land referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the Moolarben mine complex is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy*. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

EXTRACT STAGE 2 PROJECT APPROVAL (08_0135) DATED 30 JANUARY 2015

Land Acquisition Criteria

4. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 4 at any residence on privately-owned land, then upon receiving a written request for acquisition from an owner of the land listed in Table 4, the Proponent shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 4: Acquisition criteria dB(A) L_{Aeq} (15min)

Receiver ID	Day (L_{Aeq} (15min))	Evening (L_{Aeq} (15min))	Night (L_{Aeq} (15min))
63	43	43	42
All other privately-owned residences	40	40	40

Note: To interpret the land referred to Table 4, see the applicable figures in Appendix 5.

5. If the noise generated by the Moolarben mine complex contributes to exceedances of the relevant criteria in Table 5 on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 5: Land acquisition criteria

Day/Evening/Night L_{Aeq} (period)	Receiver
55/50/45	All privately-owned land

Note: Noise generated by the project is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Mitigation Criteria

6. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 6 at any privately owned residence, then upon receiving a written request the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 6: Mitigation criteria dB(A) L_{Aeq} (15min)

Receiver ID	Day (L_{Aeq} (15min))	Evening (L_{Aeq} (15min))	Night (L_{Aeq} (15min))
63	40	40	39
All other privately owned residences	37	37	37

Note: To interpret the land referred to Table 6, see the applicable figures in Appendix 5.

EXTRACT STAGE 2 PROJECT APPROVAL (08_0135) DATED 30 JANUARY 2015

Operating Conditions

7. The Proponent shall:
- (a) implement best management practice to minimise the operational and road noise of the project;
 - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
 - (c) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply (see Appendix 6);
 - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
 - (e) co-ordinate noise management at the Moolarben mine complex with the noise management at Ulan and Wilpinion mines to minimise cumulative noise impacts; and
 - (f) carry out regular monitoring to determine whether the Moolarben mine complex is complying with the relevant conditions of this approval,
- to the satisfaction of the Secretary.

Noise Management Plan

8. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to the commencement of any development on site under this approval;
 - (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval;
 - (c) describe the proposed noise management system in detail; and
 - (d) include a monitoring program that:
 - evaluates and reports on:
 - the effectiveness of the noise management system;
 - compliance against the noise criteria in this approval; and
 - compliance against the noise operating conditions;
 - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this approval and trigger for further attended monitoring); and
 - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

BLASTING

Blasting Criteria

9. The Proponent shall ensure that blasting on the Moolarben mine complex does not cause exceedances of the criteria in Table 7.

Table 7: *Blasting criteria*

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%

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

EXTRACT STAGE 2 PROJECT APPROVAL (08_0135) DATED 30 JANUARY 2015**Blasting Hours**

10. The Proponent shall only carry out blasting on site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

Blasting Frequency

11. The Proponent may carry out a maximum of:
- (a) 2 blasts a day; and
 - (b) 9 blasts a week, averaged over a calendar year, at the Moolarben mine complex.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, blast misfires or blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Property Inspections

12. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent shall:
- (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:
 - establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and
 - identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
 - (b) give the landowner a copy of the new or updated property inspection report.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.

Property Investigations

13. If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent shall:
- (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

Operating Conditions

14. The Proponent shall:
- (a) implement best management practice to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private infrastructure/property in the surrounding area from any damage; and
 - minimise the dust and fume emissions of any blasting;
 - (b) ensure that blasting on the site does not damage Aboriginal rock shelter sites S2MC229 (AHIMS No. 36-3-1376), S2MC232 (AHIMS No. 36-3-1379) or S2MC233 (AHIMS No. 36-3-1380);

EXTRACT STAGE 2 PROJECT APPROVAL (08_0135) DATED 30 JANUARY 2015

- (c) operate a suitable system to enable the public to get up-to-date information on the proposed blasting Schedule on site; and
- (d) co-ordinate the timing of blasting on site with the timing of blasting at the Ulan and Wilpinjong mines to minimise cumulative blasting impacts, to the satisfaction of the Secretary.

Note: To identify the Aboriginal rock shelter sites, see the applicable figure in Appendix 8.

15. The Proponent shall not undertake blasting on site within 500 metres of:

- (a) any public road;
- (b) the Gulgong to Sandy Hollow Railway Line;
- (c) the Wollar-Wellington 330kV Transmission Line; or
- (d) any land outside the site not owned by the Proponent,

unless the Proponent has:

- demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and
- updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or
- a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised the Department in writing of the terms of this agreement.

Blast Management Plan

16. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:

- (a) be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to conducting any blasting on site;
- (b) describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
- (c) propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and
- (d) include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this approval.

METEOROLOGICAL MONITORING

24. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:

- (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
- (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*, unless a suitable alternative is approved by the Secretary following consultation with the EPA.

APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 3 of the conditions are to apply under all meteorological conditions except the following:
 - (a) wind speeds greater than 3 m/s at 10 metres above ground level; or
 - (b) stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
 - (c) stability category G temperature inversion conditions.

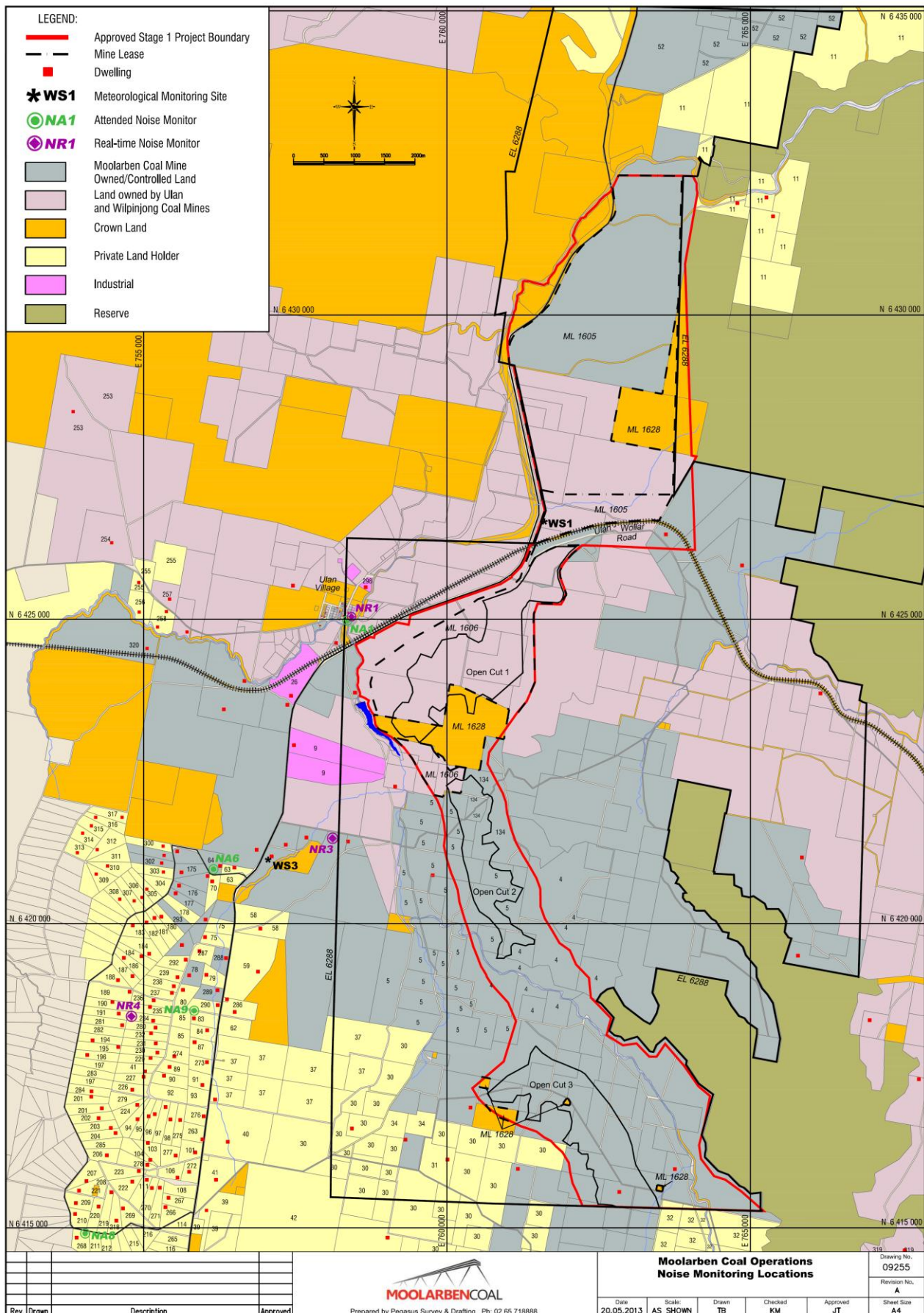
Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station located on the site.

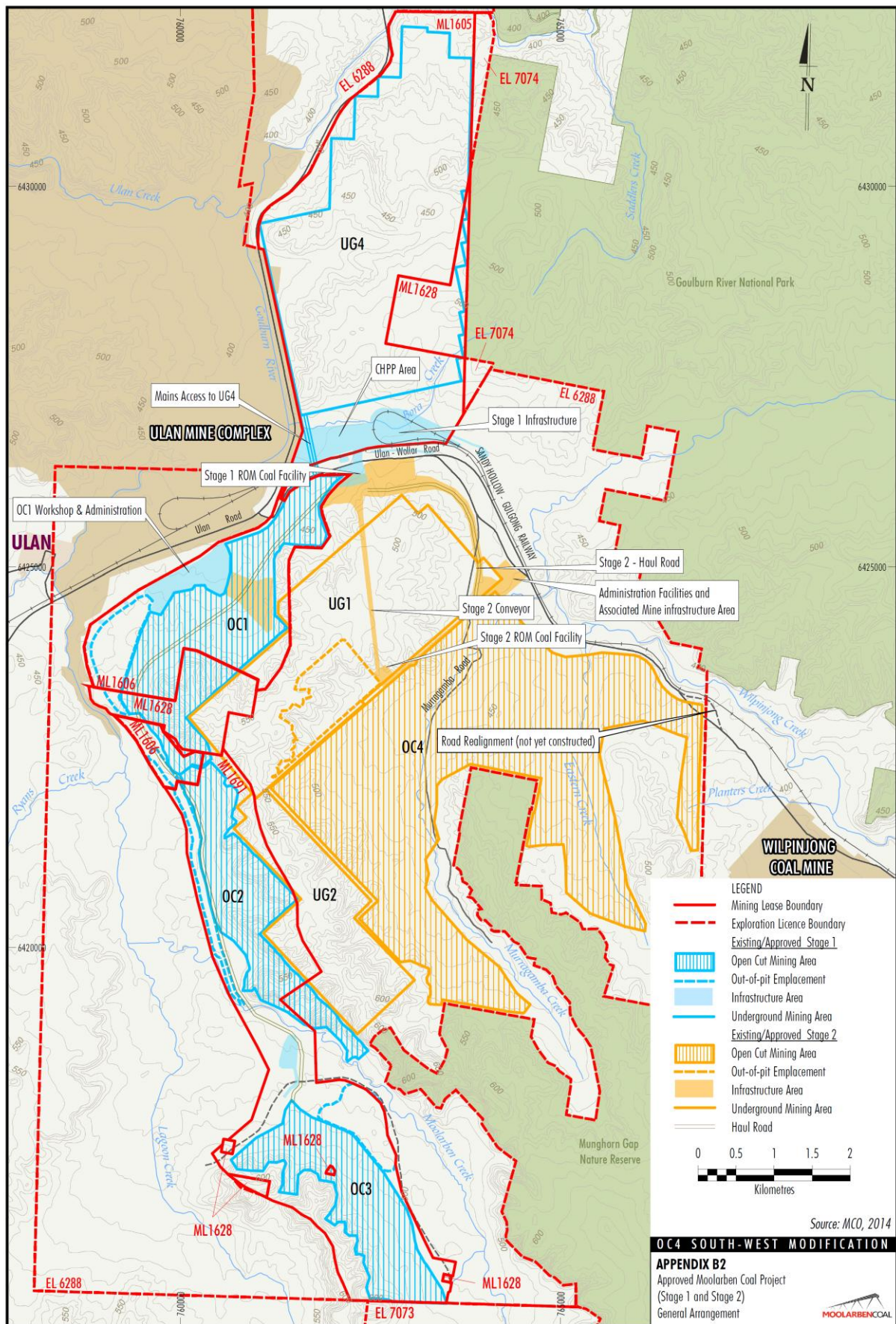
Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (d) monitoring locations for the collection of representative noise data;
 - (e) meteorological conditions during which collection of noise data is not appropriate;
 - (f) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (g) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

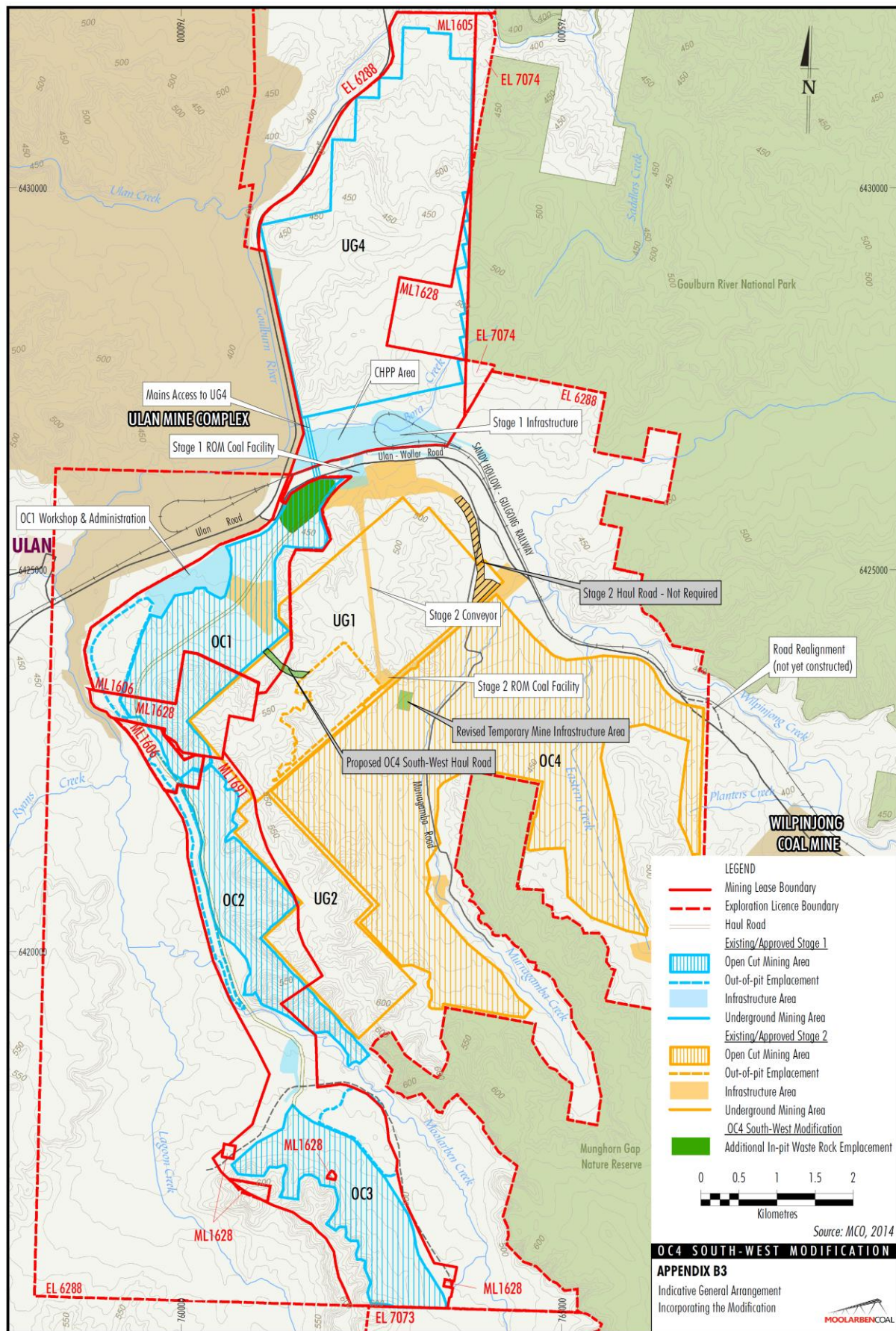
NOISE MONITORING LOCATION PLAN



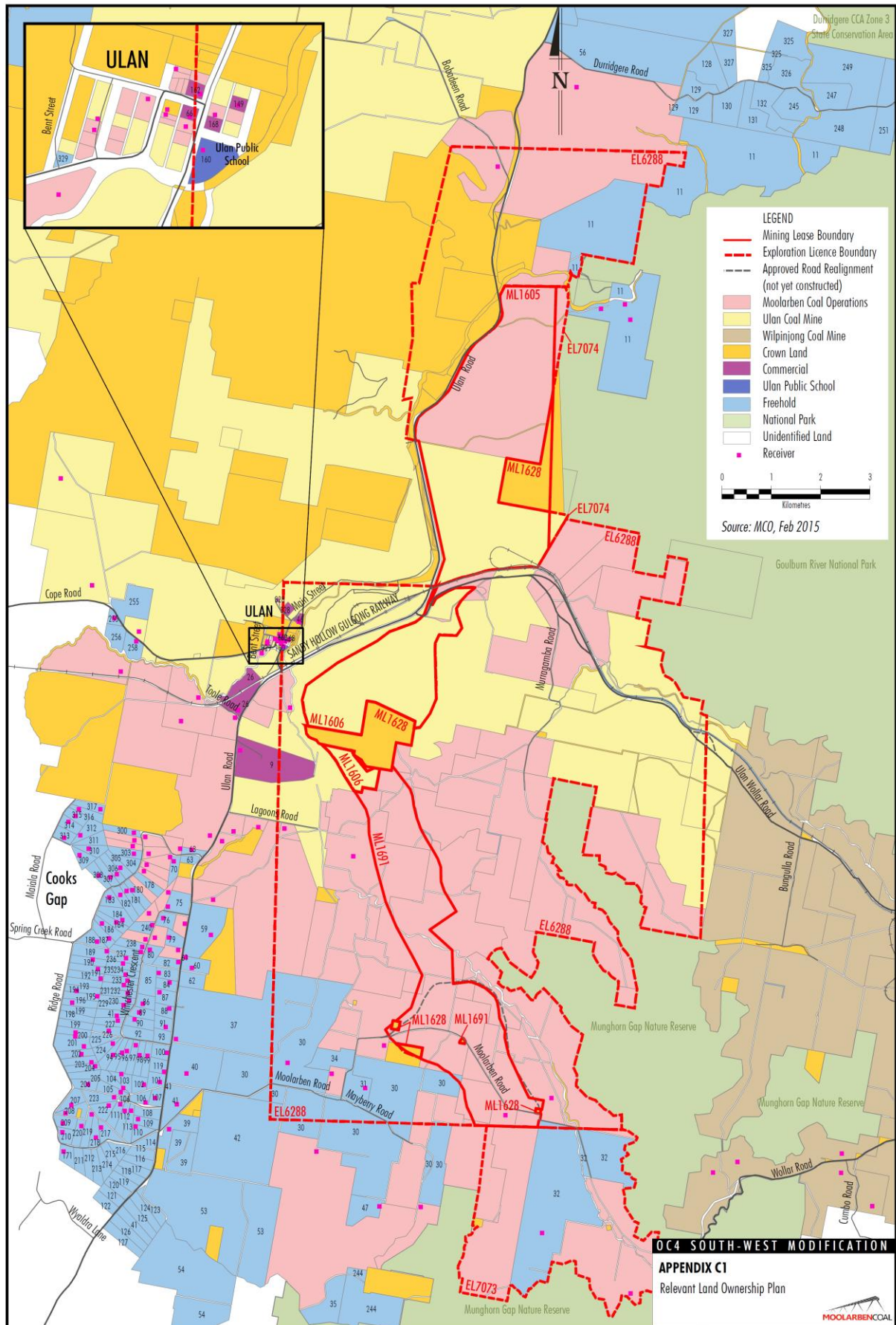
GENERAL ARRANGEMENT PLAN STAGE 1 AND STAGE 2



PROPOSED GENERAL ARRANGEMENT PLAN INCORPORATING THE MODIFICATION



LAND OWNERSHIP PLAN



RELEVANT LAND OWNERSHIP LIST

Ref No	Landholder	Ref No	Landholder	Ref No	Landholder
9	Orica Australia Pty Limited	112	MJ & LM Croft	215	SG & PM Green
11	JE Mullins & CD Imrie	113	CPG Ratcliff	216	G Holland & FA Handicott
26	Forty North Pty Limited	114	TF & K Holland	217	RP & JL Patterson
30	RB Cox	115	AK & BH Ouinn	218	GF & GEL Soody
31	MB Cox	116	DJ & SM Reid	219	T & S Riger
32	DJ & JG Stokes	117	JM Dick	220	SJ Rusten & NJ Smith
34	J Asztalos	118	A Scott	222	BJ Purtell
35	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny	119	PJ Kearns	223	EW Palmer & JM Stewart
37	J Szymkarczuk	120	PS & DR Ord	224	RS & PCC Dupond
39	RM & DJ Sprigg	121	EJ Cullen	225	G & RF Doualetas
40	JM Devenish	122	WF Wirth	226	LAA & FC Muscat
41	PP Libertis	123	ND Sullivan	227	WP & JA Hughes
42	C & L Schmidt	124	WJ & HE Bailey	229	JJ & BA Lowe
46	North Eastern Wiradjuri Wilpinjong Community Fund Limited	125	DB McBride	230	DA Hoole & DT Rawlinson
47	SF & MR Andrews	126	MP Julian	231	T Morrison & SM Benny
53	WD & MS Bryant	127	BKT & SA Bracken	232	L & JA Haaring
54	MA & C Harris	128	AW Sims	233	K & D Boal
56	MJ & V Cundy	129	M Yelds	234	D & L Gaw
59	G & GM Szymkarczuk	130	GP McEwen	235	LM & RS Wilson
60	CL Rayner & DM Munday	131	GR & RA King	236	RG & CA Donovan
61	MA Miller	132	N Atkins	237	A Puskaric
62	R Menchin	149	Mid-Western Regional Council	238	B Powell
63	BF & B Whiticker	151	AI Cunningham (Land entrusted to Catholic Church)	240	GJ & DM Hartley
66	Rostherne Pty Limited	160	Minister For Education And Training	244	JT & YR Jones
70	DJ & A Coventry	162	DM Harrison	245	MP & KLE Cresham
75	P Bon	168	PJL Constructions Pty Limited	247	J & K Batshon
76	SR & PC Carbone	171	AD & SA McGregor	248	G Boustani
79	PTJ & SE Nagle	178	PR Stone	249	CI & JI Eldridge
80	W & D Sebelic	180	CD & LL Barrett	251	NF Potter & CE Selley
82	SC Hungerford & MC Clemens	181	SM Forster	255	HJ & H Schmitz
83	CF & CR Wall	182	J Dutoitcook	256	RC Campbell
84	DS Sebelic	183	R & EA Steines	258	PM & CD Elias
85	J & Z Nikolovski	184	LA Stevenson	300	CM Collins & CY Marshall
86	NW Harris	186	RW & IJ Adamson	303	HJ Ungaro
87	BJ & K Howe	187	BT & KM Feeney	304	G Balajan
88	BC Meyers	188	KR & T Fielding	305	L Barisic & M Aul
89	MV & HM Glover & E & BJ Tomlinson	189	M, M, D & A Goggin & J, A, P & R Hyde	306	E Armstrong
90	SA Powell	190	T & LK Sahyoun	307	M Chant & NK Young
91	HM Graham	191	BW & TS Lasham	308	NA Dower
92	VA Pulicino & J & S & G Bonnici	192	D Williams	309	GS Maher
93	F & M Fenech	193	DJ Moloney	310	KI Death
94	LK Mittermayer	194	PM & K Potts	311	BJ & LC Williamson
95	BJ Withington	195	R Cottam	312	MS & JJ Ioannou
96	D Lazicic	196	F Saxberg & M Weir	313	NJ & BDE Pracy
97	DJ & MD Smith	198	GR & ME Metcalfe	314	SL Ford
98	ME & JJ Piper	199	PGG & I Nielsen	315	WJ Richards & BJ Uzelac
99	DE Jenner & WB Jensen	200	VK Grimshaw	316	CR Vassel & CM Williams
100	A Kapista	201	KR & GM Towerdon	317	RJ Hore & V Bingham
101	RD & DMZ Hull	202	H & VF Butler	325	S & T Fevale
102	KA Roberts	203	DJ Miller	326	AW & LM Murray
103	SB Burnett & SL Grant	204	RB & JE Donnan	327	CA Tanner
104	RA & LA Deeben	205	DW Sparrow & M Tallan	328	Essential Energy
105	DJ & N Katsikaris	206	CA Marshall & R Vella	329	Tuck-Lee
106	TB & JH Reid	207	AA & DM Smith		
107	ZJ & M & AA Raso	208	SA & CR Hasaart		
108	R Varga	209	F Mawson		
109	DA Evans	210	JM & AM Tebutt		
110	JT Thompson & HT Evans	211	SA McGregor & WJ Gray		
111	GJ & NJ McEwan	212	E & M Lepik		
		213	D & J Parsonage		
		214	RK & EG O'Neil		

Source: MCO, Feb 2015

OC4 SOUTH-WEST MODIFICATION

APPENDIX C2 Relevant Landholder List



Appendix C3

Report Number 610.13549-R1

Page 1 of 3

LAND OWNERSHIP DETAILS

ID	Owner	Type	Easting (MGA)	Northing (MGA)	Elevation
Cooks Gap					
37	J Szymkarczuk	Private	756179	6417107	547
39	RM & DJ Sprigg	Private	756038	6415288	585
40	JM Devenish	Private	756389	6416414	554
41(a)	PP Libertis (Perpetual Lease)	Private	756194	6415791	574
41(b)	PP Libertis (Perpetual Lease)	Private	754978	6417572	586
59	G & GM Szymkarczuk	Private	756886	6419210	538
60	CL Rayner and DM Munday	Private	756500	6418546	527
61	MA Miller	Private	756375	6418755	524
63 ^{1, 2}	BF & B Whiticker	Private	756497	6420923	494
70 ²	DJ & A Coventry	Private	756132	6420692	510
75 ²	P Ban	Private	756012	6419777	513
76	SR & PC Carbone	Private	755920	6419546	517
79	PTJ & SE Nagle	Private	756034	6419159	519
80	W & D Sebelic	Private	755649	6418908	531
82	SC Hungerford & MC Clemens	Private	756223	6418659	524
83	CF & CR Wall	Private	755832	6418444	533
84	DS Sebelic	Private	756047	6418248	531
86	NW Harris	Private	755506	6417818	558
87	BJ & K Howe	Private	755841	6418051	539
88	BC Meyers	Private	756043	6417724	539
89	MV & HM Glover & E & BJ Tomlinson	Private	755431	6417645	559
90	SA Powell	Private	755337	6417501	565
91	HM Graham	Private	755969	6417348	544
94	LK Mitemmayer	Private	754900	6416785	609
95	BJ Withington	Private	755085	6416834	600
96	D Lazicic	Private	755183	6416867	590
97	DJ & MD Smith	Private	755364	6416985	573
98	ME & JJ Piper	Private	755440	6416783	575
99	DE Jenner & WB Jensen	Private	755603	6416770	568
100	A Kapista	Private	755992	6416832	556
101	RD & DMZ Hull	Private	755850	6416237	571
102	KA Roberts	Private	755530	6416189	579
103	SB Burnett & SL Grant	Private	755072	6416399	595
104	RA & LA Deeben	Private	755112	6416116	592
105	DJ & N Katsikaris	Private	755061	6416033	597
106	TB & JH Reid	Private	755558	6415823	601
107	ZJ & M & AA Raso	Private	755752	6415919	587
109	DA Evans	Private	755410	6415494	620
110	JT Thompson & HT Evans	Private	755361	6415339	619
111	GJ & NJ McEwan	Private	755052	6415789	604
112	MJ & LM Croft	Private	755138	6415655	605
113	CPG Ratcliff	Private	755269	6415661	606
119	PJ Kearns	Private	755937	6416447	564

Appendix C3

Report Number 610.13549-R1

Page 2 of 3

LAND OWNERSHIP DETAILS

ID	Owner	Type	Easting (MGA)	Northing (MGA)	Elevation
171	AD & SA McGregor	Private	753898	6414840	665
180	CD & LL Barrett	Private	755292	6420111	565
181	SM Forster	Private	755178	6420092	568
182	J Dutoitcook	Private	755049	6420016	580
183	R & EA Steines	Private	754822	6419969	589
184(a)	LA Stevenson	Private	755093	6419504	564
184(b)	LA Stevenson	Private	754967	6419464	581
186	RW & IJ Adamson	Private	754674	6419437	589
187	BT & KM Feeney	Private	754816	6419137	594
188	KR & T Fielding	Private	754577	6419073	584
189	M Goggin & JA Hyde	Private	754772	6418881	593
190	T & LK Sahyoun	Private	754488	6418711	579
191	BW & TS Lasham	Private	754592	6418520	588
192	D Williams	Private	754649	6418328	589
194	PM & K Potts	Private	754160	6418080	578
195	R Cottam	Private	754583	6417973	591
196	F Saxberg & M Weir	Private	754072	6417840	583
200	VK Grimshaw	Private	754141	6417241	604
201 (a)	KR & GM Towerton	Private	754138	6417158	605
201 (b)	KR & GM Towerton	Private	754311	6416962	609
202	H & VF Butler	Private	754258	6416804	609
203	DJ Miller	Private	754462	6416639	627
204	RB & JE Donnan	Private	754537	6416557	635
206	CA Marshall & R Vella	Private	754394	6416192	628
207	AA & DM Smith	Private	754057	6415768	635
208	SA & CR Hasaart	Private	753938	6415612	648
209	F Mawson	Private	753883	6415407	650
210	JM & AM Tebutt	Private	753873	6415226	660
217	RP & JL Patterson	Private	754659	6415319	661
218	GF & GEL Soady	Private	754550	6415117	666
219	T & S Riger	Private	754468	6415587	647
220	SJ Rusten & NJ Smith	Private	754258	6415351	645
222	BJ Purtell	Private	754813	6415761	628
223	EW Palmer & JM Stewart	Private	754921	6415935	612
224	RS & PCC Dupond	Private	754895	6417021	602
226	LAA & FC Muscat	Private	754812	6417270	592
227	WP & JA Hughes	Private	755000	6417482	585
229	JJ & BA Lowe	Private	755115	6417791	579
230	DA Hoole & DT Rawlinson	Private	755229	6417879	573
231	T Morrison & SM Benny	Private	755200	6418034	563
232	L & JA Haaring	Private	755121	6418197	564
233	D & K Boal	Private	755196	6418290	554
234	D & L Gaw	Private	755157	6418405	557
235	LM & RS Wilson	Private	755107	6418631	559

LAND OWNERSHIP DETAILS

ID	Owner	Type	Easting (MGA)	Northing (MGA)	Elevation
236	RG & CA Donovan	Private	755165	6418738	557
237	A Puskaric	Private	755468	6418862	540
238	B Powell	Private	755497	6418969	537
240	GJ & DM Hartley	Private	755694	6419408	527
300	CM Collins & CY Marshall	Private	755327	6421268	542
303	HJ Ungaro	Private	755327	6420850	553
305	L Barisic & M Aul	Private	755052	6420566	559
306	E Armstrong	Private	754978	6420431	564
307	M Chant & NK Young	Private	754843	6420373	563
308	NA Dower	Private	754605	6420402	554
309	GS Maher	Private	754219	6420817	534
310	KI Death	Private	754407	6420948	534
312	MS & JJ Ioannou	Private	754239	6421215	523
313	NJ & BDE Pracy	Private	753906	6421166	518
314	SL Ford	Private	753997	6421486	512
315	WJ Richards & BJ Uzelac	Private	754141	6421605	511
316	CR Vassel & CM Williams	Private	754210	6421744	510
317	RJ Hore & V Bingham	Private	754646	6421744	519
Moolarben Road					
302. ³	RB Cox	Private	758435	6416631	496
31 ²	MB Cox	Private	760008	6416123	501
32	DJ & JG Stokes	Private	763590	6413194	544
35	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny	Private	759021	6414840	541
47	SF & MR Andrews	Private	760293	6413734	561
Ulan					
11 (a)	JE Mullins & CD Imrie	Commercial	765376	6431622	388
11 (b)	JE Mullins & CD Imrie	Private	765265	6431931	380
11 (c)	JE Mullins & CD Imrie	Commercial	764784	6431839	393
255	HJ & H Schmitz	Private	754922	6425602	458
258	PM & CD Elias	Private	755375	6425132	453
Ulan Village Non-residential					
160	Minister for Education and Training (Ulan Public School)	School	758350	6425029	418
168	PJL Constructions Pty Limited (Church)	Church	758386	6425136	419
9	Orica Australia Pty Limited	Commercial	757478	6422930	451
26	Forty North Pty Limited	Commercial	757430	6423741	435
46B	North Eastern Wiradjuri Wilpinjong Community Fund Limited	Commercial	758663	6425526	416
66	Rostherne Pty Limited	Commercial	758310	6425130	420
149	Mid Western Regional Council	Commercial	758457	6425165	417
162	Rowmint Pty Ltd	Commercial	758342	6425199	419

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer Appendices A1 and A2).

Note 3: Landowner that can request additional noise mitigation measures.

MOOLARBEN COAL COMPLEX METEOROLOGICAL SUMMARY

On-site Automatic Weather Station (AWS) - August 2011 to July 2014

Table D1 Seasonal Frequency of Occurrence Wind Speed Intervals - Daytime

Period	Calm (< 0.5 m/s)	Wind Direction (± 45°)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	10.0%	ENE	13.1%	10.4%	23.4%
Summer	4.1%	ENE	12.7%	15.0%	27.7%
Autumn	12.9%	ENE	17.0%	11.8%	28.8%
Winter	16.4%	WSW	17.5%	13.3%	30.8%
		W	16.3%	13.8%	30.0%
Spring	6.1%	WSW	9.9%	12.4%	22.4%

Table D2 Seasonal Frequency of Occurrence Wind Speed Intervals - Evening

Period	Calm (< 0.5 m/s)	Wind Direction (± 45°)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	19.1%	SW	28.7%	4.4%	33.0%
		WSW	26.1%	4.7%	30.8%
Summer	9.5%	ENE	14.8%	15.8%	30.6%
Autumn	24.7%	SSW	29.8%	1.8%	31.6%
		SW	32.1%	2.6%	34.7%
		WSW	27.6%	2.8%	30.3%
Winter	28.0%	SSW	29.6%	2.8%	32.3%
		SW	35.5%	5.0%	40.5%
		WSW	34.3%	6.1%	40.4%
		W	24.4%	6.1%	30.5%
Spring	13.1%	SSW	32.0%	5.3%	37.3%
		SW	37.1%	7.3%	44.4%
		WSW	34.5%	7.5%	42.1%

Table D3 Seasonal Frequency of Occurrence Wind Speed Intervals - Night-Time

Period	Calm (< 0.5 m/s)	Wind Direction (± 45°)	Wind Speed		
			0.5 to 2 m/s	2 to 3 m/s	0.5 to 3 m/s
Annual	36.1%	SW	25.5%	1.9%	27.4%
Summer	25.7%	ENE	21.2%	15.9%	37.1%
		E	20.3%	16.0%	36.3%
Autumn	43.8%	SW	25.2%	1.3%	26.5%
Winter	44.7%	SW	29.4%	3.3%	32.7%
		WSW	28.4%	4.7%	33.1%
Spring	28.6%	SSW	34.6%	1.6%	36.1%
		SW	35.4%	2.1%	37.5%
		WSW	28.4%	2.3%	30.6%

Table D4 Winter Temperature Gradient Exceedance Level (Degrees C per 100 m) Summary

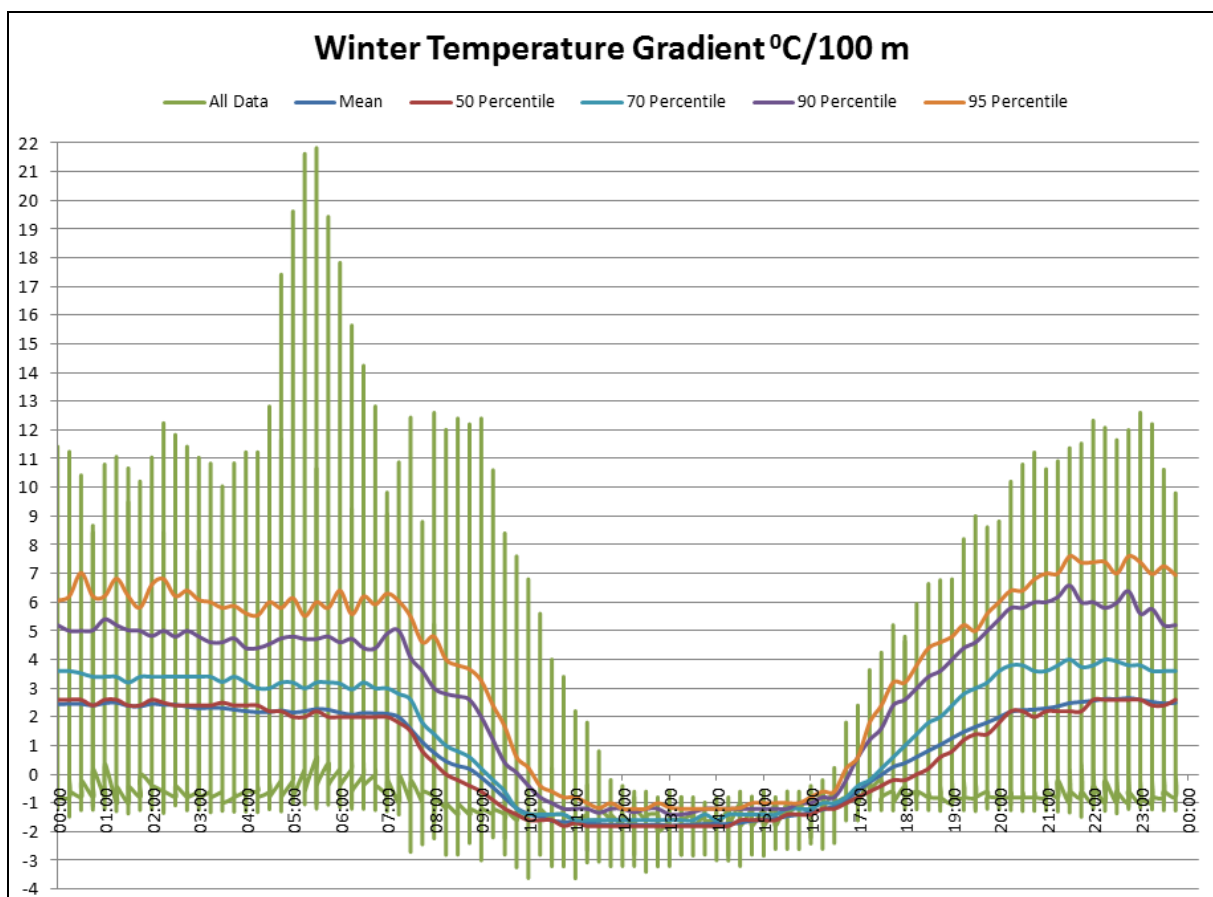
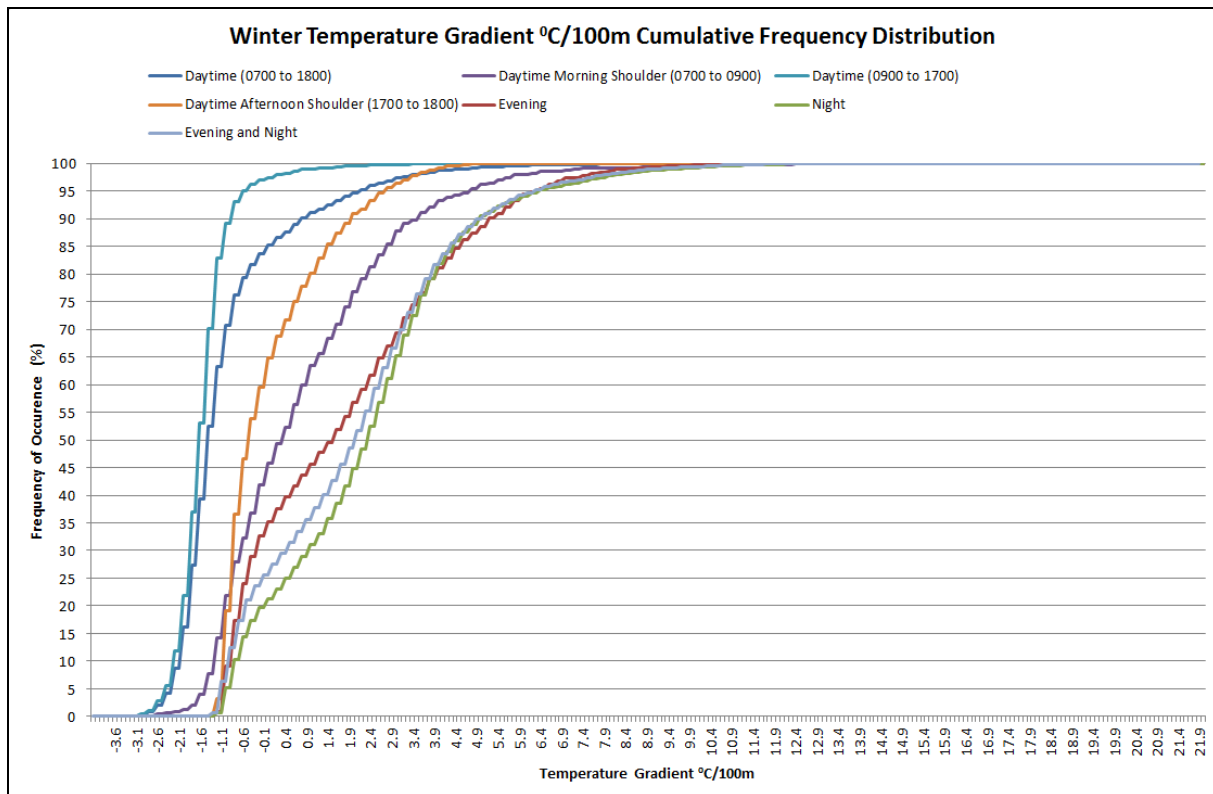
Daytime Exceedance			Evening Exceedance			Night-time Exceedance			Evening/Night-time Exceedance		
0700 to 1800 hours			1800 to 2200 hours			2200 to 0700 hours			1800 to 0700 hours		
50%	30%	10%	50%	30%	10%	50%	30%	10%	50%	30%	10%
-1.4	-1.0	0.8	1.6	3.2	5.2	2.4	3.4	5.0	2.2	3.4	5.2

Table D5 Morning Shoulder, Daytime and Afternoon Shoulder Exceedance

0700 to 0900 hours				0900 to 1700 hours				1700 to 1800 hours			
50%	30%	10%	5%	50%	30%	10%	5%	50%	30%	10%	5%
0.4	1.6	3.6	4.8	-1.6	-1.4	-0.8	-0.4	-0.4	0.4	2.0	2.8

MOOLARBEN COAL COMPLEX METEOROLOGICAL SUMMARY

On-site Automatic Temperature Tower (ATT) - August 2011 to July 2014



PHOTOS OF EXISTING REASONABLE AND FEASIBLE NOISE CONTROLS



Plate 1 Haul truck fitted with Duratray



Plate 2 Excavator shielded by pit wall



Plate 3 Overburden dump area shielded by side of waste emplacement



Plate 4 Typical berms/bunding along haul roads

Source: MCO, 2014

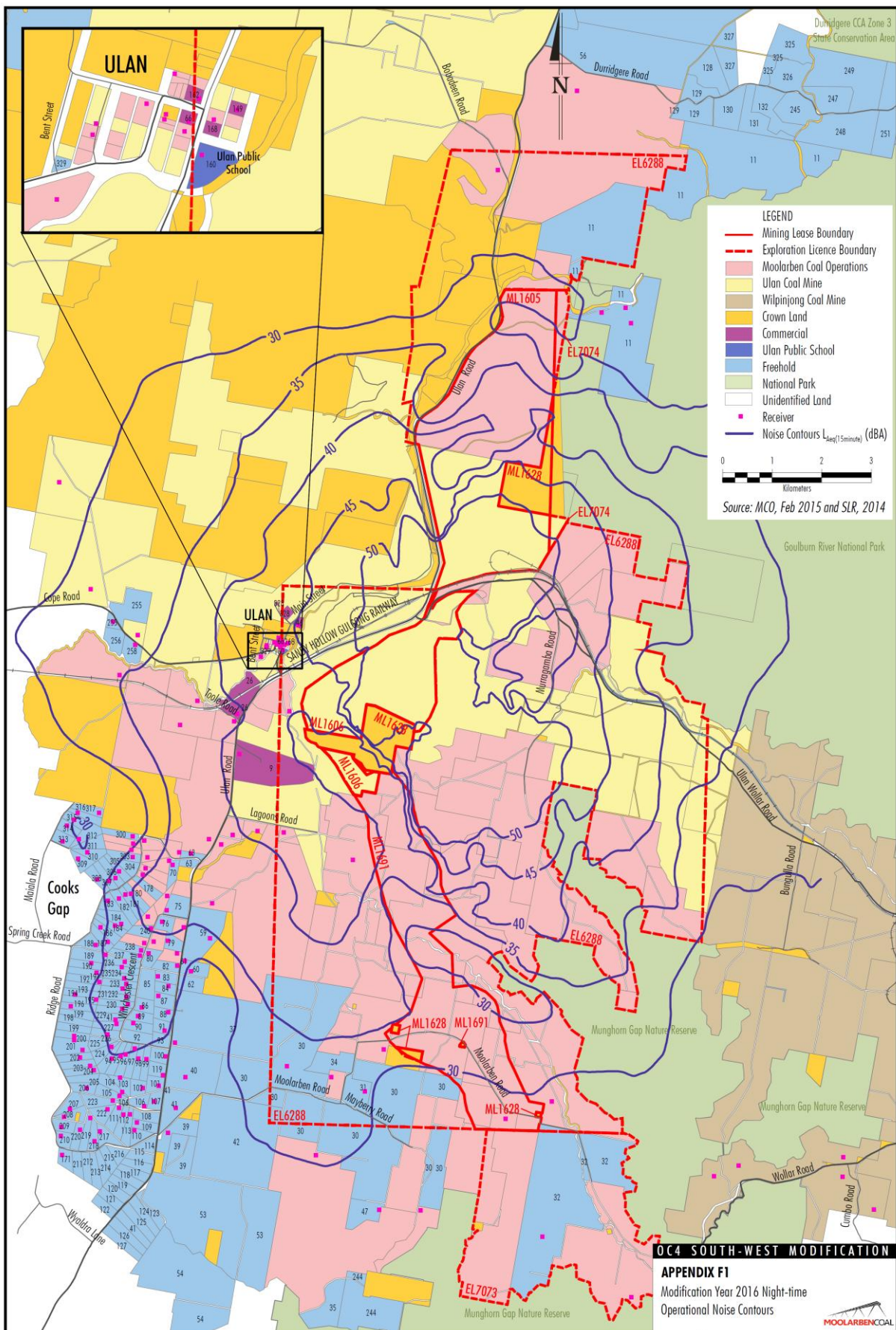
OC4 SOUTH-WEST MODIFICATION

APPENDIX E

Existing Noise Management Measures



YEAR 2016 NIGHT-TIME OPERATING INTRUSIVE LAEQ(15MINUTE) NOISE CONTOUR



MCA-13-02 MOC4_SWMod EA_App NBA_205C



EVENING CUMULATIVE NOISE ASSESSMENT

In accordance with the INP Chapter 2 Industrial Noise Criteria (Section 2.2.4), the evening cumulative sum of the existing, approved and proposed developments LAeq(4hour) noise amenity levels have been determined as presented below.

Table G1 - Evening Cumulative (LAeq(4hour)) Noise Amenity Levels (dBA re 20 µPa)

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
Cooks Gap						
37	Szymkarczuk	24	25	24	29	45
39	Sprigg	24	24	23	28	45
40	Devenish	23	25	24	29	45
41(a)	Libertis	24	24	23	29	45
41(b)	Libertis	26	25	23	30	45
59	Szymkarczuk	30	28	24	33	45
60	Rayner & Munday	25	27	24	30	45
61	Miller	27	27	24	31	45
63 ^{1, 2}	Whiticker	33	30	24	35	45
70 ²	Coventry	32	29	23	34	45
75 ²	Ban	31	28	23	33	45
76	Carbone	30	28	23	33	45
79	Nagle	30	27	23	32	45
80	Sebelic	29	27	23	32	45
82	Hungerford & Clemens	27	27	24	31	45
83	Wall	27	26	23	31	45
84	Sebelic	26	26	24	30	45
86	Harris	26	26	23	30	45
87	Howe	26	26	23	30	45
88	Meyers	26	26	24	30	45
89	Glover & Tomlinson	26	26	23	30	45
90	Powell	26	25	23	30	45
91	Graham	25	25	23	29	45
94	Mittmayer	25	25	23	29	45
95	Withington	25	25	23	29	45
96	Lazicic	25	25	23	29	45
97	Smith	25	25	23	29	45
98	Piper	24	25	23	29	45
99	Jenner & Jensen	24	25	23	29	45
100	Kapista	24	25	23	29	45
101	Hull	23	24	23	28	45
102	Roberts	23	24	23	28	45
103	Burnett & Grant	24	24	23	28	45
104	Deeben	23	24	23	28	45
105	Katsikaris	23	24	23	28	45
106	Reid	23	24	23	28	45
107	Raso	23	24	23	28	45

EVENING CUMULATIVE NOISE ASSESSMENT

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
109	Evans	23	24	23	28	45
110	Thompson & Evans	23	24	23	28	45
111	McEwan	23	24	23	28	45
112	Croft	23	24	23	28	45
113	Ratcliff	23	24	23	28	45
119	Kearns	23	25	23	29	45
171	McGregor	18	23	22	26	45
180	Barrett	30	28	23	33	45
181	Forster	28	28	23	31	45
182	Dutoitcook	29	28	23	32	45
183	Steines	29	27	22	32	45
184(a)	Stevenson	29	27	23	32	45
184(b)	Stevenson	29	27	23	32	45
186	Adamson	26	27	22	30	45
187	Feeney	28	27	23	31	45
188	Fielding	24	26	22	29	45
189	Goggin & Hyde	28	26	23	31	45
190	Sahyoun	23	26	22	29	45
191	Lasham	25	26	22	29	45
192	Williams	27	26	22	30	45
194	Potts	23	25	22	29	45
195	Cottam	26	25	22	30	45
196	Saxberg & Weir	23	25	22	28	45
200	Grimshaw	22	25	22	28	45
201(a)	Towerton	21	25	22	28	45
201(b)	Towerton	23	25	22	28	45
202	Butler	22	24	22	28	45
203	Miller	24	24	22	28	45
204	Donnan	24	24	22	28	45
206	Marshall & Vella	22	24	22	27	45
207	Smith	23	24	22	28	45
208	Hasaart	23	23	22	28	45
209	Mawson	23	23	22	27	45
210	Tebutt	22	23	22	27	45
217	Patterson	23	23	22	28	45
218	Soady	23	23	22	28	45
219	Riger	23	24	22	28	45
220	Rusten & Smith	20	23	22	27	45
222	Purtell	23	24	22	28	45
223	Palmer & Stewart	23	24	22	28	45
224	Dupond	25	25	23	29	45
226	Muscat	25	25	23	29	45

EVENING CUMULATIVE NOISE ASSESSMENT

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
227	Hughes	26	25	23	30	45
229	Lowe	27	26	23	30	45
230	Hoole & Rawlinson	27	26	23	30	45
231	Morrison & Benny	27	26	23	30	45
232	Haaring	27	26	23	30	45
233	Boal	28	26	23	31	45
234	Gaw	28	26	23	31	45
235	Wilson	28	26	23	31	45
236	Donovan	28	26	23	31	45
237	Puskaric	29	27	23	32	45
238	Powell	29	27	23	32	45
240	Hartley	30	27	23	32	45
300	Collins & Marshall	27	29	23	32	45
303	Ungaro	28	29	23	32	45
305	Barisic & Aul	27	28	23	31	45
306	Armstrong	27	28	23	31	45
307	Chant & Young	27	28	22	31	45
308	Dower	26	28	22	30	45
309	Maher	25	28	22	30	45
310	Death	26	28	22	31	45
312	Ioannou	26	28	22	31	45
313	Pracy	25	28	22	30	45
314	Ford	25	28	22	31	45
315	Richards & Uzelac	26	28	22	31	45
316	Vassel & Williams	26	28	22	31	45
317	Hore & Bingham	26	29	22	31	45
Moolarben Road						
30 ^{2, 3}	Cox	28	25	26	31	45
31 ²	Cox	27	25	27	31	45
32	Stokes	6	22	32	32	45
35	Johnson & Thompson & Debreczeny	26	24	26	30	45
47	Andrews	23	23	27	30	45
Ulan						
11(a)	Mullins & Imrie	9	25	23	27	65
11(b)	Mullins & Imrie	9	25	23	27	45
11(c)	Mullins & Imrie	10	25	23	27	65
255	Schmitz	28	30	20	32	45
258	Elias	30	28	21	32	45
Ulan Village Non-residential						
9	Orica Australia Pty Limited	37	34	25	39	65
26	Forty North P/L	16	36	25	36	65
46B	North Eastern Wiradjuri Wilpinjong Community Fund Limited	35	48	23	48	65

EVENING CUMULATIVE NOISE ASSESSMENT

ID No and Landholder	Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
66 Rostherne P/L	16	43	23	43	65
149 Mid Western Regional Council	39	44	23	45	65
160 ⁵ Minister for Education and Training (Ulan Public School)	38	42	23	44	45/45 ⁶
162 Rowmint P/L	16	43	23	43	65
168 ⁵ P/JL Constructions Pty Limited (church)	39	43	23	44	50/45 ⁶

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer Appendices A1 and A2).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (**Table 9**) for each receiver.

Note 5: In use daytime and evening only.

Note 6: INP Acceptable amenity noise level criteria/Project Approval noise limit.

Note 7: Predicted evening noise level complies with the INP Acceptable noise amenity level.

NIGHT-TIME CUMULATIVE NOISE ASSESSMENT

In accordance with the INP Chapter 2 Industrial Noise Criteria (Section 2.2.4), the night-time cumulative sum of the existing, approved and proposed developments LAeq(9hour) noise amenity levels have been determined as presented below.

Table G2 - Night-time Cumulative (LAeq(9hour)) Noise Amenity Levels (dBA re 20 µPa)

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
Cooks Gap						
37	Szymkarczuk	27	26	26	31	40
39	Sprigg	27	25	25	30	40
40	Devenish	26	26	26	31	40
41(a)	Libertis	27	25	25	31	40
41(b)	Libertis	29	26	25	32	40
59	Szymkarczuk	33	29	26	35	40
60	Rayner & Munday	28	28	26	32	40
61	Miller	30	28	26	33	40
63 ^{1, 2}	Whiticker	36	31	26	38	40
70 ²	Coventry	35	30	25	37	40
75 ²	Ban	34	29	25	35	40
76	Carbone	33	29	25	35	40
79	Nagle	33	28	25	35	40
80	Sebelic	32	28	25	34	40
82	Hungerford & Clemens	30	28	26	33	40
83	Wall	30	27	25	33	40
84	Sebelic	29	27	26	32	40
86	Harris	29	27	25	32	40
87	Howe	29	27	25	32	40
88	Meyers	28	27	26	32	40
89	Glover & Tomlinson	28	27	25	32	40
90	Powell	28	26	25	31	40
91	Graham	28	26	25	31	40
94	Mittmayer	27	26	25	31	40
95	Withington	27	26	25	31	40
96	Lazicic	27	26	25	31	40
97	Smith	27	26	25	31	40
98	Piper	27	26	25	31	40
99	Jenner & Jensen	27	26	25	31	40
100	Kapista	27	26	25	31	40
101	Hull	26	25	25	30	40
102	Roberts	26	25	25	30	40
103	Burnett & Grant	26	25	25	30	40
104	Deeben	26	25	25	30	40
105	Katsikaris	26	25	25	30	40
106	Reid	26	25	25	30	40
107	Raso	26	25	25	30	40

NIGHT-TIME CUMULATIVE NOISE ASSESSMENT

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
109	Evans	26	25	25	30	40
110	Thompson & Evans	26	25	25	30	40
111	McEwan	25	25	25	30	40
112	Croft	25	25	25	30	40
113	Ratcliff	25	25	25	30	40
119	Kearns	26	26	25	30	40
171	McGregor	20	24	24	28	40
180	Barrett	33	29	25	35	40
181	Forster	30	29	25	33	40
182	Dutoitcook	32	29	25	34	40
183	Steines	32	28	24	34	40
184(a)	Stevenson	32	28	25	34	40
184(b)	Stevenson	31	28	25	34	40
186	Adamson	28	28	24	32	40
187	Feeney	31	28	25	33	40
188	Fielding	27	27	24	31	40
189	Goggin & Hyde	30	27	25	33	40
190	Sahyoun	26	27	24	31	40
191	Lasham	27	27	24	31	40
192	Williams	30	27	24	32	40
194	Potts	26	26	24	30	40
195	Cottam	29	26	24	32	40
196	Saxberg & Weir	26	26	24	30	40
200	Grimshaw	24	26	24	29	40
201(a)	Towerton	23	26	24	29	40
201(b)	Towerton	26	26	24	30	40
202	Butler	24	25	24	29	40
203	Miller	26	25	24	30	40
204	Donnan	26	25	24	30	40
206	Marshall & Vella	24	25	24	29	40
207	Smith	25	25	24	29	40
208	Hasaart	25	24	24	29	40
209	Mawson	25	24	24	29	40
210	Tebutt	25	24	24	29	40
217	Patterson	25	24	24	30	40
218	Soady	25	24	24	29	40
219	Riger	26	25	24	30	40
220	Rusten & Smith	22	24	24	28	40
222	Purtell	26	25	24	30	40
223	Palmer & Stewart	26	25	24	30	40
224	Dupond	27	26	25	31	40
226	Muscat	28	26	25	31	40

NIGHT-TIME CUMULATIVE NOISE ASSESSMENT

ID No and Landholder		Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
227	Hughes	28	26	25	31	40
229	Lowe	29	27	25	32	40
230	Hoole & Rawlinson	29	27	25	32	40
231	Morrison & Benny	29	27	25	32	40
232	Haaring	30	27	25	32	40
233	Boal	30	27	25	33	40
234	Gaw	30	27	25	33	40
235	Wilson	31	27	25	33	40
236	Donovan	31	27	25	33	40
237	Puskaric	31	28	25	34	40
238	Powell	32	28	25	34	40
240	Hartley	33	28	25	35	40
300	Collins & Marshall	31	30	25	34	40
303	Ungaro	31	30	25	34	40
305	Barisic & Aul	30	29	25	33	40
306	Armstrong	30	29	25	33	40
307	Chant & Young	30	29	24	33	40
308	Dower	28	29	24	32	40
309	Maher	28	29	24	32	40
310	Death	29	29	24	33	40
312	Ioannou	29	29	24	33	40
313	Pracy	28	29	24	32	40
314	Ford	29	29	24	32	40
315	Richards & Uzelac	29	29	24	33	40
316	Vassel & Williams	29	29	24	33	40
317	Hore & Bingham	29	30	24	33	40
Moolarben Road						
30 ^{2, 3}	Cox	31	26	28	34	40
31 ²	Cox	30	26	29	33	40
32	Stokes	12	23	34	34	40
35	Johnson & Thompson & Debreczeny	28	25	28	32	40
47	Andrews	25	24	29	32	40
Ulan						
11(a)	Mullins & Imrie	23	27	26	30	65
11(b)	Mullins & Imrie	19	27	26	30	40
11(c)	Mullins & Imrie	21	27	26	30	65
255	Schmitz	31	32	23	35	40
258	Elias	33	31	24	36	40
Ulan Village Non-residential						
9	Orica Australia Pty Limited	40	35	27	42	65
26	Forty North P/L	34	37	27	39	65
46B	North Eastern Wiradjuri	40	50	26	50	65

NIGHT-TIME CUMULATIVE NOISE ASSESSMENT

ID No and Landholder	Moolarben Coal Complex Modification ⁴	Ulan Coal Continued Operations	Wilpinjong Coal Project Modification ⁴	Cumulative Amenity Level	NSW INP Acceptable Amenity
Wilpinjong Community Fund Limited					
66 Rostherne P/L	38	45	26	45	65
149 Mid Western Regional Council	43	46	26	48	65
160 ⁵ Minister for Education and Training (Ulan Public School)	-	-	-	-	45/45 ⁶
162 Rowmint P/L	38	45	26	46	65
168 ⁵ P/L Constructions Pty Limited (Church)	-	-	-	-	50/45 ⁶

Note 1: Receiver subject to a private agreement with MCO.

Note 2: Project Approval Noise Limit for this receiver is above the intrusive PSNL (refer **Appendices A1** and **A2**).

Note 3: Landowner that can request additional noise mitigation measures.

Note 4: Highest predicted noise level from the INP meteorological conditions (**Table 9**) for each receiver.

Note 5: In use daytime and evening only.

Note 6: INP Acceptable amenity noise level criteria/Project Approval noise limit.

Note 7: Predicted evening noise level complies with the INP Acceptable noise amenity level.



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AIR SCIENCES

AIR QUALITY ASSESSMENT
MOOLARBEN COAL PROJECT
OC4 SOUTH-WEST MODIFICATION

Moolarben Coal Operations Pty Ltd

16 April 2015

Job Number 14010276

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Air Quality Assessment – Moolarben Coal Project OC4 South-West Modification

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Date: 16/04/2015

16/04/2014

DOCUMENT CONTROL

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FINAL - 001	18/11/2014	P Henschke	A Todoroski
FINAL - 002	06/02/2015	A Todoroski	A Todoroski
FINAL - 003	16/04/2015	P Henschke	A Todoroski

This report has been prepared in accordance with the scope of works between Todoroski Air Sciences Pty Ltd (TAS) and the client. TAS relies on and presumes accurate the information (or lack thereof) made available to it to conduct the work. If this is not the case, the findings of the report may change. TAS has applied the usual care and diligence of the profession prevailing at the time of preparing this report and commensurate with the information available. No other warranty or guarantee is implied in regard to the content and findings of the report. The report has been prepared exclusively for the use of the client, for the stated purpose and must be read in full. No responsibility is accepted for the use of the report or part thereof in any other context or by any third party.

TABLE OF CONTENTS

1	INTRODUCTION	1
2	PROJECT BACKGROUND	1
3	EXISTING AIR QUALITY MONITORING AND MANAGEMENT	5
4	PROPOSED MODIFICATION	6
4.1	Modelling scenario	8
4.2	Emission estimation	8
4.3	Modelling methodology	10
4.4	Reactive dust mitigation measures	10
5	DIPERSION MODELLING RESULTS	12
6	SUMMARY AND CONCLUSIONS	16
7	REFERENCES	17

LIST OF APPENDICES

Appendix A – Indicative Mine Plan Scenario

Appendix B – Emissions Inventory

Appendix C – Dispersion Modelling Results for PM_{2.5}, TSP and Dust Deposition

LIST OF TABLES

Table 4-1: Summary of estimated annual quantities of material and emissions for the Modification 9

LIST OF FIGURES

Figure 2-1: Regional Location.....	2
Figure 2-2: Relevant Land Ownership Plan	3
Figure 2-3: Relevant Landholder List	4
Figure 4-1: Indicative General Arrangement Incorporating the Modification	7
Figure 4-2: Examples of wind conditions which can cause air quality impacts	11
Figure 5-1: Predicted maximum 24-hour average PM ₁₀ concentrations due to emissions from the Modification	13
Figure 5-2: Predicted annual average PM ₁₀ concentrations due to emissions from the Modification	14
Figure 5-3: Comparison of predicted maximum 24-hour average PM ₁₀ concentrations	15

1 INTRODUCTION

Todoroski Air Sciences has been engaged by Moolarben Coal Operations Pty Ltd (MCO) to prepare an air quality assessment for the proposed Open Cut 4 (OC4) South-West Modification (hereafter referred to as the Modification).

Previously, a detailed air quality impact assessment (**Todoroski Air Sciences, 2013**) was prepared for the Moolarben Coal Project Stage 1 Optimisation Modification (MOD9) and appended to the previous MOD9 environmental assessment as Appendix D. This report utilises some of the work and data presented in the MOD9 report to assess the potential for air quality impacts associated with this Modification and to compare the predicted impacts of this Modification with the previous predictions.

This report incorporates the following aspects:

- + A description of the proposed Modification;
- + A summary of the dispersion modelling approach used to assess potential air quality impacts;
- + Presentation of the predicted results and comparison with existing/approved predictions; and
- + Discussion of the potential air quality impacts as a result of the Modification and proposed management measures.

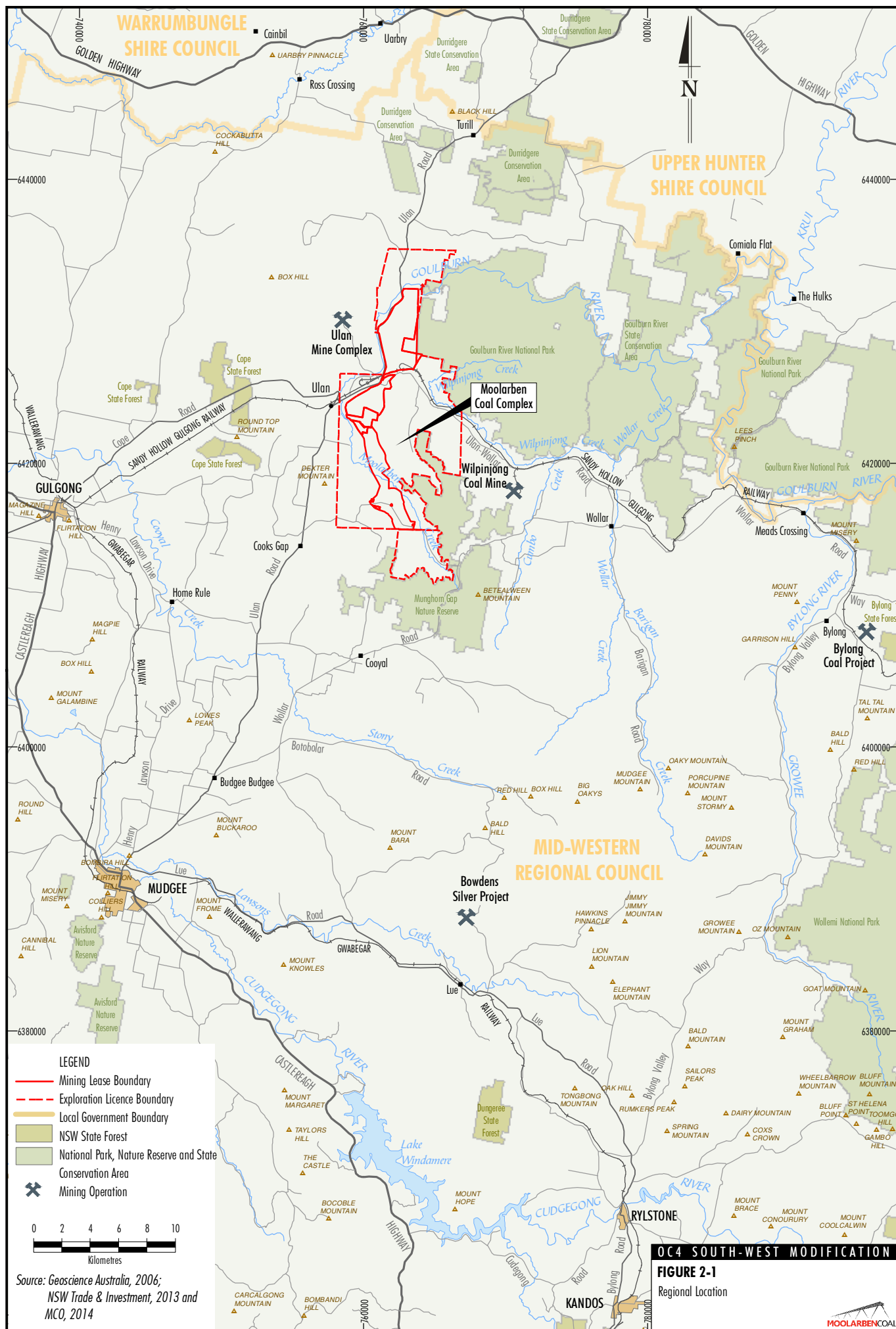
2 PROJECT BACKGROUND

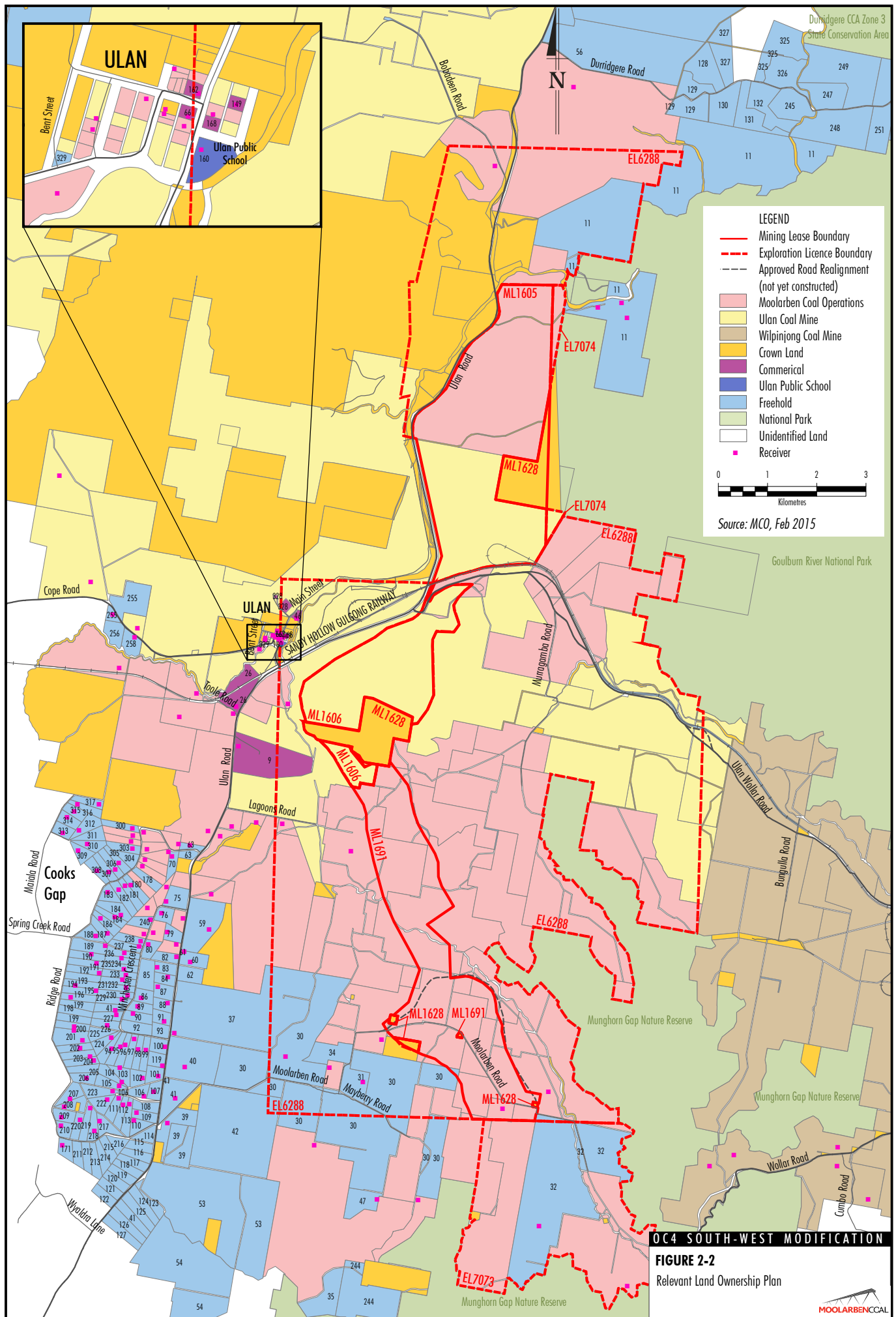
The Moolarben Coal Complex is located at Moolarben in the Western Coalfields of New South Wales (NSW), approximately 40 kilometres north of Mudgee (see **Figure 2-1**).

It is bordered by the Goulburn River to the northwest, Goulburn River National Park to the northeast and Munghorn Gap Nature Reserve to the south. The Ulan Coal Mine is located to the northwest and Wilpinjong Coal Mine is located to the east. Ulan settlement and Cooks Gap are located to the west and southwest, respectively.

The relevant land ownership in the vicinity of the Moolarben Coal Complex is shown in **Figure 2-2** and **Figure 2-3**.







Ref No	Landholder	Ref No	Landholder	Ref No	Landholder
9	Orica Australia Pty Limited	112	MJ & LM Croft	215	SG & PM Green
11	JE Mullins & CD Imrie	113	CPG Ratcliff	216	G Holland & FA Handicott
26	Forty North Pty Limited	114	TF & K Holland	217	RP & JL Patterson
30	RB Cox	115	AK & BH Quinn	218	GF & GEL Soady
31	MB Cox	116	DJ & SM Reid	219	T & S Riger
32	DJ & JG Stokes	117	JM Dick	220	SJ Rusten & NJ Smith
34	J Asztalos	118	A Scott	222	BJ Purtell
35	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny	119	PJ Kearns	223	EW Palmer & JM Stewart
37	J Szymkarczuk	120	PS & DR Ord	224	RS & PCC Dupond
39	RM & DJ Sprigg	121	EJ Cullen	225	G & RF Doualetas
40	JM Devenish	122	WF Wirth	226	LAA & FC Muscat
41	PP Libertis	123	ND Sullivan	227	WP & JA Hughes
42	C & L Schmidt	124	WJ & HE Bailey	229	JJ & BA Lowe
46	North Eastern Wiradjuri Wilpinjong Community Fund Limited	125	DB McBride	230	DA Hoole & DT Rawlinson
47	SF & MR Andrews	126	MP Julian	231	T Morrison & SM Benny
53	WD & MS Bryant	127	BKT & SA Bracken	232	L & JA Haaring
54	MA & C Harris	128	AW Sims	233	K & D Boal
56	MJ & V Cundy	129	M Yelds	234	D & L Gaw
59	G & GM Szymkarczuk	130	GP McEwen	235	LM & RS Wilson
60	CL Rayner & DM Munday	131	GR & RA King	236	RG & CA Donovan
61	MA Miller	132	N Atkins	237	A Puskaric
62	R Menchin	149	Mid-Western Regional Council	238	B Powell
63	BF & B Whiticker	151	AI Cunningham (Land entrusted to Catholic Church)	240	GJ & DM Hartley
66	Rostherne Pty Limited	160	Minister For Education And Training	244	JT & YR Jones
70	DJ & A Coventry	162	DM Harrison	245	MP & KLE Cresham
75	P Ban	168	PJL Constructions Pty Limited	247	J & K Batshon
76	SR & PC Carbone	171	AD & SA McGregor	248	G Boustani
79	PTJ & SE Nagle	178	PR Stone	249	CJ & JI Eldridge
80	W & D Sebelic	180	CD & LL Barrett	251	NF Potter & CE Selley
82	SC Hungerford & MC Clemens	181	SM Forster	255	HJ & H Schmitz
83	CF & CR Wall	182	J Dutoitcook	256	RC Campbell
84	DS Sebelic	183	R & EA Steines	258	PM & CD Elias
85	J & Z Nikolovski	184	LA Stevenson	300	CM Collins & CY Marshall
86	NW Harris	186	RW & IJ Adamson	303	HJ Ungaro
87	BJ & K Howe	187	BT & KM Feeney	304	G Balajan
88	BC Meyers	188	KR & T Fielding	305	L Barisic & M Aul
89	MV & HM Glover & E & BJ Tomlinson	189	M, M, D & A Gaggin & J, A, P & R Hyde	306	E Armstrong
90	SA Powell	190	T & LK Sahyoun	307	M Chant & NK Young
91	HM Graham	191	BW & TS Lasham	308	NA Dower
92	VA Pulicino & J & S & G Bonnici	192	D Williams	309	GS Maher
93	F & M Fenech	193	DJ Maloney	310	KI Death
94	LK Mitemmayer	194	PM & K Potts	311	BJ & LC Williamson
95	BJ Witherington	195	R Cottam	312	MS & JJ Ioannou
96	D Lazicic	196	F Saxberg & M Weir	313	NJ & BDE Pracy
97	DJ & MD Smith	198	GR & ME Metcalfe	314	SL Ford
98	ME & JJ Piper	199	PGG & I Nielsen	315	WJ Richards & BJ Uzelac
99	DE Jenner & WB Jensen	200	VK Grimshaw	316	CR Vassel & CM Williams
100	A Kapista	201	KR & GM Towerton	317	RJ Hore & V Bingham
101	RD & DMZ Hull	202	H & VF Butler	325	S & T Fevale
102	KA Roberts	203	DJ Miller	326	AW & LM Murray
103	SB Burnett & SL Grant	204	RB & JE Donnan	327	CA Tanner
104	RA & LA Deeben	205	DW Sparrow & M Tallan	328	Essential Energy
105	DJ & N Katsikaris	206	CA Marshall & R Vella	329	Tuck-Lee
106	TB & JH Reid	207	AA & DM Smith		
107	ZJ & M & AA Raso	208	SA & CR Hasaart		
108	R Varga	209	F Mawson		
109	DA Evans	210	JM & AM Tebutt		
110	JT Thompson & HT Evans	211	SA McGregor & WJ Gray		
111	GJ & NJ McEwan	212	E & M Lepik		
		213	D & J Parsonage		
		214	RK & EG O'Neil		

Source: MCO, Feb 2015

OC4 SOUTH-WEST MODIFICATION

FIGURE 2-3

Relevant Landholder List



3 EXISTING AIR QUALITY MONITORING AND MANAGEMENT

The existing Air Quality Management Plan (**MCO, 2013**) describes the air quality management and monitoring regime at the Moolarben Coal Complex.

The Air Quality Management Plan describes:

- ✦ Project Approval air quality criteria;
- ✦ Dust monitoring locations and frequency, comprising:
 - four Tapered Element Oscillating Microbalance measuring PM₁₀ continuously (i.e. real-time monitor);
 - two High Volume Air Samplers measuring PM₁₀ on a one day in six cycle; and
 - Eleven dust deposition gauges.
- ✦ Ongoing dust management measures; and
- ✦ Performance indicators (real-time response triggers) which, if exceeded, trigger the implementation of additional dust management measures.

The existing Air Quality Management Plan is currently being reviewed and updated.

Operational air quality management measures that are implemented at the Moolarben Coal Complex include:

- ✦ Disturbance of only the minimum area necessary for mining (e.g. typically only one strip ahead of the active mining operations);
- ✦ Limiting clearing and topsoil stripping activities as far as practicable during the drier months;
- ✦ Adoption of progressive rehabilitation of mining operations to minimise exposed soils;
- ✦ Employing appropriate dust suppression methods at the coal handling facilities;
- ✦ Use of water carts on all trafficked areas to minimise dust generation as necessary and practicable;
- ✦ Use of chemical dust suppressants where watering alone is unable to achieve required dust control efficiencies;
- ✦ Use of constructed roads only, minimisation of access roads and removal of obsolete access roads;
- ✦ Maintaining coal handling areas and stockpiles in a moist condition using water carts and/or water sprays;
- ✦ Relocation, modification and/or temporarily ceasing mining operations in adverse meteorological conditions to minimise the short term air quality impacts;



- ✦ Use of dust suppression systems on stationary and mobile plant (such as the dump hopper, transfer stations, drill rigs);
- ✦ Long term topsoil stockpiles, not used for over 6 months will be revegetated with grass;
- ✦ Use of dust aprons and water injection systems on drills;
- ✦ Partial enclosure of coal conveyors where possible;
- ✦ Watering of out-of-pit emplacement areas that will remain inactive for prolonged periods creating a dry crust layer to reduce dust emissions associated with wind erosion; and
- ✦ Increasing excavator bench height when working on drier weathered rock near the natural surface to allow blending with underlying overburden which contains more moisture.

MCO has recently implemented new software that assists in pro-active management of dust emissions. The system provides daily reports and predictions of upcoming meteorological conditions and potential dust risks. Based on prevailing wind conditions, MCO can strategically alter its operations to reduce these impacts.

A predictive system would reduce the peak periods of elevated dust effects due to the mining activities and the operation of an effective predictive system has been applied in the modelling results presented in this assessment.

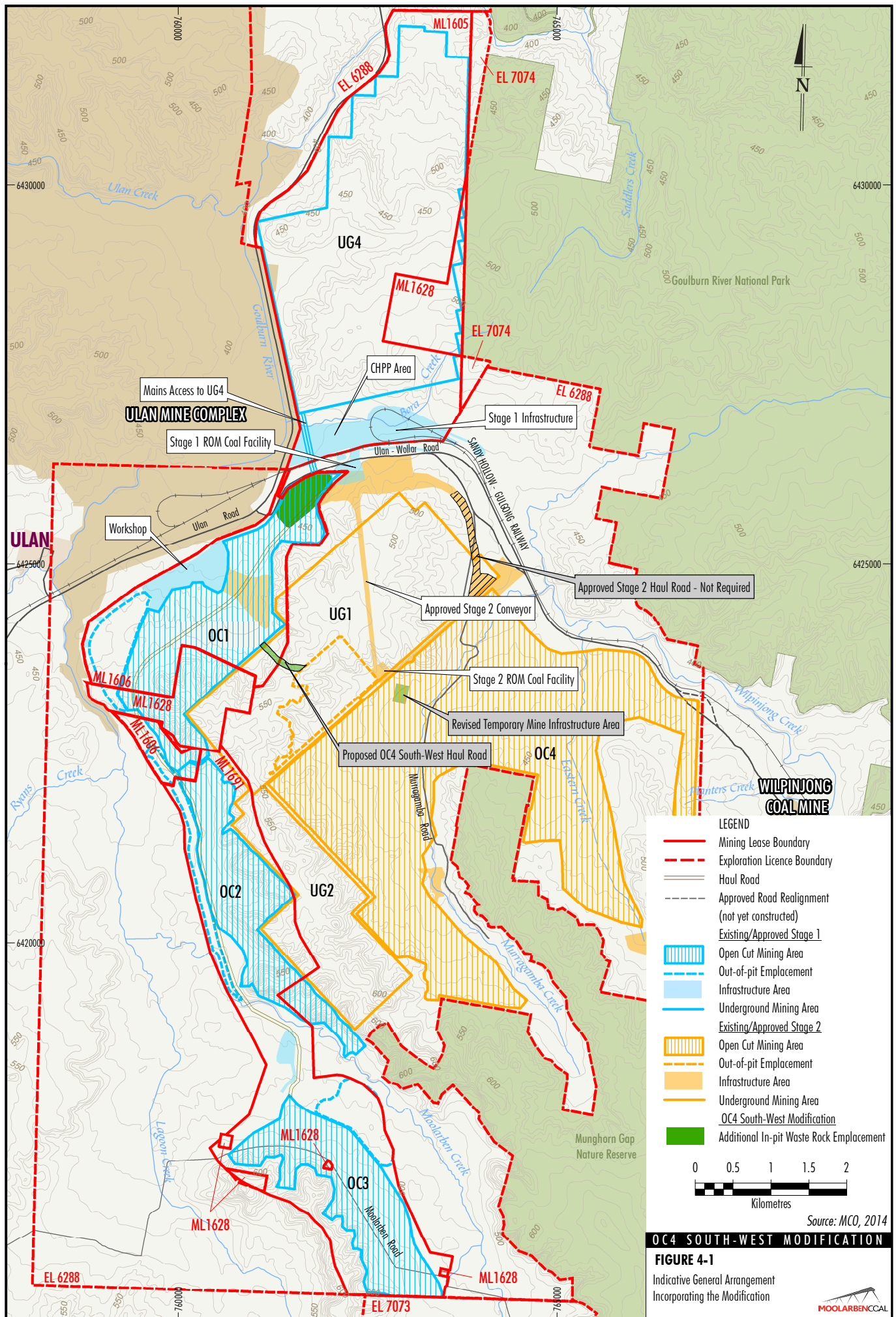
4 PROPOSED MODIFICATION

MCO has reviewed the mining sequence and associated infrastructure layout requirements at the Moolarben Coal Complex to enable more efficient access to the OC4 resource. As a consequence, the approved Stage 2 haul road (to the north of OC4) would no longer be required, and would be replaced by a shorter, more direct, haul road route to OC1 (to the southwest of the approved Stage 2 haul road) (see **Figure 4-1**).

The Modification includes construction of the OC4 South-West haul road, adjustments to the site water management system, and refinements to the early stages of mining and associated infrastructure layout at OC4 and placement of waste rock in OC1 including the following key components (**Figure 4-1**):

- ✦ construction of the OC4 South-West haul road between OC4 and OC1 (and therefore the approved Stage 2 haul road would not need to be constructed);
- ✦ adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- ✦ refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- ✦ backfilling of the northern OC1 final void to approximately pre-mining elevations.





4.1 Modelling scenario

This assessment has considered a single mine plan year to represent the proposed Modification. The assessed scenario was selected to demonstrate a worst-case operational scenario for the Modification with the maximum ROM coal and overburden removal production and with the maximum fleet using the proposed OC4 South-West haul road realignment.

The air quality model was updated to account for the relocation of the OC4 South-West haul road, changes to the progression of the mine and the implementation of current air quality controls and management measures.

Relevant to potential air quality impacts, 2016 was chosen for the air quality modelling scenario as this year includes:

- ✦ maximum ROM coal and waste rock extraction;
- ✦ first year of maximum fleet operations in OC4;
- ✦ maximum fleet using the proposed OC4 south-west haul road;
- ✦ fleet in OC4 (where the majority of the fleet is located) focused in the west resulting in potential maximum impacts at Ulan and Cooks Gap; and
- ✦ dumping of overburden on the OC4 out-of-pit waste emplacement.

Potential wind erosion emissions associated with the inactive OC2 pit have been included in the air quality model.

The 2016 scenario is considered to be representative of a scenario equivalent to MOD9 Year 6 (which included the early development of the OC4 pit) and therefore allows for a comparison to be made between the existing/approved Moolarben Coal Complex and the Modification.

The indicative year 2016 mine plan scenario is provided in **Appendix A**.

4.2 Emission estimation

The rate of dust emission arising from the worst case scenario selected for modelling has been calculated by analysing the various dust generating activities and applying appropriate emission factors.

The emission factors applied are considered the most applicable and representative factors available for calculating the dust generation rates for the proposed activities. The emission factors were sourced mainly from studies supported by the United States Environmental Protection Authority (1985 and updates) and from local studies where possible. The emissions inventory for the Modification has been based on the emissions inventory developed for the MOD9 assessment (**Todoroski Air Sciences, 2013**).



The maximum annual ROM coal and overburden production rates and total dust emissions from all significant dust generating activities for the Moolarben Coal Complex incorporating the proposed Modification are presented in **Table 4-1**. A detailed emission inventory for the modelled scenario is presented in **Appendix B**.

Table 4-1: Summary of estimated annual quantities of material and emissions for the Modification

Activity	MOD9 Year 6	Modification	Percent (%) Change
ROM Coal – OC (tonnes)	12,382,041	13,000,000	5.0
ROM Coal – UG (tonnes)	4,000,000	4,000,000	0.0
Overburden (tonnes)	111,600,000	112,576,506	0.9
TSP emission (kg)	5,930,324	4,370,856	-26.3

The estimated dust emissions for the Modification presented in **Table 4-1** and **Appendix B** reflect the application of best practice dust mitigation currently being implemented at Moolarben Coal Complex in accordance with its Air Quality Management Plan and Pollution Reduction Program (PRP) for wheel generated dust.

MCO implements PRP dust control measures in accordance with Environment Protection Licence 12932:

- ✦ PRP U1: Particulate Matter Control Best Practice Implementation – Wheel Generated Dust;
- ✦ PRP U2: Particulate Matter Control Best Practice Implementation – Disturbing and Handling Overburden under Adverse Weather Conditions; and
- ✦ PRP U3: Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden.

In accordance with PRP U1, MCO must achieve a wheel generated dust control efficiency of 80% or more. A monitoring Program was undertaken by Todoroski Air Sciences and demonstrated a control efficiency of 93 to 99% was achieved through the use of watering of haul roads, and that a control efficiency of 90% could be maintained on a day-to-day basis (**Todoroski Air Sciences, 2014**). Therefore, a dust control efficiency on haul roads of 90% has been adopted for the Modification.

The estimated dust emissions for the Modification presented in **Table 4-1** and **Appendix B** do not include the dust reduction effects of PRP U2. These effects are however considered in the modelling results only for a few periods with adverse weather conditions and to be conservative only for activity in OC1.

The net reduction in dust emissions relative to the MOD 9 Year 6 emissions arises due to some increased efficiencies in the mine design, but also the application of the MCO's current control measures.

4.3 Modelling methodology

The dispersion modelling methodology applied in this assessment is the same as that applied in the MOD9 assessment using the CALPUFF modelling suite. Further specific detail regarding the approach used can be found in the air quality impact assessment (**Todoroski Air Sciences, 2013**).

The CALMET meteorological modelling has been revised to incorporate the changes to the local mine terrain for the proposed modelling scenario which affect the local wind flows of the area (e.g. to account for the updated sequencing of the open cut pits). This assessment used the same meteorological conditions assessed in the MOD9 assessment which were based on data for January 2011 to December 2011 from six surrounding monitoring sites.

Dust emissions from each activity were represented by a series of volume sources and included in the CALPUFF model via an hourly varying emission file. Meteorological conditions associated with dust generation (such as wind speed) and levels of dust generating activity were considered in calculating the hourly varying emission rate for each source.

It should be noted that as a conservative measure, the effect of the precipitation rate (rainfall) in reducing dust emissions has not been considered in this assessment.

4.4 Reactive dust mitigation measures

Initial screening dispersion modelling for the Modification (without mitigation measures in place) was conducted and indicated the potential for elevated dust levels to occur at nearby sensitive receptor locations, in particular receptors in Ulan.

An investigation was conducted to determine the cause of the elevated predicted dust levels. The investigation found that the elevated dust levels arise in the modelling due to a combination of adverse meteorological conditions and the worst case clustering of activities associated with the OC1 and OC4 pits in the model.

An analysis of the meteorological conditions determined that the potential for elevated dust levels occurred under poor dispersion conditions occurring when the wind was blowing from the Modification to the receptors (e.g. Ulan) for an extended period of time.

An example of these typical wind conditions affecting receptors in Ulan is presented in **Figure 4-2**.

The conditions which may result in elevated dust level predictions are relatively infrequent and were found to only occur approximately 2% of the time in the 12 month long modelling period.

In accordance with the Air Quality Management Plan, MCO currently operates a real-time air quality monitoring system and implements dust management measures in response to weather conditions and real-time dust monitoring trigger levels. When a real-time response trigger event occurs, MCO may be required to relocate or shutdown fleet until monitoring indicates that dust levels have fallen below the real-time response trigger.

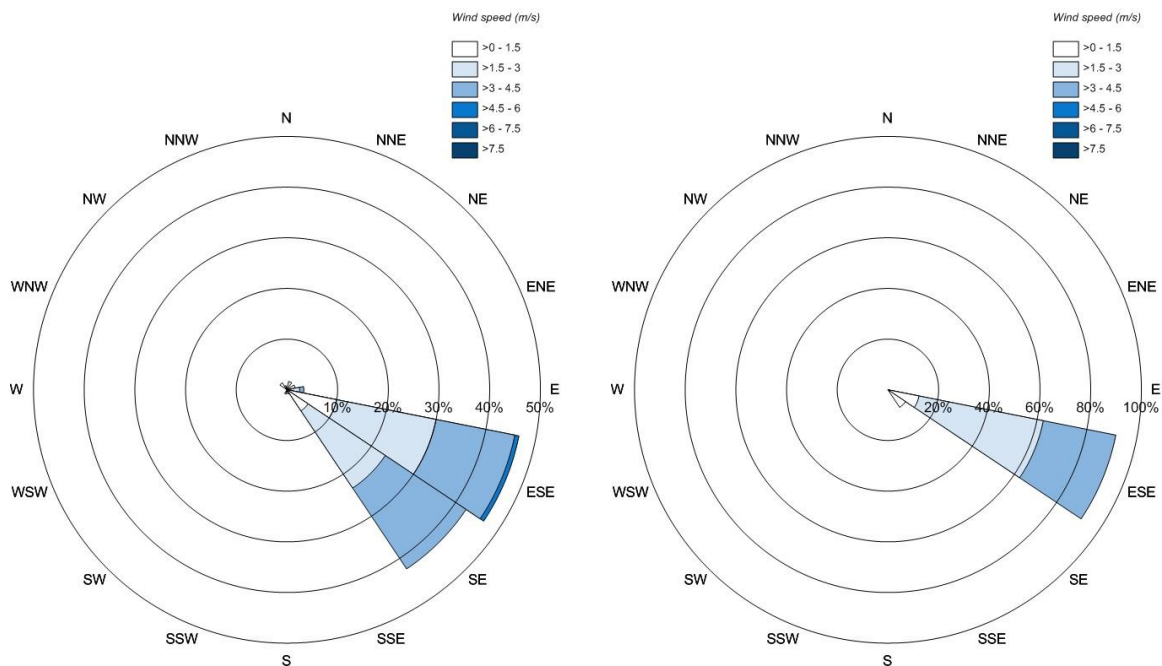


Figure 4-2: Examples of wind conditions which can cause air quality impacts

To assess the effectiveness of these reactive dust mitigation measures in mitigating the predicted worst case elevated dust levels, the air dispersion modelling was setup to examine the cessation of operations in the OC1 pit when the worst case conditions occurred. Dust emissions due to wind erosion from the OC1 pit areas and all other activities occurring at the Modification, including activities associated with OC4 and UG1, were assumed to continue to operate.

It should be noted that this demonstration of the reactive dust mitigation measures only considered cessation of activities in the OC1 pit, whereas in reality MCO would investigate and cease and/or relocate specific fleet in any pit as required to minimise potential adverse dust impacts. Nevertheless, with application of reactive measures in OC1 only, the modelling results (see **Section 5**) indicate that the use of reactive management would achieve compliance with approved impact assessment criteria in the vicinity of Ulan.

5 DIPERSION MODELLING RESULTS

The incremental dispersion modelling results for the Moolarben Coal Complex incorporating the Modification are presented in **Figure 5-1** and **Figure 5-2** showing the predicted maximum 24-hour average PM₁₀ and annual average PM₁₀, respectively.

The predicted maximum 24-hour average PM₁₀ 50 µg/m³ contour is separately overlaid with the previous predictions for Year 6 of the MOD9 (**Todoroski Air Sciences, 2013**). This is considered to be representative of a scenario equivalent to the Year 2016 scenario modelled for the proposed Modification, in **Figure 5-3** to examine the potential change resulting from the proposed Modification. It should be noted that the previous modelling did not incorporate reactive mitigation measures in the predicted results.

The comparison shows that dust levels for the Modification are generally lower when compared to the approved Moolarben Coal Complex (MOD9), however effects occur in somewhat different positions, as would be expected due to the different mine layout and different mine topography used in the contemporary modelling.

With the implementation of the air quality management measures and real-time response triggers described in the existing Air Quality Management Plan, the results indicate that the predicted dust levels would not exceed the 24-hour average PM₁₀ criteria at any sensitive receptor as a result of the proposed Moolarben Coal Complex incorporating the Modification.

Dispersion modelling results for PM_{2.5}, TSP and dust deposition arising from the Moolarben Coal Complex incorporating the Modification are presented in **Appendix C**. The results indicate that the Modification would result in negligible change to the extent of the predicted levels in the MOD9 assessment and indicate compliance with the relevant criteria levels.

The modifications to the Wilpinjong Coal Mine since the MOD9 assessment (i.e. Wilpinjong Modifications 5 and 6) would not materially impact on the cumulative air quality of receptors in the vicinity of the Moolarben Coal Complex due to spatial displacement of activities occurring at these operations and the Ulan Coal Mine has not been modified since the MOD9 assessment. Therefore, as the Modification is unlikely to result in additional project-only air quality impacts (i.e. in addition those approved for the Moolarben Coal Complex), it is unlikely that there would be any increase in potential cumulative air quality impacts.

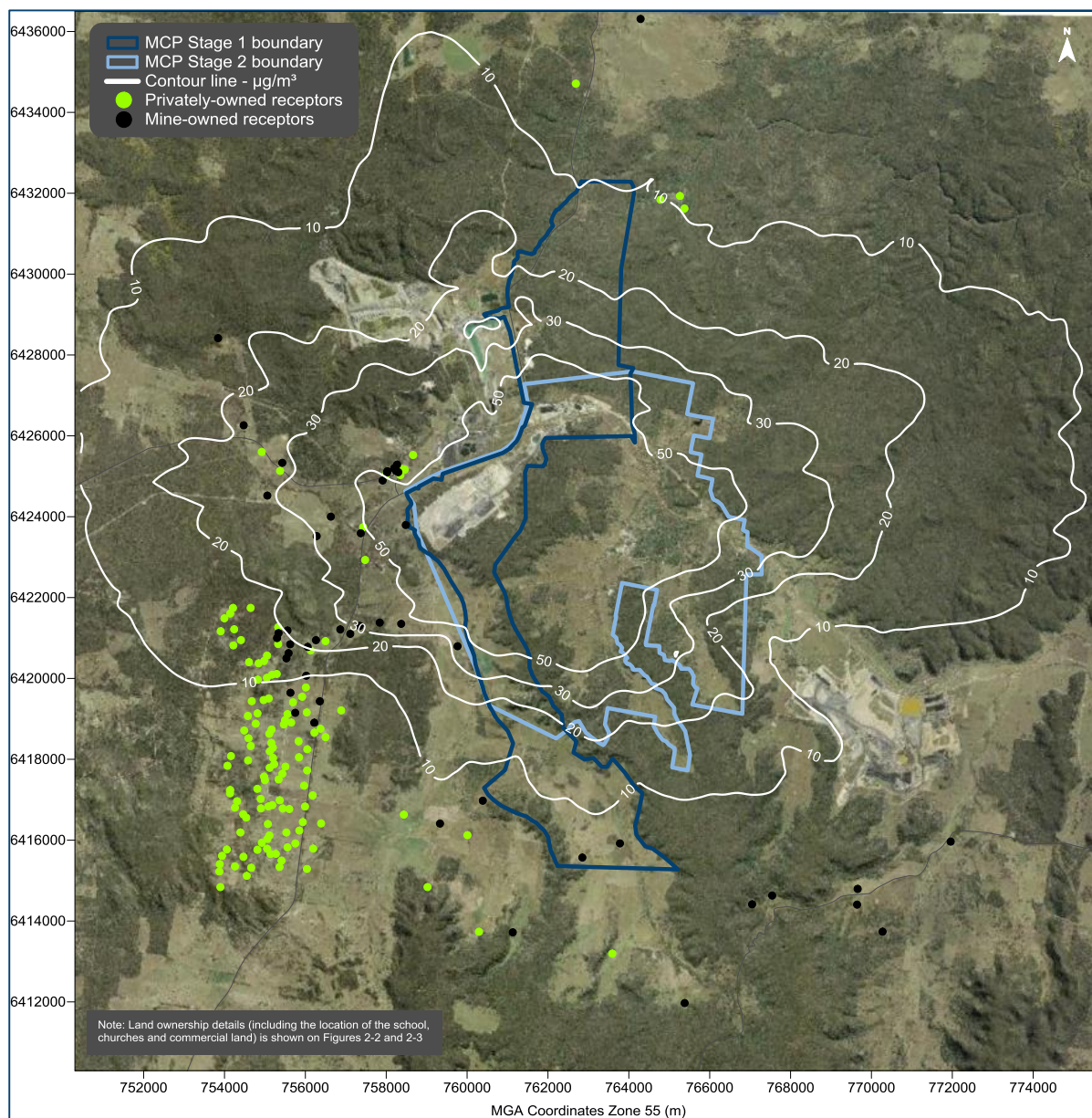


Figure 5-1: Predicted maximum 24-hour average PM₁₀ concentrations due to emissions from the Modification

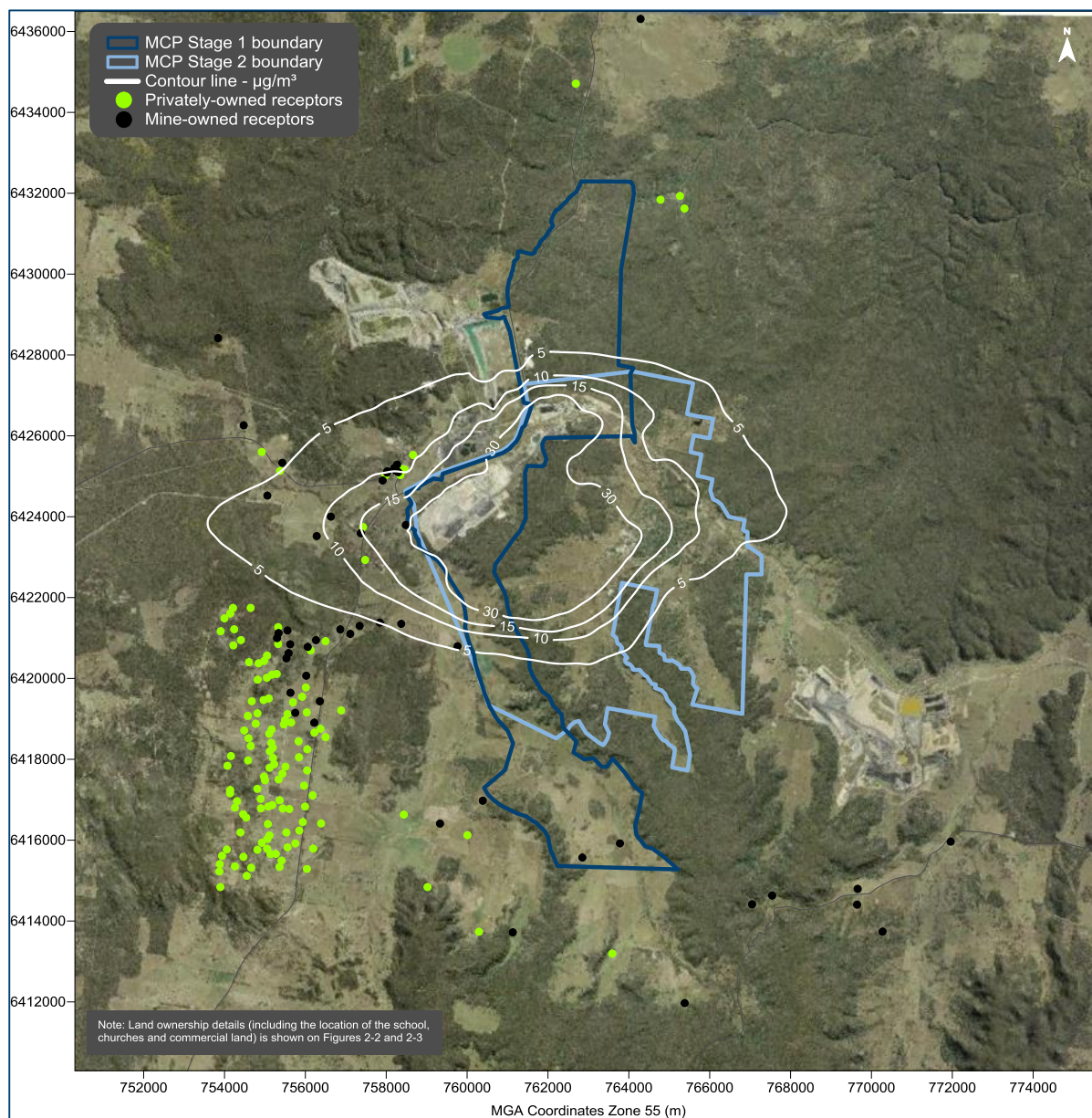


Figure 5-2: Predicted annual average PM₁₀ concentrations due to emissions from the Modification

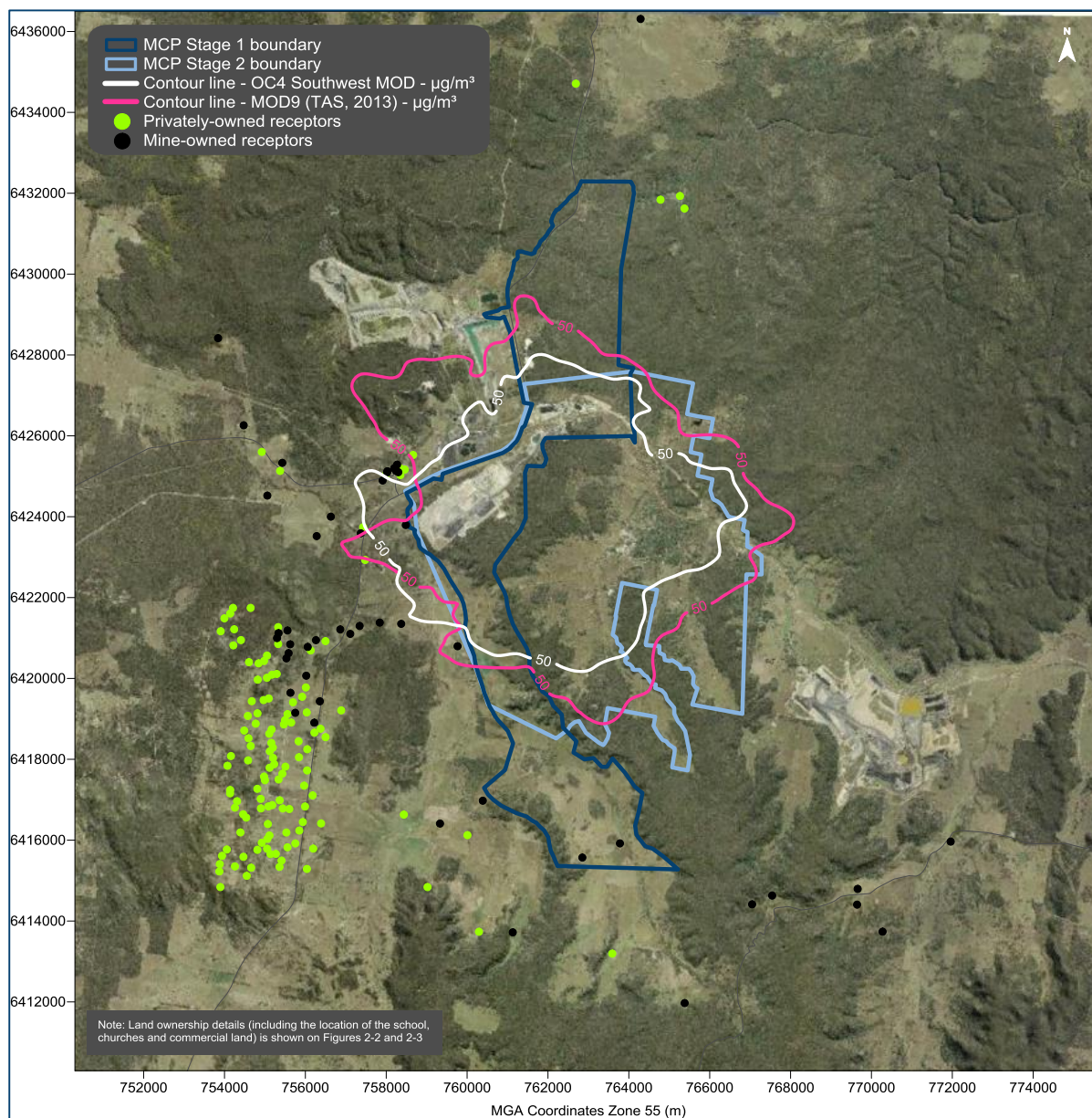


Figure 5-3: Comparison of predicted maximum 24-hour average PM_{10} concentrations

6 SUMMARY AND CONCLUSIONS

This assessment has examined the likely air quality effects resulting from the proposed Modification.

Air dispersion modelling has been conducted for a single mine plan year selected to demonstrate a potential worst-case operational scenario for the Moolarben Coal Complex incorporating the Modification. For the modelling assessment, the operations in the OC1 and OC4 pits were concentrated in areas that are likely to have the greatest potential for air quality impacts for the majority of receivers to the west (i.e. Ulan) and southwest (i.e. Cooks Gap).

The assessment estimated that activities associated with the proposed Modification would be generally within the existing envelope of impact approved for MOD9 (**Todoroski Air Sciences, 2013**), noting that in this (proposed Modification) assessment the effects of the existing air quality management strategies are more fully considered.

The reactive dust mitigation measures have a positive effect in minimising potential air quality impacts in the local area. It is expected that MCO would continue to implement these measures and ensure best practice dust management measures are in place at the Moolarben Coal Complex.

Therefore it is reasonable to conclude that the proposed Modification is unlikely to cause any exceedance or additional impact at any surrounding sensitive receptor locations.

Notwithstanding, MCO would review and update the Air Quality Management Plan, where necessary, to incorporate the OC4 South-West Modification.

7 REFERENCES

Moolarben Coal Operations (2013)

"Air Quality Management Plan", prepared by Moolarben Coal Operations Pty Ltd, 2013.

Todoroski Air Sciences (2013)

"Moolarben Coal Project Stage 1 Optimisation Modification Air Quality and Greenhouse Gas Assessment", prepared for EMGA Mitchell McLennan by Todoroski Air Sciences, May 2013.

Todoroski Air Sciences (2014)

"DRAFT Particulate Matter Control Best Practice Implementation Wheel Generated Dust & Disturbing and Handling Overburden in Adverse Weather Conditions", prepared by Todoroski Air Sciences, August 2014.

United States Environmental Protection Authority (1985 and updates)

"Compilation of Air Pollutant Emission Factors", AP-42, Fourth Edition United States Environmental Protection Agency, Office of Air and Radiation Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina 27711.



Appendix A

Indicative Mine Plan Scenario



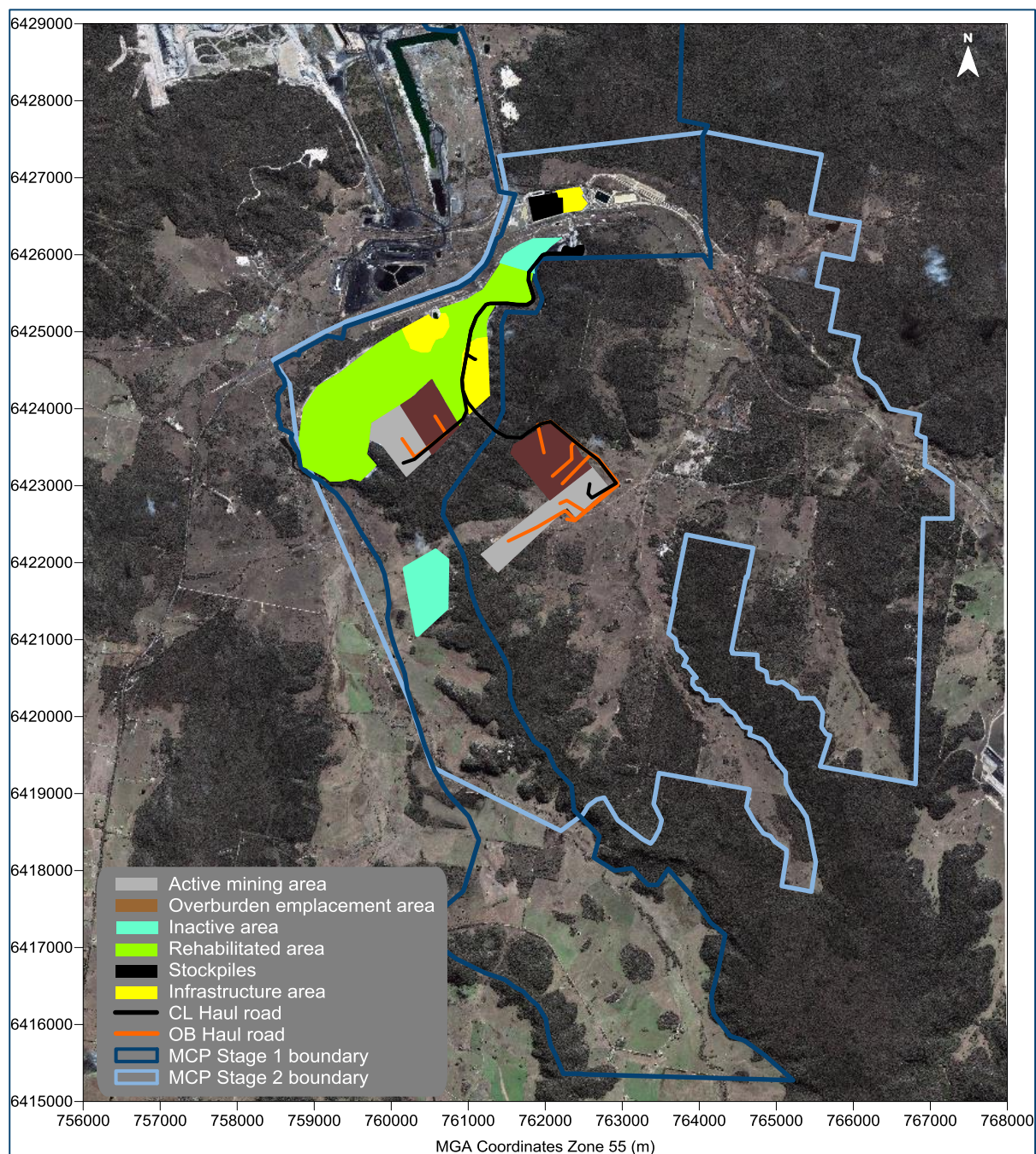


Figure A-1: Indicative mine plan scenario for year 2016

Appendix B

Emissions Inventory

Table B-1: Emission Inventory

ACTIVITY	TSP emission (kg/y)	Intensity	Units	Emission Factor	Units	Variable 1	Units	Variable 2	Units	Variable 3	Units	Variable 4	Units	Variable 5	Units	Variable 6	Units
OB - Stripping Topsoil - OC1	1,050	75	hours/year	14	kg/h												
OB - Stripping Topsoil - OC4	5,250	375	hours/year	14	kg/h												
OB - Drilling - OC1	963	5,438	holes/year	0.59	kg/hole											70 %	Control
OB - Drilling - OC4	2,409	13,611	holes/year	0.59	kg/hole											70 %	Control
OB - Blasting - OC1	20,099	107	blasts/year	188	kg/blast	9000	Area of blast in square metres										
OB - Blasting - OC4	50,341	268	blasts/year	188	kg/blast	9000	Area of blast in square metres										
OB - Excavator loading OB to haul truck - OC1	26,356	22,968,763	tonnes/year	0.001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Excavator loading OB to haul truck - OC4	102,822	89,607,742	tonnes/year	0.001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Hauling to dump - OC1	106,520	22,968,763	tonnes/year	0.046	kg/t	240	tonnes/load	2.1	km/return trip	5.21	kg/VKT	4.2	% silt content	266	Ave GMV (tonnes)	90	% Control
OB - Hauling to dump - OC4	729,665	89,607,742	tonnes/year	0.081	kg/t	240	tonnes/load	3.8	km/return trip	5.21	kg/VKT	4.2	% silt content	266	Ave GMV (tonnes)	90	% Control
OB - Emplacing at dump - OC1	26,356	22,968,763	tonnes/year	0.001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Emplacing at dump - OC4	102,822	89,607,742	tonnes/year	0.001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	2	moisture content in %								
OB - Dozers on OB at dump - OC1	91,635	5,476	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB at dump - OC4	358,898	21,446	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC1	77,166	4,611	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
OB - Dozers on OB in pit - OC4	358,898	21,446	hours/year	16.7	kg/h	10	silt content in %	2	moisture content in %								
CL - Drilling - OC1	626	3,535	holes/year	0.59	kg/hole											70 %	Control
CL - Drilling - OC4	1,532	8,654	holes/year	0.59	kg/hole											70 %	Control
CL - Blasting - OC1	5,072	27	blasts / year	188	kg/blast	9000	Area of blast in square metres										
CL - Blasting - OC4	12,397	66	blasts / year	188	kg/blast	9000	Area of blast in square metres										
CL - Dozers ripping/pushing/clean-up - OC1	40,802	5,476	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Dozers ripping/pushing/clean-up - OC4	75,162	10,087	hours/year	14.9	kg/h	5	silt content in %	7.4	moisture content in %							50	% Control
CL - Loading ROM coal to haul truck - OC1	132,933	2,530,951	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Loading ROM coal to haul truck - OC4	560,047	10,662,888	tonnes/year	0.053	kg/t	7.4	moisture content in %										
CL - Conveying from UG1 portal	39	0.04	ha	0.4	kg/ha/hour	8760	hours									70	% Control
CL - Unloading to stockpile at UG1	735	4,000,000	tonnes/year	0.000	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	7.4	moisture content in %								
CL - Loading ROM coal to haul truck - UG1	105,046	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									50	% Control
CL - Hauling ROM to hopper - OC1	51,148	2,530,951	tonnes/year	0.202	kg/t	200	tonnes/load	8.4	km/return trip	4.82	kg/VKT	4.2	% silt content	224	Ave GMV (tonnes)	90	% Control
CL - Hauling ROM to hopper - OC4	312,618	10,662,888	tonnes/year	0.293	kg/t	200	tonnes/load	12.2	km/return trip	4.82	kg/VKT	4.2	% silt content	224	Ave GMV (tonnes)	90	% Control
CL - Hauling ROM to hopper - UG1	47,908	4,000,000	tonnes/year	0.120	kg/t	200	tonnes/load	5.0	km/return trip	4.82	kg/VKT	4.2	% silt content	224	Ave GMV (tonnes)	90	% Control
CHPP - Unloading ROM to hopper - OC1	19,940	2,530,951	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - OC4	84,007	10,662,888	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Unloading ROM to hopper - UG1	31,514	4,000,000	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Rehandle ROM at hopper	13,546	1,719,384	tonnes/year	0.053	kg/t	7.4	moisture content in %									85	% Control
CHPP - Conveying from hopper to CHPP	183	0.17	ha	0.4	kg/ha/hour	8760	hours									70	% Control
CHPP - Handling coal at CHPP	2,073	17,193,839	tonnes/year	0.000	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Dozer pushing Product coal	23,451	4,797	hours/year	9.777	kg/h	5	silt content in %	10	moisture content in %							50	% Control
CHPP - Dozer pushing Product coal	53,825	14,391	hours/year	7.480	kg/h	4	silt content in %	10	moisture content in %							50	% Control
CHPP - Conveying from CHPP to stockpile	208	0.20	ha	0.4	kg/ha/hour	8760	hours									70	% Control
CHPP - Loading Product coal to stockpile	1,575	13,067,318	tonnes/year	0.0001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %								
CHPP - Conveying from stockpile to train	247	0.24	ha	0.4	kg/ha/hour	8760	hours									70	% Control
CHPP - Loading Product coal to trains	394	13,067,318	tonnes/year	0.0001	kg/t	0.969	average of (wind speed/2.2)^1.3 in m/s	10	moisture content in %							75	% Control
CHPP - Conveying rejects from CHPP to loadout	183	0.17	ha	0.4	kg/ha/hour	8760	hours									70	% Control
CHPP - Hauling rejects	49,722	4,126,521	tonnes/year	0.12	kg/t	200	tonnes/load	5.0	km/return trip	4.82	kg/VKT	4.2	% silt content	224	Ave GMV (tonnes)	90	% Control
WE - Overburden emplacement areas	144,003	82	ha	0.4	kg/ha/hour	8760	hours									50	% Control
WE - Inactive areas	52,102	74	ha	0.4	kg/ha/hour	8760	hours									80	% Control
WE - Open pit	325,798	93	ha	0.4	kg/ha/hour	8760	hours										
WE - ROM stockpiles	5,471	3	ha	0.4	kg/ha/hour	8760	hours									50	% Control
WE - Product stockpiles	21,843	12	ha	0.4	kg/ha/hour	8760	hours									50	% Control
Grading roads	133,454	216,835	km	0.615	kg/VKT	8	speed of graders in km/h										
Total TSP emissions (kg/yr)	4,370,856																



Appendix C

Dispersion Modelling Results for PM_{2.5}, TSP and Dust Deposition



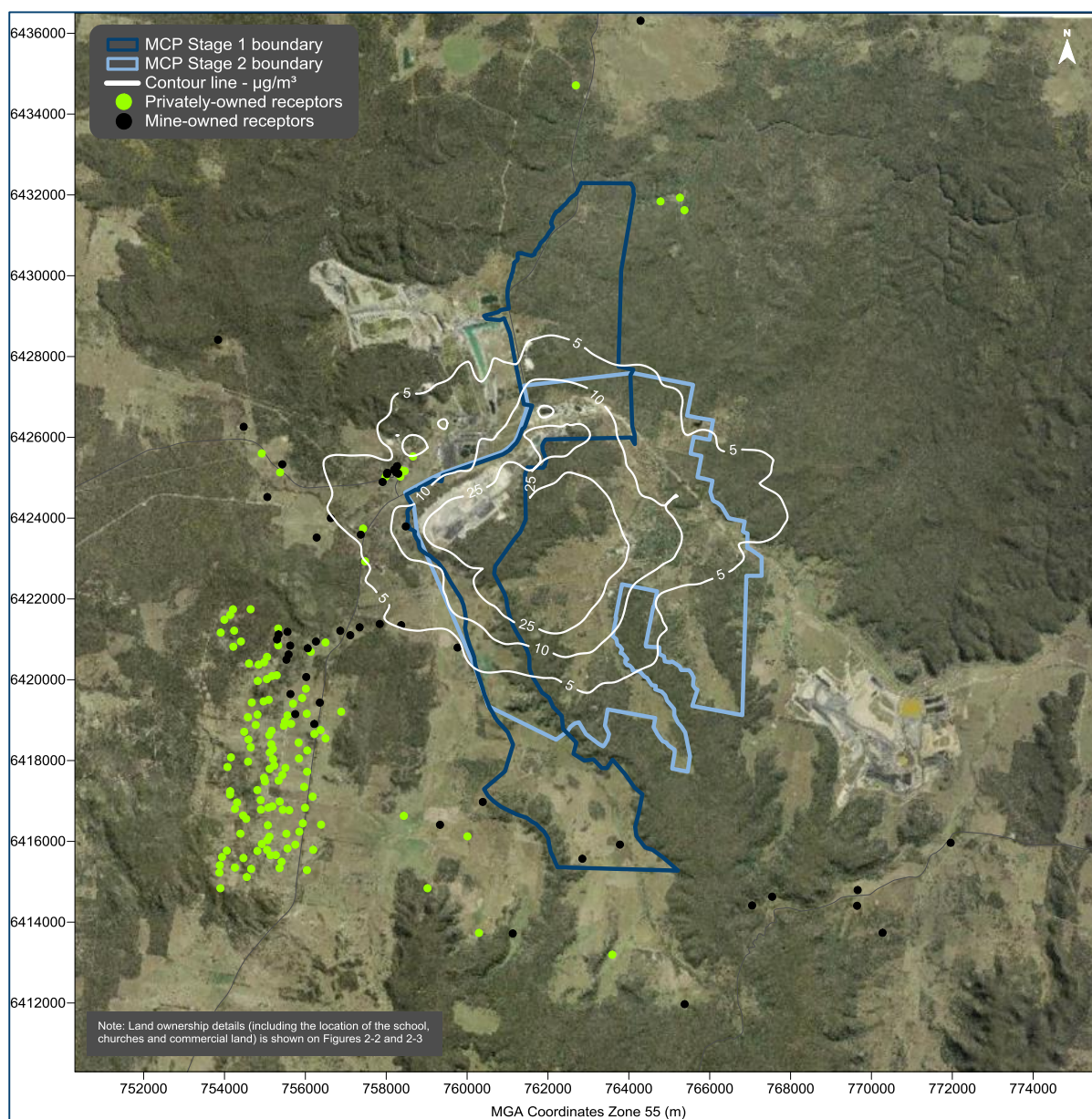


Figure C-1: Predicted maximum 24-hour average $\text{PM}_{2.5}$ concentrations due to emissions from the Modification

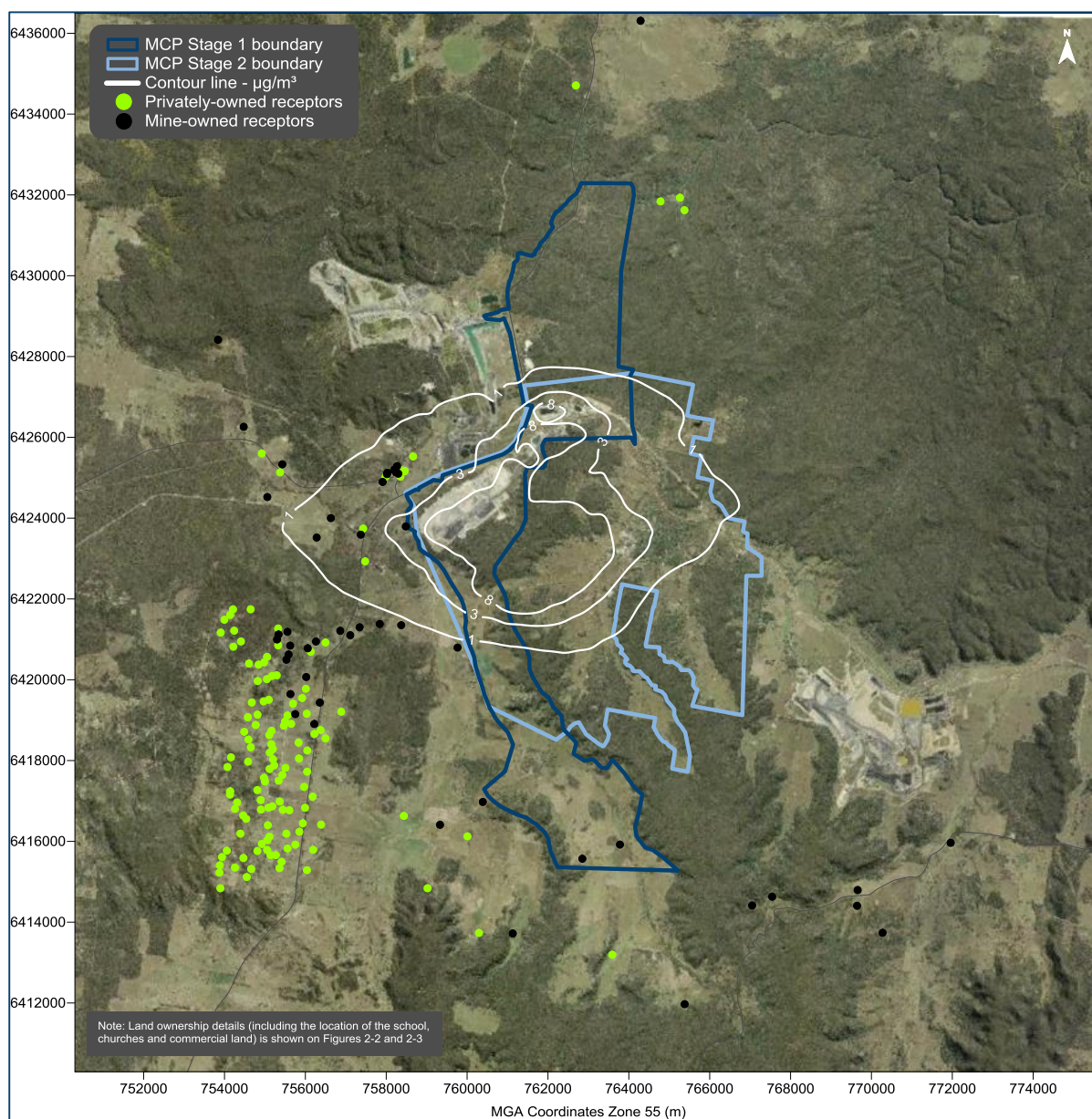


Figure C-2: Predicted annual average $PM_{2.5}$ concentrations due to emissions from the Modification

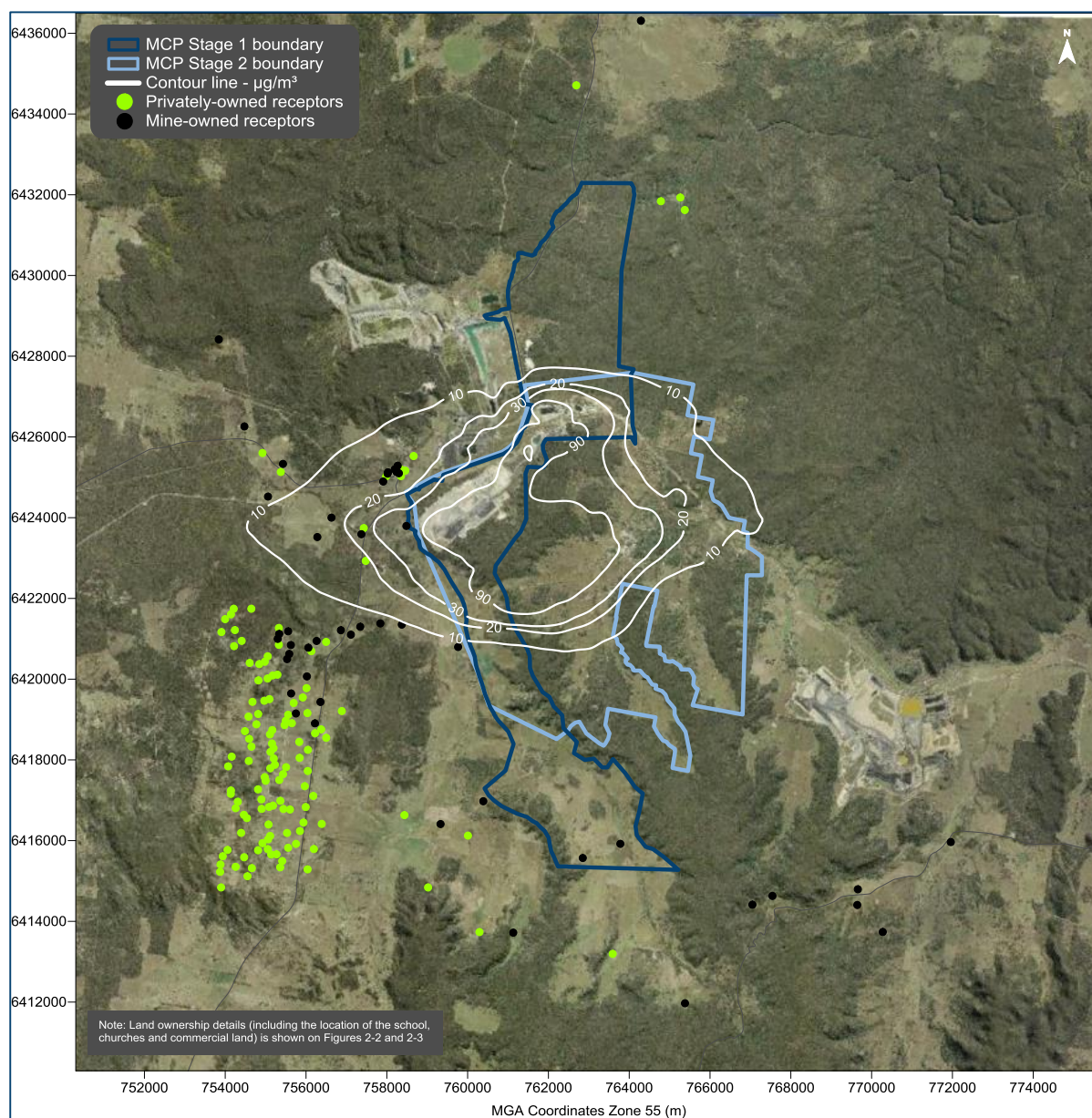


Figure C-3: Predicted annual average TSP concentrations due to emissions from the Modification

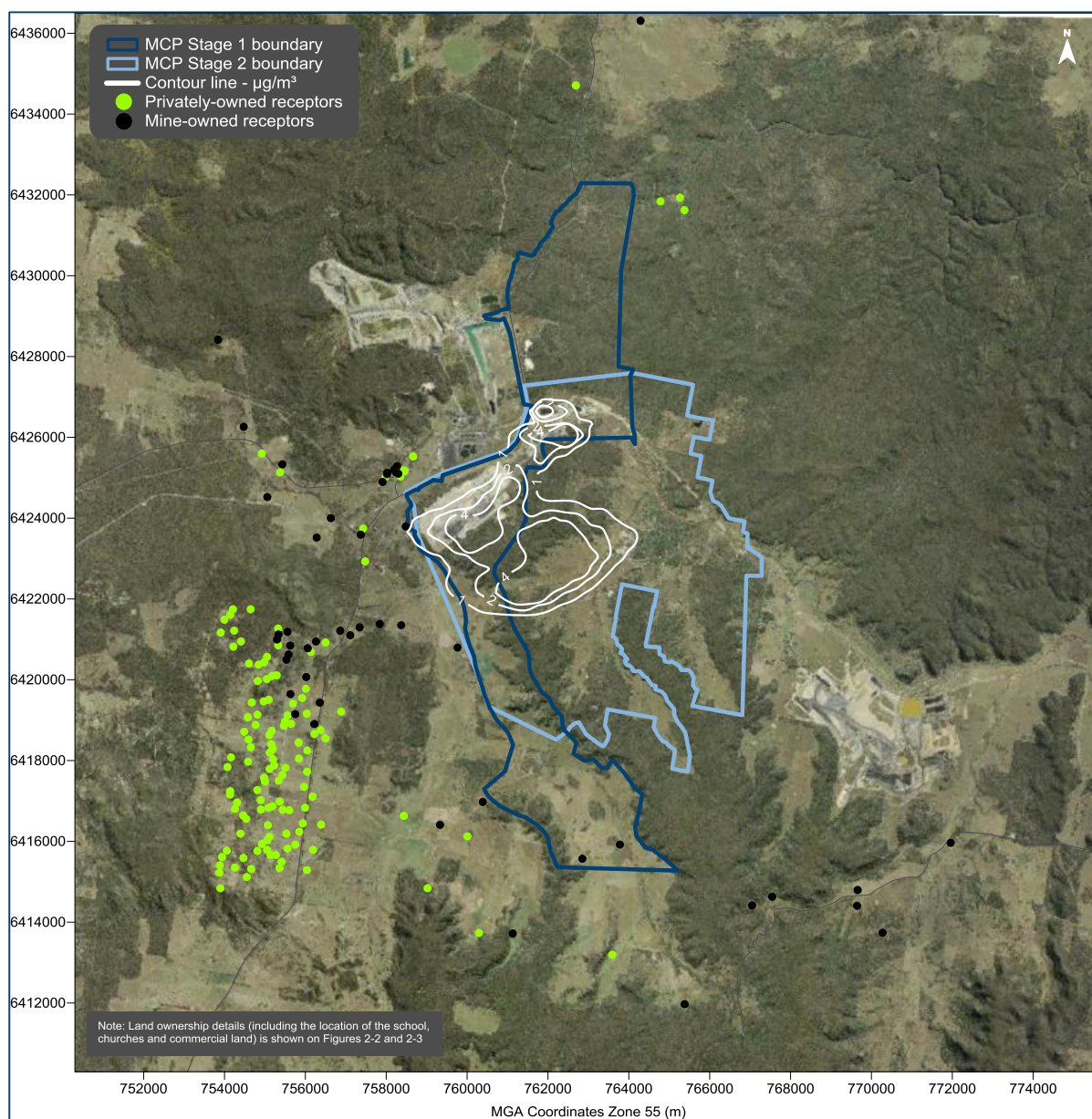


Figure C-4: Predicted annual average dust deposition levels due to emissions from the Modification



MCO OC4 South-West Modification

Flora and Fauna Impact Assessment

Prepared for
Moolarben Coal Operations

17 April 2015



DOCUMENT TRACKING

ITEM	DETAIL
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File location	W:\Projects\Mudgee\14MUDECO\14MUDECO-0001 Moolarben Coal South-West Modification Ecological Impact Assessment\Reports
Project Manager	Daniel Magdi (02) 4302 1230 Level 1, 79 Market St, Mudgee NSW 2850
Prepared by	Daniel Magdi, Rachel Murray
Approved by	Paul Frazier
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This document has been prepared by Eco Logical Australia Pty Ltd.

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Executive Summary

Eco Logical Australia (ELA) was engaged by Moolarben Coal Operations Pty Ltd (MCO) to undertake a flora and fauna impact assessment for relocation of the Stage 2 Open Cut 4 (OC4) haul road. This flora and fauna impact assessment will be used to support an Environmental Assessment to facilitate the modification of both the Stage 1 and Stage 2 Moolarben Coal Project Approvals (05_0117 and 08_0135) under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (the Modification).

This flora and fauna impact assessment has been undertaken to determine any potential impacts from the proposed modification on threatened vegetation communities, flora and fauna within and adjacent to the proposed impact area pursuant to the EP&A Act, *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Surface disturbance associated with the proposed modification consists of a relocation of the approved OC4 haul road between OC4 and the Stage 1 run-of-mine coal facility.

The proposed modification area (5.1 hectares [ha]) contains two BioMetric vegetation types, of which none are related to any threatened ecological communities listed under the TSC or EPBC Act. No threatened flora or fauna species were recorded within the OC4 haul road relocation area.

Habitat requirements for observed and potential threatened species and communities were compared with the study area's characteristics. One threatened flora species, 33 threatened fauna species and five non-threatened migratory fauna species have the potential or are likely in the area. These 39 species were assessed in accordance with the relevant legislative guidelines.

Assessments of significance were applied under Section 5A of the EP&A Act as well as significance assessments under the EPBC Act guidelines to determine the potential impacts to species, populations and communities in the study area. Following these detailed assessments (Appendices B & C) the OC4 haul road modification is unlikely to result in significant impacts to threatened biodiversity.

The impacts associated with this modification (5.1 ha of remnant native vegetation) are well catered for within the established offset for the Stage 2 Project. The current Biodiversity Offsetting Strategy for Stage 2 will result in surplus area under this proposal, as the proposed modification results in less disturbance than the approved haul road (5.1 ha versus 18.5 ha).

Mitigation measures for impacts on vegetation and fauna habitat will be undertaken. Management includes a biodiversity impact mitigation strategy that aims to 'maintain and enhance' ecological values in order to result in a net positive biodiversity benefit in the post developed landscape. Mitigation measures are scheduled to be undertaken prior, during and post mining operations.

Contents

Executive Summary	ii
1 Introduction	1
1.1 Background.....	1
1.2 Description of Project	1
1.3 Survey Area	1
1.4 Report Objectives	2
1.5 Legislative Requirements	4
2 Methods	6
2.1 Data Audit	6
2.2 Field Survey	7
3 Results	8
3.1 Vegetation communities	8
3.1.1 Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland on Ridges	12
3.1.2 White Box – Narrow-leaved Ironbark Shrubby Open Forest on Hills	13
3.2 Flora.....	14
3.3 Fauna Habitat	19
4 Impact Assessment	40
4.1 Summary of Impacts.....	40
4.1.1 Assessment of Impacts on Threatened Species, Populations and Communities	40
4.1.2 Assessment of Impacts on Migratory Species	44
4.2 Direct Impacts.....	44
4.2.1 Vegetation Clearing	44
4.2.2 Loss of Fauna Habitat	45
4.3 Indirect Impacts	46
4.3.1 Noise.....	46
4.3.2 Dust	46
4.3.3 Fragmentation, Edge Effects & Connectivity	46
4.3.4 Pest Species.....	46
4.4 Cumulative Impacts	47
4.5 Mitigation Measures	47
4.5.1 Prior to Construction	47
4.5.2 During Construction	47

4.5.3	Post Construction	47
5	Conclusion	48
6	References	49
	Appendix A – Fauna Species List.....	1
	Appendix B – EP&A Act Assessment of Significance	1
	Appendix C – EPBC Act Significant Impact Guidelines.....	1

List of Figures

Figure 1: Location of Proposed Haul Road Realignment.....	3
Figure 2: BioMetric Vegetation Types within the Proposed Haul Road Realignment.....	11
Figure 3: Rocky Outcrops within the Proposed Haul Road Realignment Area.....	20

List of Plates

Plate 1: Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland BioMetric Vegetation Type.....	12
Plate 2: White Box – Narrow-leaved Ironbark Shrubby Open Forest BioMetric Vegetation Type.....	13
Plate 3: A Rock Overhang, a Potential Form of Roosting Habitat for Threatened Bat Species	21

List of Tables

Table 1: Legislation Relevant to the Proposed Works	4
Table 2: Weather Conditions During the Field Surveys	7
Table 3: Threatened Ecological Communities Recorded within a 10 km Radius of the Study Area	8
Table 4: BioMetric Vegetation Types within the Proposed Haul Road Realignment	12
Table 5: Threatened Flora Species Recorded within a 10 km Radius of the Study Area.....	15
Table 6: Threatened Fauna Species Recorded within a 10 km Radius of the Study Area.....	22
Table 7: Summary of Potential Impacts on Threatened Fauna Species.....	41
Table 8: Summary of Potential Impacts Upon Migratory Fauna Species	44

Abbreviations

Abbreviation	Description
BOS	Biodiversity Offset Strategy
CEEC	Critically Endangered Ecological Community
DNG	Derived Native Grassland
DotE	Commonwealth of Australia Department of the Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
OEH	Office of Environment and Heritage
IA	Ecological Impacts Assessment
KTP	Key Threatening Process
LGA	Local Government Area
LWD	Large Woody Debris (e.g. fallen logs)
MCO	Moolarben Coal Operations
MNES	Matter of National Environmental Significance under EPBC Act
PMST	Protected Matters Search Tool
TEC	Threatened Ecological Community
TSC Act	<i>Threatened Species Conservation Act 1995</i>

1 Introduction

1.1 BACKGROUND

Eco Logical Australia (ELA) was engaged by Moolarben Coal Operations Pty Ltd (MCO) to undertake a flora and fauna impact assessment to relocate the Stage 2 Open Cut 4 (OC4) haul road. This flora and fauna impact assessment will be used to support an Environmental Assessment to facilitate the modification of both the Stage 1 and Stage 2 Moolarben Coal Project Approvals (05_0117 and 08_0135) under Section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (the Modification).

This flora and fauna impact assessment has been undertaken to determine any potential impacts from the proposed activity (haul road realignment) on threatened flora and fauna within and adjacent to the proposed haul road, and is required pursuant to the EP&A Act, NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Commonwealth *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.2 DESCRIPTION OF PROJECT

MCO has reviewed the mining sequence and associated infrastructure layout requirements at the Moolarben Coal Complex to enable more efficient access to the OC4 resource. As a consequence, the approved Stage 2 Haul Road (to the north-east of OC4) would no longer be required, and would be replaced by a shorter, more direct, haul road route to Stage 1 Open Cut 1 (OC1) (in the south-west).

Removal of the approved Stage 2 Haul Road would result in benefits to the environment, including:

- up to approximately 18.5 hectares (ha) of approved surface disturbance being avoided; and
- improved water management and reduced risk of uncontrolled site discharge to Murrumbidgee and Wilpinjong Creeks, by removing ongoing high maintenance requirements to control sediment along the approved haul road.

The OC4 South-West Modification includes the following key components:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations.

1.3 SURVEY AREA

The Moolarben Coal Project (MCP) is located approximately 40 kilometres (km) north-east of Mudgee within the Mid-Western Regional Council Local Government Area (LGA).

The footprint of the proposed haul road alignment overlaps the footprint of an approved waste emplacement area, assessed as part of the Stage 2 Project Approval. Therefore this report only assesses the smaller northern portion of the haul road outside of this waste emplacement footprint (**Figure 1**).

The purpose of this study was to undertake a flora and fauna impact assessment for the proposed OC4 haul road realignment for inclusion within an Environmental Assessment under Section 75W of the EP&A Act. The proposed OC4 haul road realignment is shown in **Figure 1**.

1.4 REPORT OBJECTIVES

The aims of this report are to:

- Report on the ecological values present within the study area;
- Assess the impact of the proposed haul road on threatened flora and fauna species, populations and ecological communities that occur or are likely to occur in the study area through significance assessments in accordance with the TSC Act and the EPBC Act; and
- Propose mitigation and management measures where appropriate to minimise and/or manage impacts.

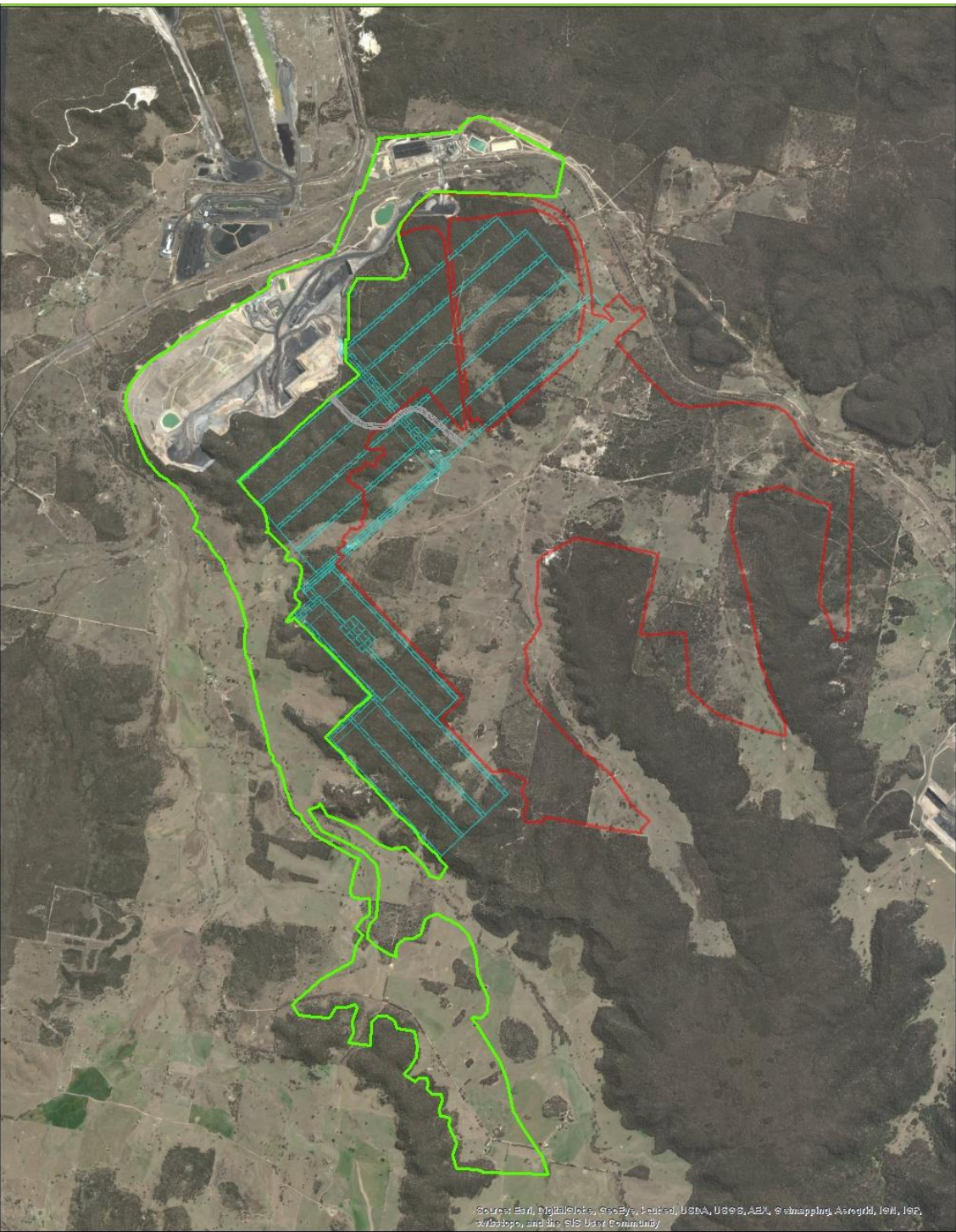


Figure 1: Location of Proposed Haul Road Realignment

1.5 LEGISLATIVE REQUIREMENTS

Relevant legislation is identified in **Table 1**.

Table 1: Legislation Relevant to the Proposed Works

Name	Relevance to the Modification
Commonwealth	
<i>Environmental Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	<p>The EPBC Act establishes a process for assessing the environmental impact of activities and developments where 'matters of national environmental significance' (MNES) may be affected. Under the Act, any action which "has, will have, or is likely to have a significant impact on a matter of national environmental significance" is defined as a "controlled action", and requires approval from the Commonwealth Department of the Environment (DotE) which is responsible for administering the EPBC Act.</p> <p>MNES have been identified on or near the site and have been considered in this report. Impacts associated with the haul road realignment have been considered not significant; therefore a referral is not required.</p>
State	
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	The modification is to be assessed under the transitional provisions of Part 3A, Section 75W of the EP&A Act. Assessments of significance for impacts to threatened species and endangered ecological communities have been prepared in accordance with s5A of the Act and the report addresses the relevant requirements of s228 of the <i>EP&A Regulation 2000</i> .
<i>Threatened Species Conservation Act 1995</i> (TSC Act)	<p>The TSC Act, as amended, aims to protect and encourage the recovery of threatened species, populations and communities listed under the Act. The Act is integrated with the EP&A Act and requires consideration of whether a development is likely to significantly affect threatened species, populations and ecological communities or their habitat.</p> <p>This report assesses the potential impacts on threatened species, communities and populations and their habitat that are known or likely to occur, as described in the Draft Guidelines for Threatened Species Assessment (Department of Environment and Conservation and Department of Primary Industries [DEC & DPI], July 2005). This document identifies matters which are relevant to the assessment of impacts to threatened species, populations, or ecological communities, or their habitats arising from a development proposal assessed under the transitional provisions of Part 3A of the EP&A Act.</p>
<i>Fisheries Management Act 1995</i>	<p>The <i>Fisheries Management Act 1995</i> (FM Act) provides for the protection, conservation, and recovery of threatened species defined under the Act. It also makes provision for the management of threats to aquatic threatened species, populations and ecological communities defined under the FM Act, as well as the protection of fish and fish habitat in general.</p> <p>No aquatic habitats or species will be impacted by the proposed works.</p>
<i>Noxious Weeds Act 1993</i> (NW Act)	The site contains weeds listed under the NW Act and proposed control measures have been proposed.

Name	Relevance to the Modification
State	
<p><i>State Environmental Planning Policy No. 44 – Koala Habitat Protection</i></p>	<p>Mid-Western Regional Council is listed as one of the Councils to which SEPP 44 applies, <i>albeit</i> that the SEPP is not relevant to an application made under Section 75W of the EP&A Act. Notwithstanding, the following has been considered for this assessment:</p> <ul style="list-style-type: none"> • No LGA wide Koala Plan of Management has been developed by Mid-Western Regional Council to date. • <i>Eucalyptus albens</i> (White Box) located on site is a tree listed under Schedule 2 of SEPP 44 as a Koala feed tree species qualifying the site as 'potential koala habitat'. • Core Koala habitat means an area with a resident population of koalas, evidenced by attributes such as breeding females, recent sightings and historical records. • There is no current or recent history of Koala activity on site. • There is no Core Koala habitat.

2 Methods

2.1 DATA AUDIT

A literature review was undertaken to determine the location and extent of previous surveys. The review aims were to identify flora and fauna within the subject site, the potential presence of any threatened species, populations and ecological communities listed under the TSC Act and the EPBC Act. The following information and databases were reviewed:

- Atlas of Living Australia (Atlas of Living Australia 2014).
- Atlas of NSW Wildlife (via BioNet) (Office of Environment and Heritage [OEH] 2014a) covering an area from latitude -32.34 to -32.44 and longitude 150.1 to 150.2 (Datum GDA94).
- EPBC Protected Matters Search Tool (PMST) (DotE 2014a) using a radius of 10 km around coordinates -32.39745 S, 150.1439 E (Datum GDA94).
- Moolarben Coal Project – Stage 1 Optimisation Modification. Ecological Impact Assessment (EMM 2013)
- Moolarben Coal Flora and Fauna Monitoring 2011/2012 Summary (EcoLogical Australia 2012)
- Moolarben Coal Project – Stage 2 Ecological Impact Assessment (Ecovision Consulting 2008)
- Moolarben Coal Project Flora, Fauna and Aquatic Ecology Assessment (Moolarben Biota 2006).

Sections 3.1, 3.2 and 3.3 identify the threatened species returned by the database searches together with an assessment of the likelihood of occurrence for each species. Each species' likely occurrence was determined by reviewing records in the area, considering the habitat available and using expert knowledge of the species ecology.

Five terms for the likelihood of occurrence of species are used in this report, as defined below:

- “yes” = the species was or has been observed on the site.
- “likely” = a medium to high probability that a species uses the site.
- “potential” = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur.
- “unlikely” = a very low to low probability that a species uses the site.
- “no” = habitat on site and in the vicinity is unsuitable for the species.

2.2 FIELD SURVEY

The field survey was undertaken on 10th July 2014 by ELA ecologists David Allworth and Kurtis Lindsay in addition to previous field assessments undertaken in the vicinity for the initial design for the haul road alignment.

An ecological assessment was undertaken within a 100 metre (m) buffer around the centre line of the haul road realignment.

The field assessment consisted of validating BioMetric vegetation types, identifying general floristic structure, targeted threatened flora searches, habitat assessment, Koala habitat assessment and opportunistic fauna sightings. Whilst some threatened species are out of season for survey (e.g. *Pomaderris queenslandica*), potential habitat for these species was targeted during the field survey where present.

Plant species were listed to species level, genera or family level following nomenclature used in the NSW Government's Plant net database (Royal Botanic Gardens Sydney 2014). Where possible an assessment of cover/abundance using a modified Braun-Blanquet system was undertaken for plants.

During the field survey the temperatures were mild to cold, with 0.3 millimetres (mm) of rain recorded (**Table 2**) (temperature records from the nearest BOM weather station, Gulgong, NSW; (BOM 2014).

Table 2: Weather Conditions During the Field Surveys

Date	Min Temp (°C)	Max Temp (°C)	Rainfall (mm)	Max Wind (km/h and direction)	9am Temp (°C)
10 th July 2014	No data	8.8	0.3	22 SW	6.3

3 Results

3.1 VEGETATION COMMUNITIES

The data audit revealed nine threatened ecological communities (TEC) listed under the TSC Act and/ or EPBC Act as having been recorded or modelled as having the potential to occur within a 10 km radius of the subject site. These TECs are listed in **Table 3** together with an assessment of the 'likelihood of occurrence' of each species.

Table 3: Threatened Ecological Communities Recorded within a 10 km Radius of the Study Area

Threatened Ecological Community	Conservation Significance		Habitat Associations	Likelihood of Occurrence
	TSC Act	EPBC Act		
Grey Box Grassy Woodlands and Derived Native Grassland	-	E	<p>Predominantly occurs on the drier edge of the temperate grassy eucalypt woodland belt. A tree canopy dominated by <i>Eucalyptus microcarpa</i> is typically present. A range associated tree species may be present but these do not dominate the ecological community (DotE 2014b).</p> <p>This endangered ecological community (EEC) has not been recorded within or adjacent to the proposed impact area. No habitat exists for Grey Box Grassy Woodlands and Derived Native Grassland within the proposed impact area.</p>	No
Central Hunter Grey Box – Ironbark Woodland	E	-	<p>Typically forms woodland dominated by <i>Eucalyptus crebra</i>, <i>Brachychiton populneus</i> subsp. <i>populneus</i> and <i>Eucalyptus moluccana</i> (OEH 2014b).</p>	Unlikely

Threatened Ecological Community	Conservation Significance		Habitat Associations	Likelihood of Occurrence
	TSC Act	EPBC Act		
Hunter Valley Footslopes Slaty Gum Woodland	V	-	<p>Typically forms woodland, or occasionally forest, comprising a sparse to moderately dense tree stratum, occasional low tree stratum, and moderately dense to dense shrub stratum. The tree canopy is typically dominated by <i>Eucalyptus dawsonii</i> and/or <i>Eucalyptus moluccana</i>. <i>Acacia salicina</i> and <i>Allocasuarina luehmannii</i> may form a low tree stratum, or may be part of the upper-most canopy (OEH 2014b).</p> <p>This EEC has not been recorded within or adjacent to the proposed impact area. No habitat exists for Hunter Valley Footslopes Slaty Gum Woodland within the proposed impact area.</p>	No
Hunter Valley Vine Thicket	E	-	<p>Typically forms a low forest with a closed canopy dominated by low trees, shrubs and vines. The canopy is dominated by both varieties of <i>Elaeodendron austral</i>, <i>Geijera parviflora</i>, <i>Notelaea microcarpa</i> var. <i>microcarpa</i>, and <i>Alectryon oleifolius</i> subsp. <i>elongatus</i> (OEH 2014b).</p> <p>This EEC has not been recorded within or adjacent to the proposed impact area. No habitat exists for Hunter Valley Vine Thicket within the proposed impact area.</p>	No
Hunter Valley Weeping Myall Woodland	E	E	<p>Typically has a dense to open tree canopy up to about 15 m tall, depending on disturbance and regrowth history. The most common tree is <i>Acacia pendula</i>, which may occur with <i>Eucalyptus crebra</i> and/or <i>Acacia salicina</i> (OEH 2014b).</p> <p>This EEC has not been recorded within or adjacent to the proposed impact area. No habitat exists for Hunter Valley Weeping Myall Woodland within the proposed impact area.</p>	No

Threatened Ecological Community	Conservation Significance		Habitat Associations	Likelihood of Occurrence
	TSC Act	EPBC Act		
Swamp Oak Floodplain Forest	E	-	<p>Has a dense to sparse tree layer in which <i>Casuarina glauca</i> is the dominant species northwards from Bermagui. Other trees including <i>Acmena smithii</i>, <i>Glochidion</i> spp. and <i>Melaleuca</i> spp. may be present as subordinate species (OEH 2014b).</p> <p>This EEC has not been recorded within or adjacent to the proposed impact area. No habitat exists for Swamp Oak Floodplain Forest within the proposed impact area.</p>	No
White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland/White Box Yellow Box Blakely's Red Gum Woodland	E	CE	<p>Characterised by the presence or prior occurrence of <i>Eucalyptus albens</i> (White Box), <i>E. melliodora</i> (Yellow Box) and/or <i>E. blakelyi</i> (Blakely's Red Gum). It is found from the Queensland border in the north, to the Victorian border in the south. It occurs in the tablelands and western slopes of NSW (OEH 2014b).</p> <p>This EEC has been recorded within the Stage 1, Stage 2 approval areas. White Box - Yellow Box - Blakely's Red Gum Grassy Woodland and Derived Native Grassland is usually restricted to lower lying and foothill areas and as such it is unlikely that the proposed disturbance will impact upon this EEC/critically endangered ecological community (CEEC).</p>	Unlikely

TSC Act Status: E – Endangered; V – Vulnerable

EPBC Act Status: CE – Critically Endangered; E – Endangered

The BioMetric vegetation types within the proposed haul road realignment have been mapped and are shown in **Figure 2**. The proposed haul road realignment contains two BioMetric vegetation types. By order of area, the dominant vegetation type is White Box – Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin and Grey Gum - Narrow-leaved Stringybark - Ironbark Woodland on ridges of the upper Hunter Valley, Sydney Basin. The BioMetric vegetation types and associated areas are shown in **Table 4**.

These BioMetric vegetation types are not related to any TECs listed under the TSC or EPBC Act.

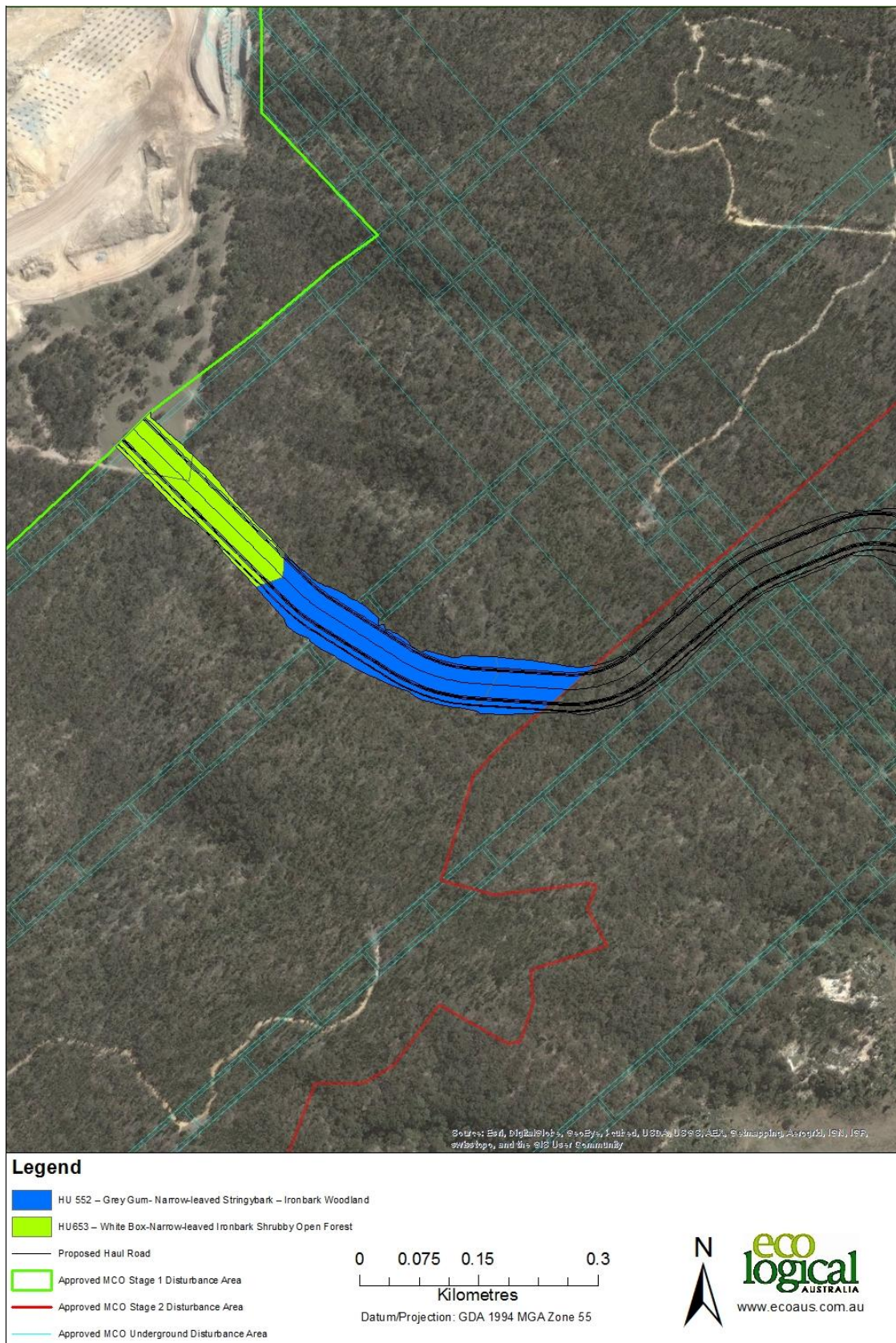


Figure 2: BioMetric Vegetation Types within the Proposed Haul Road Realignment

Table 4: BioMetric Vegetation Types within the Proposed Haul Road Realignment

Biometric Vegetation Types	Area (ha)
Grey Gum - Narrow-leaved Stringybark - Ironbark Woodland on ridges of the upper Hunter Valley, Sydney Basin (HU552)	1.8
White Box – Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin (HU653)	3.3

3.1.1 Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland on Ridges

Grey Gum - Narrow-leaved Stringybark - Ironbark Woodland on ridges of the Upper Hunter Valley, Sydney Basin is found on the northern section of the proposed impact area. This vegetation type is found on rocky escarpments of coarse grained sedimentary rocks or on sandy to skeletal soils on crests of coarse grained sedimentary beds.

The canopy is dominated by *Eucalyptus fibrosa* (Broad-leaved Ironbark) and *Eucalyptus punctata* (Grey Gum), with *Eucalyptus agglomerata* (Blue-leaved Stringybark) and *Eucalyptus dwyeri* (Dwyer's Red Gum) occurring less frequently (**Plate 1**). The mid-storey is dominated by *Acrotriche rigida*, *Bossiaea* spp, *Callitris endlicheri* (Black Cypress Pine), *Leucopogon muticus* (Blunt Beard-heath) and *Persoonia linearis* (Narrow-leaved Geebung). The groundcover is sparse with scattered native grasses and herbs.

**Plate 1: Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland BioMetric Vegetation Type**

3.1.2 White Box – Narrow-leaved Ironbark Shrubby Open Forest on Hills

White Box – Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin occurs in the southern area of the proposed impact area. This vegetation type is found on steep slopes of fine grained sedimentary rocks or on broad outwash areas downslope from coarse and fine grained sedimentary escarpments.

The canopy is dominated by *Eucalyptus albens* (White Box), with *Eucalyptus crebra* (Narrow-leaved Ironbark) and *Eucalyptus blakelyi* (Blakely's Red Gum) occurring less frequently (**Plate 2**). The mid-storey is dominated by *Acrotriche rigida*, *Cassinia* spp. and *Oxylobium ilicifolium*. The groundcover is sparse with scattered native grasses and herbs.



Plate 2: White Box – Narrow-leaved Ironbark Shrubby Open Forest BioMetric Vegetation Type

3.2 FLORA

No threatened species listed under the TSC or EPBC Acts were identified as occurring within the study area by these surveys or any other surveys conducted at Moolarben during past assessments, including the *Moolarben Coal Project Stage 1 Flora, Fauna and Aquatic Ecology Assessment* (Moolarben Biota 2006), *Moolarben Coal Project Stage 1 Optimisation Modification Ecological Impact Assessment* (EMM 2013) and *Moolarben Coal Project Stage 2 Ecological Impact Assessment* (Ecovision Consulting 2008).

The data audit revealed 12 threatened flora species listed under the TSC Act and / or EPBC Act as having been recorded or modelled as having the potential to occur within a 10 km radius of the subject site. These threatened flora species are listed in **Table 5** together with an assessment of the 'likelihood of occurrence' of each species.

Pomaderris queenslandica (Scant Pomaderris) was the only threatened flora species listed under the TSC or EPBC Act deemed to have the potential to occur within the proposed haul road realignment (i.e. all species had either a "no" or "unlikely" likelihood rating).

Table 5: Threatened Flora Species Recorded within a 10 km Radius of the Study Area

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Acacia ausfeldii</i>	Ausfeld's Wattle	V	-	Associated species include <i>Eucalyptus albens</i> , <i>E. blakelyi</i> and <i>Callitris spp.</i> , with an understorey dominated by <i>Cassinia spp.</i> and grasses (OEH 2014b). <i>Acacia ausfeldii</i> has previously been recorded within the Stage 1 approval area, however the proposed disturbance area does not constitute potential habitat for this species.	Unlikely
<i>Cryptostylis hunteriana</i>	Leafless Tongue-orchid	V	V	Grows in swamp-heath on sandy soils, chiefly in coastal districts, south from the Gibraltar Range (OEH 2014b). <i>Cryptostylis hunteriana</i> has not been recorded previously during assessments undertaken for Stage 1 or Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No
<i>Diuris tricolor</i>	Pine Donkey Orchid,	V	-	Grows in sclerophyll forest among grass, often with <i>Callitris sp.</i> , found in sandy soils, either on flats or small rises. Soils include gritty orange-brown loam on granite, shallow red loamy sand on stony porphyry (OEH 2014b). <i>Diuris tricolor</i> has previously been recorded within the Stage 1 approval area, however the proposed disturbance area does not constitute potential habitat for this species.	Unlikely
<i>Eucalyptus cannonii</i>	Capertee Stringybark	V	-	Grows in Tablelands Grassy Woodland Complex communities and Talus Slope Woodland, usually dominated by <i>Eucalyptus macrorhyncha</i> or <i>E. goniacalyx</i> (OEH 2014b). <i>Eucalyptus cannonii</i> and hybrid specimens of this species have identified locally, however, the proposed disturbance area does not constitute potential habitat for this species.	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Euphrasia arguta</i>		CE	CE	<p>Grows in eucalypt forest with a mixed grass and shrub understorey (OEH 2014b).</p> <p><i>Euphrasia arguta</i> has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Grevillea obtusiflora</i>		E	E	<p>Grows in sandy soils in dry sclerophyll woodland. Subspecies <i>obtusiflora</i> is only known to occur near Rylstone, while subspecies <i>fecunda</i> occurs in the Capertee Valley, north-west of Lithgow, and in the Gardens of Stone National Park (OEH 2014b).</p> <p><i>Grevillea obtusiflora</i> has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Pelargonium</i> sp. Striatellum (G.W. Carr 10345)		-	E	<p>In NSW, is known from the Southern Tablelands. Otherwise, only known from the shores of Lake Omeo near Benambra in Victoria where it grows in cracking clay soil that is occasionally flooded (OEH 2014b).</p> <p><i>Pelargonium</i> sp. Striatellum (G.W. Carr 10345) has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Philotheca ericifolia</i>		-	V	<p>Grows primarily in dry sclerophyll forest and heath on damp sandy flats and gullies, although it has also been collected from heath, open woodland, dry sandy creek beds, and rocky ridge and cliff tops (OEH 2014b).</p> <p><i>Philotheca ericifolia</i> has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Pomaderris queenslandica</i>	Scant Pomaderris	E	-	<p>Known from coastal and tableland areas. It is found in moist eucalypt forest or sheltered woodlands with a shrubby understorey. The species has been confirmed to the east (Goulburn River NP) and west (north-east of Dubbo) of the area.</p> <p><i>Pomaderris queenslandica</i> has previously been recorded within the Stage 2 approval area and the proposed underground disturbance area does constitute potential habitat for this species.</p>	Potential
<i>Prasophyllum</i> sp. <i>Wybong</i> (C.Phelps ORG 5269)		-	CE	<p>Generally found in shrubby and grassy habitats in dry to wet soil and is known to occur in open eucalypt woodland and grassland (DotE 2014b).</p> <p><i>Prasophyllum</i> sp. <i>Wybong</i> (C.Phelps ORG 5269) has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Thesium australe</i>	Austral Toadflax	V	V	Occurs in grassland or grassy woodland. Often found in damp sites in association with <i>Themeda australis</i> (OEH 2014b). <i>Thesium australe</i> has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No
<i>Tylophora linearis</i>		V	E	Occurs in dry scrub and open forest usually on sandy soils. Grows among shrubs and tussocks or around large woody debris (OEH 2014b). <i>Tylophora linearis</i> has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No

TSC Act Status: E – Endangered; V – Vulnerable

EPBC Act Status: CE – Critically Endangered; E – Endangered; V – Vulnerable

EPBC Protected Matters Search Tool (DotE 2014a), -32.39745 S, 150.1439 E (Datum GDA94) and Atlas of NSW Wildlife (OEH 2014a), -32.34 to -32.44 and longitude 150.1 to 150.2 (Datum GDA94), 6th February 2014.

3.3 FAUNA HABITAT

Fauna habitat within the proposed haul road realignment consists of a suite of broad habitat elements. These habitat elements include:

- Hollow-bearing trees;
- Stags;
- *Allocasuarina* stands;
- Ephemeral drainage lines and associated vegetation;
- Woody debris (fallen logs and branches);
- Rocky outcrops; and
- Rocky overhangs (**Plate 3**).

The fauna habitat characteristics available within the proposed haul road alignment potentially provide sheltering, foraging, and roosting habitat for a range of fauna groups, particularly where trees and stags support hollows for arboreal mammals, birds and bats to shelter/roost/breed. The rocky overhangs (**Figure 3**) may provide potential roosting habitat for bats. Canopy, shrub layers and derived grassland provide potential foraging habitat for birds and mammals including bats. Woody debris and rocky outcrops provide potential foraging and sheltering habitat for ground dwelling mammals, frogs and reptiles.

No threatened fauna species listed under the TSC Act and/or the EPBC Act were observed during the field survey, nor have they been recorded in the study area by past surveys.

The threatened species returned by the database search are listed in **Table 6** together with an assessment of the likelihood of occurrence for each species.

A total of 33 species of threatened fauna have been deemed to either occur or potentially occur within the study area (i.e. they have a likelihood rating of “potential” or higher). Five migratory species listed under the EPBC Act have the potential to occur within the study area (i.e. they have a likelihood rating of “potential” or higher).



Figure 3: Rocky Outcrops within the Proposed Haul Road Realignment Area



Plate 3: A Rock Overhang, a Potential Form of Roosting Habitat for Threatened Bat Species

Table 6: Threatened Fauna Species Recorded within a 10 km Radius of the Study Area

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Amphibians					
<i>Heleioporus australiacus</i>	Giant Burrowing Frog	V	V	Forages in woodlands, wet heath, dry and wet sclerophyll forest (OEH 2014b). Associated with semi-permanent to ephemeral sand or rock based streams where the soil is soft and sandy so that burrows can be constructed (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No
<i>Litoria booroolongensis</i>	Booroolong Frog	E	E	Typically inhabits rocky western-flowing rocky creeks, although a small number of populations have also been recorded in eastern-flowing streams (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No
<i>Mixophyes iteratus</i>	Giant Barred Frog	E	E	Found on forested slopes of the escarpment and adjacent ranges in riparian vegetation, subtropical and dry rainforest, wet sclerophyll forests and swamp sclerophyll forest (OEH 2014b). Lives in flowing streams with high water quality, though habitats may contain weeds (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
Reptiles					
<i>Aprasia parapulchella</i>	Pink-tailed Legless Lizard	V	V	<p>The nearest confirmed record is from over 40 km to the south-west. Inhabits sloping, open woodland areas with predominantly native grassy groundcover, particularly those dominated by Kangaroo Grass (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	<p>Typical sites consist of exposed sandstone outcrops and benching where the vegetation is predominantly woodland, open woodland and/or heath on Triassic sandstone of the Sydney Basin. They utilise rock crevices and exfoliating sheets of weathered sandstone during the cooler months and tree hollows during summer (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of exposed sandstone outcrops.</p>	Potential
Birds					
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	E	<p>Open woodlands and forests, particularly <i>Eucalyptus sideroxylon</i>, <i>E. albens</i>, <i>E. melliodora</i> and <i>E. blakelyi</i> as well as mistletoes which provide sufficient nectar on which it feeds. This species makes nomadic movements following winter flowering eucalypt species (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging habitat with winter flowering Eucalypt species.</p>	Potential

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Apus pacificus</i>	Fork-tailed Swift	-	M	<p>Non-breeding migratory bird. Occurs in Australia between October and late April. They occur over a wide range of habitats, but mostly over inland plains and other dry open habitats (DotE 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging habitat as open woodland.</p>	Potential
<i>Ardea modesta</i>	Eastern Great Egret	-	M	<p>Common and widespread in Australia. Forages in a wide range of wet and dry habitats including permanent and ephemeral freshwaters, estuarine mangroves and mudflats (Morcombe 2004).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Ardea ibis</i>	Cattle Egret	-	M	<p>Common and widespread in Australia. Forage on pasture, marsh, grassy road verges, rain puddles and croplands, but not usually in the open water of streams or lakes. Some individuals stay close to the natal heronry from one nesting season to the next, but the majority leave the district in autumn and return the next spring (Morcombe 2004).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2, however the proposed disturbance area does not constitute potential habitat for this species.</p>	Unlikely
<i>Epthianura albifrons</i>	White-fronted Chat	V	-	<p>Endemic to Australia, in particular southern regions of Australia. In NSW it occupies temperate to arid habitats from foothills to 1000 m altitude. In NSW the White-fronted Chat occurs in open habitats near the coast in close proximity to waterways including estuaries, saltmarsh or marshy wetlands (OEH 2014b).</p>	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
				This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Occurs in woodland and forested areas (OEH 2014b). Forages and breeds along inland timbered watercourses. Also known to forage in wooded farmland or urban environments (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. This species was not recorded from adjacent to the proposed impact area. Potential habitat exists in the form of potential foraging habitat as open woodland.	Potential
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	Tall, wet forests of mountains and gullies as well as alpine woodlands in summer (OEH 2014b). In winter they occur at lower altitudes in drier more open forests and woodlands, particularly box-ironbark assemblages (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. This species was not recorded from adjacent to the proposed impact area. Potential habitat exists in the form of potential foraging habitat as open woodland.	Potential
<i>Calyptorhynchus lathami</i>	Glossy Black-Cockatoo	V	-	Associated with a variety of forest types containing <i>Allocasuarina</i> species. Nests in large trees with large hollows (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat (<i>Allocasuarina</i> spp.) and potential nesting habitat (hollow-bearing trees).	Likely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	-	Occupies dry eucalypt woodlands, particularly open grassy woodland lacking a dense understorey but containing abundant fallen woody debris (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat and potential nesting habitat.	Likely
<i>Circus assimilis</i>	Spotted Harrier	V	-	Occurs in grassy open woodland and grasslands (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat.	Likely
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Eucalypt forests and woodlands with rough-barked species, or mature smooth-barked gums with dead branches (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat.	Likely
<i>Gallinago hardwickii</i>	Latham's Snipe	-	M	A variety of permanent and ephemeral wetlands, preferring open fresh water wetlands with nearby cover. Occupies a variety of vegetation around wetlands including wetland grasses and open wooded swamps (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	-	<p>Associated with dry open woodland with grassy areas, dune scrubs, in savannah areas, the fringes of mangroves, golf courses and open forest / farmland (Marchant & Higgins 1993).</p> <p>Forages in areas with fallen timber, leaf litter, little undergrowth and where the grass is short and patchy (Marchant & Higgins 1993). Is thought to require large tracts of habitat to support breeding.</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	Unlikely
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	<p>Mostly occur in dry, open eucalypt forests and woodlands containing nectar-bearing eucalypts and mistletoes on which it feeds (OEH 2014b).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and nesting habitat.</p>	Potential
<i>Grantiella picta</i>	Painted Honeyeater	V	-	<p>A nomadic species that typically inhabits woodlands with abundant mistletoe. It is a specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias, preferring <i>Amyema sp</i> mistletoe (OEH 2014b).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and nesting habitat.</p>	Potential
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	-	M	<p>Forages over large open fresh or saline lakes, rivers and wetlands.</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Occupies open eucalypt forest, woodland or open woodland, nests in tall living trees within a remnant patch (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat.	Likely
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	Forages aerially over a variety of habitats usually over coastal and mountain areas, most likely with a preference for wooded areas. Has been observed roosting in dense foliage of canopy trees, and may seek refuge in tree hollows in inclement weather (Morcombe 2004). This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Likely habitat exists in the form of potential foraging habitat as open woodland.	Likely
<i>Lathamus discolor</i>	Swift Parrot	E	E	Occur in areas where eucalypts are flowering profusely, or where there are abundant lerp. Breeds in Tasmania during spring and summer, migrating to south-eastern Australia in the autumn and winter months (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging habitat with winter flowering Eucalypt species.	Potential
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	Found in open forest and timbered grassland, especially low shrub ecotones between woodland and grasslands with high proportion of native grasses and forbs (OEH 2014b).	Likely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
				This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Modifications to Stage 1. Likely habitat for this species exists within the proposed impact area in the form of foraging and nesting habitat.	
<i>Leipoa ocellata</i>	Malleefowl	E	-	<p>Dry inland scrub, mallee with loose sandy soils. Males tend large sand nest-mound (OEH 2014b). Nearest confirmed records are between Dubbo and Mendooran over 50 km away.</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
<i>Pachycephala inornata</i>	Gilbert's Whistler	V	-	<p>The Gilbert's Whistler is found in shrubby woodland, mallee (Simpson & Day 1996).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1. No potential habitat will be removed as a result of the proposed disturbance.</p>	Unlikely
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	-	<p>Associated with a wide range of eucalypt woodlands and open forests. In temperate woodlands, usually open grassy. The species favours open areas adjoining large woodland blocks, with areas of dead timber and sparse shrub cover (OEH 2014b).</p> <p>This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging and nesting habitat.</p>	Likely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Petroica boodang</i>	Scarlet Robin	V	-	<p>Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. During autumn and winter some birds may appear on the eastern edges of the inland plains. They inhabit dry eucalypt forests and woodlands with an open grassy understorey with few scattered shrubs. Abundant logs and fallen timber are important components of its habitat (OEH 2014b).</p> <p>This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging and nesting habitat.</p>	Likely
<i>Petroica phoenicea</i>	Flame Robin	V	-	<p>Breeds in upland tall moist eucalypt forests and woodlands, often on ridges and slopes. Prefers clearings or areas with open understoreys, and a grassy ground layer for breeding habitat. Shrub density does not appear to be an important habitat factor. Many birds move to the inland slopes and plains in winter, or to drier more open habitats in the lowlands (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging habitat.</p>	Potential
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	-	<p>Predominantly associated with dry open woodlands containing nectar-bearing eucalypts or mistletoes (OEH 2014b).</p> <p>This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for modifications of Stage 1. Likely habitat for this species exists within the proposed impact area in the form of foraging habitat.</p>	Likely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Merops ornatus</i>	Rainbow Bee-eater	-	M	<p>Regular breeding migrant to southern Australia, arriving September to October, departing February to March. Occurs in open country, chiefly at suitable breeding places in areas of sandy or loamy soil: sand-ridges, riverbanks, road-cuttings, sand-pits, occasionally coastal cliffs (Morcombe 2004).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Likely habitat exists in the form of potential foraging habitat as open woodland.</p>	Likely
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	M	<p>Heavily vegetated gullies in forests, and taller woodlands of coastal south-east Australia. Also occurs in various sites during migration including more open areas.</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging habitat as open woodland.</p>	Potential
<i>Ninox connivens</i>	Barking Owl	V	-	<p>Associated with a variety of habitats such as savannah woodland, open eucalypt forests, wetland and riverine forest. The habitat is typically dominated by eucalypts. It usually nests near watercourses or wetlands in large tree hollows (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and roosting habitat.</p>	Potential

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Ninox strenua</i>	Powerful Owl	V	-	<p>Eastern forests, from the coast to the tablelands. Now uncommon and occurring at low densities. Can inhabit a wider range of vegetation types, preferring large tracts of woodland or forest habitat (OEH 2014b).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. This species was not recorded from adjacent to the proposed impact area. Likely habitat exists in the form of potential foraging and roosting habitat.</p>	Likely
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	<p>Associated with forest with sparse, open, understorey, typically dry sclerophyll forest and woodland (OEH, 2014b) and especially the ecotone between wet and dry forest, and non-forest habitat (OEH 2014b). Known to utilise forest margins and isolated stands of trees within agricultural land (OEH 2014b) and heavily disturbed forest where its prey of small and medium sized mammals can be readily obtained (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for modifications to Stage 1.</p> <p>Likely habitat for this species exists within the proposed impact area in the form of foraging habitat.</p>	Likely
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	<p>Their core breeding area in the central west is roughly centred from Cowra to Dubbo. Birds breeding in this region are mainly absent during winter, when they migrate north to the region of the upper Namoi and Gwydir Rivers (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. It is unlikely that any potential habitat will be removed as a result of the proposed disturbance.</p>	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	Open woodlands dominated by mature eucalypts with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and nesting habitat as open woodland.	Potential
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	Occupies a wide range of eucalypt dominated communities with a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Likely habitat exists in the form of potential foraging and nesting habitat.	Likely
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	Typically found in grassy eucalypt woodlands, but also occurs in open forest, mallee, natural grassland, and in secondary grassland derived from other communities. It is often found in riparian areas and sometimes in lightly wooded farmland (OEH 2014b). This species has been recorded within close proximity to the proposed impact area during the ecological assessment undertaken for Stage 1 and Stage 2. Likely habitat for this species exists within the proposed impact area in the form of foraging and nesting habitat.	Likely
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	M	Summer breeding migrant to south eastern Australia. Found in rainforest, dense wet eucalypt and monsoon forests, paperbark and mangrove swamps and riverside vegetation. Open country may be used by the Rufous Fantail during migration (Morcombe 2004).	Likely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
				This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Likely habitat exists in the form of potential foraging habitat as open woodland.	
<i>Rostratula australis</i>	Australian Painted Snipe	E	E, M	<p>Inhabits shallow inland wetlands which are fresh or brackish, temporarily or permanently inundated. Preferred habitats are fringes of swamps, dams and nearby marshy areas where there is a cover of grass, lignum, low scrub or open timber (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	No
Mammals					
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	<p>Has been recorded in a variety of habitats, including dry sclerophyll forests, woodland, sub-alpine woodland, edges of rainforests and wet sclerophyll forests. This species roosts in caves, rock overhangs and disused mine shafts (OEH 2014b).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential roosting habitat exists in the form of exposed sandstone outcrops and potential foraging habitat exists in the form as open woodland.</p>	Potential
<i>Chalinolobus picatus</i>	Little Pied Bat	V	-	The Little-Pied Bat is found in inland Queensland and NSW (including Western Plains and slopes) extending slightly into South Australia and Victoria. Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. Feeds on moths and possibly other flying invertebrates (OEH 2014b).	Potential

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
				This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential roosting habitat exists in the form of exposed sandstone outcrops and potential foraging habitat exists as open woodland.	
<i>Dasyurus maculatus</i> (listed under EPBC Act as <i>Dasyurus maculatus maculatus</i> [SE mainland population])	Spotted-tailed Quoll	V	E	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	Unlikely
<i>Phascolarctos cinereus</i>	Koala	V	V	Associated with both wet and dry eucalypt forest and woodland with acceptable Eucalypt food trees. Some preferred Eucalyptus species are: <i>Eucalyptus albens</i> , <i>E. blakelyi</i> and <i>E. punctata</i> (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of feed trees (White Box).	Potential
<i>Petaurus australis</i>	Yellow-bellied Glider	V	-	Restricted to tall mature forests, preferring productive tall open sclerophyll forests with a mosaic of tree species including some that flower in winter (OEH 2014b). Large hollows within mature trees are required for shelter, nesting and breeding (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Petaurus norfolcensis</i>	Squirrel Glider	V	-	Associated with dry forest and woodlands typically including high nectar producing species, including winter flower species (OEH 2014b). The presence of hollow bearing eucalypts is a critical habitat (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1, however the proposed disturbance area does not constitute potential habitat for this species.	Unlikely
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	-	The Eastern Pygmy Possum occurs in wet and dry eucalypt forest, subalpine woodland, coastal banksia woodland and wet heath (Menkhorst & Knight 2004). Pygmy-Possums feed mostly on the pollen and nectar from banksias, eucalypts and understorey plants and will also eat insects, seeds and fruit. Small tree hollows are favoured as day nesting sites, but nests have also been found under bark, in old bird nests and in the branch forks of tea-trees (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	No
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat (listed as Corben's Long-eared Bat under EPBC)	V	V	This species is thought to prefer structurally complex forest as foraging habitat, and breeding and sheltering is in tree hollows (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 2. Potential habitat exists in the form of potential foraging and roosting habitat (hollow-bearing trees).	Potential
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Rocky areas in a variety of habitats, typically north facing sites with numerous ledges, caves and crevices and usually near fresh water (OEH 2014b).	Unlikely

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
				This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	
<i>Pseudomys novaehollandiae</i>	New Holland Mouse	-	V	Inhabits open heathlands, open woodlands with a heathland understorey and vegetated sand dunes. A social animal, living predominantly in burrows shared with other individuals (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	Unlikely
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	V	V	Roosts in large camps generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy (OEH 2014b). This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.	Unlikely
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheathtail-bat	V	-	Found in almost all habitats, from wet and dry sclerophyll forest, open woodland, open country, mallee, rainforests and heathland. Roosts in tree hollows; may also use caves; has also been recorded in a tree hollows in paddock trees (OEH 2014b). This species has been recorded previously during assessments undertaken for Stage 1. Potential habitat exists in the form of potential foraging and roosting habitat (hollow-bearing trees).	Potential

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	<p>Associated with moist gullies in mature coastal forest, or rainforest, east of the Great Dividing Range (Churchill, 2008), tending to be more frequently located in more productive forests. Within denser vegetation types use is made of natural and artificial openings such as roads, creeks and small rivers, where it hawks backwards and forwards for prey (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. No potential habitat will be removed as a result of the proposed disturbance.</p>	Unlikely
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-	<p>Most records of this species are from dry eucalypt forest and woodland east of the Great Dividing Range (OEH 2014b). Individuals have, however, been recorded flying low over a rocky river in rainforest and wet sclerophyll forest and foraging in clearings at forest edges. Primarily roosts in hollows or behind loose bark in mature eucalypts (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and roosting habitat (hollow-bearing trees).</p>	Potential
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	<p>Prefers moist habitats with trees taller than 20 m (OEH 2014b). Roosts in tree hollows but has also been found roosting in buildings or under loose bark (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and roosting habitat (hollow-bearing trees).</p>	Potential

Scientific Name	Common Name	Conservation Significance		Habitat Associations	Likelihood of Occurrence
		TSC Act	EPBC Act		
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	-	<p>Associated with a range of habitats such as rainforest, wet and dry sclerophyll forest, monsoon forest, open woodland, paperbark forests and open grassland (OEH 2014b). It forages above and below the tree canopy on small insects. Will utilise caves, old mines, and stormwater channels, under bridges and occasionally buildings for shelter (OEH 2014b).</p> <p>This species has been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential habitat exists in the form of potential foraging and roosting habitat (hollow-bearing trees).</p>	Potential
<i>Vespadelus troungtoni</i>	Eastern Cave Bat	V	-	<p>Inhabit tropical mixed woodland and wet sclerophyll forest on the coast and the dividing range but extend into the drier forest of the western slopes and inland areas. Has been found roosting in sandstone overhand caves, boulder piles, mine tunnels and occasionally in buildings (OEH 2014b).</p> <p>This species has not been recorded previously during assessments undertaken for Stage 1 and Stage 2. Potential roosting habitat exists in the form of exposed sandstone outcrops and potential foraging habitat exists in the form as open woodland.</p>	Potential

TSC Act Status: CE – Critically Endangered; E – Endangered; V – Vulnerable

EPBC Act Status: CE – Critically Endangered; E – Endangered; V – Vulnerable; M – Migratory

EPBC PMST (DotE 2014a), -32.39745 S, 150.1439 E (Datum GDA94) and Atlas of NSW Wildlife (OEH 2014a), -32.34 to -32.44 and longitude 150.1 to 150.2 (Datum GDA94), 6th February 2014.

4 Impact Assessment

The proposed modification described in this report would result less disturbance than that associated with the approved haul road (the approved haul road is 18.5 ha vs 5.1 ha with this modification). Notwithstanding, the impact assessment presented below and the detailed threatened species/community impact assessments provided in **Appendices B and C** have been undertaken from first principles assuming that the Modification represents an additional disturbance area. The impact assessments presented in this report are therefore considered highly conservative.

4.1 SUMMARY OF IMPACTS

The proposed haul road realignment will require removal of vegetation and potential fauna habitat within the proposed impact area. This impact is described below in relation to direct and indirect impacts upon the vegetation found within the study area and any potential habitat for threatened flora and fauna species. The assessment was undertaken based on NSW and Commonwealth legislation and guidelines to determine the significance of impacts.

4.1.1 Assessment of Impacts on Threatened Species, Populations and Communities

No threatened flora or fauna species and vegetation communities listed under the TSC Act and/or the EPBC Act were observed within the proposed impact area.

Habitat requirements for potential threatened species / communities were compared with the study area's characteristics. One threatened flora species, 32 threatened fauna, and five non-threatened migratory fauna species were classed as either potential, likely or have been recorded. These 38 species were assessed in accordance with the relevant guidelines.

The results of these assessments are summarised in **Table 7**. Assessments for species listed under the TSC Act are detailed in **Appendix B**. Assessments under the EPBC Act are detailed in **Appendix C**.

No additional species would potentially be impacted by this the proposed haul road alignment than the currently approved haul road alignment being replaced (i.e. this Modification does not impact any additional species to the currently approved project). No significant impact is anticipated on the threatened flora and fauna species within the study area.

Table 7: Summary of Potential Impacts on Threatened Fauna Species

Scientific Name	Common Name	Conservation Significance		Likelihood of Occurrence	Significance of Impact
		TSC Act	EPBC Act		
<i>Pomaderris queenslandica</i>	Scant Pomaderris	E	-	Potential Habitat	Not Significant
<i>Hoplocephalus bungaroides</i>	Broad-headed Snake	E	V	Potential – Nesting, Sheltering and Foraging habitat	Not Significant
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	E	Potential - Foraging Habitat	Not Significant
<i>Lophoictinia isura</i>	Square-tailed Kite	V	-	Potential – Foraging Habitat	Not Significant
<i>Callocephalon fimbriatum</i>	Gang-gang Cockatoo	V	-	Potential – Foraging Habitat	Not Significant
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	-	Likely – Foraging and Nesting Habitat	Not Significant
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	V	-	Likely – Nesting and Foraging Habitat	Not Significant
<i>Circus assimilis</i>	Spotted Harrier	V	-	Likely - Foraging Habitat	Not Significant
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Likely - Foraging Habitat	Not Significant
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	Potential – Foraging and Nesting Habitat	Not Significant
<i>Grantiella picta</i>	Painted Honeyeater	V	-	Potential – Foraging and Nesting Habitat	Not Significant
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Likely - Foraging and Nesting Habitat	Not Significant
<i>Lathamus discolor</i>	Swift Parrot	E	E	Potential - Foraging Habitat	Not Significant

Scientific Name	Common Name	Conservation Significance		Likelihood of Occurrence	Significance of Impact
		TSC Act	EPBC Act		
<i>Neophema pulchella</i>	Turquoise Parrot	V	-	Likely - Foraging and Nesting Habitat	Not Significant
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south-eastern form)	V	-	Likely – Foraging and Nesting Habitat	Not Significant
<i>Petroica boodang</i>	Scarlet Robin	V	-	Likely - Foraging Habitat	Not Significant
<i>Petroica phoenicea</i>	Flame Robin	V	-	Potential - Foraging Habitat	Not Significant
<i>Melithreptus gularis gularis</i>	Black-chinned Honeyeater (eastern subspecies)	V	-	Likely- Foraging Habitat	Not Significant
<i>Ninox connivens</i>	Barking Owl	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Ninox strenua</i>	Powerful Owl	V	-	Likely - Roosting & Foraging Habitat	Not Significant
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Likely - Roosting & Foraging Habitat	Not Significant
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	V	-	Potential - Nesting & Foraging Habitat	Not Significant
<i>Chthonicola sagittata</i>	Speckled Warbler	V	-	Likely – Foraging and Nesting Habitat	Not Significant
<i>Stagonopleura guttata</i>	Diamond Firetail	V	-	Likely - Foraging and Nesting Habitat	Not Significant
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Potential - Roosting & Foraging Habitat	Not Significant

Scientific Name	Common Name	Conservation Significance		Likelihood of Occurrence	Significance of Impact
		TSC Act	EPBC Act		
<i>Chalinolobus picatus</i>	Little Pied Bat	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Phascolarctos cinereus</i>	Koala	V	V	Potential - Koala Feed Trees	Not Significant
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	-	Potential - Roosting & Foraging Habitat	Not Significant
<i>Nyctophilus corbeni</i>	South-eastern Long-eared Bat (Corben's Long-eared Bat)	V	V	Potential - Roosting & Foraging Habitat	Not Significant
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V	-	Potential - Roosting & Foraging Habitat	Not Significant

TSC Act Status: CE – Critically Endangered; E – Endangered; V – Vulnerable

EPBC Act Status: CE – Critically Endangered; E – Endangered; V – Vulnerable; M – Migratory

The Eastern Cave Bat, Large-eared Pied Bat and Little Pied Bat are associated with open forest on ridges that potentially include rocky outcrops. These habitat elements have the potential for use as roosting habitat. Roosting habitat in rocky outcrops is considered to be a limiting factor in the locality as it is unique to certain geographic locations and is a finite abiotic resource. Potential foraging habitat (in the form of tall open woodland) for these species will also be removed. In consideration of these factors, impacts to the Eastern Cave Bat, Large-eared Pied Bat and Little Pied Bat will most likely occur, however, given the small area of impact are considered not to be significant.

While some impacts are expected for other threatened fauna species including diurnal birds, forest owls, and microbats from the loss of potential habitat (for a full list see **Table 7**), these impacts are not considered to be significant as suitable habitat resources will remain present outside the proposed impact area, with abundant similar habitat available in wooded areas to the east and west as well as in the connected corridor with Goulburn River National Park (NP) to the north, and Munghorn Gap Nature Reserve to the south of the study area.

While connectivity is being retained with these areas, proposed offsets established for Stage 1 and Stage 2 aim to improve the connectivity of local conservation areas and the quality of remnant vegetation within the locality and region. This will potentially increase movement corridors for genetic exchange, foraging habitat and increased breeding resources for threatened fauna species.

4.1.2 Assessment of Impacts on Migratory Species

Five non-threatened, commonwealth-listed migratory species are considered likely to occur in the study area (**Table 8**). Assessments of the significance of potential impacts of the proposed haul road realignment were undertaken for each of these species using the 'EPBC Act Policy Statement 1.1 Significant Impact Guidelines: Matters of National Environmental Significance' (**Appendix C**). The results are summarised in **Table 8** below. No significant impact is anticipated for the migratory species.

Table 8: Summary of Potential Impacts Upon Migratory Fauna Species

Scientific Name	Common Name	Conservation Significance		Impact Description	Likely Significance of Impact
		TSC Act	EPBC Act		
<i>Apus pacificus</i>	Fork-tailed Swift	-	M	Potential – Foraging Habitat	Not Significant
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	Likely – Foraging Habitat	Not Significant
<i>Merops ornatus</i>	Rainbow Bee-eater	-	M	Likely – Foraging Habitat	Not Significant
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	M	Potential - Foraging Habitat	Not Significant
<i>Rhipidura rufifrons</i>	Rufous Fantail	-	M	Likely – Foraging Habitat	Not Significant

EPBC Act Status: M - Migratory

4.2 DIRECT IMPACTS

4.2.1 Vegetation Clearing

Approximately 5.1 ha of native vegetation will be directly impacted by the proposed haul road realignment.

Woodland and forest vegetation to be cleared represents less than 0.01% of the remnant forest and woodland outside of conservation areas in the Central Tablelands Local Land Services area (34,533 ha of woodland and 24,792 ha of forest [Somerville 2009]).

None of the vegetation communities identified within the proposed haul road realignment are TECs listed under either the TSC Act and/or the EPBC Act.

The Moolarben Coal Project Stage 2 Biodiversity Offset Strategy (BOS) was developed to offset the net loss of remnant vegetation with compensatory habitat in the form of ecological offsets. The Stage 2 project includes the clearing of approximately 1,534 ha of native vegetation, including 902 ha of remnant vegetation and 632 ha of grassland (including 123 ha of the *Box-Gum Woodland and Derived Native Grassland (CEEC)*).

The vegetation loss within the Stage 2 approval area has resulted in the provision of ecological offsets totalling 4,822 ha of native vegetation, including 3,689 ha of remnant vegetation, 1,134 ha of grassland (including 1,154 ha of *Box-Gum Woodland and Derived Native Grassland (CEEC)*). These offsets are distributed across eight properties.

The proposed disturbance area represents a smaller area to be cleared than the haul road approved under the Stage 2 Project Approval (08_0135), creating surplus offset areas. The approved haul road within the Stage 2 Project Approval would impact an area of 18.5 ha. This is approximately 13.4 ha more vegetation than the proposed OC4 haul road realignment. The current BOS developed for Stage 2 adequately covers the proposed impacts from the proposed haul road realignment, with surplus area.

4.2.2 Loss of Fauna Habitat

Approximately 5.1 ha of forest and woodland containing potential fauna habitat will be removed from the proposed haul road realignment impact area. The vegetation communities present within the impact area provide resources for a range of common and threatened fauna species with habitat features including structural diversity, hollow bearing trees, rocky outcrops and large woody debris.

Habitat features that will be removed include hollow bearing trees and rocky outcrops. Measures to minimise adverse impacts will be undertaken in accordance with MCP's current Landscape Management Plan (LMP) or its future revision (i.e. the complex wide Biodiversity Management Plan [BMP] that is required by Project Approval 08_0135) and include, where practical, the salvaging and relocation of large hollows identified during pre-clearing surveys.

A proportion of the species listed in **Table 7** and **Table 8** are considered to have the potential to breed within the natural habitat currently present in the proposed haul road realignment area. Collectively, approximately 5.1 ha of potential threatened species breeding habitat will be removed from the proposed haul road realignment.

The proposed disturbance area represents a smaller area to be cleared than the approved haul road under the Stage 2 Project Approval (08_0135). The approved haul road impacts an area of 18.5 ha, which contains habitat similar to the proposed haul road realignment impact area. The current BOS developed for Stage 2 adequately covers the proposed impacts upon fauna habitat from the proposed haul road realignment, with surplus area.

4.3 INDIRECT IMPACTS

4.3.1 Noise

There are no Commonwealth or NSW noise assessment criteria applicable to the protection of native fauna, including for threatened species and migratory species. The proposed haul road realignment is adjacent to an existing mining area. Mine operations already emit noise in the study area, which has the ability to disrupt fauna behaviour. Noise impacts as a result of the proposed haul road realignment are not expected to increase greatly above current levels in the study area.

4.3.2 Dust

The proposed disturbance area represents a shorter overall distance to existing mining operations than the currently approved haul road under the Stage 2 Project Approval (08_0135). Dust impacts on native flora and fauna are likely to be less than those currently approved given the shorter, more direct route to existing mining operations for the proposed haul road realignment impact area.

4.3.3 Fragmentation, Edge Effects & Connectivity

Fragmentation of habitat occurs where areas that were once continuous become divided into separate, isolated fragments by non-woodland areas. It can decrease genetic exchange in vegetation and fauna populations that cannot navigate non-woodland areas (Saunders *et al.* 1991).

A large connected patch of remnant vegetation occurs adjacent to the proposed haul road realignment area, connecting it to wooded areas and a large regional corridor containing Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment is located within the central areas of this large patch of contiguous forest and woodland.

Delineated 'edges' in vegetation are created by clearing within or adjacent to a patch of vegetation. Increasing edges in remnant vegetation can lead to changes in microclimate and ecological processes. These changes are known as 'edge effects'. Microclimatic changes can include changes in light, temperature, humidity and wind, which can favour certain species, leading to changes in structure and diversity in these areas. These changed conditions can suit disturbance tolerant species including weeds and increase the ability for feral animals to colonise and utilise remnant vegetation (Oliveira Filho *et al.* 1997).

The north-western and south-eastern edges of the proposed impact area are currently (or approved) to be impacted by edge effects. Any additional edge effects from the proposed impact area will be minimised, where possible, using active management techniques. Weeds will be managed in accordance with the LMP.

The proposed disturbance area represents a smaller area to be cleared than the approved haul road under the Stage 2 Project Approval (08_0135). The approved haul road impacts an area of 18.5 ha, which is approximately 13.4 ha more vegetation/habitat than the proposed haul road realignment.

4.3.4 Pest Species

In addition to their increased potential to colonise the impact area as a result of increased disturbance and edge effects, pest species including the European Red Fox and Rabbit may also be displaced immediately following clearing of the proposed haul road realignment area. Mitigation measures including feral animal management and control are recommended to be implemented to minimise the likelihood of such impacts taking place.

4.4 CUMULATIVE IMPACTS

Cumulative impacts include successive, incremental and combined impacts of one or more activities on the environment. Cumulative impacts result from the accumulation and interaction of impacts from past, present or future activities.

It is of significant note that the cumulative loss of native vegetation and habitat values in the study area from this proposed haul road realignment is 13.4 ha less than the currently approved haul road.

Ensuring that appropriate impact mitigation and management techniques are implemented will help to reduce overall cumulative impacts.

4.5 MITIGATION MEASURES

Mitigation measures for impacts on vegetation and fauna habitat will be undertaken in accordance with the LMP (MCO 2013), or its future revision (i.e. the complex wide BMP that is required by Project Approval 08_0135). A component of the LMP/BMP is a biodiversity impact mitigation strategy that aims to 'maintain and enhance' ecological values in order to result in a net positive biodiversity benefit in the post developed landscape.

Progressive mine disturbance rehabilitation is required to take place across the disturbance area. Disturbed areas will be progressively rehabilitated with native vegetation to provide an environment that could resemble pre-mined vegetation and fauna habitat values.

4.5.1 Prior to Construction

- Implementation of MCO's Vegetation Clearance Protocol. This includes the delineation of areas to be cleared, pre-clearing surveys, management of impacts to fauna, and vegetation clearance procedures.

4.5.2 During Construction

- Implementation of MCO's Ground Disturbance Permit to be approved by the Environment and Community Relations Manager as required prior to the commencement of clearing activities.
- Habitat features important to threatened fauna species are recommended to be collected and stockpiled for reinstatement in rehabilitation areas.
- Management for weeds and pest animals is recommended to occur.
- Implementation of dust minimisation and suppression measures detailed in the Air Quality Management Plan or its future revision.
- Top soil removed during construction works is recommended to be stockpiled and used in rehabilitation areas.

4.5.3 Post Construction

- If rehabilitation is to be performed, avoid the use of exotic or non-local native plant species in revegetation work. Appropriate native flora species characteristic of the original communities are recommended to be used. Local provenance seed stock is recommended to be used where possible. Undertake rehabilitation activities in accordance with the LMP/BMP.
- Management for weeds and pest animals is recommended to occur.

5 Conclusion

The proposed haul road realignment requires the removal of approximately 5.1 ha of native vegetation which is 13.4 ha less than the disturbance footprint associated with the currently approved haul road. No TECs or threatened flora species will be removed as part of the proposed works.

The overall removal of vegetation and fauna habitat is considered to be minor within the regional context, especially considering the impact is less than the disturbance associated with approved haul road. Open forest and woodland to be cleared (and then re-established upon completion) represents less than 0.01% of the remnant forest and woodland outside of conservation areas in the Hunter Central Rivers CMA.

Assessments of significance were applied under Section 5A of the EP&A Act as well as assessments under the EPBC Act to determine the significance of potential impacts to species, populations and communities that were deemed potential or likely to occur in the study area. The proposed haul road realignment is not likely to result in significant impacts to any threatened biodiversity.

Management of potential impacts have been addressed, with mitigation measures that include reducing impacts to fauna during clearing and the use of local provenance seed in rehabilitation.

Habitat resources occur outside the disturbance footprint, with abundant similar habitat available in wooded areas to the east, and in the connected corridor with Goulburn River NP to the north and Munghorn Gap Nature Reserve to the south of the study area.

The current BOS developed for Stage 2 adequately covers the proposed impacts from the proposed haul road realignment, with surplus area.

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Appendix A – Fauna Species List

Scientific Name	Common Name	TSC Act	EPBC Act	Presence
Birds				
<i>Acanthiza lineata</i>	Striated Thornbill	-	-	X
<i>Acanthiza pusilla</i>	Brown Thornbill	-	-	X
<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill	-	-	X
<i>Cacatua galerita</i>	Sulphur-crested Cockatoo	-	-	
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	-	-	
<i>Corcorax melanorhamphos</i>	White-winged Chough	-		X
<i>Cormobates leucophaea</i>	White-throated Treecreeper	-	-	X
<i>Corvus coronoides</i>	Australian Raven	-	-	X
<i>Cracticus tibicen</i>	Australian Magpie	-	-	X
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	-	-	X
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	X
<i>Eolophus roseicapillus</i>	Galah	-	-	X
<i>Eopsaltria australis</i>	Eastern Yellow Robin	-	-	X
<i>Hylacola pyrrhopygia</i>	Chestnut-rumped Heathwren	-	-	X
<i>Lichenostomus chrysops</i>	Yellow-faced Honeyeater	-	-	X
<i>Lichenostomus fuscus</i>	Fuscous Honeyeater	-	-	X
<i>Lichenostomus leucotis</i>	White-eared Honeyeater	-	-	X
<i>Malurus cyaneus</i>	Superb Fairy-wren	-	-	X
<i>Malurus lamberti</i>	Variegated Fairy-wren	-	-	X
<i>Manorina melanocephala</i>	Noisy Miner	-	-	X
<i>Menura novaehollandiae</i>	Superb Lyrebird	-	-	X
<i>Origma solitaria</i>	Rockwarbler	-	-	X
<i>Pachycephala pectoralis</i>	Golden Whistler	-	-	X

Scientific Name	Common Name	TSC Act	EPBC Act	Presence
<i>Pardalotus punctatus</i>	Spotted Pardalote	-	-	X
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater	-		X
<i>Platycercus eximius</i>	Eastern Rosella	-	-	X
<i>Rhipidura albiscapa</i>	Grey Fantail	-	-	X
<i>Sericornis frontalis</i>	White-browed Scrubwren	-		X
<i>Smicrornis brevirostris</i>	Weebill	-	-	X
<i>Strepera graculina</i>	Pied Currawong	-	-	X
<i>Vanellus miles</i>	Masked Lapwing	-	-	X
<i>Zosterops lateralis</i>	Silvereye	-	-	X
Mammals				
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	-	-	X
<i>Wallabia bicolor</i>	Swamp Wallaby	-	-	X
<i>Tachyglossus aculeatus</i>	Short-beaked Echidna	-	-	X
<i>Trichosurus vulpecula</i>	Common Brush-tailed Possum	-	-	X
<i>Vombatus ursinus</i>	Common Wombat	-	-	X
<i>Oryctolagus cuniculus</i> *	Rabbit*	-	-	
<i>Vulpes vulpes</i> *	Fox*	-	-	
Reptiles				
<i>Ctenotus taeniolatus</i>	Copper Tailed Skink	-	-	X
<i>Amalosia (Oedura) lesueurii</i>	Velvet Gecko	-	-	X

Appendix B – EP&A Act Assessment of Significance

As described in Section 4, the Modification described in this report would result in less disturbed than that associated with the approved haul road. Notwithstanding, the assessments presented in this appendix have been undertaken from first principles assuming that the Modification represents an additional disturbance area. The assessments are therefore considered highly conservative.

Broad-headed Snake

The Broad-headed Snake is listed as an endangered species under the TSC Act, and a vulnerable species under the EPBC Act. This species has been recorded previously within the Goulburn River National Park (NP) (OEH, 2014b), however has not been recorded within the study area.

The Broad-headed Snake is nocturnal, sheltering by day in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. This species moves from the sandstone rocks to shelter in hollows within 200 m of escarpments in summer. It feeds mostly on geckos and small skinks; but will occasionally eat frogs and small mammals. Females produce four to 12 live young from January to March (OEH, 2014b).

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts to the Broad-headed Snake.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	The proposed haul road realignment will remove potential breeding habitat (hollow-bearing trees) on escarpments, limiting recruitment of the species within the study area, should the species occur. It will also remove some potential foraging and sheltering habitat present in the form of sandstone outcrops.
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Given that this species was not identified within the study area, it is considered unlikely that this will have an adverse effect on the species. If the species occurs in the study area, the potential habitat being removed would be important to the species as a shelter and breeding resource.</p> <p>It is noted, however, that much larger areas of potential habitat exist to the east and west of the study area.</p>

<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, the study area is not at a known limit of this species distribution.
<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha of vegetation and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and rock to compensate for the loss of these habitat features.
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect habitat connectivity, as a large connected patch of remnant vegetation occurs adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve.</p> <p>The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.</p>

Threatened Forest Owls – Barking Owl, Powerful Owl and Masked Owl

The Barking Owl is listed as a vulnerable species under the TSC Act. Potential roosting habitat for the Barking Owl within the study area occurs as canopy species with dense foliage. Within the study area the potential nesting habitat occurs in the form of large tree hollows (OEH, 2014b).

The Powerful Owl is listed as a vulnerable species under the TSC Act. Within the study area the potential roosting habitat for the Barking Owl occurs as canopy species with dense foliage. Potential breeding and foraging habitat for the Powerful Owl is available within the study area in eucalypt woodlands. The Powerful Owl requires large tree hollows for nesting (OEH, 2014b).

The Masked Owl is listed as a vulnerable species under the TSC Act. The Masked Owl roosts in trees, crevices in cliffs or caves (OEH, 2014b). Nesting occurs in trees with hollows of greater than 40 centimetres (cm) in diameter (OEH, 2014b). Breeding is irregular and unpredictable for the Masked Owl, occurring from late summer to spring but mostly March to July (OEH, 2014b). Potential sheltering and foraging habitat is available in the study area within and trees with dense foliage.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts to the forest owls.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Areas of vegetation containing large hollow bearing trees, which are potential breeding resources for these species, will be removed for the proposed haul road realignment. This could limit recruitment of species and displace breeding pairs.</p> <p>Owls may be deterred from breeding in areas immediately adjacent to the study area which will be retained, due to increased noise and light.</p> <p>The study area is considered to represent a small component of these threatened owl's home ranges (up to 6,000 ha for the Barking Owl [OEH, 2014b]). As connectivity to large expanses of native bushland and conservation reserves will be retained, these owls will have access to alternative breeding sites and breeding partners outside the study area. Therefore, the removal of this potential breeding habitat is not expected to impact the species such that they would decline.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Given that this species was not identified within the study area, it is considered unlikely that this will have an adverse effect on the species. If the species does occur in the study area, the potential habitat being removed would be important to the species as a shelter and breeding resource.</p> <p>It is noted, however, that much larger areas of potential habitat exist to the east and west of the study area.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, the study area is not at a known limit of these species distribution.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows to compensate for the loss of some of these habitat features.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the narrow width of disturbance should not cause major fragmentation within in this corridor.</p>

Raptors – Square-tailed Kite, Spotted Harrier and Little Eagle

The Square tailed Kite is listed as a vulnerable species under the TSC Act. It has not been recorded within the study area. Breeding for this species is from July to February, with nest sites generally located along or near watercourses, in a fork or large horizontal limb of a tree (OEH, 2014b). Potential foraging habitat for this species exists within the proposed impact area.

The Spotted Harrier is listed as a vulnerable species under the TSC Act. It has not been recorded within the study area. This species builds a stick nest in a tree (OEH, 2014b). Potential foraging habitat for this species exists within the proposed impact area.

The Little Eagle is listed as a vulnerable species under the TSC Act. It has not been recorded within the study area. This species builds a stick nest in a tree (OEH 2014b). Potential foraging habitat for this species exists within the proposed impact area.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts to these raptors.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	The proposed haul road realignment contains potential foraging and breeding habitat for the threatened raptors. Given that no threatened raptors, or their nests were recorded within the study area, and that similar habitats for these species are available across the locality and the region, the proposed impact is unlikely to affect the life cycles of viable local populations of these species.
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (Forest / woodland) will be removed by the proposed haul road realignment.</p> <p>These species were not identified within the study area, but may still occur, however, they are wide-ranging, high mobility species that occupy large territories. The small area of land disturbed as a result of the proposed haul road realignment is unlikely to have any impact on habitat resources of these wide-ranging species.</p> <p>It is also noted, that much larger areas of potential habitat exist and remain to the east and west of the study area.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, this proposed haul road realignment is not at the known extent of these species distribution.
<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged stags and revegetate previously cleared areas to compensate for the loss of habitat features.

How is the proposal likely to affect habitat connectivity?	The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the narrow width of disturbance should not cause major fragmentation within in this corridor.
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Threatened Nomadic Nectivorous Birds – Swift Parrot, Regent Honeyeater, Painted Honeyeater and Black-chinned Honeyeater

The Regent Honeyeater is listed as a critically endangered species under the TSC Act. It has not been recorded in the study area although the Mudgee Wollar area has been identified as an important area for the species. This species builds small nests within the outer canopy of drooping *Eucalyptus* sp., *Casuarina* sp., *Melaleuca* sp. or Mistletoe branches (OEH, 2014b).

The Painted Honeyeater is listed as a vulnerable species under the TSC Act. It has not been recorded in the study area. Potential foraging and nesting habitat is present for this species in the study area. This species builds small nests within the outer canopy of drooping *Eucalyptus* sp., *Casuarina* sp., *Melaleuca* sp. or Mistletoe branches (OEH, 2014b).

The Black-chinned Honeyeater is listed as a vulnerable species under the TSC Act. It has not been recorded in the study area. This species inhabits woodlands dominated by box and ironbark eucalypts, specifically White Box (OEH, 2014b). This species builds small nests within the outer canopy of drooping *Eucalyptus* sp., *Casuarina* sp., *Melaleuca* sp. or Mistletoe branches (OEH, 2014b).

The Swift Parrot is listed as an endangered species under the TSC Act. White Box, an important winter food resource, occurs in the study area. The Swift Parrot breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south eastern Australia from Victoria and the eastern parts of South Australia to south east Queensland (OEH, 2014b).

Potential foraging habitat for threatened nectivores is present within the study area in areas that contain large numbers of mature trees and mistletoes. Key eucalypt feed species including White Box are present in the study area. Rough barked Apple and Mistletoes, and to a lesser extent, Grey Gum and Ironbark, are also present as a foraging resource for these nectivorous species (OEH, 2014b) in the study area.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts to the nectivores.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>The study area is part of an important area for the Regent Honeyeater. White Box, an important feed species is present within the study area. It is therefore likely that the study area may represent potential foraging habitat for the Regent Honeyeater. Evidence of foraging or breeding has not been recorded in the study area, but has been recorded near Moolarben Creek and at Munghorn Gap Nature Reserve, south of the study area.</p> <p>Potential breeding habitat is present for the Black chinned and Painted Honeyeaters in woodlands of the study area.</p> <p>Given that similar habitats for these species are available across the locality and the region, the small area of habitat loss from the proposed impact is unlikely to affect the life cycles of viable local populations of these species such that they would be placed at risk of extinction.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (forest / woodland) will be removed by the proposed haul road realignment.</p> <p>It is noted, however, that much larger areas of potential habitat will continue to exist to the east and west of the study area.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, this proposed haul road realignment is not at the known extent of these species distribution.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to restore vegetation and improve connectivity in the surrounding landscape (Offset properties) to compensate for the loss of these habitat features.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the narrow width of disturbance should not cause major fragmentation within in this corridor.</p>

Threatened Hollow-dependent Woodland Birds – Glossy Black-Cockatoo, Brown Treecreeper, Little Lorikeet and Turquoise Parrot

The Glossy Black-Cockatoo is listed as a vulnerable species under the TSC Act. Limited foraging habitat is present for this species within the proposed impact area. Potential nesting habitat occurs in tree hollows of the study area, but as this habitat is not close to an important foraging area, they are unlikely to breed in the study area.

The Brown Treecreeper is listed as a vulnerable species under the TSC Act. Habitat is present for this species within the proposed impact area. Fallen timber is available for foraging habitat. Hollows for nesting are available in standing dead or live trees and tree stumps (OEH, 2014b), particularly in the open forests on hill slopes.

The Little Lorikeet is listed as a vulnerable species under the TSC Act. Little Lorikeets mostly occur in dry, open eucalypt forests and woodlands and on the western slopes have been recorded in remnant woodland patches and roadside vegetation and riparian corridors which are generally favoured. Nest hollows are located at heights of between 2 m and 15 m. Hollow openings are very small, approximately 5 cm in diameter (OEH, 2014b). It has high site fidelity with nesting areas, which are usually in proximity to feeding areas. However, nomadic movements, following food availability are common (OEH, 2014b). Breeding habitat is limited to areas containing suitable hollows in relative close proximity to optimal foraging habitat.

The Turquoise Parrot is listed as a vulnerable species under the TSC Act. Foraging habitat for this species is present throughout the more open woodlands containing some grass in the understory as well as the White box shrubby woodlands and ecotones between woodland and more open areas. Nesting habitat is available in tree hollows, logs and old fence posts. The Turquoise Parrot breeds from August to December (OEH, 2014b).

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts of the proposed haul road realignment to hollow dependent woodland birds.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Evidence of foraging or breeding has not been recorded in the study area, however the potential habitat within the proposed impact area is likely to support breeding habitat for the Brown Treecreeper, Little Lorikeet and Turquoise Parrot and foraging habitat for all hollow dependant woodland birds.</p> <p>Given that similar habitats for these species are available across adjacent woodlands and the surrounding region, the proposed impact is unlikely to affect the life cycles of viable local populations of these species such that they would be placed at risk of extinction.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (Forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Habitat fragmentation will occur, however given the proposed haul road is located in an area between current and/or approved mining activities, fragmentation is not considered to be significant and affect the available habitat for these species.</p> <p>It is noted, however, that much larger areas of potential habitat exist to</p>

	the east and west of the study area.
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, the proposed haul road realignment is not at the known extent of these species distribution.
<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and undertake restoration effort to compensate for the loss of these habitat features.
<i>How is the proposal likely to affect habitat connectivity?</i>	The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.

Threatened Nest Building Woodland Birds – Varied Sittella, Grey-crowned Babbler, Speckled Warbler and Diamond Firetail

The Varied Sittella is listed as a vulnerable species under the TSC Act. The Varied Sittella is sedentary and inhabits eucalypt forests and woodlands, especially rough barked species, mature smooth barked gums with dead branches. It builds a cup shaped nest of plant fibres and cobweb in an upright tree fork high in the tree canopy. It often re uses the same fork or tree in successive years. Potential habitat occurs in the study area where smooth barked trees including Grey Gum, and rough barked species including White Box and Rough barked Apple occur.

The Grey-crowned Babbler is listed as a vulnerable species under the TSC Act. Foraging habitat for this species is available in areas of fallen timber or grassy understorey. This highly communal and territorial species builds large dome nests throughout its territory which provide roosting habitat as well as nesting habitat. The species breeds between July and February (OEH 2014b).

The Speckled Warbler is listed as a vulnerable species under the TSC Act. Speckled Warblers inhabit woodlands with a grassy understorey, often on ridges or gullies. The species is sedentary, living in pairs or trios and nests on the ground in grass tussocks, dense litter and fallen branches. They forage on the ground and in the understorey for arthropods and seeds (OEH, 2014b).

The Diamond Firetail is listed as a vulnerable species under the TSC Act. Foraging and breeding habitat is present in the grassy woodlands of the study area. This species is largely sedentary and forms small colonies to breed between August and January (OEH 2014b).

An assessment of impact criteria under Part 5A of the EP&A Act has been completed to assess potential impacts to other woodland birds in the study area.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Evidence of foraging or breeding has not been recorded in the study area, however the potential habitat within the proposed impact area is likely to support foraging and breeding habitat for threatened nest building woodland birds.</p> <p>Given that similar habitats for these species are available across the locality and the region, the proposed impact is unlikely to affect the life cycles of viable local populations of these species such that they would be placed at risk of extinction.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (Forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Habitat fragmentation will occur, however given the proposed haul road is located in an area between current and/or approved mining activities, fragmentation is not considered to be significant and affect the available habitat for these species.</p> <p>It is noted, however, that much larger areas of potential habitat exist to the east and west of the study area.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, this proposed haul road realignment is not at the known extent of these species distribution.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and large woody debris as well as undertake active vegetation restoration in accordance with the Biodiversity Offset Strategy. These efforts will aid in compensating for the loss of key habitat features.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.</p>

Threatened Robins – Hooded Robin, Scarlet Robin and Flame Robin

The Hooded Robin is listed as a vulnerable species under the TSC Act. Territories range from around 10 ha during the breeding season, to 30 ha in the non-breeding season (OEH 2014b). Potential habitat is present in woodlands of the study area, adjacent to cleared agricultural land.

The Scarlet Robin and Flame Robin are listed as vulnerable species under the TSC Act. These species were not recorded in the study area. Potential winter foraging habitat is available for these species in the proposed impact area. Tree trunks, logs and other coarse woody debris are also available for perching/foraging habitat (OEH 2014b), particularly in open forests on ridges.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts of the proposed haul road realignment to robins.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Scarlet and Flame Robins are unlikely to breed within the study area as they prefer to breed in upland, tall moist forests. Therefore, the proposed haul road realignment will not impact on the lifecycle of these species.</p> <p>If present, it is likely that the Hooded Robin would breed in the study area. Some potential breeding habitat will be removed (open forests on ridges and footslope woodlands). In the areas adjacent to the proposed impact, which will be retained, birds will be subject to an intermittent increase in noise, light and dust. This may cause birds to be deterred from breeding in these areas. Measures to reduce these potential impacts will continue to be implemented as part of the relevant management plans.</p> <p>Given the extent of similar habitats available for these species across the adjacent woodlands and surrounding region, the proposed impact is unlikely to affect the life cycles of viable local populations of these species such that they would be placed at risk of extinction.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (Forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Habitat fragmentation will occur, however given the proposed haul road is located in an area between current and/or approved mining activities, fragmentation is not considered to be significant and affect the available habitat for these species.</p> <p>It is also noted that much larger areas of potential habitat exist to the east and west of the study area.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, this proposed haul road realignment is not at the known extent of these species distribution.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and large woody debris as well as undertake active vegetation restoration in accordance with the Biodiversity Offset Strategy. These efforts will aide in compensating for the loss of key these habitat features.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area,</p>

	connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.
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Gang-gang Cockatoo

The Gang-gang Cockatoo is listed as a vulnerable species under the TSC Act. It is likely that the study area provides winter foraging and breeding habitat for this species, due to the presence of box and ironbark eucalypt species, wattles in the understorey of open forests, and suitable tree hollows. Goulburn River NP, directly north of the study area, is the northern limit of this species distribution in the area.

An assessment of impact criteria under Part 5a of the EP&A Act has been completed to assess potential impacts of the proposed haul road realignment to the Gang-gang Cockatoo.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>The Gang-gang Cockatoo is an altitudinal migrant, spending spring and summer in tall montane forests, and migrating to lower altitude, drier woodlands in winter. This species breeds from spring to summer in tall montane forests, therefore would not breed in the lower altitude, drier woodlands of the study area. As such, the breeding cycle of this species is unlikely to be affected.</p> <p>The removal of potential wintering habitat in the study area may reduce the availability of foraging and shelter habitat for the species during this part of its life cycle. Surrounding conservation reserves (Goulburn River NP and Munghorn Gap Nature Reserve) provide suitable wintering habitat for this species, minimising the scale of this impact.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Approximately 5.1 ha of potential habitat (forest / woodland) will be removed by the proposed haul road realignment.</p> <p>Habitat fragmentation will occur, however given the proposed haul road is located in an area between current and/or approved mining activities, fragmentation is not considered to be significant and affect the available habitat for these species.</p> <p>It is noted, that much larger areas of potential habitat exist to the east and west of the study area which will continue to provide suitable habitat for the species.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, this proposed haul road realignment is not at the known extent of these species distribution.

<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and large woody debris as well as undertake active vegetation restoration in accordance with the Biodiversity Offset Strategy. These efforts will aid in compensating for the loss of key these habitat features.
<i>How is the proposal likely to affect habitat connectivity?</i>	The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.

Threatened Cave Roosting Microbats – Large-eared Pied Bat, Little Pied Bat, Eastern Bentwing-bat and Eastern Cave Bat

The Large eared Pied Bat is listed as a vulnerable species under the TSC Act and EPBC Act. Roosting habitat for this species is available in crevices and overhangs in sandstone rocky outcrops. Potential foraging habitat is present in Box Gum Woodlands and creek flats (DECC 2007b), but would also be present in open forest on ridgelines. Males can roost alone or in small groups during torpor in winter. Females form maternity colonies from November to February in the roof domes of sandstone caves. Females show high fidelity to maternity caves (Churchill, 2008).

The Little Pied Bat is listed as a vulnerable species under the TSC Act. Roosting habitat for this species is available in crevices and overhangs in sandstone rocky outcrops. Potential foraging habitat is present in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimil box woodlands (Churchill, 2008).

The Eastern Bent-wing Bat is listed as a vulnerable species under the TSC Act. Habitat (non breeding) is present for this species in eucalypt woodland and open grasslands (Churchill 2008). This species migrates to maternity roosts in limestone caves in October and gives birth from December to January. Females leave maternity sites in March to seek out cold caves for winter hibernation. Eastern Bentwing Bats roost in other caves and road culverts for the remainder of the year. Within the study area, roosting habitat is available in crevices and cracks of rocky outcrops.

The Eastern Cave Bat is listed as a vulnerable species under the TSC Act. Potential roosting habitat is available for the species in crevices and overhangs in rocky outcrops and in boulder piles. Potential foraging habitat is available in open forests, footslope woodlands and riparian woodlands (Churchill, 2008). Little is known of this species' reproductive habits. Pregnant females have been captured in October, and lactating females have been observed in December. Maternity colonies have been found in sandstone caves and also under corrugated iron rooves (Churchill, 2008).

An assessment of impact criteria under Part 5a of the EP& A Act has been completed to assess potential impacts of the proposed haul road realignment to threatened cave roosting bats.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Potential breeding habitat for the Large-eared Pied Bat, Little Pied Bat and Eastern Cave Bat may be impacted by the proposed haul road realignment. Removal of this area may affect breeding success, limit recruitment and decrease the local population size in the long term as breeding habitat and caves are a limiting factor in the locality.</p> <p>Indirect impacts such as night light may also interrupt these species and affect breeding success in the study area. Habitat feature retention and re use for during rehabilitation will be undertaken.</p> <p>The Eastern Bent-wing Bat breeds in domed limestone caves outside the study area, and as such their breeding cycle will not be affected.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>Foraging habitat is widely distributed in the study area, with sheltering habitat and potential breeding habitat occurring in more restricted areas, only on ridgelines in open forest.</p> <p>Approximately 5.1 ha of suitable foraging habitat for these species and approximately 200 m of ridgeline containing potential breeding habitat for the Large-eared Pied Bat, Little Pied Bat and Eastern Cave Bat will be removed for the proposed haul road realignment.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, this proposed haul road realignment is not at the known extent of this species distribution.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain bush rock to compensate for the loss of these habitat features.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.</p>

Threatened Tree-roosting Microbats –Yellow-bellied Sheathtail-bat, Eastern Freetail-bat and Eastern False Pipistrelle

The Yellow bellied Sheathtail-bat is listed as a vulnerable species under the TSC Act. This species roosts in large tree hollows, in colonies of approximately 30 bats. They hunt above the canopy, and sometimes on the forest edge (Churchill 2008). Foraging opportunities are present for this species within the proposed impact area. Roosting opportunities for the species are available in large tree hollows in eucalypt woodlands.

The East Coast Freetail-bat is listed as a vulnerable species under the TSC Act. This species roosts in tree hollows, and usually in hollow spouts of large mature trees. They hunt on the wing in forest gaps (Churchill 2008). Foraging opportunities are present for this species within the proposed impact area.

The Eastern False Pipistrelle is listed as a vulnerable species under the TSC Act. This species roosts in hollow trunks of eucalypt trees in colonies of three to 80. They hunt in gaps and spaces in the forest and avoid dense regrowth (Churchill 2008). Foraging opportunities are present for this species within the proposed impact area.

An assessment of impact criteria under Part 5a of the EP& A Act has been completed to assess potential impacts of the proposed haul road realignment to threatened tree roosting bats.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>The study area contains potential foraging and breeding habitat, in the form of hollow bearing trees, for these microbat species. Hollow bearing trees are considered a limiting resource in the study area and the removal of this resource could impact these species given the likely competition for such resources in the landscape.</p> <p>Potential breeding habitat will be removed for all species (with the exception of the Eastern False Pipistrelle, which breeds in upland tall moist forest outside the study area), which may cause movement out of the study area into nearby conservation reserves and other connected patches of forest and woodland. Bats may also be deterred from breeding in areas adjacent to active mining areas due to increased noise, night light and dust. Measures to reduce these potential impacts will be implemented through the LMP/BMP.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>The proposed haul road realignment will remove 5.1 ha of potential foraging and breeding habitat for tree roosting bats from the study area. This habitat is considered important for the local populations of these species, if they are present, with the exception of the Eastern False Pipistrelle (This species is an altitudinal migrant that sometimes migrates to lower altitude woodlands in winter). As the 'local population' is defined as those individuals potentially occurring in the study area and nearby conservation reserves where suitable habitat is available, they are unlikely to be significantly impacted by the proposed haul road realignment.</p> <p>The proposed haul road realignment is considered unlikely to fragment habitat for these species.</p>

<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, this proposed haul road realignment is not at the known extent of these species distribution.
<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain salvaged hollows and bush rock to compensate for the loss of these habitat features.
<i>How is the proposal likely to affect habitat connectivity?</i>	The proposed haul road realignment is unlikely to affect overall connectivity of the vegetation in the area, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.

Koala

The Koala is listed as a vulnerable species under the TSC Act and EPBC Act. Limited habitat is available in the study area in White Box dominated forests and woodlands within the study area. This species breeds between September and December (OEH 2014b).

It is believed that this species occurs in very low densities in the locality as there is a paucity of records in the study area. Given the limited nature of habitat, it is likely that the study area does not constitute important habitat although this species may be utilising habitat present as part of a larger movement corridor with surrounding conservation reserves.

An assessment of impact criteria under Part 5a of the EP& A Act has been completed to assess potential impacts of the proposed haul road realignment to the Koala.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>Koala was not recorded in the study area during the field survey. The species is considered likely to occur, but in low numbers.</p> <p>Potential breeding habitat in the form of woodlands will be removed as a result of the proposed haul road realignment and could impact the Koala due to its large home range size and high dispersal capability.</p> <p>This species is likely to only be present as vagrants or temporary visitors moving through the area between habitat patches, the study area is not likely to constitute important breeding habitat. Therefore its life cycle is unlikely to be significantly impacted such that local populations will be placed at risk of extinction.</p>

<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	The proposed haul road realignment will remove 5.1 ha of potential foraging and breeding habitat for the Koala from the study area. This habitat is not considered important for a local population. The proposed haul road realignment is considered unlikely to fragment habitat for these species.
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	No, this proposed haul road realignment is not at the known extent of these species distribution.
<i>How is the proposal likely to affect current disturbance regimes?</i>	The proposed haul road realignment will clear approximately 5.1 ha and will add to the current disturbance regimes. However, impacts will be managed including measures to retain feed trees where possible and to undertake revegetation to compensate for the loss of habitat features.
<i>How is the proposal likely to affect habitat connectivity?</i>	The proposed haul road realignment is unlikely to affect overall connectivity, with a large connected patch of remnant vegetation occurring adjacent to the proposed haul road realignment area, connecting it to wooded and forested areas to the east, and a large regional corridor with Goulburn River NP and Munghorn Gap Nature Reserve. The proposed haul road realignment area is located within the central areas of this large patch of contiguous forest and woodland, however the width of disturbance should not cause major fragmentation within in this corridor.

Pomaderris queenslandica Scant Pomaderris

Pomaderris queenslandica (Scant Pomaderris) occurs in Queensland and NSW. In NSW it is found in dry sclerophyll woodlands (OEH 2014b). In the local area it has been reported in a protected valley.

There were no specimens of *Pomaderris* spp. seen within the haul road disturbance area. Specimens of *Pomaderris* spp. have been collected from the study area and were sent to the NSW Herbarium for identification. Results of this showed that a number of the specimens collected were the Scant Pomaderris. The specimens collected were taken from areas of underground disturbance only, no Scant Pomaderris plants were observed within any of the proposed surface disturbance areas.

Assessment of impact criteria under Part 5a of the EP&A Act has been addressed to assess potential impacts of the proposed works to the Scant Pomaderris.

Factor	Assessment
<i>How is the proposal likely to affect the lifecycle of a threatened species and/or population?</i>	<p>No individuals of this species were found during the field survey; therefore no loss of individuals is expected as a result of clearing works.</p> <p>The Scant Pomaderris is a prolific seeding and suckering plant that benefits from soil disturbance. Clearing may potentially increase local populations of the species.</p>
<i>How is the proposal likely to affect the habitat of a threatened species, population or ecological community?</i>	<p>The proposed works will disturb or remove up to 5.1 ha of the potential habitat of this species; this may cause direct mortality to individuals (if the species is present). This is a worst case scenario and assumes there are individuals of this species present in the study area.</p> <p>Despite these potential impacts, a viable local population is not likely to be placed at risk. This is largely because the area of potential habitat to be cleared is relatively small when compared with the area of suitable habitat to be retained in the adjacent areas.</p>
<i>Does the proposal affect any threatened species that are at the limit of its known distribution?</i>	<p>No, the proposed works are not at the known limit of the distribution of the Scant Pomaderris.</p>
<i>How is the proposal likely to affect current disturbance regimes?</i>	<p>Previous studies in the general locality have not been able to detect an impact of subsidence on local vegetation communities, and long-term impacts from random direct-mortality events are unlikely.</p> <p>Increased dust produced from mining activity in the region will be further exacerbated by the proposed works, however the extent of this impact is expected to be small and restricted to the vegetation surrounding the disturbance areas. The Scant Pomaderris is likely to continue to survive in these areas, as well as the unmodified habitat present over the rest of the UG1 area.</p>
<i>How is the proposal likely to affect habitat connectivity?</i>	<p>Clearing activities will cause removal of areas of potential habitat which exist on the fringes of a more extensive woodland remnant. The species will continue to survive in existing, extensive woodland surrounding the surface disturbance area.</p>

Appendix C – EPBC Act Significant Impact Guidelines

As described in Section 4, the Modification described in this report would result in less disturbance than that associated with the approved haul road. Notwithstanding, the assessments presented in this appendix have been undertaken from first principles assuming that the Modification represents an additional disturbance area. The assessments are therefore considered highly conservative.

The EPBC Act Administrative Guidelines on Significance set out ‘**Significant Impact Criteria**’ that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions

The relevant Significant Impact Criteria have been applied to the endangered woodland birds (Swift Parrot and Regent Honeyeater), vulnerable bats (Large-eared Pied Bat and South-eastern (Corben’s) Long-eared Bat), Koala and migratory birds (White-throated Needletail, Fork-tailed Swift, Rainbow Bee-eater, Rufous Fantail and Satin Flycatcher).

Matters to be addressed	Impact (Commonwealth Legislation)
any environmental impact on a World Heritage Property;	No.
any environmental impact on Wetlands of International Importance;	The proposal will not affect any part of RAMSAR wetland.
any impact on Commonwealth Listed Critically Endangered or Endangered Species;	<p>Regent Honeyeater (<i>Anthochaera phrygia</i>) and Swift Parrot (<i>Lathamus discolor</i>)</p> <p>The Regent Honeyeater is a highly nomadic species considered to have a widespread but patchy distribution throughout NSW, Victoria and Queensland. The species is listed as Endangered under the EPBC Act.</p> <p>The Regent Honeyeater is known to breed in only a few locations with the majority of breeding records coming from the Capertee Valley area of NSW, the Bundarra-Barraba area, and around Chiltern, Victoria. Scattered records of the species breeding in the Australian Capital Territory (ACT) and surrounding area have also been recorded.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>This species nests in tall eucalypt trees and is found in association with reliable nectar sources such as Yellow Box (<i>E. melliodora</i>), White Box and Yellow Gum (<i>E. leucoxylon</i>), but also utilises species such as Grey Box (<i>E. microcarpa</i>), Red Box (<i>E. polyanthemos</i>) and Blakely's Red Gum (<i>E. blakelyi</i>) (DotE, 2014b).</p> <p>The Regent Honeyeater migrates depending upon the flowering of particular <i>Eucalyptus</i> species as outlined above. The erratic migration behaviours of this species may mean that a site is only visited intermittently but may be of critical importance during its use and as such the irregular use of a site does not reflect the conservation status of that site (DotE, 2014b).</p> <p>The Swift Parrot is listed as an endangered species under the EPBC Act. White Box, an important winter food resource, occurs in the study area.</p> <p>The Swift Parrot breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south eastern Australia from Victoria and the eastern parts of South Australia to south east Queensland (OEH, 2014b).</p> <p>No sightings of the Regent Honeyeater or Swift Parrot were recorded in the proposed haul road realignment area, however, the species is known to utilise the region for foraging habitat and as such that there is a likelihood of it occurring.</p> <p>An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:</p> <p>Criterion 1: lead to a long-term decrease in the size of a population</p> <p>The proposed works will impact vegetation containing White Box, an important feed tree for the Regent Honeyeater and Swift Parrot. It is therefore likely that the study area may represent potential foraging habitat for the Regent Honeyeater and Swift Parrot.</p> <p>Evidence of foraging by Regent Honeyeater and Swift Parrot or breeding by Regent Honeyeater has not been recorded in the study area by detailed ecological surveys over several years and ongoing monitoring of adjacent areas. Given this, it is unlikely to lead to a long-term decrease in the size of an important population of a species.</p> <p>Criterion 2: reduce the area of occupancy of the species</p> <p>Regent Honeyeater and Swift Parrot show high site fidelity, returning to sites that have previously been used on a cyclic basis. However, as site use depends on the availability of foraging resources, the species are unlikely to be recorded at the same site every year (DotE 2014b).</p> <p>The proposed works will not reduce the area of occupancy of an important population of the Regent Honeyeater or Swift Parrot.</p> <p>Criterion 3: fragment an existing population into two or more populations</p> <p>The proposed works will not fragment an existing important population into two or more populations.</p> <p>Criterion 4: adversely affect habitat critical to the survival of a species</p> <p>The proposed works will impact only on a small area of potential foraging habitat for the Regent Honeyeater and Swift Parrot. Due to the species being highly mobile it is unlikely that the impact to foraging habitat will adversely affect habitat critical to the survival of a species.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>Criterion 5: disrupt the breeding cycle of a population</p> <p>The proposed works will impact upon a small area of potential foraging habitat for the Regent Honeyeater and Swift Parrot. Due to the species being highly mobile it is unlikely that the impact to foraging habitat will disrupt the breeding cycle of an important population of Regent Honeyeater. The Swift Parrot does not breed on mainland Australia so this Criterion does not apply to the species.</p> <p>Criterion 6: modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p> <p>The proposed works will impact upon a small area of potential foraging habitat for the Regent Honeyeater and Swift Parrot, including a small area of potential winter foraging habitat and is therefore unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. Measures to rehabilitate habitats will continue to be implemented in accordance with MCO's LMP/BMP and Biodiversity Offset Strategy.</p> <p>Criterion 7: result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat</p> <p>The proposed works will not result in invasive species that are harmful to a endangered species becoming established in the endangered species' habitat.</p> <p>Criterion 8: introduce disease that may cause the species to decline, or</p> <p>The Regent Honeyeater is not known to be subject to disease.</p> <p>Criterion 9: interfere with the recovery of the species.</p> <p>Recovery actions for the Regent Honeyeater centre upon the maintenance and enhancement of habitat at key sites. MCO's LMP/BMP will minimise impacts on habitat for these species and rehabilitation efforts will replace potential habitat.</p>
any impact on Commonwealth Listed threatened Species;	<p>Large-eared Pied Bat (<i>Chalinolobus dwyeri</i>)</p> <p>The Large-eared Pied Bat is a medium-sized insectivorous bat measuring a total length of approximately 100 mm and weighing 7–12 grams. It has shiny, black fur on the body with a white stripe on the ventral side of the torso where it adjoins the wings and tail. The ears are large, and lobes of skin adorn the lower lip and between the corner of the mouth and the bottom of the ear. Its relatively short, broad wings suggest it flies slowly and with considerable manoeuvrability.</p> <p>The distribution of the species is poorly known due to its nocturnal and unobtrusive behaviour; and recent advances in targeted survey technology have only been in use since the 1990's. Much of the species' known distribution is within NSW, with the largest concentrations occurring in the sandstone escarpments of the Sydney Basin and the north-west slopes (Coolah Tops, Mt Kaputar, Warrumbungle National Park and Pilliga Nature Reserve).</p> <p>There is insufficient data to estimate the population of the Large-eared Pied Bat; however it has been suggested that the species is not likely to undergo natural fluctuations in population numbers, extent or occurrence.</p> <p>The species requires a combination of sandstone cliff/escarpment to provide roosting habitat that is adjacent to higher fertility sites, particularly box gum woodlands or river/rainforest corridors which are used for foraging. It is believed that the Large-eared Pied Bat would utilise, in some part, the sandstone caves/overhangs and woodlands, present within the proposed impact area. These habitats provide the required potential foraging habitat for the species and as such the Large-eared Pied Bat is considered likely to occur in the area.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p> <p>Criterion 1: lead to a long-term decrease in the size of an important population of a species</p> <p>The proposed works will impact vegetation comprised of regenerating and mature native vegetation, which is potential foraging habitat. A small area of cliff line roosting habitat will be impacted as a result of the proposed works. Given this, it is possible there may be some long-term decrease in the size of any local populations of the species, although these populations have not been identified as being important.</p> <p>Criterion 2: reduce the area of occupancy of an important population</p> <p>The proposed works is not expected to reduce the area of occupancy of a known important population.</p> <p>Criterion 3: fragment an existing important population into two or more populations</p> <p>The proposed works will only remove a narrow area of habitat, therefore it is expected they will not fragment an existing important population into two or more populations.</p> <p>Criterion 4: adversely affect habitat critical to the survival of a species</p> <p>The proposed works will impact only on a small area of potential foraging and roosting habitat for the Large-eared Pied Bat. Due to the species being highly mobile it is unlikely that the impact to foraging habitat will adversely affect habitat critical to the survival of a species.</p> <p>Criterion 5: disrupt the breeding cycle of an important population</p> <p>The proposed works will impact upon a small area of potential foraging and roosting habitat for the Large-eared Pied Bat. Due to the species being highly mobile and the existence of a large extent of suitable habitat adjacent to the proposed impact area, and surrounding region it is unlikely that the impact to foraging and small area of roosting habitat will disrupt the breeding cycle of an important population of Large-eared Pied Bat.</p> <p>Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p> <p>The proposed works will impact upon only a small area of potential foraging and roosting habitat for the Large-eared Pied Bat, and is therefore unlikely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p> <p>The proposed works will not result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p> <p>Criterion 8: introduce disease that may cause the species to decline, or</p> <p>The proposed works will not introduce disease that may cause the species to decline, or interfere substantially with the recovery of the species.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>Criterion 9: interfere substantially with the recovery of the species.</p> <p>A relevant objective to the proposed works for the Large-eared Pied Bat is the protection of all known roost sites. Known or potential roost sites for the Large-eared Pied Bat do not occur within the proposed impact area, therefore, the proposed works are consistent with this objective.</p> <p>South-eastern Long-eared Bat (Corben's Long-eared Bat) (<i>Nyctophilus corbeni</i>)</p> <p>The South-eastern Long-eared Bat, also called the South-eastern Long-eared Bat, has a head and body length of around 50-75 mm and a tail length of 35-50 mm. The weight varies between genders with females (14–21 g) being heavier than males (11–15 g). The South-eastern Long-eared Bat is distinguishable from other long-eared bats by its larger size as well as a broader skull and jaw. As with the Large-eared Pied Bat, the species is quite cryptic due to its nocturnal and unobtrusive behaviour and as a result, little is known about their biology or social structure.</p> <p>The distribution of the South-eastern Long-eared Bat is mostly restricted to the Murray-Darling Basin, however within this range distribution is scattered and the species is rarely recorded. NSW distribution covers most of the state except for the north-west whereby the landscape is dominated by treeless plains.</p> <p>The South-eastern Long-eared Bat occurs in a range of inland woodland vegetation types, including box, ironbark and cypress pine woodlands. The species has primarily been recorded in moister woodland of various eucalypt species lining watercourse and lakes, being most abundant in vegetation with a distinct canopy with a dense cluttered shrub layer.</p> <p>The South-eastern Long-eared Bat is an insectivorous and voracious feeder. Food can be taken in flight, by gleaning vegetation or ground foraging. In flight, it commonly feeds on beetles, bugs, and moths however it has also been recorded feeding on grasshoppers and crickets.</p> <p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p> <p>Criterion 1: lead to a long-term decrease in the size of an important population of a species</p> <p>The proposed works will impact vegetation comprised of regenerating and mature native woodland, which is potential foraging habitat. Some hollow-bearing trees will be impacted by the proposed works. However, the area of suitable habitat being impacted is small in comparison to the habitat available surrounding area. Given this, it is unlikely to lead to a long-term decrease in the size of an important population of a species.</p> <p>Criterion 2: reduce the area of occupancy of an important population</p> <p>The proposed works will not reduce the area of occupancy of a known important population.</p> <p>Criterion 3: fragment an existing important population into two or more populations</p> <p>The proposed works will not fragment an existing important population into two or more populations.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>Criterion 4: adversely affect habitat critical to the survival of a species</p> <p>The proposed works will impact only on a small area of potential foraging and roosting habitat for the South-eastern Long-eared Bat. Due to the species being highly mobile it is unlikely that the impact to foraging and roosting habitat will adversely affect habitat critical to the survival of a species.</p> <p>Criterion 5: disrupt the breeding cycle of an important population</p> <p>The proposed works will impact upon a small area of potential foraging and roosting habitat for the South-eastern Long-eared Bat. Some hollow-bearing trees will be impacted by the proposed works. Due to the species being highly mobile, and the availability of suitable habitat in the surrounding area, the proposed impact it is unlikely to disrupt the breeding cycle of an important population of South-eastern Long-eared Bat.</p> <p>Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p> <p>The proposed works will impact upon only a small area of potential foraging and roosting habitat for the South-eastern Long-eared Bat. Due to the species being highly mobile it is unlikely the proposed impact will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline in the local area or across its distribution.</p> <p>Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p> <p>The proposed works will not result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p> <p>Criterion 8: introduce disease that may cause the species to decline, or</p> <p>The proposed works will not introduce disease that may cause the species to decline, or interfere substantially with the recovery of the species.</p> <p>Criterion 9: interfere substantially with the recovery of the species.</p> <p>Recovery actions for the South-eastern Long-eared Bat focus, in part, on gaining a better understanding of the species ecology. The proposed works do not directly interfere with this objective.</p> <p>Koala (<i>Phascolarctos cinereus</i>)</p> <p>Occurs in eucalypt woodlands and forests. In the Central Tablelands it primarily feeds on <i>Eucalyptus viminalis</i> and <i>E. camaldulensis</i>. In addition, 18 secondary food tree species have also been identified in this region this includes <i>Eucalyptus albens</i> (OEH, 2014b).</p> <p>Koalas spend most of their time in trees, but will descend and traverse open ground to move between trees. Home range size varies with quality of habitat, ranging from less than 2 ha to several hundred hectares in size. The species is generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery. Females breed at two years of age and produce one young per year (OEH, 2014b).</p> <p>White Box is a tree species listed under Schedule 2 of SEPP 44 as a koala feed tree and by OEH as a secondary koala feed tree. White Box trees occurred within proposed haul road realignment area.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:</p> <p>Criterion 1: lead to a long-term decrease in the size of an important population of a species</p> <p>The proposed development will disturb a small area of woodland which has some foraging habitat potential (5.1 ha). This is only a very small portion of the suitable foraging habitat in the surrounding area and it is unlikely to lead to a long-term decrease in the size of an important population of the species.</p> <p>Criterion 2: reduce the area of occupancy of an important population</p> <p>The proposed development will not reduce the area of occupancy of an important population.</p> <p>Criterion 3: fragment an existing important population into two or more populations</p> <p>The proposed development will not fragment an existing important population into two or more populations.</p> <p>Criterion 4: adversely affect habitat critical to the survival of a species</p> <p>The proposed development will only disturb potential foraging habitat for the Koala. Due to the species being highly mobile and the availability of a large expanse of more contiguous and suitable habitat surrounding the proposed impact area, it is unlikely that the proposed development will affect habitat critical to the survival of a species.</p> <p>Criterion 5: disrupt the breeding cycle of an important population</p> <p>No important populations are known from the study area. Due to the species being highly mobile it is unlikely to that disturbance to foraging habitat will disrupt the breeding cycle of an important population of Koala.</p> <p>Criterion 6: modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline</p> <p>The proposed development will impact upon only a small area of potential foraging habitat for the Koala. Due to the species being highly mobile it is unlikely the development will modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.</p> <p>Criterion 7: result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat</p> <p>The proposed development will not result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.</p> <p>Criterion 8: introduce disease that may cause the species to decline, or</p> <p>The proposed development will not introduce disease that may cause the species to decline, or interfere substantially with the recovery of the species.</p> <p>Criterion 9: interfere substantially with the recovery of the species.</p> <p>The overall objective of the NSW Koala recovery plan is to "...reverse the decline of the koala in NSW, to ensure adequate protection, management and restoration of koala habitat, and to maintain healthy breeding populations of koalas throughout their current range".</p>

Matters to be addressed	Impact (Commonwealth Legislation)
	<p>While some potential koala habitat will be removed, effort will be made to retain the potential koala feed trees present in the development envelope (where possible), and restoration efforts will be implemented as per the LMP/BMP. The action proposed is consistent with the objectives of the recovery plan.</p>
<p>any environmental impact on Commonwealth Listed Migratory Species;</p>	<p>White-throated Needletail (<i>Hirundapus caudacutus</i>), Fork-tailed Swift (<i>Apus pacificus</i>), Rainbow Bee-eater (<i>Merops ornatus</i>), Satin Flycatcher (<i>Myiagra cyanoleuca</i>) and Rufous Fantail (<i>Rhipidura rufifrons</i>)</p> <p>Criterion 1: substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species.</p> <p>These species are all native residents of Australia which undertake latitudinal migrations according to season. The White-throated Needletail and Fork-tailed Swift do not breed in Australian territory, but migrate to Australia to forage during summer. The Rainbow Bee-eater and Rufous Fantail are latitudinal migrants which breed and forage in eastern Australia during the spring and summer. The Satin Flycatcher is an altitudinal and latitudinal migrant which moves between high altitude wet forests in south-eastern Australia where it breeds, to more open areas during the non-breeding season.</p> <p>The study area provides suitable foraging habitat for all of these species and provides suitable breeding habitat for the Rainbow bee-eater only, however, the proposed works are not expected to impact on the availability of foraging area in the vicinity, or surrounding region. Due to the high mobility of these species, the variety of habitat in the area and the small area of proposed habitat modification expected as part of the proposed works, it is not considered that there will be any substantial modification, destruction or isolation or any areas of important habitat for these migratory species.</p> <p>Criterion 2: result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species.</p> <p>The proposed works will not result in the establishment of any invasive species that are harmful to these migratory species.</p> <p>Criterion 3: seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.</p> <p>Due to the widespread distribution, nomadic nature and adaptability of these species and the small amount of potential foraging habitat (and breeding habitat for the Rainbow Bee-eater) within the proposed impact area, the lifecycle of these species is not expected to be disrupted as a result of the project in any way.</p>
<p>any critically endangered and endangered ecological communities</p>	<p>No critically endangered and /or endangered ecological communities.</p>
<p>does any part of the Proposal involve a Nuclear Action;</p>	<p>No. The project does not include a Nuclear Action.</p>
<p>any environmental impact on a Commonwealth Marine Area;</p>	<p>No. There are no Commonwealth Marine Areas within the study area.</p>

Matters to be addressed	Impact (Commonwealth Legislation)
In addition, any direct or indirect impact on Commonwealth lands	No. The project does not directly or indirectly affect Commonwealth land.

CONCLUSION OF EPBC ACT ASSESSMENT

It is unlikely that the development will significantly impact on the endangered woodland birds (Swift Parrot and Regent Honeyeater), vulnerable bats (Large-eared Pied Bat and Southern Long-eared Bat), Koala, and migratory birds (White-throated Needle-tail, Fork-tailed Swift, Rainbow Bee-eater, Rufous Fantail and Satin Flycatcher).

Referral to the Commonwealth under the EPBC Act is not warranted nor recommended.

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Moolarben Coal Project

OC4 South-West Modification

Surface Water Assessment Review

Moolarben Coal Operations Pty Ltd

0926-05-E5, 16 April 2015

For and on behalf of WRM Water & Environment Pty Ltd
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NOTE: This report has been prepared on the assumption that all information, data and reports provided to us by our client, on behalf of our client, or by third parties (e.g. government agencies) is complete and accurate and on the basis that such other assumptions we have identified (whether or not those assumptions have been identified in this advice) are correct. You must inform us if any of the assumptions are not complete or accurate. We retain ownership of all copyright in this report. Except where you obtain our prior written consent, this report may only be used by our client for the purpose for which it has been provided by us.

Contents

1	Introduction	3
1.1	Background	3
1.2	Overview of Proposed Modification	3
2	Existing Surface Water Environment	6
2.1	Previous Studies	6
3	Overview of Moolarben Coal Complex Water Management System	7
3.1	Previous Studies	7
3.2	Proposed Changes to the Moolarben Coal Complex WMS	7
4	Impact Assessment	8
4.1	Potential Impacts	8
4.2	Mine Site Water Balance	8
4.3	Surface Water Quality	8
4.4	Changes in Catchment Area	9
5	Haul Road Drainage - Concept Layout	10
6	Management and Monitoring	11
7	Summary of Findings	12
8	References	13

List of Figures

Figure 1.1	- Regional Location	4
Figure 1.2	- Indicative General Arrangement Incorporating the Modification	5
Figure 4.1	- Change in Catchment Area	9
Figure 5.1	- Haul Road Concept Drainage Configuration	10

1 Introduction

1.1 BACKGROUND

The Moolarben Coal Complex is an approved open cut and underground coal mine in the Western Coalfields of New South Wales (NSW), approximately 40 kilometres north of Mudgee. WRM Water & Environment Pty Ltd (WRM) was engaged by Resources Strategies on behalf of Moolarben Coal Operations Pty Limited (MCO) to undertake a surface water assessment for the Moolarben Coal Project OC4 South-West Modification. Refer to Figure 1.1 for a locality plan.

This surface water assessment review forms part of an Environmental Assessment which has been prepared by MCO to support an application to modify Project Approval (05_0117) [MOD 11] and Project Approval (08_0135) [MOD 1] for the OC4 South-West Modification. This is referred to hereafter as the 'proposed modification'.

Through ongoing mine planning MCO has identified opportunities to optimise the integration of the Stage 1 and Stage 2 Moolarben Coal Projects. In particular, opportunity exists to relocate the Stage 2 Open Cut 4 (OC4) haul road to link OC4 with the Stage 1 coal processing infrastructure via OC1. There would be a reduction in the total disturbance area as the approved Stage 2 haul road and mine infrastructure area would no longer be required.

1.2 OVERVIEW OF PROPOSED MODIFICATION

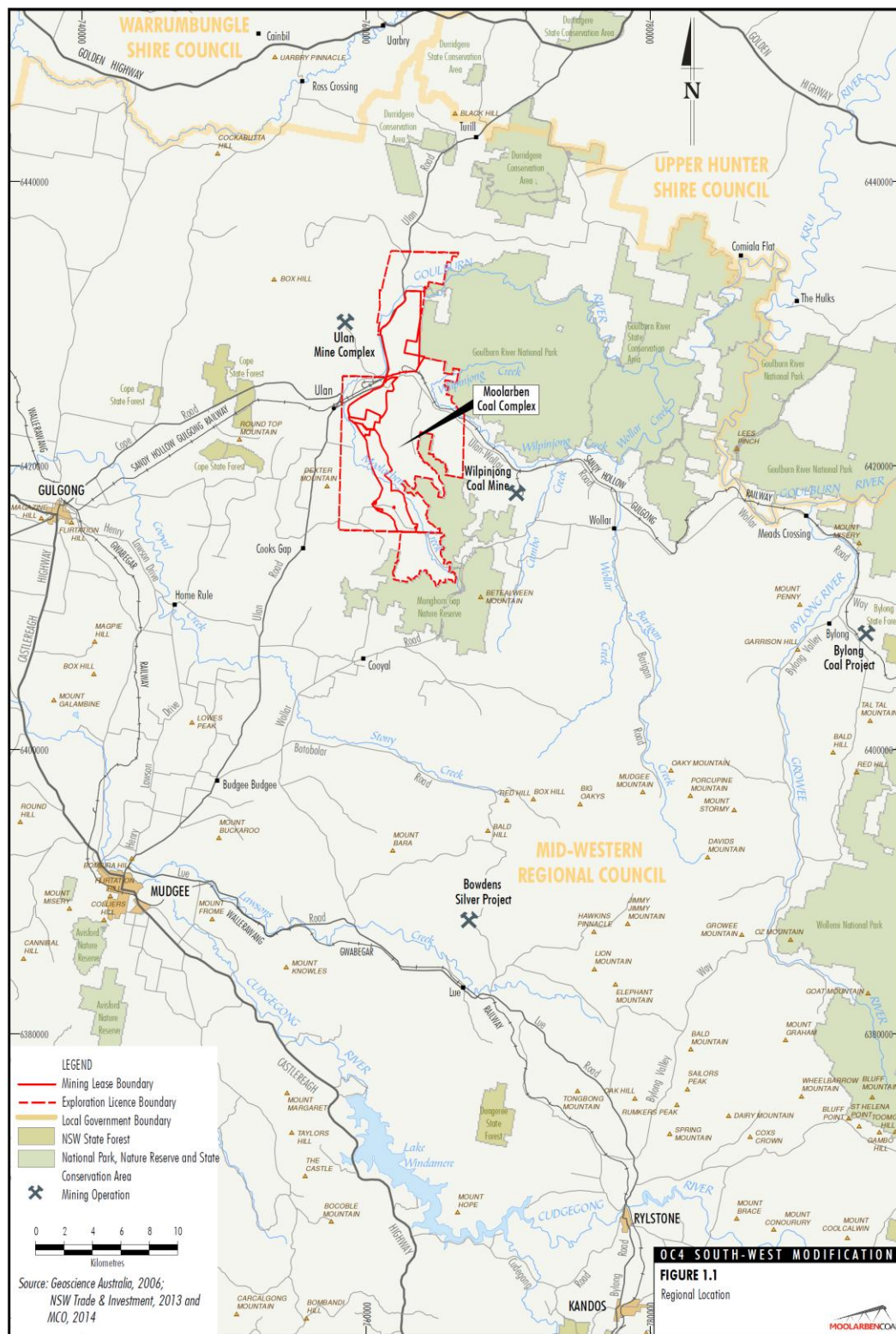
The elements of the proposed modification comprise:

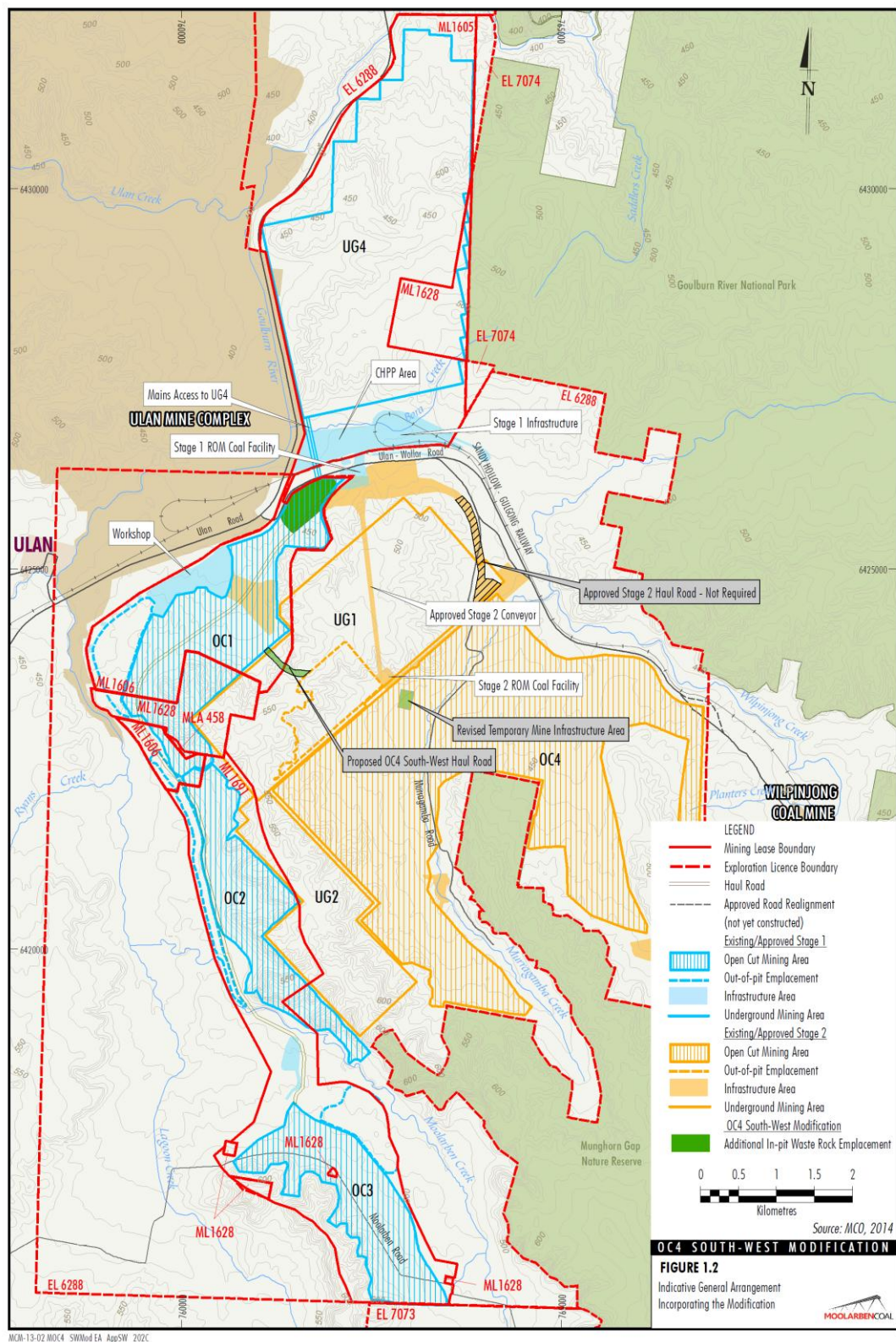
- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations.

The proposed modification elements are shown on Figure 1.2.

The scope of works for the surface water impact assessment includes the following components:

- Development of conceptual clean water diversions;
- Development of a management strategy for runoff from the haul road; and
- Assessment of potential surface water impacts as a result of the proposed modification.





2 Existing Surface Water Environment

2.1 PREVIOUS STUDIES

A description of the existing surface water environment at and in the vicinity of the Moolarben Coal Complex is provided in the report “Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment”, which was prepared by WRM in May 2013 (WRM, 2013a). Details of the existing surface water environment include:

- regional drainage network;
- local drainage network;
- climatic conditions;
- streamflow;
- surface water quality; and
- Environment Protection Licence (EPL) release conditions.

3 Overview of Moolarben Coal Complex Water Management System

3.1 PREVIOUS STUDIES

A description of the existing and proposed Stage 1 and Stage 2 Moolarben Coal Complex water management system is provided in the following reports:

- “Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment” (WRM, 2013a).
- “Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment - Addendum Report” (WRM, 2013b).

These reports provide details of the existing and proposed Moolarben Coal Complex water management system, including the following:

- key objectives of the surface water management strategy;
- sources of water supply;
- site water demands;
- details of the existing surface water management infrastructure; and
- details of the proposed surface water management infrastructure for Stage 1 and Stage 2 operations.

3.2 PROPOSED CHANGES TO THE MOOLARBEN COAL COMPLEX WMS

Key changes to the approved Moolarben Coal Complex water management system as a result of the proposed modification are described as follows:

- Re-alignment of the proposed haul road between OC1 and OC4 further to the south-west.
- Relocation of the OC4 mine infrastructure area.
- Additional in-pit waste rock emplacement within the northern OC1 void.

Other than the development of the OC4 south-west haul road, all changes to the Moolarben Coal Complex associated with the proposed Modification would be located within existing/approved disturbance areas. The proposed modification would result in an overall reduction in disturbance area as the approved Stage 2 haul road and mine infrastructure area would be avoided (Figure 1.2).

4 Impact Assessment

4.1 POTENTIAL IMPACTS

The potential impacts of the proposed modification on surface water resources include:

- impact on the mine site water balance;
- impacts on downstream surface water quality; and
- impacts of changes to catchment areas draining to receiving waters.

An assessment of each of these potential impacts of the proposed modification is provided in the following sections.

4.2 MINE SITE WATER BALANCE

Backfilling of the northern OC1 void would result in negligible change to the overall mine site water balance, as it was previously proposed as an access point for the UG4 mine, and therefore would not have been used for water storage during operations.

The south-west haul road is located within catchments which drain to approved existing or proposed water management infrastructure.

In addition, there would be a reduction to the overall area of disturbance and no material change to the strategy for capture of mine affected water (refer to Section 5).

Given the above, there is negligible expected change to the overall mine site water balance as a result of the proposed modification.

4.3 SURFACE WATER QUALITY

Water on the mine site consists of:

- Runoff from undisturbed areas (clean runoff),
- Runoff from disturbed areas (sediment-laden runoff), and
- Water that has been affected by contact with coal or other potential contaminants (mine water). This includes groundwater and surface runoff inflows to open cut pits, runoff from coal stockpiles etc.

Wherever possible, clean runoff will be diverted around disturbance areas using diversion drains. This will minimise the volume of water collected in onsite storages and also minimise the impacts on downstream catchments.

Sediment-laden runoff will be collected and settled in sediment dams. If the quality of this water is not suitable for release to receiving waters, it will be pumped back into the mine water management system. This water will only be released from site in accordance with the EPL 12932.

The mine water management system will be operated to fully contain mine water on the mine site and to preferentially reuse this water to meet site demands. The results of the previous mine water balance modelling (undertaken as part of the MOD 9 project) show that under the full range of historical rainfall conditions, the proposed mine water management system will have sufficient capacity to contain all mine water on the site without uncontrolled releases.

As there is no material change to the operation of the mine water management system due to the proposed modification, no impact on the surface water quality of the receiving environment is expected.

4.4 CHANGES IN CATCHMENT AREA

The currently approved Stage 2 haul road alignment that is no longer required impacts approximately 175 hectares (ha) of undisturbed catchment draining to Wilpinjong Creek.

The proposed relocation of the south-west haul road is located within catchments which drain to approved existing or proposed water management infrastructure (refer to Section 5 for further details of the proposed haul road drainage). The approximate catchment area for the proposed haul road is 80ha and would be captured in two water storages DD1 and DD2. Figure 4.1 shows the catchment area for both the approved and proposed south-west haul roads. It is relevant to note that the catchment area for the south-west haul road (i.e. 80 ha) is conservative as it includes those areas within existing approved disturbance areas (i.e. OC1 and the northern waste emplacement).

As shown in Figure 4.1, the re-alignment of the haul road to the south-west results in a reduced impact on the catchments of both Bora Creek and Wilpinjong Creek.

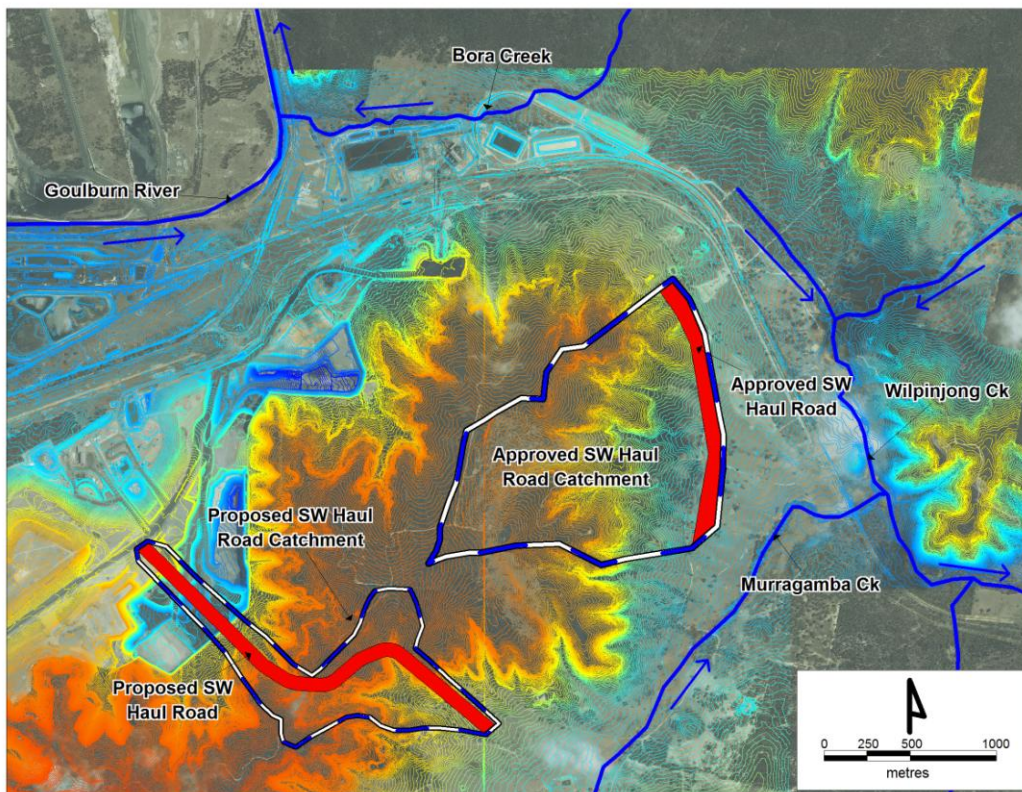


Figure 4.1 - Change in Catchment Area

5 Haul Road Drainage - Concept Layout

A concept drainage layout for the proposed south-west haul road has been developed, based on information provided by MCO and the latest topographic data. The proposed haul road extends from the OC1 mining area, crosses over the Moolarben Creek/Murragamba Creek catchment divide, and ends at the revised OC4 Mine Infrastructure Area.

The alignment of the proposed haul road is shown in Figure 5.1.

As the haul road will primarily be in cut, drains will be required on either side of the road to capture runoff from the road itself, as well as the cut batter slopes. The runoff from the haul road will be captured in two dams proposed under the Stage 2 operations.

Runoff from the haul road will generally be managed as follows (refer to Figure 5.1):

- Runoff which drains west will be captured within the storage Dam DD2.
- Runoff which drains east will be captured within the storage Dam DD1.
- Where possible, the top of the cut batters will have bunds to direct clean catchment away from the haul road.

The drainage lines shown on Figure 5.1 are indicative only, and are shown outside of the proposed haul road foot print for illustrative purposes only. It is expected that the drains will be located within the proposed haul road disturbance footprint, and this will be confirmed during the infrastructure detailed design process.

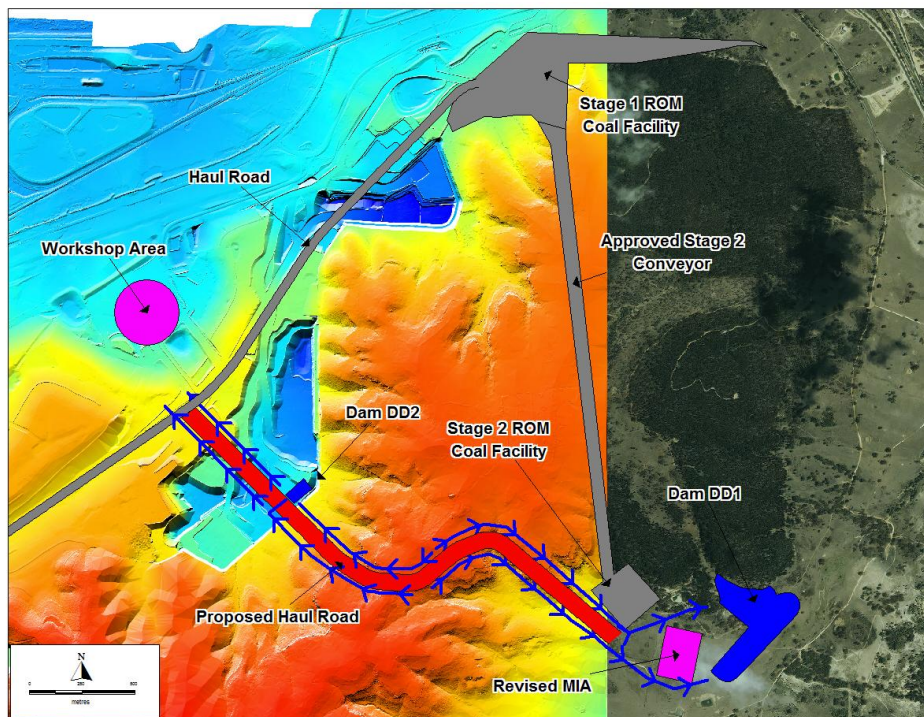


Figure 5.1 - Haul Road Concept Drainage Configuration

6 Management and Monitoring

Surface water impacts associated with Stage 1 and Stage 2 operations are managed under MCO's Water Management Plan (WMP), developed in consultation with the NSW Office of Water, NSW Office of Environment and Heritage and NSW Department of Trade and Investment, Regional Infrastructure and Services. The primary objectives of the WMP, with respect to surface water, are to:

- ensure that the water quality leaving the mine site meets the appropriate quality standards under EPL 12932;
- define the structures, strategies and procedures to be implemented to ensure that all environmental impacts associated with site water management are minimised;
- define a program to monitor and assess impacts on surface water;
- define how the mine will mitigate and respond to potential impacts from mining activities on surface water;
- divert upslope clean surface water runoff around disturbed areas where feasible;
- maximise the reuse of treated dirty water onsite;
- maximise water sharing with other mines; and
- ensure that groundwater make is stored and treated on-site and re-used as needed.

The WMP provides guidance on the monitoring and management for the surface water management system, including details of management response actions.

The WMP and relevant sub-plans will be reviewed and updated as required to accommodate the proposed modification.

7 Summary of Findings

The surface water impact assessment has considered the potential impacts of the proposed modification on surface water resources. A summary of the assessed impacts on the surface water management system are as follows:

- There is no expected change to the overall mine site water balance as a result of the proposed modification, and therefore no expected impact.
- As there is no material change to the operation of the mine water management system due to the proposed modification, no impact on the surface water quality of the receiving environment is expected.
- The re-alignment of the haul road to the south-west results in a reduced impact on the Wilpinjong Creek catchment.

The WMP and relevant sub-plans will be reviewed and updated as required to accommodate the proposed modification.

8 References

- WRM, 2013a *'Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment'* Report prepared by WRM Water and Environment, May 2013.
- WRM, 2013b *'Moolarben Coal Project - Stage 1 Optimisation Modification - Surface Water Impact Assessment - Addendum Report'* Report prepared by WRM Water and Environment, October 2013.




ABORIGINAL CULTURAL HERITAGE ASSESSMENT

Moolarben Coal Complex OC4 South-West Modification

April 2015

Local Government Area:	Mid-Western Region
Nearest Town:	Ulan
Consultant Name:	Niche Environment and Heritage Pty Ltd
Authors:	Clare Anderson and Jamie Reeves
Proponent:	Moolarben Coal Mines Pty Ltd

Document Controls

Project No.	1932		
Document Description	Aboriginal Cultural Heritage Assessment: Moolarben Coal Complex OC4 South-West Modification		
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Document Manager	Jamie Reeves		
Authors	Clare Anderson and Jamie Reeves		
Client Review	Yancoal Australia Ltd		
Document Status	Revision 7		
Date	16 April 2015		
Prepared for:	Moolarben Coal Operations Pty Ltd		

Cover Photo: Surveying in the proposed OC4 South-West Modification corridor. Source: Niche Environment and Heritage Pty Ltd.

Summary

This report presents the results of an Aboriginal cultural heritage and archaeological assessment of the proposed Moolarben Coal Complex OC4 South-West Modification (the Modification) at the Moolarben Coal Complex, near Ulan in New South Wales. The OC4 South-West Modification includes the following key components:

- ❑ construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed);
- ❑ adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- ❑ refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- ❑ backfilling of the northern OC1 final void to approximately pre-mining elevations.

The subject area for the proposed Modification falls within hilly terrain comprised of simple slopes, ridge crests and first order drainage paths with low to steep slopes. The subject area and surrounding area of the proposed OC4 haul road has been subject to relatively intensive Aboriginal cultural heritage and archaeological survey in the past. These surveys were for the purposes of assessing the impacts of other mine related activities; such as subsidence, waste rock emplacements and exploration. Despite the relatively intensive previous survey effort, there have been no Aboriginal cultural heritage sites or objects previously recorded in the subject area.

Additional survey of the proposed subject area (comprising Option 1 and Option 2 haul road alternatives) was conducted on 12 March 2014 and 31 July 2014 by an experienced and qualified archaeologist (Jamie Reeves of Niche Environment and Heritage) and representatives of the four Moolarben Coal Project Registered Aboriginal Parties (Warrabinga Native Title Claimants Aboriginal Corporation, North East Wiradjuri Company Ltd, Murong Gialinga Aboriginal and Torres Strait Islander Corporation and Mudgee Local Aboriginal Land Council).

There were no Aboriginal objects or areas of cultural heritage value identified within the subject area, and none were considered likely to occur within the subject area.

Table of Contents

1.	Introduction.....	1
2.	Site Location.....	2
3.	Investigators and Contributors.....	2
4.	Description of Development Proposal	5
5.	Aboriginal Community Consultation Process	6
	The Consultation Process.....	8
	Stage 1 - Notifications	8
	Stages 2 and 3 - Presentation of Project Information and Gathering Information about Cultural Significance	8
	Stage 4 - Review of Draft Report.....	10
6.	Register Searches	17
	Commonwealth Registers.....	17
	National Heritage Registers	17
	State Registers	17
	Heritage Act Registers	17
	Environmental Planning and Assessment Act Registers (EP&A Act).....	17
	National Parks and Wildlife Act Registers (AHIMS)	18
7.	Landscape Context	19
8.	Local Aboriginal History	20
9.	Previous Archaeological Work	21
	Regional Archaeological Studies.....	21
	Local Archaeological Assessments.....	29
10.	Predictive Model	33
11.	Field Methods.....	33
	Survey Sampling Strategy.....	33
	Survey Methods.....	34

Methods of Assessing Heritage Significance	34
12. Results	35
Simple Slopes	37
Ridge Crests and Steep Slopes	38
13. Analysis and Discussion	39
14. Scientific Values and Significance Assessment	40
Aesthetic Value	40
Historic Value	40
Scientific Value	40
Social Value	40
Other Approaches	41
Research Potential	41
Representativeness	41
Rarity	41
Educational Potential	42
Aesthetics	42
Assessment of Significance	42
Archaeological Value	42
Cultural Value	43
Social Value	43
Historic Value	43
Scientific (Archaeological) Value	43
Aesthetic Value	43
15. Impact Assessment	44
16. Management and Mitigation Measures	44
17. Recommendations	45
18. References	50
19. Glossary	56

Appendix 1 Consultation Log	58
Appendix 2 Copies of Comments on Draft Report	60
Appendix 3 AHIMS Search Results	67

List of Tables

Table 1: Summary of Assessments at the Ulan Coal Mine (Kuskie 2013a: 15)	23
Table 2: Frequency of Aboriginal Sites at the Ulan Coal Mine as of 2009 (Kuskie 2009: 108).....	24
Table 3: Summary of Assessments at the Wilpinjong Coal Mine (Source: Kuskie 2013b)	27
Table 4: Summary of Aboriginal Sites Within the Wilpinjong Coal Mine (Source: Kuskie 2013b:11)	28
Table 5: Summary of Past Aboriginal Heritage Investigations at Moolarben Coal Complex (Source: Kuskie 2013c: 12-14)	29
Table 6: Summary of Identified Aboriginal Heritage Sites within Stages 1 and 2 of the Moolarben Coal Complex (Source: Moolarben Coal Mine Aboriginal Sites Database as at February 2014).....	31
Table 7: Survey Coverage Data.....	35
Table 8: Landform Summary Data	35

List of Figures

Figure 1: Regional Location (Source: Niche, 2014)	3
Figure 2: Site Map (Source: Niche, 2014).....	4
Figure 3: Moolarben Coal Aboriginal Heritage (Source: Niche with Data Provided by OEH).....	12
Figure 4: Landforms and Survey Results (Source: Niche Environment and Heritage 2014)	36

List of Plates

Plate 1. Example of the Simple slopes landform (Source: Niche)	37
Plate 2. Example of the Ridge crests and steep slopes landform (Source: Niche)	38

1. Introduction

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfields of New South Wales (NSW) in the Mid-Western Regional Local Government Area.

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

Stage 1 of the Moolarben Coal Complex (i.e. the Moolarben Coal Project) was approved in 2007 as a Major Project (05_0117) under Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). Stage 1 consists of three open cut coal mines (OC 1, OC 2, OC 3), one underground mine (UG4), a coal handling and preparation plant, coal stockpiles, a rail loop, rail loader, and office and workshop support facilities. Modifications to the Stage 1 approval include Modifications 1, 2, 3, 4, 5, 6, 7, 8 and 9. An Aboriginal Heritage Management Plan (AHMP) for Stage 1 has been approved and is currently implemented.

MCO is seeking to expand its operations as part of Stage 2 of the Moolarben Coal Project. A Major Project Application (08_0135) was submitted to the NSW Department of Planning and Infrastructure (now the NSW Department of Planning and Environment) in 2008 and was approved on 30 January 2015. Stage 2 comprises an open cut mine (OC4), two underground mines (UG1 and UG2) and associated infrastructure.

MCO has identified that an opportunity exists to relocate the Stage 2 OC4 haul road to link the Stage 2 open cut operations with existing Stage 1 coal processing infrastructure and support facilities. The proposed relocation of the OC4 haul road would require a modification to both its Stage 1 and Stage 2 Moolarben Coal Project Approvals (05_0117 and 08_0135) under Section 75W of the EP&A Act.

Niche Environment and Heritage Pty Ltd (Niche) has been commissioned by MCO to undertake an Aboriginal Cultural Heritage Assessment (ACHA) and archaeological assessment report to inform an Environmental Assessment of the two options for the proposed OC4 haul road.

This archaeological assessment report has been prepared in accordance with the following guidelines:

- ❑ *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRs)(NSW Department of Environment, Climate Change and Water [DECCW] 2010a);
- ❑ *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW 2010b); and

- ❑ *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (NSW Office of Environment and Heritage [OEH] 2011).

The objectives of this report were to assess the proposed Option 1 and Option 2 routes for a potential relocation of the OC4 haul road and the location of a Mine Water Dam (which is no longer a component of the Modification) for Aboriginal heritage values, to identify whether Aboriginal sites, objects or places would be impacted by the proposed works, and provide appropriate mitigation and management recommendations, where required.

2. Site Location

The subject area is located within the Moolarben Coal Complex, approximately 40 km north of Mudgee in the Western Coalfields of NSW (Figure 1). The Moolarben Coal Complex is located immediately west of the Wilpinjong Coal Mine and south of the Ulan Mine Complex in the locality of Ulan in the Central Tablelands of NSW.

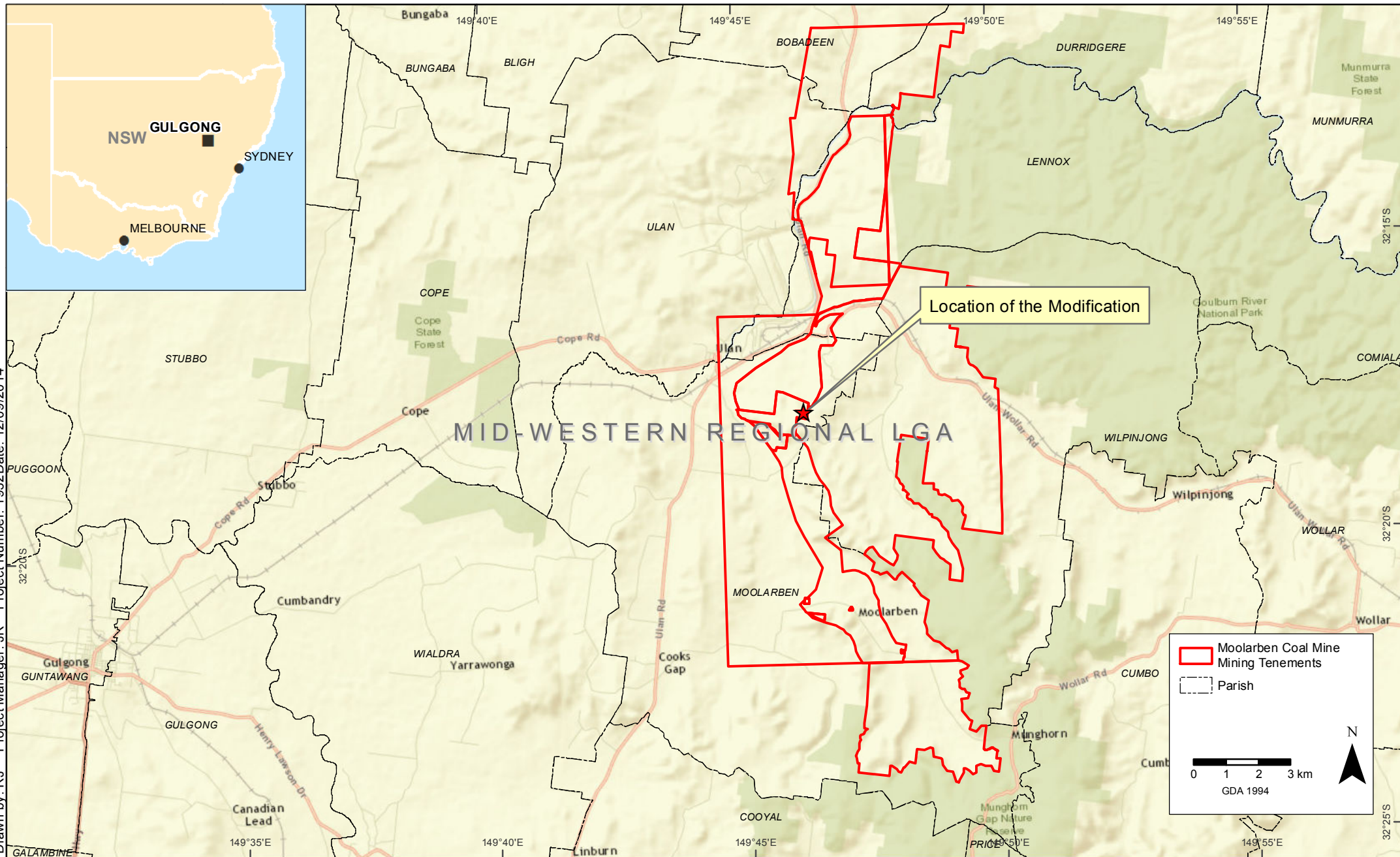
The subject area is defined as the preferred Option 1 and Option 2 areas for the proposed OC4 haul road as depicted in Figure 2. This consists of a development corridor approximately 90 metres (m) wide and approximately 650 m in length for the Option 1 haul road (an area of approximately 5.1 hectares [ha]) and 1,690 m in length for the Option 2 haul road (an area of approximately 15.2 ha).

3. Investigators and Contributors

This investigation was conducted by Jamie Reeves, Archaeologist of Niche. This report was written by Jamie Reeves and Clare Anderson and reviewed by Renée Regal (Niche).

Coral Williams (Warrabinga Native Title Claimants Aboriginal Corporation), Shaen Morgan (North East Wiradjuri Company Ltd), Shannon Foley (Murong Gialinga Aboriginal and Torres Strait Islander Corporation) Christine Maynard and Larry Foley (Mudgee Local Aboriginal Land Council) participated in the archaeological survey campaigns. All of the Registered Aboriginal Parties (RAPs) were consulted and invited to provide advice on Aboriginal cultural heritage values during the assessment, regardless of participation in the archaeological survey work.

Drawn by: RJ Project Manager: JR Project Number: 1932 Date: 12/09/2014



Regional Location

Moolarben OC4 South-West Modification

FIGURE 1

4. Description of Development Proposal

MCO has reviewed the mining sequence and associated infrastructure layout requirements at the Moolarben Coal Complex to enable more efficient access to the OC4 resource. As a consequence, the approved Stage 2 Haul Road (to the north-east of OC4) would no longer be required, and would be replaced by a shorter, more direct, haul road route to OC1 (in the south-west).

Removal of the approved Stage 2 Haul Road would result in benefits to the environment, including:

- ❑ up to approximately 18.5 ha of approved surface disturbance being avoided; and
- ❑ improved water management and reduced risk of uncontrolled site discharge to Murragamba and Wilpinjong Creeks, by removing ongoing high maintenance requirements to control sediment along the approved haul road.

The OC4 South-West Modification includes the following key components:

- ❑ construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed);
- ❑ adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of clean water;
- ❑ refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- ❑ backfilling of the northern OC1 final void to approximately pre-mining elevations.

5. Aboriginal Community Consultation Process

In administering its statutory functions under Part 6 of the NSW *National Parks and Wildlife Act, 1974*, the OEH requires that proponents consult with Aboriginal people about the Aboriginal cultural heritage values (cultural significance) of Aboriginal objects and/or places within any given development area in accordance with Clause 80c of the NSW *National Parks and Wildlife Regulation, 2009*.

The OEH maintains that the objective of consultation with Aboriginal communities about the cultural heritage values of Aboriginal objects and places is to ensure that Aboriginal people have the opportunity to improve ACHA outcomes by (DECCW 2010a):

- ☐ providing relevant information about the cultural significance and values of Aboriginal objects and/or places;
- ☐ influencing the design of the method to assess cultural and scientific significance of Aboriginal objects and/or places;
- ☐ actively contributing to the development of cultural heritage management options and recommendations for any Aboriginal objects and/or places within the proposed subject area; and
- ☐ commenting on draft assessment reports before they are submitted by the proponent to the OEH.

Consultation in the form outlined in the ACHCRs is a formal requirement where a proponent is aware that his/her development activity has the potential to harm Aboriginal objects or places. The OEH also recommends that these requirements be used when the certainty of harm is not yet established but a proponent has, through some formal development mechanism, been required to undertake a cultural heritage assessment to establish the potential harm their proposal may have on Aboriginal objects and places.

Consultation for this Modification, has been undertaken in accordance with the ACHCRs as these meet the fundamental tenants of the 2004 consultation requirements (NSW Department of Environment and Conservation [DEC] 2004), while meeting current industry standards for community consultation.

The ACHCRs outline a four stage consultation process that includes detailed step-wise guidance as to the aim of the stage, how it is to proceed and what actions are necessary for it to be successfully completed. The four stages are:

- ☐ Stage 1 - Notification of Project proposal and registration of interest.
- ☐ Stage 2 - Presentation of information about the proposed Project.
- ☐ Stage 3 - Gathering information about the cultural significance.
- ☐ Stage 4 - Review of draft cultural heritage assessment report.

The document also outlines the roles and responsibilities of the OEH, Aboriginal Parties including Local and State Aboriginal Land Councils, and proponents throughout the consultation process.

To meet the requirements of consultation it is expected that proponents will (DECCW 2010a):

- ☐ bring the RAPs or their nominated representatives together and be responsible for ensuring appropriate administration and management of the consultation process;
- ☐ consider the cultural perspectives, views, knowledge and advice of the RAPs involved in the consultation process in assessing cultural significance and developing any heritage management outcomes for Aboriginal objects(s) and/or places(s);
- ☐ provide evidence to the OEH of consultation by including information relevant to the cultural perspectives, views, knowledge and advice provided by the RAPs;
- ☐ accurately record and clearly articulate all consultation findings in the final cultural heritage assessment report; and
- ☐ provide copies of their cultural heritage assessment report to the RAPs who have been consulted.

The consultation process undertaken to seek active involvement from relevant Indigenous people followed the current NSW statutory guideline, namely, the ACHCRs. Section 1.3 of the ACHCRs describes the guiding principles of the document. The principles have been derived directly from the Principles section of the Australian Heritage Commission's *Ask First: A guide to respecting Indigenous heritage places and values* (Australian Heritage Commission 2002). Both documents share the aim of creating a system where free prior informed advice can be sought from the Aboriginal community.

The following outlines the process and results of the consultation conducted during this assessment to ascertain and reflect the Aboriginal cultural heritage values of the subject area.

The Consultation Process

Stage 1 - Notifications

This stage of the consultation process is used to identify any Aboriginal people or groups who may have a cultural interest and possess cultural knowledge in the subject area. Aboriginal stakeholder groups with an interest in the Moolarben Coal Complex have previously been identified (in compliance with the *Consultation Requirements*) and MCO has maintained ongoing consultation and engagement with these groups since 2004 (see overview in Kuskie 2013a: 70).

For the Modification, the existing parties were contacted and consulted with. These parties are:

- ☐ Ms Aleisha Lonsdale;
- ☐ Mr Craig McConnell;
- ☐ Mudgee Local Aboriginal Land Council;
- ☐ Murong Gialinga Aboriginal and Torres Strait Islanders Corporation;
- ☐ NC01¹;
- ☐ North-East Wiradjuri Company Ltd;
- ☐ Warrabinga Native Title Claimants Aboriginal Corporation; and
- ☐ Ms Warranha Ngumbaay.

A consultation log detailing all Aboriginal community consultation undertaken for the Modification is provided in Appendix 1. A copy of relevant written correspondence received from the RAPs is also provided in Appendix 2.

Stages 2 and 3 - Presentation of Project Information and Gathering Information about Cultural Significance

The RAPs were provided with a letter outlining information about the Modification and a copy of the Proposed Methodology for an ACHA in accordance with the ACHCRs (DECCW 2010b).

An information session was held on 11 March 2014 at the Moolarben Coal Complex. RAPs were invited to the information session and representatives from the following RAPs attended:

- ☐ Warrabinga Native Title Claimants Aboriginal Corporation;
- ☐ North East Wiradjuri Company Ltd;

¹ One of the RAPs for the Modification advised Moolarben Coal that they did not wish for their name to be made public or be published in any formal documentation. Accordingly, in this report this RAP is referred to as "NC01".

- ☐ Murong Gialinga Aboriginal and Torres Strait Islander Corporation; and
- ☐ Mudgee Local Aboriginal Land Council.

At the information session, MCO provided a presentation on the nature and scale of the proposed Modification, an overview of the impact assessment process, a discussion of the roles, functions and responsibilities of participants and protocols for the management of any sensitive cultural heritage information. The information session also provided RAPs with an additional opportunity to raise any cultural issues or comments/perspectives regarding the proposed Modification or the Proposed Methodology.

The Proposed Methodology for the ACHA was also discussed and distributed at the information session, with a minimum of 28 days allowed for RAPs to:

- ☐ suggest any protocols to be adopted into the information gathering process and assessment methodology; and
- ☐ highlight any other matters such as issues or areas of cultural significance that might affect, inform or refine the methodology.

The period for commenting on the Proposed Methodology was open between 11 March 2014 and 8 April 2014. No comments on the Proposed Methodology were received from the RAPs during this time.

Representatives from the following RAPs attended the field survey of the subject area on 12 March 2014 and 31 July 2014:

- ☐ Warrabinga Native Title Claimants Aboriginal Corporation;
- ☐ North East Wiradjuri Company Ltd;
- ☐ Murong Gialinga Aboriginal and Torres Strait Islander Corporation; and
- ☐ Mudgee Local Aboriginal Land Council.

The first campaign of field surveys (i.e. 12 March 2014) was undertaken during the period for review and comment on the Proposed Methodology. It was explained at the information session (11 March 2014) that if any RAP had comments on the Proposed (assessment) Methodology which (subject to agreement by MCO) would change the approach for the field surveys (i.e. pedestrian survey across the extent of the study area that has not been subject to previous systematic survey), MCO would commit to re-surveying the relevant portions of the study area following the Proposed Methodology review period. As no comments of this nature were received, no re-surveying was undertaken.

Following comments received from NC01, an additional copy of the Proposed Methodology was provided for their review and feedback on 13 June 2014, with comments requested by 10 July 2014. No comments on the Proposed Methodology were received from NC01 during this time.

Following completion of the 12 March 2014 survey work and the conclusion of the Proposed Methodology review period, access was gained to a previously inaccessible portion of the proposed Haul Road Option 1. Field survey of this land was undertaken on 31 July 2014 consistent with the Proposed (assessment) Methodology. This survey work was undertaken during the review period for the draft ACHA.

Stage 4 - Review of Draft Report

A draft of this report (i.e. the draft ACHA) was provided to the RAPs for their review and comment on 7 May 2014 in accordance with the ACHCRs (DECCW 2010a). A minimum of 28 days were provided to each of the RAPs with a request for comments to be provided by 6 June 2014.

During the 31 July 2014 survey work, no Aboriginal culture heritage sites or cultural heritage values were identified, which is consistent with the findings of the 12 March 2014 survey work and the content of the draft ACHA provided to the RAPs for their review on 7 May 2014. It is also noted that the landforms surveyed during the 31 July 2014 survey campaign were consistent and contiguous with those originally surveyed during the 12 March 2014 survey (i.e. the landforms were directly adjacent to those previously surveyed).

A copy of the final ACHA report will be made available to all RAPs during the public exhibition period for the Environmental Assessment. During this exhibition period all RAPs will have the opportunity to review and provide additional comment on the final ACHA report.

Written submissions on the draft ACHA were received from the following RAPs in accordance with the ACHCRs (DECCW 2010a):

- ☐ Warrabinga Native Title Claimants Aboriginal Corporation (10 June 2014);
- ☐ NC01 (6 June 2014);
- ☐ Murong Gialinga Aboriginal and Torres Strait Islanders Corporation (5 June 2014); and
- ☐ Mr Craig McConnell (27 May 2014).

The copies of the submissions are included in this report in Appendix 2. Responses to each submission are provided below.

Warrabinga Native Title Claimants Aboriginal Corporation

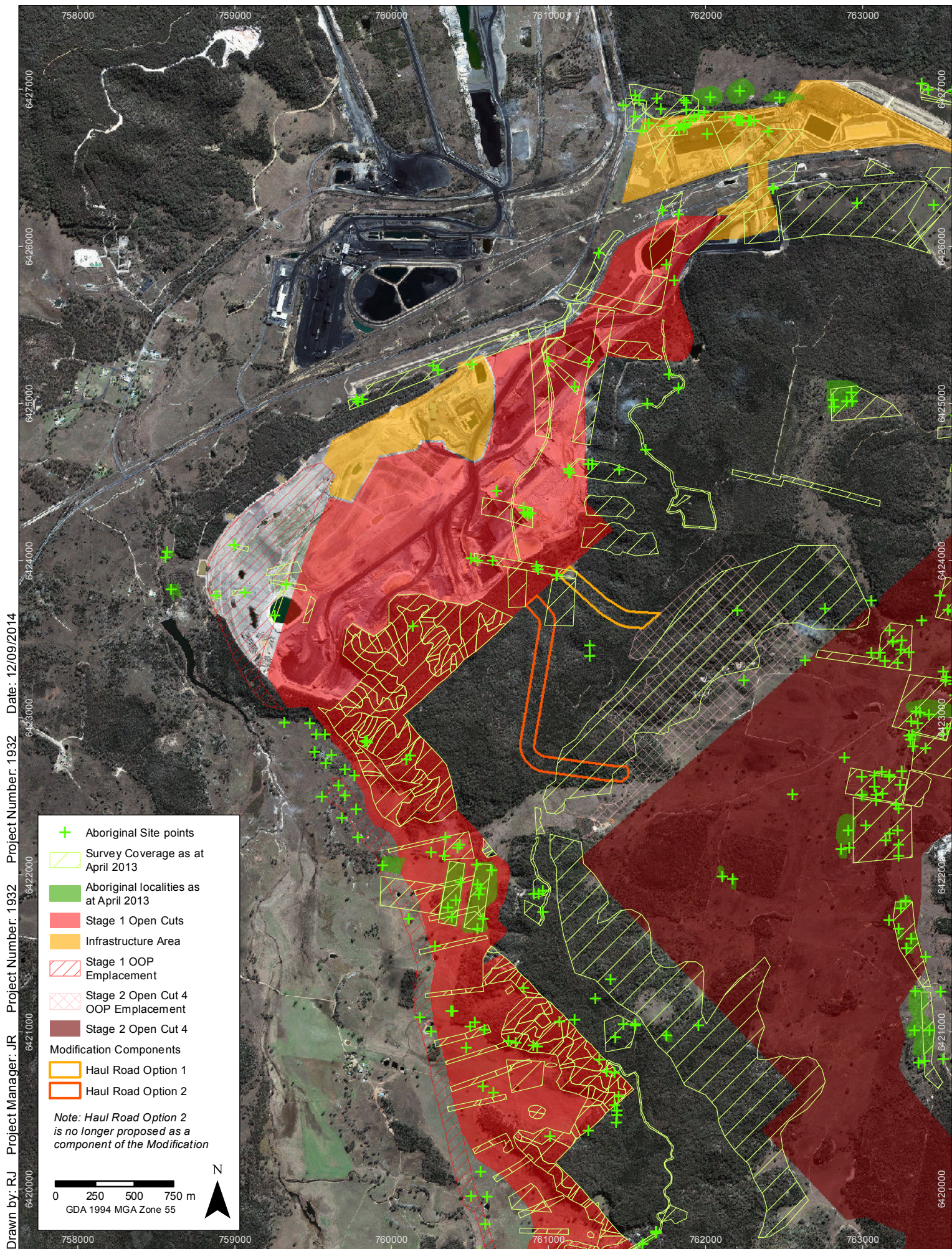
Comment: *“The first area of improvement relates to the provision of more detailed and referenced maps so an accurate understanding of the areas stated in Section 1 paragraphs 2 and 3 can be understood in context.”*

Response: Figure 1 presents the location of the Modification in relation to the Moolarben Coal Complex tenements and provides a more regional context to the Modification area. Figure 2 provides a zoom-in on the proposed haul road route options in relation to key surrounding surface disturbance areas including the Stage 1 open cut, Stage 2 open cut and the Stage 2 open cut emplacement. Figure 3 provides a more general site overview and presents the haul road options in relation to surface disturbance activities associated with the wider Moolarben Coal Complex area including the infrastructure areas, Stages 1 and 2 emplacements, Stage 1 and 2 open cuts. Figure 3 also provides context in relation to the existing known Aboriginal heritage sites and previous survey coverage. On this basis, Niche is of the opinion that sufficient site context has been provided to enable a thorough review of this report by the RAPs.

Comment: *“Further, we note that there are two options identified for the haul road yet there is no preferred option identified, are we to assume that both haul roads are to be built?”*

Response: Only one haul road option is proposed to be constructed as a component of the Modification (Figure 2)

Comment: *“Could you also please confirm whether the “pipeline network” mentioned in Section 4 is proposed to be contained wholly within the Haul Road Easement (90m wide) or are they proposed for separate routes and therefore are currently not adequately assessed. We note that two Aboriginal sites are known to be located to the south east of the proposed Mine Water Dam (Figure 3). Yet those two sites do not appear to receive any specific consideration in the report. We have concerns that the placement of the mine water dam in the present location will make inundation of these two sites easier to justify in the future. Without further more specific details in relation to these two sites we are unable to indicate any level of agreement or endorsement of the proposed works. It is critical that these documents contain sufficient information for a person unfamiliar with the project to gain an appreciation of the project and understand what is being asked for. How can we be expected to seek input from our senior people in relation to these areas and what is being proposed when this is unclear in the report.”*



Notice: 2014-04-24. Niche Environment and Heritage Pty Ltd have identified spatial discrepancies, indicative of datum error, between the Moolarben Coal heritage database and AHIMS. These discrepancies are under investigation. The site point date presented here should be interpreted in this regard.

Moolarben Coal Aboriginal Heritage Records

Moolarben OC4 South-West Modification

FIGURE 3

Imagery: (c) YanCoal 2013-08-12

Response: The Mine Water Dam and the associated pump and pipeline network are no longer a component of the Modification. Section 4 and Figure 2 of this report provide a clear description of the Modification, including the key components which may require surface disturbance.

Comment: *"We also are unable to understand how some of the visibility and exposure percentages specified in Table 7 can be accurate. We assume that Plates 1 and 2 document the typical conditions in their respective Survey Units and as such we certainly do not agree with visibility and exposure percentage to the levels specified in the report. By overstating the Visibility and Exposure percentages it has the effect of making the effective survey coverage appear higher and therefore has the effect of making the results of the survey appear more legitimate. I would suggest that visibility and exposure percentage in the order of 10-20% would be more in keeping with the area surveyed."*

Response: As stated in text and captions, Plates 1 and 2 do not represent "typical conditions in their respective survey units", rather they provide examples of the terrain that is characteristic of each landform defined by the survey archaeologist. Archaeological exposure and visibility were estimated using the OEH *Code of Practice for the Archaeological Investigation of Aboriginal Objects* (DECCW 2010b). Niche is confident the estimates provide an accurate and fair interpretation of the survey's effectiveness, as intended by the Code, and recognises nothing can be gained from deliberately artificially reporting such values.

Comment: *"There is a question over Moolarben Coal Mines ability to respond to any queries raised in relation to the methodology. If the period of comment was 11/3/2014 to 8/4/2014 as stated in Section 5 then how is it that the survey could be conducted on 12/3/2014. I would suggest to you that the reason you received no comment was because there was no reason for bothering drafting a letter when clearly it would not be considered, as Moolarben Coal Mine had already undertaken the works which were supposed to be subject to comment."*

Response: Noted. There is no regulatory requirement to conduct the surveys subsequent to the expiry of the Proposed Methodology review period (noting that the Proposed Methodology refers to more than just the archaeological survey, and provides a methodology for the progression of the assessment). At the information session (11 March 2014) MCO advised that if any submissions or comments were received in regard to the Proposed Methodology that MCO reasonably considers would have altered the field survey design/implementation, then MCO committed to undertaking the field surveys (with involvement of the RAPs) again after the completion of the Proposed Methodology review period, having regard to the survey requirements and the objectives of the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a).

Comment: *“Warrabinga request that our comments be addressed in the report and that a further round of consultation be undertaken once these comments have been addressed. At this stage we do not believe that the report provided sufficient detail for us to reach a position supporting the proposed works.”*

Response: The comments provided by Warrabinga Native Title Claimants Aboriginal Corporation have been included in full in Appendix 2 and considered in detail in this section. Detailed consideration of the comments provided by all RAPs has been undertaken, including updates and/or clarification in the report where required. A copy of the final ACHA report will be made available to all RAPs during the public exhibition period for the Environmental Impact Statement. During this exhibition period all RAPs will have the opportunity to review and provide additional comment on the final ACHA report. Niche considers that the draft ACHA and this final report present a robust and adequate assessment of Aboriginal cultural heritage in relation to the Modification. The sections of the report describing the Modification description (Section 4), the survey (Section 11), the results (Section 12), scientific values and significance assessment (Section 14), impact assessment (Section 15), the management and mitigation measures (Section 16) and the recommendations (Section 17) present a detailed and comprehensive assessment. On this basis, it is considered that a re-issue of the report is not warranted.

NC01

Comment: NC01 *“is supportive of any efforts to provide facilities for the community at large within our Traditional Lands, where it does not significantly impact on cultural artefacts, heritage sites, the environment including water sources and the sub-terrain water table, endangered or threatened species of flora or fauna and provided Proponents have consulted with [NC01] and negotiated an agreed outcome in relation to our cultural, heritage and environmental concerns which Moolarben have not.[NC01] objects to any other non-traditional aboriginal organizations or people taking part in site surveys, consultation and assessments within our defined traditional lands. These non-traditional people and groups are outsiders under Traditional Lore and have no right to advise on or to be present during consultation or site visits as they do not possess the specific traditional knowledge in relation to these lands or sites. These participants may be indigenous and may live locally however this still does not give them the right to disregard Traditional Lore and values.”*

Response: Consultation for the Modification ACHA has been undertaken in accordance with the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a) and the NSW *National Parks and Wildlife Regulation, 2009*. It is noted that in accordance with the OEH policy *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010a), MCO can only limit consultation where an approved determination of Native Title exists over the study area. MCO is not aware of any approved Native Title Determinations across the study area.

Comment: NC01 *"as Registered Native Titles Claimants were not involved nor Consulted in any Heritage aspects at Moolarben Coal from 2010 to present day and this is contrary to the Native Title Act and Consultation Guidelines and is therefore constitutes an illegal act by Moolarben Coal and its parent company Yancoal. On behalf of the [NC01], We formally object as a Traditional Owner Group with interest over this Mining Lease and wider lands were not involved in nor consulted at any time in the drafting of this Aboriginal Cultural Heritage Assessment report.[NC01] representatives have not been consulted in person nor onsite and a mutual agreement has not been reached and therefore we strongly object to the entire project".*

Response: As described earlier in this section, NC01 has been consulted in relation to the Modification through the provision of a Proposed Methodology for review and comment and the provision of a draft ACHA for review and comment.

Comment: *"It is as Traditional owners that [NC01] cannot support this Aboriginal Cultural Heritage report by Moolarben Coal as it will significantly impact on cultural artefacts, heritage sites, the environment including water sources and the sub-terrain water table, endangered or threatened species of flora or fauna."*

Response: Objection noted. The assessment concluded that the study areas have been thoroughly surveyed and that no Aboriginal objects or areas of cultural heritage value were identified within the proposed disturbance footprint and therefore the Modification would not harm any known Aboriginal objects or cultural heritage values. The proposed OC4 South-West Modification works will be conducted and managed in accordance with the relevant approved Heritage Management Plan. Notwithstanding, additional management measures and recommendations are presented in Section 17. Potential impacts of the Modification on water resources and ecology will be considered in the Environmental Impact Statement and supporting specialist studies. A copy of the final ACHA report and all other specialist studies will be made available to all RAPs during the public exhibition period, during which all RAPs will have the opportunity to review and provide comment on all and any aspects of the Modification.

Murong Gialinga Aboriginal and Torres Strait Islanders Corporation

Comment: *"After reading the draft we would like to recommend that all the areas be thoroughly survey and the rock shelters be Monitored For Impact and Subsidence all Aboriginal stakeholders be involved with the monitoring."*

Response: The assessment concluded that the study areas have been thoroughly surveyed and that no Aboriginal objects or areas of cultural heritage value were identified within the proposed disturbance footprint and therefore the Modification would not harm any known Aboriginal objects or cultural heritage values. The proposed OC4 South-West Modification works will be conducted and managed in accordance with the relevant approved Heritage Management Plan. Notwithstanding, additional management measures and recommendations are presented in Section 17. It is noted that subsidence impacts are not relevant to the Modification. Potential subsidence impacts from approved components of the Moolarben Coal Complex will be managed in accordance with the relevant management plan.

Mr Craig McConnell

Comment: *"I thank Moolarben Coal for the opportunity to comment on the proposed Modification to the OC4 South-West Aboriginal Cultural Heritage Assessment... From the Draft report I can summarise there will less Environmental Impacts, Improved water Management, & The Cultural Heritage Survey of the subject area found no Aboriginal objects or areas of Aboriginal Cultural Significance. The report states the reps from the RAPs have expressed their satisfaction with the Methodology of the site survey. I am Pleased with the Reference to Historical survey data, the fact that the proposed Modifications will not impact any Identified Aboriginal objects, or Significant sites in the surrounding areas, & the Quantity & Quality of the Report. I have no objections or Amendments, from the information provided, to the Moolarben Coal Mine OC4 South-West Modification Aboriginal Cultural Heritage Assessment."*

Response: Noted.

6. Register Searches

Commonwealth Registers

National Heritage Registers

Under the *Environment Protection and Biodiversity Conservation Act, 1999* Amendments (No. 88, 2003), two mechanisms have been created for the protection of heritage places of National or Commonwealth significance (<http://www.environment.gov.au/heritage/places/national/index.html>) - the National Heritage List (NHL) and the Commonwealth Heritage List (CHL). The NHL provides protection to places of cultural significance to the nation of Australia, while the CHL comprises natural, Aboriginal and historic heritage places owned and controlled by the Commonwealth. There are no management constraints associated with listing on the Register of the National Estate (RNE) unless the listed place is owned by a Commonwealth agency.

A search of the online Australian Heritage Database, which includes items from the CHL and RNE was conducted on 4 March 2014. Search terms used were: Mid-Western regional, Ulan and Wollar. No heritage items were identified within or in close proximity to the subject area.

State Registers

Heritage Act Registers

The State Heritage Register (SHR) holds items that have been assessed as being of State Significance to NSW. The State Heritage Inventory (SHI) contains items that are listed on Local Environmental Plans (LEPs) and/or on a State Government Agency's Section 170 registers (OEH Website - www.heritage.nsw.gov.au/index.html). An assessment of heritage significance is required for items greater than 50 years in age. Items appearing on either the SHR or SHI have been granted a defined level of statutory protection under NSW legislation.

Searches of the SHR and SHI were completed on the 4 March 2014. No heritage items were listed in the subject area.

Environmental Planning and Assessment Act Registers (EP&A Act)

Local Environmental Plans

Each Local Government Area is required to create and maintain a LEP that identifies and conserves Aboriginal and Historic heritage items. These items are protected under the EP&A Act and the *Heritage Act 1977*.

A search of the *Mid-Western Regional Local Environmental Plan 2012* was undertaken on the 4 March 2014. There are no Aboriginal heritage items listed in the LEP that are located specifically within the subject area.

National Parks and Wildlife Act Registers (AHIMS)

Aboriginal Archaeological Sites in proximity to the Modification

An extensive Aboriginal Heritage Information Management System (AHIMS) search was conducted on 6 February 2014 (AHIMS ID 124265; Appendix 3) for the area surrounding the subject area. The search identified 117 Aboriginal sites, none of which were located in the impact footprint of the proposed activities. The 117 Aboriginal sites were recorded during the numerous environmental assessments of the Moolarben, Ulan and Wilpinjong Coal Mines between 1980 and 2013, indicating intensive levels of previous archaeological assessment, and form a small fraction of the sites known within a 10 km radius of the subject area. Each of the three mines hold databases of the number and nature of Aboriginal sites in their project boundaries and the extent of previous archaeological survey. At Moolarben it was noted that in some cases the AHIMS data was not consistent with the database held by MCO, with some sites being located in different positions on AHIMS when compared to the Moolarben Coal Mine Database. This was concluded to be an error in AHIMS (e.g. due to the incorrect datum being used), and as such the Aboriginal Sites Database site positions are presented in Figure 3 and used for the basis of this assessment. The distribution and nature of sites in the region are discussed further in Section 9 and are shown on Figure 3².

² Sites shown on Figure 3 in areas already subject to disturbance have been managed in accordance with the existing approved AHMP (or its former revision).

7. Landscape Context

The subject area is situated within the Central Tablelands region of NSW, about 2 km west of the Munghorn Gap Nature Reserve. The proposed haul road Option 1 and Option 2 traverse a hilly area comprised of simple slopes and ridge crests. Proposed haul road Option 2 is adjacent to a first order drainage path. The slope classes contained within the proposed haul road routes range from very gently inclined to moderately inclined slopes.

The subject area is situated at the north-western margin of the Sydney Basin and is characterised by Late Permian age Illawarra Coal Measures sandstone (mudstone, claystone, coal, torbanite and rhyolitic tuff) which is overlain by the Narrabeen Group (sandstone, conglomeratic sandstone, chert, shale coal and torbanite).

There are no known raw material sources for the manufacture of stone artefacts in the subject area, though the geological formations of Illawarra Coal Measures and Narrabeen Group sandstones are known to have provided exploitable quartz conglomerates across the region. Outcrops and exposed veins of tuff, cherts within the Illawarra Coal Measures and Narrabeen sandstone groups may also have provided raw materials for the manufacture of stone artefacts.

There are three soil landscapes within the subject area; the Ulan, Lees Pinch and Munghorn Plateau Soil Landscapes. All three soil landscapes are present within haul road Option 2 while the accessible portion of haul road Option 1 traverses the Ulan and Lees Pinch Soil Landscapes.

The lower elevations of the subject area are situated within the Ulan Soil Landscape, which is typically found in association with low undulating rises and creek flats on slopes between 2 and 10 percent (%). Yellow podzolic soils are present on the lower slopes and drainage line with yellow and brown earths, earthy sands and occasional occurrences of yellow solodic soils with salt sands. The Ulan Soil Landscape had moderate to high levels of erosion.

The Lees Pinch Soil Landscape, situated on the lower to midslopes of the subject area, is typically found in association with sandstone plateau and hillslopes with boulder debris and rock outcrops with slopes between 15 and 40%. Soils in the landscape are shallow siliceous sands with yellow earths and yellow podzolic soils on the lower slopes. This soil landscape is subject to high levels of downslope erosion.

The ridgelines within the subject area are dominated by the Munghorn Plateau Soil Landscape which is typically characterised by low undulating hills forming plateaux with slopes between 3 and 10%. Like the Lees Pinch Soil Landscape, soils in the Munghorn Gap Soil Landscape are shallow siliceous sands with yellow earths and yellow podzolic soils and rock outcrops may be present.

The geological composition and soil landscapes of the subject area indicate that sandstone boulders, outcrops, shelters and overhangs may be present, particularly in the Lees Pinch and Munghorn Soil Landscape units. Sandstone features have frequently been utilised in the region by past Aboriginal people and may contain evidence of past Aboriginal occupation in the form of rock art, grinding grooves and archaeological deposits of stone artefacts. Scatters of stone artefacts will most likely occur in association with sandstone features rather than in open, surface or subsurface contexts due to the shallow soils of the subject area and the sloped and erosional nature of the landscape.

Water is considered one of the primary factors in the prediction of the location of Aboriginal sites in the landscape. The subject area falls within the upper reaches of the Murragamba Creek Catchment. There are no permanent water sources within the subject area, with the nearest permanent water sources being the Moolarben and Murragamba Creeks, 1.4 km west and 1.7 km east in distance respectively. Drainage depressions in proximity to the subject area can be considered first or second order drainage lines and are unlikely to act as temporary sources of potable water. (After rain, water may have temporarily collected in depressions in sandstone outcrops within the subject area).

A number of ecological resources are known to have been exploited by the Wiradjuri (the traditional Aboriginal people of the area) including possums, kangaroos, wallabies, wombats, kangaroo rats, lizards, snakes, goanna, bird, insects and a range of plant species (Pearson 1981: 335). Many of these resources would have been available in the local landscape.

Climate data collected at the Gulgong weather station, approximately 20 km to the west of the subject area, indicates that the subject area is situated in an area with an average rainfall of 630 to 650 millimetres with warm to hot summers and cold winters. Winter frosts occur. Greater variation in seasonal weather may have resulted in more seasonal changes to Aboriginal practice; however to date there is no archaeological evidence of this occurring.

8. Local Aboriginal History

At the time of first contact, the subject area lay within the land occupied by Wiradjuri speaking people (Tindale 1974, Horton 1994), close to boundaries with the Kamilaroi, Gweagal and Wonnarua speaking peoples. Pearson (1981: 81) hypothesises three possible Wiradjuri speaking clans living at Bathurst, Wellington and Mudgee - Rylstone. The subject area most likely lies within the Mudgee - Rylstone group's area. Based on his review of historical sources, Pearson (1981: 75) suggested that most day to day activities were undertaken by groups of up to 20 individuals who came together into larger groups at certain times of the year to utilise a resource or undertake law or ceremonial activities.

The 1820s, with increasing European settlement along the Cudgegong River and from Mudgee to Wellington, would have resulted in increasing upheaval to traditional Aboriginal practices. Hostilities between the local Aboriginal population and non-Indigenous settlers peaked between 1824 and 1826 with the advent of martial law by Governor Brisbane and resistance from Windradyne, a Wiradjuri man (Haglund 1999a). Settlement increased with the gold rush between the 1850s and 1870s, causing further displacement of the local Aboriginal population.

Today, Wiradjuri people continue to live in the district and maintain an interest in their cultural heritage. The revitalisation of the Wiradjuri language has been taking place over the last 10 years with the publication of *A First Wiradjuri Dictionary* and Wiradjuri being taught at schools and TAFE in Parkes and Forbes (Senior and Rudder 2005).

9. Previous Archaeological Work

Regional Archaeological Studies

Archaeological studies provide material evidence of Aboriginal use of the landscape at times both before and after written history and complements the oral histories and cultural knowledge held by the Aboriginal community.

The earliest evidence of Aboriginal occupation in the region was found at Granites 2 Shelter, located approximately 150 km south-west of the subject area, and dates to 7,000 years before present (Pearson 1981). A number of other archaeological excavations have been undertaken in the nearby area and resulted in dates of occupation in the last 5,000 years (Kuskie 2009).

A number of archaeological models for the distribution of material evidence of Aboriginal use of the landscape have been developed for the region. The purpose of archaeological models is to assist in the prediction of what Aboriginal sites may be present in the landscape and where they might be located.

The first archaeological model of the region was developed by Pearson (1981) through the analysis of sites in the Upper Macquarie. He identified a range of site types typical to the region including open camp sites, scarred trees and grinding grooves and the presence of ceremonial sites and burial sites. From his data Pearson proposed that:

- ❑ Most sites would occur between 10 and 500 m from water, with the largest sites occurring nearest to water;
- ❑ That good soil drainage, views over watercourses, level ground with shelter from winds and elevation above cold air were important factors in site location;

- ☐ The majority of sites were in places that would originally have been open woodlands with an adequate source of fuel;
- ☐ Burials and grinding grooves would be located as close to habitation as possible;
- ☐ Grinding grooves required the presence of suitable stone such as sandstone;
- ☐ Burials were most likely to occur where soils were deep enough for internment;
- ☐ Ceremonial sites such as earth rings and stone arrangements would be situated away from campsites, potentially in isolated places, on small hills or knolls but also on flat land;
- ☐ There was no obvious patterning to the location of scarred and carved trees beyond proximity to water and occupation sites;
- ☐ Quarries may occur where suitable sources of stone were present and accessible; and
- ☐ Camp sites were rarely used by Aboriginal people in the past for longer than three nights and that sites with extensive archaeological deposits represented accumulation of material over multiple visits.

This model has since been revised and refined as part of the many archaeological assessments that have been conducted as part of the environmental assessment and approval process for the three mines located within 10 km of the subject area: Ulan, Wilpinjong and Moolarben.

Ulan Coal Mine

The Ulan Coal Mine is an open cut coal mine located adjacent to and north-west of the Moolarben Coal Complex, near the village of Ulan. The Ulan Coal Mine has been operational since the 1920s. In 2009, the Ulan Coal Mine sought a consolidated Part 3A Approval. Archaeological assessment of the Ulan Coal Mine commenced in the 1980s (Haglund 1980) with 29 assessments occurring over subsequent years (Table 1).

An Aboriginal sites database was developed for the Ulan Coal Mine as part of the environmental assessment process for the Part 3A Approval (Kuskie 2009). Revision 10 of the database included 1,274 Aboriginal sites within the Ulan Coal Mine including 322 rockshelters with Potential Archaeological Deposits (PADs) (Table 2). The most frequent Aboriginal site features known within the Ulan Coal Mine were artefact scatters, rockshelters with PADs, and isolated artefacts.

Open camp sites range in size at the Ulan Coal Mine from one stone artefact to 990 stone artefacts (Kuskie 2009: 109). The bulk of open camp sites contain less than 10 artefacts and most sites occur over a 50 square metre (m²) area or less (Kuskie 2009: 109).

Table 1: Summary of Assessments at the Ulan Coal Mine (Kuskie 2013a: 15)

Author	Date	Title
Haglund	1980	Preliminary Archaeological Survey of the Coal mining Area at Ulan, NSW
Haglund	1981a	Archaeological Survey and Sampling at the Site of the Ulan Coal Mine, Ulan, NSW
Haglund	1981b	Ulan Coal Mine: Archaeological Investigation in Connection with Proposed Changes in Development Plans
Corkill	1991	Survey for Aboriginal Archaeological Sites at Ulan Colliery, New South Wales: proposed Overland Conveyor and Creek Site Development
Haglund	1992	Sample Surveys in Relation to Preposed Mine Extension in the Ulan Area, NSW
Haglund	1996a	Salvage Excavation Completed for Ulan Coal Mines Ltd: NPWS Site 36-3-177
Haglund	1996b	Archaeological Inspection and Monitoring of Track and Drill Site East of Ulan Creek
Edgar	1997	Ulan Open Cut Mine: Trench Through Proposed Highwall Zone 3: Aboriginal Heritage Aspects
Haglund	1999b	Ulan Coal Mines Second Longwall Project Environment Statement: Preliminary Survey for Aboriginal Sites
Haglund	1999a	Addendum to Ulan Coal Mines Second Longwall Project Environmental Statement
Haglund	1999c	Ulan Coal Mines Pty Ltd: Archaeological Review and Inspection in Relation to Potential High Wall Mining – Areas West and North-west of Trench A
Haglund	1999d	Report on Aboriginal heritage Studies Relating to SEPP No. 34 Application by Ulan Coal Mine
Therin	2000	Spring Gully 5 Salvage Excavation Usewear and Residue Report
Kuskie	2000	An Assessment of Two Aboriginal Grinding Grooves Sites at Ulan Coal Mine, Central Tablelands, New South Wales
Haglund	2001a	Salvage Excavation Completed for Ulan Coal Mines Ltd: Site SG5 Aboriginal Rock Shelter Site Vol I
Haglund	2001b	Salvage Excavation Completed for Ulan Coal Mines Ltd: Site SG5 Aboriginal Rock Shelter Site Vol III
White	2001a	Salvage Excavation Completed for Ulan Coal Mines Ltd Site SG4 Aboriginal Rock Shelter. Vol II
White	2001b	A Comment on the stone artefact assemblage from squares E 7 and E8 at Site SG6, Ulan, NS
Kuskie and Webster	2001	Archaeological Survey of Aboriginal Heritage within Longwall Panels 18-22, Mining Lease 1468 and 1341, Ulan Coal Mine, Central Tablelands, New South Wales, Volumes 1 and 2
Kuskie	2002	An Archaeological Assessment of a Proposed Basalt Quarry within Mining lease 1468, Ulan Coal Mine, Central Tablelands New South Wales
Kuskie and Clarke	2003	Proposed Open Cut Mine Extension, Additional Infrastructure and Consolidation Consents at Ulan Coal mine New South Wales: Aboriginal heritage Assessment (Vol. 1)
Kuskie	2004	Proposed Open Cut Mine Extension, Additional Infrastructure and Consolidation Consents at Ulan Coal mine New South Wales: Aboriginal heritage Assessment (Vol. 2)
Kuskie and Clarke	2005a	Proposed Open Cut Mine Extension, Additional Infrastructure at Ulan Coal Mine: Aboriginal heritage Assessment
Kuskie and Clarke	2005b	Archaeological Survey of Aboriginal heritage within SMP Application Area (Longwall Panels 23-25 and W1) of Mining Lease 1468, Ulan Coal Mine, Central Tablelands. Vol A and Vol B
Kuskie and Clarke	2007	Archaeological Survey of Aboriginal Heritage within SMP Application Area (Longwall Panels W2 and W3) of Mining Lease 1468, Ulan Coal Mine, Central Tablelands, New South Wales: Volume A and Volume B
Kuskie	2008	Ulan Coal Mines Limited: Project Waratah: Preliminary Aboriginal Heritage Assessment
Kuskie	2009	Ulan Coal Continued Operations Aboriginal Heritage Impact Assessment
Kuskie	2010a	Ulan Coal Continued Operations Aboriginal heritage Impact Assessment – Supplementary Report for North 1 panels project Modification
Kuskie	2012a	Ulan Coal Continued Operations Project: Test excavations of Aboriginal Rock Shelter Sites within the North 1 Panels - Interim Report

Table 2: Frequency of Aboriginal Sites at the Ulan Coal Mine as of 2009 (Kuskie 2009: 108)

Aboriginal Site Features	Number of Aboriginal Sites
Artefact Scatter and Open Sites	521
Isolated Artefacts	291
Grinding Groove	13
Grinding Grooves and Artefact Scatter	4
Ochre Quarry	3
Scarred Trees	8
Scarred Tree with Artefact Scatter	2
Stone Arrangements	6
Waterhole/Well	1
Rockshelters with Artefacts	87
Rockshelter with Grinding Grooves	3
Rockshelter with Grinding Grooves and Artefacts	1
Rockshelters with Art	8
Rockshelters with Art and Artefacts	4
Rockshelters with PAD	322
Total	1,274

The stone artefact assemblage at the Ulan Coal Mine as of 2009 consisted of over 9,000 items (Kuskie 2009: 118). Most artefacts were made from quartz, with tuff and chert being the next most common raw material type. Acidic volcanics, basalt, bone, breccia, chalcedony, flint, granite, ironstone, lithic sandstone, quartzite, rhyolite, sandstone, shell, silcrete, siltstone and petrified wood stone artefacts were also present in small quantities. The bulk of the artefact assemblage comprised complete and broken flakes, angular fragments, cores and core fragments. Retouched and utilised flakes, backed artefacts, hammer stones, anvils and axes were also present.

An analysis of the spatial distribution of Aboriginal sites and artefacts was completed for the archaeological resources at the Ulan Coal Mine. This involved the separation of the landscape into distinct landform and slope classes (Kuskie 2009: 131). Approximately 62% of the Ulan Coal Mine consisted of comparable land forms to the subject area - that is simple slopes and ridge crests (Kuskie 2009: 21).

It was noted that overall, artefacts occurred at a very low mean density across the analysis area (Kuskie 2009: 133) and indicated a background discard. Level to gently inclined terraces had some of the highest densities of artefacts, as did level to very gently inclined spur crests while moderately inclined simple slopes had marginally higher densities of artefacts than gentle simple slopes and valley flats. This may be the result of the presence of assemblages within rockshelters.

Rockshelters were found to occur on scarps, simple slopes, spur crests and drainage depressions with sandstone rock formation. Artefact densities were found not to increase in density with proximity to water (Kuskie 2009: 135).

As a result of the archaeological assessment of the Ulan Coal Mine (Table 2), including spatial analysis of the distribution of sites and a review of the historical sources, an archaeological model was developed and has been refined (Kuskie and Clarke 2005b, 2007, Kuskie 2009). This model has subsequently been applied to the Wilpinjong Coal Mine and the Moolarben Coal Complex.

The model states that most evidence of occupation will date within the last 5,000 years though may have extended 30-40,000 years before present. The model determines three zones of resources: primary resource zones, secondary resource zones and a third zone that encompasses the land beyond primary and secondary resource zones (Kuskie 2009: 22).

Primary resource zones: areas of more abundant and diverse resource rich zones in north-east Wiradjuri territory such as the junction of the higher order watercourses such as Goulburn and Talbragar Rivers, would most likely be a focus of occupation. These zones may have supported nuclear and extended family base camps, community base camps and congregations of larger groups. This zone may have been subject to longer stays, more frequent occupation than other areas, for example secondary resource zones. Kuskie's model states that these zones would contain substantially higher counts and densities of artefacts, a greater range of stone materials and artefact types and a higher number of activity areas would be present.

Outside primary and secondary zones: occupation is anticipated to be hunter gatherer activities with small parties of men, women or children. Movement across the landscape would be transitory between resource locations and may include special purpose journeys for ceremonial purpose or the procurement of stone. Utilisation of landforms such as simple slopes, ridge crests, spur crests and lower order watercourses would be far less intense than that found in primary and secondary resource zones. The evidence of this occupation would be low to very low artefact counts and densities, little range in the number of activity areas, and dates of sporadic occupation rather than continuous occupation. Evidence of stone quarries at sources may also be present.

Activities that may have occurred in the landscape, in this model, include food procurement and processing, food consumption, maintenance and production of tools, the building of shelter, children's play, ceremonial activity, spiritual activity, burials and social and political activity by people.

The bulk of these activities would be evidenced through the presence of material evidence; in particular through the stone artefact assemblage. For instance, food procurement and processing might be evidenced through the presence of usewear residue on stone tools. Ceremonial activities may be evidenced by the presence of carved trees, bora grounds and stone arrangements.

The archaeological model predicts that most stone artefacts will be made of quartz due to its ease of access and availability in the local landscape. The model hypothesises that the relative intensity of use of each of the materials will be dependent on the proximity of the original source of the stone. Most stone procurement is hypothesised to have occurred during normal daily and seasonal movement without the need for special purpose visits and as a result of the abundance of available local stone, the stone is less likely to exhibit intensive reduction as evidence of conservation of material.

Most stone technology will be basic and non specific (e.g. complete and broken flakes) with low frequencies of microblade or microlithic technologies, bipolar knapping, backing and usewear.

Grinding grooves for the sharpening of ground edge axes may occur on exposed sandstone bedrock but are unlikely to occur in high numbers and most likely represent occasional activity and short term activities rather than special purpose visits.

Wilpinjong Coal Mine

The Wilpinjong Coal Mine is an open cut mine located adjacent to and east of the Moolarben Coal Complex. The Wilpinjong Coal Mine was approved under Part 3A of the EP&A Act and has been operational since 2006. During this time, 17 Aboriginal archaeological assessments are known to have occurred (Table 3).

In 2005 Navin Officer undertook the primary environmental assessment, identifying 224 Aboriginal sites and PADs for the project and subsequently completed a series of salvage excavations and surface collections and rock art recording of some shelter sites (Navin Officer 2005, 2006a, 2006b). An ACHMP was developed for the project (WCPL 2008). Between 2006 and 2009, Kayandel Archaeological Services (2006a, 2006b, 2006c, 2006d, 2007a, 2007b, 2007c, 2008a, 2008b, 2009a, 2009b; Boer-Mah 2006) completed a number of surface collections and test excavations. Many of these reports were not available for review at the time of this assessment.

Subsequently, South East Archaeology undertook a review of archaeological assessments at Wilpinjong as part of a proposed modification project for the Wilpinjong Coal Mine and provided an updated Aboriginal site database, an analysis of some stone artefacts recorded during an archaeological survey of the proposed modification and an updated distribution and occupation model (Kuskie 2013a, 2013b).

As of April 2013, the Wilpinjong Coal Mine Aboriginal Site Database contained 463 Aboriginal sites (Kuskie 2013a, Table 4). Aboriginal site types known to occur at the Wilpinjong Coal Mine include individual stone artefacts, stone artefact scatters, scarred and carved trees, a stone quarry, ceremonial sites, grinding grooves, resources sites such as waterholes and rockshelters with art, stone artefacts, archaeological deposit or potential archaeological deposit. A number of areas of contemporary cultural significance have been identified including Castle Rock and the high density archaeological deposits at Cumbo Creek.

Table 3: Summary of Assessments at the Wilpinjong Coal Mine (Source: Kuskie 2013b)

Author	Date	Title
Navin Officer Heritage Consultants Pty Ltd	2005	Wilpinjong Coal Project Appendix F Aboriginal Cultural Heritage Assessment
Navin Officer Heritage Consultants Pty Ltd	2006a	Wilpinjong Coal Project: Archaeological Salvage and Post EIS Investigations
Navin Officer Heritage Consultants Pty Ltd	2006b	Baseline Recording of Three Aboriginal Rock Arts Sites WCP 72, 152 and 163 at Wilpinjong, NSW
Kayandel Archaeological Services.	2006a	Aboriginal Heritage Rapid Survey
Kayandel Archaeological Services	2006b	Wilpinjong Coal Project: Aboriginal Heritage Surface Salvage Summary Report. September 2006
Boer-Mah, T.	2006	Lithics Report for Surface Salvage and Salvage Excavation at Wilpinjong Mine, N.S.W: June 2006. Prepared for Kayandel Archaeological Services
Kayandel Archaeological Services	2006c	Proposed Electricity Transmission Line: Ulan Substation to Wilpinjong Coal Project: Aboriginal Cultural Heritage Assessment. March 2006
Kayandel Archaeological Services	2006d	Wilpinjong Coal Project: Aboriginal Cultural Heritage Survey: Supplemental Survey of Escarpment Areas and Report of Findings. November 2006
Kayandel Archaeological Services	2007a	Kayandel Archaeological Services. 2007. Archaeological Survey Report and Mapping for Proposed Borehole Locations: Aboriginal Pedestrian Survey. May 2007. Prepared for Wilpinjong Coal Pty Ltd
Kayandel Archaeological Services.	2007b	Wilpinjong Coal Project: Aboriginal Heritage: Surface Salvage of Sites. August 2007. Prepared for Wilpinjong Coal Pty Ltd
Kayandel Archaeological Services.	2007c	Wilpinjong Coal Project. Aboriginal Heritage Surface Salvage Summary. Report. September 2007
Kayandel Archaeological Services	2008a	Surface Salvage Report: Wilpinjong Coal Mine, Mudgee: December 2008. Prepared for Wilpinjong Coal Ltd Pty
Kayandel Archaeological Services	2008b	Slate Gully Drillhole Assessments. Report not available for review
Kayandel Archaeological Services	2009a	Test excavations of the Pit 5 Extension. Report not available for review
Kayandel Archaeological Services	2009b	Wintersun Hill / Bald Knobb Test Excavations. Report not available for review
Kuskie, P.	2013b	Wilpinjong Coal Mine, Central Tablelands of New South Wales - Modification: Aboriginal Cultural Heritage Assessment
Brennan, W.	2013	Wilpinjong Coal Mine, Rock Art Conservation and Monitoring Project: Field Inspection Report and Recommendations. Unpublished report to Wilpinjong Pty Ltd

The stone artefact assemblage at the Wilpinjong Coal Mine was found to be waterworn and terrestrial quartz dominated the assemblage. The dominance of quartz is thought to relate to the accessibility of quartz conglomerates in the local geological landscape. Tuff and chert were also present in the stone artefact assemblage and very small frequencies of acidic volcanic stone, jasper, petrified wood, porphyritic rhyolite and quartzite (Kuskie 2013b: 56).

Table 4: Summary of Aboriginal Sites Within the Wilpinjong Coal Mine
(Source: Kuskie 2013b:11)

Aboriginal Site Features	Number of Aboriginal Sites
Bora/ceremonial site and carved tree	1
Grinding grooves	2
Grinding grooves and open artefact site	1
Lithic quarry	1
Non-Aboriginal mounds	1
Open Artefact site	271
PAD	2
Possible cultural value and association	2
Rockshelter with art	4
Rockshelter with art and PAD	2
Rockshelter with artefacts	25
Rockshelter with artefacts and art	1
Rockshelter with artefacts and waterhole/well	1
Rockshelter with PAD	80
Scarred Tree	8
Scarred tree (possible – Aboriginal)	45
Scarred tree (possible – European)	4
Uncertain*	2
Waterhole possible	3
Waterhole/well	7
Total	463

* This feature description is used in the original source with no further explanation.

The types of artefacts in the assemblage were also found to be consistent with the Ulan Coal Mine stone artefact assemblage (Kuskie 2013a, 2013b: 58). Complete and broken flakes were the most common artefact types followed by angular fragments, cores and core fragments. Retouched or utilised flakes were also present while backed artefacts such as bondi points and geometric microliths made up a less than 2% of the overall assemblage. A tula slug and hammerstone were also present (Kuskie 2013a, 2013b: 58-59).

The revised archaeological model presented by Kuskie (2013a, 2013b) is consistent with the current models for the archaeological resources at the Ulan Coal Mine.

Local Archaeological Assessments

Moolarben Coal Complex

The subject area is situated within the Moolarben Coal Complex, which is adjacent the Ulan and Wilpinjong Coal Mines. Between 2006 and 2013, 23 archaeological assessments and management plans were completed for the Moolarben Coal Complex. These are summarised in Table 5.

Table 5: Summary of Past Aboriginal Heritage Investigations at Moolarben Coal Complex (Source: Kuskie 2013c: 12-14)

Author	Date	Title
Hamm	2006a	Moolarben Coal project – Aboriginal Cultural Heritage Assessment Report
Hamm	2006b	Responses to Issues Raised in Respect of the Moolarben Coal Project Aboriginal Cultural Heritage Assessment Report
Hamm	2008a	Moolarben Coal Project – Aboriginal Cultural Heritage Assessment Report Stage 2
Hamm	2008b	Aboriginal Heritage Plan for MCP Stage 1 Development Areas: Open Cut 1 and Main Infrastructure Area
Urban Tree Management Australia	2008	Report: Aboriginal cultural Assessment of Scarred Tree ref. 26-3-0798: SIMC1) at Ulan, New South Wales for Moolarben Coal Project Stage 1
Hamm	2009a	Aboriginal Cultural Heritage & Archaeological Assessment for Moolarben Coal Project Stage 1 Infrastructure Area & Proposed Water Sharing Pipeline Modification Project in Support of a Section 75w (2) Approval
Hamm	2009b	Aboriginal Cultural Heritage & Archaeological Assessment for Moolarben Coal project Stage 1 Northern Borefield Area
Hamm	2009c	Moolarben Coal Project Executive Summary
Coffey Natural Systems	2009	Response to Submissions Report – Part A Moolarben Coal Project – Stage 2
Hamm	2010	Disturbance Report for Moolarben Coal Project Stage 2
Hamm and Foley	2010	Cultural Heritage Management Report on Moolarben Coal Project Stage 1: Open Cut & Main Infrastructure Area
Kuskie	2010b	Moolarben Coal project Stage 2: Aboriginal Heritage Advice on Potential Impact to Aboriginal Sites
AECOM	2011a	Moolarben Preferred project Report: Aboriginal Archaeological and Cultural Heritage Addendum
AECOM	2011b	Archaeological Collection & Excavation: Northern Borefield, Moolarben Coal Operations, Ulan, NSW
AECOM	2011c	Due Diligence Assessment of Proposed Exploration Drill Sites EL 6288
AECOM	2012	Due Diligence Assessment of Proposed Exploration Drill Sites EL 6288
Hansen Bailey	2012	Moolarben Coal Project Stage 2 Preferred project Report Response to Submissions
Kuskie	2012b	Moolarben Coal project Stage 2 – Preliminary Report on Aboriginal heritage Survey of Geotechnical Investigation Areas
Kuskie	2012c	Moolarben Coal Project Stage 2 – Preliminary Report on Aboriginal Heritage Survey of Proposed Ulan- Wollar Road and Country Energy 66kv Powerline realignment
Kuskie	2012d	Moolarben Coal project: Preliminary Aboriginal heritage Assessment of Proposed Temporary Workers Accommodation near Ulan, Central Tablelands of new South Wales
Kuskie	2013c	Aboriginal Heritage Management Plan Stage 1. Version 2
Kuskie	2013d	Moolarben Coal Project – Stage 1 Optimisation Modification, near Ulan, Central Tablelands of New South Wales: Aboriginal Cultural Heritage Assessment
Kuskie	2013e	Moolarben Coal Project Stage 2: Aboriginal Heritage Assessment of proposed Ulan – Wollar Road and Essential Energy Powerline Realignments, near Ulan Central Tablelands of New South Wales

Some of these earlier surveys (Table 5) assessed parts of the subject area for Aboriginal heritage values. Approximately 400 m of the Option 2 haul road was surveyed for Aboriginal heritage values in April 2013. No Aboriginal objects were identified in the subject area at this time.

Approximately 100 m of the 321 m of the accessible portion of Option 1 was also surveyed in April 2013, with no Aboriginal objects being identified in the subject area.

In 2006, an ACHA for environmental assessment of Stage 1 of the Moolarben Coal Project was undertaken and included an investigation area of 34.8 square kilometres (km²) (Hamm 2006a). This area was surveyed using a sampling strategy with effective survey coverage of 1.1%. The assessment identified 222 Aboriginal sites, including isolated artefacts, artefact scatters, rockshelters with artefacts/art, a scarred tree and a grinding groove site (Hamm 2006a). In addition to this, Hamm also identified a number of PADs (Hamm 2006). The assessment noted that concentrations of Aboriginal sites occurred on the Moolarben and Bora Creek alluvial flats and the northern ridges. A series of management and mitigation measures were recommended including the collection of 51 Aboriginal sites, the test excavation and salvage of 43 sites, recording and salvage of three sites and subsidence monitoring and recording of 23 sites.

In response to submissions to the Environmental Assessment for Stage 1, three cultural landscapes were identified by the RAPs including the Bora Creek alluvial flats, the Goulbourn River and the Drip. Revisions were made to the underground plan to reduce impact to a rockshelter site with art (Hamm 2006b).

An area of 37 km² was investigated for Aboriginal heritage values in 2008 as part of the proposed Stage 2 Project (Hamm 2008a). This assessment work identified 258 new Aboriginal sites, 102 isolated artefacts, 150 artefact scatters, 5 rockshelters with artefacts, one grinding groove site, 33 PADs and 4,825 stone artefacts. Aboriginal sites were found to concentrate around the central and southern portion of Murragamba Creek within 100 m of the creek channel, within 100 m of the "Eastern Creek" tributary of Wilpinjong Creek, within 100 m of the headwaters of the Wilpinjong Creek (northern catchment) and the Moolarben Ridge south of Carrs Gap and the Trig station flank of the ridge (Hamm 2008a). Management recommendations included the surface collection of 133 Aboriginal sites, the test excavation and salvage of 34 sites and recording of six sites.

An ACHMP was developed for the initial Stage 1 works in 2008. In the process of actioning the management and mitigation measures, Hamm and Foley (2010) completed test excavations across the Open Cut 1 area and mine infrastructure area. An approximate surface area of 13,700 m² was subject to mechanical exposure (surface scrapes) and 271 m² excavated by hand/shovel testing, resulting in the recovery of 2,643 artefacts and identification of 35 new open artefact sites (Hamm and Foley 2010).

In 2011, AECOM assessed a revision to the Stage 2 Project. The assessment targeted Stage 2 surface facilities, the southern portion of a proposed modified haul road and the south-eastern boundary of an alternative out of pit emplacement location, two rockshelter sites and the Red Hills and Murragamba Creek Management Areas. No additional sites were identified and an updated impact assessment was completed for the proposed works (AECOM 2011b: 1).

In addition to the above work, an additional 16 Aboriginal cultural heritage sites have been documented as the result of various due diligence activities at the Moolarben Coal Complex.

A revised HMP was subsequently approved and implemented to include all of the Stage 1 Project areas and replace the earlier ACHMP for OC 1 and mine infrastructure area. The revised AHMP contained an updated summary of the Moolarben Coal Mine Aboriginal Sites Database (Kuskie 2013c, 2013d, Table 6), which at that time contained a total of 531 Aboriginal sites.

Subsequent work including the Moolarben Coal Project Stage 1 Optimisation Modification (Kuskie 2013d), Moolarben Coal Project Stage 2 utilities realignments (Kuskie 2013e), gap surveys of the OC2 area and due diligence assessments for drilling activities has resulted in an additional 72 sites being recorded since January 2013. The Moolarben Coal Mine Aboriginal Sites Database as current at February 2014 is shown in Table 6. Currently there has been 603 Aboriginal sites identified at the Moolarben Coal Complex. Similar to the Wilpinjong and Ulan Coal Mines, open artefact sites (including artefact scatters and isolated finds) are the most frequent site type with occasional grinding groove sites, ochre quarries, scarred trees and rock shelters with art, artefacts and/or PADs also being present.

Table 6: Summary of Identified Aboriginal Heritage Sites within Stages 1 and 2 of the Moolarben Coal Complex (Source: Moolarben Coal Mine Aboriginal Sites Database as at February 2014)

Aboriginal Site Features	Number of Aboriginal Sites
Artefact Scatter ¹	248
Artefact Scatter and Grinding Grooves	1
Artefact Scatter and PAD	10
Grinding Grooves	2
Grinding Grooves and Artefact Scatter	2
Isolated Find ²	276
Ochre Quarry	1
PAD	9
Rock Shelter with Art	1
Rock Shelter with Art and Artefacts	1
Rock Shelter with Art and Grinding Grooves	1
Rock Shelter with Artefacts ³	23
Rock shelter with PAD	26
Scarred Tree	1
Scarred Tree and Artefact Scatter	1
Total	603

¹ Includes sites recorded as "Open Artefact Site" with greater than 1, or an unspecified number of artefacts

² Includes sites recorded as "Open Artefact Site" with 1 artefact

³ Includes site recorded as "Artefact Shelter/Scatter"

Overall the existing information presents few identifiable limitations, with extensive assessments having been carried out in the vicinity of the subject area, including some previous assessments which overlap the subject area. It is assumed all available and up-to-date information has been assessed and presented in this report, however minor limitations such as unidentifiable AHIMS errors may exist. It is assumed that all relevant cultural knowledge that may have the potential to be harmed by the proposed Modification has been provided by the RAPs during the ACHA consultation process.

10. Predictive Model

As described above, parts of the subject area have previously been surveyed for Aboriginal heritage values on a number of occasions and no Aboriginal sites have been identified. The subject area is situated on simple slopes and ridge crests with gently to moderately inclined slopes and the distance from water is greater than 1 km. Sandstone formations are present. It is therefore anticipated that any evidence of Aboriginal occupation is likely to take the form of rockshelters with art, artefacts or PADs. This landscape would be considered in the current model for the Moolarben, Wilpinjong and Ulan coal mines as outside a primary or secondary resource zone. The occupation will therefore most likely represent transient movement through the landscape for activities such as hunting or gathering and this would be reflected in low counts and densities of Aboriginal sites and artefacts. Any artefacts contained within the rockshelters will most likely be made of locally obtained quartz with infrequent artefacts of tuff or chert. Types of artefacts will most likely be complete or broken flakes with infrequent occurrences of other technologies such as retouched flakes, backed artefacts and other stone tool technologies.

11. Field Methods

Survey Sampling Strategy

Due to the relatively small and accessible size of the subject area, and because the subject area included some parts that were previously surveyed, a detailed landscape or landform sampling strategy was not used. Rather the approach taken was to use a low intensity transect survey across the majority of the subject area, including all those landforms that occur within it.

This approach was considered appropriate given that previous survey efforts in the subject area, and in the immediate vicinity of the subject area, had not identified any Aboriginal objects or areas of cultural value. The approach was discussed with the RAP representatives on site prior to and during the 12 March 2014 survey, and it was agreed that the method employed was appropriate given the low likelihood of Aboriginal objects or areas of cultural value being present. The same survey approach was employed during the 31 July 2014 survey.

Survey Methods

The proposed OC4 haul road Option 1 and Option 2 subject area exists in hilly terrain comprised of simple slopes, ridge crests and first order drainage paths with low to steep slopes. With the exception of the cleared pastures fringing the southern parts of the subject area, the area has seen relatively little recent disturbance, with the exception of occasional vehicle tracks, and some areas where exploration activities have removed undergrowth.

During both the 12 March 2014 and 31 July 2014 survey campaigns, the survey team consisted of five team members (i.e. four representatives of the RAPs and one archaeologist), walking pedestrian transects across the subject area. Because of the small size of the subject area, and the previous findings in the vicinity of the subject area which indicate a low likelihood of Aboriginal objects being present, a low intensity survey was conducted with team member spacing being flexible dependant on terrain conditions. Notwithstanding, the spacing was generally 10 m - 20 m apart. This method retains the potential for discovering large sites on the ground surface through inspection of areas of exposure, and allows conspicuous sites such as rockshelters and scarred trees to be readily inspected by the team. During both the 12 March 2014 and 31 July 2014 surveys all areas of relatively higher exposure were inspected for artefacts, and all potential rockshelters and rock formations were inspected for possible art, occupation and grinding grooves.

The location of survey units and archaeological finds were recorded using a hand-held DGPS, and uploaded directly to a GIS for presentation on maps and figures. All positional recording used Map Grid of Australia (MGA) coordinates (zone 55) based on the Geocentric Datum of Australia (GDA94). Details such as landform, visibility and exposure for each survey unit were recorded on standard survey unit recording forms, with transects being determined based on changes in the landform, as per the *Code of Practice for the Archaeological Investigation of Aboriginal Objects in NSW* (DECCW 2010b). Exposure and visibility were estimated in accordance with the requirements of the *Code of Practice*. A compact digital camera with 7 mega pixel resolution was used for all photography.

Methods of Assessing Heritage Significance

Heritage significance was assessed by considering each cultural or archaeological site against the significance criteria set out in the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011).

In all cases the assessment of significance was informed by the Aboriginal community, and this is documented in this report. If any culturally sensitive values were identified they would not be specifically included in the report, or made publicly available, but would be documented and lodged with the knowledge holder providing the information.

12. Results

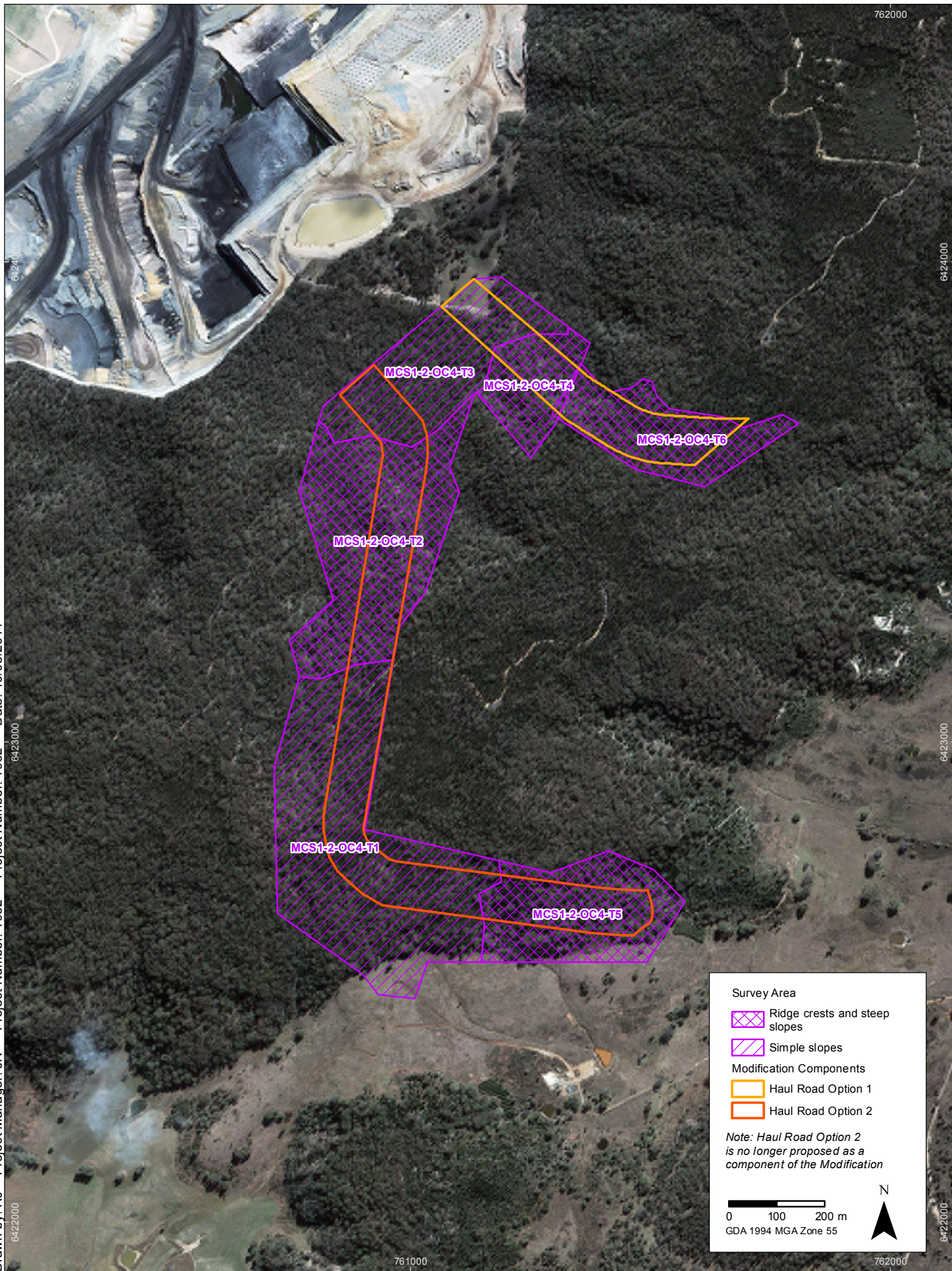
The survey covered the majority of the subject area, and no Aboriginal objects or areas of Aboriginal cultural heritage value were identified during either the 12 March 2014 or 31 July 2014 survey periods. All areas of exposure and areas of archaeological potential observed within the survey transects, such as rockshelters and overhangs, were inspected by the survey team. Whilst on-site, the representatives from the RAPs expressed their satisfaction with the conduct, methods and coverage of the survey. The survey conditions were good with fine weather with no constraints to access. A summary table of the coverage of the survey is outlined below in Table 7, and a summary of the landform areas is provided in Table 8. The survey results are displayed in Figure 4.

Table 7: Survey Coverage Data

Survey Unit	Landform	Survey Unit Area (ha)	Visibility %	Exposure %	Effective Coverage (ha)	Effective Coverage %
Transect 1	Simple slopes	18.14	40	40	2.90	16
Transect 2	Ridge crests and steep slopes	3.56	60	50	1.07	30
Transect 3	Simple slopes	12.46	50	40	2.49	20
Transect 4	Ridge crests and steep slopes	7.71	60	50	2.31	30
Transect 5	Ridge crests and steep slopes	7.36	60	50	2.20	30
Transect 6	Ridge crests and steep slopes	5.79	40	50	1.16	20
<i>Total:</i>		<i>55.02</i>			<i>12.14</i>	<i>22.06</i>

Table 8: Landform Summary Data

Landform	Landform Area	Area Effectively Surveyed	% of landform effectively surveyed	Number of sites	Number of features
Simple slopes	30.60	5.39	18	0	0
Ridge crests and steep slopes	24.42	6.75	28	0	0
<i>Total:</i>	<i>55.02</i>	<i>12.14</i>			



Landforms and Survey Results
Moolarben Haul Road ACHA

FIGURE 4

Imagery: (c) YanCoal 2013-08-12

Simple Slopes

Transects 1 and Transect 3 covered the simple slope landform. This landform was characterised by low relief slopes with slope gradients of less than 10 degrees. The soils encountered in this landform were loose, coarse siliceous soils with low fertility. The landform was generally heavily treed with cypress pine and eucalyptus, with a clear understorey, possibly due to cattle grazing. Rock outcrop was an occasional feature, and where observed formed distinctive inversion of relief with tor-like structures being present. All proposed disturbance areas (parts of Option 1 and Option 2 haul road corridors, and the Mine Water Dam wall [which is no longer a component of the Modification]) within this landform were surveyed (Figure 4).

Due to a lack of terrain differentiation on this landform (there are no drainage lines for example), and based on the results of this and previous survey results, the landform is considered to have low archaeological potential. Plate 1 shows an example of this landform.

Plate 1. Example of the Simple slopes landform (Source: Niche)



Ridge Crests and Steep Slopes

Transect 2, Transect 4, Transect 5 and Transect 6 covered the ridge crests and steep slopes landform. This landform was characterised by steep slopes (gradients greater than 10 degrees, but highly variable above this) and ridge crests, and occasional low cliffs. Where they were present the soils were loose and skeletal, but frequently the ground surface was either stone rubble, or bare rock surfaces at rock outcrops, which were very frequent and consisted of tor like structures and boulders.

All of the disturbance footprint within this landform was covered by the survey, in addition, such features have been extensively surveyed previously in the immediate area, and the results of these surveys do not suggest these ridge features are of more sensitivity than the remainder of the ridge crests and steep slopes landform that have been subject to systematic survey.

The landform is well vegetated, generally with eucalypts and shrubs/bushes. Overall this landform is generally steep and rocky terrain. Where boulders and outcrop formed potential shelters these were inspected, but generally the areas under shelter were small. Due to the ruggedness of this landform, and the lack of large shelter formations (which may have made the landform more attractive for habitation or use to Aboriginal people in the past) this landform is determined to have low archaeological potential. Plate 2 shows an example of the ridge crests and steep slopes landform.

Plate 2. Example of the Ridge crests and steep slopes landform (Source: Niche)



13. Analysis and Discussion

The subject area was characterised by the predictive model as being likely to contain only the sparse archaeological traces of transient movement through the area by Aboriginal people in the past. The main reasons for this were:

- ❑ Distance greater than 1 km from water;
- ❑ Outside of a primary or secondary resource zone based on current models of Aboriginal past land use for the Moolarben, Wilpinjong and Ulan coal mine areas; and
- ❑ Steep, rocky terrain that may contain shelter deposits.

A survey of the majority of the subject area was conducted. Some small areas were not surveyed, however this is not considered a notable constraint as the current survey and previous surveys have concluded the local area is of low archaeological potential and cultural value. Given the low archaeological potential the surveyed areas provide an adequate sample from which to confidently extrapolate their results to the small portions of land not directly surveyed. The survey achieved a good level of effective survey coverage, and inspected all features, such as potential rockshelters, boulders and tor like structures that were present within the subject area for evidence of past Aboriginal land use.

The survey also inspected all areas of ground surface exposure that were encountered, as these areas are most likely to reveal any Aboriginal stone objects that may be present. Despite skeletal soils and good exposure and visibility conditions no Aboriginal objects were found by the survey.

The survey results are in line with the expectations of the predictive model, and are commensurate with the results of previous surveys that have overlapped with the subject area, and previous surveys in areas adjacent to the subject area, which have generally not found any Aboriginal objects or areas of Aboriginal cultural heritage value, or have found only low numbers of Aboriginal objects.

14. Scientific Values and Significance Assessment

The *Burra Charter* (Australia ICOMOS 1999) defines the basic principles and procedures to be observed in the conservation of important places. It provides the primary framework within which decisions about the management of heritage sites in Australia should be made. The *Burra Charter* defines cultural significance as being derived from the following values:

Aesthetic Value

Aesthetic value includes aspects of sensory perception for which criteria can and should be stated. Such criteria may include consideration of the form, scale, colour, texture and material of the fabric; the smells and sounds associated with the place and its use.

Historic Value

Historic value encompasses the history of aesthetics, science and society, and therefore to a large extent underlies all of the terms set out in this section.

A place may have historic value because it has influenced, or has been influenced by, an historic figure, event, phase or activity. It may also have historic value as the site of an important event. For any given place the significance will be greater where evidence of the association or event survives in situ, or where the settings are substantially intact, than where it has been changed or evidence does not survive. However, some events or associations may be so important that the place retains significance regardless of subsequent treatment.

Scientific Value

The scientific or research value of a place will depend upon the importance of the data involved, on its rarity, quality or representativeness, and on the degree to which the place may contribute further substantial information.

Social Value

Social value embraces the qualities for which a place has become a focus of spiritual, political, national or other cultural sentiment to a majority or minority group.

Other Approaches

The categorisation into aesthetic, historic, scientific and social values is one approach to understanding the concept of cultural significance. However, more precise categories may be developed as understanding of a particular place increases.

The NSW DECCW guidelines for the significance assessment of Aboriginal archaeological sites are contained within the *Aboriginal Cultural Heritage Standards and Guidelines Kit* (DEC 1997). The Kit identifies with two main streams in the overall significance assessment process: the assessment of cultural/social significance to Aboriginal people and the assessment of scientific significance to archaeologists.

This approach encapsulates those aspects of the Burra Charter that are relevant to Aboriginal archaeological sites. The guidelines specify the following criteria for archaeological significance, as paraphrased below:

Research Potential

It is the potential to elucidate past behaviour which gives significance under this criterion rather than the potential to yield collections of artefacts. Matters considered under this criterion include - the intactness of a site, the potential for the site to build a chronology and the connectedness of the site to other sites in the archaeological landscape.

Representativeness

As a criterion, representativeness is only meaningful in relation to a conservation objective. Presumably all sites are representative of those in their class or they would not be in that class. What is an issue is the extent to which a class of sites is conserved and whether the particular site being assessed, should be conserved in order to ensure that we retain a representative sample of the archaeological record as a whole. The conservation objective which underwrites the 'representativeness' criteria is that such a sample should be conserved.

Rarity

This criterion cannot easily be separated from that of representativeness. If a site is 'distinctive' then it will, by definition, be part of the variability which a representative sample would represent. The criteria might best be approached as one which exists within the criteria of representativeness, giving a particular weighting to certain classes of site. The main requirement for being able to assess rarity will be to know what is common and what is unusual in the site record but also the way that archaeology confers prestige on certain sites because of their ability to provide certain information.

The criterion of rarity may be assessed at a range of levels: local, regional, state, national, and global.

Educational Potential

Heritage sites and areas should be conserved and managed in relation to their value to people. It is assumed that archaeologists have the ability to speak of the value of sites to members of their own profession. Where archaeologists or others carrying out assessments are speaking for the educational value of sites to the public, the onus is on them to go to the public for an assessment of this value, or to reputable studies which have canvassed public demand for education. The danger, otherwise, is that archaeologists would be projecting their values onto a public which is itself given no voice on the matter.

Aesthetics

Archaeologists are not expected to include an assessment of aesthetic significance along with their assessment of scientific significance. In relation to heritage places, aesthetic significance is generally taken to mean the visual beauty of the place. Aesthetic value is not inherent in a place, but arises in the sensory response people have to it.

Although the guidelines provide no expectation for archaeologists to consider *aesthetic values* it is often the case that a site's or a landscape's aesthetic is a significant contributory value to significance. Examples of archaeological sites that may have high aesthetic values would be rock art sites, or sites located in environments that evoke strong sensory responses. For this reason we consider it appropriate to include aesthetic values as part of the significance assessment below.

Assessment of Significance

The assessment of significance has been completed in consideration of previous assessments, as well as the contemporary survey and assessment.

The subject area contains no identified Aboriginal objects or areas of identified Aboriginal cultural heritage value. The subject area is concluded to be unlikely to contain Aboriginal objects or areas of Aboriginal cultural heritage value, and is therefore concluded to have low Aboriginal heritage significance.

Archaeological Value

The archaeological value of this site is considered to be low due to there being no identified Aboriginal objects within the subject area, and to the conclusion of this and previous assessments which conclude the area has low potential to contain Aboriginal archaeological or cultural heritage sites.

Cultural Value

There were no specific areas or places of cultural value identified during the survey for the Modification. However, previous assessments have identified and documented cultural values for the Moolarben Coal Complex area, including:

- ❑ Archaeological sites having contemporary cultural value because they provide a tangible link to the traditional past (Kuskie 2013a: 59).
- ❑ The presence of flora and fauna species with known traditional uses (Kuskie 2013a: 59).
- ❑ The area of Moolarben Ridge to the south of Carrs Gap having contemporary cultural value to the Wiradjuri community (Hamm 2008b, Kuskie 2013a). The Modification would not affect this area or these values.
- ❑ The area along the Goulburn River known as “The Drip” (approximately 8 km north of the subject area) is considered to have high cultural value as the sites represent easily identified material remains and the area is ceremonially important (Hamm 2006a). The Modification would not affect this area or these values.

Social Value

For the reasons described above the Moolarben Coal Complex area has social value to the Wiradjuri community. It is also noted that Aboriginal people who are not Wiradjuri have identified a social and cultural connection to the place (Kuskie 2013a: 59).

Historic Value

Owing to its small size the subject area is not considered to be important to the cultural or natural history of the local area and/or region and/or state.

Scientific (Archaeological) Value

The subject area does not have potential to yield information that would contribute to a further understanding of the cultural or natural history of the local area and/or region and/or state. The subject area contains no identified Aboriginal objects, and this and previous assessments have concluded Aboriginal objects are unlikely to occur.

Aesthetic Value

Owing to its small size the subject area is not important in demonstrating aesthetic characteristics in the local area and/or region and/or state.

15. Impact Assessment

A detailed surface survey was undertaken within the subject area, covering the majority of the subject area and focussing on areas of visibility and areas of potential sensitivity, such as ground surface exposures and rock formations that may have formed rockshelters suitable for art or habitation. No Aboriginal objects were identified, and none are considered to be likely to occur within the subject area. The subject area is deemed to have low archaeological potential.

Because no Aboriginal objects or areas of cultural heritage value have been identified within the subject area it is concluded that the proposed OC4 haul road Modification (regardless of which haul road route is ultimately selected) will have no impact on known Aboriginal cultural heritage values.

The original proposed OC4 haul road would have impacted a single Aboriginal archaeological site (AECOM 2011a: Appendix B, p.8); both Option 1 and Option 2 for the proposed modification to the OC4 haul road will not impact any identified Aboriginal objects. At the time of finalisation of this report, Option 1 is the preferred haul road option.

16. Management and Mitigation Measures

The proposed activity will not harm any known Aboriginal objects or cultural heritage values, and is located in an area of low Aboriginal archaeological potential. In addition to this, as described above, the Modification will result in a reduced ground disturbance footprint compared to the original proposed OC4 haul road, and will not harm any known Aboriginal objects (the original OC4 haul road proposal would have harmed 1 Aboriginal archaeological site). As such, the Modification supports, albeit within the context of a much larger development, the principles of *ecological sustainable development* and *inter-generational equity* described and recommended in the *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH 2011).

Nevertheless, MCO should ensure that the proposed works proceed as planned, and remain within the assessed boundaries of the subject area. The emergency response procedures described in the HMP should be implemented to manage the low residual risk of Aboriginal objects being identified during the further design and construction of the OC4 haul road Modification.

17. Recommendations

There were no Aboriginal objects or areas of cultural heritage value identified within the subject area, however the following recommendations are made:

1. For the 280 m area of Option 1 that was not surveyed, MCO should implement the following procedures³:
 - a. In locations with Aboriginal heritage potential where impacts are proposed that may involve significant ground disturbance, but heritage survey sampling has not occurred to a level consistent with the OEH requirements, MCO will engage an appropriately qualified and experienced archaeologist to conduct a detailed archaeological survey and recording of those locations, in consultation with the RAPs, prior to any impacts occurring.
2. For any previously unrecorded open artefact sites identified by Recommendation 1⁴:
 - a. Where feasible, MCO will seek to redesign the proposed works such that impacts are minimised or avoided to the heritage evidence;
 - b. Where the site is assessed as being of low significance and impacts cannot be avoided, following detailed recording of the evidence, impacts will be permitted to occur without further action;

³ It is noted that additional detailed archaeological survey work was undertaken on 31 July 2014 for haul road route Option 1 to cover the area of land that was previously inaccessible during the 12 March 2014 surveys. This recommendation is therefore no longer relevant. However, as this recommendation was reviewed by the RAPs during the draft ACHA review period this recommendation has been footnoted rather than removed to maintain consistency between the draft version and final version of this report.

⁴ This recommendation remains relevant for any previously unrecorded open artefact sites identified during surface disturbance works.

- c. Where the site is assessed as being of low to moderate, or moderate significance, and impacts cannot be avoided, following detailed recording of the evidence, the Environment and Community Relations Manager of MCO will determine in consultation with a heritage expert the extent of proposed impacts, and where impacts are substantial, the evidence within the impact area will be subject to surface collection before impacts are permitted to occur. Where the consensus agreement of MCO and the RAPs is reached, additional mitigation measures, such as surface scrapes and/or hand excavation, may be implemented for evidence within the impact area. Where the impacts are determined to be minimal, impacts will be permitted to occur without further action; and
- d. Where the site is assessed as being of moderate to high, or high significance, and impacts cannot be avoided, following detailed recording of the evidence, the Environment and Community Relations Manager of MCO will determine in consultation with a heritage expert the extent of proposed impacts, and where impacts are substantial, the evidence within the impact area will be subject to surface collection and any other mitigation measures, such as surface scrapes and/or hand excavation, as determined by the consensus agreement of MCO and the RAPs before impacts are permitted to occur. Where the impacts are determined to be minimal, impacts will be permitted to occur after the evidence within the impact area has been subject to surface collection. In the event that consensus agreement cannot be reached between MCO and the RAPs about the mitigation strategy, the Environment and Community Relations Manager of MCO will determine that strategy in consultation with a heritage expert, but it will as a minimum involve surface collection of the evidence.

3. For any previously unrecorded open grinding groove sites identified by Recommendation 1⁵:
 - a. Where feasible, MCO will seek to redesign the proposed works such that impacts are minimised or avoided to the heritage evidence;
 - b. Where the site is assessed as being of low, low to moderate, or moderate significance and impacts cannot be avoided, following detailed recording of the evidence and use-wear and residue analysis, impacts will be permitted to occur without further action; and
 - c. Where the site is assessed as being of moderate to high, or high significance, following detailed recording of the evidence and use-wear and residue analysis, the Environment and Community Relations Manager of MCO will determine in consultation with a heritage expert the extent of proposed impacts. Where impacts are substantial, the evidence will be subject to any mitigation measures, such as removal of the sandstone slab hosting the grooves and subsequent display for educational purposes, as determined by the consensus agreement of MCO and the RAPs before impacts are permitted to occur. In the event that consensus agreement cannot be reached between MCO and the RAPs about the mitigation strategy, the Environment and Community Relations Manager of MCO will determine that strategy in consultation with a heritage expert. Where the impacts are determined to be minimal, impacts will be permitted to occur without further action.
4. For any previously unrecorded rockshelters identified by Recommendation 1⁶:
 - a. MCO will seek to redesign the proposed works such that impacts are minimised or avoided to the heritage evidence;

⁵ This recommendation remains relevant for any previously unrecorded grinding groove sites identified during surface disturbance works.

⁶ This recommendation remains relevant for any previously unrecorded rock shelters identified during surface disturbance works.

- b. Where the site is assessed as being of low to moderate, or moderate significance, and impacts cannot be avoided, following detailed recording of the evidence, where the consensus agreement of MCO and the RAPs is reached, the site will be subject to test excavation and consideration of further mitigation measures (salvage excavation). In the event that consensus agreement cannot be reached between MCO and the RAPs about the mitigation strategy, the Environment and Community Relations Manager of MCO will determine that strategy in consultation with a heritage expert; and
 - c. Where the site is assessed as being of moderate to high, or high significance, and impacts cannot be avoided, it will be subject to test excavation and any other mitigation measures, such as salvage excavation by hand, as determined by the consensus agreement of MCO and the RAPs before impacts are permitted to occur. In the event that consensus agreement cannot be reached between MCO and the RAPs about the mitigation strategy, the Environment and Community Relations Manager of MCO will determine that strategy in consultation with a heritage expert, but it will as a minimum involve test excavation of the shelter.
5. For any other previously unrecorded site types (i.e. site types other than open artefact scatters, grinding grooves and rockshelters) identified by Recommendation 1⁷:

⁷ This recommendation remains relevant for any other previously unrecorded site types during surface disturbance works.

- a. MCO will seek to redesign the proposed works such that impacts are minimised or avoided to the heritage evidence. Where avoidance of impacts is not feasible, the Environment and Community Relations Manager of MCO will determine an appropriate mitigation strategy in consultation with a heritage expert and with the consensus agreement of the RAPs. In the event that consensus agreement cannot be reached between MCO and the RAPs about the mitigation strategy, the Environment and Community Relations Manager of MCO will determine that strategy in consultation with a heritage expert. Where the site is assessed as being of moderate to high, or high significance, and impacts are substantial, some form of mitigation will be implemented before impacts are permitted to occur.
6. MCO should implement emergency response procedures for the unexpected discovery of Aboriginal objects during design and construction activities for the Modification:
 - a. With the exception of skeletal material, where the newly identified heritage evidence may be subject to impacts, MCO will engage an appropriately qualified and experienced archaeologist to undertake a detailed archaeological recording of the evidence and assess the significance of the evidence in consultation with the RAPs, assess the nature of the proposed impacts, and provide advice on appropriate management strategies consistent with the approved MCO HMP Stage 1; and
 - b. If human skeletal material is identified, all work in the area of the material will cease immediately and notification and protection procedures will be implemented.
7. That the approved MCO AHMP Stage 1 (or other relevant contemporary heritage management plan [i.e. the complex wide Heritage Management Plan required by Project Approval 08_0135]) is updated to include the extent of the Modification and the management of Aboriginal heritage values within it.
8. MCO should continue to liaise with the RAPs throughout the design and construction activities for the Modification.

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19. Glossary

Term	Definition
Aboriginal Cultural Heritage	The tangible (objects) and intangible (dreaming stories, legends and places) cultural practices and traditions associated with past and present day Aboriginal communities.
Aboriginal Object(s)	The legal definition for material Aboriginal cultural heritage under the <i>National Parks and Wildlife Act 1974</i> .
Aboriginal Stakeholders	Members of a local Aboriginal land council, registered holders of Native Title, Aboriginal groups or other Aboriginal people who may have an interest in the project.
Archaeology	The scientific study of human history, particularly the relics and cultural remains of the distant past.
Archaeological Deposit	A layer of soil material containing archaeological remains.
Archaeological Investigation	The process of assessing the archaeological potential of an impact area by a qualified archaeologist.
Archaeological site	A site with material evidence of past Aboriginal or non-Aboriginal activity in which material evidence (artefacts) of past activity is preserved.
Artefact	An object made by human agency (e.g. stone artefacts).
Assemblage	<ol style="list-style-type: none"> 1. A group of stone artefacts found in close association with one another. 2. Any group of items designated for analysis - without any assumptions of chronological or spatial relatedness.
Avoidance	A management strategy which protects Aboriginal sites within an impact area by avoiding them totally in development.
Borehole	A hole produced in the ground by drilling for the investigation and assessment of soil and rock profiles.
Catchment	The area from which a surface watercourse or a groundwater system derives its water.
Cumulative Impacts	Combination of individual effects of the same kind due to multiple actions from various sources over time.
Development	The operations involved in preparing a mine for extraction, including cutting roadways and headings. Also includes tunnelling, sinking, crosscutting, drifting, and raising.
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Ephemeral	Existing for a short duration of time.
Exploration	The work done to prove or establish the extent of the coal resource.
Flake	A piece of stone detached from a core, displaying a bulb of percussion and striking platform.
Harm	With regard to Aboriginal objects this has the same meaning as the <i>National Parks and Wildlife Act 1974</i> .
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Impact Area	An area that requires archaeological investigation and management assessment.
In situ	Latin words meaning 'on the spot, undisturbed'.
Isolated Find	A single artefact found in an isolated context.
Landscape Character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features.
Land Unit	An area of common landform, and frequently with common geology, soils and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system.
Landform	Any one of the various features that make up the surface of the earth.

Term	Definition
Management Plans	Conservation plans which identify short and long term management strategies for all known sites recorded within a (usually approved) project area.
Methodology	The procedures used to undertake an archaeological investigation.
Minimum Requirements	The minimum standard of which NPWS will accept the reporting of an archaeological investigation.
Mitigation	To address the problem of conflict between land use and site conservation.
Open Camp Site	An archaeological site situated within an open space (e.g. archaeological material located on a creek bank, in a forest, on a hill, etc.).
PAD	Potential archaeological deposit. A location considered to have a potential for subsurface archaeological material.
Site Recording	The systematic process of collecting archaeological data for an archaeological investigation.
Site	A place where past human activity is identifiable.
Spatial Significance	A site which may contain potential sub-surface deposits or in situ material useful in the analysis of human use of land and site formation process.
Survey Coverage	A graphic and statistical representation of how much of an impact area was actually surveyed and therefore assessed.
Tributary	A river or stream flowing into a larger river or lake.

Appendix I Consultation Log

Date	Organisation/Person Contacted	How Contacted	Contacted By	Nature of Consultation
4/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd, Aleisha Lonsdale and Warranha Ngumbaay	Email	Moolarben Coal	Email to RAPs to invite them to the information session on Tuesday 11 March 2014.
5/3/2014	Craig McConnell	Email	Moolarben Coal	Email to RAPs to invite them to the information session on Tuesday 11 March 2014.
11/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd	In person	Moolarben Coal	Attendance at information session.
11/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd	In person	Moolarben Coal	Attendees at information session provided with a hard copy of the proposed methodology.
12/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd, Aleisha Lonsdale and Warranha Ngumbaay	Email/Post	Moolarben Coal	Email to all RAPs following the information session providing a copy of the proposed methodology (and covering letter) and information session presentation. Raps who didn't attend information session posted a hard of the proposed methodology.
12/3/2014 13/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd	In person	Moolarben Coal	Attendance at field surveys on Wednesday 12 and Thursday 13 March 2014.
12/3/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd	Email	Moolarben Coal	Email to thank the RAPs for their attendance at the field surveys.
7/5/2014	Mudgee LALC, Warrabinga Native Title Claimants Aboriginal Corporation, Murong Gialinga Aboriginal & Torres Strait Islander Corporation, North East Wiradjuri Company Ltd, Aleisha Lonsdale, Craig McConnell and Warranha Ngumbaay	Post	Moolarben Coal	Draft ACHA and covering letters posted to all RAPs for their review and comment.
8/5/2014	Warranha Ngumbaay	Email	Moolarben Coal	Email to Warranha to provide an electronic copy of the draft ACHA and covering letter and to confirm that a hard copy had been posted to her.

Date	Organisation/Person Contacted	How Contacted	Contacted By	Nature of Consultation
9/5/2014	NC01	Email	Moolarben Coal	Email to NC01 providing a copy of the draft ACHA and covering letter for their review and comment, and a copy of the proposed methodology and information session presentation for their records.
12/5/2014	NC01	Post	Moolarben Coal	A copy of the draft ACHA and covering letter was posted to NC01 for their review and comment, and a copy of the proposed methodology and information session presentation for their records.
26/5/2014	Moolarben Coal	Email	Craig McConnell	Craig provided comments on the draft ACHA.
5/6/2014	Moolarben Coal	Email	Murong Gialinga Aboriginal & Torres Strait Islander Corporation	Murong Gialinga Aboriginal & Torres Strait Islander Corporation provided comments on the draft ACHA.
6/6/2014	Moolarben Coal	Email	NC01	NC01 provided comments on the draft ACHA.
10/6/2014	Moolarben Coal	Email	Warrabinga Native Title Claimants Aboriginal Corporation	Warrabinga Native Title Claimants Aboriginal Corporation provided comments on the draft ACHA.
13/6/2014	NC01	Email	Moolarben Coal	Moolarben Coal emailed NC01 a copy of the Proposed Methodology and a covering letter explicitly providing 28 days to review the Proposed Methodology.
13/6/2014	NC01	Post	Moolarben Coal	Moolarben Coal posted NC01 a copy of the Proposed Methodology and a covering letter explicitly providing 28 days to review the Proposed Methodology.
17/6/2014	NC01	Meeting	Moolarben Coal	Meeting held between Moolarben Coal and NC01 as requested.
18/6/2014	North East Wiradjuri Company Ltd	Post	Moolarben Coal	An additional copy of the draft ACHA was provided to North East Wiradjuri Company Ltd as requested.
23/6/2014	NC01	Email	Moolarben Coal	NC01 contacted to confirm approach to presenting their comments and registered group name in the ACHA report.
24/6/2014	Moolarben Coal	Email	NC01	NC01 emailed to confirm their satisfaction with the proposed approach to referring to their group as NC01 throughout the report, including an explanatory footnote and blacking-out the identifying details in their correspondence.

Appendix 2 Copies of Comments on Draft Report

WARRABINGA

Native Title Claimants Aboriginal Corporation

ON: 2972 Incorporated in the Corporations (Aboriginal and Torres Strait Islander) Act 2006

PO BOX 282

MUDGEES NSW 2850

TEL: 02 4627 8633

EMAIL: INFO@WARRABINGA.COM.AU



Moolarben Coal
Attn: Donna Whillock
Cultural Heritage Officer
Locked Bag 2003
Mudgee NSW 2850

10 June 2014

Mrs Whillock,

RE: Comment on Moolarben Coal Mine – OC4 South-West Modification Draft Aboriginal Cultural Heritage Assessment

Below you will find our comments for the Aboriginal Cultural Heritage Assessment completed by Niche Environment and Heritage for the Moolarben Coal Mine OC4 South-West Modification dated May 2014.

Warrabinga have reviewed the report prepared by Niche Environment and Heritage and whilst we can see that it will in the main meet all regulatory requirements we are of the opinion that it has aspects that can be improved. The first area of improvement relates the provision of more detailed and referenced maps so an accurate understanding of the areas stated in Section 1 paragraphs 2 and 3 can be understood in context. Further we note that there are two options identified for the haul road yet there is no preferred option identified, are we to assume that both haul roads are to be built.

Could you also please confirm whether the “pipeline network” mentioned in Section 4 is proposed to be contained wholly within the Haul Road Easement (90m wide) or are they proposed for separate routes and therefore are not currently adequately assessed.

We note that two Aboriginal sites are known to be located to the south east of the proposed Mine Water Dam (Figure 3). Yet those two sites do not appear to receive any specific consideration in the report. We have concerns that the placement of the mine water dam in the present location will make inundation of these two sites easier to justify in the future. Without further more specific details in relation to these two sites we are unable to indicate any level of agreement or endorsement of the proposed works.

It is critical that these documents contain sufficient information for a person unfamiliar with the project to gain an appreciation of the project and understand what is being asked for. How can we be expected to seek input from our senior people in relation to these areas and what is being proposed when this is unclear in the report.

WARRABINGA

Native Title Claimants Aboriginal Corporation

CN: 2972 Incorporated in the Corporations (Aboriginal and Torres Strait Islander) Act 2006

PO BOX 282

MUDGEE NSW 2850

TEL: 02 4627 8633

EMAIL: INFO@WARRABINGA.COM.AU



We also are unable to understand how some of the visibility and exposure percentages specified in Table 7 can be accurate. We assume that Plates 1 and 2 document the typical conditions in their respective Survey Units and as such we certainly do not agree with visibility and exposure percentage to the levels specified in the report. By overstating the Visibility and Exposure percentages it has the effect of making the effective survey coverage appear higher and therefore has the effect of making the results of the survey appear more legitimate. I would suggest that visibility and exposure percentage in the order of 10-20% would be more in keeping with the area surveyed.

There is a question over Moolarben Coal Mines ability to respond to any queries raised in relation to the methodology. If the period for comment was 11/3/2014 to 8/4/2014 as stated Section 5 then how is it that the survey could be conducted on 12/3/2014. I would suggest to you that the reason you received no comment was because there was no reason bothering drafting a letter when clearly it could not be considered, as Moolarben Coal Mine had already undertaken the works which were supposed to be subject to comment. This is not the first time that Moolarben Coal Mine has been found to have not completed their consultation appropriately. I believe that it speaks to a corporate culture within Moolarben Coal Mine where Aboriginal cultural heritage is not treated with the respect it deserves. There is no genuine willingness to engage and consult with the Aboriginal community only a willingness to tick a box and be seen to have complied with a process.

Warrabinga requests that our comments be addressed in the report and that a further round of consultation be undertaken once these comments have been addressed. At this stage we do not believe that the report provided sufficient detail for us to reach a position supporting the proposed works.

Should you wish to have a meeting to discuss the issues we have raised please coordinate this with our office via email (info@warrabinga.com.au)

Regards,

Lance Syme
Director

Moolarben Coal
C/- Donna Whillock
Cultural Heritage Officer,
Locked Bag 2003
Mudgee NSW 2850.

Dear Ms. Whillock,

objects to any other non-traditional aboriginal organizations or people taking part in site surveys, consultation and assessments within our defined traditional lands. These non-traditional people and groups are outsiders under Traditional Lore and have no right to advise on or to be present during consultation or site visits as they do not possess the specific traditional knowledge in relation to these lands or sites. These participants may be indigenous and may live locally however this still does not give them the right to disregard Traditional Lore and values.

██████████ is supportive of any efforts to provide facilities for the community at large within our Traditional Lands, where it **does not significantly impact on cultural artefacts, heritage sites, the environment including water sources and the sub-terrain water table, endangered or threatened species of flora or fauna** and provided Proponents have consulted with ██████████ and negotiated an agreed outcome in relation to our cultural, heritage and environmental concerns which Moolarben have not. ██████████ as Registered Native Titles Claimants were not involved nor Consulted in any Heritage aspects at Moolarben Coal from 2010 to present day and this is contrary to the Native Title Act and Consultation Guidelines and is therefore constitutes an illegal act by Moolarben Coal and its parent company Yancoal.

63

representatives have not been consulted in person nor onsite and a mutual agreement has not been reached and therefore we **strongly object** to the entire project.

It is as Traditional owners that **cannot support** this Aboriginal Cultural Heritage report by Moolarben Coal **as it will significantly impact on cultural artefacts, heritage sites, the environment including water sources and the sub-terrain water table, endangered or threatened species of flora or fauna.**

does not object to our details being given to OEH, however do not wish you to advise any other organization of our interest to this project.

We trust our response meets your requirements. Please contact Directors should you require our assistance to address any Aboriginal issues to support your future plans.

Yours sincerely,

[Redacted signature block]

Subject: FW: draft acha

From: Murong Gialinga [<mailto:muronggialinga@hotmail.com>]
Sent: Thursday, 5 June 2014 9:05 PM
To: Donna Whillock
Subject: RE: draft acha

Hello Donna we are replying to the Draft Aboriginal Cultural Heritage Assessment for OC4. After reading the draft we would like to recommend that all the areas be thoroughly survey and the rock shelters be Monitored For Impact and Subsidence all Aboriginal stakeholders be involved with the monitoring
Regards Larry Foley Chairperson Murong Gialinga

From: Donna.Whillock@vancoal.com.au
To: muronggialinga@hotmail.com
Subject: draft acha
Date: Mon, 2 Jun 2014 23:01:35 +0000

Good morning all,

You would have by now received a copy of the Draft Aboriginal Cultural Heritage Assessment for the Moolarben Coal Mine OC4 South-West Modification for your review and comment (sent 7 May 2014).

Please note that the closing date for the provision of comments and feedback (either in writing or verbally) on the draft report is **5.00pm Friday 6 June 2014**. All comments received by that date will be taken into consideration (and appended in full) in the finalisation of the assessment.

To provide any comments on the draft ACHA, please don't hesitate to send me an email (Donna.Whillock@vancoal.com.au) or a hard copy letter (Locked Bag 2003 Mudgee NSW 2850 Australia).

Regards,

Donna

Donna Whillock | CULTURAL HERITAGE OFFICER

Moolarben Coal Operations Pty Ltd

SITE: 4250 Ulan Road, Ulan NSW 2850
POSTAL: Locked Bag 2003 Mudgee NSW 2850 Australia
PHONE: 02 6376 1403
FAX: +61 2 6376 1599
MOBILE: N/A
EMAIL: Donna.Whillock@vancoal.com.au
WEBSITE: www.moolarbencoal.com.au



Craig McConnell
6 Wanda Crescent Mudgee N.S.W. 2850

26 May 2014

In reply to: Moolarben Coal Mine- OC4 South West Modification Draft Aboriginal Cultural Heritage Assessment

Mr Mark Jacobs
C/- Donna Whillock
Moolarben Coal
General Manager, Environment, Approvals & Community Relations

Dear Mr Jacobs:

I thank Moolarben Coal for the opportunity to comment on the proposed Modifications to OC4 South-West Aboriginal Cultural Heritage Assessment. Due to work & family commitments I have not been involved in this process to date, & an apology is in order from me. Therefore my comments must be solely based on the information provided by the Report Supplied to me By Moolarben Coal, Dated 7th May 2014.

From the Draft report I can summarise there will less Environmental Impacts, Improved water Management, & The Cultural Heritage Survey of the subject area found no Aboriginal objects or areas of Aboriginal Cultural Significance. The report states the reps from the RAPs have expressed their satisfaction with the Methodology of the site survey. I am Pleased with the Reference to Historical survey data, the fact that the proposed Modifications will not impact any Identified Aboriginal objects, or Significant sites in the surrounding areas, & the Quantity & Quality of the Report.

I have no objections or Amendments, from the information provided, to the Moolarben Coal Mine OC4 South-West Modifications Aboriginal Cultural Heritage Assessment.

Craig McConnell

Appendix 3 AHIMS Search Results

Office of
Environment &
Heritage

AHIMS Web Services (AWS)
Extensive search - Site list report

Your Ref Number : 3932 Moolarben


Client Service ID : 124265

SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0134	Murrumbidgee No.1:	AGD	SS	761300	6421170	Closed site	Valid	Art (Pigment or Engraved) :-	Shelter with Art	
	Contact	Recorders	Warren Bluff					Permits		
36-3-0060	Ulan Creek Site 10	AGD	SS	760215	6426006	Open site	Valid	Artefact :-	Open Camp Site	361.1299
	Contact	Recorders	Ms Lalla Haglund					Permits		
36-3-0016	Ulan Murrumbidgee	AGD	SS	760796	6421957	Closed site	Valid	Art (Pigment or Engraved) :-	Shelter with Art	1299
	Contact	Recorders	Ired McCarthy					Permits		
36-3-0043	SIMC001	AGD	SS	759993	6424099	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0044	SIMC002	AGD	SS	758886	6423780	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0045	SIMC040	AGD	SS	760441	6421958	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0046	SIMC041	AGD	SS	760384	6421732	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0047	SIMC042	AGD	SS	760408	6421838	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0048	SIMC043	AGD	SS	760558	6421874	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0049	SIMC044	AGD	SS	760550	6421657	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0050	SIMC045	AGD	SS	760592	6421721	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0051	SIMC046	AGD	SS	760547	6421941	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0052	SIMC047	AGD	SS	760637	6422033	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0053	SIMC048	AGD	SS	760569	6421916	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0054	SIMC049	AGD	SS	760543	6422069	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0055	SIMC050	AGD	SS	760340	6422126	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0056	SIMC051	AGD	SS	760434	6422195	Open site	Valid	Artefact : 1		

Report generated by AHIMS Web Service on 06/02/2014 for Clare Anderson for the following area at Datum : GDA, Zone : 55, Eastings : 750739 - 762000, Northings : 6420970 - 6426639 with a Buffer of 0 meters. Additional Info : arch assessment. Number of Aboriginal sites and Aboriginal objects found is 117

This information is not guaranteed to be free from error omission. Office of Environment and Heritage (NSW) and its employees disclaim liability for any act done or omission made on the information and consequences of such acts or omissions.

Page 1 of 8



AHIMS Web Services (AWS)

Extensive search - Site list report


Your Ref Number : 3932 Moolarben
Client Service ID : 124265

SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0057	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC052	AGD	SS	760422	6422175	Open site	Valid	Artefact : 1		
36-3-0058	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC053	AGD	SS	759942	6422062	Open site	Valid	Artefact : 1		
36-3-0059	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC054	AGD	SS	760966	6421764	Open site	Valid	Artefact : 1		
36-3-0060	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC055	AGD	SS	760964	6421902	Open site	Valid	Artefact : 1		
36-3-0061	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC056	AGD	SS	760936	6421882	Open site	Valid	Artefact : 1		
36-3-0062	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC057	AGD	SS	760906	6421882	Open site	Valid	Artefact : 1		
36-3-1041	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC225	AGD	SS	761752	6425807	Open site	Valid	Artefact : 1		
36-3-1042	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC226	AGD	SS	761726	6426232	Open site	Valid	Artefact : 1		
36-3-1043	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC227	AGD	SS	761825	6426206	Open site	Valid	Artefact : 1		
36-3-1044	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC228	AGD	SS	762428	6426370	Open site	Valid	Artefact : 1		
36-3-1045	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC229	AGD	SS	762430	6426375	Open site	Valid	Artefact : 1		
36-3-1059	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC043	AGD	SS	762310	6424801	Open site	Valid	Artefact : 1		
36-3-0798	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC1	AGD	SS	760670	6424444	Open site	Valid	Modified Tree (Carved or Scored) : 1		
36-3-0799	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>		
	SIMC2	AGD	SS	760840	6424339	Open site	Valid	Artefact : 1		
36-3-0800	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC3	AGD	SS	760846	6424309	Open site	Valid	Artefact : 1		
36-3-0801	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	
	SIMC4	AGD	SS	760806	6424307	Open site	Valid	Artefact : 1		
	<u>Contact</u>	<u>Recorders</u>	Mr Giles Hannam					<u>Permits</u>	3439	

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Page 2 of 8



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Extensive search - Site list report

Your Ref Number : 1932 Moolarben

Client Service ID : 124265

SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0802	SIMC05	AGD	SS	760867	6424306	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0803	SIMC06	AGD	SS	760890	6424301	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0804	SIMC07	AGD	SS	760867	6424294	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0805	SIMC08	AGD	SS	760548	6424002	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0806	SIMC09	AGD	SS	760508	6424018	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0807	SIMC10	AGD	SS	760645	6424004	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0808	SIMC11	AGD	SS	760924	6423968	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0809	SIMC12	AGD	SS	760933	6423948	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0810	SIMC13	AGD	SS	761054	6423910	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0811	SIMC14	AGD	SS	761050	6423907	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0812	SIMC15	AGD	SS	761252	6425269	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0813	SIMC16	AGD	SS	761168	6425107	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0814	SIMC17	AGD	SS	760997	6425271	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0815	SIMC18	AGD	SS	759777	6425026	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0816	SIMC19	AGD	SS	759786	6425012	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0817	SIMC20	AGD	SS	759816	6425028	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0818	SIMC21	AGD	SS	760296	6425214	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		

Report generated by AHIMS Web Service on 06/02/2014 for Clare Anderson for the following area at Datum: GDA, Zone : SS, Eastings : 750739 - 762000, Northings : 6420978 - 6426639 with a Buffer of 0 meters. Additional Info : arch assessment. Number of Aboriginal sites and Aboriginal objects found is 117

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Page 3 of 8

Page 3 of 8

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SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0819	SIMC22	AGD	SS	760297	6425216	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0820	SIMC23	AGD	SS	760289	6425239	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0954	PAD 8 Moolarben Coal	AGD	SS	761478	6421053	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0955	PAD 9 Moolarben Coal	AGD	SS	761552	6421040	Open site	Valid	Potential Archaeological Deposit (PAD): 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0956	PAD 10 Moolarben Coal	AGD	SS	761551	6421051	Open site	Valid	Potential Archaeological Deposit (PAD): 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0957	PAD 11 Moolarben Coal	AGD	SS	761426	6420964	Open site	Valid	Potential Archaeological Deposit (PAD): 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0958	PAD 12 Moolarben Coal	AGD	SS	761318	6420832	Open site	Valid	Potential Archaeological Deposit (PAD): 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0821	SIMC24	AGD	SS	760514	6425250	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0822	SIMC25	AGD	SS	761802	6425783	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0823	SIMC26	AGD	SS	761766	6425183	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0824	SIMC27	AGD	SS	761828	6425100	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0825	SIMC28	AGD	SS	761627	6425002	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0826	SIMC29	AGD	SS	761619	6424707	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		
36-3-0827	SIMC30	AGD	SS	761135	6424559	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits	3439	
36-3-0828	SIMC31	AGD	SS	761132	6424567	Open site	Valid	Artefact : 1		
	Contact	Recorders	Mr Giles Hannam					Permits		

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Page 4 of 6

Page 4 of 8

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SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-0029	<u>Contact</u> 31MC32	<u>Recorders</u> AGD	SS	761124	6424585	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0030	<u>Contact</u> 31MC33	<u>Recorders</u> AGD	SS	761125	6424584	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0031	<u>Contact</u> 31MC34	<u>Recorders</u> AGD	SS	761128	6424583	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0032	<u>Contact</u> 31MC35	<u>Recorders</u> AGD	SS	761125	6424584	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0033	<u>Contact</u> 31MC36	<u>Recorders</u> AGD	SS	761255	6424616	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0034	<u>Contact</u> 31MC37	<u>Recorders</u> AGD	SS	761256	6424618	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0035	<u>Contact</u> 31MC38	<u>Recorders</u> AGD	SS	761279	6424617	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0036	<u>Contact</u> 31MC39	<u>Recorders</u> AGD	SS	761280	6424620	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0037	<u>Contact</u> PAD 1 Moolarben Coal	<u>Recorders</u> AGD	SS	761452	6424581	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	<u>Permits</u>	3439
36-3-0038	<u>Contact</u> PAD 2 Moolarben Coal	<u>Recorders</u> AGD	SS	761265	6423464	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	<u>Permits</u>	3439
36-3-0039	<u>Contact</u> PAD 3 Moolarben Coal	<u>Recorders</u> AGD	SS	761265	6423392	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	<u>Permits</u>	3439
36-3-0040	<u>Contact</u> 31MC398	<u>Recorders</u> AGD	SS	759258	6423654	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0041	<u>Contact</u> 31MC399	<u>Recorders</u> AGD	SS	759331	6423850	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-0042	<u>Contact</u> 31MC300	<u>Recorders</u> AGD	SS	759071	6423798	Open site	Valid	Artefact : 1	<u>Permits</u>	3439
36-3-1143	<u>Contact</u> 31MC306	<u>Recorders</u> GDA	SS	762426	6426370	Open site	Valid	Artefact : 1	<u>Permits</u>	101600

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Page 5 of 8

Page 5 of 8

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Client Service ID : 124265

SiteID	Site Name	Datum	Zone	Eastings	Northings	Contact	Site Status	Site Features	Site Types	Reports
36-3-1144	Contact	GEA	SS	762110	6421138	Open site	Valid	Artefact : 1	Permits	3439
	Recorders	Mr Giles Hamm								101600
36-3-1145	Contact	GEA	SS	761997	6421905	Open site	Valid	Artefact : 1	Permits	3439
	Recorders	Mr Giles Hamm								101600
36-3-2602	Contact	GEA	SS	762104	6421992	Open site	Valid	Artefact : 1	Permits	3439
	Recorders	South East Archaeology								
36-3-2657	Contact	GEA	SS	762632	6423366	Open site	Valid	Artefact : 1	Permits	
	Recorders	Mr Peter Kuski/South East Archaeology								
36-3-2660	Contact	GEA	SS	760344	6422239	Open site	Valid	Artefact : 1	Permits	
	Recorders	Mr Peter Kuski/South East Archaeology								
36-3-2661	Contact	GEA	SS	760362	6421794	Open site	Valid	Artefact : 1	Permits	
	Recorders	Kayandel Archaeological Services/Ms Bridget Walker								
36-3-2662	Contact	GEA	SS	760253	6422144	Open site	Valid	Artefact : 1	Permits	
	Recorders	Kayandel Archaeological Services/Ms Bridget Walker								
36-3-2607	Contact	GEA	SS	760137	6423587	Open site	Valid	Artefact : 1	Permits	
	Recorders	South East Archaeology								
36-3-2653	Contact	GEA	SS	762243	6423241	Open site	Valid	Artefact : 1	Permits	
	Recorders	South East Archaeology								
36-3-2608	Contact	GEA	SS	759832	6422848	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	Permits	
	Recorders	South East Archaeology								
36-3-2609	Contact	GEA	SS	759841	6422853	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	Permits	
	Recorders	South East Archaeology								
36-3-2610	Contact	GEA	SS	759847	6422847	Open site	Valid	Artefact : 1	Permits	
	Recorders	South East Archaeology								
36-3-2611	Contact	GEA	SS	760119	6422761	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	Permits	
	Recorders	South East Archaeology								
36-3-2612	Contact	GEA	SS	760097	6422739	Open site	Valid	Potential Archaeological Deposit (PAD) : 1	Permits	
	Recorders	South East Archaeology								

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Page 6 of 8

Page 6 of 8

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SiteID	SiteName	Datum	Zone	Eastings	Northings	Contact	Site Status	SiteFeatures	SiteTypes	Reports
36-3-2613	31MC331	GD A	SS	760943	6421283	Open site	Valid	Artefact :-		
	Contact	Recorders						Permits		
36-3-2633	31MC351	GD A	SS	761070	6421070	Open site	Valid	Potential Archaeological Deposit (PAD) :-		
	Contact	Recorders						Permits		
36-3-2634	31MC352	GD A	SS	761168	6421080	Open site	Valid	Potential Archaeological Deposit (PAD) :-		
	Contact	Recorders						Permits		
36-3-0222	Moolarben Creek MCL	AGD	SS	760420	6420820	Open site	Valid	Artefact :-	Open Camp Site	
	Contact	Recorders						Permits		
36-3-0223	MCL	AGD	SS	760420	6420880	Open site	Valid	Artefact :-	Open Camp Site	
	Contact	Recorders						Permits		
36-3-0691	CS-15-1P	AGD	SS	761305	6425777	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0703	CS-27-1P	AGD	SS	758686	6425350	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0704	CS-28-1P	AGD	SS	758674	6425288	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0705	CS-29-1P	AGD	SS	758745	6425257	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0706	CS-30-1P	AGD	SS	758769	6425190	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0707	CS-31-1P	AGD	SS	759498	6425055	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0708	CS-32-1P	AGD	SS	760009	6425477	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-0709	CS-33-1P	AGD	SS	760010	6425593	Open site	Valid	Artefact : 1		
	Contact	Recorders						Permits	2531	
36-3-1273	32MC117	GD A	SS	762552	6422517	Open site	Valid	Artefact : 1		101603
	Contact	Recorders						Permits		
36-3-1377	32MC130	GD A	SS	762763	6423968	Open site	Valid	Artefact : 1		101603
	Contact	Recorders						Permits		
36-3-1378	32MC131	GD A	SS	762203	6423681	Open site	Valid	Habitation Structure :- Artefact : 31		101603
	Contact	Recorders						Permits		

Report generated by AHIMS Web Service on 06/02/2014 for Clare Anderson for the following area at Datum: GD A, Zone : SS, Eastings : 750739 - 762000, Northings : 6420978 - 6426639 with a Buffer of 0 meters. Additional Info : arch assessment. Number of Aboriginal sites and Aboriginal objects found is 117

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Page 7 of 8

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Client Service ID : 124265

SiteID	Site Name	Datum	Zone	Eastings	Northings	Contact	Site Status	Site Features	Site Types	Reports
36-3-1208	Contact 32MC161	Recorders GDA	SS	7621172	6421977	Open site	Valid	Artefact : 51	Permits	101603
36-3-1209	Contact 32MC162	Recorders GDA	SS	7621104	6421992	Open site	Valid	Artefact : 67	Permits	101603
36-3-1402	Contact Identifier 91.T10 to 11	Recorders GDA	SS	760234	6426304	Open site	Destroyed	Modified Tree (Carved or Scarred) : -	Permits	
36-3-1403	Contact Identifier 92.T12	Recorders GDA	SS	759813	6426292	Open site	Destroyed	Modified Tree (Carved or Scarred) : -	Permits	
36-3-1302	Contact 32MC137	Recorders GDA	SS	761302	6421217	Open site	Valid	Artefact : 1	Permits	101603
36-3-1303	Contact 32MC138	Recorders GDA	SS	761752	6420964	Open site	Valid	Artefact : 104	Permits	101603
36-3-1304	Contact 32MC139	Recorders GDA	SS	761953	6421041	Open site	Valid	Artefact : 3	Permits	101603

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Page 8 of 8

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I approve the project application referred to in schedule 1, subject to the conditions in schedules 2 to 5.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Red type represents the November 2008 modification (MOD 1)

Blue type represents the December 2008 modification (MOD 2)

Green type represents the June 2009 modification (MOD 4)

Purple type represents the October 2009 modification (MOD 5)

Orange type represents the January 2010 modification (MOD 6)

Pink type represents the May 2010 modification (MOD 8)

Violet text represents the January 2011 modification (MOD 7)

Aqua text represents the June 2014 modification (MOD 9)

Maroon text represents the January 2015 modification (MOD3)

Olive green type represents the April 2015 modification (MOD 10)

Frank Sartor MP
Minister for Planning

Sydney

2007

SCHEDULE 1

Application Number:	05_0117
Proponent:	Moolarben Coal Mines Pty Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Moolarben Coal Project Stage 1

TABLE OF CONTENTS

DEFINITIONS.....	3
ADMINISTRATIVE CONDITIONS	5
Obligation to Minimise Harm to the Environment	5
Terms of Approval	5
Limits on Approval.....	5
Structural Adequacy	6
Demolition	6
Protection of Public Infrastructure	6
Operation of Plant and Equipment	6
Staged Submission of Strategies, Plans or Programs.....	6
Voluntary Planning Agreement.....	6
ENVIRONMENTAL CONDITIONS - GENERAL	7
Noise	7
Blasting	9
Air Quality.....	11
Meteorological Monitoring	13
Ulan Public School.....	13
Subsidence	13
Water.....	14
Biodiversity	16
Heritage.....	18
Transport.....	19
Traffic Management	19
Visual	20
Bushfire Management	20
Waste	21
Rehabilitation	21
Greenhouse Gas	22
Subsidence	22
ADDITIONAL PROCEDURES	26
Notification Of Landowners/Tenants	26
Independent Review.....	26
Land Acquisition	27
ENVIRONMENTAL MANAGEMENT, AUDITING AND REPORTING	28
Environmental Management	28
Reporting.....	29
Auditing	30
Access To Information.....	30
APPENDIX 1: SCHEDULE OF LAND	31
APPENDIX 2: GENERAL LAYOUT OF PROJECT	35
APPENDIX 3: STATEMENT OF COMMITMENTS	39
APPENDIX 4: VOLUNTARY PLANNING AGREEMENT	45
APPENDIX 5: PROPERTY NUMBERS AND LAND OWNERSHIP.....	46
APPENDIX 6: NOISE COMPLIANCE ASSESSMENT	51
APPENDIX 7: UNDERGROUND MINE LAYOUT AND LOCATION OF SENSITIVE FEATURES.....	52
APPENDIX 8: REHABILITATION AND BIODIVERSITY OFFSET STRATEGY	53
APPENDIX 9: ABORIGINAL HERITAGE.....	54
APPENDIX 10: NON-ABORIGINAL HERITAGE.....	62
APPENDIX 11: INDEPENDENT DISPUTE RESOLUTION PROCESS	64

DEFINITIONS

Annual review	The review required by condition 4 of Schedule 5
ARTC	Australian Rail Track Corporation Ltd
BCA	Building Code of Australia
Blast misfires	The failure of one or more holes in a blast pattern to initiate
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; any pipeline, water, sewer, telephone, gas or other service main
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 5 inclusive
Council	Mid-Western Regional Council
CPI	Australian Bureau of Statistics Consumer Price Index
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DEC	NSW Department of Education and Communities
Department	Department of Planning and Environment
DPI	Department of Primary Industries
DRE	Division of Resources and Energy (within Department of Trade and Investment, Regional Infrastructure and Services)
EA	The report titled <i>Moolarben Coal Project Environmental Assessment, Volumes 1-5</i> , dated September 2006, as modified by the Preferred Project Report submitted to the Department in December 2006 and the response to submissions.
EA (MOD 1)	The <i>Application to Make Modifications to the Project Approval for the Moolarben Coal Project</i> , prepared by Wells Environmental Services and dated August 2008.
EA (MOD 2)	The <i>Environmental Assessment - Section 75W Modification Application</i> , prepared by Coffey Natural Systems and dated December 2008.
EA (MOD 3)	Environmental assessment titled <i>Moolarben Coal Project Stage 2 Environmental Assessment Report</i> (6 volumes), dated March 2009 as modified by the preferred project report, dated January 2012; the response to submissions dated June 2012; the residual matters report dated August 2012; and the following supplementary information: <ul style="list-style-type: none"> a) Groundwater Accounting and Water Sharing Plan prepared by RPS Aquaterra Pty Ltd and dated 13 June 2012; b) Surface water information prepared by Worley Parsons Services Pty Ltd and dated 28 September 2012, 15 October 2012 and 9 November 2012; c) Biodiversity Offset Strategy prepared by Cumberland Ecology Pty Ltd and dated December 2012; d) <i>Water Licensing Report – Wollar Creek Water Source</i> prepared by Dundon Consulting Pty Ltd and dated 11 June 13.
EA (MOD 4)	The <i>Documentation in Support of the Balloon Loop Modification</i> , prepared by Wells Environmental Services and dated April 2009.
EA (MOD 5)	The <i>Environmental Assessment - Section 75W Modification Application</i> , prepared by Coffey Natural Systems and dated July 2009, associated response to submissions dated August 2009, and supplementary information dated September 2009.
EA (MOD 6)	The <i>Environmental Assessment - Section 75W Modification Application</i> , prepared by Coffey Natural Systems and dated December 2009.
EA (MOD 7)	The <i>Environmental Assessment – Section 75W Modification Application</i> , prepared by Coffey Natural Systems Pty Ltd and dated March 2010, and associated response to submissions dated June 2010, and supplementary information dated 2 November 2010 and 6 December 2010.
EA (MOD 8)	The <i>Environmental Assessment – Section 75W Modification Application</i> , prepared by Moolarben Coal Operations Pty Ltd and dated April 2010.
EA (MOD 9)	The <i>Environmental Assessment for the Moolarben Coal Project Stage 1 Optimisation Modification</i> prepared by EMGA Mitchell McLennan Pty Limited and dated May 2013, and associated response to submissions dated September 2013, and supplementary information dated 2 October 2013, 14 October 2013 and 15 October 2013.
EA (MOD 10)	Modification Application 05_0117 MOD 10 and accompanying letter reports from Moolarben Coal Operations Pty Limited dated 24 February 2015 and 17 March 2015
EEC	Endangered ecological community, as defined under the TSC Act
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence under the POEO Act
Evening	Evening is defined as the period from 6pm to 10pm
Executive Director Mineral Resources	Executive Director of Mineral Resources, within DRE, or equivalent position

Feasible	Feasible relates to the engineering coordinates and what is practical to build or implement
Heritage Item	An item as defined under the <i>Heritage Act 1977</i> and/or an Aboriginal Object or Aboriginal Place as defined under the <i>National Parks and Wildlife Act 1974</i>
Incident	A set of circumstances that: <ul style="list-style-type: none"> causes, or threatens to cause, material harm to the environment; and/or breaches or exceeds the limits or performance measures/criteria in this approval
Land	As defined in the EP&A Act, except for where the term is used in the noise and air quality conditions in Schedules 3 and 5 of this approval where it is defined to mean the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mine water	Water that accumulates within, or drains from active mining and infrastructure areas (synonymous with dirty water)
Mining operations	Includes the removal and emplacement of overburden, and extraction, processing, handling, storage and transport of coal on site
Minister	Minister for Planning & Infrastructure, or delegate
Minor	Not very large, important or serious
Mitigation	Activities associated with reducing the impacts of the project
Moolarben mine complex	The combined operations of the Moolarben Stage 1 and Stage 2 mines
Moolarben Stage 1 mine	The approved mining operations and associated development within the area marked in blue on the figures in Appendix 2
Moolarben Stage 1 mine surface infrastructure area	The approved surface infrastructure area, including the coal handling and preparation plant and the rail loop, as shown on the figures in Appendix 2
Moolarben Stage 2 mine	The approved mining operations and associated development within the area marked in red on the figures in Appendix 2
Mtpa	Million tonnes per annum
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water, within DPI
NP&W Act	<i>National Parks & Wildlife Act 1974</i>
OEI	Office of Environment and Heritage, within Department of Premier and Cabinet
P&I	NSW Planning & Infrastructure
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Privately-owned land	Land that is not owned by a public agency, or a mining company (or its subsidiary)
Project	The development as described in the EA, and adequately modified by other EAs
Proponent	Moolarben Coal Mines Pty Limited, or any other person or persons who rely on this approval to carry out the development that is subject to this approval
Public Infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Rehabilitation	The restoration of land disturbed by the project to a good condition, and ensure it is safe, stable and non-polluting
RFS	Rural Fire Service
RMS	Roads and Maritime Services
ROM	Run-of-mine
Secretary	Secretary of the Department, or nominee
Site	The land referred to in Appendix 1
Statement of commitments	The Proponent's commitments in Appendix 3
TSC Act	<i>Threatened Species Conservation Act 1995</i>
Ulan Road Strategy	The strategy prepared by the Arrb Group Limited, dated December 2011 as amended by the Director-General's letter dated 25 May 2013
VPA	Voluntary planning agreement under the EP&A Act

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project generally in accordance with the:

- (a) EA;
- (b) EA (MOD 1);
- (c) EA (MOD 2);
- (d) EA (MOD 4);
- (e) EA (MOD 5);
- (f) EA (MOD 6);
- (g) EA (MOD 7);
- (h) EA (MOD 8);
- (i) EA (MOD 9);
- (j) EA (MOD 3);
- (k) EA (MOD 10);
- (l) statement of commitments; and
- (m) conditions of this approval.

Notes:

- The general layout of the project is shown in Appendix 2; and
- The statement of commitments is shown in Appendix 3.

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The proponent shall comply with any reasonable requirement/s of the Secretary arising from the department's assessment of:
 - (a) any reports, plans, programs, strategies, reviews, audits or correspondence that are submitted in accordance with this approval; and
 - (b) the implementation of any actions or measures contained in these documents.

LIMITS ON APPROVAL

Mining Operations

5. The Proponent may carry out mining operations on the site until 31 December 2038.

Note: Under this approval, the Proponent is required to rehabilitate the site and perform additional undertakings to the satisfaction of both the Secretary and the Executive Director Mineral Resources. Consequently, this approval will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.

Coal Extraction

6. The Proponent shall not extract more than:
 - (a) 8 million tonnes of ROM coal from the open-cut mining operations of the project in any calendar year except 2015 and 2016;
 - (b) 9 million tonnes of ROM coal from the open-cut mining operations of the project in the calendar years 2015 and 2016; and
 - (c) 4 million tonnes of ROM coal from the underground mining operations of the project in any calendar year.

Coal Processing

7. The Proponent shall not process more than 13 million tonnes of coal from the Moolarben mine complex in any calendar year.

Coal Transport

8. The Proponent shall ensure that:
 - (a) all product coal is transported from the Moolarben mine complex by rail; and
 - (b) no more than 5 laden trains leave the Moolarben mine complex each day.

STRUCTURAL ADEQUACY

9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works.
- Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.

DEMOLITION

10. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

11. Unless the Proponent and the applicable authority agree otherwise, the Proponent shall:
- (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
 - (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Note: This condition does not apply to any damage to public infrastructure subject to compensation payable under the Mine Subsidence Compensation Act 1961, or to damage to roads caused as a result of general road usage.

OPERATION OF PLANT AND EQUIPMENT

12. The Proponent shall ensure that all plant and equipment used at the site, or in connection with the project, is:
- (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

STAGED SUBMISSION OF STRATEGIES, PLANS OR PROGRAMS

13. With the approval of the Secretary, the Proponent may:
- (a) submit any strategy, plan or program required by this approval on a progressive basis; and
 - (b) combine any strategy, plan, program, review, audit or report required by this approval with any similar strategy, plan, program, review, audit or report required under Project Approval 08_0135 for the Moolarben Coal Project Stage 2.

Notes:

- While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times; and
- If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.

VOLUNTARY PLANNING AGREEMENT

14. Within 12 months of this approval, the Proponent shall enter into a planning agreement with Council in accordance with:
- (a) Division 6 of Part 4 of the EP&A Act; and
 - (b) the terms of the Proponent's offer to the Minister on 4 September 2007, which includes the matters set out in Appendix 4.
-

SCHEDULE 3 ENVIRONMENTAL CONDITIONS - GENERAL

NOISE

Noise Criteria

Acquisition Upon Request

- 1A. Upon receiving a written request for acquisition from an owner of the land listed in Table 1A, the Applicant shall acquire the land in accordance with the procedures in conditions 10 and 11 of Schedule 4.

Table 1A: Land subject to acquisition upon request

Receiver ID
32

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

Transitional Acquisition and Mitigation Arrangements

- 1B. Any receiver that had made a written request for acquisition or mitigation prior to the determination of Modification 3, on 30 January 2015 shall be granted the acquisition or mitigation options in accordance with the condition that applied at the date of that request.

Note: Receivers 30, 63, 70, 75 and 31 were granted mitigation on request rights with the approval of Modification 9 in June 2014. A new Voluntary Land Acquisition and Mitigation Policy was gazetted on 19 December 2014, consequently the conditions have been updated to reflect the new policy, however transitional arrangements are provided for the owners of any privately owned land, if a written request for acquisition or mitigation had already been made, prior to the determination of Modification 3.

1. The Proponent shall ensure that the noise generated by the Moolarben mine complex does not exceed the noise criteria in Table 1 at any residence on privately-owned land or the other specified locations.

Table 1: Noise criteria dB(A)

Land Number	Day	Evening	Night	
	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{Aeq}(15min)$	$L_{A1}(1min)$
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 residences	35	35	35	45
Ulan Primary 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			-

Note: To interpret the land referred to in Table 1 see the applicable figures in Appendix 5.

Noise generated by the complex is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Land Acquisition Criteria

2. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 2A at any residence on privately-owned land, then upon receiving a written request for acquisition from an owner of the land listed in Table 2A, the Proponent shall acquire the land in accordance with the procedures in conditions 10 and 11 of Schedule 4.

Table 2A: Acquisition criteria dB(A) $L_{Aeq}(15min)$

Receiver ID	Day ($L_{Aeq}(15min)$)	Evening ($L_{Aeq}(15min)$)	Night ($L_{Aeq}(15min)$)
63	43	43	42

Receiver ID	Day (<i>L_{Aeq}</i> (15min))	Evening (<i>L_{Aeq}</i> (15min))	Night (<i>L_{Aeq}</i> (15min))
All other privately-owned residences	40	40	40

Note: To interpret the land referred to Table 2A, see the applicable figures in Appendix 5.

3. If the noise generated by the Moolarben mine complex contributes to exceedances of the relevant criteria in Table 2 on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 10-11 of Schedule 4.

Table 2: Land acquisition criteria

Day/Evening/Night <i>L_{Aeq}</i> (period)	Receiver
55/50/45	All privately-owned land

Note: Noise generated by the complex is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Mitigation Criteria

4. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 3A at any privately owned residence, then upon receiving a written request the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 3A: Mitigation criteria dB(A) *L_{Aeq}* (15min)

Receiver ID	Day (<i>L_{Aeq}</i> (period))	Evening (<i>L_{Aeq}</i> (15min))	Night (<i>L_{Aeq}</i> (15min))
63	40	40	39
All other privately owned residences	37	37	37

Note: To interpret the land referred to Table 3A, see the applicable figures in Appendix 5.

Mitigation Upon Request

5. Upon receiving a written request from the owner of the residence on the land listed in Table 3, the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the complex on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 3: Land subject to additional noise mitigation upon request

Receiver ID
30

Note: To interpret the land referred to in Table 3 see the applicable figures in Appendix 5.

Operating Conditions

6. The Proponent shall:
- implement best management practice to minimise the operational, road and rail noise of the project;
 - operate a comprehensive noise management system on site that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of

- mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
 - (c) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply (see Appendix 6);
 - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
 - (e) co-ordinate noise management with the noise management at Ulan and Wilpinjong mines to minimise cumulative noise impacts; and
 - (f) carry out regular monitoring to determine whether the project is complying with the relevant conditions of this approval,
- to the satisfaction of the Secretary.

Noise Management Plan

7. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
 - (a) be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;
 - (b) describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval;
 - (c) describe the proposed noise management system in detail;
 - (d) include a monitoring program that:
 - uses attended noise monitoring to evaluate compliance of the project against the noise criteria in this approval;
 - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this approval and trigger for further attended monitoring);
 - evaluates and reports on:
 - the effectiveness of the noise management system; and
 - compliance against the noise operating conditions; and
 - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

BLASTING

Blasting Criteria

8. The Proponent shall ensure that the blasting on the Moolarben mine complex does not cause exceedances of the criteria in Table 4.

Table 4: Blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land, churches and schools	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%

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.

Blasting Hours

9. The Proponent shall only carry out blasting on the site between 9am and 5pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

Blasting Frequency

10. The Proponent may carry out a maximum of:

- (a) 2 blasts a day; and
- (b) 9 blasts a week, averaged over a calendar year, at the Moolarben mine complex.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, blasts misfires or blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Property Inspections

11. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent shall:
 - (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:
 - establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and
 - identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
 - (b) give the landowner a copy of the new or updated property inspection report.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.

Property Investigations

12. If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent shall:
 - (a) commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
 - (b) give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

Operating Conditions

13. The Proponent shall:
 - (a) implement best practice blasting management to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private infrastructure/property in the surrounding area from any damage; and
 - minimise the dust and fume emissions of any blasting;
 - (b) operate a suitable system to enable the public to get up-to-date information on the proposed blasting Schedule on site; and
 - (c) co-ordinate the timing of blasting on site with the timing of blasting at the Ulan and Wilpinjong mines to minimise cumulative blasting impacts, to the satisfaction of the Secretary.
14. The Proponent shall not undertake blasting on site within 500 metres of:
 - (a) any public road;
 - (b) the Gulgong to Sandy Hollow Railway Line;
 - (c) the Wollar-Wellington 330kV Transmission Line; or
 - (d) any land outside the site not owned by the Proponent, unless the Proponent has:
 - demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and
 - updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or

- a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised the Department in writing of the terms of this agreement.

Blast Management Plan

- The Proponent shall prepare and implement a Blast Management Plan for the project prior to undertaking any blasting on site to the satisfaction of the Secretary. This plan must:
 - be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;
 - describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
 - propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and
 - include a monitoring program for evaluating compliance with the blasting criteria and operating conditions of this approval.

AIR QUALITY

Odour

- The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.

Air Quality Criteria

- The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 5, 6 and 7 at any residence on privately owned land.

Table 5: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 6: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 7: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 5-7:

^a Cumulative (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

^b Incremental impact (i.e. incremental increase in concentrations due to the complex on its own);

^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.

Mine-owned Land

- The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 8, 9 and 10 at any occupied residence on mine-owned land (including land owned by another mine) unless:
 - the tenant and landowner has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this approval;
 - the tenant of any land owned by the Proponent can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice, and the Proponent uses its best endeavours to provide assistance with relocation and sourcing of alternative accommodation;

- (c) air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant and landowner (if the residences is owned by another mine);
 - (d) particulate matter air quality monitoring is regularly undertaken to inform the tenant and landowner of the actual particulate emissions; and
 - (e) data from this monitoring is presented to the tenant in an appropriate format, for a medical practitioner to assist the tenant in making informed decisions on the health risks associated with occupying the property,
- to the satisfaction of the Secretary.

Air Quality Acquisition Criteria

19. If particulate matter emissions generated by the Moolarben mine complex exceed the incremental criteria, or contribute to an exceedance of the relevant cumulative criteria, in Tables 8, 9 and 10 at any residence on privately-owned land or on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 10-11 of Schedule 4.

Table 8: Long term land acquisition criteria for particulate matter

Pollutant	Averaging period	^a Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 9: Short term land acquisition criteria for particulate matter

Pollutant	Averaging period	^a Criterion	Basis
Particulate matter < 10 µm (PM ₁₀)	24 hour	^b 50 µg/m ³	Increment ^b

Table 10: Long term land acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 8-10:

^a Cumulative (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

^b Incremental impact (i.e. incremental increase in concentrations due to the complex on its own);

^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.

Operating Conditions

20. The Proponent shall:
- (a) implement best management practice to minimise the off-site odour, fume and dust emissions of the project;
 - (b) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site;
 - (c) minimise any visible off-site air pollution generated by the project;
 - (d) minimise the surface disturbance of the site;
 - (e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;
 - (f) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note d under Table 9); and
 - (g) co-ordinate the air quality management on site with the air quality management at the Ulan and Wilpinjong mines to minimise cumulative air quality impacts,
- to the satisfaction of the Secretary.

Air Quality Management Plan

- 20A. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:

- (a) be prepared in consultation with the EPA and be submitted to the Secretary for approval by 31 March 2015;
- (b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval;
- (c) describe the air quality management system;
- (d) include an air quality monitoring program that:
 - uses a combination of real-time and supplementary monitors to evaluate the performance of the project against the air quality criteria in this approval;
 - adequately supports the air quality management system;
 - evaluates and reports on the:
 - the effectiveness of the air quality management system; and
 - compliance against the air quality operating conditions;
 - defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.

METEOROLOGICAL MONITORING

- 20B. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:
- (a) complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline; and
 - (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.

ULAN PUBLIC SCHOOL

- 20C. The Proponent shall consult with DEC and, if requested:
- (a) implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or
 - (b) on a reasonable basis relating to the adverse effect of noise and/or dust from the project, contribute to or meet reasonable costs toward relocating the school.

21. (deleted)

22. (deleted)

23. (deleted)

24. (deleted)

25. (deleted)

SUBSIDENCE

Subsidence – Natural Features

26. The Proponent shall:
- (a) ensure that the Drip, Goulburn River Gorge and bed of the Goulburn River (see Appendix 7) remain outside the zone of recorded subsidence damage for longwall mining in NSW;
 - (b) minimise subsidence damage to Cliff Line 3 (see Appendix 7); and
 - (c) reduce the likelihood of subsidence damage to:
 - Aboriginal sites 264, 282, 283, 286, 287 (see Appendix 7) to low; and
 - Aboriginal site 280 (see Appendix 7) to moderate.

Note: The mine layout and design will be reviewed during the assessment of each subsidence management plan (see below), which will be informed by both the end-of panel reports (see condition 26 below) and each independent environmental audit (see condition 10 of Schedule 5). Consequently, the final mine plan may differ in minor respects from the mine plan shown in Appendix 7. However, the revised mine plan would need to comply with the performance criteria specified in this condition.

Subsidence Management Plan

27. The Proponent shall prepare and implement a Subsidence Management Plan (SMP) for the project to the satisfaction of the Director-General of DRE. This plan must:
- (a) be prepared in accordance with the latest version (or subsequent replacement) of the:
 - New Approval Process for Management of Coal Mining Subsidence - Policy; and
 - Guideline for Applications for Subsidence Management Approvals;
 - (b) be approved prior to the carrying out any underground mining operations that could cause subsidence;
 - (c) include a detailed program to monitor:

- the height of fracturing above the goaf of the longwall panels;
 - surface subsidence above the longwall panels, including all near and far field components of subsidence;
 - the impact of surface subsidence on surface features, including flora and fauna, threatened species, and any surface water quality and/or flows; and
 - the effectiveness of any subsidence mitigation measures; and
- (d) a program to validate the subsidence prediction methodology for the project, and calibrate it to sit specific conditions.

End-of-Panel Report

28. Prior to completion of each longwall panel, the Proponent shall:
- prepare an end-of-panel report analysing the subsidence, surface water, and groundwater impacts of the panel, and the cumulative impacts of this panel combined with any other longwall panels;
 - commission suitably qualified subsidence and groundwater experts whose appointment has been approved by the Secretary to review the end-of-panel report, and if necessary recommend changes to the monitoring programs and/or mine plan for subsequent panels; and
 - submit a copy of the end-of-panel report and expert review to the Department, DRE and any other relevant agencies.

WATER

Water Supply

29. The Proponent shall ensure that:
- it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations on site to match its available water supply; and
 - any water supply constraints do not compromise any aspect of the environmental performance of the mine.

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.

Compensatory Water Supply

30. The Proponent shall provide a compensatory water supply to any landowner of privately owned land whose water supply is adversely and directly impacted (other than an impact that is negligible) as a result of the project, in consultation with NOW, and to the satisfaction of the Secretary.

The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributed to the project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified.

If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.

Water Pollution

31. Unless an EPL authorises otherwise, the Proponent shall comply with section 120 of the POEO Act.

Water Management Performance Measures

32. The Proponent shall comply with the performance measures in Table 11 to the satisfaction of the Secretary.

Table 11: Water Management Performance Measures

Feature	Performance Measure
Water Management - General	<ul style="list-style-type: none"> Minimise cumulative water impacts with the other mines in the region Maximise water sharing with the other mines in the region Minimise the use of clean water on site
The Drip	<ul style="list-style-type: none"> Nil
Construction and operation of linear infrastructure	<ul style="list-style-type: none"> Design, install and maintain erosion and sediment controls generally in accordance with the series Managing Urban Stormwater: Soils and Construction including Volume 1, Volume 2A – Installation of Services and Volume 2C – Unsealed Roads

Feature	Performance Measure
	<ul style="list-style-type: none"> Design, install and maintain the infrastructure within 40 m of watercourses generally in accordance with the <i>Guidelines for Controlled Activities on Waterfront Land (DPI 2007)</i>, or its latest version Design, installation and maintenance of creek crossings generally in accordance with the Policy and Guidelines for Fish Friendly Waterway Crossings (NSW Fisheries, 2003) and Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003), or their latest versions
Mine Sediment Dams	<ul style="list-style-type: none"> Design, install and maintain the dams generally in accordance with the series Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries
Clean water diversion & storage infrastructure	<ul style="list-style-type: none"> Use best endeavours to upgrade the existing clean water systems to capture and convey the 100 year ARI flood Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site
Mine water storages	<ul style="list-style-type: none"> Mine water storage infrastructure is designed to store a 50 year ARI 72 hour storm event On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams) are suitably lined to comply with a permeability standard of $< 1 \times 10^{-9}$ m/s
Tailings, acid forming and potentially acid forming materials	(c) In-pit emplacement, encapsulation or capping to prevent the migration of pollutants beyond the pit shell
The Ulan Seam sub-crop line of the most northerly final void	<ul style="list-style-type: none"> Suitably lined to comply with a permeability standard of $< 1 \times 10^{-9}$ m/s
In-pit emplacement of tailings, acid forming and potentially acid forming materials	<ul style="list-style-type: none"> Emplacement, encapsulation and capping to prevent or minimise the migration of pollutants beyond the pit shell of seepage from out of pit emplacement areas Adequate freeboard within the pit void to minimise the risk of discharge to surface waters
Chemical and hydrocarbon storage	<ul style="list-style-type: none"> Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard
Aquatic and riparian ecosystem, including the relevant sections of Moolarben Creek, Bora Creek and the Goulburn River	<ul style="list-style-type: none"> Maintain or improve baseline channel stability Develop site-specific in-stream water quality objectives in accordance with ANZECC 2000 and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW</i> procedures (DECC 2006), or its latest version

Water Management Plan

33. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with NOW and the EPA, by suitably qualified and experienced persons whose appointment has been approved by the Secretary and be submitted to the Secretary for approval by 31 March 2015;
 - (a1) include reference to the National Water Quality Management Strategy;
 - (a2) include detailed performance criteria and describe measures to ensure that the Proponent complies with the Water Management Performance Measures (see Table 11);
 - (b) in addition to the standard requirements for management plans (see Condition 3 of Schedule 5), this plan must include a:
 - (i) Site Water Balance that:
 - includes details of:
 - sources and security of water supply, including contingency planning for future reporting periods;
 - water use and management on site, including details of water sharing between neighbouring mining operations;
 - reporting procedures, including the preparation of a site water balance for each calendar year;
 - describes the measures that would be implemented to:
 - minimise clean water use on site;
 - maximise water sharing with the other mines in the region;
 - (ii) Surface Water Management Plan, that includes:
 - detailed baseline data on water flows and quality in the water bodies that could be affected by the project;

- a detailed description of the water management system on site;
 - detailed plans, including design objectives and performance criteria, for the:
 - in-pit emplacement areas for tailings, acid forming and potentially acid forming materials;
 - final voids (see the Rehabilitation Objectives in Table 13);
 - detailed performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project:
 - the water management system;
 - downstream surface water quality;
 - downstream flooding impacts and
 - stream and riparian vegetation health for Moolarben Creek, Bora Creek, and the Goulburn River;
 - a program to monitor and report on:
 - the effectiveness of the water management system; and
 - surface water flows and quality, stream and riparian vegetation health in the watercourses that could be affected by the project; and
 - downstream flooding impacts;
 - reporting procedures for the results of the monitoring program; and
 - a plan to respond to any exceedances of the performance criteria, and mitigate any adverse surface water impacts of the project;
- (iii) Groundwater Management Plan, that includes:
- detailed baseline data on groundwater levels, yield and quality in the region and privately-owned groundwater bores that could be affected by the project;
 - groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
 - a program to monitor and report on:
 - groundwater inflows to the underground and open cut mining operations;
 - the seepage/leachate from water storages, emplacements, backfilled voids and final voids;
 - background changes in groundwater yield/quality against mine-induced changes;
 - impacts of the project on:
 - regional and local (including alluvial) aquifers;
 - groundwater supply of potentially affected landowners; and
 - groundwater dependent ecosystems (including the Drip) and riparian vegetation;
 - a program to validate the groundwater model for the project, and compare the monitoring results with modelled predictions; and
 - a plan to respond to any exceedances of the groundwater assessment criteria.
- (iv) a protocol that has been prepared in consultation with the owners of the Ulan and Wilpinjong mines to:
- minimise cumulative water quality impacts;
 - review opportunities of increased water sharing between these projects;
 - co-ordinate water quality monitoring programs as far as practicable;
 - undertake joint investigations/studies in relation to complaints/exceedances of trigger levels where cumulative impacts are considered likely; and
 - co-ordinate modelling programs for validation, re-calibration and re-running of groundwater models.

BIODIVERSITY

Biodiversity Offset Strategy

34. The Proponent shall implement the biodiversity offset strategy for the project summarised in Table 12, and shown conceptually in Appendix 8, to the satisfaction of the Secretary.

Table 12: Summary of Biodiversity Offset Strategy

Area	Offset Type	Minimum Size Hectares
Area 3 Property 6	Conserve: <ul style="list-style-type: none"> • 6 ha of existing EEC Enhance and conserve: <ul style="list-style-type: none"> • 2.6 ha of regenerating EEC 	8.6
Areas 1, 2 and 3 Properties 6, 10, 12, 13, 14 and 15	Enhance existing vegetation: <ul style="list-style-type: none"> • 1282 ha of native vegetation Revegetate: <ul style="list-style-type: none"> • 48 ha of existing disturbed land to EEC 	1330

Area 1 Properties 12, 13, 14 and 15	Revegetate: • 153 ha of cleared land to native vegetation	153
Clark	Enhance existing vegetation: • 300 ha of existing native vegetation • 32 ha of EEC	332
Clifford	Enhance existing vegetation: • 19 ha of native vegetation • 62 ha of EEC	81
Elward	Enhance existing vegetation: • 146 ha of native vegetation • 24 ha of EEC	170
Property 5	Enhance existing vegetation: • 40 ha of native vegetation • 25 ha of EEC	65
Properties 24 and 25	Enhance existing vegetation: • 59 ha of native vegetation • 4 ha of EEC	63
Bobadeen	Enhance existing vegetation: • 8 ha of native vegetation • 159 ha of EEC	167
Moolarmoo	Enhance existing vegetation: • 25 ha of native vegetation • 19 ha of EEC	44

Note: The EEC referred to in this table is the White Box Yellow Box Blakely's Red Gum Woodland as defined under the TSC Act and White Box Yellow Box Blakely's Red Gum Grassy Woodland as defined under the EPBC Act.

Long Term Security of Offset

35. By the end of June 2015, unless otherwise agreed by the Secretary, the Proponent shall make suitable arrangements to provide appropriate long-term security for the offset areas in Table 12 in perpetuity, in consultation with OEH and to the satisfaction of the Secretary.

Note: The preferred mechanisms for the provision of long-term conservation security are via Biobanking Arrangements and additions to the OEH Estate.

Biodiversity Management Plan

36. The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with OEH and be submitted to the Secretary for approval by 31 March 2015;
 - describe the short, medium, and long term measures that would be implemented to:
 - manage the remnant vegetation and habitat on the site and in the offset areas;
 - minimise biodiversity impacts of the project; and
 - implement the biodiversity offset strategy, including detailed performance and completion criteria;
 - include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy, and triggering remedial action (if necessary);
 - include a detailed description of the measures that would be implemented for:
 - enhancing the quality of existing vegetation and fauna habitat;
 - restoring native vegetation and fauna habitat on the biodiversity offset areas through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary);
 - maximising the salvage of resources within the approved disturbance area - including vegetative, soil and cultural heritage resources – for beneficial reuse in the enhancement of the biodiversity areas or rehabilitation area;
 - rehabilitating the environmental bunds on site as soon as practicable and maintaining the landscaping on the bunds once it has been established;
 - collecting and propagating seed;
 - minimising the impacts on fauna on site, including undertaking pre-clearance surveys;
 - managing any potential conflicts between the proposed restoration works in the biodiversity areas and any Aboriginal heritage values (both cultural and archaeological);
 - managing salinity;
 - controlling weeds and feral pests;
 - controlling erosion;
 - managing grazing and agriculture on site;
 - controlling access; and
 - bushfire management;

- (e) include a seasonally-based program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria;
- (f) identify the potential risks to the successful implementation of the biodiversity offset strategy, and include a description of the contingency measures that would be implemented to mitigate against these risks; and
- (g) include details of who would be responsible for monitoring, reviewing, and implementing the plan.

Conservation Bond

37. By 30 June 2015, unless otherwise agreed by the Secretary, the Proponent shall lodge a Conservation Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by:
- (a) calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and
 - (b) employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Secretary.

If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.

If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works.

Notes:

- Existing bonds which have been paid for the Redhills, Area 1, Area 2 and Area 3 biodiversity offset areas remain current and are satisfactory to fulfill the requirements of this condition for those areas;
- Alternative funding arrangements for long-term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond, and
- The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.

HERITAGE

Protection of Aboriginal Heritage Items

38. Unless otherwise authorised under the NP&W Act, the Proponent shall ensure that the project does not cause any direct or indirect impact on the identified Aboriginal heritage items located outside the approved disturbance area of the project.

Note: Identified Aboriginal heritage items are listed in Appendix 9.

Heritage Management Plan

39. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary within six (6) months from the date of approval for MOD 9. This plan must:
- (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
 - (b) be prepared in consultation with OEH and the Aboriginal stakeholders (in relation to the management of Aboriginal heritage values);
 - (c) include results of further archaeological survey of the 10 hectares of land (as identified on Figure 10 of Appendix F of the EA) that has not been surveyed, and any land adjacent to the open cut mines that has not been surveyed and may be subject to blasting impacts;
 - (d) include the following for the management of Aboriginal Heritage:
 - a detailed archaeological test excavation and potential salvage program for site S1MC331;
 - a detailed archaeological test excavation and potential salvage program for sites S1MC343 and S1MC344, if it is determined by a qualified archaeologist that these sites may be subject to impacts associated with blasting;
 - a description of the measures that would be implemented for:
 - protecting, monitoring and/or managing the heritage sites/items identified in Appendix 9 and any sites identified during the surveys required in (c) above;
 - conserving the sites outside the surface disturbance area, including measures that would be implemented to secure, analyse and record the sites at risk of subsidence and/or blasting;
 - managing the discovery of any human remains or previously unidentified Aboriginal objects on site;
 - maintaining and managing reasonable access for Aboriginal stakeholders to heritage items on site;
 - ongoing consultation with the Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on site and within any Aboriginal heritage conservation areas; and

- ensuring any workers on site receive suitable heritage inductions prior to carrying out any development on site, and that suitable records are kept of these inductions;
 - a strategy for the storage of any heritage items salvaged on site, both during the project and in the long term;
- (e) include a detailed plan for the implementation of the mitigation and management measures outlined for the specified heritage items in Appendix 10, including archival recording, historical research and archaeological assessment prior to any disturbance.

40. (deleted)

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TRANSPORT

Road Works

54. Prior to the commencement of mining operations in open cut 2, the Proponent shall divert or close Carrs Gap Road to the satisfaction of Council.

55. Prior to the commencement of mining operations in open cut 3, the Proponent shall divert or close Moolarben Road to the satisfaction of Council.

Note: These road works must be constructed in accordance with the relevant RMS or Austroads standards, and signposted and lit in accordance AS 1742 – Manual of Uniform Traffic Control Devices and AS/NZS 1158: 2005 – Lighting for Roads and Public Spaces.

Ulan Road Strategy

56. The Proponent shall:

- (a) work with Council and the owners of the Ulan and Wilpinjong mines to agree to develop a detailed plan for the implementation of the Ulan Road Strategy; and
- (b) make financial contributions towards the implementation of this detailed plan, in accordance with the requirements in the plan, with its share of the mining companies' contribution for the implementation of the strategy to be proportionate to its share of mining-related traffic to be generated on the road during the life of the strategy.

If there is any dispute between the various parties involved in either the development of the detailed plan for the implementation of the strategy, or the implementation of the strategy, then any of the parties may refer the matter to the Secretary for resolution.

57. (deleted)

TRAFFIC MANAGEMENT

58. The Proponent shall:

- (a) schedule the shift changes on site to occur outside of school bus hours; and
- (b) co-ordinate the shift changes on site with the shift changes of the adjoining Ulan and Wilpinjong mines to minimise the potential cumulative traffic impacts of the shift changes at the three mines.

Rail Transport – West

59. The Proponent shall not transport any coal west of the site through Gulgong and Mudgee without the written approval of the Secretary. In seeking this approval, the Proponent shall submit a report to the Secretary that:
- (a) has been prepared in consultation with Council;
 - (b) demonstrates that the railway line has been suitably upgraded to accommodate the proposed coal train traffic;
 - (c) describes:
 - the expected tonnages, train size, number, and rail scheduling of the proposed coal train movements (both laden and unladen);
 - the measures that would be implemented to minimise, mitigate and/or manage the ongoing environmental effects of these coal train movements; and
 - how the performance of these measures would be monitored.

Monitoring of Coal Transport

60. The Proponent shall monitor the:
- (a) amount of coal transported from the site each year; and
 - (b) date and time of each train movement generated by the project.

VISUAL

Additional Visual Impact Mitigation

61. Upon receiving a written request from the owner of any residence on privately-owned land which has, or would have, significant direct views of the mining operations and infrastructure on site during the project, the Proponent shall implement additional visual impact mitigation measures (such as landscaping treatments or vegetation screens) to reduce the visibility of these mining operations and infrastructure from the residences on their properties.

These mitigation measures must be reasonable and feasible, and must be implemented within a reasonable timeframe.

If the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Notes:

- The additional visual impact mitigation measures must be aimed at reducing the visibility of the mining operations on site from significantly affected residences, and do not require measures to reduce the visibility of the mining operations from other locations on the affected properties.
- The additional visual impact mitigation measures do not necessarily have to include the implementation of measures on the affected property itself (i.e. the additional measures could involve the implementation of measures outside the affected property boundary that provide an effective reduction in visual impacts).

Operating Conditions

62. The Proponent shall:
- (a) implement best management practice to minimise the visual and off-site lighting impacts of the project;
 - (b) ensure no fixed outdoor lights shine above the horizontal;
 - (c) ensure no in-pit mobile lighting rigs shine above the pit wall and other mobile lighting rigs do not shine above the horizontal;
 - (d) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting* or its latest version;
 - (e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding to minimise visual and lighting impacts on the Proponent's land adjoining public roads with views of the site;
 - (f) ensure that the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape, to the satisfaction of the Secretary.

BUSHFIRE MANAGEMENT

63. The Proponent shall:
- (a) ensure that the project is suitably equipped to respond to any fires on site; and
 - (b) assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site.

WASTE

64. The Proponent shall:
- implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project;
 - ensure that the waste generated by the project is appropriately stored, handled and disposed of; and
 - monitor and report on effectiveness of the waste minimisation and management measures in the Annual Review.

REHABILITATION

Rehabilitation Objectives

65. The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed rehabilitation described in the EA (and depicted conceptually in the figure in Appendix 8), and comply with the objectives in Table 13.

Table 13: Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting; Constructed landforms are to drain to the natural environment (excluding the final voids); Final landforms are to be consistent with the surrounding topography of the area, taking into account relief patterns and principles; and Minimise visual impact of final landforms as far as is reasonable and feasible.
Final Voids	<ul style="list-style-type: none"> Minimise the size and depth of final voids so far as is reasonable and feasible, subject to meeting the objectives below; Minimise the drainage catchment of the final void so far as is reasonable and feasible; Negligible high wall instability risk; The size and depth of the final voids must be designed having regard to their function as long-term groundwater sinks, to ensure that groundwater flows across the back-filled pit towards the final void; and Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level.
Surface infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed, unless the Executive Director, Mineral Resources agrees otherwise.
Agricultural land	<ul style="list-style-type: none"> Establish agricultural land in areas indicated in the figure in Appendix 8 to a similar agricultural suitability to that existing prior to mining.
Other Land	<ul style="list-style-type: none"> Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of: <ul style="list-style-type: none"> native forests and woodland, including EECs; habitat for threatened fauna species; and wildlife corridors (as indicated in the figure in Appendix 8).
Community	<ul style="list-style-type: none"> Ensure public safety; and Minimise the adverse socio-economic effects associated with mine closure.

Progressive Rehabilitation

66. The Proponent shall rehabilitate the site progressively. That is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.

Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the project.

67. The Proponent shall progressively landscape the environmental bunds on site.

Rehabilitation Management Plan

68. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the Executive Director, Mineral Resources. This plan must:
- be prepared in consultation with the Department, NOW, OEH, Council and the CCC;
 - be submitted to the Executive Director, Mineral Resources for approval by 31 March 2015;
 - be prepared in accordance with any relevant DRE guideline;

- (c1) provide for the periodic review and updating of the rehabilitation plans and management strategies to ensure best practice landform design and establishment strategies are employed
- (d) describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy;
- (e) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);
- (f) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform, and final land use;
- (g) include interim rehabilitation where necessary to minimise the area exposed for dust generation;
- (h) include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and
- (i) build to the maximum extent practicable on the other management plans required under this approval.

The Drip

69. Notwithstanding the approval of Modification 9, there is to be no extraction of the additional coal resource approved under Modification 9 until the land tenure and surrounds associated with the natural feature known as 'the Drip' is resolved to ensure its conservation to the satisfaction of the Secretary and the Office of Environment and Heritage.

This does not prohibit the implementation of the components for Modification 9 including construction and operation the approved water management infrastructure upgrade works.

GREENHOUSE GAS

Energy Savings Action Plan

70. The Proponent shall prepare and implement an updated Energy Savings Action Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with NOW;
 - (b) be prepared in accordance with the Guidelines for Energy Savings Action Plans (DEUS 2005, or its latest version);
 - (c) be submitted to the Secretary for approval; and
 - (d) include an updated program to monitor the effectiveness of measures to reduce energy use on site.

Gas Drainage

71. The Proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Secretary.
72. Prior to carrying out underground mining operations, the Proponent shall submit an updated Greenhouse Gas Minimisation Plan to the Secretary. This plan must:
- (a) identify options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions;
 - (b) investigate the feasibility of implementing each option;
 - (c) propose the measures that would be implemented in the short to medium term on site; and
 - (d) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.

SUBSIDENCE

Performance Measures – Natural and Heritage Features

73. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 14, to the satisfaction of the Secretary.

Table 14: Subsidence Impact Performance Measures

Special Feature	
The Drip	Nil impact or environmental consequences
Water Resources	
Goulburn River and the bed of the Goulburn River	Negligible impact or environmental consequences
Land	
Cliff Line 3	See condition 26
Heritage Sites	
Aboriginal heritage sites 264, 280, 282, 283, 286 and 287	See condition 26
Historic heritage sites	No greater subsidence impact or environmental consequences than predicted in the EA

Mine workings	
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible impact, negligible consequence or negligible loss	To remain long-term stable and non-subsiding.
Second workings	To be carried out only within the longwall mining domains, in accordance with an approved Extraction Plan.

Notes:

- The locations of the features referred to in Table 14 are shown in Appendix 7.
- The Proponent will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this approval.
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of this approval.

Offsets

74. If the Proponent exceeds the performance measures in Table 14 and the Secretary determines that:
- it is not reasonable or feasible to remediate the impact or environmental consequence; or
 - remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;
- then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Impacts to the Drip cannot be offset and consequently the proponent shall ensure that the project has no impact on the Drip or the water supply to the Drip.

Performance Measures – Built Features

75. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 15, to the satisfaction of the Secretary.

Table 15: Subsidence Impact Performance Measures – Built Features

Key public infrastructure:	
Gulgong-Sandy Hollow Railway Line Wollar-Wellington 330kV Transmission Line	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.
Other infrastructure:	
Roads	Safe, serviceable and repairable unless the owner agrees otherwise in writing
Other built features and improvements, including fences	Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Public Safety	
Public safety	Negligible additional risk

Notes:

- The locations of the features referred to in Table 15 are shown in Appendix 7.
- The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 74 below).
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.
- Requirements under this condition may be met by measures undertaken in accordance with the Mine Subsidence Compensation Act 1961.
- Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.

76. Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 15 is to be settled by the Secretary, following consultation with the Executive Director Mineral Resources. Any decision by the Secretary shall be final and not subject to further dispute resolution under this approval.

Extraction Plan

77. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each extraction plan must:
- (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
 - (b) be approved by the Secretary before the Proponent carries out any of the second workings covered by the plan;
 - (c) include detailed plans of existing and proposed first and second workings and any associated surface development;
 - (d) include detailed performance indicators for each of the performance measures in Tables 14 and 15;
 - (e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;
 - (f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 14 and 15, and manage or remediate any impacts and/or environmental consequences;
 - (g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:
 - i. addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;
 - ii. has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;
 - iii. recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and
 - iv. in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;
 - (h) include a Water Management Plan, which has been prepared in consultation with EPA and NOW, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including:
 - i. surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;
 - ii. a program to monitor and report stream flows, assess any changes resulting from subsidence impacts and remediate and improve stream stability;
 - iii. a program to monitor and report groundwater inflows to underground workings;
 - iv. a program to predict, manage and monitor impacts on groundwater bores on privately-owned land; and
 - (i) include a Biodiversity Management Plan, which has been prepared in consultation with OEH, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities; and water dependent ecosystems;
 - (j) include a Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;
 - (k) include a Heritage Management Plan, which has been prepared in consultation with OEH and relevant stakeholders for both Aboriginal and historic heritage, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects all requirements under conditions 38-39 of schedule 3;
 - (l) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety in the mining area;
 - (m) include the Subsidence Management Plan required in condition 27 and a Subsidence Monitoring Program, which has been prepared in consultation with DRE, to:
 - i. describe the on-going subsidence monitoring program;
 - ii. provide data to assist with the management of the risks associated with subsidence;
 - iii. validate the subsidence predictions;
 - iv. analyse the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences;
 - v. inform the contingency plan and adaptive management process; and
 - vi. inform the End-of-Panel report required in condition 28;
 - (n) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 14 and 15, or where any such exceedance appears likely;

- (o) proposes appropriate revisions to the Rehabilitation Management Plan required under condition 68 of Schedule 3; and
- (p) include a program to collect sufficient baseline data for future Extraction Plans.

Note: To identify the longwall mining domains referred to in this condition, see Appendix 2.

78. The Proponent shall ensure that the management plans required under conditions 77(g)-(l) above include:
- (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and
 - (b) a detailed description of the measures that would be implemented to remediate predicted impacts.

First Workings

79. The Proponent may carry out first workings on site other than in accordance with an approved Extraction Plan, provided that DRE is satisfied that the first workings are designed to remain long-term stable and non-subsiding, except insofar as they may be impacted by approved second workings.

Payment of Reasonable Costs

80. The Proponent shall pay all reasonable costs incurred by the department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.
-

SCHEDULE 4 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS/TENANTS

1. By the end of **March 2015**, the Proponent shall:
 - (a) notify in writing the owners of:
 - (a) any land in Table 1A and any land or residence exceeding the criteria in Tables 2A and 2 (respectively) of Schedule 3 that they have the right to require the Proponent to acquire their land at any stage during the project;
 - (b) any residence on the land listed in Table 3 and any residence exceeding the criteria in Table 3A of Schedule 3 that they have the right to request the Proponent for additional noise mitigation measures to be installed at their residence at any stage during the project; and
 - any privately-owned land within 2 kilometres of the approved open cut mining pit/s that they are entitled to ask for an inspection to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated;
 - (b) notify the tenants of any mine-owned land of their rights under this approval; and
 - (c) send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in Schedule 3 at any time during the life of the project.
2. Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 3 that is subsequently purchased by the Proponent, the Proponent shall:
 - (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and
 - (b) advise the prospective tenants of the rights they would have under this approval, to the satisfaction of the Secretary.
3. As soon as practicable after obtaining monitoring results showing:
 - (a) (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and
 - (b) (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).

INDEPENDENT REVIEW

4. If an owner of privately-owned land considers the project to be exceeding the criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.

If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Proponent shall:

 - (a) commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Secretary, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the project is complying with the relevant impact assessment criteria in Schedule 3; and
 - if the project is not complying with these criteria then:
 - o determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine regarding the impact on the land;
 - o identify the measures that could be implemented to ensure compliance with the relevant criteria; and
 - (b) give the Secretary and landowner a copy of the independent review.
5. (deleted)
6. (deleted)
7. (deleted)
8. (deleted)
9. (deleted)

LAND ACQUISITION

10. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:
- (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the project, having regard to the:
 - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
 - presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the additional noise and/or air quality mitigation measures in **conditions 4 and 5** of Schedule 3;
 - (b) the reasonable costs associated with:
 - relocating within the Mid-western Regional local government area, or to any other local government area determined by the Secretary; and
 - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
 - (c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if at the end of this period, the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.

Upon receiving such a request, the Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to:

- consider submissions from both parties;
- determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
- prepare a detailed report setting out the reasons for any determination; and
- provide a copy of the report to both parties.

Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report of the party that disputes the independent valuer's determination and any other relevant submissions.

Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.

If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Secretary determines otherwise.

11. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 10 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.

SCHEDULE 5
ENVIRONMENTAL MANAGEMENT, AUDITING AND REPORTING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:
 - (a) be submitted to the Secretary for approval within 6 months of the date of this approval;
 - (b) provide the strategic framework for environmental management of the project;
 - (c) identify the statutory approvals that apply to the project;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this approval; and
 - a clear plan depicting all the monitoring to be carried out in relation to the project.

Adaptive Management

2. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.

Management Plan Requirements

3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the project;
 - effectiveness of any management measures (see c above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and
 - exceedances of the impact assessment criteria and/or performance criteria; and
 - (h) a protocol for periodic review of the plan.

Annual Review

4. 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.

Revision of Strategies, Plans and Programs

5. Within 3 months of the submission of:
 - (a) the submission for annual review under condition 4 above;
 - (b) the submission for incident report under condition 7 below;
 - (c) the submission for audit under condition 9 below; or
 - (d) any modification of this approval,the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within four weeks of the review the revised document must be submitted to the Secretary for approval.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

Community Consultative Committee

6. The Proponent shall operate a Community Consultative Committee (CCC) for the **Moolarben mine complex** to the satisfaction of the Secretary. This CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version).

Notes:

- The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval; and
- The CCC should be comprised of an independent chair and appropriate representation from the Proponent, Council, recognised environmental groups and the local community.

REPORTING

Incident Reporting

7. The Proponent shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

8. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

AUDITING

9. By 31 December 2015, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
- be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
 - include consultation with the relevant agencies;
 - assess the environmental performance of the project and assess whether it is complying with the requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease (including any assessment, plan or program required under these approvals);
 - review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and
 - recommend measures or actions to improve the environmental performance of the Moolarben mine complex, and/or any strategy, plan or program required under these approvals.
- Note:*
- Notwithstanding the timing referred to above, audits must be carried out prior to the completion of longwall panels 4 and 8. The Proponent must liaise with the Department to determine the precise date of these audits.*
 - This audit team should be led by a suitably qualified auditor, and include experts in the field of subsidence, surface water and groundwater management, noise, ecology and mine rehabilitation.*
10. Within 6 weeks of completing this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary with a response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

11. The Proponent shall:
- make the following information publicly available on its website:
 - the EA;
 - current statutory approvals for the project;
 - approved strategies, plans or programs required under the conditions of this approval;
 - a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;
 - a complaints register, which is to be updated on a monthly basis;
 - minutes of CCC meetings;
 - the last five annual reviews;
 - any independent environmental audit, and the Proponent's response to the recommendations in any audit;
 - any other matter required by the Secretary; and
 - keep this information up to date,
 - investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publicly available on its website to the satisfaction of the Secretary.
-

**APPENDIX 1:
SCHEDULE OF LAND**

Owner	Description		Parish	County	EA ID
Moolarben Coal Operations Pty Ltd	Lot 1	DP 817487	Lennox	Phillip	-
Moolarben Coal Operations Pty Ltd	Pt. Lot 102	DP 755442	Moolarben	Phillip	50
Moolarben Coal Operations Pty Ltd	Pt. Lot 157	DP 755442	Moolarben	Phillip	50
Moolarben Coal Operations Pty Ltd	Pt. Lot 6	DP 115031	Moolarben	Phillip	50
DJ & JG Stokes	Pt. Lot 208	DP 755442	Moolarben	Phillip	32
DJ & JG Stokes	Pt. Lot 4	DP 575167	Moolarben	Phillip	32
DJ & JG Stokes	Pt. Lot 65	DP 755442	Moolarben	Phillip	32
DJ & JG Stokes	Pt. Lot 88	DP 755442	Moolarben	Phillip	32
Moolarben Coal Operations Pty Ltd	Lot 1	DP 115031	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Lot 2	DP 115031	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Lot 89	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Lot 98	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Pt. Lot 140	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Pt. Lot 218	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Pt. Lot 238	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Pt. Lot 260	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Pt. Lot 261	DP 755442	Moolarben	Phillip	36
Moolarben Coal Operations Pty Ltd	Lot 107	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 108	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 145	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 16	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 17	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 18	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 19	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 248	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 40	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 45	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 50	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 51	DP 755442	Moolarben	Phillip	29A
Moolarben Coal Operations Pty Ltd	Lot 53	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 64	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Pt. Lot 167	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Pt. Lot 170	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Pt. Lot 172	DP 755442	Moolarben	Phillip	29B
Moolarben Coal Operations Pty Ltd	Pt. Lot 183	DP 755442	Moolarben	Phillip	29
Moolarben Coal Operations Pty Ltd	Lot 146	DP 755442	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Lot 52	DP 755442	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Lot 63	DP 755442	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Lot 99	DP 755442	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Pt. Lot 205	DP 755442	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Pt. Lot 289	DP 704098	Moolarben	Phillip	33
Moolarben Coal Operations Pty Ltd	Pt. Lot 93	DP 755442	Moolarben	Phillip	134
Moolarben Coal Operations Pty Ltd	Pt. Lot 93	DP 755454	Wilpinjong	Phillip	134
Moolarben Coal Operations Pty Ltd	Lot 119	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Lot 44	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 1	DP 803204	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 192	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 193	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 37	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 60	DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 61	DP 755442	Moolarben	Phillip	5

Owner	Description	Parish	County	EA ID
Moolarben Coal Operations Pty Ltd	Pt. Lot 62 DP 755442	Moolarben	Phillip	5
Moolarben Coal Operations Pty Ltd	Pt. Lot 95 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Lot 109 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Lot 110 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Lot 223 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Lot 234 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Pt. Lot 112 DP 755454	Wilpinjong	Phillip	4
Moolarben Coal Operations Pty Ltd	Pt. Lot 113 DP 755454	Wilpinjong	Phillip	4
Moolarben Coal Operations Pty Ltd	Pt. Lot 228 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Pt. Lot 229 DP 755442	Moolarben	Phillip	4
Moolarben Coal Operations Pty Ltd	Pt. Lot 96 DP 755454	Wilpinjong	Phillip	4
RB Cox	Pt. Lot 125 DP 755442	Moolarben	Phillip	30
Moolarben Coal Operations Pty Ltd	Pt. Lot 2 DP 878678	Wilpinjong	Phillip	13
Moolarben Coal Operations Pty Ltd	Pt. Lot 262 DP 755442	Moolarben	Phillip	7
Moolarben Coal Operations Pty Ltd	Pt. Lot 30 DP 755439	Lennox	Phillip	10
Moolarben Coal Operations Pty Ltd	Pt. Lot 7 DP 878678	Wilpinjong	Phillip	19
Moolarben Coal Operations Pty Ltd	Pt. Lot 97 DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Operations Pty Ltd	Pt. Lot 6 DP 878678	Wilpinjong	Phillip	18
Moolarben Coal Operations Pty Ltd	Pt. Lot 3 DP 878678	Wilpinjong	Phillip	15
Moolarben Coal Operations Pty Ltd	Pt. Lot 11 DP 1152406	Wilpinjong/Lennox	Phillip	12
Ulan Coal Mines Ltd.	Lot 1 DP 722881	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 178 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 179 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 2 DP 722882	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 272 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 277 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 3 DP 722882	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 45 DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 18 DP 1140073	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 1 DP 1089166	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 1 DP 1099037	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 1 DP 720332	Ulan	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 14 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 20 DP 755439	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 242 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 253 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 44 DP 736630	Lennox/Ulan	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 46 DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 47 DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 48 DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 50 DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 75 DP 750773	Ulan	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 91 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 92 DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 13 DP 1152406	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt. Lot 14 DP 1152046	Lennox	Phillip	46
Mid-Western Regional Council	Lot 16 DP 1140073	Lennox	Phillip	-
Mid-Western Regional Council	Lot 17 DP 1140073	Lennox	Phillip	-
Mid-Western Regional Council	Lot 20 DP 1140073	Lennox	Phillip	-
Crown	Carrs Gap Road	Moolarben	Phillip	-
Crown	Moolarben Road	Moolarben	Phillip	-
Crown	Saddlers Creek Road			-
Crown	Ulan Road			-

Owner	Description	Parish	County	EA ID
Crown	Ulan–Wollar Road			-
Crown	Lot 152 DP 755442 Reserve for Public School	Moolarben	Phillip	-
Crown	Lot 176 DP 755442 Reserve for future public requirements R65457	Moolarben	Phillip	-
Crown	Pt. Lot 204 DP 755442 Reserve for future public requirements R65457	Moolarben	Phillip	-
Crown	Pt. Lot 290 DP 704098 Reserve for Access	Moolarben	Phillip	-
Crown	Pt. Lot 7009 DP 1025321 Vacant Crown Land	Moolarben	Phillip	-
Crown	Pt. Lot 31 DP 755439 Vacant Crown Land	Lennox	Phillip	-
Crown	Pt. Lot 7010 DP 1025345 Vacant Crown Land	Moolarben	Phillip	-
Crown	Pt. Lot 7302 DP 1143562 Reserve for Resting Place R.82539	Lennox	Phillip	-
Crown	Lot 33 DP 755439	Lennox	Phillip	-
Crown	Lot 34 DP 755439	Lennox	Phillip	-
Crown	Lot 55 DP 722794	Lennox	Phillip	-
Crown	Lot 56 DP 722795	Lennox	Phillip	-
Crown	Pt. Lot 43 DP 736630	Lennox/Ulan	Phillip	-
Crown	Unidentified Crown Road - No 10 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 11 (Refer 0857C) Plan	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road - No 12 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 13 (Refer 0857C) Plan	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road - No 14 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 15 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 16 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 17 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 18 (Refer 0857C) Plan	Moolarben	Phillip	-

Owner	Description	Parish	County	EA ID
Crown	Unidentified Crown Road - No 19 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 20 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 21 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 22 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Unidentified Crown Road - No 6 (Refer 0857C) Plan	Lennox	Phillip	-
Crown	Unidentified Crown Road - No 7 (Refer 0857C) Plan	Lennox	Phillip	-
Crown	Unidentified Crown Road - No 8 (Refer 0857C) Plan	Lennox	Phillip	-
Crown	Unidentified Crown Road - No 9 (Refer 0857C) Plan	Moolarben	Phillip	-
Crown	Lot 7303 Vacant Crown Land DP 1143562	Lennox	Phillip	-
Crown	Lot 7005 Vacant Crown Land DP 1096180	Lennox	Phillip	-
Crown	Vacant Crown Land - No 5 (Refer 0857C) Plan	Lennox	Phillip	-
State Rail Authority	Sandy Hollow–Gulgong Railway			-

LEGEND:

- Stage 1 Project Boundary
- EL 6288 Boundary
- Moolarben Coal Mine
- Ulan Coal Mine
- Wilpinjong Coal Mine
- Crown Land
- National Park/Nature Reserve
- Private Freehold
- Commercial Land
- Unknown
- Private Freehold Receiver
- Mine Owned Receiver
- Social Infrastructure Receiver
- Commercial Receiver
- Out of Pit Dump
- Open Cut

Map Labels:

- Hands on Rock Aboriginal Site
- Ulan Coal Mine
- Water Sharing Pipeline Route
- CHPP Area
- Office / Admin
- UG4 Highway Entries
- Open Cut 1 Facilities
- Environmental Bund
- Lagoons Road
- Open Cut 1
- Open Cut 2
- Open Cut 3 Facilities
- Moolarben Road Division
- Open Cut 3
- ROM Coal Facilities
- Northern Borefield
- Underground 4
- Rail Loadout Area
- Ulan Road
- Ulan Water Road
- Wilpinjong Coal Mine
- Munghom Gap Nature Reserve
- Woolbar Road

Scale: 0 1000 2000 3000 4000m

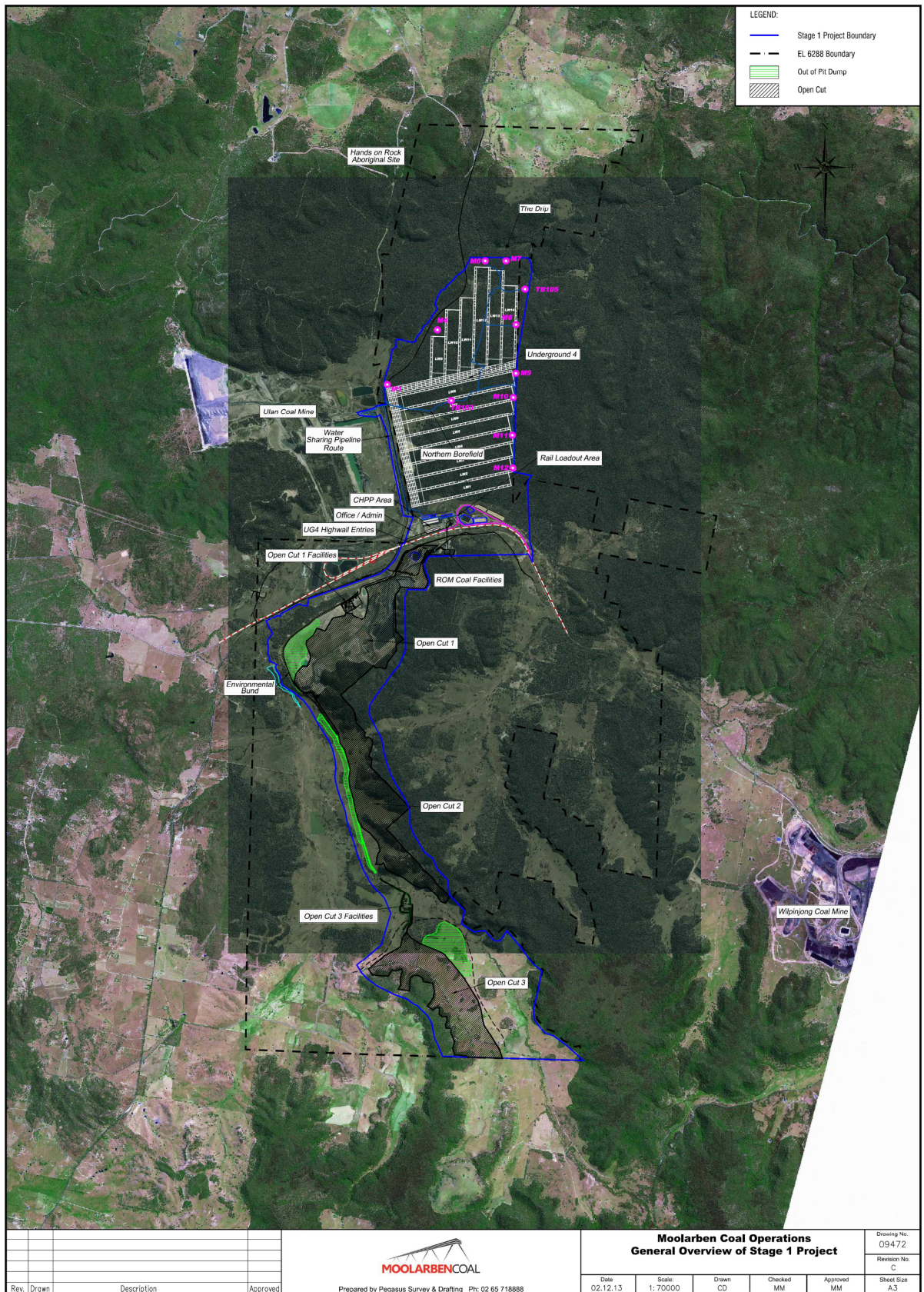
MOOLARBEN COAL

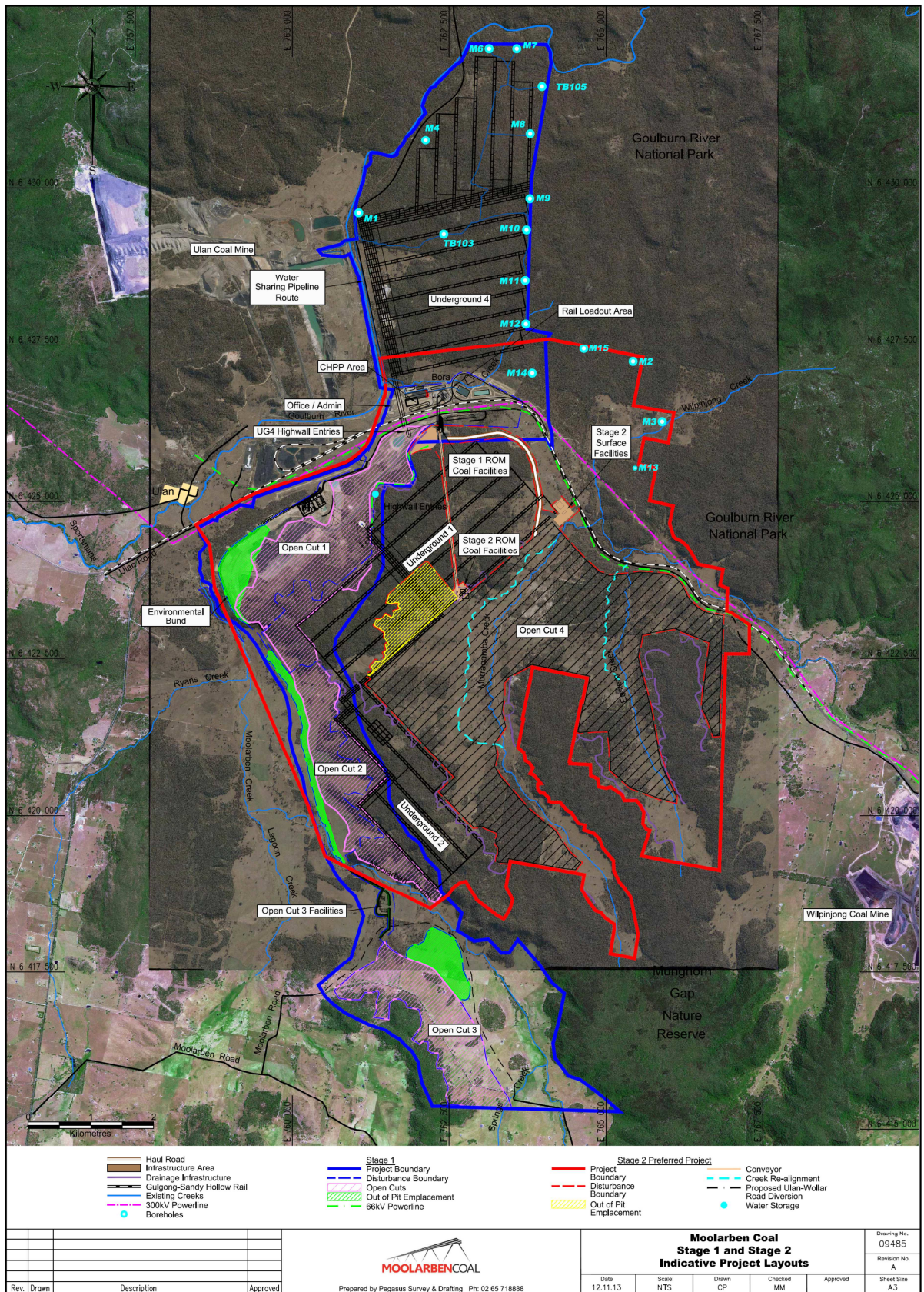
**Moolarben Coal Operations
General Overview of Stage 1 Project**

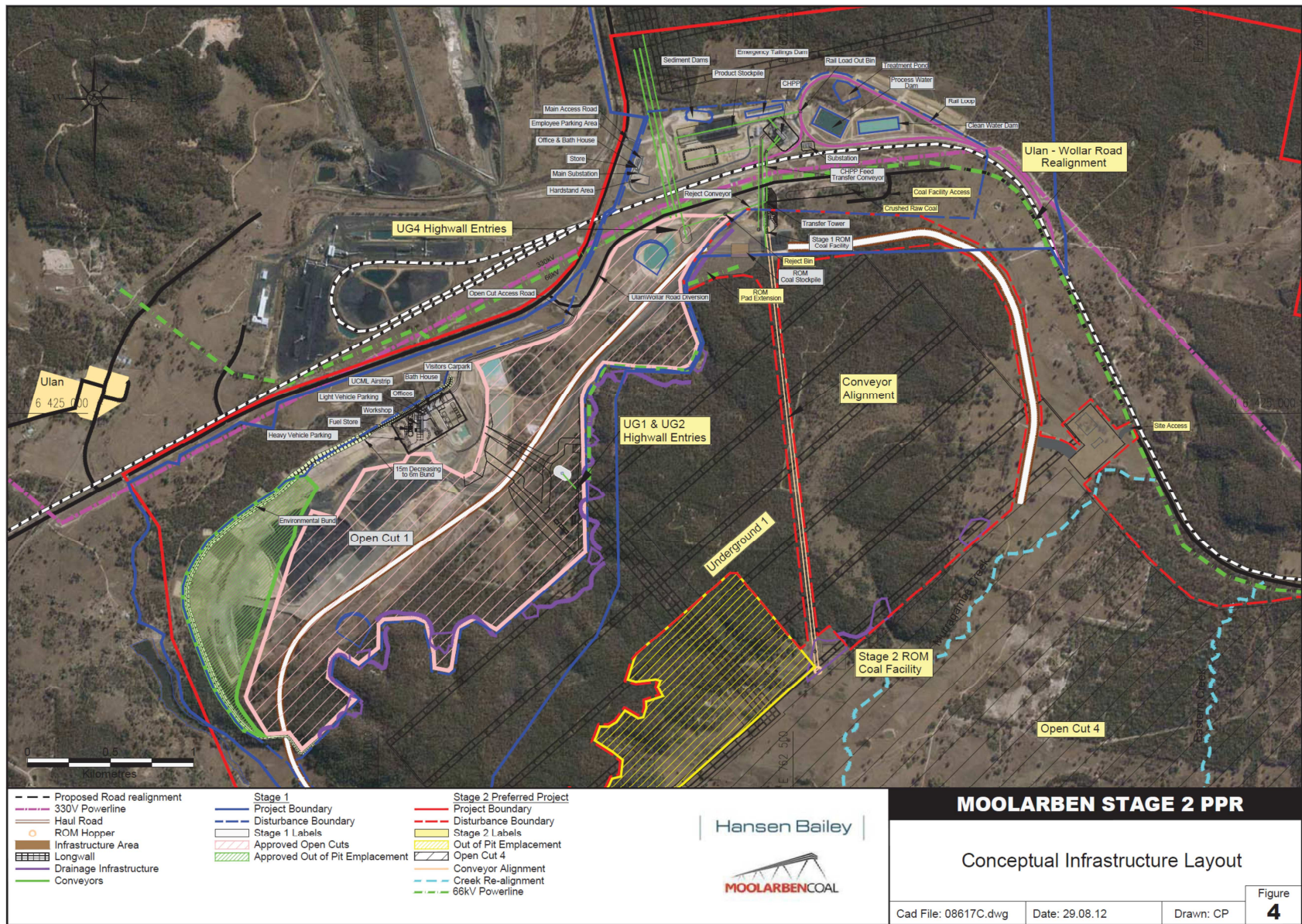
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Prepared by Pegasus Survey & Drafting Ph: 02 65 718888

Rev.	Drawn	Description	Approved







**APPENDIX 3:
STATEMENT OF COMMITMENTS**

- (1) Protect The Drip and Goulburn River Corner Gorge**
*The Drip and the Goulburn River Corner Gorge are shown on the plan titled “Moolarben Coal Mine – Preferred Mine Plan General Layout” contained in Appendix A9 to the “Moolarben Coal Project Response to Submissions”.
Moolarben will conduct its underground mining operations consistent with the Preferred Project Underground No. 4 layout to protect the Goulburn River features known as the Drip, the Goulburn River Corner Gorge and associated cliffs so that there is no damage whilst seeking to maximise recovery of coal resources and as may be required by any conditions of project approval for the Moolarben Coal Project.*
- (2) Shift Change**
Moolarben undertakes to schedule its major employee shift changes to times outside the hours of 8.15 to 9.00 am and 3.15 to 4.00 pm Monday to Friday to seek to reduce overlap of employee traffic and school transport and as may be required by any conditions of project approval for the Moolarben Coal Project.
- (3) Replace Water**
Moolarben will compensate or replace waters (similar quality and quantity) lost by a private landholder as a consequence of the Moolarben Coal Project in accordance with the adopted protocols and procedures contained in the Moolarben Coal Project Environmental Management System and as may be required by any conditions of project approval for the Moolarben Coal Project.
- (4) Environmental Management System**
Moolarben will prepare and implement an Environmental Management System containing Environmental Management Plans, and Mine Operating Plan for the life of the Moolarben Coal Project consistent with the Environmental Assessment Report, the Response to Submissions Report, the Preferred Project Report, subsequent modification applications and as may be required by any conditions of project approval for the Moolarben Coal Project.
- (5) Noise in School Rooms**
*Moolarben in consultation with the Ulan Public School and the Department of Education will undertake agreed works to ameliorate potential noise and dust impacts associated with the Moolarben Coal Project upon classrooms and general school operations.
OR
Moolarben will, should the Department of Education request, on a reasonable basis relating to the effect of noise and dust from the Moolarben Coal Project, negotiate to contribute to or meet reasonable costs toward relocating the school.*
- (6) Land Purchase Commitment**
Moolarben will accept an obligation to purchase (if so required by any affected private landholder) any land affected by operations of the Moolarben Coal Project in accordance with any requirement to do so as provided in any project approval for the Moolarben Coal Project.
- (7) Mine Water Sharing Plan**
Moolarben will seek to enter into a mine water sharing plan in respect of mining operations of the Ulan Coal Mine and Wilpinjong Coal Mine under the auspices of the Director General of the Department of Planning and as may be required by any conditions of project approval for the Moolarben Coal Project.
- (8) Voluntary Planning Agreement**
Moolarben will enter into a Voluntary Planning Agreement with Mid Western Regional Council and the Minister for Planning incorporating the principles contained in the offer by Moolarben to the Minister for Planning on 4 September 2007 to enter into the Voluntary Planning Agreement.
- (9) Employ Local People**

Moolarben will, wherever possible and feasible, employ appropriately qualified persons residing within the local area.

(10) Traineeships

Moolarben will provide traineeships for the youth of the local community.

(11) Dronvisa Quarry

Moolarben will seek to enter into an operational agreement with Dronvisa Quarry with regard to the safe continuation of its operations in conjunction with underground mining.

(12) Ecology

Moolarben will enter into such arrangements as may be required by the Secretary to provide for ecological offsets as proposed in the Environmental Assessment, Preferred Project Report, subsequent modification applications and as may be required by any conditions of project approval for the Moolarben Coal Project.

(13) Flows in the Goulburn River – Co-operative Monitoring Program

Moolarben will use its reasonable endeavours to agree and implement a monitoring program in cooperation with the Ulan and Wilpinjong mines (and to the reasonable requirement of the Director General who will consult with the NOW) to identify any potential for any change in the water flows in the Goulburn River due to mining at the Moolarben, Ulan and Wilpinjong mines and as may be required by any conditions of project approval for the Moolarben Coal Project.

(14) Mine Water Management and Salinity – Sharing with Ulan and Wilpinjong

Moolarben will use its reasonable endeavours to agree and implement a co-operative arrangement with and enter into a life of mine agreement between the Ulan and Wilpinjong mines (the “Mines”) to establish, implement and operate water sharing and use plans and procedures with the objective of minimising the removal by the Mines of water from the environment and the discharge of minewaters by the Mines to the environment and which shall address the ability of the Mines to utilise mine water produced by the Mines between the Mines and as may be required by any conditions of project approval for the Moolarben Coal Project.

(15) Salinity Off Sets

– Bobadeen Irrigation Scheme (“BIS”) - Salinity Offset Management Plan (“SOMP”)

In the event that the Moolarben Coal Project reduces the capacity for the removal of salt from the Salinity Offset Management Plan area operated by Ulan Mine in conjunction with the Bobadeen Irrigation Scheme under Environment Protection Licence 394, then Moolarben will, at its election, either:

- take from Ulan that volume of water that would otherwise have been used in the BIS; OR*
- provide an area of land with equivalent salt removal capacity; AND*
- any disputed issue will be determined by an appropriately qualified expert agreed between Moolarben and Ulan and in default appointed by the Director General of Planning.*

(16) Haulage of Coal to the West by Rail

Prior to the haulage of coal by rail to the west of the Moolarben Coal Project, Moolarben shall notify the Secretary with details of expected tonnages, train size and rail scheduling and where practicable schedule rail haulage during daylight hours only through the town of Mudgee as may otherwise be required by any conditions of project approval for the Moolarben Coal Project.

(17) Traffic Management – Mid Western Regional Council

Moolarben acknowledges the need for it to contribute to the upgrade and maintenance of aspects of the local road system affected by the operation of the Moolarben Coal Project and commits to implement the Voluntary Planning Agreement in satisfaction of the principles of that agreement.

**(18) Additional Management and Mitigation
– Modification of Stage 1**

Moolarben commits to implementing the following management and mitigation measures to ensure that impacts associated with modifications to the Moolarben Coal Project are minimised.

Environmental Aspect	Management and Mitigation Commitments
Air quality	<ul style="list-style-type: none"> • Management and monitoring of air quality will continue to be undertaken in accordance with the best management practices set out in an approved Air Quality Management Plan. • Dust control measures will be used on internal haul roads. • Raw coal transfer and rejects conveyors will be partially enclosed. • Dust sprays will be fitted to the dump hopper. • Water carts will be used to minimise dust generation from unsealed access tracks and construction areas, where required. • A TEOM will be located to the southwest of the project to enable pro-active dust management and compliance monitoring for private residences to the south of the project prior to mining in Open Cut 2. • Use of a TEOM located to the northeast of the project for measuring background dust levels. • MCO will continue to report annually in the AEMR, the total amount of greenhouse gas emissions from the MCP and the effectiveness of measures implemented to achieve energy savings.
Noise	<ul style="list-style-type: none"> • Management and monitoring of noise will continue to be undertaken in accordance with an approved Noise Management Plan, including proactive and reactive management. • MCO further commits to: <ul style="list-style-type: none"> - Limiting northern borefield construction hours from 7am to 6pm Monday to Friday (inclusive). - Limiting surface water management infrastructure upgrade construction hours from 7:00am to 5:00pm Monday to Saturday (inclusive). - Fitting haul trucks with noise attenuation equipment to meet sound power levels assumed in the Stage 1 EA and subsequent noise Impact assessments - Specifying sound power levels in supply contracts for mobile plant and equipment , where appropriate. - Fitting northern borefield water supply/dewatering bores with submersible pumps. - Use of a temporary power supply generator located near the borefield pipeline outlet, at least 4km from the nearest private residence, unless power is provided from the electricity network. - Maintaining awareness of best practice noise mitigation technologies and alternative operating methodologies, and continuing to investigate the potential for further noise reductions to the haul truck fleet through potential additional noise attenuation and mitigation opportunities (such as Duratray). - Designing and locating the haul roads behind earthen bunds as far as practically possible.

Environmental Aspect	Management and Mitigation Commitments
Biodiversity	<ul style="list-style-type: none"> • Management and monitoring of ecology will continue to be undertaken in accordance with an approved Landscape Management Plan (or equivalent), which will be reviewed and updated as required to incorporate the Open Cut 1 and Open Cut 2 extension areas. • Where possible, construction works in areas of known and potential threatened woodland species habitat will be avoided during their breeding cycle. • Pre-clearing fauna surveys will be undertaken prior to ground clearing disturbance. • One of two hollow bearing trees within the rail loop alignment will be retained (where possible). • Tree hollows and other habitat features will be salvaged for use as compensatory habitat, in rehabilitation areas. • The cleared area along the mining lease boundary will be rehabilitated and revegetated to enable cleared EEC to re-establish. • Disturbed areas not required for ongoing access and maintenance will be rehabilitated. Endemic species will be used to supplement natural vegetation regeneration, where required. • Groundcover will be maintained to minimise the risk of soil erosion, wherever practicable. Feral animals, weeds and pests will be controlled. • MCO further commits to: <ul style="list-style-type: none"> - Undertake a detailed flora and fauna inventory and mapping of the vegetation types and threatened species for properties proposed to offset the clearing impacts of the Open Cut 1 and Open Cut 2 extension areas. - Manage offset and rehabilitation areas in accordance with a Rehabilitation and Offset Management Plan (ROMP or equivalent plan) to improve biodiversity outcomes. - Provide adequate funds to implement the management measures described in the ROMP. - Implement the management actions specific to each property and report annually on the implementation of the plan to relevant stakeholders. - Arrange for the independent review of the adequacy and implementation of the ROMP every three years. - Provide long-term security of offset areas through an appropriate mechanism (such as a conservation covenant) agreed to with relevant stakeholders. - Provide an alternative secure offset property of at least equivalent biodiversity value where long-term security of a nominated offset property is not achievable. - Investigate potential roosting sites for bat activity on properties proposed to offset the impacts of Open Cut 1 and Open Cut 2 extension areas. - Investigate use of artificial roosting sites for microbat habitat augmentation where offset areas are determined not to have sufficient roosting habitat. - Carry out targeted spring surveys for <i>Diuris Tricolor</i> in potential habitat areas within Open Cut 1 and Open Cut 2 extension areas. Where <i>Diuris Tricolor</i> plants are identified in disturbance areas, these will be translocated to suitable offset property habitat areas consistent with the monitoring and reporting requirements of the Australian Network for Plant Conservation translocation guidelines (ANPC, 2004). - Review land use history of Derived Native Grassland offset areas (including, where possible, cultivation, fertiliser application, soil nutrient levels and ground cover species) to inform appropriate management and performance and completion criteria. Where monitoring indicates these areas are not recovering as expected within the first five years of management alternative management measures will be investigated. - Maintain existing third party access arrangements on offset properties, where required. - Progressive rehabilitation of disturbed areas and re-use of habitat features (e.g. hollow logs, rocks) in rehabilitation areas to minimise the habitat resource competition in adjoining conservation reserves.

<i>Environmental Aspect</i>	<i>Management and Mitigation Commitments</i>
<i>Cultural heritage</i>	<ul style="list-style-type: none"> • <i>Cultural heritage sites will be monitored and managed according to the measures described in an approved Aboriginal Cultural Heritage Management Plan.</i> • <i>Cultural heritage sites adjacent to and outside construction, mining and general disturbance areas will have appropriate controls in place to prevent potential disturbance.</i> • <i>Cultural heritage monitoring and salvage will be undertaken by a qualified archaeologist and members of the Aboriginal Stakeholder community groups (Mudgee Local Aboriginal Land Council based in Mudgee; North-East Wiradjuri Pty Ltd, based in Ulan; Murong Gialinga Aboriginal and Torres Strait Islander Corporation, based in Mudgee; and Warrabinga Native Title Claimants Aboriginal Corporation, based in Kandos).</i> • <i>Where additional cultural heritage sites are identified, these sites will be managed in accordance with the measures described in the Aboriginal Cultural Heritage Management Plan.</i> • <i>Local Aboriginal community representatives will be involved in the recording, salvaging and storing of cultural heritage objects impacted by site works.</i> • <i>The Aboriginal Cultural Heritage Management Plan will be updated to include:</i> <ul style="list-style-type: none"> - <i>Additional registered parties as necessary.</i> - <i>Sub-surface testing and potential salvage of S1MC343-345 and S1MC352 where blasting is assessed to adversely impact these sites.</i> - <i>Test excavation and potential salvage of S1MC331 and S1MC334.</i>
<i>Water</i>	<ul style="list-style-type: none"> • <i>Erosion and sediment control measures detailed in an approved Erosion and Sediment Control Plan (or equivalent) will be implemented.</i> • <i>Water pressure will be monitored at the inlet and outlet of the water sharing and borefield pipeline network, and the entire length of pipeline will be inspected regularly.</i> • <i>In the event that a leak or loss of pressure is detected in the water sharing or borefield pipeline network, pumping in that portion of the pipeline network will cease and the resultant cause investigated and remediated.</i> • <i>Management and monitoring of surface water and groundwater will be undertaken in accordance with an approved Water Management Plan, which will be reviewed and updated, as necessary, to include the Open Cut 1 and Open Cut 2 extension areas and additional surface water management infrastructure. As part of this review, MCO will liaise with the NOW on the water licensing requirements for the open cut extension areas.</i> • <i>MCO is committed to the effective management of water in the modified landform and where required will develop strategies to this effect, including returning rehabilitated areas to clean water catchments as promptly as practically possible.</i> • <i>MCO will abide by the rules of any relevant water sharing plan and return water where required.</i>
<i>Rehabilitation</i>	<ul style="list-style-type: none"> • <i>Soils will be stockpiled and used to rehabilitate areas not required for ongoing operations.</i> • <i>MCO is committed to progressively rehabilitating mined areas as soon as practical following disturbance, in accordance with an approved Landscape Management Plan (or equivalent Rehabilitation Plan), including returning areas disturbed by mining to their pre-mining land use (unless otherwise agreed with relevant stakeholders). The plan will be updated, as required, to include the Open Cut 1 and Open Cut 2 extension areas. The plan will consider use of terrestrial riparian buffers.</i> • <i>The majority of the Open Cut 1 and Open Cut 2 extension areas will be rehabilitated for biodiversity outcomes.</i> • <i>The 15.7 ha area of Class 3 agricultural land directly impacted by the Open Cut 1 and Open Cut 2 extension areas will be reinstated for agricultural purposes post mining.</i>
<i>Traffic</i>	<ul style="list-style-type: none"> • <i>Appropriate traffic management will be implemented for Ulan Road for construction vehicles entering and leaving the site to Ulan Road and along Saddlers Creek Road, where required.</i> • <i>MCO is committed to participate in the Ulan Road Strategy and will continue to consult with MWRC in relation to local road strategies.</i>

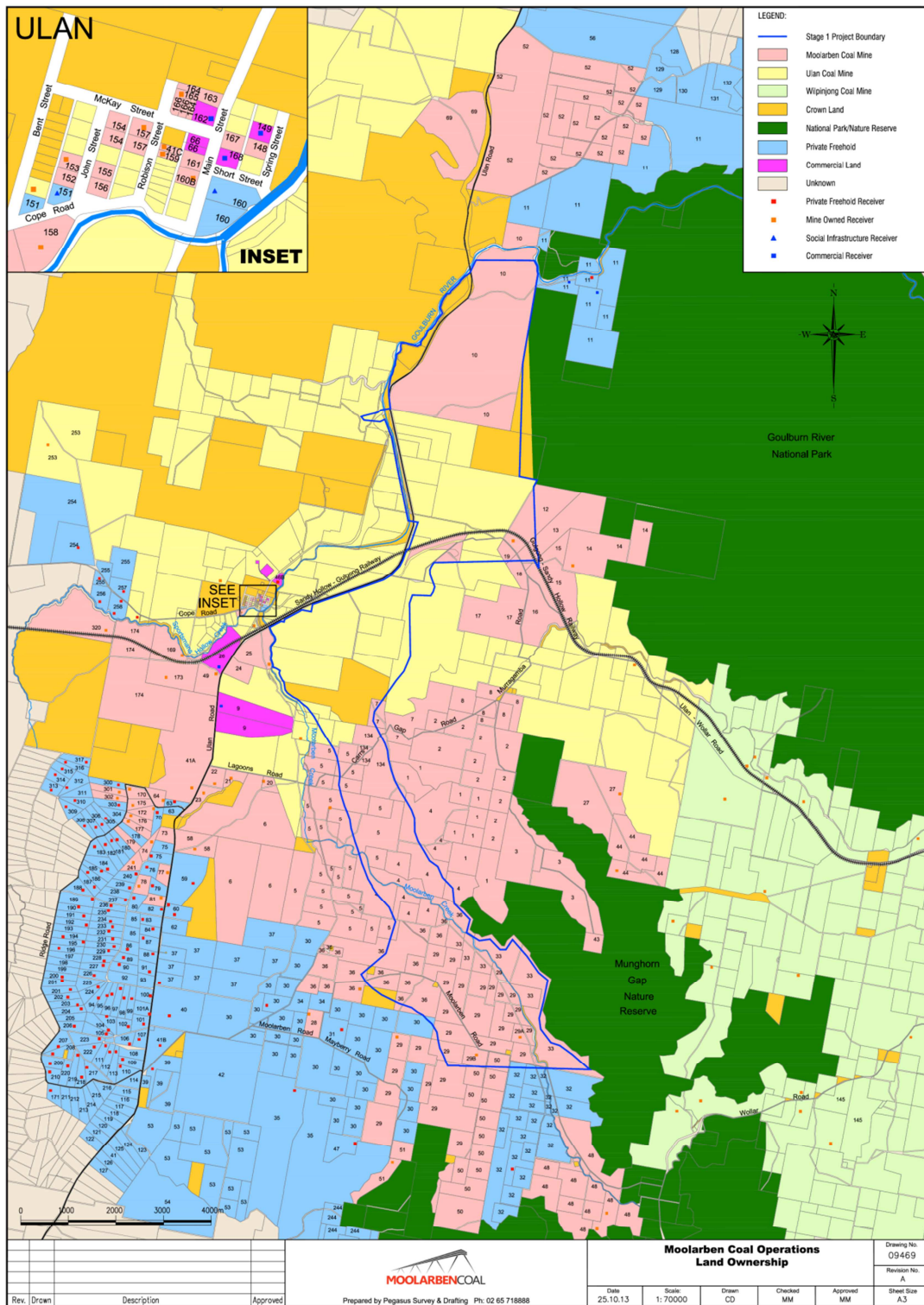
<i>Environmental Aspect</i>	<i>Management and Mitigation Commitments</i>
<i>Visual</i>	<ul style="list-style-type: none"> • <i>Trees and shrubs will be planted to provide a visual screen:</i> <ul style="list-style-type: none"> - <i>To the switch and bore pads located adjacent to Saddlers Creek Road, where required.</i> - <i>Along the southern edge of Cope Road, where views of Open Cut 1 extension areas will be possible, subject to landowner consent.</i> • <i>The Landscape Management Plan (or equivalent) will be reviewed and updated to describe the measures that will be implemented to manage visual impacts associated with the Open Cut 1 and Open Cut 2 extension areas, such as:</i> <ul style="list-style-type: none"> - <i>Vegetation screen planting, subject to land owner's consent, along the southern edge of Cope Road, in areas visually affected by direct views of the Open Cut 1 extension area.</i> - <i>Investigating the feasibility of targeted vegetation screen planting for affected properties along Ridge Road (with direct views from the residence to both Open Cut 1 and Open Cut 2 extension areas), to mitigate the visual and lighting impacts of Open Cut 1 and Open Cut 2 extension areas, subject to landowner consent.</i> - <i>Building-up out-of-pit embankments first so that continued operations are obscured by the embankment. Wherever possible out-of-pit emplacements around the perimeter will be established first, providing a visual screen while work is undertaken in the central part of the emplacement.</i> - <i>Seeding and grassing embankment outer faces visually exposed to private residents as soon as practically possible to soften the view.</i> - <i>Where possible, maintaining a strip of vegetation along the leading face of the ridgeline associated with the Open Cut 1 extension area to provide a visual screen to workings for as long as practical.</i> - <i>Use of operational screening measures such as landform re-establishment sequencing and lighting management.</i> - <i>Progressive rehabilitation.</i> • <i>As far as practically possible, and where mine safety allows, management protocols will be established and implemented to:</i> <ul style="list-style-type: none"> - <i>Locate mobile lighting plant to be directed away from private residences.</i> - <i>Direct stationary lighting sources below the horizontal to minimise potential light spill.</i> - <i>Design lighting systems that minimise light spillage.</i> - <i>Avoid lighting of light coloured surfaces that have greater reflectivity.</i>
<i>Social</i>	<ul style="list-style-type: none"> • <i>MCO is committed to prevent or minimise negative social impacts resulting from the MCP and will use its best endeavours to enhance the social benefits of the Project in accordance with its Environment and Community Policy.</i>

**APPENDIX 4:
VOLUNTARY PLANNING AGREEMENT**

Funding Area	Minimum Proponent Contribution	Funding Time Frame
Monetary Contribution – open cut product coal	\$1,000,000	Three equal instalments to be paid over a three year period, with the first annual instalment to be paid within seven days of the first loading and dispatch of coal produced from the open cut operations from the Project.
Monetary Contribution – underground product coal	\$300,000	One instalment to be paid within seven days of the first loading and dispatch of coal produced from the underground operations of the Project.
Road Maintenance Contribution – Cope Road and Ulan Road	\$1,000,000	Three equal instalments to be paid over a three year period, with the first instalment to be paid within seven days of the commencement of construction
Road Maintenance Contribution – General	\$1,250,000	\$62,500 each year for a period of 20 years with the first instalment to be paid on the first anniversary of the first loading and dispatch of coal produced from the operations of the Project.
Community Infrastructure Contribution	\$1,000,000	\$100,000 each year for a period of 10 years with the first instalment to be paid on the first anniversary of the first loading and dispatch of coal produced from the operations of the Project.

Note: The “Road Maintenance Contribution – General” and “Community Infrastructure Contribution” must be reviewed and adjusted to take into account any increase in the CPI over time.

APPENDIX 5: PROPERTY NUMBERS AND LAND OWNERSHIP



No.	NAME	No.	NAME	No.	NAME
1	Moolarben Coal Mine Owned/Controlled Land	82	S.C. Hungerford & M.C. Clemens	164	Moolarben Coal Mine Owned/Controlled Land
2	Moolarben Coal Mine Owned/Controlled Land	83	C.F. & C.R. Wall	165	Moolarben Coal Mine Owned/Controlled Land
3	Moolarben Coal Mine Owned/Controlled Land	84	D.S. Sebelic	166	Moolarben Coal Mine Owned/Controlled Land
4	Moolarben Coal Mine Owned/Controlled Land	85	J. & Z. Nikolovski	167	Moolarben Coal Mine Owned/Controlled Land
5	Moolarben Coal Mine Owned/Controlled Land	86	N.W. Harris	168	PJL Construction Complete Mining Services & Solutions P/L
6	Moolarben Coal Mine Owned/Controlled Land	87	B.J. & K. Howe	169	Moolarben Coal Mine Owned/Controlled Land
7	Moolarben Coal Mine Owned/Controlled Land	88	B.C. Meyers	170	Moolarben Coal Mine Owned/Controlled Land
8	Moolarben Coal Mine Owned/Controlled Land	89	M.V. & H.M. Glover & E. & B.J. Tomlinson	171	J.M. McGregor
9	I.C.I. Australia Operations	90	S.A. Powell	172	Moolarben Coal Mine Owned/Controlled Land
10a,b	Moolarben Coal Mine Owned/Controlled Land	91	H.M. Graham	173	Moolarben Coal Mine Owned/Controlled Land
11	J. Mullins & C. Imrie	92	V.A. Pulicino, J. Bonnici, S. Bonnici & G. Bonnici	174	Moolarben Coal Mine Owned/Controlled Land
12	Moolarben Coal Mine Owned/Controlled Land	93	F. & M. Fenech	175	Moolarben Coal Mine Owned/Controlled Land
13	Moolarben Coal Mine Owned/Controlled Land	94	L.K. Mittermayer	176	Moolarben Coal Mine Owned/Controlled Land
14a	Moolarben Coal Mine Owned/Controlled Land	95	B.J. Wittington	177	Moolarben Coal Mine Owned/Controlled Land
14b	The Minister for National Parks	96	D. Lazicic	178	P. Stone
15	Moolarben Coal Mine Owned/Controlled Land	97	D.J. & M.D. Smith	179	Moolarben Coal Mine Owned/Controlled Land
16	Moolarben Coal Mine Owned/Controlled Land	98	J.P. & M.E. Piper	180	C. & L. Barrett
17	Moolarben Coal Mine Owned/Controlled Land	99	D.E. Jenner & W.B. Jensen	181	S. Forster
18	Moolarben Coal Mine Owned/Controlled Land	100	O. & A. Kapista	182	J. Dutoitcook
19	Moolarben Coal Mine Owned/Controlled Land	101	R.D. & D.M.Z. Hull	183	R. & E. Steines
20	Moolarben Coal Mine Owned/Controlled Land	101a	P.J. Kearns	184	L. Stevenson
21	Moolarben Coal Mine Owned/Controlled Land	102	K.A. Roberts	185	L. Stevenson
22	Moolarben Coal Mine Owned/Controlled Land	103	S.B. Burnett & S.L. Grant	186	R. & I. Adamson
23	Moolarben Coal Mine Owned/Controlled Land	104	R.A. & L.A. Deeben	187	B. & K. Feeney
24	Moolarben Coal Mine Owned/Controlled Land	105	D.J. & N. Katsikaris	188	K. & T. Fielding
25	Moolarben Coal Mine Owned/Controlled Land	106	T.B. & J.H. Reid	189	M,M,D & A Goggin & J.A,P & R Hyde
26	Forty North Pty Limited	107	Z.J. & M. & A.A. Raso, B. Poplasen	190	T. & L. Sahyoun
27	Moolarben Coal Mine Owned/Controlled Land	108	R. Varga	191	B. & T. Lasham
28	Moolarben Coal Mine Owned/Controlled Land	109	D.A. & V.M. Evans	192	R. & J. Williams
29a,b	Moolarben Coal Mine Owned/Controlled Land	110	J.T. Thompson & H.T. Evans	193	D.J. Moloney
30	R. Cox	111	G.J. & N.J. McEwan	194	P. & K. Potts
31	M. Cox	112	M.J. & L.M. Croft	195	R. Cottam
32	D. & J. Stokes	113	C.P.G. Ratcliff	196	F. Saxberg & F. Weir

No.	NAME	No.	NAME	No.	NAME
33	Moolarben Coal Mine Owned/Controlled Land	114	T.F. & K. Holland	197	P. Gorm & I. Neilsen
34	J. Asztalos	115	A.K. & B.H. Ouinn	198	G.R. & M.E. Metcalfe
35	P. Johnson, M. & G. Thompson, P. & F. Debreczeny	116	D.J. & S.M. Reid	199	P. Gorm & I. Neilsen
36	Moolarben Coal Mine Owned/Controlled Land	117	J.M. Dick	200	V.K. Grimshaw
37	J. Szymkarczuk	118	A. Scott	201	K. & G. Towerton
38	State of NSW	119	P.J. Kearns	202	H. & V. Butler
39	R. & D. Sprigg	120	P.S. & D.R. Ord	203	D. Miller
40	J. Devenish	121	E.J. Cullen	204	R. & J. Donnan
41a,c	Moolarben Coal Mine Owned/Controlled Land	122	W.F. Wirth	205	D. Sparrow
41b	P. Libertis	123	N.D. Sullivan	206	C. Marshall & R.Vella
42	C. & L. Schmidt	124	W.J. & H.E. Bailey	207	A. & D. Smith
43	Moolarben Coal Mine Owned/Controlled Land	125	D.B. McBride	208	S. & C. Hasaart
44	Moolarben Coal Mine Owned/Controlled Land	126	M.P. Julian	209	F. Mawson
45	NSW Elec. Trans. Auth	127	B.K.T. & S.A. Bracken	210	J. & A. Tebbutt
46a,c,d,f,g	Ulan Coal Mines Ltd.	128	A. Sims	211	S. McGregor & W. Gray
46b	North Eastern Wiradjuri Wilpinjong Community Fund Limited	129	M. Yelds	212	E. & M. Lepik
47	S.F. & M.R. Andrews	130	G. McEwen	213	D. & J. Parsonage
48	Moolarben Coal Mine Owned/Controlled Land	131	G.R. & R.A. King	214	R. & E. O'Neil
49	Moolarben Coal Mine Owned/Controlled Land	132	N. Atkins	215	S. & P. Green
50	Moolarben Coal Mine Owned/Controlled Land	133	J.M. & T.E. Tynan	216	G. Holland & F. Handicott
51	Moolarben Coal Mine Owned/Controlled Land	134	Moolarben Coal Mine Owned/Controlled Land	217	R.P. & J.L. Patterson
52	Moolarben Coal Mine Owned/Controlled Land	136	Cumbo Land Pty Ltd	218	G. & G. Soady
53	W.D. & M.S. Bryant	137	Cumbo Land Pty Ltd	219	T. & S. Riger
54	M. A. & C. Harris	138	Cumbo Land Pty Ltd	220	S. Rusten & N. Smith
55	M.J. Cundy	139	Ulan Coal Mines Ltd.	221	State of NSW
56	M.J. & V Cundy	140	Cumbo Land Pty Ltd	222	B. Purtell
57	M.J. Cundy	141	Wilpinjong Coal Pty. Limited ¹⁴¹	223	E. Palmer & J. Stewart
58	Moolarben Coal Mine Owned/Controlled Land	142	Cumbo Land Pty Ltd	224	R. & P. Dupond
59	G. & G. M. Szymkarczuk	143	Cumbo Land Pty Ltd	225	G. & R.F. Doulates
60	C.L. Rayner & D.M. Munday	144	J.T. & Y.R Jones	226	L. & F. Muscat
61	M.A. Miller	145	Cumbo Land Pty Ltd	227	W. & J. Hughes
62	R. C. Menchin	146	Cumbo Land Pty Ltd	228	P. Libertis
63	B. F. & B. Whiticker	147	Cumbo Land Pty Ltd	229	J. & B. Lowe
64	Moolarben Coal Mine Owned/Controlled Land	148	Moolarben Coal Mine Owned/Controlled Land	230	D. Rawlinson & D. Hoole
65	Cumbo Land Pty Ltd	149	Mid Western Regional Council	231	T. Morrison & S. Benny
66	Rostherne Pty Ltd	150	Ulan Coal Mines Ltd	232	L. & J. Haaring
68	Cumbo Land Pty Ltd	151	A.I. Cunningham (Land entrusted to Catholic Church)	233	K. & D. Boal
69	Moolarben Coal Mine Owned/Controlled Land	152	Moolarben Coal Mine Owned/Controlled Land	234	D. & L. Gaw
70	D.J. & A. Coventry	153	Moolarben Coal Mine Owned/Controlled Land	235	L. & R. Wilson
71	Council of the Shire of Mudgee	154	Moolarben Coal Mine Owned/Controlled Land	236	R. & C. Donovan

No.	NAME	No.	NAME	No.	NAME
72	Ulan Electricity	155	Moolarben Coal Mine Owned/Controlled Land	237	A. Puskaric
73	Moolarben Coal Mine Owned/Controlled Land	156	Moolarben Coal Mine Owned/Controlled Land	238	B. Powell
74	Moolarben Coal Mine Owned/Controlled Land	157	Moolarben Coal Mine Owned/Controlled Land	239	J. Delarue
75	P. Ban	158	Moolarben Coal Mine Owned/Controlled Land	240	G.J. & D.M. Hartley
76	S.R & P.C Carbone	159	Moolarben Coal Mine Owned/Controlled Land	241	Moolarben Coal Mine Owned/Controlled Land
77	Moolarben Coal Mine Owned/Controlled Land	160	Minister for Education & Training	242	Mid Western Regional Council
78	Moolarben Coal Mine Owned/Controlled Land	160b	Moolarben Coal Mine Owned/Controlled Land	243	R.J. Hopper & T.H. Thompson
79	P. T.J. & S.E. Nagle	161	Moolarben Coal Mine Owned/Controlled Land	244	Y.R. Jones
80	W. & D.I. Sebelic	162	D.M. Harrison	245	M.P. & K.L.E. Cresham
81	Moolarben Coal Mine Owned/Controlled Land	163	Moolarben Coal Mine Owned/Controlled Land	246	A.W. & L.M. Murray
247	J. & H. & K. Batshon	258	P.M. & C.D. Elias	308	N.A. Dower
248	G. Boustani	259	State Rail Authority of NSW	309	G.S. Maher
249	C.J. & J.I. Eldridge	299	Country Energy	310	K.I. Death
250	G.C. Eldridge	300	C.M. Collins & C.Y. Marshall	311	B.J. & L.C. Williamson
251	N.F. Potter & C.E. Selley	301	Moolarben Coal Mine Owned/Controlled Land	312	M.S. & J.J. Ioannou
252	G.A. & R.M. Johnston	302	Moolarben Coal Mine Owned/Controlled Land	313	N.J. & B.D.E. Pracy
253	Ulan Coal Mines Ltd	303	H.J. Ungaro	314	S.L. Ford
254	Ulan Coal Mines Ltd	304	G. Balajan	315	W.J. Richards & B.J. Uzelac
255	H.J. & H. Schmitz	305	L. Barisic & M. Aul	316	C.R. Vassel & C.M. Williams
256	R.C. Campbell	306	E. Armstrong	317	R.J. Hore & V. Bingham
257	Ulan Coal Mines Ltd	307	M. Chant & N.K. Young	320	Moolarben Coal Mine Owned/Controlled Land

APPENDIX 6: NOISE COMPLIANCE ASSESSMENT

~~Applicable Meteorological Conditions~~

- ~~1. The noise criteria in Table 2 of the conditions are to apply under all meteorological conditions except the following:~~
 - ~~(a) during periods of rain or hail;~~
 - ~~(b) average wind speed at microphone height exceeds 5 m/s;~~
 - ~~(c) wind speeds greater than 3 m/s measured at 10 m above ground level; or~~
 - ~~(d) temperature inversion conditions greater than 3°C/100 m.~~

Applicable Meteorological Conditions

1. The noise criteria in Table 2 of the conditions are to apply under all meteorological conditions except the following:
 - (a) wind speeds greater than 3 m/s at 10 metres above ground level; or
 - (b) stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
 - (c) stability category G temperature inversion conditions.

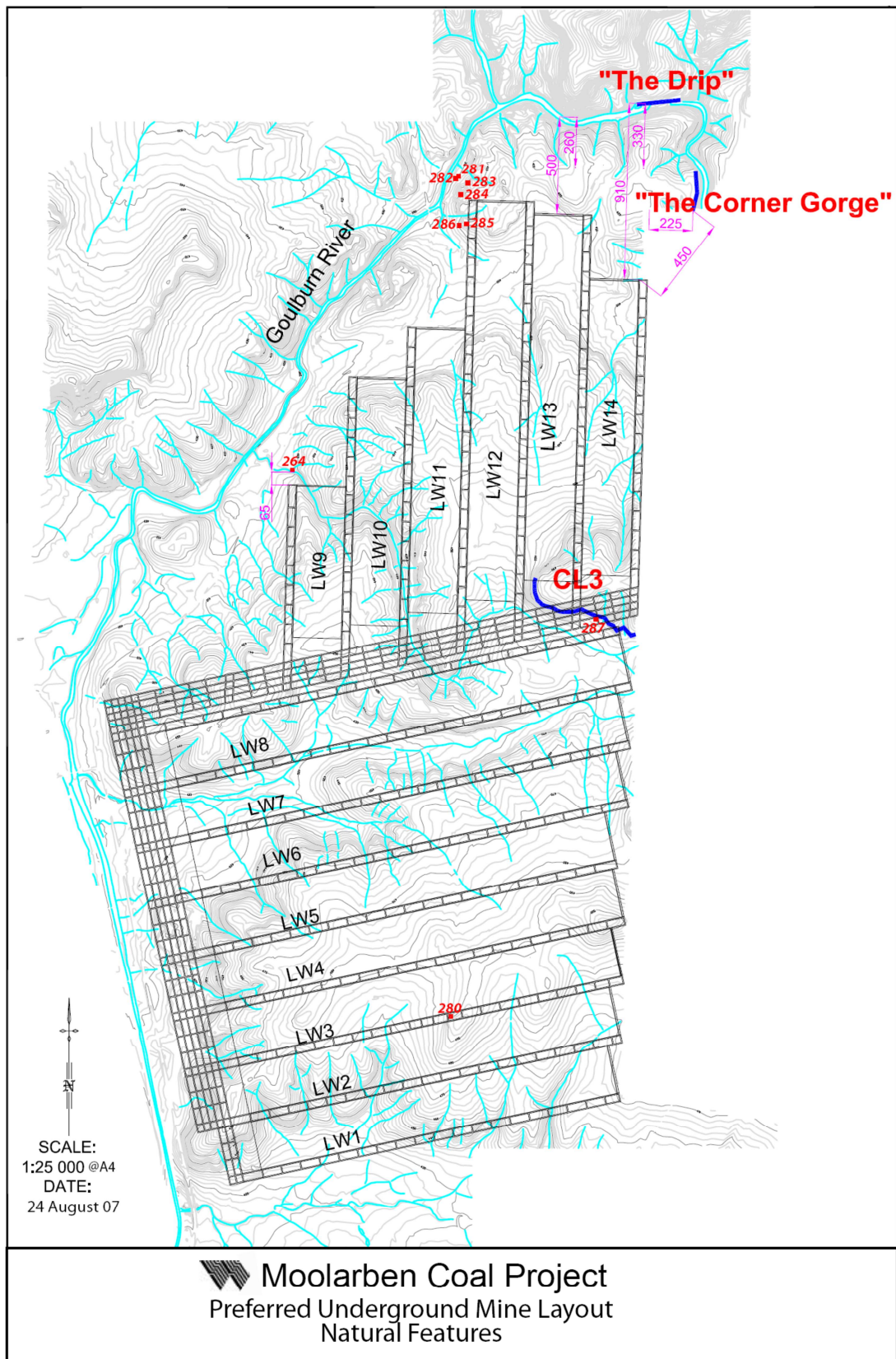
Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station located on the site.

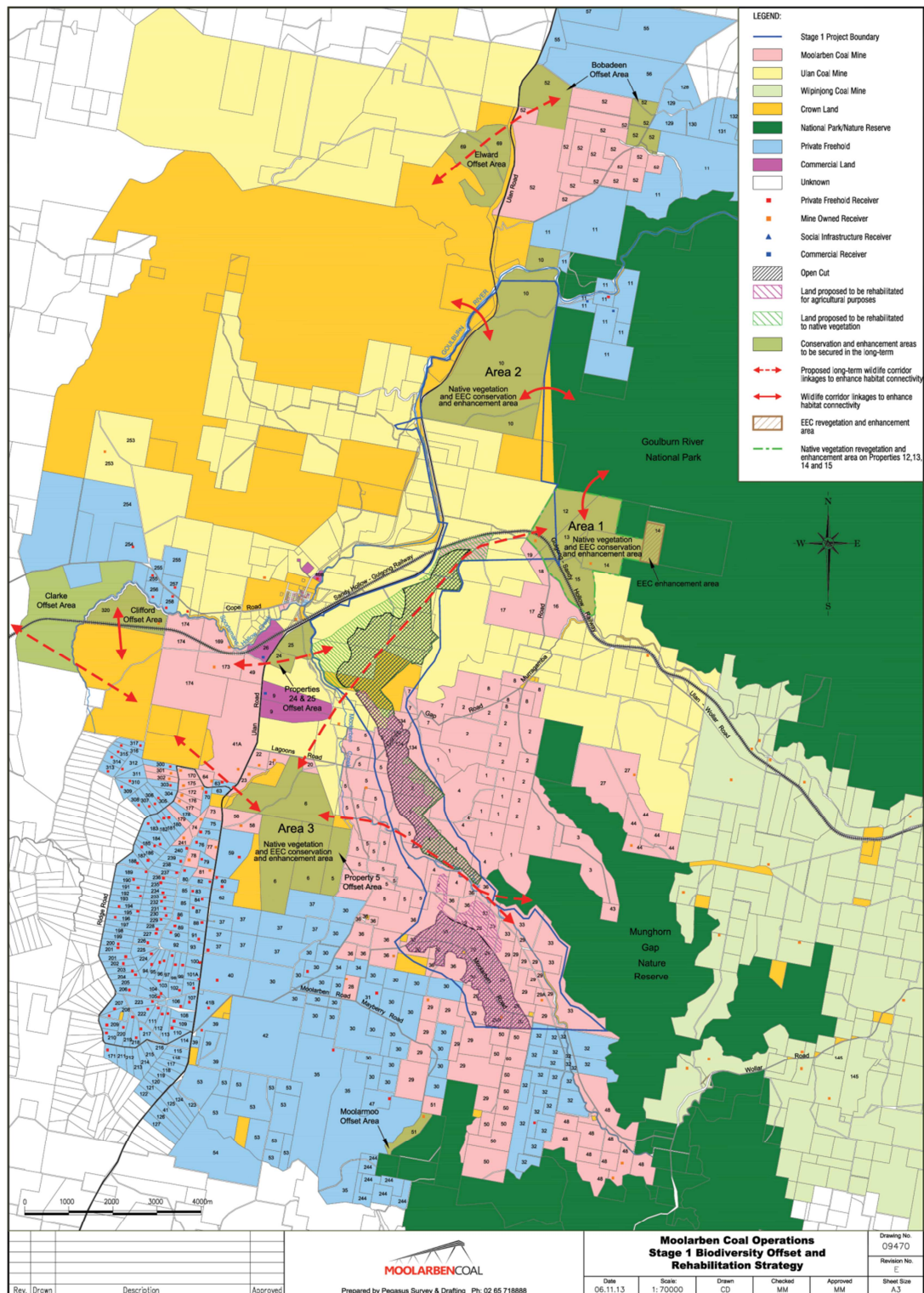
Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the NSW Industrial Noise Policy (as amended from time to time), in particular the requirements relating to:
 - (a) monitoring locations for the collection of representative noise data;
 - (b) meteorological conditions during which collection of noise data is not appropriate;
 - (c) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

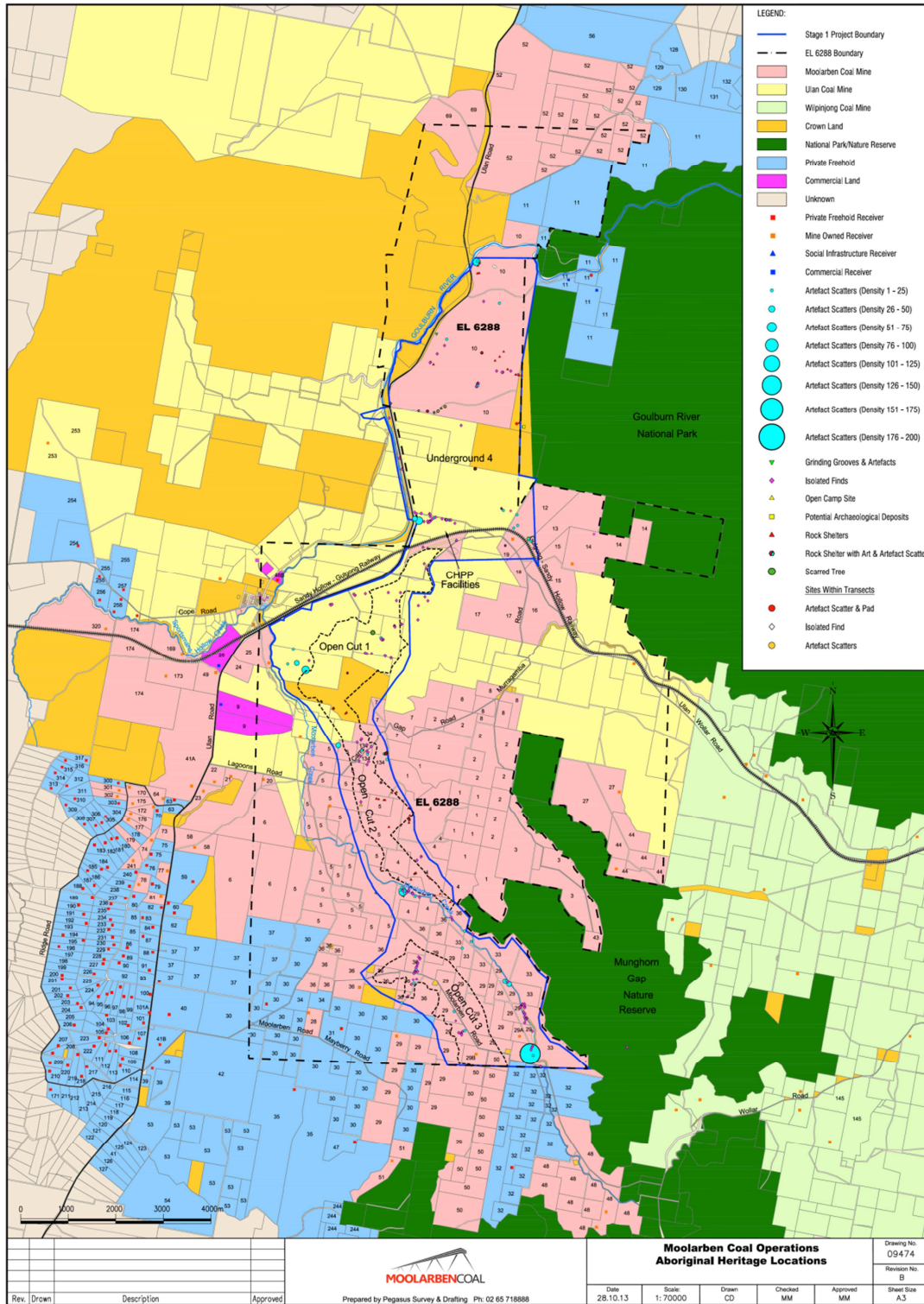
APPENDIX 7:
UNDERGROUND MINE LAYOUT AND LOCATION OF SENSITIVE FEATURES



REHABILITATION AND BIODIVERSITY OFFSET STRATEGY



APPENDIX 9: ABORIGINAL HERITAGE



Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC1	Scarred Tree	760670	6424444	1	Intensive scientific recording prior to disturbance.
S1MC2	Artefact Scatter	760840	6424339	14	Surface Collection
S1MC3	Isolated Find	760846	6424309	1	Surface Collection
S1MC4	Isolated Find	760866	6424307	1	Surface Collection
S1MC5	Artefact Scatter	760867	6424306	3	Surface Collection
S1MC6	Isolated Find	760890	6424301	1	Surface Collection
S1MC7	Isolated Find	760867	6424294	1	Surface Collection
S1MC8	Isolated Find	760548	6424002	1	Surface Collection
S1MC9	Isolated Find	760508	6424018	1	Surface Collection
S1MC10	Isolated Find	760645	6424004	1	Surface Collection
S1MC11	Artefact Scatter	760924	6423968	3	Surface Collection
S1MC12	Isolated Find	760933	6423948	1	Surface Collection
S1MC13	Isolated Find	761054	6423910	1	Surface Collection
S1MC14	Isolated Find	761050	6423907	1	Surface Collection
S1MC15	Isolated Find	761252	6425269	1	Surface Collection
S1MC16	Isolated Find	761168	6425107	1	Surface Collection
S1MC17	Isolated Find	760997	6425271	1	Surface Collection
S1MC18	Isolated Find	759777	6425026	1	Conservation
S1MC19	Isolated Find	759786	6425012	1	Conservation
S1MC20	Isolated Find	759816	6425028	1	Conservation
S1MC21	Isolated Find	760296	6425214	1	Conservation
S1MC 22	Isolated Find	760297	6425216	1	Conservation
S1MC 23	Isolated Find	760269	6425239	1	Conservation
S1MC24	Isolated Find	760514	6425250	1	Surface Collection
S1MC25	Isolated Find	761802	6425783	1	Surface Collection
S1MC26	Isolated Find	761766	6425183	1	Conservation
S1MC27	Isolated Find	761828	6425100	1	Conservation
S1MC28	Isolated Find	761627	6425002	1	Conservation
S1MC29	Isolated Find	761619	6424707	1	Conservation
S1MC30	Isolated Find	761135	6424559	1	Surface Collection
S1MC31	Isolated Find	761132	6424567	1	Surface Collection
S1MC32	Isolated Find	761124	6424585	1	Surface Collection
S1MC33	Isolated Find	761125	6424584	1	Surface Collection
S1MC34	Isolated Find	761128	6424583	1	Surface Collection
S1MC35	Isolated Find	761125	6424584	1	Surface Collection
S1MC36	Isolated Find	761255	6424616	1	Surface Collection
S1MC37	Isolated Find	761255	6424616	1	Surface Collection
S1MC38	Isolated Find	761279	6424617	1	Surface Collection
S1MC39	Isolated Find	761279	6424617	1	Surface Collection
PAD 1	Pad 1	761452	6424581	N/A	Conservation
PAD 2	Pad 2	761265	6423464	N/A	Conservation
PAD 3	Pad 3	761265	6423392	N/A	Conservation
S1MC40	Artefact Scatter	760441	6421958	12	Test Excavations and Salvage
S1MC41	Isolated Find	760384	6421732	1	Test Excavations and Salvage
S1MC42	Isolated Find	760408	6421838	1	Test Excavations and Salvage
S1MC43	Artefact Scatter	760558	6421874	9	Test Excavations and Salvage
S1MC44	Isolated Find	760550	6421657	1	Test Excavations and Salvage
S1MC45	Isolated Find	760582	6421721	1	Test Excavations and Salvage
S1MC46	Isolated Find	760547	6421941	1	Test Excavations and Salvage
S1MC47	Isolated Find	760637	6422033	1	Test Excavations and Salvage

Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC48	Isolated Find	760569	6421916	1	Test Excavations and Salvage
S1MC49	Isolated Find	760543	6422069	1	Test Excavations and Salvage
S1MC50	Isolated Find	760340	6422126	1	Test Excavations and Salvage
S1MC51	Isolated Find	760434	6422195	1	Test Excavations and Salvage
S1MC52	Isolated Find	760422	6422175	1	Test Excavations and Salvage
S1MC53	Artefact Scatter	759942	6422062	39	Test Excavations and Salvage
S1MC54	Artefact Scatter	760966	6421764	3	Conservation
S1MC55	Rockshelter & Artefacts	760964	6421902	8	Conservation
S1MC56	Rockshelter & Artefacts	760936	6421882	1	Conservation
S1MC57	Artefact Scatter	760906	6421882	16	Conservation
S1MC58	Artefact Scatter	761241	6419040	10	Conservation
S1MC59	Artefact Scatter	761274	6419089	8	Conservation
S1MC60	Artefact Scatter	761555	6418906	12	Conservation
S1MC61	Isolated Find	761650	6418891	1	Conservation
S1MC62	Isolated Find	761503	6418958	1	Conservation
S1MC63	Isolated Find	761502	6418979	1	Conservation
S1MC64	Isolated Find	761502	6418979	1	Conservation
S1MC65	Isolated Find	761382	6418984	1	Conservation
S1MC66	Artefact Scatter	761345	6418974	24	Conservation
S1MC67	Artefact Scatter	761298	6418996	52	Conservation
S1MC68	Isolated Find	761300	6419026	1	Conservation
S1MC69	Isolated Find	761300	6419031	1	Conservation
S1MC70	Isolated Find	761427	6419023	1	Conservation
S1MC71	Isolated Find	761427	6419023	1	Conservation
S1MC72	Isolated Find	761421	6419023	1	Conservation
S1MC73	Isolated Find	761429	6419089	1	Conservation
S1MC74	Isolated Find	761687	6419730	1	Conservation
S1MC75	Isolated Find	761683	6419722	1	Conservation
S1MC76	Isolated Find	761683	6419722	1	Conservation
S1MC77	Isolated Find	761597	6419653	1	Unmitigated impact
PAD 4	Pad 4	761685	6419735	N/A	Conservation
PAD 5	Pad 5	761685	6419735	N/A	Conservation
PAD 6	Pad 6	761341	6420748	N/A	Conservation
36-3-0222	Artefact Scatter	760420	6420820	6	Intensive Recording and Salvage
36-3-0223	Isolated Find	760420	6420880	1	Intensive Recording and Salvage
S1MC78	Artefact Scatter	761628	6417183	12	Test Excavations and Salvage
S1MC79	Isolated Find	761592	6417154	1	Test Excavations and Salvage
S1MC80	Isolated Find	761535	6417281	1	Surface Collection
S1MC81	Isolated Find	761547	6417308	1	Surface Collection
S1MC82	Isolated Find	761563	6417309	1	Surface Collection
S1MC83	Isolated Find	761557	6417330	1	Surface Collection
S1MC84	Artefact Scatter	761580	6417360	6	Surface Collection
S1MC85	Isolated Find	761613	6417323	1	Surface Collection
S1MC86	Isolated Find	761612	6417508	1	Surface Collection
S1MC87	Isolated Find	761615	6417500	1	Surface Collection
S1MC88	Isolated Find	761608	6417465	1	Surface Collection
S1MC89	Isolated Find	761591	6417421	1	Surface Collection
S1MC90	Isolated Find	761579	6417403	1	Surface Collection

Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC91	Isolated Find	761631	6417624	1	Surface Collection
S1MC92	Isolated Find	761659	6417596	1	Surface Collection
S1MC93	Isolated Find	761659	6417588	1	Surface Collection
S1MC94	Artefact Scatter	761638	6417728	3	Surface Collection
S1MC95	Isolated Find	762537	6415994	1	Surface Collection
S1MC96	Isolated Find	762530	6416009	1	Surface Collection
S1MC97	Isolated Find	762523	6416029	1	Surface Collection
S1MC98	Isolated Find	762475	6416038	1	Surface Collection
S1MC99	Isolated Find	762553	6416059	1	Surface Collection
S1MC100	Isolated Find	762414	6416282	1	Surface Collection
S1MC101	Isolated Find	762415	6416282	1	Surface Collection
S1MC102	Artefact Scatter	762379	6416477	3	Surface Collection
S1MC103a	Artefact Scatter	762693	6416081	2	Surface Collection
S1MC103	Artefact Scatter	763978	6415601	184	Conservation
S1MC104	Artefact Scatter	764042	6415564	4	Conservation
S1MC105	Isolated Find	763996	6415683	1	Conservation
S1MC106	Isolated Find	764013	6415735	1	Conservation
S1MC107	Isolated Find	766017	6415739	1	Conservation
S1MC108	Isolated Find	764026	6415756	1	Conservation
S1MC109	Isolated Find	764023	6416068	1	Conservation
S1MC110	Isolated Find	764118	6416246	1	Conservation
S1MC111	Isolated Find	764135	6416310	1	Conservation
S1MC112	Isolated Find	764136	6416312	1	Conservation
S1MC113	Isolated Find	764140	6416326	1	Conservation
S1MC114	Isolated Find	764148	6416337	1	Conservation
S1MC115	Isolated Find	764124	6416425	1	Conservation
S1MC116	Isolated Find	764114	6416357	1	Conservation
S1MC117	Isolated Find	764095	6416462	1	Conservation
S1MC118	Isolated Find	764026	6416575	1	Conservation
S1MC119	Isolated Find	764027	6416566	1	Conservation
S1MC120	Isolated Find	764095	6416601	1	Conservation
S1MC121	Isolated Find	764111	6416632	1	Conservation
S1MC122	Isolated Find	764066	6416619	1	Conservation
S1MC123	Isolated Find	764064	6416622	1	Conservation
S1MC124	Isolated Find	764070	6416630	1	Conservation
S1MC125	Isolated Find	764058	6416612	1	Conservation
S1MC126	Isolated Find	764056	6416612	1	Conservation
S1MC127	Isolated Find	764121	6416573	1	Conservation
S1MC128	Isolated Find	764161	6416333	1	Conservation
S1MC129	Isolated Find	764118	6416557	1	Conservation
S1MC130	Artefact Scatter	762600	6418163	23	Conservation
S1MC131	Isolated Find	762763	6418104	1	Conservation
S1MC132	Artefact Scatter	763451	6417107	33	Conservation
S1MC133	Artefact Scatter	763477	6417119	7	Conservation
S1MC134	Isolated Find	763507	6417086	1	Conservation
S1MC135	Artefact Scatter	763535	6417042	32	Conservation
S1MC136	Artefact Scatter	762737	6417948	5	Conservation
S1MC137	Isolated Find	762338	6418398	1	Conservation
S1MC138	Isolated Find	762315	6418451	1	Conservation
S1MC139	Artefact Scatter	762549	6417807	23	Test Excavations and Salvage
S1MC140	Artefact Scatter	761278	6416654	4	Conservation

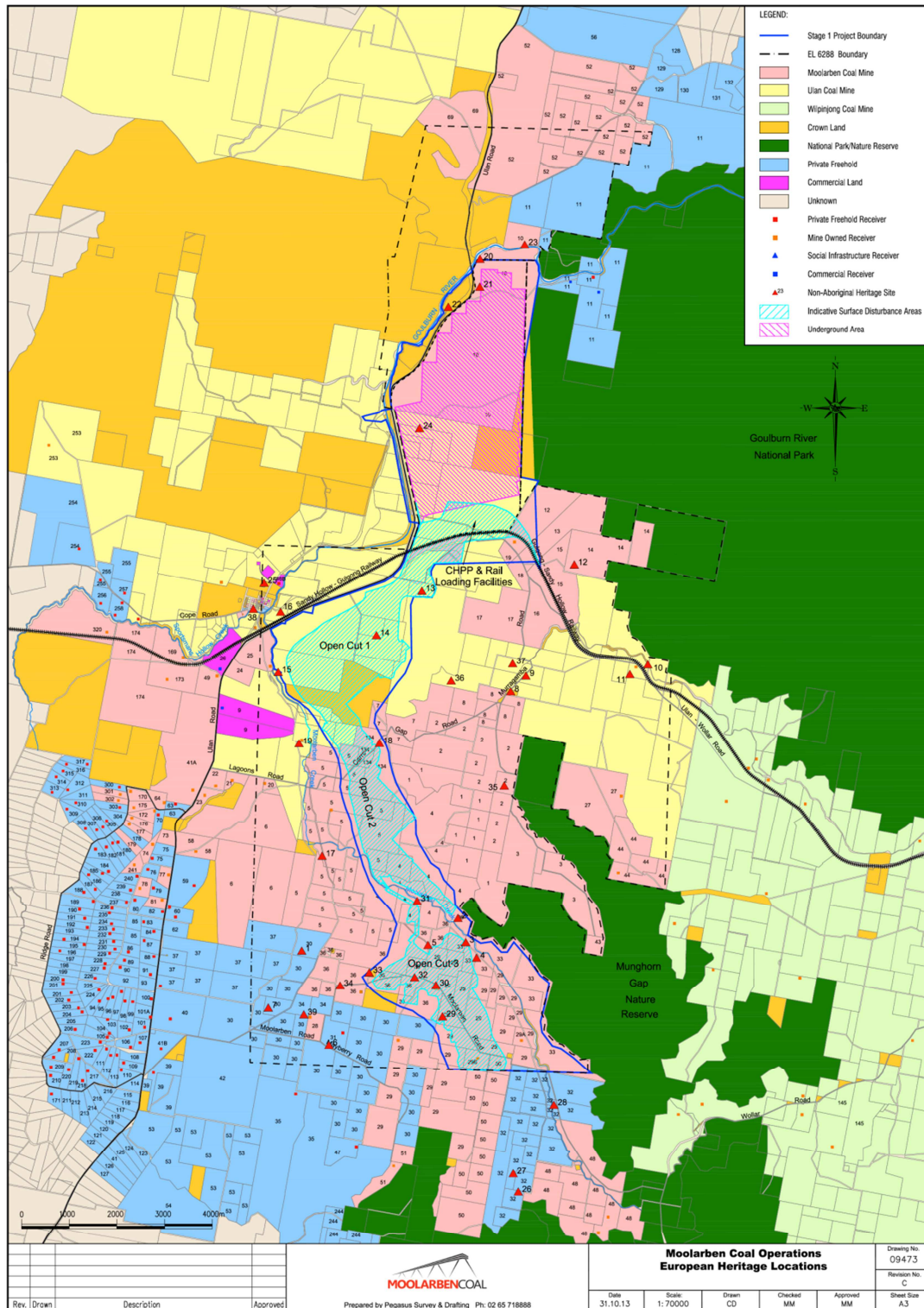
Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC141	Isolated Find	761409	6416796	1	Test Excavations and Salvage
S1MC142	Isolated Find	761479	6417036	2	Test Excavations and Salvage
S1MC143	Artefact Scatter	761535	6417066	3	Test Excavations and Salvage
S1MC144	Isolated Find	761519	6417142	1	Test Excavations and Salvage
PAD 8	Pad 8	761478	6421053	0	Conservation
PAD 9	Pad 9	761552	6421040	0	Conservation
PAD 10	Pad 10	761551	6421051	0	Conservation
PAD 11	Pad 11	761426	6420964	0	Conservation
PAD 12	Pad 12	761318	6420832	0	Unmitigated impact
S1MC213	Isolated Find	764196	6415322	1	Conservation
S1MC225	Isolated Find	761752	6425887	1	Test Excavations and Salvage
S1MC226	Isolated Find	761726	6426232	1	Test Excavations and Salvage
S1MC227	Isolated Find	761825	6426206	1	Test Excavations and Salvage
S1MC228	Artefact Scatter	762428	6426370	13	Test Excavations and Salvage
S1MC229	Isolated Find	762430	6426375	1	Test Excavations and Salvage
S1MC230	Artefact Scatter	761640	6426786	69	Test Excavations and Salvage
S1MC231	Isolated Find	761907	6426804	1	Test Excavations and Salvage
S1MC232	Isolated Find	761926	6426825	1	Test Excavations and Salvage
S1MC233	Artefact Scatter	761954	6426840	2	Test Excavations and Salvage
S1MC234	Isolated Find	761990	6426858	1	Test Excavations and Salvage
S1MC235	Isolated Find	762126	6426823	1	Test Excavations and Salvage
S1MC236	Artefact Scatter	762199	6426811	14	Test Excavations and Salvage
S1MC237	Isolated Find	762202	6426805	1	Test Excavations and Salvage
S1MC238	Isolated Find	762211	6426803	1	Test Excavations and Salvage
S1MC239	Isolated Find	762220	6426805	1	Test Excavations and Salvage
S1MC240	Artefact Scatter	762231	6426802	7	Test Excavations and Salvage
S1MC241	Artefact Scatter	762272	6426800	10	Test Excavations and Salvage
S1MC242	Isolated Find	762291	6426800	1	Test Excavations and Salvage
S1MC243	Isolated Find	762310	6426800	1	Test Excavations and Salvage
S1MC244	Artefact Scatter	762395	6426732	1	Test Excavations and Salvage
S1MC244a	Artefact Scatter	761552	6426828	30	Test Excavations and Salvage
S1MC245	Isolated Find	761747	6426767	1	Test Excavations and Salvage
S1MC246	Isolated Find	761820	6426775	1	Test Excavations and Salvage
S1MC247	Isolated Find	761831	6426745	1	Test Excavations and Salvage
S1MC248	Isolated Find	761863	6426758	1	Test Excavations and Salvage
S1MC249	Isolated Find	761863	6426771	1	Test Excavations and Salvage
S1MC250	Isolated Find	761860	6426773	1	Test Excavations and Salvage
S1MC252	Isolated Find	761867	6426779	1	Test Excavations and Salvage
S1MC253	Isolated Find	761870	6426772	1	Test Excavations and Salvage
S1MC254	Artefact Scatter	763332	6431357	2	Conservation
S1MC255	Isolated Find	763332	6431357	1	Test Excavations and Salvage
S1MC256	Artefact Scatter	762878	6429620	23	Monitor subsidence
S1MC257	Artefact Scatter	762850	6429600	4	Conservation
S1MC258	Artefact Scatter	762865	6429652	2	Conservation
S1MC259	Isolated Find	762889	6429671	1	Conservation
S1MC260	Isolated Find	762849	6429605	1	Conservation
S1MC261	Rockshelter & Artefact	762876	6429660	2	Conservation
S1MC262	Isolated Find	762876	6429676	1	Conservation
S1MC263	Isolated Find	762177	6430458	1	Conservation
S1MC264	Grinding Grooves & Artefacts	762010	6430705	78	Monitor subsidence: Intensive recording.

Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC265	Artefact Scatter	762224	6430592	3	Conservation
S1MC266	Isolated Find	763000	6431393	1	Conservation
S1MC267	Rockshelter & Artefact	761945	6430063	10	Monitor subsidence
S1MC268	Isolated Find	761875	6430102	1	Conservation
S1MC269	Isolated Find	761882	6430110	1	Conservation
S1MC270	Isolated Find	762024	6430287	1	Monitor subsidence
S1MC271	Rockshelter & Artefacts	763749	6428829	8	Monitor subsidence
S1MC272	Artefact Scatter	763827	6428747	2	Conservation
S1MC273	Isolated Find	762660	642864	1	Conservation
S1MC274	Isolated Find	761580	6426932	1	Conservation
S1MC275	Isolated Find	761878	6426869	1	Conservation
S1MC276	Isolated Find	761877	6426917	1	Conservation
S1MC277	Isolated Find	761862	6426931	1	Conservation
S1MC278	Isolated Find	761688	6426940	1	Conservation
S1MC279	Isolated Find	761551	6426963	1	Conservation
S1MC280	Rockshelter & Artefacts	762822	6427883	45	Monitor subsidence: Intensive recording.
S1MC281	Artefact Scatter	762865	6432219	11	Monitor subsidence
S1MC282	Artefact Scatter	762851	6432207	65	Monitor subsidence
S1MC283	Rockshelter & Artefacts	762912	6432185	6	Monitor subsidence
S1MC284	Rockshelter & Artefacts	762877	6432127	8	Monitor subsidence
S1MC285	Rockshelter & Artefacts	762905	6431976	2	Monitor subsidence
S1MC286	Rockshelter & Artefacts	762868	6431969	28	Monitor subsidence
S1MC287	Rockshelter & Artefacts	763240	6430143	28	Monitor subsidence: Intensive recording.
S1MC288	Rockshelter & Artefacts	763336	6430223	1	Monitor subsidence: Intensive recording.
S1MC289	Rockshelter & Artefacts	763795	6429838	9	Monitor subsidence: Intensive recording.
S1MC290	Rockshelter & Artefacts	763739	6429835	5	Monitor subsidence: Intensive recording.
S1MC291	Isolated Find	763726	6429853	1	Monitor subsidence: Intensive recording.
S1MC292	Isolated Find	763406	6429904	1	Monitor subsidence: Intensive recording.
S1MC293	Isolated Find	763385	6429901	1	Monitor subsidence: Intensive recording.
S1MC294	Rockshelter & Artefacts	763673	6429849	2	Monitor subsidence: Intensive recording.
S1MC295	Isolated Find	763273	6429928	1	Monitor subsidence: Intensive recording.
S1MC296	Rockshelter & Artefacts	763503	6429961	12	Monitor subsidence: Intensive recording.
S1MC297	Rockshelter & Artefacts	763420	6430329	5	Monitor subsidence: Intensive recording.
PAD 7	Pad 7	763846	6428750	0	Conservation
S1MC298	Artefact Scatter	759258	6423654	75	Test Excavation & Salvage
S1MC299	Isolated Find	759331	6423850	1	Surface Collection
S1MC300	Artefact Scatter	759071	6423798	41	Intensive Recording & Surface Collection
S1MC301	Artefact Scatter	758997	6424100	10	Surface Collection

Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC302	Artefact Scatter	758881	6423779	20	Surface Collection
S1MC303	Artefact Scatter and PAD	762029	6426950	249	Conservation
S1MC304	Artefact Scatter and PAD	762216	6426991	63	Conservation
S1MC305	Artefact Scatter and PAD	762474	6426945	143	Conservation
S1MC306	Isolated Find	763630	6426632	1	Surface Collection
S1MC307	Isolated Find	763714	6426587	1	Surface Collection
S1MC308	Artefact Scatter	763945	6426408	2 + PAD	Test Excavation & Salvage
S1MC309	Isolated Find	763991	6426357	1	Surface Collection
S1MC310	Isolated Find	761014	6428930	1	Surface Collection
S1MC311	Isolated Find	761232	6428099	1	Surface Collection
S1MC312	Isolated Find	761279	6427873	1	Surface Collection
S1MC313	Artefact Scatter	762188	6429182	2	Surface Collection
S1MC314	Artefact Scatter and PAD	761819	6429071	2	Test Excavation & Salvage
S1MC315	Isolated Find	761959	6429047	1	Surface Collection
S1MC316	Artefact Scatter	762039	6429072	2	Surface Collection
S1MC317	Isolated Find	762078	6429120	1	Surface Collection
S1MC318	Isolated Find	762107	6429141	1	Surface Collection
S1MC319	Isolated Find	761634	6429082	1	Surface Collection
S1MC320	Isolated Find	761047	6429251	1	Surface Collection
S1MC321	Isolated Find	763728	6427662	1	Surface Collection
S1MC322	Artefact Scatter and PAD	763693	6428813	3	Conservation
S1MC323	Isolated Find	763211	6432118	1	Surface Collection
S1MC324	Isolated Find	763245	6432104	1	Surface Collection
S1MC325	Isolated Find	760137	6423587	1	Unmitigated impact
S1MC326	Rock Shelter & PAD	759832	6422848	N/A	Unmitigated impact
S1MC327	Rock Shelter & PAD	759841	6422853	N/A	Unmitigated impact
S1MC328	Isolated Find	759847	6422847	1	Unmitigated impact
S1MC329	Rock Shelter & PAD	760119	6422761	N/A	Unmitigated impact
S1MC330	Rock Shelter & PAD	760097	6422739	N/A	Unmitigated impact
S1MC331	Rock Shelter & Artefacts	760843	6421283	10	Test excavation & salvage
S1MC332	Rock Shelter & PAD	762299	6418767	N/A	Unmitigated impact
S1MC333	Rock Shelter & PAD	762086	6418954	N/A	Unmitigated impact
S1MC334	Rock Shelter & PAD	761975	6418915	N/A	Unmitigated impact
S1MC335	Rock Shelter & PAD	761874	6419277	N/A	Unmitigated impact
S1MC336	Rock Shelter & PAD	761725	6418961	N/A	Unmitigated impact
S1MC337	Rock Shelter & PAD	761575	6419390	N/A	Unmitigated impact
S1MC338	Rock Shelter & PAD	761564	6419379	N/A	Unmitigated impact
S1MC339	Rock Shelter & PAD	761544	6419370	N/A	Unmitigated impact

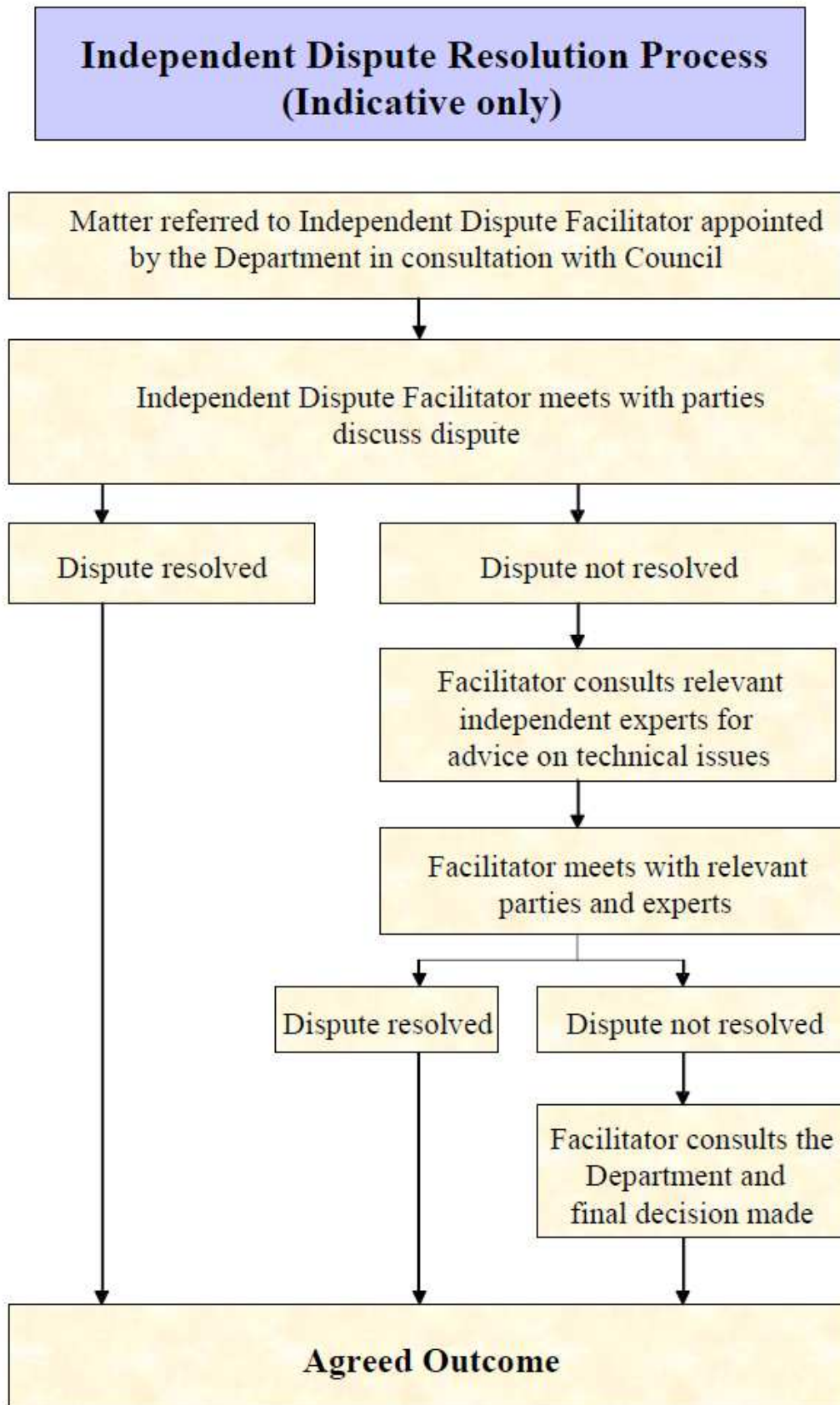
Site Name	Site Type	X Centre	Y Centre	Artefact Density	Management Recommendation
S1MC340	Rock Shelter & PAD	761472	6419251	N/A	Unmitigated impact
S1MC341	Rock Shelter & PAD	761009	6420337	N/A	Unmitigated impact
S1MC342	Rock Shelter & PAD	761252	6420370	N/A	Unmitigated impact
S1MC343	Rock Shelter & PAD	761430	6420424	N/A	Monitor blasting: test excavation & salvage
S1MC344	Rock Shelter & Artefacts	761434	6420500	6	Monitor blasting: test excavation & salvage
S1MC345	Rock Shelter & PAD	761438	6420476	N/A	Unmitigated impact
S1MC346	Rock Shelter & PAD	761423	6420537	N/A	Unmitigated impact
S1MC347	Rock Shelter & PAD	760928	6420913	N/A	Unmitigated impact
S1MC348	Rock Shelter & PAD	760901	6420914	N/A	Unmitigated impact
S1MC349	Rock Shelter & PAD	760793	6420933	N/A	Unmitigated impact
S1MC350	Rock Shelter & PAD	760746	6420946	N/A	Unmitigated impact
S1MC351	Rock Shelter & PAD	761070	6421070	N/A	Unmitigated impact
S1MC352	Rock Shelter & PAD	761168	6421080	N/A	Unmitigated impact
S1MC353	Rock Shelter & PAD	761421	6420743	N/A	Unmitigated impact
S1MC354	Rock Shelter & PAD	761448	6420591	N/A	Unmitigated impact
S1MC355	Artefact Scatter	760344	6422239	2	Unmitigated impact
S1MC356	Artefact Scatter	763124	6426882	1	Salvage
S1MC357	Artefact Scatter	762882	6426983	1	Salvage
S2MC1	Isolated Find	763454	6426266	1	Surface collection
S2MC256	Artefact Scatter	763698	6426910	2	Conservation
S2MC257	Isolated Find	763567	6426991	1	Conservation
S2MC258	Artefact Scatter & PAD	763414	6427000	9	Conservation
S2MC259	Isolated Find	763374	6427039	1	Conservation
S2MC260	Isolated Find	765318	6426505	1	Surface collection

APPENDIX 10: NON-ABORIGINAL HERITAGE



No	Place Name	Impact Status	Significance	Summary Recommendation
2	Farm site. Portion 218. Ph Moolarben	No impact	Local – moderate	No further action required In situ conservation.
3	Burial site, Roberts family. Portion 146, Ph Moolarben	Impact by Open Cut 3 development	Local – high	Exhumation. Discussion to be held with related families.
4	House & burial site. Portion 63, Ph Moolarben	Impact by Open Cut 3 development	Local – moderate	Exhumation. Discussion to be held with related families.
14	House site. Portion 178 Ph Moolarben	Impact by Open Cut 1 development	Local – moderate	Archival recording
15	Moolarben Dam	No impact	Local – moderate	In situ conservation
18	Carr's Gap Road. Portion 30. Ph Moolarben	Impact by Open Cut 2 development likely	Local – moderate	Archival recording In situ conservation. If impacted recovery works to be recommended
19	Farm site. 'Glen Moor', Portion 203 Ph Moolarben	No impact	Local – exceptional	Archival recording. In situ conservation.
20	Grave & memorial garden. Portion 30 Ph Lennox	No impact	Local - high	Area to be maintained.
22	Stock yards. Portion 34 Ph Lennox	No impact	Local – moderate	Archival recording. In situ conservation.
23	Natural environment. 'The Drip'	No impact	Local – high	Ensure public access is maintained
29	House site. Portion 45 Ph Moolarben	Impact by Open Cut 3 development	Local – moderate	Archival recording.
30	School site. Portion 176 Ph Moolarben	Impact by Open Cut 3 development	Local – moderate	Archival recording.
31	House site, Portion 228, Ph Moolarben	No impact	Local – moderate	Archival recording. In situ conservation.
32	House site. Portion 89 Ph Moolarben	Impact by Open Cut 3 development	Local – moderate	Archival recording.
33	Recreation Ground. Portion 204. Ph Moolarben	No impact	Local – moderate	Archival recording. In situ conservation.

APPENDIX 11:
INDEPENDENT DISPUTE RESOLUTION PROCESS



Project Approval

Section 75J of the *Environmental Planning & Assessment Act 1979*

As delegate of the Minister for Planning, the Planning Assessment Commission of NSW approves the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 6.

These conditions are required to:

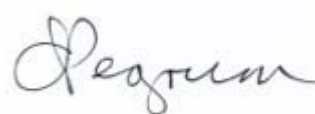
- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.



Brian Gilligan
Member of the Commission



Lynelle Briggs AO
Member of the Commission



Annabelle Pegrum AM
Member of the Commission

Sydney

30 January 2015

SCHEDULE 1

Application Number:	08_0135
Proponent:	Moolarben Coal Mines Pty Ltd
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Moolarben Coal Project Stage 2

TABLE OF CONTENTS

DEFINITIONS	3
ADMINISTRATIVE CONDITIONS	6
Obligation to Minimise Harm to the Environment	6
Terms of Approval	6
Lapsing of Approval	6
Limits on Approval	6
Structural Adequacy	6
Demolition	7
Protection of Public Infrastructure	7
Operation of Plant and Equipment	7
Staged Submission of Strategies, Plans and Programs	7
Community Enhancement	7
ENVIRONMENTAL CONDITIONS – GENERAL	8
Noise	8
Blasting	10
Air Quality	12
Ulan Public School	13
Meteorological Monitoring	14
Water	14
Biodiversity	17
Heritage	20
Transport	21
Visual	21
Bushfire Management	22
Waste	22
Rehabilitation	22
ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING	24
Subsidence	24
ADDITIONAL PROCEDURES	28
Notification of Landowners/Tenants	28
Independent Review	28
Land Acquisition	28
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING	30
Environmental Management	30
Reporting	31
Auditing	32
Access to Information	32
APPENDIX 1: SCHEDULE OF LAND	33
APPENDIX 2: GENERAL LAYOUT OF PROJECT	37
APPENDIX 3: STATEMENT OF COMMITMENTS	40
APPENDIX 4: UNDERGROUND LAYOUT & SENSITIVE FEATURES	45
APPENDIX 5: PROPERTY NUMBERS AND LAND OWNERSHIP	47
APPENDIX 6: NOISE COMPLIANCE ASSESSMENT	51
APPENDIX 7: BIODIVERSITY OFFSET STRATEGY	52
APPENDIX 8: ABORIGINAL HERITAGE	54
APPENDIX 9: NON- ABORIGINAL HERITAGE	70
APPENDIX 10: REHABILITATION PLAN	72

DEFINITIONS

Annual review	The review required by condition 4 of Schedule 6
ARI	Average Recurrence Interval
ARTC	Australian Rail Track Corporation Ltd
BCA	Building Code of Australia
Biodiversity offset strategy	The conservation and enhancement strategy described in EA, and depicted conceptually in the figure in Appendix 7
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; any pipeline, water, sewer, telephone, gas or other service main
Blast misfire	The failure of one or more holes in a blast pattern to initiate
CCC	Community Consultative Committee
Cliff	A continuous rock face, including overhangs, having a minimum length of 20 metres, a minimum height of 10 metres and a minimum slope of 2 in 1 (>63.4°)
Conditions of this approval	Conditions contained in Schedules 2 to 6 inclusive
Council	Mid-Western Regional Council
CLD	Crown Lands Division within the Department of Trade and Investment, Regional Infrastructure and Services
CPI	Australian Bureau of Statistics Consumer Price Index
CCI	Construction Cost Index
Day	The period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DEC	NSW Department of Education and Communities
Department	Department of Planning & Environment
DPI	Department of Primary industries
DRE	Division of Resources and Energy within the Department of Trade and Investment, Regional Infrastructure and Services
DSC	Dams Safety Committee
EA	Environmental assessment titled <i>Moolarben Coal Project Stage 2 Environmental Assessment Report</i> (6 volumes), dated March 2009 as modified by the preferred project report, dated January 2012; the response to submissions dated June 2012; the residual matters report dated August 2012; and the following supplementary information: <ul style="list-style-type: none"> • Groundwater Accounting and Water Sharing Plan prepared by RPS Aquaterra Pty Ltd and dated 13 June 2012; • Surface water information prepared by Worley Parsons Services Pty Ltd and dated 28 September 2012, 15 October 2012 and 9 November 2012; • Biodiversity Offset Strategy prepared by Cumberland Ecology Pty Ltd and dated December 2012; • <i>Water Licensing Report – Wollar Creek Water Source</i> prepared by Dundon Consulting Pty Ltd and dated 11 June 13.
EEC	Endangered ecological community, as defined under the <i>Threatened Species Conservation Act 1995</i>
Environmental consequences	The environmental consequences of subsidence impacts, including: damage to built features; loss of surface flows to the subsurface; loss of standing pools; adverse water quality impacts; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts on aquatic ecology; and ponding.
EPA	Environment Protection Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
EPBC Act	<i>Commonwealth Environment Protection and Biodiversity Conservation Act 1999</i>
EPL	Environment Protection Licence issued under the POEO Act
Evening	The period from 6pm to 10pm
Executive Director Mineral Resources	Executive Director of Mineral Resources within DRE, or equivalent position
Feasible	Feasible relates to engineering considerations and what is practical to build or implement
Heritage item	An item as defined under the <i>Heritage Act 1977</i> and/or an Aboriginal Object or Aboriginal Place as defined under the <i>National Parks and Wildlife Act 1974</i>
Incident	A set of circumstances that: <ul style="list-style-type: none"> • causes or threatens to cause material harm to the environment; and/or • breaches or exceeds the limits or performance measures/criteria in this approval

Land	As defined in the EP&A Act, except for where the term is used in the noise and air quality conditions in Schedules 3 and 5 of this approval where it is defined to mean the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mine water	Water that accumulates within, or drains from, active mining and infrastructure areas (synonymous with 'dirty water')
Mining operations	Includes the removal and emplacement of overburden and extraction, processing, handling, storage and transport of coal carried out on the site
Minister	Minister for Planning, or delegate
Minor	Not very large, important or serious
Minor cliff	A continuous rock face, including overhangs, which has a: <ul style="list-style-type: none"> • minimum length of 20 metres and a height between 5 metres and 10 metres, or maximum length of 20 metres and a minimum height of 10 metres; and • minimum slope of 2 to 1 (>63.4°).
Mitigation	Activities associated with reducing the impacts of the project
Moolarben mine complex	The combined operations of the Moolarben Stage 1 and Stage 2 mines
Moolarben Stage 1 mine	The approved mining operations and associated development within the area marked in blue on the figures in Appendix 2
Moolarben Stage 1 mine surface infrastructure area	The approved surface infrastructure area, including the coal handling and preparation plant and the rail loop, as shown on the figures in Appendix 2
Moolarben Stage 2 mine	The approved mining operations and associated development within the area marked in red on the figures in Appendix 2
NP&W Act	<i>National Parks & Wildlife Act 1974</i>
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
NOW	NSW Office of Water within DPI
OEH	Office of Environment and Heritage
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
Privately-owned land	Land that is not owned by a public agency or a mining company (or its subsidiary)
Project	The development as described in the EA
Proponent	Moolarben Coal Mines Pty Limited, or any other person or persons who rely on this approval to carry out the development that is subject to this approval.
Public infrastructure	Linear and related infrastructure that provides services to the general public, such as roads, railways, water supply, drainage, sewerage, gas supply, electricity, telephone, telecommunications, etc.
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Reasonable costs	The costs agreed between the Department and the Proponent for obtaining independent experts to review the adequacy of any aspects of the extraction plan, or where such costs cannot be agreed, the costs determined by a dispute resolution process
Rehabilitation	The restoration of land disturbed by the project to a good condition, to ensure it is safe, stable and non-polluting
RFS	Rural Fire Service
RMS	Roads and Maritime Services
Rock face feature	A continuous rock face, including overhangs, which has a: <ul style="list-style-type: none"> • minimum length of 20 metres and a height between 3 metres and 5 metres, or maximum length of 20 metres and a minimum height of 5 metres; and • minimum slope of 2 to 1 (>63.4°).
ROM	Run-of-mine
Secretary	Secretary of the Department, or nominee
Safe, serviceable & repairable	Safe means no danger to users who are present, serviceable means available for its intended use, and repairable means damaged components can be repaired economically
Second workings	Extraction of coal from longwall panels, mini-wall panels or pillar extraction
Site	The land referred to in Appendix 1
Statement of commitments	The Proponent's commitments in Appendix 3
Steep slope	An area of land having a gradient between 1 in 3 (33% or 18.3°) and 2 in 1 (200% or 63.4°)

Subsidence	The totality of subsidence effects, subsidence impacts and environmental consequences of subsidence impacts
Subsidence effects	Deformation of the ground mass due to mining, including all mining induced ground movements, such as vertical and horizontal displacement, tilt, strain and curvature
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs
UCML	Ulan Coal Mines Limited
TSC Act	<i>Threatened Species Conservation Act 1995</i>
Ulan Road Strategy	The strategy prepared by the Arrb Group Limited, dated December 2011 as amended by the Secretary's letter dated 25 May 2013

SCHEDULE 2 ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project generally in accordance with the:
 - (a) EA;
 - (b) statement of commitments; and
 - (c) conditions of this approval.

Notes:

- *The general layout of the project is shown in Appendix 2; and*
- *The statement of commitments is shown in Appendix 3.*

3. If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.
4. The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
 - (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this approval; and
 - (b) the implementation of any actions or measures contained in these documents.

LAPSING OF APPROVAL

5. If the project has not been physically commenced within 5 years of the date of this approval, then this project approval shall lapse.

LIMITS ON APPROVAL

Mining Operations

6. The Proponent may carry out mining operations on site until 31 December 2038.

Note: Under this approval, the Applicant is required to rehabilitate the site and perform additional undertakings to the satisfaction of both the Secretary and the Executive Director Mineral Resources. Consequently, this approval will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these additional undertakings have been carried out satisfactorily.

Coal Extraction

7. The Proponent shall not extract more than:
 - (a) 12 million tonnes of ROM coal from the open cut mining operations of the project in any calendar year; and
 - (b) 4 million tonnes of ROM coal from the underground mining operations of the Moolarben mine complex in any calendar year.

Coal Processing and Transport

8. The Proponent shall ensure that all coal extracted from the project is sent to the Moolarben Stage 1 mine surface infrastructure area for processing and/or transport to market.

STRUCTURAL ADEQUACY

9. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:

- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates (where applicable) for the proposed building works; and*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

10. The Proponent shall ensure that all demolition work on site is carried out in accordance with AS 2601-2001: *The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

11. Unless the Proponent and the applicable authority agree otherwise, the Proponent shall:
 - (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
 - (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Note: This condition does not apply to any damage to public infrastructure subject to compensation payable under the Mine Subsidence Compensation Act 1961, or to damage to roads caused as a result of general road usage.

OPERATION OF PLANT AND EQUIPMENT

12. The Proponent shall ensure that all plant and equipment used on site, or in connection with the project, is:
 - (a) maintained in a proper and efficient condition; and
 - (b) operated in a proper and efficient manner.

STAGED SUBMISSION OF STRATEGIES, PLANS OR PROGRAMS

13. With the approval of the Secretary, the Proponent may:
 - (a) submit any strategy, plan or program required by this approval on a progressive basis; and
 - (b) combine any strategy, plan, program, review, audit or report required by this approval with any similar strategy, plan, program, review, audit or report required under Project Approval 05_0117 for the Moolarben Coal Project Stage 1.

Notes:

- *While any strategy, plan or program may be submitted on a progressive basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times; and*
- *If the submission of any strategy, plan or program is to be staged, then the relevant strategy, plan or program must clearly describe the specific stage to which the strategy, plan or program applies, the relationship of this stage to any future stages, and the trigger for updating the strategy, plan or program.*

COMMUNITY ENHANCEMENT

14. From the commencement of construction until mining operations under this approval cease, the Proponent shall pay to Council a total of \$515 a year for each full-time equivalent employee/contractor at the Moolarben mine complex in excess of 320. This payment is for the provision of infrastructure and services generated by the project. It is also to be indexed in accordance with the CPI for the previous quarter.

SCHEDULE 3 ENVIRONMENTAL CONDITIONS - GENERAL

NOISE

Acquisition Upon Request

1. Upon receiving a written request for acquisition from the owner of the land listed in Table 1, the Applicant shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 1: Land subject to acquisition upon request

Receiver ID
32

Note: To interpret the land referred to in Table 1, see the applicable figures in Appendix 5.

Mitigation Upon Request

2. Upon receiving a written request from the owner of any residence on the land listed in Table 2, the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Residence subject to additional noise mitigation upon request

Receiver ID
30

Note: To interpret the land referred to in Table 2, see the applicable figures in Appendix 5.

Noise Criteria

3. The Proponent shall ensure that the noise generated by the Moolarben mine complex does not exceed the criteria in Table 3 at any residence on privately-owned land or the other specified locations.

Table 3: Noise criteria dB(A)

Receiver ID	Day	Evening	Night	
	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{Aeq(15min)}$	$L_{A1(1min)}$
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 residences	35	35	35	45
Ulan Primary 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			-

Note: To interpret the land referred to in Table 3, see the applicable figures in Appendix 5.

Noise generated by the Moolarben mine complex is to be measured in accordance with the relevant requirements of the *NSW Industrial Noise Policy*. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Land Acquisition Criteria

4. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 4 at any residence on privately-owned land, then upon receiving a written request for acquisition from an owner of the land listed in Table 4, the Proponent shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 4: Acquisition criteria dB(A) L_{Aeq} (15min)

Receiver ID	Day (L_{Aeq} (15min))	Evening (L_{Aeq} (15min))	Night (L_{Aeq} (15min))
63	43	43	42
All other privately-owned residences	40	40	40

Note: To interpret the land referred to Table 4, see the applicable figures in Appendix 5.

5. If the noise generated by the Moolarben mine complex contributes to exceedances of the relevant criteria in Table 5 on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), the Proponent shall, upon receiving a written request for acquisition from the landowner, acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 5: Land acquisition criteria

Day/Evening/Night $L_{Aeq}(\text{period})$	Receiver
55/50/45	All privately-owned land

Note: Noise generated by the project is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy. Appendix 6 sets out the meteorological conditions under which these criteria apply, and the requirements for evaluating compliance with these criteria.

However, these noise criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Noise Mitigation Criteria

6. If the noise generated by the Moolarben mine complex exceeds the criteria in Table 6 at any privately owned residence, then upon receiving a written request the Proponent shall implement additional noise mitigation measures (such as double-glazing, insulation and/or air conditioning) at the residence in consultation with the landowner. These measures must be reasonable and feasible, and directed towards reducing the noise impacts of the project on the residence.

If within 3 months of receiving this request from the owner, the Proponent and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 6: Mitigation criteria dB(A) L_{Aeq} (15min)

Receiver ID	Day (L_{Aeq} (15min))	Evening (L_{Aeq} (15min))	Night (L_{Aeq} (15min))
63	40	40	39
All other privately owned residences	37	37	37

Note: To interpret the land referred to Table 6, see the applicable figures in Appendix 5.

Operating Conditions

7. The Proponent shall:
 - (a) implement best management practice to minimise the operational and road noise of the project;
 - (b) operate a comprehensive noise management system that uses a combination of predictive meteorological forecasting and real-time noise monitoring data to guide the day to day planning of mining operations, and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;
 - (c) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply (see Appendix 6);
 - (d) only use locomotives and rolling stock that are approved to operate on the NSW rail network in accordance with the noise limits in ARTC's EPL;
 - (e) co-ordinate noise management at the Moolarben mine complex with the noise management at Ulan and Wilpinjong mines to minimise cumulative noise impacts; and

- (f) carry out regular monitoring to determine whether the Moolarben mine complex is complying with the relevant conditions of this approval, to the satisfaction of the Secretary.

Noise Management Plan

8. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to the commencement of any development on site under this approval;
 - describe the measures that would be implemented to ensure compliance with the noise criteria and operating conditions in this approval;
 - describe the proposed noise management system in detail; and
 - include a monitoring program that:
 - evaluates and reports on:
 - the effectiveness of the noise management system;
 - compliance against the noise criteria in this approval; and
 - compliance against the noise operating conditions;
 - includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this approval and trigger for further attended monitoring); and
 - defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

BLASTING

Blasting Criteria

9. The Proponent shall ensure that blasting on the Moolarben mine complex does not cause exceedances of the criteria in Table 7.

Table 7: Blasting criteria

Location	Airblast overpressure (dB(Lin Peak))	Ground vibration (mm/s)	Allowable exceedance
Residence on privately owned land	120	10	0%
	115	5	5% of the total number of blasts over a period of 12 months
All public infrastructure	-	50 (or a limit determined by the structural design methodology in AS 2187.2-2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Secretary)	0%

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

Blasting Hours

10. The Proponent shall only carry out blasting on site between 9 am and 5 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.

Blasting Frequency

11. The Proponent may carry out a maximum of:
- 2 blasts a day; and
 - 9 blasts a week, averaged over a calendar year, at the Moolarben mine complex.

This condition does not apply to blasts that generate ground vibration of 0.5 mm/s or less at any residence on privately-owned land, blast misfires or blasts required to ensure the safety of the mine or its workers.

Note: For the purposes of this condition, a blast refers to a single blast event, which may involve a number of individual blasts fired in quick succession in a discrete area of the mine.

Property Inspections

12. If the Proponent receives a written request from the owner of any privately-owned land within 2 kilometres of any approved open cut mining pit on site for a property inspection to establish the baseline condition of any buildings and/or structures on his/her land, or to have a previous property inspection updated, then within 2 months of receiving this request the Proponent shall:
- commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to:
 - establish the baseline condition of any buildings and other structures on the land, or update the previous property inspection report; and
 - identify measures that should be implemented to minimise the potential blasting impacts of the project on these buildings and/or structures; and
 - give the landowner a copy of the new or updated property inspection report.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the property inspection report, either party may refer the matter to the Secretary for resolution.

Property Investigations

13. If the owner of any privately-owned land claims that buildings and/or structures on his/her land have been damaged as a result of blasting on the site, then within 2 months of receiving this claim the Proponent shall:
- commission a suitably qualified, experienced and independent person, whose appointment is acceptable to both parties to investigate the claim; and
 - give the landowner a copy of the property investigation report.

If this independent property investigation confirms the landowner's claim, and both parties agree with these findings, then the Proponent shall repair the damage to the satisfaction of the Secretary.

If there is a dispute over the selection of the suitably qualified, experienced and independent person, or the Proponent or the landowner disagrees with the findings of the independent property investigation, then either party may refer the matter to the Secretary for resolution.

Operating Conditions

14. The Proponent shall:
- implement best management practice to:
 - protect the safety of people and livestock in the surrounding area;
 - protect public or private infrastructure/property in the surrounding area from any damage; and
 - minimise the dust and fume emissions of any blasting;
 - ensure that blasting on the site does not damage Aboriginal rock shelter sites S2MC229 (AHIMS No. 36-3-1376), S2MC232 (AHIMS No. 36-3-1379) or S2MC233 (AHIMS No. 36-3-1380);
 - operate a suitable system to enable the public to get up-to-date information on the proposed blasting Schedule on site; and
 - co-ordinate the timing of blasting on site with the timing of blasting at the Ulan and Wilpinjong mines to minimise cumulative blasting impacts, to the satisfaction of the Secretary.

Note: To identify the Aboriginal rock shelter sites, see the applicable figure in Appendix 8.

15. The Proponent shall not undertake blasting on site within 500 metres of:
- any public road;
 - the Gulgong to Sandy Hollow Railway Line;
 - the Wollar-Wellington 330kV Transmission Line; or
 - any land outside the site not owned by the Proponent,

unless the Proponent has:

- demonstrated to the satisfaction of the Secretary that the blasting can be carried out closer to the infrastructure or land without compromising the safety of people or livestock or damaging the infrastructure and/or other buildings and structures; and
- updated the Blast Management Plan to include the specific measures that would be implemented while blasting is being carried out within 500 metres of the infrastructure or land; or
- a written agreement with the relevant infrastructure owner or landowner to allow blasting to be carried out closer to the infrastructure or land, and the Proponent has advised the Department in writing of the terms of this agreement.

Blast Management Plan

16. The Proponent shall prepare and implement a Blast Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to conducting any blasting on site;
 - describe the measures that would be implemented to ensure compliance with the blast criteria and operating conditions of this approval;
 - propose and justify any alternative ground vibration limits for public infrastructure in the vicinity of the site (if relevant); and
 - include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions of this approval.

AIR QUALITY

Odour

17. The Proponent shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.

Air Quality Criteria

18. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 8, 9 and 10 at any residence on privately-owned land.

Table 8: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 9: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	^d Criterion
Particulate matter < 10 µm (PM ₁₀)	24 hour	^a 50 µg/m ³

Table 10: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 8-10:

^a Total impact (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

^b Incremental impact (i.e. incremental increase in concentrations due to the complex on its own);

^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and

^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.

Mine-owned Land

19. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the Moolarben mine complex do not cause exceedances of the criteria listed in Tables 11, 12 and 13 at any occupied residence on mine-owned land (including land owned by another mining company) unless:
- the tenant and landowner (if the residence is owned by another mining company) have been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 5 of this approval;
 - the tenant of any land owned by the Proponent can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice;
 - air mitigation measures such as air filters, a first flush roof water drainage system and/or air conditioning) are installed at the residence, if requested by the tenant or landowner (if the residence is owned by another mining company);

- (d) air quality monitoring is regularly undertaken to inform the tenant or landowner (if the residence is owned by another mining company) of the actual particulate emissions at the residence; and
 - (e) data from this monitoring is presented to the tenant and landowner in an appropriate format for a medical practitioner to assist the tenant and landowner in making informed decisions on the health risks associated with occupying the property,
- to the satisfaction of the Secretary.

Air Quality Acquisition Criteria

20. If particulate matter emissions generated by the Moolarben mine complex exceed the incremental criteria, or contribute an exceedance of the relevant cumulative criteria, in Tables 11, 12 and 13 at any residence on privately-owned land or on more than 25% of any privately-owned land (and a dwelling could be built on that land under existing planning controls), then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in conditions 5 and 6 of Schedule 5.

Table 11: Long term land acquisition criteria for particulate matter

Pollutant	Averaging period	^d Criterion
Total suspended particulate (TSP) matter	Annual	^a 90 µg/m ³
Particulate matter < 10 µm (PM ₁₀)	Annual	^a 30 µg/m ³

Table 12: Short term land acquisition criteria for particulate matter

Pollutant	Averaging period	^d Criterion	Basis
Particulate matter < 10 µm (PM ₁₀)	24 hour	^b 50 µg/m ³	Increment ^d

Table 13: Long term land acquisition criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
^c Deposited dust	Annual	^b 2 g/m ² /month	^a 4 g/m ² /month

Notes to Tables 11-13:

^a Cumulative impact (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);

^b Incremental impact (i.e. incremental increase in concentrations due to the complex on its own);

^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method;

^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.

Operating Conditions

21. The Proponent shall:
- (a) implement best management practice to minimise the off-site odour, fume and dust emissions of the project;
 - (b) implement all reasonable and feasible measures to minimise the release of greenhouse gas emissions from the site;
 - (c) minimise any visible off-site air pollution generated by the project;
 - (d) minimise the surface disturbance of the site;
 - (e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval;
 - (f) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note d above under Table 13); and
 - (g) co-ordinate the air quality management at the Moolarben mine complex with the air quality management at the Ulan and Wilpinjong mines to minimise cumulative air quality impacts,
- to the satisfaction of the Secretary.

Air Quality Management Plan

22. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with the EPA, and submitted to and approved by the Secretary prior to the commencement of any development on site;

- (b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this approval;
- (c) describe the air quality management system;
- (d) include an air quality monitoring program that:
 - uses a combination of real-time and supplementary monitors to evaluate the performance of the project against the air quality criteria in this approval;
 - adequately supports the air quality management system;
 - evaluates and reports on the:
 - the effectiveness of the air quality management system;
 - compliance with the air quality criteria;
 - compliance with the air quality operating conditions; and
 - defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.

ULAN PUBLIC SCHOOL

23. The Proponent shall consult with DEC and, if requested:
- a) implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or
 - b) on a reasonable basis relating to the adverse effect of noise and/or dust from the project, contribute to or meet reasonable costs toward relocating the school.

METEOROLOGICAL MONITORING

24. For the life of the project, the Proponent shall ensure that there is a meteorological station in the vicinity of the site that:
- (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
 - (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the *NSW Industrial Noise Policy*, unless a suitable alternative is approved by the Secretary following consultation with the EPA.

WATER

Water Supply

25. The Proponent shall ensure that:
- (a) it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations on site to match its available water supply; and
 - (b) any water supply constraints do not compromise any aspect of the environmental performance of the mine.

Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain the necessary water licences for the project.

Compensatory Water Supply

26. The Proponent shall provide a compensatory water supply to any landowner of privately owned land whose water supply is adversely and directly impacted (other than an impact that is negligible) as a result of the project, in consultation with NOW, and to the satisfaction of the Secretary.

The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent to the loss attributable to the project. Equivalent water supply should be provided (at least on an interim basis) within 24 hours of the loss being identified, unless otherwise agreed with the landowner.

If the Proponent and the landowner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

If the Proponent is unable to provide an alternative long-term supply of water, then the Proponent shall provide alternative compensation to the satisfaction of the Secretary.

Water Pollution

27. Unless an EPL authorises otherwise, the Proponent shall comply with section 120 of the POEO Act.

Water Management Performance Measures

28. The Proponent shall comply with the performance measures in Table 14 to the satisfaction of the Secretary.

Table 14: Water Management Performance Measures

Feature	Performance Measure
Water Management – General	<ul style="list-style-type: none"> • Minimise cumulative water impacts with the other mines in the region • Maximise water sharing with the other mines in the region • Minimise the use of clean water on site
The Drip	<ul style="list-style-type: none"> • Nil impact on the water supply to the Drip
Construction and operation of linear infrastructure	<ul style="list-style-type: none"> • Design, install and maintain erosion and sediment controls generally in accordance with the series <i>Managing Urban Stormwater: Soils and Construction</i> including Volume 1, Volume 2A – <i>Installation of Services</i> and Volume 2C – <i>Unsealed Roads</i> • Design, install and maintain the infrastructure within 40 m of watercourses generally in accordance with the <i>Guidelines for Controlled Activities on Waterfront Land (DPI 2007)</i>, or its latest version • Design, install and maintain creek crossings generally in accordance with the <i>Policy and Guidelines for Fish Friendly Waterway Crossings</i> (NSW Fisheries, 2003) and <i>Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings</i> (NSW Fisheries 2003), or their latest versions
Mine Sediment Dams	<ul style="list-style-type: none"> • Design, install and maintain the dams generally in accordance with the series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries</i>
Clean water diversion & storage infrastructure	<ul style="list-style-type: none"> • Design, install and maintain the clean water system to capture and convey the 100 year ARI flood • Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site
Mine water storages	<ul style="list-style-type: none"> • Mine water storage infrastructure is designed to store a 100 year ARI 72 hour storm event • On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams) are suitably lined to comply with a permeability standard of $< 1 \times 10^{-9}$ m/s
Tailings, acid forming and potentially acid forming materials	<ul style="list-style-type: none"> • In-pit emplacement, encapsulation or capping to prevent the migration of pollutants beyond the pit shell • Adequate freeboard within the pit void to minimise the risk of discharge to surface waters
Chemical and hydrocarbon storage	<ul style="list-style-type: none"> • Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standards
Murrumbidgee and Eastern Creek realignments	<ul style="list-style-type: none"> • Increase the overall length of the creek diversions and reduce the overall average bed slope compared to the existing creek alignments • Mimic the existing meandering plan form of the low flow channel • Include creek corridors which are designed to contain flood flows up to the 1 in 100 year ARI • Include low flow channels which are designed to contain a rainfall event of a 1 in 1 year ARI • Include riffle/drop structures that are designed for a 1 in 20 year ARI peak flow • Incorporate erosion control measures based on vegetation and engineering revetments • Incorporate persistent/permanent pools for aquatic habitat • Incorporate seepage control/flow loss measures

	through sections of the creek lines to be constructed over mine waste backfill • Revegetate with suitable native riparian vegetation species to restore aquatic biodiversity throughout the realignments
Aquatic and riparian ecosystem, including the relevant sections of Murragamba Creek, Eastern Creek and Wilpinjong Creek	• Maintain or improve baseline channel stability • Develop site-specific in-stream water quality objectives in accordance with ANZECC 2000 and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW</i> procedures (DECC 2006), or its latest version

Water Management Plan

29. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
- (a) be prepared in consultation with NOW and the EPA, by suitably qualified and experienced persons whose appointment has been approved by the Secretary;
 - (b) be submitted to the Secretary for approval prior to the commencement of any development on site;
 - (c) include reference to the National Water Quality Management Strategy;
 - (d) include detailed performance criteria and describe measure to ensure that the Proponent complies with the Water Management Performance Measures (see Table 14);
 - (e) in addition to the standard requirements for management plans (see condition 3 of Schedule 6), this plan must include a:
 - (i) Site Water Balance that:
 - includes details of:
 - sources and security of water supply, including contingency planning for future reporting periods;
 - water use and management on site, including details of water sharing between neighbouring mining operations;
 - reporting procedures, including the preparation of a site water balance for each calendar year;
 - describes the measures that would be implemented to:
 - minimise clean water use on site;
 - maximise water sharing with the other mines in the region;
 - (ii) Surface Water Management Plan, that includes:
 - detailed baseline data on water flows and quality in the waterbodies that could be affected by the project;
 - a detailed description of the water management system on site;
 - detailed plans, including design objectives and performance criteria, for the:
 - Murragamba and Eastern Creek realignments;
 - in-pit emplacement areas for tailings, acid forming and potentially acid forming materials;
 - final voids (see the Rehabilitation Objectives in Table 14);
 - detailed performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project:
 - the water management system;
 - downstream surface water quality;
 - downstream flooding impacts and
 - stream and riparian vegetation health for Moolarben Creek, Bora Creek, Murragamba Creek, Eastern Creek, Wilpinjong Creek and the Goulburn River;
 - a program to monitor and report on:
 - the effectiveness of the water management system; and
 - surface water flows and quality, stream and riparian vegetation health in the watercourses that could be affected by the project; and
 - downstream flooding impacts;
 - reporting procedures for the results of the monitoring program; and
 - a plan to respond to any exceedances of the performance criteria, and mitigate any adverse surface water impacts of the project;
 - (iii) Groundwater Management Plan, that includes:
 - detailed baseline data on groundwater levels, yield and quality in the region and privately-owned groundwater bores that could be affected by the project;
 - groundwater assessment criteria, including trigger levels for investigating any potentially adverse groundwater impacts;
 - a program to monitor and report on:
 - groundwater inflows to the underground and open cut mining operations;
 - the seepage/leachate from water storages, emplacements, backfilled voids and final voids;

- background changes in groundwater yield/quality against mine-induced changes;
 - the permeability, hydraulic gradient, flow direction and connectivity of the palaeochannel and flows within Wilpinjong Creek (requires 3 additional monitoring piezometers within the main trunk of the paleochannel between the open cut 4 boundary and Wilpinjong Creek);
 - impacts of the project on:
 - regional and local (including alluvial) aquifers;
 - groundwater supply of potentially affected landowners; and
 - groundwater dependent ecosystems (including the Drip) and riparian vegetation;
 - a program to validate the groundwater model for the project, and compare against monitoring results with modelled predictions; and
 - a plan to respond to any exceedances of the groundwater assessment criteria.
- (iv) a protocol that has been prepared in consultation with the owners of the Ulan and Wilpinjong mines to:
- minimise cumulative water quality impacts;
 - review opportunities of increased water sharing between these projects;
 - co-ordinate water quality monitoring programs as far as practicable;
 - undertake joint investigations/studies in relation to complaints/exceedances of trigger levels where cumulative impacts are considered likely; and
 - co-ordinate modelling programs for validation, re-calibration and re-running of groundwater models.

BIODIVERSITY

Biodiversity Offset Strategy

30. The Proponent shall implement the biodiversity offset strategy for the project summarised in Table 15 and shown conceptually in Appendix 7 to the satisfaction of the Secretary.

Table 15: Summary of the Biodiversity Offset Strategy

Area	Offset Type	Minimum Size hectares (ha)
Dun Dun East	Enhance existing vegetation: <ul style="list-style-type: none"> • 1368 ha of native vegetation • 408 ha of EEC Regenerate: <ul style="list-style-type: none"> • 380 ha of existing grassland to forest/woodland 	1776
Dun Dun West	Enhance existing vegetation: <ul style="list-style-type: none"> • 837 ha of native vegetation • 122 ha of EEC Regenerate: <ul style="list-style-type: none"> • 307 ha of existing grassland to forest/woodland 	959
Avisford 1	Enhance existing vegetation: <ul style="list-style-type: none"> • 300 ha of native vegetation • 102 ha of EEC Regenerate: <ul style="list-style-type: none"> • 7 ha of existing grassland to forest/woodland 	402
Avisford 2	Enhance existing vegetation: <ul style="list-style-type: none"> • 203 ha of native vegetation • 5 ha of EEC 	208
Ulan 18	Enhance existing vegetation: <ul style="list-style-type: none"> • 291 ha of native vegetation • 48 ha of EEC Regenerate: <ul style="list-style-type: none"> • 178 ha of existing grassland to forest/woodland 	339
Onsite Offset	Enhance existing vegetation: <ul style="list-style-type: none"> • 420 ha of native vegetation • 51 ha of EEC Regenerate: <ul style="list-style-type: none"> • 199 ha of existing grassland to forest/woodland 	471
Old Bobadeen	Enhance existing vegetation: <ul style="list-style-type: none"> • 90 ha of native vegetation • 400 ha of EEC Regenerate: <ul style="list-style-type: none"> • 409 ha of existing grassland to forest/woodland 	490
Libertus	Enhance existing vegetation: <ul style="list-style-type: none"> • 160 ha of native vegetation • 18 ha of EEC 	178

	Regenerate: • 22 ha of existing grassland to forest/woodland	
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Notes:

- To identify the areas referred to in Table 15, see the applicable figures in Appendix 7;
- The amount of native vegetation includes forest/woodland and grassland but excludes woodland and grassland EECs. The combined total of native vegetation and EEC on each property equates to the minimum size available as an offset;
- The amount of grassland available for regeneration includes sparsely vegetated woodland; and
- The strategy includes the regeneration of existing grassland areas within each offset to woodland communities.

Regeneration Areas

31. The Proponent shall ensure that the regeneration of vegetation within the specified areas of the biodiversity offset strategy is focused on the re-establishment of flora species typical of the White Box Yellow Box Blakely's Red Gum Woodland as defined under the TSC Act and White Box Yellow Box Blakely's Red Gum Grassy Woodland as defined under the EPBC Act.
32. The Proponent shall use its best endeavours to work with the CLD to identify and implement any reasonable and feasible regeneration of vegetation on Crown lands in the vicinity of Pyramul Creek immediately to the south of the 'Dun Dun East' biodiversity offset area.

Munghorn Gap Nature Reserve

33. The Proponent shall ensure that:
 - (a) the boundary of the project with the Munghorn Gap Nature Reserve is identified and surveyed prior to the commencement of open cut mining; and
 - (b) a 50 meter buffer zone is maintained between the open cut mining and the Munghorn Gap Nature Reserve during the life of the project.

Habitat for Threatened Fauna Species

34. The Proponent shall ensure that the biodiversity offset strategy provides suitable habitat for all the threatened fauna species confirmed and identified as being potentially present in the disturbance areas.

Note: The threatened fauna species confirmed and identified as being potentially present in the disturbance areas are listed in Appendix 7.

Regent Honeyeater Study

35. Within 6 months of the date of this approval, the Proponent shall calculate:
 - (a) the impacts generated by the project on the Regent Honeyeater in species credits; and
 - (b) the species credits that would be generated for the Regent Honeyeater from implementation of the offset strategy described in condition 30 above,
 in accordance with the *NSW Biodiversity Offset Policy for Major Projects*, and to the satisfaction of OEH.
36. If the calculations carried out in condition 35 above identify a shortfall of species credits to offset the impacts of the project, then within 24 months of the date of this approval, the Proponent shall satisfy the outstanding offset requirements to the satisfaction of OEH. This can be achieved by one or more of the following:
 - (a) acquiring or retiring credits under the Biobanking Scheme in the TSC Act;
 - (b) making payments into an offset fund that has been developed by the NSW Government; and/or
 - (c) providing supplementary measures.

Vegetation Information System Mapping Data

37. At the request of OEH, the Proponent shall provide OEH with detailed vegetation mapping and survey data associated with its lands to be conserved in perpetuity in accordance with this approval. This information is to be provided free of charge.

Long Term Security of Biodiversity Offsets

38. By 31 December 2015, unless the Secretary agrees otherwise, the Proponent shall make suitable arrangements to protect the offset areas in Table 15 in perpetuity, in consultation with OEH and to the satisfaction of the Secretary.

Note: The preferred mechanisms for the provision of long-term conservation security are via Biobanking Arrangements and additions to the OEH Estate.

Biodiversity Management Plan

39. The Proponent shall prepare and implement a Biodiversity Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared in consultation with OEH, and submitted to and approved by the Secretary prior to the commencement of any development on site;
 - describe the short, medium, and long term measures that would be implemented to:
 - manage the remnant vegetation and fauna habitat on the site; and
 - implement the biodiversity offset strategy;
 - integrate the implementation of the biodiversity offset strategy to the greatest extent practicable with the rehabilitation of the site;
 - include detailed performance and completion criteria for evaluating the performance of the biodiversity offset strategy, and triggering remedial action (if necessary);
 - include a detailed description of the measures that would be implemented over the next 3 years for:
 - enhancing the quality of existing vegetation and fauna habitat in the biodiversity offset areas;
 - creating native vegetation and fauna habitat in the biodiversity offset areas and rehabilitation area through focusing on assisted natural regeneration, targeted vegetation establishment and the introduction of naturally scarce fauna habitat features (where necessary);
 - maximising the salvage of resources within the approved disturbance area - including vegetative and soil resources – for beneficial reuse in the enhancement of the biodiversity offset areas or rehabilitation area;
 - collecting and propagating seed;
 - protecting vegetation and fauna habitat outside the approved disturbance area on-site;
 - minimising the impacts on fauna on site, including undertaking pre-clearance surveys;
 - managing any potential conflicts between the proposed enhancement works in the biodiversity offset strategy areas and any Aboriginal heritage values (both cultural and archaeological) in these areas;
 - managing salinity;
 - controlling weeds and feral pests;
 - controlling erosion;
 - managing grazing and agriculture on site;
 - controlling access; and
 - bushfire management;
 - include a seasonally-based program to monitor and report on the effectiveness of these measures, and progress against the detailed performance and completion criteria;
 - identify the potential risks to the successful implementation of the biodiversity offset strategy, and include a description of the contingency measures that would be implemented to mitigate against these risks; and
 - include details of who would be responsible for monitoring, reviewing, and implementing the plan.

Conservation Bond

40. By 31 December 2015, the Proponent shall lodge a Conservation Bond with the Department to ensure that the biodiversity offset strategy is implemented in accordance with the performance and completion criteria of the Biodiversity Management Plan. The sum of the bond shall be determined by:
- calculating the full cost of implementing the biodiversity offset strategy (other than land acquisition costs); and
 - employing a suitably qualified quantity surveyor to verify the calculated costs, to the satisfaction of the Secretary.

If the offset strategy is completed generally in accordance with the completion criteria in the Biodiversity Management Plan to the satisfaction of the Secretary, the Secretary will release the bond.

If the offset strategy is not completed generally in accordance with the completion criteria in the Biodiversity Management Plan, the Secretary will call in all, or part of, the conservation bond, and arrange for the satisfactory completion of the relevant works.

Notes:

- Alternative funding arrangements for long-term management of the Biodiversity Offset Strategy, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate can be used to reduce the liability of the conservation and biodiversity bond, and
- The sum of the bond may be reviewed in conjunction with any revision to the biodiversity offset strategy.

HERITAGE

Protection of Aboriginal Heritage Items

41. Unless otherwise authorised under the NP&W Act, the Proponent shall ensure that the project does not cause any direct or indirect impact on the identified Aboriginal heritage items located outside the approved disturbance area of the project.

Note: Identified Aboriginal heritage items are listed in Appendix 8.

Additional Survey

42. Prior to carrying out any development on site, unless the Secretary agrees otherwise, the Proponent shall:
- carry out additional archaeological survey work in the vicinity of the proposed Stage 2 ROM Coal Facilities and the northern section of the proposed Haul Road, in consultation with OEH and Aboriginal stakeholders;
 - undertake a detailed analysis of the significance of the heritage items that are identified during the survey; and
 - recommend measures to avoid and/or mitigate the impacts of the project on these heritage items,
- to the satisfaction of the Secretary.
43. Within 12 months of the date of this approval, unless the Secretary agrees otherwise, the Proponent shall carry out a detailed investigation into the Aboriginal cultural heritage values of the southern portion of the Dun Dun East biodiversity offset area (Lot 79, DP 704159), in the vicinity of Pyramul Creek, in consultation with OEH and Aboriginal stakeholders, and to the satisfaction of the Secretary.

Heritage Conservation Areas

44. The Proponent shall implement the heritage conservation strategy described in the EA, summarised in Table 16 and shown conceptually in Appendix 8, to the satisfaction of the Secretary.

Table 16: Summary of the Heritage Conservation Strategy

Area	Sites	Minimum Size hectares (ha)
Murrumbidgee Creek Management Area	40 sites - 5 of high significance, 6 of medium and 29 of low	154
Powers Conservation Area	10 sites – 1 of high significance, 2 of medium and 7 of low significance	63
Red Hills Conservation Area	42 sites – 2 of high significance, 9 of medium and 31 of low significance	107

Note: To identify the areas referred to in Table 16, see the applicable figures in Appendix 8.

Long Term Security of Heritage Conservation Areas

45. Within 18 months of approval of the Heritage Management Plan, unless the Secretary agrees otherwise, the Proponent shall make suitable arrangements to protect the heritage conservation areas in Table 16 in perpetuity to the satisfaction of the Secretary.

Notes:

- The location of the conservation areas are shown in the figure in Appendix 8.
- The protection of the Aboriginal heritage conservation area/s may be combined with the protection of the biodiversity offset areas required under condition 30 of this approval.

Heritage Management Plan

46. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary. This plan must:
- be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
 - be prepared in consultation with OEH and the Aboriginal stakeholders (in relation to the management of Aboriginal heritage values);
 - be submitted to and approved by the Secretary prior to construction, unless the Secretary agrees otherwise;
 - include a description of the measures that would be implemented for:

- managing the discovery of human remains or previously unidentified heritage items on site; and
 - ensuring any workers on site receive suitable heritage inductions prior to carrying out any development on site, and that suitable records are kept of these inductions;
- (e) include the following for the management of Aboriginal Heritage:
- a detailed plan of management for the Murragamba Creek, Red Hills and Powers conservation areas;
 - a description of the measures that would be implemented for:
 - protecting, monitoring and/or managing (including any proposed archaeological investigations and/or salvage measures) the heritage items identified in the tables in Appendix 8;
 - managing the discovery of previously unidentified Aboriginal items on site;
 - conserving the sites outside the surface disturbance area (see Appendix 8), including measures that would be implemented to secure, analyse and record the sites at risk of subsidence;
 - maintaining and managing reasonable access for Aboriginal stakeholders to heritage items on site and within any Aboriginal heritage conservation areas;
 - ongoing consultation with the Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage both on site and within any Aboriginal heritage conservation areas; and
 - a strategy for the storage of any heritage items salvaged on site, both during the project and in the long term;
- (f) include a detailed plan for the implementation of the mitigation and management measures outlined for the specified heritage items in Appendix 9, including archival recording, historical research and archaeological assessment prior to any disturbance.

TRANSPORT

Ulan Road Strategy

47. The Proponent shall:
- (a) work with Council and the owners of the Ulan and Wilpinjong mines to develop to a detailed plan for the implementation of the Ulan Road Strategy; and
 - (b) make financial contributions towards the implementation of this detailed plan, in accordance with the requirements in the plan, with its share of the mining companies' contribution for implementation of the strategy to be proportionate to its share of mining-related traffic to be generated on the road during the life of the strategy.

If there is any dispute between the various parties involved in either the development of the detailed plan or the implementation of the strategy, then any of the parties may refer the matter to the Secretary for resolution.

Ulan-Wollar Road Site Access

48. The Proponent shall design, construct, and maintain the site access intersection off Ulan-Wollar Road to the satisfaction of Council.

Cope Road Maintenance

49. The Proponent shall pay Council \$480,000 (in 2013 dollar value) for the maintenance of Cope Road. This payment must be:
- (a) made in 4 instalments of \$120,000 over the first four years of mining operations, with the first payment to be made on the commencement of mining operations on site;
 - (b) indexed in accordance with the CPI for the previous quarter.

VISUAL

50. The Proponent shall:
- (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project;
 - (b) ensure no fixed outdoor lights shine above the horizontal or above the building line or any illuminated structure;
 - (c) ensure no in-pit mobile lighting rigs shine above the pit wall and other mobile lighting rigs do not shine above the horizontal;
 - (d) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version;
 - (e) provide for the establishment of trees and shrubs and/or the construction of mounding or bunding to minimise visual and lighting impacts on the Proponent's land adjoining public roads with views of the site;
 - (f) ensure that the visual appearance of all buildings, structures, facilities or works (including paint colours and specifications) is aimed at blending as far as possible with the surrounding landscape,

to the satisfaction of the Secretary.

BUSHFIRE MANAGEMENT

51. The Proponent shall:
- ensure that the project is suitably equipped to respond to any fires on site; and
 - assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site.

WASTE

52. The Proponent shall:
- implement all reasonable and feasible measures to minimise the waste (including coal reject) generated by the project;
 - ensure that the waste generated by the project is appropriately stored, handled and disposed of; and
 - monitor and report on effectiveness of the waste minimisation and management measures in the Annual Review.

REHABILITATION

Rehabilitation Objectives

53. The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA (and depicted conceptually in the figures in Appendix 10), and comply with the objectives in Table 17.

Table 17: Rehabilitation Objectives

Feature	Objective
Mine site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting; Constructed landforms drain to the natural environment (excluding final voids); and Minimise visual impact of final landforms as far as is reasonable and feasible. Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems that is compatible with the conservation values of the adjacent Munghorn Gap Nature Reserve and Goulburn River National Park, that is comprised of: <ul style="list-style-type: none"> 1502 ha of open woodland including Grey Box – Narrow-leaved Ironbark shrubby woodland on hills of the Hunter Valley, North Coast and Sydney Basin; Scribbly Gum – Brown Bloodwood woodland of the southern Brigalow Belt South; Rough-barked Apple – Coast Banksia shrubby woodland on Warkworth Sands of the central Hunter Valley, Sydney Basin; and White Box Yellow Box Blakely's Red Gum Woodland (EEC); aquatic habitat areas (within the diverted creek lines and retained water features); habitat for threatened fauna species; and wildlife corridors.
Final Voids	<ul style="list-style-type: none"> Minimise the size and depth of final voids so far as is reasonable and feasible, subject to meeting the objectives below Minimise the drainage catchment of the final void so far as is reasonable and feasible; Negligible high wall instability risk; The size and depth of the final voids must be designed having regard to their function as long-term groundwater sinks, to ensure that groundwater flows across the back-filled pit towards the final void; and Minimise risk of flood interaction for all flood events up to and including the Probable Maximum Flood level.
Surface infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed, unless the Executive Director, Mineral Resources agrees otherwise.
Degraded riparian areas along Wilpinjong Creek and along Murrumbidgee and Eastern Creeks downstream of the mined areas to the boundary of the Wilpinjong	<ul style="list-style-type: none"> Restore channel stability; Restore riparian and aquatic ecosystem function; and Include compensatory aquatic habitat areas.

mine.	
Community	<ul style="list-style-type: none"> • Ensure public safety; and • Minimise adverse socio-economic effects associated with mine closure.

Progressive Rehabilitation

54. The Proponent shall rehabilitate the site progressively as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot be permanently rehabilitated.

Note: It is accepted that some parts of the site that are progressively rehabilitated may be subject to further disturbance at some later stage of the project.

Long Term Security of Rehabilitated Areas

55. Prior to relinquishing the mining lease that covers the site, unless the Secretary agrees otherwise, the Proponent shall make suitable arrangements to protect the rehabilitation areas with conservation value in perpetuity, in consultation with OEH and to the satisfaction of the Secretary.

Rehabilitation Management Plan

56. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of the Executive Director, Mineral Resources. This plan must:
- be prepared in consultation with the Department, NOW, OEH, Council and the CCC;
 - be submitted to and approved by the Executive Director, Mineral Resources prior to the commencement of any development on site under this approval, unless the Secretary agrees otherwise;
 - be prepared in accordance with any relevant DRE guideline;
 - provide for periodic review and updating of the rehabilitation plans and management strategies to ensure best practice landform design and establishment strategies are employed;
 - describe how the rehabilitation of the site would be integrated with the implementation the biodiversity offset strategy;
 - include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);
 - describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform, and final land use;
 - include interim rehabilitation where necessary to minimise the area exposed for dust generation;
 - include a program to monitor, independently audit and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and
 - build to the maximum extent practicable on the other management plans required under this approval.

SCHEDULE 4 ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING

SUBSIDENCE

Performance Measures – Natural and Heritage Features

- The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 18, to the satisfaction of the Secretary.

Table 18: Subsidence Impact Performance Measures

Water Resources	
Drainage Lines (DL1 – DL7)	No greater subsidence impacts or environmental consequences than predicted in the EA
Land	
Cliffs C7, C9 and C10	Negligible environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs or fracturing, that in total do not impact more than 0.5% of the total face of such cliffs within any longwall mining domain)
Other cliffs	No greater subsidence impacts or environmental consequences than predicted in the EA
Minor cliffs Rock face features Steep slopes	Minor environmental consequences (that is, occasional rockfalls, displacement of or dislodgment of boulders or slabs, or fracturing, that in total do not impact more than 5% of the total face area of each such type of feature within any longwall mining domain)
Biodiversity	
Threatened species, threatened populations, or endangered ecological communities	Negligible subsidence impacts or environmental consequences
Heritage Sites	
Aboriginal heritage site S2MC 236 (AHIMS No.s 36-3-0016 and 36-3-0134)	Negligible subsidence impacts or environmental consequences
Historic heritage sites	No greater subsidence impact or environmental consequences than predicted in the EA
Mine workings	
First workings under an approved Extraction Plan beneath any feature where performance measures in this table require negligible subsidence impacts or negligible environmental consequences	To remain long-term stable and non-subsiding
Second workings	To be carried out only in accordance with an approved Extraction Plan

Notes:

- The locations of the features referred to in Table 18 are shown in Appendix 4.
- The Proponent will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this approval.
- Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.
- The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of this approval.

Offsets

- If the Proponent exceeds the performance measures in Table 18 and the Secretary determines that:
 - it is not reasonable or feasible to remediate the impact or environmental consequence; or
 - remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;
 then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Performance Measures – Built Features

3. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 19, to the satisfaction of the Secretary.

Table 19: Subsidence Impact Performance Measures – Built Features

Key public infrastructure:	
Gulgong-Sandy Hollow Railway Line	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.
Other infrastructure:	
Murrumbidgee Road Low voltage electricity power line	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Telecommunication cable Fibre-optic cable Murrumbidgee Trig Station	Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Other built features and improvements, including fences	Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Public Safety	
Public safety	Negligible additional risk

Notes:

- The locations of the features referred to in Table 19 are shown in Appendix 4.
 - The Proponent will be required to define more detailed performance indicators for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 5 below).
 - Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.
 - The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.
 - Requirements under this condition may be met by measures undertaken in accordance with the Mine Subsidence Compensation Act 1961.
 - Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.
4. Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 19 is to be settled by the Secretary, following consultation with the Executive Director Mineral Resources. Any decision by the Secretary shall be final and not subject to further dispute resolution under this approval.

Extraction Plan

5. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each extraction plan must:
 - (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
 - (b) be approved by the Secretary before the Proponent carries out any of the second workings covered by the plan;
 - (c) include detailed plans of existing and proposed first and second workings and any associated surface development;
 - (d) include detailed performance indicators for each of the performance measures in Tables 18 and 19;
 - (e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;

- (f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 18 and 19, and manage or remediate any impacts and/or environmental consequences;
- (g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected public infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:
 - addresses in appropriate detail all items of key public infrastructure and other public infrastructure and all classes of other built features;
 - has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;
 - recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and
 - in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;
- (h) include a Water Management Plan, which has been prepared in consultation with EPA and NOW, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including:
 - surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;
 - a program to monitor and report stream flows, assess any changes resulting from subsidence impacts and remediate and improve stream stability;
 - a program to monitor and report groundwater inflows to underground workings;
 - a program to predict, manage and monitor impacts on groundwater bores on privately-owned land; and
- (i) include a Biodiversity Management Plan, which has been prepared in consultation with OEH, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities; and water dependent ecosystems;
- (j) include a Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;
- (k) include a Heritage Management Plan, which has been prepared in consultation with OEH and relevant stakeholders for both Aboriginal and historic heritage, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items, and reflects all requirements under conditions 41-46 of Schedule 3;
- (l) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety in the mining area;
- (m) include a Subsidence Monitoring Program, which has been prepared in consultation with DRE, to:
 - describe the on-going subsidence monitoring program;
 - provide data to assist with the management of the risks associated with subsidence;
 - validate the subsidence predictions;
 - analyse the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; and
 - inform the contingency plan and adaptive management process;
- (n) include a contingency plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 18 and 19, or where any such exceedance appears likely;
- (o) proposes appropriate revisions to the Rehabilitation Management Plan required under condition 56 of Schedule 3; and
- (p) include a program to collect sufficient baseline data for future Extraction Plans.

Note: To identify the longwall mining domains referred to in this condition, see Appendix 2.

6. The Proponent shall ensure that the management plans required under conditions 5(g)-(l) above include:
 - (a) an assessment of the potential environmental consequences of the Extraction Plan, incorporating any relevant information that has been obtained since this approval; and
 - (b) a detailed description of the measures that would be implemented to remediate predicted impacts.

First Workings

7. The Proponent may carry out first workings on site other than in accordance with an approved Extraction Plan, provided that DRE is satisfied that the first workings are designed to remain long-term stable and non-subsiding, except insofar as they may be impacted by approved second workings.

Payment of Reasonable Costs

8. The Proponent shall pay all reasonable costs incurred by the department to engage suitably qualified, experienced and independent experts to review the adequacy of any aspect of an Extraction Plan.

Gas Drainage

9. The Proponent shall implement all reasonable and feasible measures to minimise the greenhouse gas emissions from the underground mining operations to the satisfaction of the Secretary.
10. Prior to carrying out underground mining operations, the Proponent shall submit an updated Greenhouse Gas Minimisation Plan to the Secretary. This plan must:
 - (a) identify options for minimising greenhouse gas emissions from underground mining operations, with a particular focus on capturing and/or using these emissions;
 - (b) investigate the feasibility of implementing each option;
 - (c) propose the measures that would be implemented in the short to medium term on site; and
 - (d) include a research program to inform the continuous improvement of the greenhouse gas minimisation measures on site.

SCHEDULE 5 ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS/TENANTS

1. Within 1 month of the date of this approval, the Proponent shall:
 - (a) notify in writing the owners of:
 - any land listed in Table 1 and any residence or land exceeding the criteria in Tables 4 or 5 (respectively) of Schedule 3 that they have the right to require the Proponent to acquire their land at any stage during the project;
 - any residence on the land listed in Table 2 and any residence exceeding the criteria in Table 6 of Schedule 3 that they have the right to request the Proponent for additional noise mitigation measures to be installed at their residence at any stage during the project; and
 - any privately-owned land within 2 kilometres of the approved open cut mining pit/s that they are entitled to ask for an inspection to establish the baseline condition of any buildings or structures on their land, or to have a previous property inspection report updated;
 - (b) notify the tenants of any mine-owned land of their rights under this approval; and
 - (c) send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the owners and/or existing tenants of any land (including mine-owned land) where the predictions in the EA identify that dust emissions generated by the project are likely to be greater than the relevant air quality criteria in Schedule 3 at any time during the life of the project.
2. Prior to entering into any tenancy agreement for any land owned by the Proponent that is predicted to experience exceedances of the recommended dust and/or noise criteria, or for any of the land listed in Table 3 that is subsequently purchased by the Proponent, the Proponent shall:
 - (a) advise the prospective tenants of the potential health and amenity impacts associated with living on the land, and give them a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time); and
 - (b) advise the prospective tenants of the rights they would have under this approval, to the satisfaction of the Secretary.
3. As soon as practicable after obtaining monitoring results showing:
 - (a) an exceedance of any relevant criteria in Schedule 3, the Proponent shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the project is again complying with the relevant criteria; and
 - (b) an exceedance of the relevant air quality criteria in Schedule 3, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).

INDEPENDENT REVIEW

4. If an owner of privately-owned land considers the project to be exceeding the criteria in Schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.

If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision, the Proponent shall:

- (a) commission a suitably qualified, experienced and independent expert, whose appointment has been approved by the Secretary, to:
 - consult with the landowner to determine his/her concerns;
 - conduct monitoring to determine whether the project is complying with the relevant impact assessment criteria in Schedule 3; and
 - if the project is not complying with these criteria then:
 - determine if more than one mine is responsible for the exceedance, and if so the relative share of each mine regarding the impact on the land;
 - identify the measures that could be implemented to ensure compliance with the relevant criteria; and
- (b) give the Secretary and landowner a copy of the independent review.

LAND ACQUISITION

5. Within 3 months of receiving a written request from a landowner with acquisition rights, the Proponent shall make a binding written offer to the landowner based on:
 - (a) the current market value of the landowner's interest in the land at the date of this written request, as if the land was unaffected by the project, having regard to the:
 - existing and permissible use of the land, in accordance with the applicable planning instruments at the date of the written request; and
 - presence of improvements on the land and/or any approved building or structure which has been physically commenced at the date of the landowner's written request, and is due to be

completed subsequent to that date, but excluding any improvements that have resulted from the implementation of the additional noise mitigation measures in conditions 2 and 6 of Schedule 3;

- (b) the reasonable costs associated with:
- relocating within the Mid-Western Regional Council local government area, or to any other local government area determined by the Secretary; and
 - obtaining legal advice and expert advice for determining the acquisition price of the land, and the terms upon which it is to be acquired; and
- (c) reasonable compensation for any disturbance caused by the land acquisition process.

However, if at the end of this period, the Proponent and landowner cannot agree on the acquisition price of the land and/or the terms upon which the land is to be acquired, then either party may refer the matter to the Secretary for resolution.

Upon receiving such a request, the Secretary will request the President of the NSW Division of the Australian Property Institute to appoint a qualified independent valuer to:

- consider submissions from both parties;
- determine a fair and reasonable acquisition price for the land and/or the terms upon which the land is to be acquired, having regard to the matters referred to in paragraphs (a)-(c) above;
- prepare a detailed report setting out the reasons for any determination; and
- provide a copy of the report to both parties.

Within 14 days of receiving the independent valuer's report, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the independent valuer's determination.

However, if either party disputes the independent valuer's determination, then within 14 days of receiving the independent valuer's report, they may refer the matter to the Secretary for review. Any request for a review must be accompanied by a detailed report setting out the reasons why the party disputes the independent valuer's determination. Following consultation with the independent valuer and both parties, the Secretary will determine a fair and reasonable acquisition price for the land, having regard to the matters referred to in paragraphs (a)-(c) above, the independent valuer's report, the detailed report of the party that disputes the independent valuer's determination and any other relevant submissions.

Within 14 days of this determination, the Proponent shall make a binding written offer to the landowner to purchase the land at a price not less than the Secretary's determination.

If the landowner refuses to accept the Proponent's binding written offer under this condition within 6 months of the offer being made, then the Proponent's obligations to acquire the land shall cease, unless the Secretary determines otherwise.

6. The Proponent shall pay all reasonable costs associated with the land acquisition process described in condition 5 above, including the costs associated with obtaining Council approval for any plan of subdivision (where permissible), and registration of this plan at the Office of the Registrar-General.

SCHEDULE 6

ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:
 - (a) be submitted to the Secretary for approval prior to the commencement of any development on the site;
 - (b) provide the strategic framework for environmental management of the project;
 - (c) identify the statutory approvals that apply to the project;
 - (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
 - (e) describe the procedures that would be implemented to:
 - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
 - receive, handle, respond to, and record complaints;
 - resolve any disputes that may arise;
 - respond to any non-compliance;
 - respond to emergencies; and
 - (f) include:
 - copies of any strategies, plans and programs approved under the conditions of this approval; and
 - a clear plan depicting all the monitoring to be carried out in relation to the project.

Adaptive Management

2. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 & 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:

- (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- (c) implement remediation measures as directed by the Secretary, to the satisfaction of the Secretary.

Management Plan Requirements

3. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
 - (a) detailed baseline data;
 - (b) a description of:
 - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
 - any relevant limits or performance measures/criteria;
 - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the project or any management measures;
 - (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
 - (d) a program to monitor and report on the:
 - impacts and environmental performance of the project;
 - effectiveness of any management measures (see c above);
 - (e) a contingency plan to manage any unpredicted impacts and their consequences;
 - (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
 - (g) a protocol for managing and reporting any:
 - incidents;
 - complaints;
 - non-compliances with statutory requirements; and

- exceedances of the impact assessment criteria and/or performance criteria; and
- (h) a protocol for periodic review of the plan.

Annual Review

4. By the end of March each year, or as otherwise 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 current calendar 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:
 - relevant statutory requirements, limits or performance measures/criteria;
 - monitoring results of previous years; and
 - 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.

Revision of Strategies, Plans and Programs

5. Within 3 months of the submission of:
 - (a) the submission of annual review under condition 4 above;
 - (b) the submission of an incident report under condition 7 below;
 - (c) the submission of an audit under condition 9 below; or
 - (d) any modification to the conditions of this approval or MP 05_0117 (unless the conditions require otherwise),the Proponent shall review and, if necessary, revise the strategies, plans, and programs required under this approval to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the project.

Community Consultative Committee

6. The Proponent shall operate a Community Consultative Committee (CCC) for the Moolarben mine complex to the satisfaction of the Secretary. This CCC must be operated in general accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Projects* (Department of Planning, 2007, or its latest version), and be operating by the end of March 2015.

Notes:

- The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval; and
- The CCC should be comprised of an independent chair and appropriate representation from the Proponent, Council, recognised environmental groups and the local community.

REPORTING

Incident Reporting

7. The Proponent shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the project, the Proponent shall notify the Secretary and any other relevant agencies as soon as practicable after the Proponent becomes aware of the incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

8. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval.

AUDITING

9. By 31 December 2015, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
 - (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
 - (b) include consultation with the relevant agencies;
 - (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease (including any assessment, plan or program required under these approvals);
 - (d) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and
 - (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor, and include experts in noise, air quality, ecology, Aboriginal heritage and any other fields specified by the Secretary.

10. Within 3 months of commissioning this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

11. The Proponent shall:
 - (a) make the following information publicly available on its website:
 - the EA;
 - current statutory approvals for the project;
 - approved strategies, plans or programs required under the conditions of this approval;
 - a comprehensive summary of the monitoring results of the project, which have been reported in accordance with the various plans and programs approved under the conditions of this approval;
 - a complaints register, which is to be updated on a monthly basis;
 - minutes of CCC meetings;
 - the last five annual reviews;
 - any independent environmental audit, and the Proponent's response to the recommendations in any audit;
 - any other matter required by the Secretary; and
 - (b) keep this information up to date,
 - (c) investigate and report on reasonable and feasible measures to make predictive meteorological data and real time monitoring data publicly available on its website to the satisfaction of the Secretary.

**APPENDIX 1
SCHEDULE OF LAND**

Owner	Description		Parish	County	EA ID
Moolarben Coal Mines Pty. Ltd.	Pt Lot 218	DP 755442	Moolarben	Phillip	36
Moolarben Coal Mines Pty. Ltd.	Pt Lot 238	DP 755442	Moolarben	Phillip	36
Moolarben Coal Mines Pty. Ltd.	Pt Lot 107	DP 755454	Wilpinjong	Phillip	44
Moolarben Coal Mines Pty. Ltd.	Lot 90	DP 755454	Wilpinjong	Phillip	44
Moolarben Coal Mines Pty. Ltd.	Lot 85	DP 755454	Wilpinjong	Phillip	44
Moolarben Coal Mines Pty. Ltd.	Lot 86	DP 755454	Wilpinjong	Phillip	27
Moolarben Coal Mines Pty. Ltd.	Lot 3	DP 878678	Wilpinjong	Phillip	15
Moolarben Coal Mines Pty. Ltd.	Lot 44	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Pt Lot 193	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Lot 119	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Pt Lot 192	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Pt Lot 1	DP 803204	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Pt Lot 61	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Lot 95	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Pt Lot 36	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Pt Lot 37	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Lot 60	DP 755442	Moolarben	Phillip	5
Moolarben Coal Mines Pty. Ltd.	Lot 93	DP 755454	Wilpinjong	Phillip	134
Moolarben Coal Mines Pty. Ltd.	Lot 93	DP 755442	Moolarben	Phillip	134
Moolarben Coal Mines Pty. Ltd.	Pt Lot 229	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Pt Lot 228	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Pt Lot 110	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 223	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 234	DP 755442	Moolarben	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 96	DP 755454	Wilpinjong	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 112	DP 755454	Wilpinjong	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 113	DP 755454	Wilpinjong	Phillip	4
Moolarben Coal Mines Pty. Ltd.	Lot 2	DP 1023568	Wilpinjong	Phillip	3
Moolarben Coal Mines Pty. Ltd.	Lot 1	DP 1023568	Wilpinjong	Phillip	3
Moolarben Coal Mines Pty. Ltd.	Lot 105	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 91	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 99	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 42	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 41	DP 755454	Wilpinjong	Phillip	1

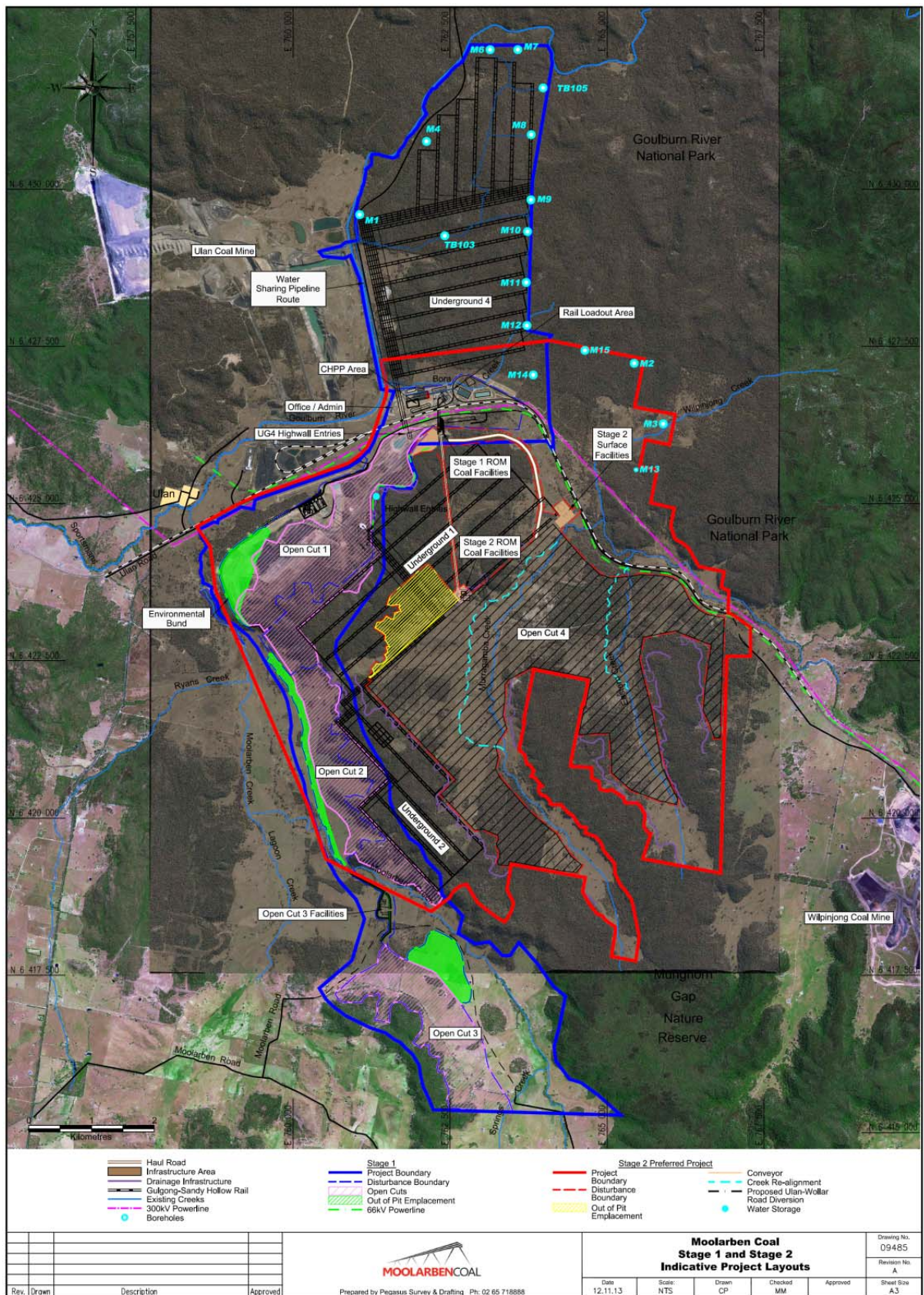
Moolarben Coal Mines Pty. Ltd.	Lot 7	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 92	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 97	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 82	DP 755454	Wilpinjong	Phillip	1
Moolarben Coal Mines Pty. Ltd.	Lot 61	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 33	DP 755454	Wilpinjong	Phillip	43
Moolarben Coal Mines Pty. Ltd.	Lot 2	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 36	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 53	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 8	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 62	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 4	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 34	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 57	DP 755454	Wilpinjong	Phillip	2
Moolarben Coal Mines Pty. Ltd.	Lot 262	DP 755442	Moolarben	Phillip	7
Moolarben Coal Mines Pty. Ltd.	Lot 32	DP 755454	Wilpinjong	Phillip	7
Moolarben Coal Mines Pty. Ltd.	Lot 1	DP 755454	Wilpinjong	Phillip	8
Moolarben Coal Mines Pty. Ltd.	Lot 58	DP 755454	Wilpinjong	Phillip	8
Moolarben Coal Mines Pty. Ltd.	Lot 21	DP 755454	Wilpinjong	Phillip	8
Moolarben Coal Mines Pty. Ltd.	Lot 76	DP 755454	Wilpinjong	Phillip	8
Moolarben Coal Mines Pty. Ltd.	Pt Lot 2	DP 1143354	Wilpinjong	Phillip	14
Moolarben Coal Mines Pty. Ltd.	Lot 11	DP 1152406	Wilpinjong/ Lennox	Phillip	46
Moolarben Coal Mines Pty. Ltd.	Lot 2	DP 878678	Wilpinjong	Phillip	13
Moolarben Coal Mines Pty. Ltd.	Lot 6	DP 878678	Wilpinjong	Phillip	18
Moolarben Coal Mines Pty. Ltd.	Lot 5	DP 878678	Moolarben/Wilpinjong	Phillip	17
Moolarben Coal Mines Pty. Ltd.	Lot 4	DP 878678	Wilpinjong	Phillip	16
Moolarben Coal Mines Pty. Ltd.	Lot 7	DP 878679	Wilpinjong	Phillip	19
Moolarben Coal Mines Pty. Ltd.	Lot1	DP 817487	Lennox	Phillip	71
Mid-Western Regional Council	Lot 16	DP 1140073	Lennox	Phillip	71
Mid-Western Regional Council	Lot 17	DP 1140073	Lennox	Phillip	71
Mid-Western Regional Council	Lot 20	DP 1140073	Lennox	Phillip	71
Ulan Coal Mines Ltd.	Lot 80	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 28	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 38	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 65	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 79	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 40	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 253	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 13	DP 1152406	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 18	DP 1140073	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 3	DP 722882	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 2	DP 722882	Lennox	Phillip	46

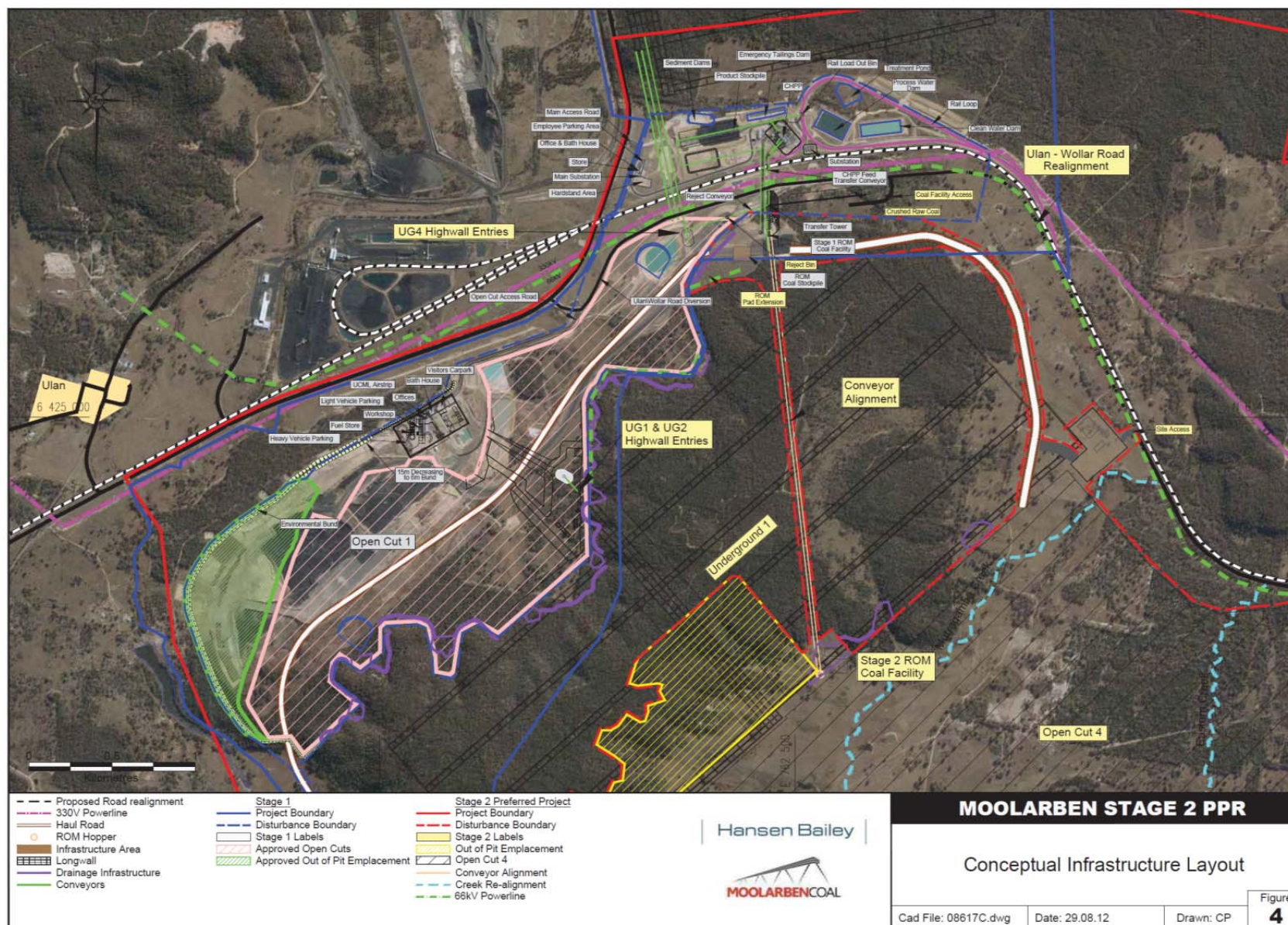
Ulan Coal Mines Ltd.	Pt Lot 50	DP 736630	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 14	DP 1152406	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 106	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 118	DP 724657	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 120	DP 724656	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 63	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 29	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 69	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 59	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 122	DP 724655	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 67	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 68	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 37	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 52	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 95	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 74	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 75	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 71	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 77	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 78	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 117	DP 705226	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 54	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 30	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 50	DP 755454	Wilpinjong	Phillip	46
Ulan Coal Mines Ltd.	Lot 253	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 14	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 178	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 179	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 277	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 242	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 91	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 7	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 272	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Lot 1	DP 1089166	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 1	DP 1099037	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 2	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 3	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 4	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 5	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 6	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 8	DP 206588	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 92	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 8	DP 755442	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 27	DP 755439	Lennox	Phillip	46
Ulan Coal Mines Ltd.	Lot 1	DP 722881	Moolarben	Phillip	46
Ulan Coal Mines Ltd.	Pt Lot 3	DP 115031	Moolarben	Phillip	46
Crown	Ulan-Wollar Road				
Crown	Murragamba Road				
Crown	Carrs Gap Road				
Crown	Ulan Road				
Crown	Lot 43	DP 755454	Wilpinjong	Phillip	38
	Vacant Crown Land				
Crown	Lot 44	DP 755454	Wilpinjong	Phillip	38
	Vacant Crown Land				
Crown	Lot 116	DP 705226	Wilpinjong	Phillip	38
	Reserve for Access				
Crown	Lot 119	DP 724657	Wilpinjong	Phillip	38
	Reserve for Access				
Crown	Lot 121	DP 724656	Wilpinjong	Phillip	38
	Reserve for Access				
Crown	Pt Lot 123	DP 724655	Wilpinjong	Phillip	38
	Reserve for Access				
Crown	Pt Lot 7010	DP 1025345	Moolarben	Phillip	38
	Vacant Crown Land				
Crown	Unidentified Crown Road No 7	(Refer Plan 0857C)	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road No 8	(Refer Plan 0857C)	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road No 9	(Refer Plan 0857C)	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road No 10	(Refer Plan 0857C)	Wilpinjong	Phillip	-

Crown	Unidentified Crown Road No 11	(Refer Plan 0857C)	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road No 12	(Refer Plan 0857C)	Wilpinjong	Phillip	-
Crown	Unidentified Crown Road No 13	(Refer Plan 0857C)	Wilpinjong	Phillip	-
State Rail Authority	Sandy Hollow Gulgong Railway				

APPENDIX 2 GENERAL LAYOUT OF PROJECT







APPENDIX 3 STATEMENT OF COMMITMENTS

Ref	Commitment
Mining Operations	
1.	MCM will operate the Stage 1 and Stage 2 projects as a combined mining complex (the MCC) to extract up to 17 Mtpa of ROM coal comprising: <ul style="list-style-type: none"> 13 Mtpa from combined open cut operations (with up to 8 Mtpa derived from Stage 1 OCs and up to 12 Mtpa from Stage 2 OC); and up to 4 Mtpa from underground operations, for 24 years, generally in accordance with the Stage 2 EA and PPR.
2.	MCM will ensure that open cut plant and equipment meet the sound power levels described in the noise impact assessment for the project, including specifying sound power levels and factory fitting of attenuation kits in relevant plant and equipment purchase contracts.
3.	MCM will obtain all necessary licences and approvals required to operate the Stage 2 project, generally in accordance with the Stage 2 EA and PPR.
Environmental Management	
4.	MCM will revise the Stage 1 Environmental Management System to incorporate the MCC Stage 2 project in consultation with relevant regulators and stakeholders (where appropriate). This may require revision or preparation of monitoring and management plans as prescribed by the Project Approval, such as (where relevant): <ul style="list-style-type: none"> Environmental Monitoring Program; Air Quality and Greenhouse Gas Management Plan (including energy savings actions); Spontaneous Combustion Management Plan; Noise Management Plan; Blast Management Plan; Water Management Plan (including groundwater and surface water); Creek and Aquatic Rehabilitation Plan; Rehabilitation Management Plan; Biodiversity Management Plan; Subsidence Management Plan; Aboriginal Cultural Heritage Management Plan; Non Aboriginal Heritage Management Plan; Erosion and Sediment Control Plan; Social Engagement and Issue Response Strategy; Bushfire Management Plan; and Waste Management Plan. (Note where applicable or appropriate some of these plans may be combined).
Air Quality	
5.	MCM will use its best endeavours to implement industry best practice air quality management initiatives to minimise the air quality impacts of the MCC.
6.	The revised MCC Air Quality Management Plan (and future variations) will include a validation exercise of the real time response triggers.

Ref	Commitment
7.	MCM will complete a review of particulate emission controls implemented at the MCC against industry best practice on a three yearly basis and report the findings in the relevant Annual Review.
8.	MCM will develop and implement meteorological criteria to help ensure that blasting is not undertaken under unfavourable wind and/or atmospheric conditions which would result in an exceedance of relevant criteria.
9.	Where air quality impacts are predicted to exceed criteria at private residences in the PPR due to MCC operations, MCM will install a first flush system to the rain water tanks upon written request of the landholder.
Greenhouse Gas	
10.	MCM will undertake regular revision of energy efficiency initiatives to ensure that Scope 1 greenhouse gas emissions per tonne of product coal are kept to the minimum practicable level.
Noise and Blasting	
11.	MCM will use its best endeavours to implement industry best practice noise control and management measures to minimise the noise impacts of the MCC.
12.	MCM will proactively manage its operations to ensure noise impacts are within the worst case predicted noise envelope.
13.	MCM will ensure noise monitoring is implemented to determine and manage the contribution to cumulative mine noise from the MCC at Property 258, including implementing at least quarterly attended noise monitoring and installing a directional noise monitor in the vicinity of the property in conjunction with the Ulan Mine, unless monitoring indicates there is no noise impact from the MCC at this property.
14.	MCM will work cooperatively with neighbouring mines to develop a blast monitoring system which is representative of the closest sensitive receivers to ensure compliance with the relevant blast criteria.
15.	The sound power of the conveyor used in the NIA will be provided to equipment manufacturers and suppliers to help ensure that the conveyor is maintained at these levels during operations
16.	MCM will continue to advise neighbours of blasting schedules upon request so that any concerns regarding blasting and impacts to pets and livestock can be managed by neighbours.
Water Resources	
17.	MCM will implement the water management and mitigation measures described in the PPR and subsequent supporting documents.
18.	<p>MCM will continue to monitor groundwater impacts on surrounding privately owned bores. In the event that it is demonstrated that water levels in existing landholder bores decline as a consequence of the MCC, leading to an adverse impact on groundwater supply, MCM will:</p> <ul style="list-style-type: none"> engage an appropriately qualified and experienced hydrogeologist to investigate the cause of the impact and recommend an appropriate action response plan; and provide an alternate interim water supply or commensurate compensation as agreed to with the landholder.
19.	MCM will develop a surface water monitoring program to quantify the streamflow and water quality characteristics within Murrumbidgee and Eastern Creeks for existing conditions prior to mining of the creek lines.
20.	MCM will manage rainfall run-off from MCC mine disturbed areas to prevent contamination of downstream water sources from sediment laden water, unless otherwise approved under a relevant Environment Protection Licence.

Ref	Commitment
21.	MCM will develop a six monthly water balance for MCC operations to assist in site water management and monitoring protocols. This will be reviewed on a regular basis to account for changing mine water inflows and water management infrastructure as mining progresses. The frequency of this review will be revised after Year 3 of Stage 2 operations to the approval of relevant regulators.
22.	Collated groundwater monitoring data will be reviewed annually to assess the impacts of the MCC on the groundwater environment and to compare observed impacts with those predicted from groundwater modelling.
23.	The groundwater monitoring program will be revised to include additional piezometers in alluvial areas, including palaeochannel areas, potentially affected by the MCC.
24.	A groundwater modelling post-audit and model re-calibration (where required) will be carried out 2 years (and 5 yearly thereafter) after commencing Stage 2 coal extraction. Should any groundwater review or post-audit indicate a significant variance from the model predictions, an appropriate response will be implemented in consultation with NOW and DP&I.
25.	MCM will acquire relevant licences under the <i>Water Act 1912</i> and <i>Water Management Act 2000</i> as required (or implement other such ameliorative measures as agreed with relevant regulators, such as return flows or other such reasonable and feasible mitigation measures to reduce the total direct and indirect water take of the MCC from alluvial and connected surface water sources).
26.	MCM will endeavour to implement an integrated monitoring program for the MCC, with UCML and Wilpinjong Coal Mine for data-sharing.
27.	MCM commits to realign and reconstruct the mined sections of Murragamba and Eastern creeks to meet geomorphological, hydraulic and ecological performance and completion criteria developed in consultation with relevant regulators.
28.	MCM will develop operational criteria for the realigned sections of Murragamba and Eastern creeks in consultation with relevant regulators and install diversions around the realigned sections of creek until such time as they become operational.
29.	As a part of its revised Water Management Plan, MCM will prioritise UCML surplus water for use within the MCC, to minimise the need for extraction from the Northern Borefield.
Ecology	
30.	MCM will implement the ecological management and mitigation measures described in the PPR and subsequent supporting documents.
31.	<p>MCM will establish the Biodiversity Offset Strategy as described in the PPR and subsequent supporting documents to initially maintain and ultimately improve ecological values.</p> <p>Where ownership or the controlling interest of any proposed offset property is not able to be held by MCM it will either provide an alternate property of equal biodiversity value as a replacement, or make other such alternate arrangements as agreed to with relevant regulators.</p> <p>Management of offset properties for conservation purposes will be described in a Rehabilitation Offset Management Plan (or equivalent).</p>
32.	MCM will implement appropriate security mechanisms to ensure that offset areas and rehabilitated areas (at the completion on mining) are protected in the long-term.
33.	MCM will continue to consult with OEH on the inclusion of relevant Moolarben owned properties into the existing Avisford Nature Reserve.
Aboriginal Archaeology and Cultural Heritage	
34.	The salvage and the protection of all known Aboriginal objects within the Project Boundary will be

Ref	Commitment
	<p>managed in accordance with the measures described in the PPR, subsequent supporting documents and an approved Aboriginal Cultural Heritage Management Plan for the MCC which has been prepared in consultation with local Aboriginal community stakeholders and the OEH.</p> <p>Prior to finalisation and approval of the Aboriginal Cultural Heritage Management Plan, the description of significance, development area, potential impacts, management strategies and current management status for all sites in the Stage 2 area will be reviewed by a suitably experienced and qualified archaeologist.</p>
35.	Site S2MC229 will be described as being a directly impacted site with a management strategy of 'detailed recording and surface collection, including closer inspection of the drip line' in the approved Aboriginal Cultural Heritage Management Plan.
36.	Unsurveyed areas such as the Powers Management Area will be assessed and managed in accordance with the procedures agreed to with local Aboriginal community stakeholders and approved in the Aboriginal Cultural Heritage Management Plan for the MCC.
37.	MCM will manage the Aboriginal conservation zones as outlined in the PPR and subsequent supporting documents in consultation with local Aboriginal community stakeholders.
Rehabilitation	
38.	<p>MCM will rehabilitate the Stage 2 project area to restore forest and woodland across the valley landscape, including rehabilitating 631 ha of currently degraded secondary grasslands.</p> <p>Areas of derived native grassland, secondary grassland and exotic grassland will be rehabilitated to treed landscapes.</p>
39.	MCM will implement best practice environmental management to progressively rehabilitate mined and degraded non-mined areas with a focus on the re-establishment of C/EEC Box Gum Woodland and threatened species habitat.
40.	The gradients of final landform slopes will be generally designed to be no more than 10 to 14 degrees. However, where the out-of-pit (OOP) emplacement area is spatially constrained the final gradients of these slopes will be limited to a maximum of 20 degrees, provided it is agreed to by the relevant regulators.
Traffic and Transport	
41.	Early morning and evening shift changes will be outside school bus service times, and where feasible will be offset from existing Ulan and Wilpinjong mine shift changes over time to minimise peak traffic loads on the road network.
42.	MCM will work with MRWC and Ulan and Wilpinjong coal mines to generally improve road safety and traffic management on the local road network.
Visual	
43.	Rehabilitation will be carried out on disturbed areas as soon as practical after disturbance with emphasis on bunding and the OOP emplacement area.
44.	Infrastructure lighting will be designed to control light spill with directional lighting in elevated and exposed areas and will utilise low intensity lights to the level necessary for operational and safety requirements to minimise adverse night lighting impacts.

Community	
45.	MCM will provide fair and reasonable community enhancement contributions for Stage 2 of the MCC to MWRC, which will augment the existing VPA for Stage 1.
46.	MCM will consult with the community, neighbouring industry and government authorities in relation to the MCC.
47.	MCM will employ appropriately qualified persons residing in the MWRC area where feasible. MCM will also provide traineeships for young people residing in the MWRC area.
Reporting	
48.	MCM will prepare an Annual Review (which summarises monitoring results and reviews performance) and distribute it to the relevant regulatory authorities and the MCM CCC.

APPENDIX 4 **UNDERGROUND MINE LAYOUT AND LOCATION OF** **SENSITIVE NATURAL AND MAN MADE FEATURES**

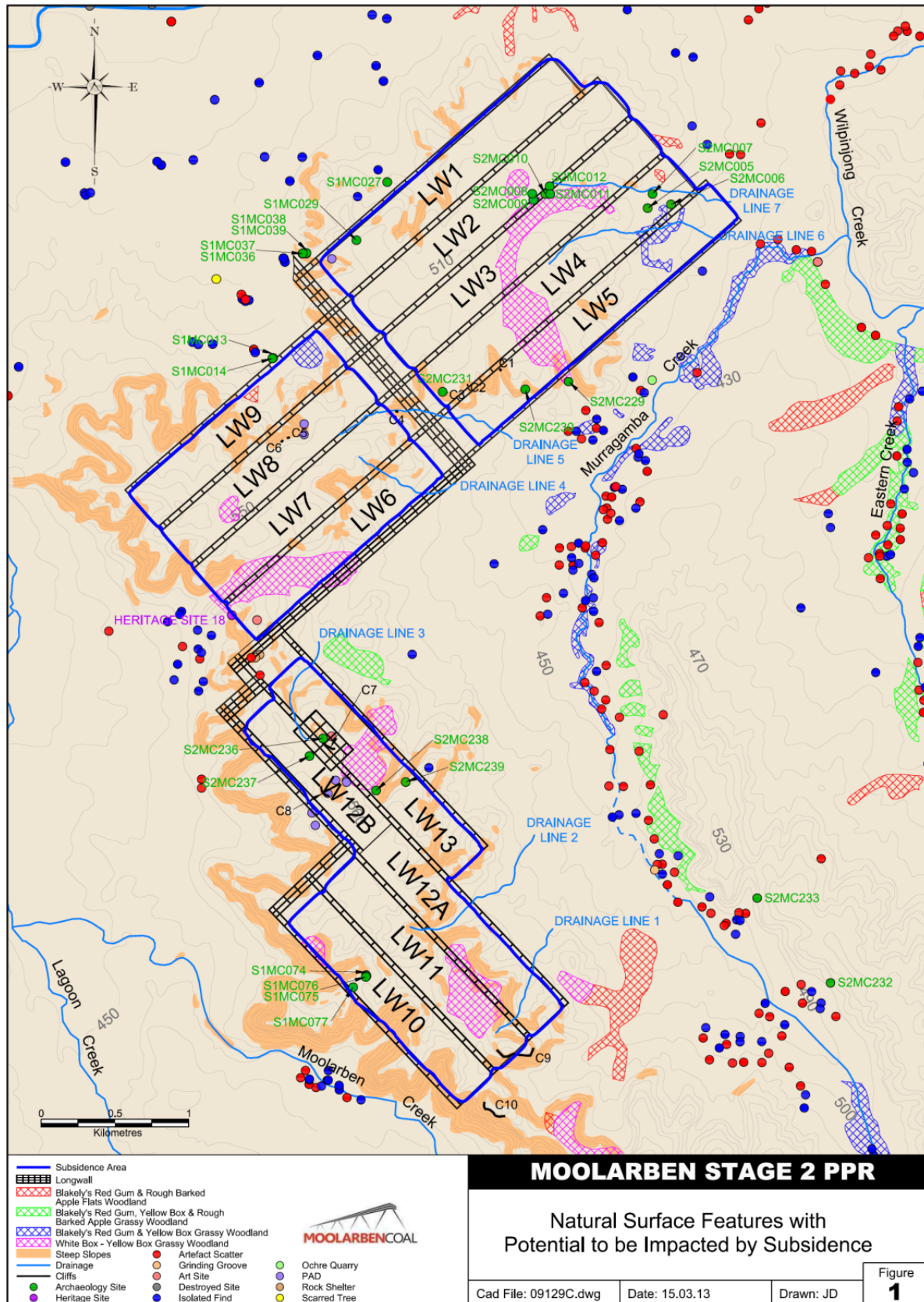


Figure 4.1

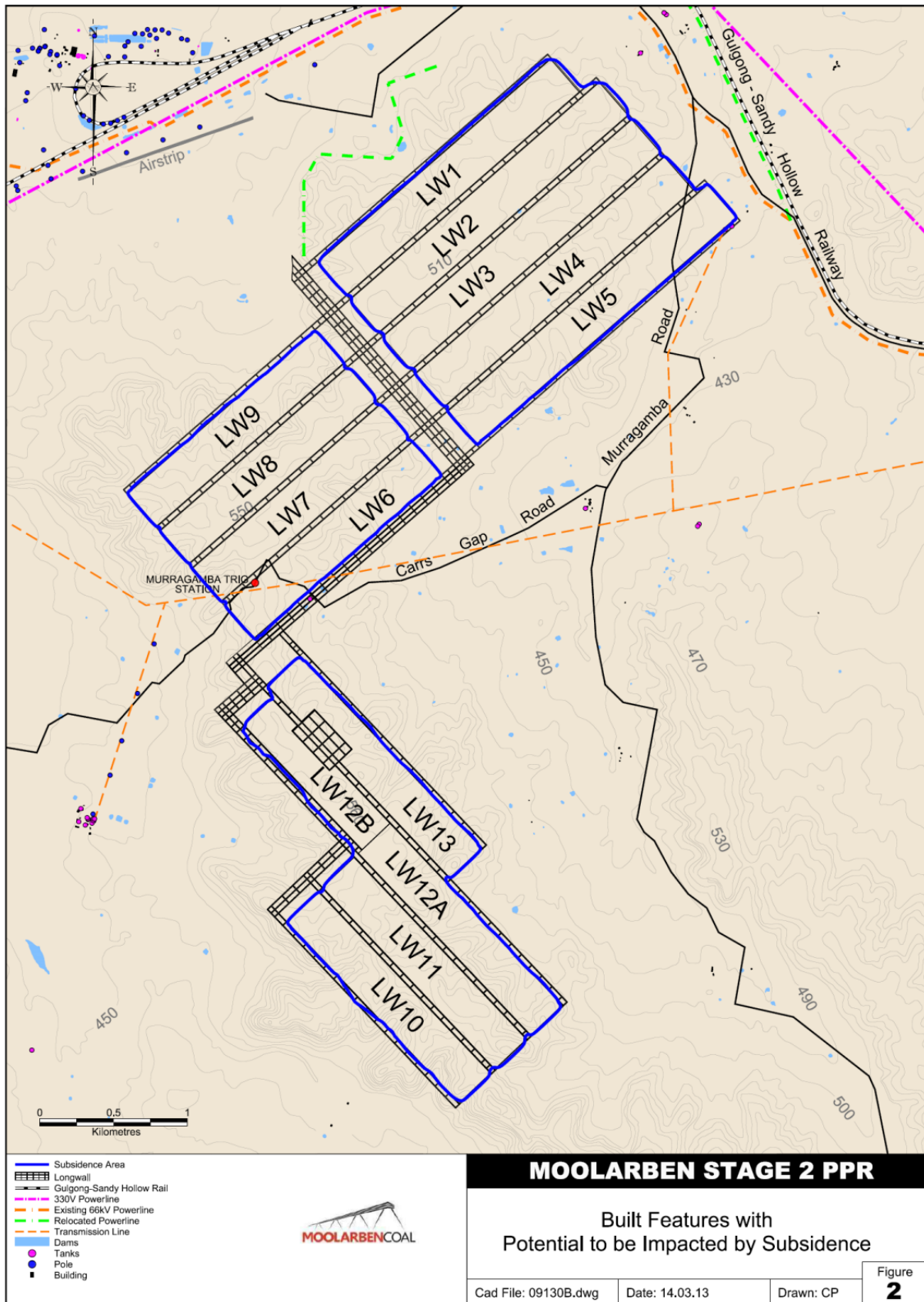


Figure 4.2

APPENDIX 5 PROPERTY NUMBERS AND LAND OWNERSHIP

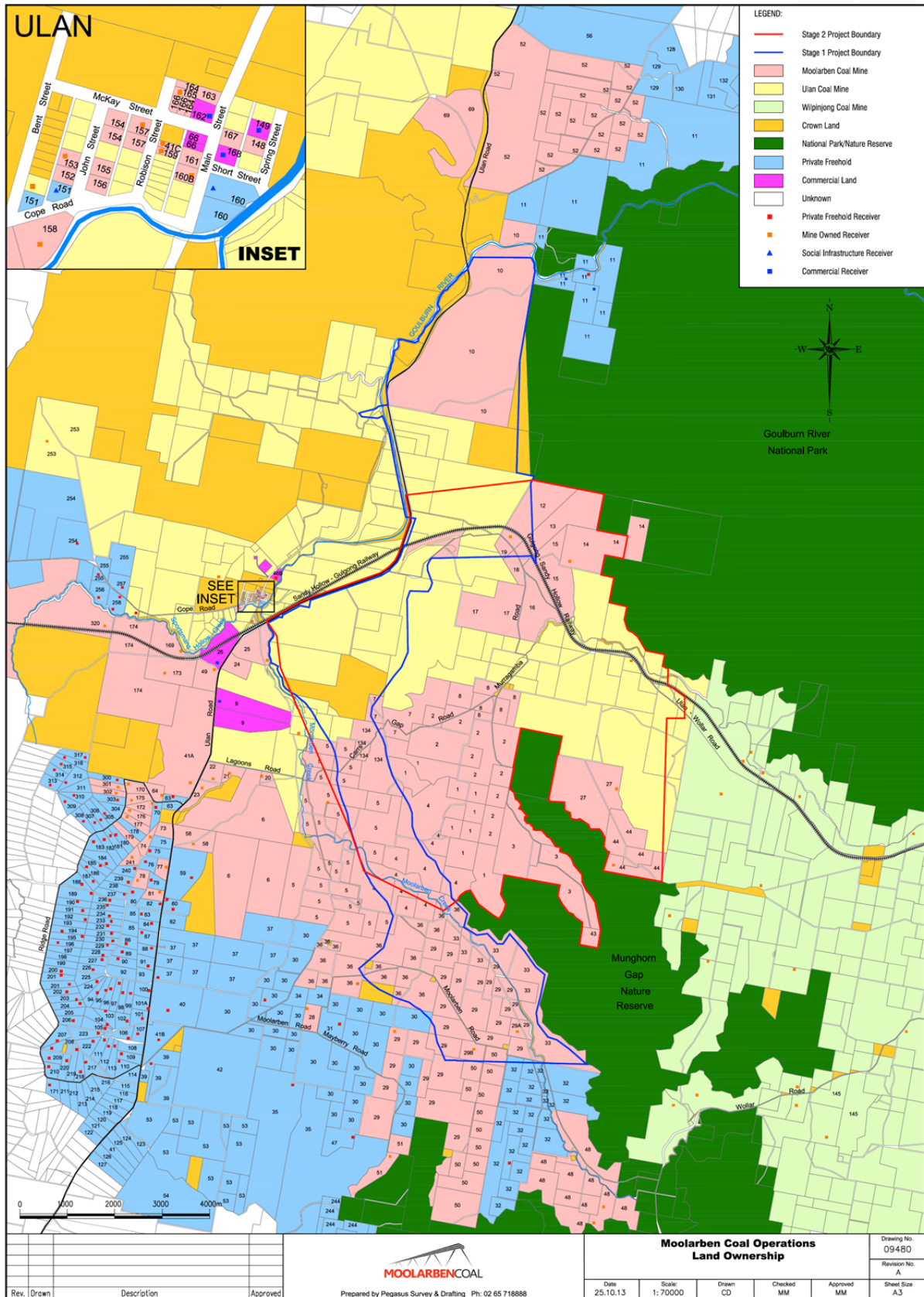


Figure 5.1

Table 5.1 Land Ownership

No.	NAME	No.	NAME	No.	NAME
1	Moolarben Coal Mine Owned/Controlled Land	82	S.C. Hungerford & M.C. Clemens	164	Moolarben Coal Mine Owned/Controlled Land
2	Moolarben Coal Mine Owned/Controlled Land	83	C.F. & C.R. Wall	165	Moolarben Coal Mine Owned/Controlled Land
3	Moolarben Coal Mine Owned/Controlled Land	84	D.S. Sebelic	166	Moolarben Coal Mine Owned/Controlled Land
4	Moolarben Coal Mine Owned/Controlled Land	85	J. & Z. Nikolovski	167	Moolarben Coal Mine Owned/Controlled Land
5	Moolarben Coal Mine Owned/Controlled Land	86	N.W. Harris	168	PJL Construction Complete Mining Services & Solutions P/L
6	Moolarben Coal Mine Owned/Controlled Land	87	B.J. & K. Howe	169	Moolarben Coal Mine Owned/Controlled Land
7	Moolarben Coal Mine Owned/Controlled Land	88	B.C. Meyers	170	Moolarben Coal Mine Owned/Controlled Land
8	Moolarben Coal Mine Owned/Controlled Land	89	M.V. & H.M. Glover & E. & B.J. Tomlinson	171	J.M. McGregor
9	I.C.I. Australia Operations	90	S.A. Powell	172	Moolarben Coal Mine Owned/Controlled Land
10a,b	Moolarben Coal Mine Owned/Controlled Land	91	H.M. Graham	173	Moolarben Coal Mine Owned/Controlled Land
11	J. Mullins & C. Imrie	92	V.A. Pulicino, J. Bonnici, S. Bonnici & G. Bonnici	174	Moolarben Coal Mine Owned/Controlled Land
12	Moolarben Coal Mine Owned/Controlled Land	93	F. & M. Fenech	175	Moolarben Coal Mine Owned/Controlled Land
13	Moolarben Coal Mine Owned/Controlled Land	94	L.K. Mittermayer	176	Moolarben Coal Mine Owned/Controlled Land
14a	Moolarben Coal Mine Owned/Controlled Land	95	B.J. Wittington	177	Moolarben Coal Mine Owned/Controlled Land
14b	The Minister for National Parks	96	D. Lazicic	178	P. Stone
15	Moolarben Coal Mine Owned/Controlled Land	97	D.J. & M.D. Smith	179	Moolarben Coal Mine Owned/Controlled Land
16	Moolarben Coal Mine Owned/Controlled Land	98	J.P. & M.E. Piper	180	C. & L. Barrett
17	Moolarben Coal Mine Owned/Controlled Land	99	D.E. Jenner & W.B. Jensen	181	S. Forster
18	Moolarben Coal Mine Owned/Controlled Land	100	O. & A. Kapista	182	J. Dutoitcook
19	Moolarben Coal Mine Owned/Controlled Land	101	R.D. & D.M.Z. Hull	183	R. & E. Steines
20	Moolarben Coal Mine Owned/Controlled Land	101a	P.J. Kearns	184	L. Stevenson
21	Moolarben Coal Mine Owned/Controlled Land	102	K.A. Roberts	185	L. Stevenson
22	Moolarben Coal Mine Owned/Controlled Land	103	S.B. Burnett & S.L. Grant	186	R. & I. Adamson
23	Moolarben Coal Mine Owned/Controlled Land	104	R.A. & L.A. Deeben	187	B. & K. Feeney
24	Moolarben Coal Mine Owned/Controlled Land	105	D.J. & N. Katsikaris	188	K. & T. Fielding
25	Moolarben Coal Mine Owned/Controlled Land	106	T.B. & J.H. Reid	189	M,M,D & A Goggin & J.A,P & R Hyde
26	Forty North Pty Limited	107	Z.J. & M. & A.A. Raso, B. Poplasen	190	T. & L. Sahyoun
27	Moolarben Coal Mine Owned/Controlled Land	108	R. Varga	191	B. & T. Lasham
28	Moolarben Coal Mine Owned/Controlled Land	109	D.A. & V.M. Evans	192	R. & J. Williams
29a,b	Moolarben Coal Mine Owned/Controlled Land	110	J.T. Thompson & H.T. Evans	193	D.J. Moloney
30	R. Cox	111	G.J. & N.J. McEwan	194	P. & K. Potts

No.	NAME	No.	NAME	No.	NAME
31	M. Cox	112	M.J. & L.M. Croft	195	R. Cottam
32	D. & J. Stokes	113	C.P.G. Ratcliff	196	F. Saxberg & F. Weir
33	Moolarben Coal Mine Owned/Controlled Land	114	T.F. & K. Holland	197	P. Gorm & I. Neilsen
34	J. Asztalos	115	A.K. & B.H. Ouinn	198	G.R. & M.E. Metcalfe
35	P. Johnson, M. & G. Thompson, P. & F. Debreczeny	116	D.J. & S.M. Reid	199	P. Gorm & I. Neilsen
36	Moolarben Coal Mine Owned/Controlled Land	117	J.M. Dick	200	V.K. Grimshaw
37	J. Szymkarczuk	118	A. Scott	201	K. & G. Towerton
38	State of NSW	119	P.J. Kearns	202	H. & V. Butler
39	R. & D. Sprigg	120	P.S. & D.R. Ord	203	D. Miller
40	J. Devenish	121	E.J. Cullen	204	R. & J. Donnan
41a,c	Moolarben Coal Mine Owned/Controlled Land	122	W.F. Wirth	205	D. Sparrow
41b	P. Libertis	123	N.D. Sullivan	206	C. Marshall & R.Vella
42	C. & L. Schmidt	124	W.J. & H.E. Bailey	207	A. & D. Smith
43	Moolarben Coal Mine Owned/Controlled Land	125	D.B. McBride	208	S. & C. Hasaart
44	Moolarben Coal Mine Owned/Controlled Land	126	M.P. Julian	209	F. Mawson
45	NSW Elec. Trans. Auth	127	B.K.T. & S.A. Bracken	210	J. & A. Tebbutt
46a,c,d,f,g	Ulan Coal Mines Ltd.	128	A. Sims	211	S. McGregor & W. Gray
46b	North Eastern Wiradjuri Wilpinjong Community Fund Limited	129	M. Yelds	212	E. & M. Lepik
47	S.F. & M.R. Andrews	130	G. McEwen	213	D. & J.Parsonage
48	Moolarben Coal Mine Owned/Controlled Land	131	G.R. & R.A. King	214	R. & E. O'Neil
49	Moolarben Coal Mine Owned/Controlled Land	132	N. Atkins	215	S. & P. Green
50	Moolarben Coal Mine Owned/Controlled Land	133	J.M. & T.E. Tynan	216	G. Holland & F. Handicott
51	Moolarben Coal Mine Owned/Controlled Land	134	Moolarben Coal Mine Owned/Controlled Land	217	R.P. & J.L. Patterson
52	Moolarben Coal Mine Owned/Controlled Land	136	Cumbo Land Pty Ltd	218	G. & G. Soady
53	W.D. & M.S. Bryant	137	Cumbo Land Pty Ltd	219	T. & S. Riger
54	M. A. & C. Harris	138	Cumbo Land Pty Ltd	220	S. Rusten & N. Smith
55	M.J. Cundy	139	Ulan Coal Mines Ltd.	221	State of NSW
56	M.J. & V Cundy	140	Cumbo Land Pty Ltd	222	B. Purtell
57	M.J. Cundy	141	Wilpinjong Coal Pty. Limited ¹⁴¹	223	E. Palmer & J. Stewart
58	Moolarben Coal Mine Owned/Controlled Land	142	Cumbo Land Pty Ltd	224	R. & P. Dupond
59	G. & G. M. Szymkarczuk	143	Cumbo Land Pty Ltd	225	G. & R.F. Doulates
60	C.L. Rayner & D.M. Munday	144	J.T. & Y.R Jones	226	L. & F. Muscat
61	M.A. Miller	145	Cumbo Land Pty Ltd	227	W. & J. Hughes
62	R. C. Menchin	146	Cumbo Land Pty Ltd	228	P. Libertis
63	B. F. & B. Whiticker	147	Cumbo Land Pty Ltd	229	J. & B. Lowe
64	Moolarben Coal Mine Owned/Controlled Land	148	Moolarben Coal Mine Owned/Controlled Land	230	D. Rawlinson & D. Hoole
65	Cumbo Land Pty Ltd	149	Mid Western Regional Council	231	T. Morrison & S. Benny
66	Rostherne Pty Ltd	150	Ulan Coal Mines Ltd	232	L. & J. Haaring
68	Cumbo Land Pty Ltd	151	A.I. Cunningham (Land entrusted to Catholic Church)	233	K. & D. Boal
69	Moolarben Coal Mine	152	Moolarben Coal Mine	234	D. & L. Gaw

No.	NAME	No.	NAME	No.	NAME
	Owned/Controlled Land		Owned/Controlled Land		
70	D.J. & A. Coventry	153	Moolarben Coal Mine Owned/Controlled Land	235	L. & R. Wilson
71	Council of the Shire of Mudgee	154	Moolarben Coal Mine Owned/Controlled Land	236	R. & C. Donovan
72	Ulan Electricity	155	Moolarben Coal Mine Owned/Controlled Land	237	A. Puskaric
73	Moolarben Coal Mine Owned/Controlled Land	156	Moolarben Coal Mine Owned/Controlled Land	238	B. Powell
74	Moolarben Coal Mine Owned/Controlled Land	157	Moolarben Coal Mine Owned/Controlled Land	239	J. Delarue
75	P. Ban	158	Moolarben Coal Mine Owned/Controlled Land	240	G.J. & D.M. Hartley
76	S.R & P.C Carbone	159	Moolarben Coal Mine Owned/Controlled Land	241	Moolarben Coal Mine Owned/Controlled Land
77	Moolarben Coal Mine Owned/Controlled Land	160	Minister for Education & Training	242	Mid Western Regional Council
78	Moolarben Coal Mine Owned/Controlled Land	160b	Moolarben Coal Mine Owned/Controlled Land	243	R.J. Hopper & T.H. Thompson
79	P. T.J. & S.E. Nagle	161	Moolarben Coal Mine Owned/Controlled Land	244	Y.R. Jones
80	W. & D.I. Sebelic	162	D.M. Harrison	245	M.P. & K.L.E. Cresham
81	Moolarben Coal Mine Owned/Controlled Land	163	Moolarben Coal Mine Owned/Controlled Land	246	A.W. & L.M. Murray
247	J. & H. & K. Batshon	258	P.M. & C.D. Elias	308	N.A. Dower
248	G. Boustani	259	State Rail Authority of NSW	309	G.S. Maher
249	C.J. & J.I. Eldridge	299	Country Energy	310	K.I. Death
250	G.C. Eldridge	300	C.M. Collins & C.Y. Marshall	311	B.J. & L.C. Williamson
251	N.F. Potter & C.E. Selley	301	Moolarben Coal Mine Owned/Controlled Land	312	M.S. & J.J. Ioannou
252	G.A. & R.M. Johnston	302	Moolarben Coal Mine Owned/Controlled Land	313	N.J. & B.D.E. Pracy
253	Ulan Coal Mines Ltd	303	H.J. Ungaro	314	S.L. Ford
254	Ulan Coal Mines Ltd	304	G. Balajan	315	W.J. Richards & B.J. Uzelac
255	H.J. & H. Schmitz	305	L. Barisic & M. Aul	316	C.R. Vassel & C.M. Williams
256	R.C. Campbell	306	E. Armstrong	317	R.J. Hore & V. Bingham
257	Ulan Coal Mines Ltd	307	M. Chant & N.K. Young	320	Moolarben Coal Mine Owned/Controlled Land

APPENDIX 6 NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 3 of the conditions are to apply under all meteorological conditions except the following:
 - (a) wind speeds greater than 3 m/s at 10 metres above ground level; or
 - (b) stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
 - (c) stability category G temperature inversion conditions.

Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station located on the site.

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this consent.
4. This monitoring must be carried out at least 12 times a year, unless the Secretary directs otherwise.
5. Unless the Secretary agrees otherwise, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
 - (d) monitoring locations for the collection of representative noise data;
 - (e) meteorological conditions during which collection of noise data is not appropriate;
 - (f) equipment used to collect noise data, and conformity with Australian Standards relevant to such equipment; and
 - (g) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 7 BIODIVERSITY OFFSET STRATEGY

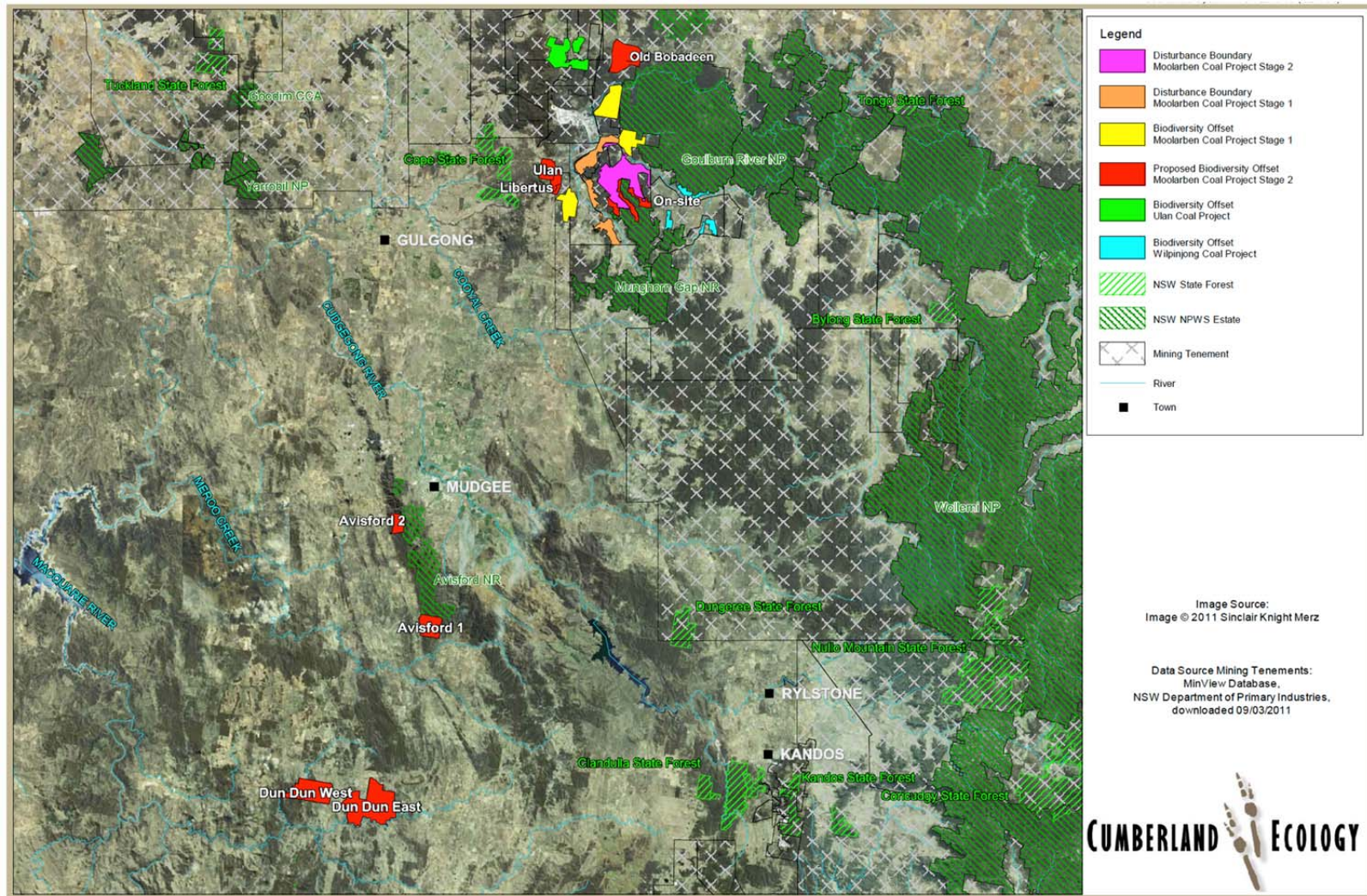


Figure 7.1

Table 7.1

**MOOLARBEN STAGE 2
ACTUAL & POTENTIAL THREATENED FAUNA SPECIES LIST**

#	Common Name	Scientific Name	TSC	EPBC
MAMMALS				
1	Yellow-bellied Sheath-tail Bat	<i>Scolaimus flaviventris</i>	V	
2	Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V
3	Little Pied Bat	<i>Chalinolobus picatus</i>	V	
4	Eastern Bent-wing Bat	<i>Miniopterus orinae/schreibersii</i>	V	
5	Greater Long-eared Bat	<i>Nyctophilus timoriensis</i>	V	V
6	Squirrel Glider	<i>Petaurus norfolcensis</i>	V	
7	Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	
8	Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	E	E
9	Eastern-false Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	
10	Eastern Freetail Bat	<i>Mormopterus norfolkensis</i>	V	
11	Yellow-bellied Glider	<i>Petaurus australis</i>	V	
12	Koala	<i>Phascolarctos cinereus</i>	V	
13	Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V
14	Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V	
15	Eastern Cave Bat	<i>Vespadelus troughtoni</i>	V	
BIRDS				
16	Square-tailed Kite	<i>Lophoicinia isua</i>	V	
17	Glossy Black Cockatoo	<i>Calyptorhynchus lathami</i>	V	
18	Gang Gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	
19	Powerful Owl	<i>Ninox strenua</i>	V	
20	White-throated Needle-tail	<i>Hirundapus caudacutus</i>		M
21	Rainbow Bee-eater	<i>Merops ornatus</i>		M
22	Brown Treecreeper	<i>Climacteris picumnus</i>	V	
23	Speckled Warbler	<i>Chthinicola sagittata</i>	V	
24	Black-chinned Honeyeater	<i>Melithreptus gularis</i>	V	
25	Painted Honeyeater	<i>Grantiella picta</i>	V	
26	Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	V	
27	Hooded Robin	<i>Melanodryas cucullata</i>	V	
28	Gilbert's Whistler	<i>Pachycephala inornata</i>	V	
29	Rufous Fantail	<i>Rhipidura fuliginosa</i>		M
30	Satin Flycatcher	<i>Myiagra cyanoleuca</i>		M
31	Diamond Firetail	<i>Stagonopleura guttata</i>	V	
32	Swift Parrot	<i>Lathamus discolor</i>	E	E, M
33	Little Eagle	<i>Hieraaetus morphnoides</i>	V	
34	Cattle Egret	<i>Ardea ibis</i>		M
35	Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	
36	Little Lorikeet	<i>Glossopsitta pusilla</i>	V	
37	White-fronted Chat	<i>Epthianura albifrons</i>	V	
38	Scarlet Robin	<i>Petroica boodang</i>	V	
39	Spotted Harrier	<i>Circus assimilis</i>	V	
40	Bush Stone Curlew	<i>Burhinus grallarius</i>	E	
41	Turquoise Parrot	<i>Neophema pulchella</i>	V	
42	Barking Owl	<i>Ninox connivens</i>	V	
43	Masked Owl	<i>Tyto novaehollandiae</i>	V	V
44	Regent Honeyeater	<i>Xanthomyza phrygia</i>	CE	E, M
45	Superb Parrot	<i>Polytelis swainsonii</i>	V	V
46	Flame Robin	<i>Petroica phoenicea</i>	V	

APPENDIX 8 ABORIGINAL HERITAGE

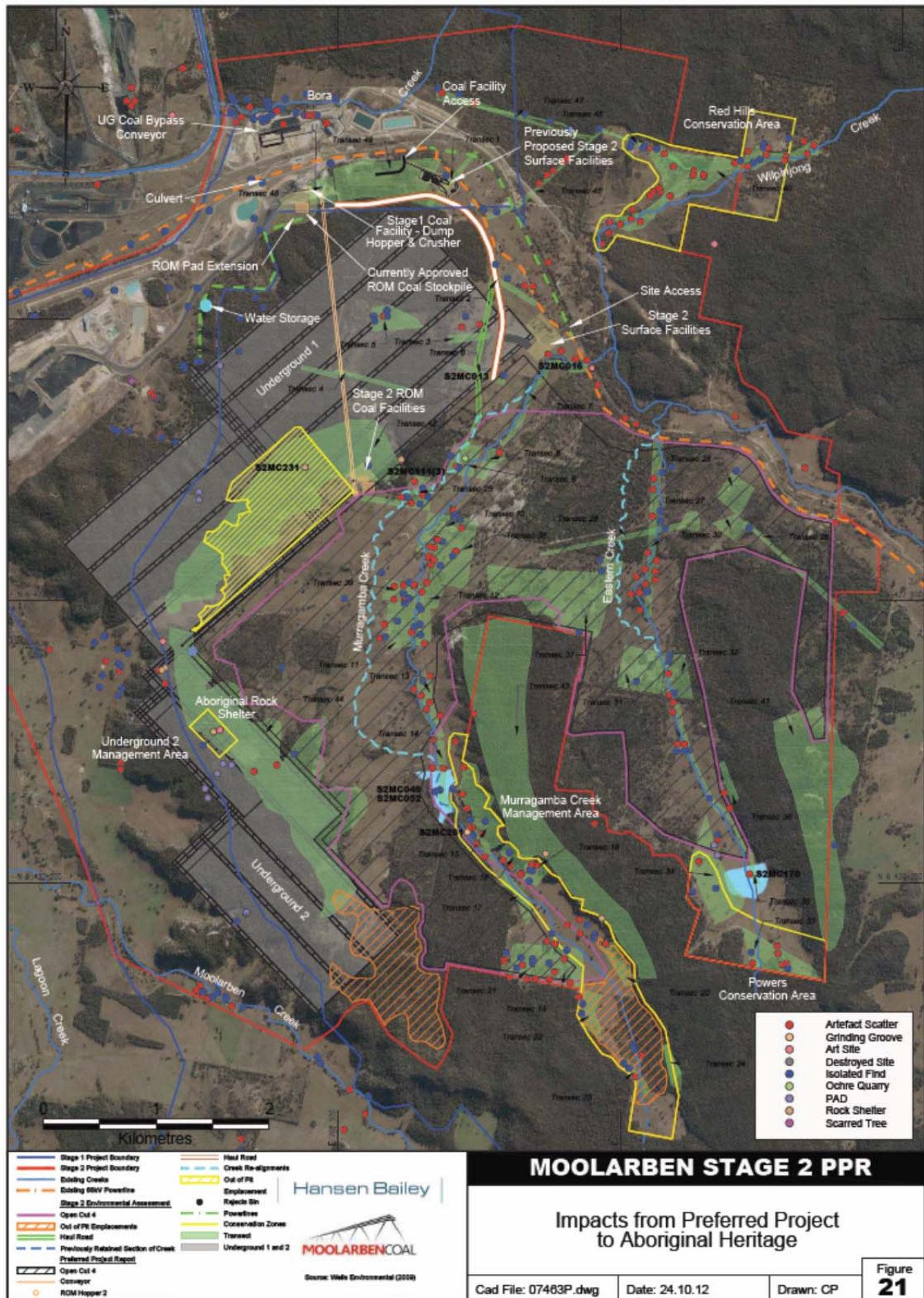


Figure 8.1

Table 8.1

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
36-3-0237†*	Artefact Scatter	14	Medium	Not Impacted	Recording and surface collection	No Change	Murrumbidgee Creek Conservation Area
36-3-0238†*	Artefact Scatter	6	Medium	OC4	Recording and surface collection	No Change	No Change
36-3-0239†*	Artefact Scatter	3	Medium	OC4	Recording and surface collection	No Change	No Change
36-3-0240†*	Isolated Find	1	Medium	OC4	Recording and surface collection	No Change	No Change
36-3-0241†*	Artefact Scatter	19	Medium	OC4	Recording and surface collection	No Change	No Change
36-30287^	Artefact Scatter	unknown	Medium	Not Impacted	Nil required	No Change	Removed reference to this site as 36-3-0720 is the same site with correct location
36-30720^	Artefact Scatter	unknown	Medium	Not Impacted	Not identified	In situ conservation – fence site	Murrumbidgee Creek Conservation Area
36-3-0337†*	Artefact Scatter	32	Medium	OC4	Recording and surface collection	No Change	No Change
PAD 1†§	Pad	N/A	Low	UG1	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 10†§	Pad	0	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 11†§	Pad	0	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 2†§	Pad	N/A	Low	UG1	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 3†§	Pad	N/A	Low	UG1	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 4†§	Pad	N/A	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 5†§	Pad	N/A	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 8†§	Pad	0	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
PAD 9†§	Pad	0	Low	UG2	Test excavation where monitoring indicates impacts are likely	No Change	No Change
S1MC 22	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S1MC 23	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change
S1MC027+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC029+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC040+	Artefact Scatter	12	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC041+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC042+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC043+	Artefact Scatter	9	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC044+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC045+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC046+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC047+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC048+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC049+	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S1MC054+	Artefact Scatter	3	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC055+	Rock Shelter & Artefact Scatter	8	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC056+	Rock Shelter & Artefact Scatter	1	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC057+	Artefact Scatter	16	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC058+	Artefact Scatter	10	Low	UG2	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC059+	Artefact Scatter	8	Low	UG2	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC060+	Artefact Scatter	12	Low	OC4	Recording and surface collection	No Change	No Change
S1MC061+	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC062+	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC063+	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC064+	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC065+	Isolated Find	1	Low	UG2	Nil required	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S1MC066†	Artefact Scatter	24	Low	UG2	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC067†	Artefact Scatter	52	Low	UG2	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S1MC068†	Isolated Find	1	Low	UG2	Nil required	No Change	No Change
S1MC069†	Isolated Find	1	Low	UG2	Nil required	No Change	No Change
S1MC074†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC075†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC076†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC077†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC130†	Artefact Scatter	23	Low	OC4	Recording and surface collection	No Change	No Change
S1MC131†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC136†	Artefact Scatter	5	Low	OC4	Surface collection	No Change	No Change
S1MC137†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC138†	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S1MC139†	Artefact Scatter	23	Low	OC4	Recording and surface collection	No Change	No Change
S1MC18	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change
S1MC19	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change
S1MC20	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change
S1MC21	Isolated Find	1	Low	In situ Conservation	In situ Conservation	No Change	No Change
S1MC274	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change
S1MC275	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S1MC276	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change
S1MC277	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change
S1MC278	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change
S1MC279	Isolated Find	1	Low	In situ Conservation	Site is currently undisturbed and will be conserved within the Bora Creek Riparian Conservation Area. Restricted access is being maintained by fencing, padlocks, signage and site communication protocols; including inductions.	No Change	No Change
S2MC 228	Artefact Scatter	2	Low	Not Impacted	Nil required	No Change	No Change
S2MC001	Isolated Find	1	Low	Infrastructure	Surface collection	No Change	No Change
S2MC002	Isolated Find	1	Low	Infrastructure	Surface collection	No Change	No Change
S2MC003	Artefact Scatter	5	Low	Not Impacted	Nil required	No Change	No Change
S2MC004	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC005	Artefact Scatter & PAD	2	Low	UG1	Surface collection and test excavation where monitoring indicates impacts are likely	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC006	Artefact Scatter & PAD	25	Medium	UG1	Site to be intensively recorded including test excavation and salvaged in accordance with the methodology to be included in the Aboriginal Heritage Management Plan	No Change	No Change
S2MC006*	Artefact Scatter & PAD	25	Medium	Infrastructure and UG1	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC007	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S2MC008	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S2MC009	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S2MC010	Artefact Scatter	3	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S2MC011	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S2MC012	Isolated Find	1	Low	UG1	Nil required	No Change	No Change
S2MC013	Isolated Find	1	Low	OC4	Nil required	Site to be intensively recorded and salvaged in accordance with the methodology to be included in the Aboriginal Heritage Management Plan	No Change
S2MC014	Artefact Scatter and PAD	16	Medium	Not Impacted	Nil required	No Change	No Change
S2MC015	Artefact Scatter and PAD	28	Medium	Not Impacted	Nil required	No Change	No Change
S2MC016	Artefact Scatter	2	Low	OC4	Nil required	Site to be intensively recorded and salvaged in accordance with the methodology to be included in the Aboriginal Heritage Management Plan	No Change
S2MC017	Artefact Scatter	27	Low	OC4	Recording and surface collection	No Change	No Change
S2MC018	Artefact Scatter and PAD	15	Medium	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC019	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC020	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC021	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC022	Artefact Scatter	6	Low	OC4	Recording and surface collection	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC023	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC024	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC025	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC029	Artefact Scatter	12	Low	OC4	Recording and surface collection	No Change	No Change
S2MC030	Artefact Scatter	58	Medium	OC4	Recording and surface collection	No Change	No Change
S2MC031	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC032	Artefact Scatter	8	Low	OC4	Recording and surface collection	No Change	No Change
S2MC033	Artefact Scatter	6	Low	OC4	Recording and surface collection	No Change	No Change
S2MC034	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC035	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC036	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC037	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC038	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC039	Artefact Scatter	9	Low	OC4	Surface collection	No Change	No Change
S2MC040	Artefact Scatter	12	Low	OC4	Recording and surface collection	No Change	No Change
S2MC041	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC042	Artefact Scatter	47	Low	OC4	Recording and surface collection	No Change	No Change
S2MC043	Artefact Scatter and PAD	152	High	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC044	Artefact Scatter	18	Low	OC4	Recording and surface collection	No Change	No Change
S2MC045	Artefact Scatter and PAD	16	Medium	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC046	Artefact Scatter and PAD	20	Medium	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC047	Artefact Scatter and PAD	5	Low	OC4	Recording, surface collection and test excavation	No Change	No Change
S2MC048	Artefact Scatter	17	Low	OC4	Recording and surface collection	No Change	No Change
S2MC049	Isolated Find	1	Low	Dam	Conservation of the site by protective fencing.	Surface collection	No Change
S2MC050	Artefact Scatter	68	Medium	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	No Change
S2MC051	Artefact Scatter and PAD	17	Medium	No Impact	Recording, surface collection, test excavation and salvage	No impact, no excavation or salvage required. Site to be fenced within 100 m of MCO activities	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC052	Isolated Find	1	Low	Dam	Conservation of the site by protective fencing.	Surface collection	No Change
S2MC053	Artefact Scatter	43	Low	OC4	Recording and surface collection	No Change	No Change
S2MC054	Artefact Scatter and PAD	85	High	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC055	Artefact Scatter	18	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC056	Artefact Scatter	110	Medium	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC057	Artefact Scatter	53	Medium	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC058	Artefact Scatter	98	Medium	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC059	Artefact Scatter	25	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC059a	Artefact Scatter	6	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC060	Isolated Find	1	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC061	Artefact Scatter	51	Medium	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC062	Artefact Scatter and PAD	67	High	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC063	Artefact Scatter and PAD	28	High	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC064	Artefact Scatter and PAD	627	High	No Impact	Recording, surface collection, test excavation and salvage	No impact, no excavation or salvage required. Site to be fenced within 100 m of MCO activities	Murrumbidgee Creek Conservation Area
S2MC065	Artefact Scatter	21	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC066	Isolated Find	1	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC067	Artefact Scatter	13	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC068	Isolated Find	1	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC069	Isolated Find	1	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC070	Artefact Scatter	3	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC071	Artefact Scatter	4	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	Murrumbidgee Creek Conservation Area
S2MC072	Artefact Scatter	4	Low	OC4	Surface collection	No Change	No change
S2MC073	Isolated Find	1	Low	No Impact	Surface collection	No impact, no excavation or salvage required. Site to be fenced within 100 m of MCO activities	Murrumbidgee Creek Conservation Area
S2MC074	Artefact Scatter	9	Low	OC4	Surface collection	No Change	No Change
S2MC075	Isolated Find	1	Low	No Impact	Surface collection	No impact, no excavation or salvage required. Site to be fenced within 100 m of MCO activities	Murrumbidgee Creek Conservation Area
S2MC076	Artefact Scatter	60	Medium	No Impact	Recording and surface collection	No impact, no excavation or salvage required. Site to be fenced within 100 m of MCO activities	No Change
S2MC077	Artefact Scatter	4	Low	OC4	Surface collection	No Change	No Change
S2MC078	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC079	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC080	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC081	Artefact Scatter	52	Medium	OC4	Recording and surface collection	No Change	No Change
S2MC082	Artefact Scatter	3	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC083	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Murrumbidgee Creek Conservation Area
S2MC084	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Murrumbidgee Creek Conservation Area
S2MC085	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Murrumbidgee Creek Conservation Area

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC086	Artefact Scatter and PAD	6	Low	Not Impacted	Nil required	No Change	Murrumbidgee Creek Conservation Area
S2MC087	Artefact Scatter	13	Low	No Impact	Recording and surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC088	Artefact Scatter	4	Low	No Impact	Surface collection	No impact, no collection required	No Change
S2MC089	Artefact Scatter	93	Medium	Not Impacted	Nil required	No Change	No Change
S2MC090	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC091	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC092	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC093	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC094	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC095	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC096	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC097	Artefact Scatter	7	Low	Not Impacted	Nil required	No Change	No Change
S2MC098	Isolated Find	1	Low	No Impact	Surface collection	No impact	Murrumbidgee Creek Conservation Area
S2MC099	Isolated Find	1	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC100	Artefact Scatter	4	Low	Not Impacted	Nil required	No Change	No Change
S2MC101	Artefact Scatter	9	Low	No Impact	Recording and surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC102	Isolated Find	1	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC103	Isolated Find	1	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC104	Artefact Scatter	8	Low	No Impact	Recording and surface collection	No impact, no excavation or salvage required	Murrumbidgee Creek Conservation Area
S2MC105	Isolated Find	1	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC106	Isolated Find	1	Low	No Impact	Surface collection	No impact, no collection required	Murrumbidgee Creek Conservation Area
S2MC107	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC108	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC109	Artefact Scatter	5	Low	OC4	Surface collection	No Change	No Change
S2MC110	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC111	Artefact Scatter	3	Low	OC4	Surface collection	Site to be intensively recorded and salvaged in accordance with the methodology to be included in the Aboriginal Heritage Management Plan	No Change
S2MC112	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC113	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC114	Artefact Scatter	4	Low	OC4	Surface collection	No Change	No Change
S2MC115	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC116	Artefact Scatter	2	Low	Not Impacted	Nil required	No Change	No Change
S2MC117	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC118	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC119	Artefact Scatter and PAD	14	Low	OC4	Recording, surface collection and test excavation	No Change	No Change
S2MC120	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC121	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC122	Artefact Scatter and PAD	33	Low	OC4	Recording, surface collection and test excavation	No Change	No Change
S2MC123	Artefact Scatter and PAD	255	High	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC124	Artefact Scatter and PAD	171	High	OC4	Recording, surface collection, test excavation and salvage	No Change	No Change
S2MC125	Artefact Scatter	30	Medium	OC4	Recording and surface collection	No Change	No Change
S2MC126	Artefact Scatter and PAD	7	Low	OC4	Recording, surface collection and test excavation	No Change	No Change
S2MC127	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC128	Artefact Scatter	5	Low	OC4	Surface collection	No Change	No Change
S2MC129	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC130	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC131	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC132	Artefact Scatter	10	Low	OC4	Recording and surface collection	No Change	No Change
S2MC133	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC134	Artefact Scatter	50	Low	OC4	Recording and surface collection	No Change	No Change
S2MC135	Artefact Scatter	4	Low	OC4	Surface collection	No Change	No Change
S2MC136	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC137	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC138	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC139	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC140	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC141	Artefact Scatter	6	Low	OC4	Recording and surface collection	No Change	No Change
S2MC142	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC143	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC144	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC145	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC146	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC147	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC148	Artefact Scatter	6	Low	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC149	Isolated Find	1	Low	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC150	Artefact Scatter	64	Medium	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC151	Grind Grooves / Artefact Scatter	17	High	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC152	Artefact Scatter	2	Low	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC153	Artefact Scatter	67	Low	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC154	Artefact Scatter and PAD	49	Medium	Not Impacted	Powers Conservation Area	No Change	Powers Conservation Area
S2MC155	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Powers Conservation Area
S2MC156	Artefact Scatter	12	Low	Not Impacted	Nil required	No Change	Powers Conservation Area
S2MC157	Artefact Scatter	5	Low	Not Impacted	Nil required	No Change	Powers Conservation Area
S2MC158	Isolated Find and PAD	1	Low	OC4	Surface collection and test excavation	No Change	No Change
S2MC159	Isolated Find and PAD	1	Low	OC4	Surface collection and test excavation	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC160	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC161	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC162	Artefact Scatter	26	Low	OC4	Recording and surface collection	No Change	No Change
S2MC163	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC164	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC165	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC166	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC167	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC168	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC169	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC170	Artefact Scatter	2	Low	Dam	Surface collection	No Change	No Change
S2MC171	Artefact Scatter	4	Low	OC4	Surface collection	No Change	No Change
S2MC172	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC173	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC174	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC175	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC176	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC177	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC178	Artefact Scatter	8	Low	OC4	Recording and surface collection	No Change	No Change
S2MC179	Artefact Scatter	8	Low	OC4	Recording and surface collection	No Change	No Change
S2MC180	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC181	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC182	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC183	Artefact Scatter	5	Low	OC4	Surface collection	No Change	No Change
S2MC184	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC185	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC186	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC187	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC188	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC189	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC190	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change
S2MC191	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC192	Isolated Find	1	Low	OC4	Surface collection	No Change	No Change

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC193	Artefact Scatter	2	Low	OC4	Surface collection	No Change	No Change
S2MC194	Artefact Scatter	3	Low	OC4	Surface collection	No Change	No Change
S2MC195	Artefact Scatter	3	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC196	Artefact Scatter	8	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC197	Artefact Scatter and PAD	13	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC198	Artefact Scatter	2	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC199	Artefact Scatter	7	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC200	Artefact Scatter and PAD	260	High	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC201	Artefact Scatter	360	Medium	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC202	Artefact Scatter	2	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC203	Artefact Scatter	20	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC204	Artefact Scatter	3	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC205	Artefact Scatter	2	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC206	Artefact Scatter	53	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC207	Artefact Scatter and PAD	112	High	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC208	Artefact Scatter and PAD	53	Medium	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC209	Artefact Scatter and PAD	89	Medium	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC210	Artefact Scatter	8	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC211	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC212	Artefact Scatter	2	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC213	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC214	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC215	Artefact Scatter	5	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC216	Artefact Scatter	91	Medium	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC217	Artefact Scatter	9	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC218	Artefact Scatter	50	Medium	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC219	Artefact Scatter	7	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC220	Artefact Scatter	15	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC221	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC222	Artefact Scatter	72	Medium	Not Impacted	Red Hills Conservation Area	No Change	Nil required

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC223	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC224	Isolated Find	1	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC225	Artefact Scatter	45	Low	Not Impacted	Red Hills Conservation Area	No Change	Nil required
S2MC226	Artefact Scatter and PAD	109	Medium	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC227	Artefact Scatter and PAD	62	Medium	Not Impacted	Red Hills Conservation Area	No Change	No Change
S2MC229	Rock-shelter	14	Low	UG1	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S2MC230	Isolated Find	1	Low	Stage 2 ROM Coal Facility	Nil required	No Change	No Change
S2MC231	Artefact Scatter / Sandstone Overhang	31	Low	Northern Out of Pit Emplacement Area	Record, surface collection and test excavation where monitoring indicates impacts are likely	Site to be intensively recorded including test excavation and salvaged in accordance with the methodology to be included in the Aboriginal Heritage Management Plan	No Change
S2MC232	Isolated Find / Rock Shelter	1	Low	Not Impacted	Nil required	No Change	Murrumbidgee Creek Conservation Area
S2MC233	Artefact Scatter / Rock Shelter	3	Low	Not Impacted	Nil required	No Change	No Change
S2MC234	Artefact Scatter	2	Low	Not Impacted	Nil required	No Change	No Change
S2MC236 36-30134*	Shelter / Artefacts / Rock Paintings	5	High	Not Impacted	Underground 2 Conservation Area	No Change	No Change
S2MC237	Isolated Find	1	Low	Not Impacted	Underground 2 Conservation Area	No Change	No Change
S2MC238	Artefact Scatter	104	High	UG2	Recording and surface collection where monitoring indicates impacts are likely	No Change	No Change
S2MC239	Artefact Scatter	3	Low	UG2	Surface collection where monitoring indicates impacts are likely	No Change	No Change
S2MC240	Artefact Scatter	7	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area
S2MC241	Artefact Scatter	4	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area
S2MC242	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area
S2MC243	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area

Site Name	Site Type	Artefact Density	Significance	Impact Status	Previously Proposed Management Measure	Preferred Project Management Measure	Final Management Measure
S2MC244	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area
S2MC245	Isolated Find	1	Low	Not Impacted	Nil required	No Change	Red Hills Conservation Area
S2MC246	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC247	Artefact Scatter	3	Low	Not Impacted	Nil required	No Change	No Change
S2MC248	Artefact Scatter	2	Low	Not Impacted	Nil required	No Change	No Change
S2MC249	Artefact Scatter	7	Low	Not Impacted	Nil required	No Change	No Change
S2MC250	Artefact Scatter and PAD	2	Medium	Not Impacted	Nil required	No Change	No Change
S2MC251	Artefact Scatter and PAD	12	Medium	Not Impacted	Nil required	No Change	No Change
S2MC252	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC253	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC254	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC255	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC256	Artefact Scatter	2	Low	Not Impacted	Nil required	No Change	No Change
S2MC257	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC258	Artefact Scatter	9	Medium	Not Impacted	Nil required	No Change	No Change
S2MC259	Isolated Find	1	Low	Not Impacted	Nil required	No Change	No Change
S2MC260	Isolated Find	1	Low	Infrastructure	Surface collection	No Change	Red Hills Conservation Area
S2MC059b	Isolated Find	1	Low	Not Impacted	Murrumbidgee Creek Conservation Area	No Change	No Change
S2MC261	Grinding Grooves	92	High	Not Impacted	Murrumbidgee Creek Conservation Area	Surveyed since the Stage 2 EA	Murrumbidgee Creek Conservation Area
S2MC262	Isolated Artefact	1	Low	Not Impacted	Not identified	Surveyed since the Stage 2 EA	Murrumbidgee Creek Conservation Area

^aSites 36-3-0287 and 36-3-0720 are the same site, having the same site cards; the information has been entered into AHIMS twice, with 36-3-0287 having an incorrect digit. The site card records the site as being an 'art site', but there are no details regarding the art. A site inspection indicated that there was no art in the vicinity. † Described in the Stage 1 EA. § Rock overhangs with a floor area of 1 x 2 m or greater are considered to be rock shelters and sites of potential archaeological deposits (PAD)

NSW Government
Department of Planning and Environment

Table 9.1

Item #	Item Name	Significance	Impact Status	Recommendation
8	Murrugamba School Site	Local – moderate	High - within Open Cut 4	Archival Record Archaeological Assessment
9	Farm Site	Local – high	High – within Open Cut 4	Historical Research Archival Record
11	Farm Site	Local – moderate	High - on boundary of Open Cut 4	Historical Research Archival Record Archaeological Assessment
18	Carr's Gap Road stone wall	Local – moderate	High - on boundary of Open Cut 4 and Underground 1	Historical Research Archival Record
35	House Site ⁵	Local – intrusive	High - on boundary of Open Cut 4	No further action
36a	House Site	Local – high	High - within Open Cut 4	Historical Research Archival Record Archaeological Assessment
36b	Burial	Local – high	High - within Open Cut 4	Historical Research Archival Record Archaeological Assessment
37	House Site	Local – moderate	High - within Open Cut 4	Historical Research Archival Record
55	Water Trough and Spring Fed Well	Not assessed, but noted as an item of interest	Low/nil - outside area of Open Cut 4 – possible indirect impact by draining of water	Archival Record
56	Water Trough and Spring Fed Well	Not assessed, but noted as an item of interest	Low/nil - outside area of Open Cut 4 – possible indirect impact by draining of water	Archival Record
57	Feed Trough	Not assessed, but noted as an item of interest	High – adjacent to road re-alignments	Historical Research Archival Record Ex situ Conservation

APPENDIX 10 REHABILITATION PLAN

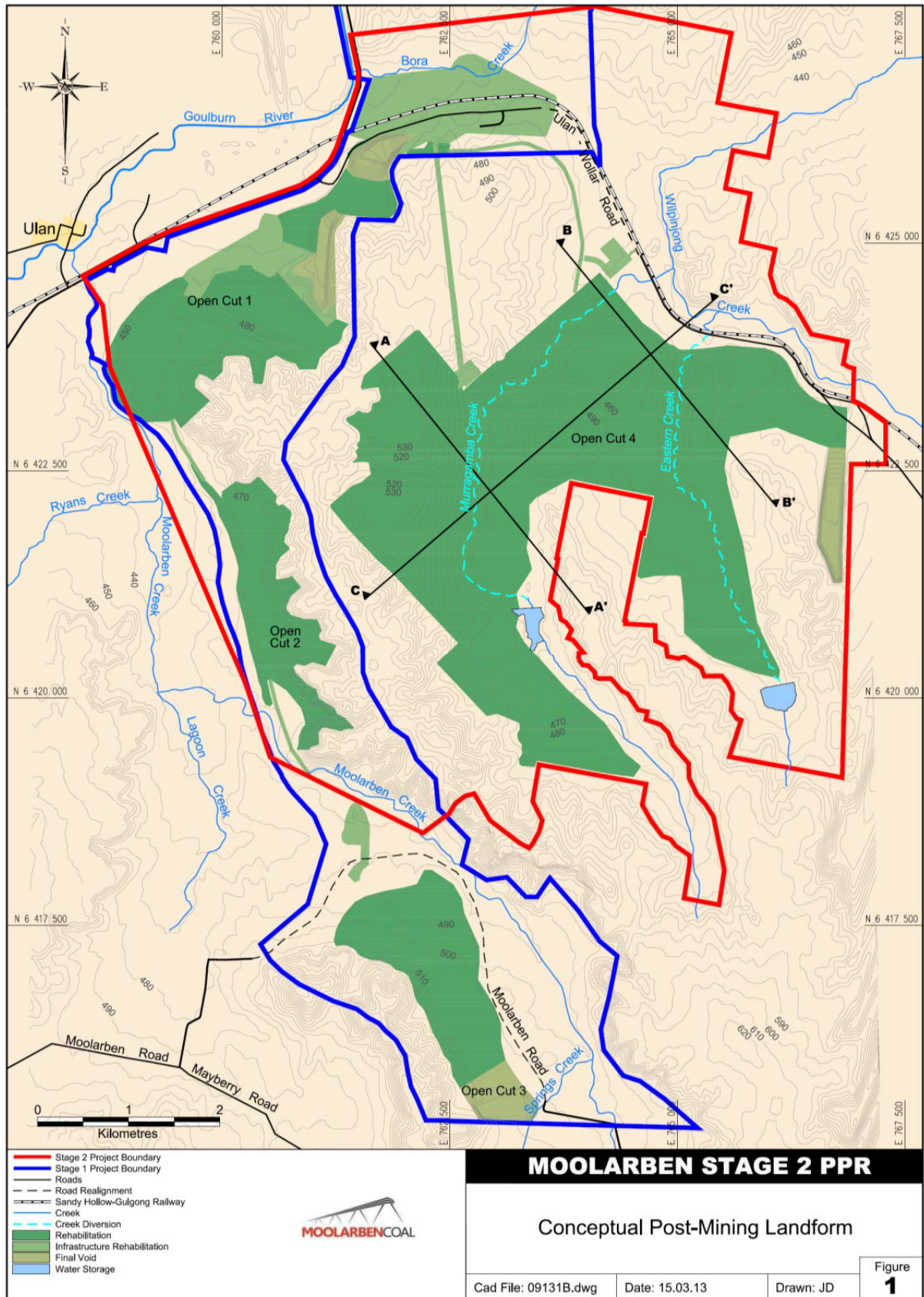


Figure 10.1

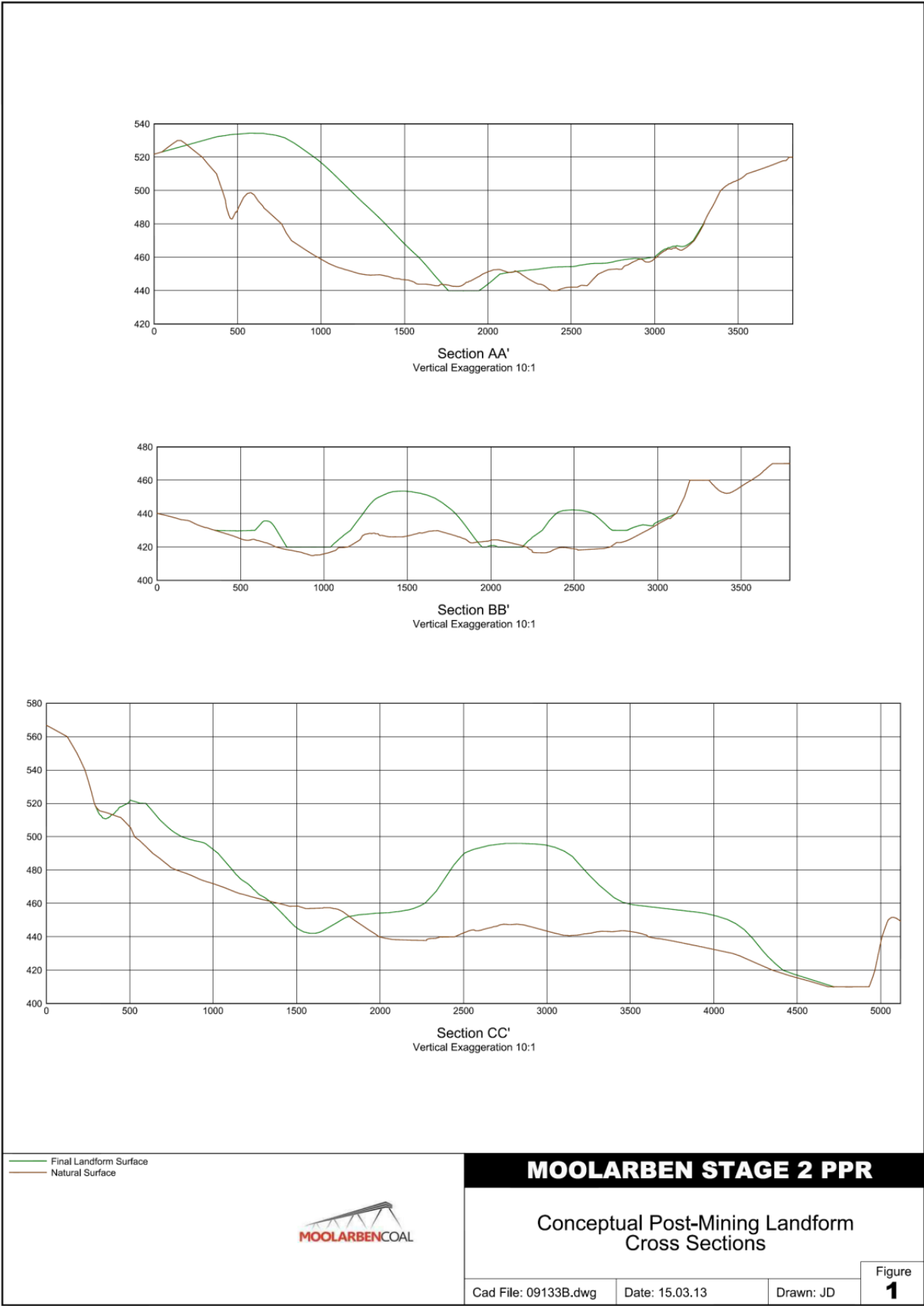


Figure 10.2

Site Verification Certificate Moolarben Coal Mine

Part 4AA, Division 3 of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*

Pursuant to clause 17C(1) of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*, I determine the application made by Moolarben Coal Mines Pty Ltd by issuing this certificate.

I certify that in my opinion, having regard to the criteria in the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land*, the land specified in Schedule 1 is not Biophysical Strategic Agricultural Land.

The reasons for forming the opinion on each of the relevant criteria are contained in Schedule 2.



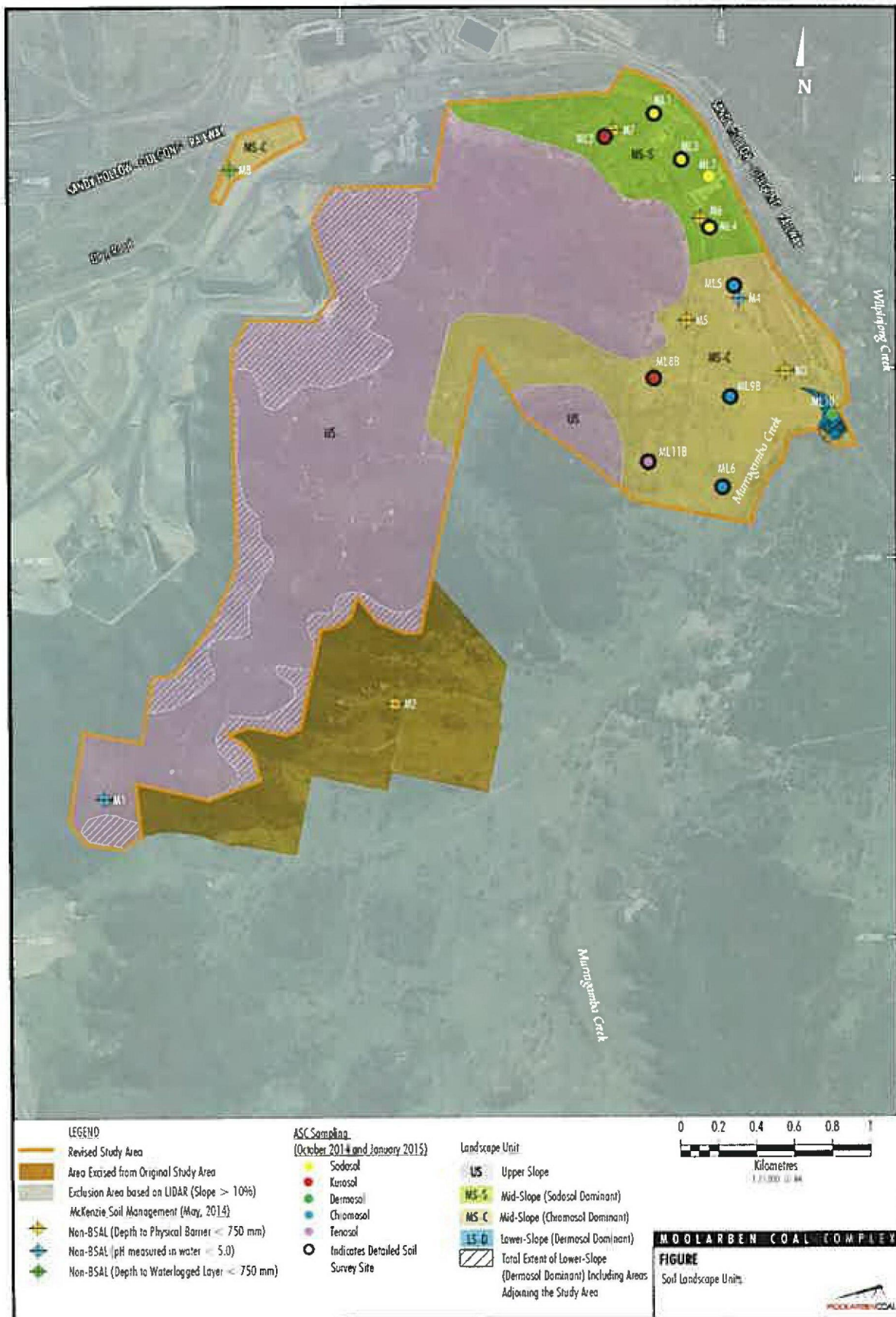
Secretary

Date certificate issued:

31.3.15

This certificate will remain current for 5 years from the date of issue.

SCHEDULE 1



SCHEDULE 2

Relevant criteria	Consideration
Slope	Ground slope is greater than 10% along the southern and western extent of the site, and therefore does not meet the BSAL criteria in these areas.
Soil type	The rest of the site comprises soils of low fertility, high salinity and/or inadequate rooting depth, and does not meet the BSAL criteria.

**MOOLARBEN COAL COMPLEX
OC4 SOUTH-WEST MODIFICATION**

ENVIRONMENTAL ASSESSMENT

MOOLARBEN COAL PROJECT STAGE 1
PROJECT APPROVAL (05_0117) [MOD 11]

MOOLARBEN COAL PROJECT STAGE 2
PROJECT APPROVAL (08_0135) [MOD 1]



APRIL 2015
Project No. MCM-13-02
Document No. 00670386.docx

EXECUTIVE SUMMARY

ES1 BACKGROUND

The Moolarben Coal Complex is located approximately 40 kilometres north of Mudgee in the Western Coalfields of New South Wales (NSW) (Figure ES1).

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

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) as modified and Project Approval (08_0135) (Moolarben Coal Project Stage 2).

Environmental management and monitoring at the Moolarben Coal Complex is conducted in accordance with a range of management plans required in accordance with Project Approvals (05_0117) and (08_0135).

ES2 MODIFICATION OVERVIEW

This Environmental Assessment has been prepared by MCO to support a request to modify Project Approvals (05_0117) and (08_0135) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (the OC4 South-West Modification).

Following a review of the mining sequence and associated infrastructure layout requirements, MCO has identified opportunities to enable more efficient access to the OC4 resource and management of waste rock in OC1.

As such, the OC4 South-West Modification proposes the following:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure ES2);
- adjustments to the site water management system to contain surface water runoff from the OC4 south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint) (Figure ES2); and
- backfilling of the northern OC1 final void to approximate pre-mining elevations (Figure ES2).

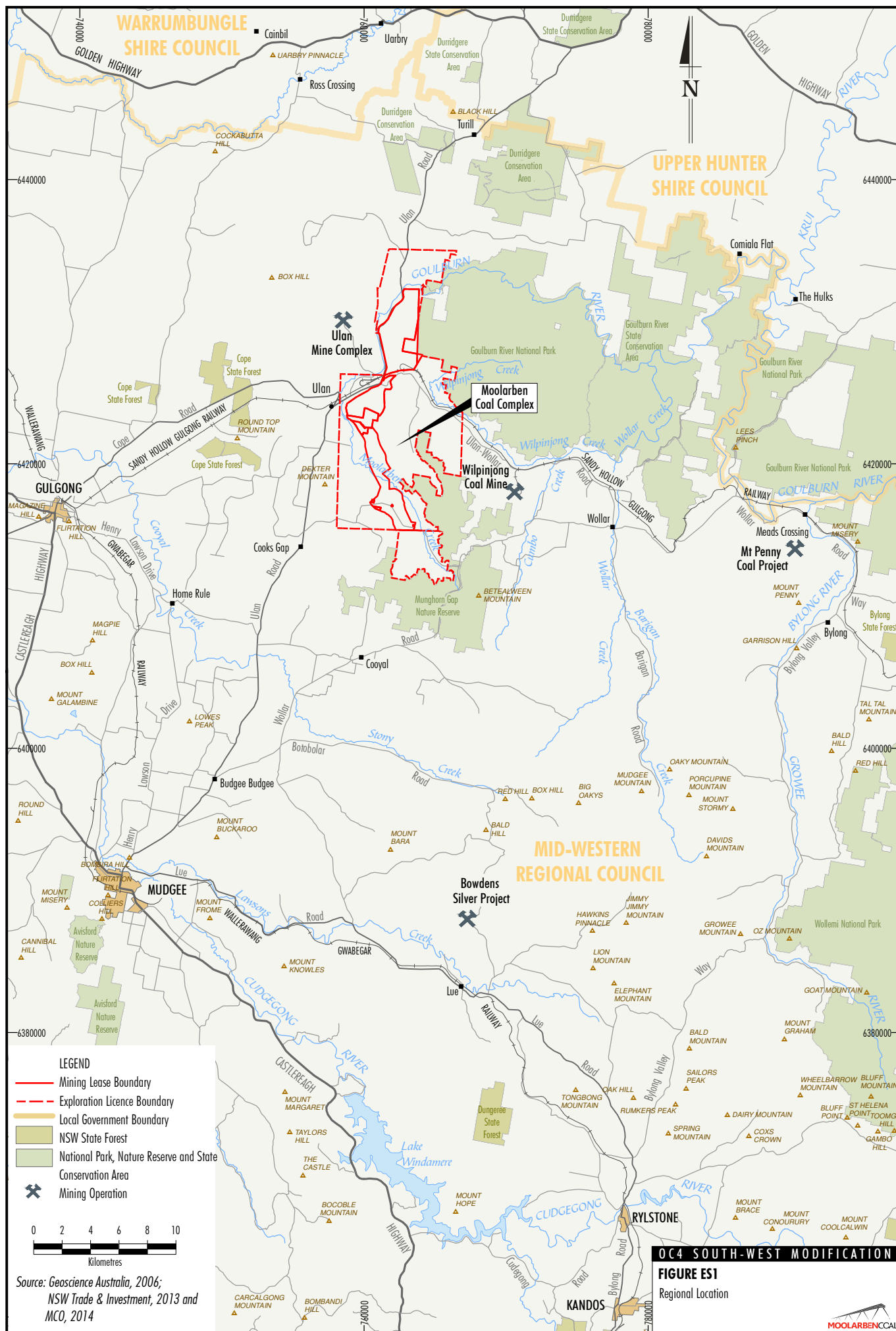
Other components of the approved Moolarben Coal Complex would **not change** as a result of the OC4 South-West Modification, including:

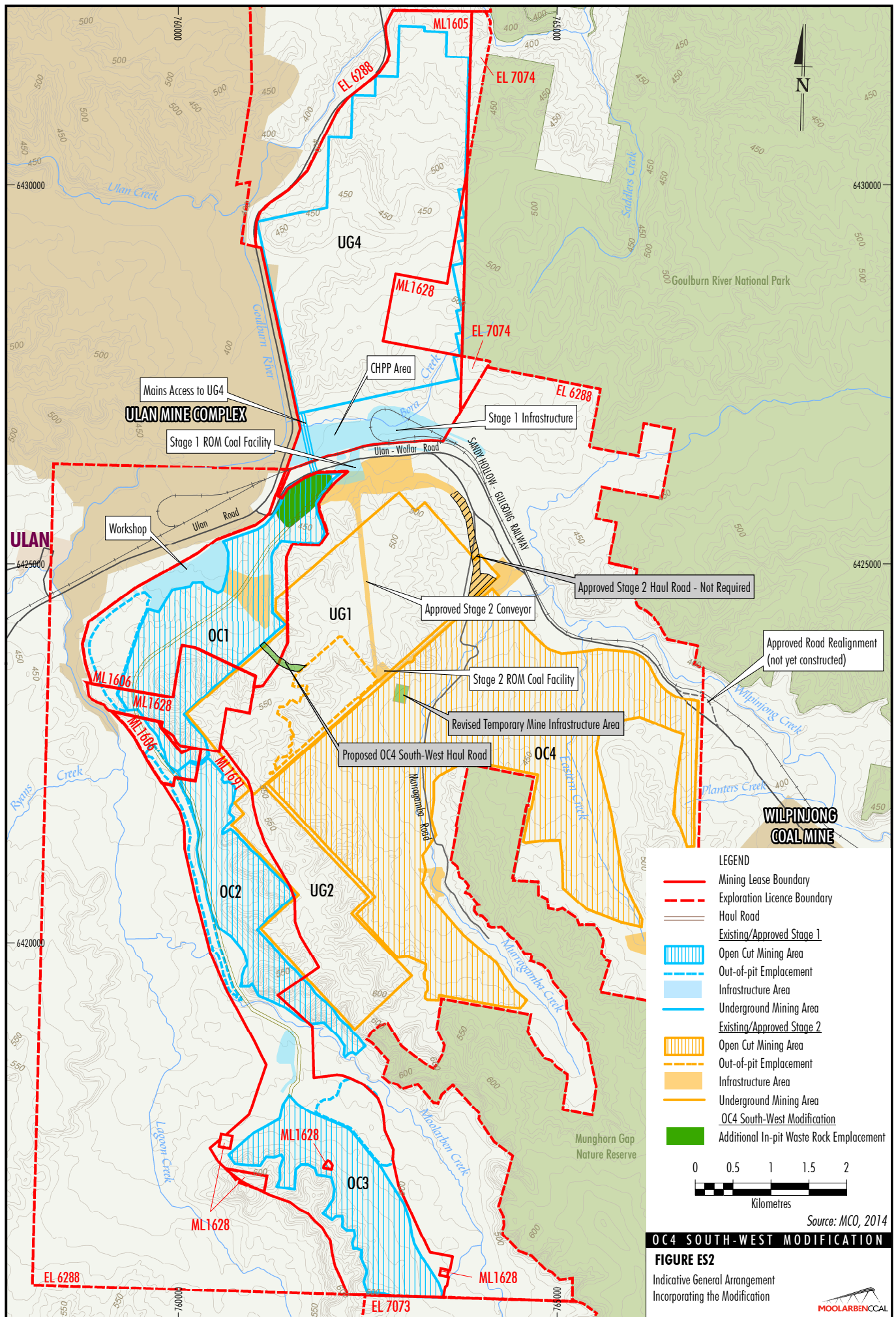
- operational mine life;
- hours of operation;
- blasting limits;
- coal extraction limits;
- coal processing, production and transport limits;
- number of full-time employees; or
- Ulan-Wollar Road site access.

ES3 ENVIRONMENTAL REVIEW AND MODIFICATION JUSTIFICATION

To assess the potential environmental impacts of the OC4 South-West Modification, a number of environmental reviews were completed, along with the following supporting specialist reports:

- Noise Assessment (prepared by SLR Consulting);
- Air Quality Assessment (prepared by Todoroski Air Sciences);
- Flora and Fauna Impact Assessment (prepared by EcoLogical Australia);
- Surface Water Assessment Review (prepared by WRM Water & Environment); and
- Aboriginal Cultural Heritage Assessment (prepared by Niche Environment & Heritage).





The environmental reviews indicate that, with the continued implementation of management and monitoring measures, potential environmental impacts could be managed within the currently approved environmental performance limits specified in Project Approvals (05_0117) and (08_0135).

In addition, there would be potential environmental benefits resulting from the OC4 South-West Modification associated with:

- Replacement of the approved haul road with the shorter proposed OC4 south-west haul road, resulting in:
 - reduction in total surface disturbance of approximately 13.4 ha;
 - reduction in catchment excision; and
 - avoidance of impacts to an Aboriginal artefact.

- Backfill of the OC1 final void, resulting in:
 - one less void in the final landform;
 - reduction in catchment excision (following rehabilitation); and
 - improved compatibility with surrounding land-uses in the long-term.

A summary of the key findings of the environmental reviews is provided in Table ES-1.

Table ES-1
Key Outcomes of the OC4 South-West Modification Environmental Reviews

Environmental Aspect	Summary of Environmental Assessment	Key Management, Mitigation or Monitoring Measures
Noise	Compliance with existing Project Approval noise limits.	Continued implementation of: <ul style="list-style-type: none"> • At source noise controls. • Predictive meteorological forecasting. • Real-time noise monitoring and performance indicators. • Attended noise monitoring.
Air Quality	Compliance with existing Project Approval air quality limits.	Continued implementation of: <ul style="list-style-type: none"> • At source dust controls. • Predictive meteorological forecasting. • Real-time monitoring and performance.
Ecology	Reduction in total surface disturbance. No significant impacts to threatened species, populations or communities.	Existing Stage 2 Biodiversity Offset Strategy adequately compensates potential impacts, with surplus area. Continued implementation of vegetation clearance protocols.
Surface Water Resources	No significant change to site water balance expected. Reduction in catchment excision following rehabilitation.	Continued implementation of water management system and water monitoring network.
Groundwater Resources	No change to potential groundwater impacts. No change to groundwater licensing requirements.	Continued implementation of groundwater monitoring and management would continue to be conducted in accordance with the Water Management Plan. Holding of adequate groundwater licenses.
Visual	Negligible change in potential visual impacts from sensitive viewpoints.	Rehabilitation of the OC4 south-west haul road and backfilled OC1 final void.
Aboriginal Heritage	Avoidance of impacts to one Aboriginal artefact. No impact to known Aboriginal artefacts or cultural heritage values.	Continued implementation of monitoring and management measures.

TABLE OF CONTENTS

1	INTRODUCTION	1	3.5	MANAGEMENT OF DANGEROUS GOODS	25
1.1	BACKGROUND	1	3.6	WORKFORCE	25
1.1.1	Moolarben Coal Complex History	1	3.7	CONSTRUCTION ACTIVITIES	25
1.1.2	Neighbouring Mine Operations/Projects	5	3.8	REHABILITATION AND FINAL LANDFORM	25
1.2	MODIFICATION OVERVIEW	5	3.8.1	Northern OC1 Final Void	25
1.2.1	Project Justification and Consideration of Alternatives	8	3.8.2	OC4 South-West Haul Road	27
1.3	SITE LOCATION AND TENURE	9	4	ENVIRONMENTAL ASSESSMENT	29
1.4	CONSULTATION	12	4.1	NOISE	29
1.4.1	Public Consultation	12	4.1.1	Background	29
1.5	STRUCTURE OF THE EA	12	4.1.2	Environmental Review	32
2	SUMMARY DESCRIPTION OF EXISTING/APPROVED MOOLARBEN COAL COMPLEX	14	4.1.3	Mitigation Measures, Management and Monitoring	33
2.1	APPROVALS HISTORY	14	4.2	AIR QUALITY	33
2.2	CONSTRUCTION	15	4.2.1	Background	33
2.3	MINING OPERATIONS	15	4.2.2	Environmental Review	37
2.4	COAL HANDLING AND PREPARATION	15	4.2.3	Mitigation Measures, Management and Monitoring	38
2.5	PRODUCT COAL TRANSPORT	15	4.3	ECOLOGY	38
2.6	WASTE ROCK MANAGEMENT	16	4.3.1	Background	38
2.7	DRILL AND BLAST	16	4.3.2	Environmental Review	41
2.8	COAL REJECT MANAGEMENT	16	4.3.3	Mitigation Measures, Management, Monitoring and Offset	42
2.9	GENERAL INFRASTRUCTURE	16	4.4	SURFACE WATER RESOURCES	42
2.9.1	Site Access and Infrastructure Areas	16	4.4.1	Background	42
2.9.2	Haul Roads	17	4.4.2	Environmental Review	44
2.9.3	Electricity Supply and Distribution	17	4.4.3	Mitigation Measures, Management and Monitoring	44
2.9.4	Potable Water	17	4.5	GROUNDWATER RESOURCES	44
2.9.5	Ancillary Infrastructure	17	4.5.1	Background	44
2.10	WATER MANAGEMENT	17	4.5.2	Environmental Review	45
2.11	WASTE MANAGEMENT	18	4.5.3	Mitigation Measures, Management and Monitoring	45
2.12	MANAGEMENT OF DANGEROUS GOODS	18	4.6	VISUAL	45
2.12.1	Hydrocarbon Storages	18	4.6.1	Background	45
2.12.2	Explosives Storage	18	4.6.2	Environmental Review	47
2.13	WORKFORCE	18	4.6.3	Mitigation Measures, Management and Monitoring	49
2.14	REHABILITATION AND FINAL LANDFORM	18	4.7	ABORIGINAL HERITAGE	49
2.14.1	Rehabilitation Objectives	19	4.7.1	Background	49
2.14.2	Final Landform	20	4.7.2	Environmental Review	49
2.14.3	Rehabilitation Monitoring	20	4.7.3	Management and Mitigation Measures	50
2.15	ENVIRONMENTAL MANAGEMENT AND MONITORING	20	4.8	OTHER ENVIRONMENTAL ASPECTS	50
2.16	COMMUNITY CONTRIBUTIONS	20	4.8.1	LAND RESOURCES	50
2.17	COMPLAINTS	22	4.8.2	Blasting	50
3	DESCRIPTION OF THE PROPOSED MODIFICATION	22	4.8.3	Greenhouse Gas Emissions	51
3.1	MINING OPERATIONS	22	4.8.4	Non-Aboriginal Heritage	51
3.1.1	Mining Extent	22	4.8.5	Road Transport	51
3.1.2	Mine Schedule	22	4.8.6	Aquatic Ecology	51
3.1.3	OC4 South-West Haul Road	23	4.8.7	Hazard and Risk	51
3.1.4	Mobile Fleet	23	5	STATUTORY CONTEXT	52
3.1.5	Waste Rock Management	23	5.1	GENERAL STATUTORY CONSIDERATIONS	52
3.1.6	Underground Access to UG4	23	5.1.1	State Legislation	52
3.1.7	Drill and Blast	23	5.1.2	Other State Legislation	53
3.1.8	Product Coal Transport	23	5.1.3	Environmental Planning Instruments	54
3.2	GENERAL INFRASTRUCTURE	25	5.1.4	Commonwealth Legislation	57
3.2	GENERAL INFRASTRUCTURE	25	5.2	NSW GOVERNMENT POLICY	58
3.3	WATER MANAGEMENT	25	5.2.1	Strategic Regional Land Use Plan	58
3.4	WASTE MANAGEMENT	25	5.2.2	Aquifer Interference Policy	58
			5.3	APPROVALS, LICENCES AND PLANS	58

TABLE OF CONTENTS (Continued)

	5.3.1	Project Approval Conditions	58
	5.3.2	Management/Monitoring Plans	59
	5.3.3	Mining Operations Plan	59
6	REFERENCES		60

LIST OF TABLES

Table 1	Summary Comparison of Approved and Modified Moolarben Coal Project
Table 2	Indicative Mine Schedule
Table 3	Native Vegetation Communities Recorded in the OC4 South-West Modification Disturbance Area
Table 4	Summary of Visual Impacts

LIST OF FIGURES

Figure 1	Regional Location
Figure 2	Approved Moolarben Coal Project (Stage 1 and Stage 2) General Arrangement
Figure 3	Aerial Photo of the Moolarben Coal Complex at May 2014
Figure 4	Indicative General Arrangement Incorporating the Modification
Figure 5a	Relevant Land Ownership Plan
Figure 5b	Relevant Landholder List
Figure 6	Moolarben Coal Complex Environmental Monitoring Sites
Figure 7	Indicative Alternate Access to UG4
Figure 8	Final Voids at the Moolarben Coal Complex Incorporating the Modification
Figure 9	Conceptual Final Landform Cross Section of the Northern OC1 Final Void
Figure 10	Moolarben Coal Project Relevant Noise, Blasting and Dust Monitoring Site Locations
Figure 11	Current Noise Management Measures
Figure 12	Modification Year 2016 Night-time Operational Noise Contours
Figure 13	Modification Year 2018 Night-time Operational Noise Contours
Figure 14	Modification Year 2016 Project Only 24 hour PM ₁₀ Air Quality Contours
Figure 15	Vegetation Mapping of the Disturbance Area
Figure 16	Sub-catchments at the Moolarben Coal Complex and Relevant Surface Water Monitoring Locations
Figure 17	Previously Assessed Sensitive Viewpoints and Proposed Surface Infrastructure

LIST OF ATTACHMENTS

Attachment 1	Stage 1 Project Approval (05_0117)
Attachment 2	Stage 2 Project Approval (08_0135)
Attachment 3	Site Verification Certificate

LIST OF APPENDICES

Appendix A	Noise Assessment
Appendix B	Air Quality Assessment
Appendix C	Flora and Fauna Impact Assessment
Appendix D	Surface Water Assessment Review
Appendix E	Aboriginal Cultural Heritage Assessment

1 INTRODUCTION

The Moolarben Coal Complex is located approximately 40 kilometres (km) north of Mudgee in the Western Coalfields of New South Wales (NSW) (Figure 1).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex 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).

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities) (Figure 2).

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) (as modified) and Project Approval (08_0135) (Moolarben Coal Project Stage 2).

Stage 1 mining operations are also undertaken in accordance with Approval Decisions EPBC 2007/3297 granted on 24 October 2007 (and varied by notice on 25 February 2009 and 11 May 2010) and EPBC 2013/6296 granted on 13 November 2014 under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act). The current mining operations are also conducted in accordance with the requirements of the conditions of Mining Lease (ML) 1605, ML 1606, ML 1628 and ML 1691 granted under the *Mining Act, 1992*.

Since commencement of coal mining operations in 2010, mining activities have occurred within OC1 and OC2 (Figure 3). Subject to all necessary approvals being in place (both State and Commonwealth), development of the OC4 pit (Stage 2) is planned to commence during 2015. The development of the UG1 (i.e. highwall stabilisation, portal construction and drivage development) would also commence in 2015.

This Environmental Assessment (EA) has been prepared by MCO to support a request to modify both the Stage 1 and Stage 2 Project Approvals (05_0117 and 08_0135, respectively) under section 75W of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act) (the OC4 South-West Modification).

The OC4 South-West Modification includes construction of the OC4 south-west haul road (located south-west of the approved Stage 2 Haul Road), adjustments to the site water management system, refinements to the early stages of mining and associated infrastructure layout at OC4, and backfilling of the northern OC1 final void.

A copy of Project Approval (05_0117) and Project Approval (08_0135) are provided as Attachments 1 and 2.

1.1 BACKGROUND

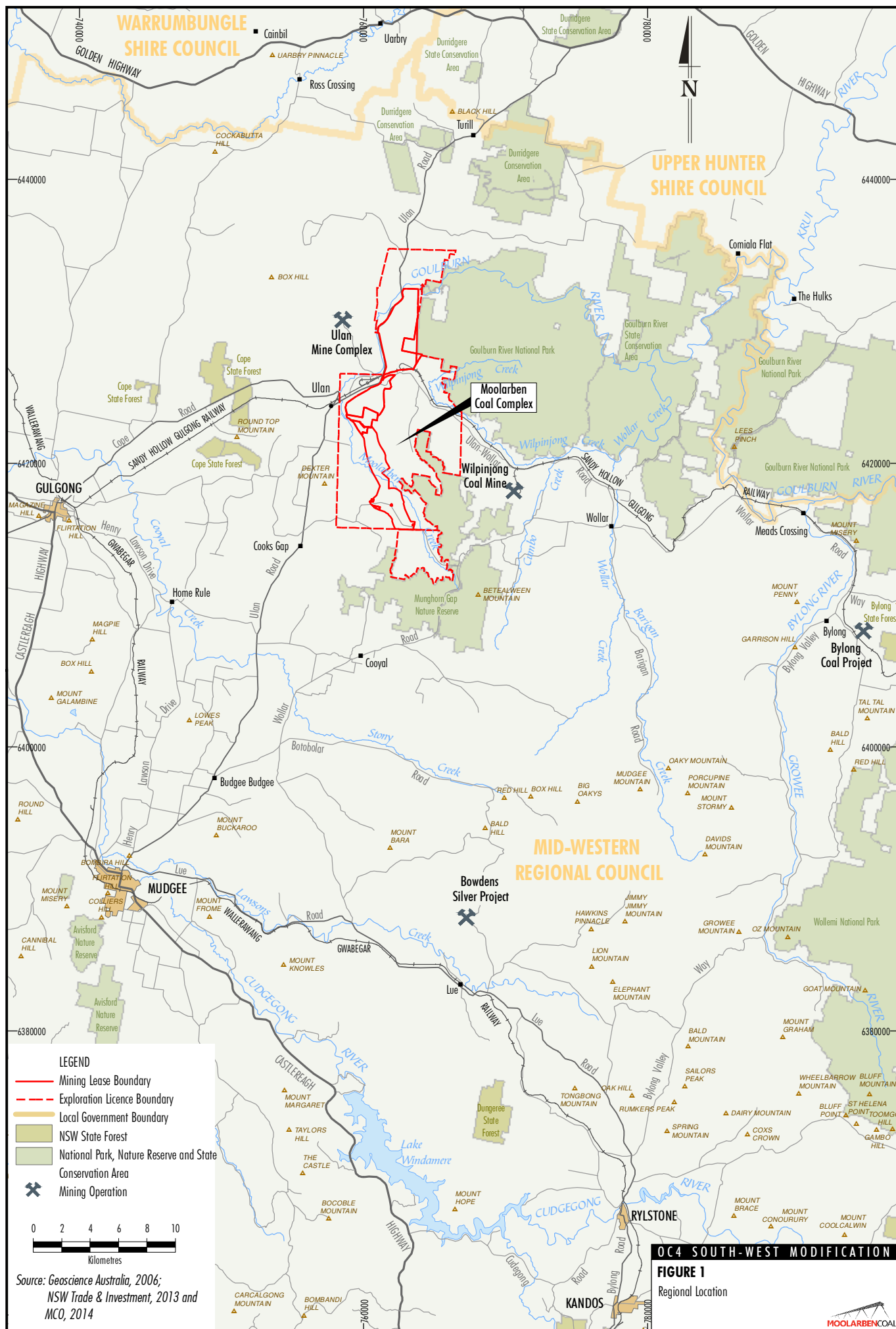
1.1.1 Moolarben Coal Complex History

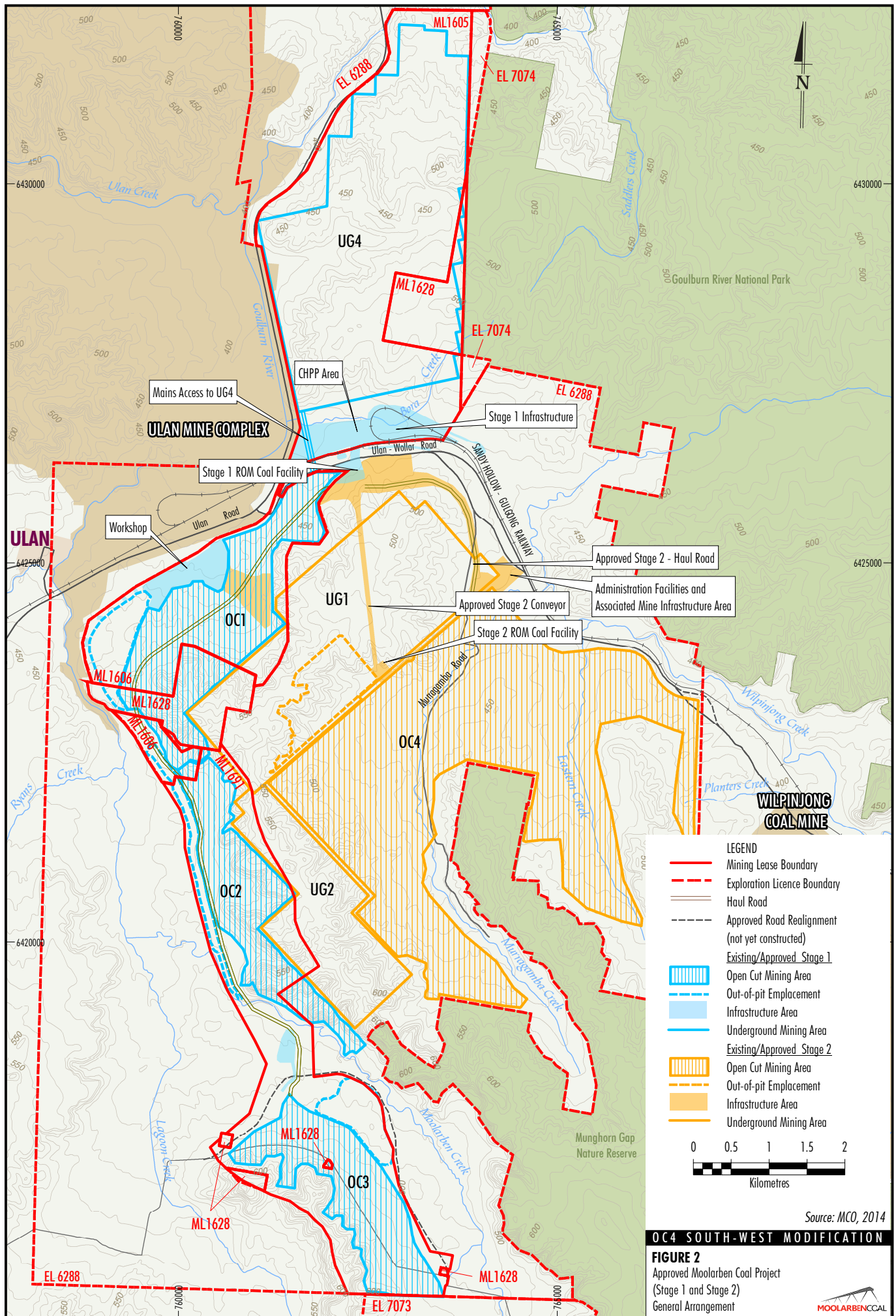
The Moolarben Coal Project (Stage 1) was assessed in the *Moolarben Coal Project Environmental Assessment Report* (Moolarben Coal Mines Limited, 2006) (Stage 1 EA) and was approved by the NSW Minister for Planning on 6 September 2007 (Stage 1 Project Approval [05_0117]).

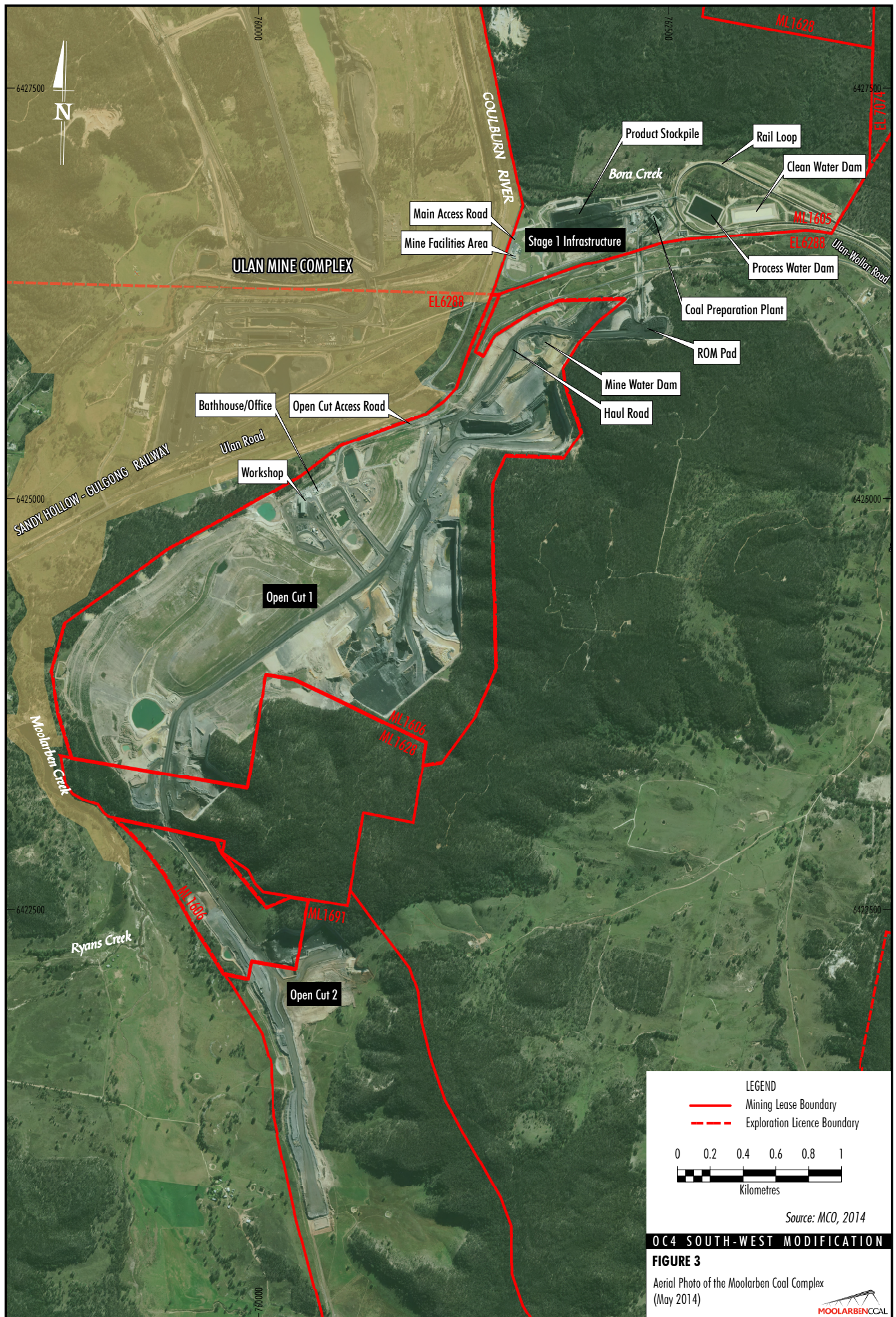
Stage 1 Project Approval (05_0117) has been subject to ten modifications. The modifications were generally required to reconfigure the mine layout (e.g. extension to mining areas, relocation of coal handling infrastructure and water infrastructure) and were aimed to improve the efficiency and operation of the Moolarben Coal Complex and enable access to additional economically viable coal reserves.

A Major Project Application for the Moolarben Coal Project (Stage 2) was lodged with the NSW Minister for Planning on 1 May 2008. Following exhibition of the Moolarben Coal Project Stage 2 Environmental Assessment (Stage 2 EA), MCM made a number of changes to the proposed layout and design of the Moolarben Coal Project Stage 2 in order to address issues raised by the Department of Planning and Infrastructure (DP&I) (now Department of Planning and Environment [DP&E]) and its independent technical reviewers, introduce additional impact avoidance measures and to enable the effective integration of Stage 2 with Stage 1. Changes to the Moolarben Coal Project Stage 2 were described in a Preferred Project Report (Stage 2 PPR) which was exhibited from 31 January 2012 to 24 February 2012.

The Moolarben Coal Project Stage 2 was approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015 (Stage 2 Project Approval [08_0135]).







A Variation of Proposal to take Action (EPBC 2008/4444) under the EPBC Act for Moolarben Coal Project (Stage 2) was accepted on 26 April 2012. The Variation of Proposal to take Action (EPBC 2008/4444) will require separate approval under the EPBC Act.

The most recently approved modification of Stage 1 of the Moolarben Coal Project (Modification 3) was approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015.

Modification 3 allows for Stage 1 infrastructure to receive, handle and process Stage 2 coal for the life of Stage 2 (to 31 December 2038) and aligns approved mine operation timeframes between Stage 1 and Stage 2. An additional void at the northern end of OC1 was also approved to allow access to UG4.

A summary description of the existing/approved Moolarben Coal Complex is provided in Section 2. The general arrangement of the existing/approved Moolarben Coal Complex is shown on Figure 2.

1.1.2 Neighbouring Mine Operations/Projects

Potential interactions with neighbouring mine operations/projects to the Moolarben Coal Complex have been considered where relevant in this EA, including the Ulan Mine Complex and the Wilpinjong Coal Mine.

Ulan Mine Complex

The Ulan Mine Complex is located adjacent to and north-west of the Moolarben Coal Complex (Figure 1) and is operated by Ulan Coal Mines Limited (UCML) and managed by Glencore.

Operations at the Ulan Mine Complex are undertaken in accordance with Project Approval (08_0184) for the Ulan Continued Operations Project. The Ulan Mine Complex is approved to operate up to a maximum coal export capacity (from the site) of 20 million tonnes per annum (Mtpa) and all product coal is transported from the site by rail.

The location and extent of the approved Ulan Mine Complex are shown on Figure 2.

Wilpinjong Coal Mine

The Wilpinjong Coal Mine is located adjacent to and east of the Moolarben Coal Complex (Figures 1 and 2) and is owned and operated by Wilpinjong Coal Pty Ltd (WCPL), a wholly owned subsidiary of Peabody Energy Australia Pty Limited.

Operations at the Wilpinjong Coal Mine are undertaken in accordance with Project Approval (05_0021) for the Wilpinjong Coal Project. The Wilpinjong Coal Mine is approved to operate up to a maximum coal export capacity (from the site) of 12.5 Mtpa and all product coal is transported from the site by rail.

The location and extent of the approved Wilpinjong Coal Mine are shown on Figure 2.

1.2 MODIFICATION OVERVIEW

The OC4 South-West Modification includes the following key components:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure 4);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint) (Figure 4); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations (Figure 4).

Table 1 provides a summary comparison of the currently approved Moolarben Coal Complex under the Stage 1 Project Approval (05_0117) and Stage 2 Project Approval (08_0135), and the Moolarben Coal Complex incorporating the OC4 South-West Modification.

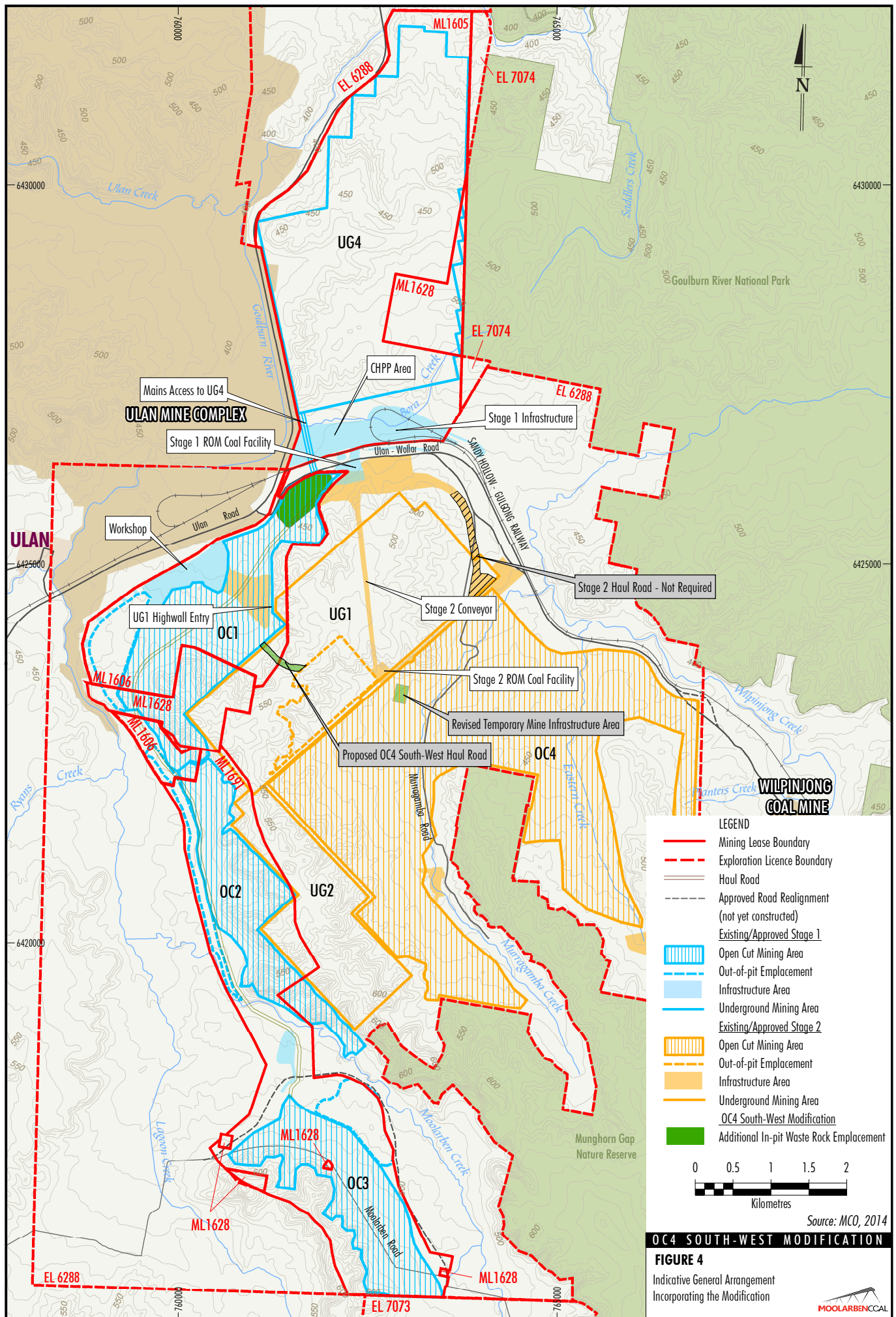


Table 1
Summary Comparison of Approved and Modified Moolarben Coal Project

Relevant Approval Component	Moolarben Coal Project		Moolarben Coal Project (including the OC4 South-West Modification)
	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.		Unchanged.
Hours of Operation	Mining operations can be carried out 24 hours a day, 7 days a week.		Unchanged.
Blasting Limits	A maximum of 2 blasts a day and up to 9 blasts a week (averaged over a calendar year), can be carried out at the Moolarben Coal Complex.		Unchanged.
	Blasting can be carried out on site between 9.00 am and 5.00 pm Monday to Saturday inclusive. No blasting is allowed on Sundays, public holidays, or at any other time without the written approval of the Secretary.		Unchanged.
Coal Extraction Limits	Up to 9 Mtpa of run-of-mine (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.	Unchanged.
	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.		Unchanged.
Coal Processing and Offsite Transport	Up to 13 Mt (total) of ROM coal from the Moolarben Coal Complex can be processed in any calendar year from Stages 1 and 2.		Unchanged.
	All coal is to be transported from the site by rail.	The Proponent shall ensure that all coal extracted from the site is sent to the Moolarben Stage 1 mine surface infrastructure area for processing and/or transport to market.	Unchanged.
General Layout	The general layout is shown in Appendix 2A of Project Approval (05_0117).	The general layout is shown in Appendix 2 of Project Approval (08_0135).	<p>The revised general layout is shown on Figure 4 and includes the following changes:</p> <ul style="list-style-type: none"> Revised Stage 2 Haul Road between the Stage 1 infrastructure and OC4. Revised final landform in OC1 (including backfilling of the northern final void to approximately pre-mining elevations).
Biodiversity Offset Strategy	The Biodiversity Offset Strategy is shown conceptually in Appendix 8 of Project Approval (05_0117).	The Biodiversity Offset Strategy is shown conceptually in Appendix 7 of Project Approval (08_0135).	No change required.
Northern Section of the Approved Stage 2 Haul Road	N/A	Additional archaeological survey work is to be carried out prior to carrying out the development.	The approved Stage 2 Haul Road route is being avoided and therefore the additional archaeological survey is no longer required. Archaeological survey of the south-west haul road has been conducted as described in Section 4.7.
Ulan-Wollar Road Site Access	N/A	The site access intersection off Ulan-Wollar Road is to be designed, constructed, and maintained to the satisfaction of Mid-Western Regional Council (MWRC).	Unchanged.

Table 1 (Continued)
Summary Comparison of Approved and Modified Moolarben Coal Project

Relevant Approval Component	Moolarben Coal Project		Moolarben Coal Project (including the OC4 South-West Modification)
	Stage 1 Project Approval (05_0117)	Stage 2 Project Approval (08_0135)	
Water Management Design and Objectives	Design, install and maintain the dams generally in accordance with the series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries</i> .		Unchanged. A change to the general location of some of the sediment dams would be required.
	Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site.		Unchanged. A change to the general location of some of the up-catchment water diversions would be required.
	Mine water storage infrastructure is designed to store a 50 year average recurrence interval 72 hour storm event.	Mine water storage infrastructure is designed to store a 100 year average recurrence interval 72 hour storm event.	Water management objectives remain unchanged.
	On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams), and the Ulan Seam sub-crop line of the most northerly final void are suitably lined to comply with a permeability standard of less than 1×10^{-9} metres per second (m/s).	On-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams) are suitably lined to comply with a permeability standard of less than 1×10^{-9} m/s.	The requirement to line the Ulan Seam sub-crop line of the most northerly final void in OC1 would be made redundant as it would be backfilled to approximately pre-mining elevations (Figure 4). Other water management objectives for tailings dams, mine infrastructure dams, groundwater storage and treatment dams remain unchanged.

As shown in Table 1, the OC4 South-West Modification **does not** involve any change to the Moolarben Coal Project (Stages 1 and 2) for the following relevant approval components:

- operational mine life;
- hours of operation;
- blasting limits;
- coal extraction limits;
- coal processing, production and transport limits;
- Biodiversity Offset Strategy;
- coal conveyors between OC4 and Stage 1 ROM coal facility;
- number of full-time employees; or
- Ulan-Wollar Road site access.

A detailed description of the proposed OC4 South-West Modification is provided in Section 3.

Section 4 describes the potential environmental impacts of the OC4 South-West Modification and discusses how existing requirements in environmental management and monitoring programs at the Moolarben Coal Complex would be applied to manage potential environmental impacts.

1.2.1 Project Justification and Consideration of Alternatives

OC4 South-West Haul Route

Justification

The approved haul road (Figure 4) was included in the 2009 Stage 2 Environmental Assessment and 2012 Stage 2 PPR. The purpose of the haul road was to transport ROM coal from OC4 to Stage 1 infrastructure (e.g. CHPP area) (Figure 4).

The Moolarben Coal Complex mine layout has changed since the approved haul road was proposed. In particular, approved Stage 1 mining operations have progressed in OC1.

Recent review of the mine sequence and infrastructure layout has identified it would be more efficient to relocate the haul road from OC4 to the south-west (i.e. the OC4 south-west haul road). This would enable the use of established haul roads in OC1 to transport ROM coal from OC4 to the Stage 1 infrastructure and transport waste rock from OC4 to OC1 (e.g. as part of backfill of OC1 final void).

In comparison to the approved haul road location, the OC4 south-west haul road would involve:

- a shorter, more direct haul road, resulting in lower construction and operating costs;
- less disturbance (i.e. net reduction of approximately 13.4 hectares [ha]);
- reduced water management and sediment control requirements, as runoff from the OC4 south-west haul road catchment would report to water storages in either OC1 or OC4, whereas the approved haul road requires dedicated water management structure to prevent runoff from disturbed areas entering Murrumbidgee Creek; and
- removal of the requirement for supporting administration facilities in the OC4 area associated with the temporary mine infrastructure area.

Based on the above, the OC4 south-west haul road would result in environmental and operational benefits in comparison to the approved haul road location.

Consideration of Alternatives

Several alternative haul road options were considered by MCO. The relative costs and environmental benefits of each option were considered and refinements made to the proposed south-west haul road route to minimise environmental impacts and capital and operating costs.

In comparison to these other alternative routes, the OC4 south-west haul road would result in:

- reduced potential noise impacts on Cooks Gap residences (compared to alternative options considered that were located further to the west);
- avoidance of impacts to Aboriginal cultural heritage sites; and
- reduced haul distance between OC1 and OC4 (e.g. resulting in lower potential dust and noise emissions).

Backfilling OC1 Final Void

Justification

Two final voids are approved in OC1. The northernmost of these voids was proposed to provide access to the Stage 1 UG4 underground mining area (Figure 4).

Following approval of Stage 2, mining in UG4 is not proposed to commence until mining in the Stage 2 UG1 underground mining area is completed. The preferred access to UG4 is now from UG1 (note that approval for access to UG4 via UG1 would be sought as part of a separate EA and approval application).

Therefore, the northern OC1 final void is no longer required to provide access to UG4, and would be backfilled with waste rock during mining operations to approximately pre-mining elevations, providing additional in-pit waste rock emplacement storage for the open cut operations.

Backfill of the OC1 final void would result in the following environmental benefits:

- one less void in the final landform;
- reduction in catchment excision (following rehabilitation); and
- improved compatibility with surrounding land-uses in the long-term.

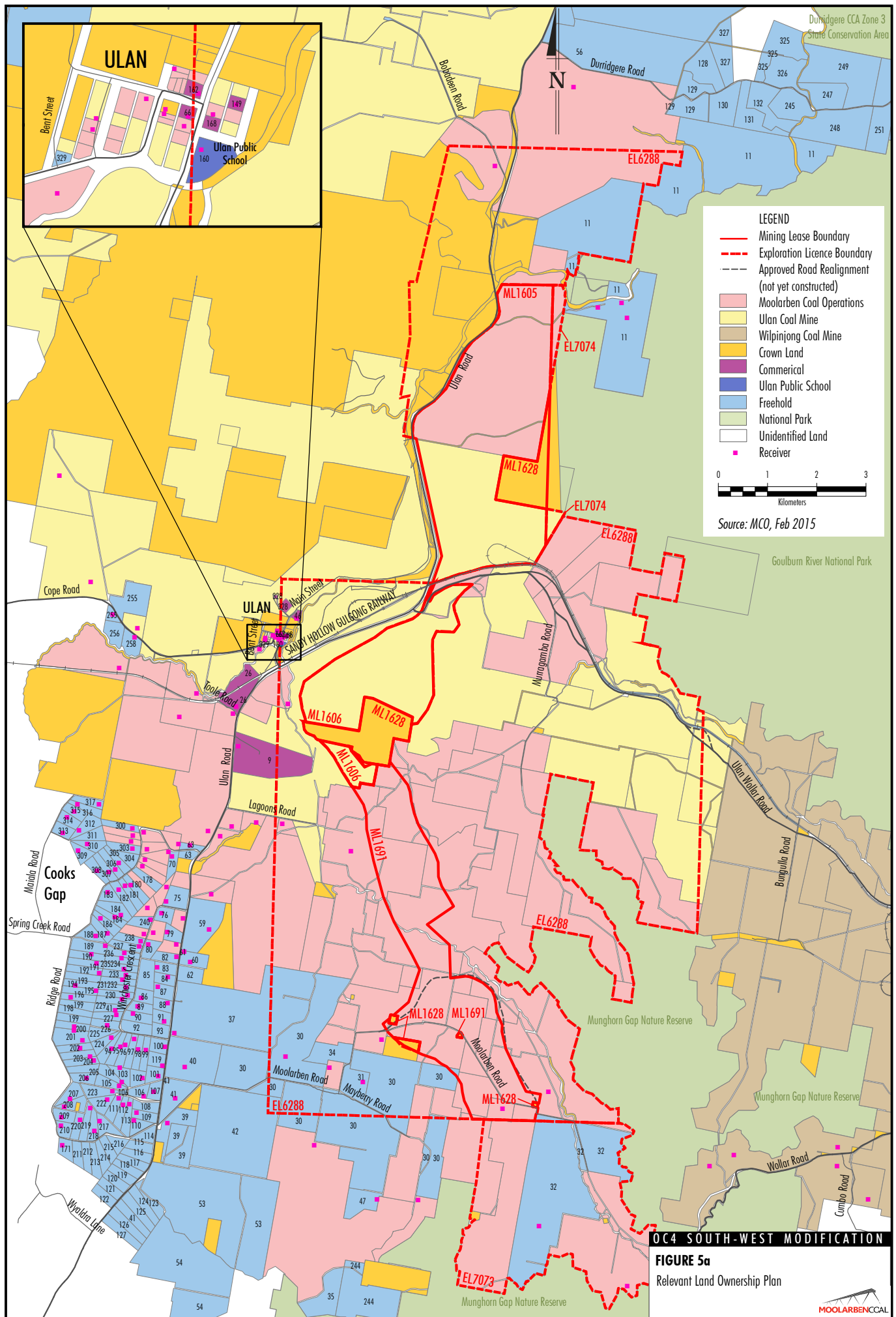
1.3 SITE LOCATION AND TENURE

The Moolarben Coal Complex is located within ML 1605, ML 1606, ML 1628, ML 1691 and Mining Lease Application (MLA) Area 458 and within Exploration Licence (EL) 6288 and EL 7074.

The Project Application Areas and the real property descriptions are provided in Appendix 1 of the Stage 1 and 2 Project Approvals, which are provided as Attachments 1 and 2 to this EA.

Relevant land ownership information within the immediate vicinity of the Moolarben Coal Complex is provided on Figures 5a and 5b.

The Moolarben Coal Complex is located within the Mid-Western Regional Local Government Area (LGA).



Ref No	Landholder	Ref No	Landholder	Ref No	Landholder
9	Orica Australia Pty Limited	112	MJ & LM Croft	215	SG & PM Green
11	JE Mullins & CD Imrie	113	CPG Ratcliff	216	G Holland & FA Handicott
26	Forty North Pty Limited	114	TF & K Holland	217	RP & JL Patterson
30	RB Cox	115	AK & BH Quinn	218	GF & GEL Soady
31	MB Cox	116	DJ & SM Reid	219	T & S Riger
32	DJ & JG Stokes	117	JM Dick	220	SJ Rusten & NJ Smith
34	J Asztalos	118	A Scott	222	BJ Purtell
35	PR Johnson & MS & GJ Thompson & PH & FH Debreczeny	119	PJ Kearns	223	EW Palmer & JM Stewart
37	J Szymkarczuk	120	PS & DR Ord	224	RS & PCC Dupond
39	RM & DJ Sprigg	121	EJ Cullen	225	G & RF Doualetas
40	JM Devenish	122	WF Wirth	226	LAA & FC Muscat
41	PP Libertis	123	ND Sullivan	227	WP & JA Hughes
42	C & L Schmidt	124	WJ & HE Bailey	229	JJ & BA Lowe
46	North Eastern Wiradjuri Wilpinjong Community Fund Limited	125	DB McBride	230	DA Hoole & DT Rawlinson
47	SF & MR Andrews	126	MP Julian	231	T Morrison & SM Benny
53	WD & MS Bryant	127	BKT & SA Bracken	232	L & JA Haaring
54	MA & C Harris	128	AW Sims	233	K & D Boal
56	MJ & V Cundy	129	M Yelds	234	D & L Gaw
59	G & GM Szymkarczuk	130	GP McEwen	235	LM & RS Wilson
60	CL Rayner & DM Munday	131	GR & RA King	236	RG & CA Donovan
61	MA Miller	132	N Atkins	237	A Puskaric
62	R Menchin	149	Mid-Western Regional Council	238	B Powell
63	BF & B Whiticker	151	AI Cunningham (Land entrusted to Catholic Church)	240	GJ & DM Hartley
66	Rostherne Pty Limited	160	Minister For Education And Training	244	JT & YR Jones
70	DJ & A Coventry	162	DM Harrison	245	MP & KLE Cresham
75	P Ban	168	PJL Constructions Pty Limited	247	J & K Batshon
76	SR & PC Carbone	171	AD & SA McGregor	248	G Boustani
79	PTJ & SE Nagle	178	PR Stone	249	CJ & JJ Eldridge
80	W & D Sebelic	180	CD & LL Barrett	251	NF Potter & CE Selley
82	SC Hungerford & MC Clemens	181	SM Forster	255	HJ & H Schmitz
83	CF & CR Wall	182	J Dutoitcook	256	RC Campbell
84	DS Sebelic	183	R & EA Steines	258	PM & CD Elias
85	J & Z Nikolovski	184	LA Stevenson	300	CM Collins & CY Marshall
86	NW Harris	186	RW & IJ Adamson	303	HJ Ungaro
87	BJ & K Howe	187	BT & KM Feeney	304	G Balajan
88	BC Meyers	188	KR & T Fielding	305	L Barisic & M Aul
89	MV & HM Glover & E & BJ Tomlinson	189	M, M, D & A Gaggin & J, A, P & R Hyde	306	E Armstrong
90	SA Powell	190	T & LK Sahyoun	307	M Chant & NK Young
91	HM Graham	191	BW & TS Lasham	308	NA Dower
92	VA Pulicino & J & S & G Bonnici	192	D Williams	309	GS Maher
93	F & M Fenech	193	DJ Maloney	310	KI Death
94	LK Mittemayer	194	PM & K Potts	311	BJ & LC Williamson
95	BJ Wrihington	195	R Cottam	312	MS & JJ Ioannou
96	D Lazicic	196	F Saxberg & M Weir	313	NJ & BDE Pracy
97	DJ & MD Smith	198	GR & ME Metcalfe	314	SL Ford
98	ME & JJ Piper	199	PGG & I Nielsen	315	WJ Richards & BJ Uzelac
99	DE Jenner & WB Jensen	200	VK Grimshaw	316	CR Vassel & CM Williams
100	A Kapista	201	KR & GM Towerton	317	RJ Hore & V Bingham
101	RD & DMZ Hull	202	H & VF Butler	325	S & T Fevale
102	KA Roberts	203	DJ Miller	326	AW & LM Murray
103	SB Burnett & SL Grant	204	RB & JE Donnan	327	CA Tanner
104	RA & LA Deeben	205	DW Sparrow & M Tallan	328	Essential Energy
105	DJ & N Katsikaris	206	CA Marshall & R Vella	329	Tuck-Lee
106	TB & JH Reid	207	AA & DM Smith		
107	ZJ & M & AA Raso	208	SA & CR Hasaart		
108	R Varga	209	F Mawson		
109	DA Evans	210	JM & AM Tebutt		
110	JT Thompson & HT Evans	211	SA McGregor & WJ Gray		
111	GJ & NJ McEwan	212	E & M Lepik		
		213	D & J Parsonage		
		214	RK & EG O'Neil		

Source: MCQ, Feb 2015

OC4 SOUTH-WEST MODIFICATION

FIGURE 5b
Relevant Landholder List



1.4 CONSULTATION

MCO consults with relevant State Government agencies on a regular basis in relation to the approved Moolarben Coal Complex.

Consultation has been conducted with key State Government agencies, local councils, the local community and Aboriginal stakeholders during the preparation of this EA. A summary of this consultation to date is provided below. Consultation would continue during the public exhibition of this EA and the assessment of the OC4 South-West Modification.

Department of Planning & Environment

Briefings with the DP&E were conducted in May 2014 and February 2015 to provide an overview of the proposed OC4 South-West Modification and the proposed scope of environmental assessment.

Regulatory Agencies and Local Council

MCO sent briefing letters (dated April 2015) providing an overview description of the OC4 South-West Modification and proposed scope of environmental assessment to the following regulatory agencies:

- Office of Environment and Heritage (OEH);
- Environment Protection Authority (EPA);
- Department of Primary Industries – NSW Office of Water;
- NSW Division of Resource and Energy (within Department of Trade, Investment, Regional Infrastructure and Services); and
- Mid-Western Regional Council (MWRC).

Local Community

The Community Consultative Committee was established for the Moolarben Coal Complex in accordance with Project Approval (05_0117). The operation of the Community Consultative Committee was updated in March 2015 in accordance with Project Approval (08_0135).

The Community Consultative Committee provides a mechanism for ongoing communication between MCO and the local community. MCO sent a briefing letter (dated April 2015) to the Community Consultative Committee providing an overview description of the OC4 South-West Modification and proposed scope of environmental assessment.

Other Mines

MCO works closely with the operations of Ulan Mine Complex and Wilpinjong Coal Mine managing cumulative impacts associated with mining operations. The mining operations share their extensive environmental databases through a formal data sharing agreement to support relevant EAs or incident investigations and co-operate in the implementation of joint programs such as the Ulan Road Strategy.

Both UCML and WCPL were consulted in relation to the OC4 South-West Modification in April 2015.

1.4.1 Public Consultation

The Moolarben Coal website (www.moolarbencoal.com.au) provides regular updates on the Moolarben Coal Complex and provides access to relevant environment and community information, including EA documents, compliance reports and approval documents.

An environmental enquiry phone line (1800 556 484) allows members of the public to contact MCO with enquiries or complaints.

A copy of this EA would be made available on the Moolarben Coal website.

1.5 STRUCTURE OF THE EA

This EA is structured as follows:

Section 1	Provides an overview of the existing/approved Moolarben Coal Complex, the OC4 South-West Modification and a summary of the consultation undertaken in relation to the OC4 South-West Modification.
Section 2	Provides a description of the existing/approved Moolarben Coal Complex.
Section 3	Provides a description of the OC4 South-West Modification.
Section 4	Provides a review of the existing environment, assesses the potential impacts associated with the OC4 South-West Modification and describes the existing MCO environmental management systems and measures in place to manage and monitor any potential impacts.

Section 5 Provides the planning framework and statutory context.

Section 6 References.

Attachments 1 to 3 and Appendices A to E provide supporting information as follows:

Attachment 1 Stage 1 Project Approval (05_0117)

Attachment 2 Stage 2 Project Approval (08_0135)

Attachment 3 Site Verification Certificate

Appendix A Noise Assessment

Appendix B Air Quality Assessment

Appendix C Flora and Fauna Impact Assessment

Appendix D Surface Water Assessment Review

Appendix E Aboriginal Cultural Heritage Assessment

2 SUMMARY DESCRIPTION OF EXISTING/APPROVED MOOLARBEN COAL COMPLEX

2.1 APPROVALS HISTORY

Moolarben Coal Project (Stage 1)

The Moolarben Coal Project Stage 1 was approved under Part 3A of the EP&A Act by the NSW Minister for Planning on 6 September 2007 (Project Approval [05_0117]). Ten modifications to Project Approval (05_0117) have since been approved as summarised below:

- **MOD 1:** In August 2008, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to reconfigure the Coal Preparation Plant, emergency tailings dam, transfer stations and conveyors, rail loop, coal stockpiles, UG4 conveyor, groundwater treatment ponds and a water storage dam as well as amend the wording of three clauses in the Project Approval. The modification was approved by the NSW Minister for Planning on 26 November 2008.
- **MOD 2:** In December 2008, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to permit minor construction activities to commence at the site prior to completion of the main mine site access intersection off Ulan-Cassilis Road. The modification was approved by the NSW Minister for Planning on 18 December 2008.
- **MOD 3:** In February 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to allow for Stage 1 infrastructure to receive, handle and process Stage 2 coal for the life of Stage 2 (to 31 December 2038). An additional void in OC1 was also proposed to allow access to UG4. The modification was approved by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015.
- **MOD 4:** In April 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to change the configuration of the rail loop from a figure-8 to a balloon loop layout. The modification was approved by the NSW Minister for Planning on 30 June 2009.
- **MOD 5:** In July 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to relocate the ROM coal facility and develop a water sharing pipeline from the Ulan Mine Complex. The modification was approved by the NSW Minister for Planning on 5 October 2009.
- **MOD 6:** In December 2009, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to relocate the rejects bin to a preferred location about 250 m north-west of its previously approved location. The modification was approved by the NSW Minister for Planning on 11 January 2010.
- **MOD 7:** In March 2010, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act for the development and operation of a water supply and dewatering borefield and associated ancillary facilities. The modification was approved by the NSW Minister for Planning on 3 February 2011.
- **MOD 8:** In April 2010, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to establish and operate a ROM coal stockpile adjacent to the ROM coal dump hopper. The modification was approved by the NSW Minister for Planning on 27 May 2010.
- **MOD 9:** In May 2013, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to increase the extents of the approved Stage 1 open cuts. The modification was approved by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 16 June 2014.
- **MOD 10:** In February 2015, MCM submitted an application to modify Project Approval (05_0117) under section 75W of the EP&A Act to increase the Stage 1 ROM coal production rate from 8 to 9 Mtpa for calendar years 2015 and 2016. The modification was approved by the NSW Minister for Planning on 17 April 2015.

Moolarben Coal Project (Stage 2)

The Stage 2 EA was originally prepared by MCM under Part 3A of the EP&A Act. MCM made a number of changes to the proposed layout and design of the Moolarben Coal Project Stage 2 in order to address issues raised by the DP&I (now DP&E) and its independent technical reviewers, introduce additional impact avoidance measures and to enable the effective integration of Stage 2 with Stage 1.

Changes to the Moolarben Coal Project Stage 2 were described in the Stage 2 PPR which was exhibited from 31 January 2012 to 24 February 2012.

The Moolarben Coal Project Stage 2 was approved under Part 3A of the EP&A Act by the NSW Planning and Assessment Commission (as a delegate of the NSW Minister for Planning) on 30 January 2015 (Project Approval 08_0135).

2.2 CONSTRUCTION

The majority of Moolarben Coal Project Stage 1 facilities were constructed in 2009, including the office administration complex, ROM pad, Coal Handling and Preparation Plant (CHPP), rail spur, rail loop and rail loading infrastructure. Additional infrastructure construction activities have occurred as required over the life of the mine (Figure 3).

Construction of Moolarben Coal Project Stage 2 facilities is yet to commence.

2.3 MINING OPERATIONS

Four open cut pits (OC1, OC2, OC3 and OC4) are approved at the Moolarben Coal Complex. MCM is currently approved to mine up to 9 Mtpa of ROM coal from OC1, OC2 and OC3 combined in calendar years 2015 and 2016, and 8 Mtpa thereafter (i.e. Stage 1), and up to 12 Mtpa of ROM coal from OC4 (i.e. Stage 2) using conventional open cut coal mining methods. A combined total of 13 Mtpa of ROM coal from Stages 1 and 2 is approved to be processed (i.e. the maximum ROM coal extraction rates from Stages 1 and 2 do not occur simultaneously).

MCO is currently conducting open pit mining at the Moolarben Coal Complex in the OC1 and OC2 pits (Figure 3).

Three underground mining areas (UG1, UG2 and UG4) targeting the Ulan Seam are approved to be mined at a combined rate of up to 4 Mtpa. Coal would be recovered using conventional longwall mining and transferred to surface by conveyors. Highwall entries for UG1 and UG4 mines are approved in the OC1 highwall but have not yet been constructed. Access to UG2 would be via UG1.

Mining is approved 24 hours per day, seven days per week.

2.4 COAL HANDLING AND PREPARATION

The Moolarben Coal Complex produces washed coal products from the open cut operations and would produce unwashed coal products from the underground operations. The coal handling and preparation infrastructure has been designed to accommodate the processing of raw coal and the handling of washed product coal. The coal handling and preparation infrastructure would be upgraded once underground operations commence to handle raw (bypass) coal.

ROM coal from the open cut operations is transferred to the Stage 1 ROM coal facility or ROM stockpile by internal haul roads. ROM coal from the underground operations would be transferred to the Stage 1 ROM coal facility or ROM stockpile by conveyor and internal haul roads.

Coal at the Stage 1 ROM coal facility is conveyed to the Coal Preparation Plant. Crushing and sizing facilities are included at the Stage 1 ROM coal facility and the Coal Preparation Plant. The Moolarben Coal Complex is approved to handle up to 17 Mtpa of ROM coal.

The CHPP area includes an existing 400,000 tonne (t) open cut (washed) product coal stockpile. An approved 200,000 t underground (unwashed) product coal stockpile is yet to be constructed.

Approved conveyors connecting the Stage 1 ROM coal facility to the OC4 pit are yet to be constructed (Figure 2). Once constructed, these conveyors would allow transfer of OC4 ROM coal to the Stage 1 ROM coal facility and Coal Preparation Plant rejects from the Stage 1 ROM coal facility to OC4.

The CHPP operates up to 24 hours per day, seven days per week.

2.5 PRODUCT COAL TRANSPORT

The Moolarben Coal Complex is approved to export up to 13 million tonnes (Mt) of product coal from site each year. Product coal is loaded onto trains using a dedicated rail loop and rail load out facility, and transported to the Port of Newcastle.

Product coal is loaded onto trains 24 hours per day, seven days per week. Trains arrive and depart the Moolarben Coal Complex 24 hours per day, seven days per week.

The approved Moolarben Coal Complex requires the dispatch of up to five product coal trains per day.

2.6 WASTE ROCK MANAGEMENT

With the exception of the initial boxcut development, overburden and interburden or partings material is progressively placed back in-pit once the coal has been mined.

A combination of temporary and permanent out-of-pit waste rock emplacements are located adjacent to the open cut mining operations (Figure 2).

2.7 DRILL AND BLAST

Overburden and coal material at the Moolarben Coal Complex is blasted where necessary to achieve optimal fragmentation while complying with relevant impact assessment criteria of Project Approval (05_0117) and Project Approval (08_0135).

Blasting is approved to occur between the hours of 9.00 am and 5.00 pm, six days per week (excluding public holidays or Sundays).

The approved blast frequency is nine blasts per week on average over any 12 month period with a maximum of two blasts on any day. These restrictions do not apply to blasts that generate ground vibration of 0.5 mm/s or less at any privately-owned land, blasts misfires or blasts required to ensure the safety of the mine or its workers.

2.8 COAL REJECT MANAGEMENT

The Moolarben Coal Complex generates coarse reject and tailings in the coal preparation process.

Reject and tailings are conveyed from the CHPP to the Stage 1 ROM coal facility and then hauled or conveyed to an open pit void for emplacement.

An emergency tailings storage dam has been constructed adjacent to the Coal Preparation Plant to cater for emergency tailings storage (if required). The dam is also used for runoff and dirty water collection. Tailings in the emergency storage dam are periodically removed and transported for disposal within the open cuts.

2.9 GENERAL INFRASTRUCTURE

2.9.1 Site Access and Infrastructure Areas

The main infrastructure areas approved at the Moolarben Coal Complex include the CHPP area and rail loading facilities, Stage 1 mine infrastructure area, Stage 2 mine infrastructure area, Stage 1 ROM coal facility and Stage 2 ROM coal facility. Access to these areas is via Ulan Road or Ulan-Wollar Road (Figure 2).

The Moolarben Coal Complex CHPP area and rail loading facilities comprise the Coal Preparation Plant, rail loop, rail loadout, conveyors, hoppers, coal stockpiles, mine water dams, fuel store, workshop, sump, B-double turning loop, office, bathhouse, stores, main substation, hardstand areas, crib shed, car park and a number of service facilities (i.e. potable water, sewerage, electricity, fire services and hydrocarbon management) (Figure 3).

The Stage 1 open cut mine infrastructure area includes a workshop, bathhouse, offices, fuel store, light and heavy vehicle parking and other minor infrastructure and supporting facilities (Figures 2 and 3). An approved underground Mine Infrastructure Area in the OC1 void adjacent to the UG1 entry (Figure 2), which would comprise offices, bath house, substation, sump and ventilation fan (among other ancillary facilities), is yet to be constructed.

The Stage 2 open cut mine infrastructure area would include offices, bathhouses, workshops, final storages, explosive facility and magazine storage. Temporary facilities would be established in advance of mining in OC4.

The Stage 1 and Stage 2 infrastructure would be integrated where possible to allow services and facilities to be shared between Stage 1 and Stage 2 operations.

The Stage 1 ROM coal facility includes sizing stations, crushers, conveyors, dump hoppers and other associated infrastructure (Figure 2).

The Stage 2 mine infrastructure area and ROM coal facility have not yet been constructed.

Minor disturbance associated with approved ancillary works would continue to be developed outside of open cut pit and infrastructure disturbance boundaries, including (but not limited to) firebreaks, water diversion structures, minor contour banks, tracks, pipelines, explosives/magazine storage facilities, power supply for rope shovel, powerlines, fences and sediment and erosion control structures as required.

2.9.2 Haul Roads

All coal is hauled on internal roads or conveyed, and all product coal is transported by rail. All waste rock is hauled on internal haul roads. Internal haul roads are progressively constructed between the open cut operations, mine waste rock emplacements and ROM coal stockpiles within approved development areas as required.

Haul roads are regularly watered to minimise dust generation.

2.9.3 Electricity Supply and Distribution

Power is supplied to the Moolarben Coal Complex at 66 kilovolt (kV) from the existing Essential Energy Ulan Switchyard. The 66 kV powerline runs adjacent to the road and rail corridor to the CHPP area where a 66/11 kV substation is located. Power is distributed around the site by overhead cable or underground cable where necessary.

MCM has approval to realign the existing 66 kV powerline along the old Ulan-Wollar Road. This realignment has not yet been undertaken.

2.9.4 Potable Water

Potable water for all facilities is sourced from a combination of rainwater captured from roofs of facilities, suitably treated bore water or imported from external sources. The potable water supply reticulation system services the appropriate areas around the site.

2.9.5 Ancillary Infrastructure

The Moolarben Coal Complex is supported by a range of ancillary infrastructure that are periodically relocated, modified or expanded as mining operations progress. Such components include water management features (e.g. bores, pipelines, pumps, drains, contour banks, diversion channels and dams), environmental monitoring equipment, electricity supply, access tracks, equipment such as communication towers, in-pit facilities including bulk fuel handling and personnel crib huts/ablution facilities (among other things).

2.10 WATER MANAGEMENT

The water management strategy for the Moolarben Coal Complex is based on the containment and re-use of mine water as well as the control of sediment that may be potentially carried with runoff from disturbed areas such as the waste rock emplacements or areas cleared in advance of mining.

The existing water management system at the Moolarben Coal Complex comprises the following:

- water management storages;
- diversion of runoff from catchment areas upslope of the mine disturbance area;
- runoff control on disturbed and rehabilitated areas at the mine;
- runoff control on infrastructure areas;
- sedimentation control;
- water transfer pumps and piping;
- open pit dewatering; and
- sewage treatment and disposal of effluent.

Water is required to operate the Coal Preparation Plant, for washdown of mobile equipment, dust suppression on haul roads and for dust emission control sprays in the ROM and product coal stockpile areas. Water would also be used in the underground mines once developed (e.g. dust suppression). The main water sources for the operation are:

- recovery from coal processing;
- groundwater inflows into the open cut voids;
- catchment runoff (from disturbed areas) and infiltration;
- incidental rainfall over water storages;
- water sharing arrangements with UCML; and
- groundwater extraction from licensed bores.

If stored water volumes are excessive, MCO can release water off-site in accordance with the requirements of Environment Protection Licence (EPL) 12932, subject to stringent release criteria and conditions being met.

The water balance of the system fluctuates with climatic conditions and as the extent of the mining operations changes over time. The water management system is progressively developed as water management requirements evolve in accordance with the approved Water Management Plan.

2.11 WASTE MANAGEMENT

MCO operates the Moolarben Coal Complex waste management system in accordance with the Waste Management Plan (MCO, 2013).

MCO waste disposal systems are designed to minimise the amount of waste generated by the mine that goes to landfill.

Waste generated at the Moolarben Coal Complex includes general rubbish, sewage, scrap timber; batteries, tyres, waste oil and filters and other hydrocarbons, empty drums and scrap metals.

Operation of the mining fleet generates waste hydrocarbons such as oils, greases and hydraulic fluids. These waste hydrocarbons are placed in suitable containers and removed from the site for disposal at either an EPA-approved hydrocarbon waste site or a recycling depot.

Treated effluent is discharged in accordance with EPL 12932.

Suppliers are encouraged to supply recyclable products and products that have the capacity for reuse in accordance with the specified 70% waste reduction target.

2.12 MANAGEMENT OF DANGEROUS GOODS

The transportation, handling and storage of all dangerous goods at the Moolarben Coal Complex is conducted in accordance with *Storage and Handling of Dangerous Goods – Code of Practice 2005* (Workcover, 2005).

2.12.1 Hydrocarbon Storages

A fuel and lubrication store contains above-ground bunded diesel-storage tanks in accordance with the requirements of Australian Standard (AS) 1940: *The Storage and Handling of Flammable and Combustible Liquids*.

Runoff water from mobile equipment service areas is directed to an interceptor trap to extract hydrocarbons, prior to it being discharged into the mine water management system. The trap is routinely emptied of hydrocarbons by a licensed contractor.

2.12.2 Explosives Storage

Explosives required for the Moolarben Coal Complex include initiating products and detonators, ammonium nitrate fuel oil and emulsion explosives.

Explosives on-site are stored, transported and used in accordance with the requirements of AS 2187.2:2006 *Explosives – Storage, Transport and Use – Use of Explosives*.

2.13 WORKFORCE

At full development, the Moolarben Coal Complex requires an average workforce of approximately 439 people. Stage 2 would require a construction workforce of 220 workers.

2.14 REHABILITATION AND FINAL LANDFORM

The Mining Operations Plan (MOP) for the Moolarben Coal Complex describes site activities and the progress toward environmental and rehabilitation outcomes required under the ML conditions and the Project Approvals (05_0117 and 08_0135).

Rehabilitation of the Moolarben Coal Complex Stage 1 has been undertaken in accordance with the Rehabilitation and Offset Management Plan¹. To December 2014, approximately 157 ha of the backfilled OC1 pit has been rehabilitated in accordance with the Rehabilitation and Offset Management Plan. Ongoing monitoring and maintenance is undertaken in accordance with the Rehabilitation and Offset Management Plan.

Rehabilitation of the Moolarben Coal Complex Stage 2 would be undertaken in accordance with a Rehabilitation Management Plan to be prepared for the Moolarben Coal Complex incorporating Stage 2. The proposed Stage 2 rehabilitation strategy is outlined in Appendix K of the Stage 2 PPR.

¹ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Biodiversity Management Plan and Rehabilitation Management Plan which will supersede the Landscape Management Plan (including the Rehabilitation and Offset Management Plan).

2.14.1 Rehabilitation Objectives

Stage 1 Rehabilitation

The rehabilitation objectives for Stage 1 of the Moolarben Coal Project are described in the Rehabilitation and Offset Management Plan and are as follows:

- Create a safe, stable, adequately drained post-mining landform that is consistent with the local surrounding landscape within the operational area to minimise visual impacts.
- Rehabilitate the OC1 footprint using native vegetation to create Box Gum Woodlands and Sedimentary Ironbark Forests with stands of *Allocasuarina*.
- Revegetate lands adjoining the northern part of the OC2 area and haul road linkage with OC1 that are under the control of MCO, to enhance vegetation cover and connectivity.
- Enhance Grassy White Box Woodland on basalt soils, in close proximity to Carrs Gap, that are located within the Moolarben Coal Complex Stage 1 application area.
- Improve the ecological integrity of the aquatic habitats through revegetation using native species identified in the Rehabilitation Management Plan.
- Revegetate the riparian zone of the Moolarben Creek to the east of OC3 to improve stream health and enhance the Alluvial Apple Forest.
- Manage the riparian zone of the Bora Creek to improve stream health.
- Rehabilitate mined land to a comparable standard as the relative analogue sites and completion criteria.
- Minimise site access by vehicles which can result in the compaction of soil (which can reduce the infiltration of water into the soil and restrict root growth, and consequently reduce natural regeneration), the spread of weeds and disturbance to vegetation.
- Conduct works associated with UG4 in accordance with an approved Extraction Plan to minimise subsidence impacts on vegetation.
- Protect portions of the lands located above UG4 with an appropriate conservation mechanism for the long-term security of this ecosystem.
- Separate clean and dirty water across the Moolarben Coal Complex Stage 1 application area.
- Promote biodiversity through weed and feral animal control programs.

- Rehabilitate OC2 and OC3 footprints principally for agricultural outcomes.

The OC4 South-West Modification proposes to backfill the northern OC1 final void to approximately pre-mining elevations and revegetate with woodland species.

Stage 2 Rehabilitation

Rehabilitation of Stage 2 is described in the Stage 2 Moolarben Coal Project Rehabilitation Strategy (MCO, 2011). The specific rehabilitation objectives for Stage 2 are:

- Create a natural looking, stable and well drained post-mining landform that is visually consistent with surrounding areas.
- Create a self-sustaining and ecologically diverse post-mining landscape that is compatible with the conservation values of the adjacent Munghorn Gap Nature Reserve and Goulburn River National Park.
- Revegetate and enhance remnant vegetation on non-mine owned land that is under the control of MCO with endemic native species.
- Create wildlife corridors and habitat links, where feasible, between existing remnant vegetation in the Munghorn Gap Nature Reserve, Goulburn River National Park and other surrounding areas by increasing the continuity of woodland vegetation.
- Maintain the diversity and genetic resource of flora currently existing within the locality.
- Maintain and enhance habitat for native fauna.
- Realign and rehabilitate Murragamba and Eastern creeks to be hydraulically and geomorphologically stable and ecologically diverse.
- Rehabilitate degraded riparian areas along Wilpinjong Creek and along Murragamba and Eastern creeks downstream from mined areas within the Moolarben Coal Complex Stage 2 application area.
- Reinstate subsidiary surface drainage.
- Improve soil condition and native seed bank.
- Prevent soil erosion and sedimentation.
- Provide access for monitoring and adaptive management, control of exotic flora and fauna species and suppression of fires.
- Progress towards meeting closure and post-mining land use objectives (to be developed in consultation with stakeholders and described in a Mine Closure Plan) in a timely and cost effective manner.

2.14.2 Final Landform

The approved final landform for the Moolarben Coal Complex includes final voids in the south of OC3, east of OC4 and two voids in the OC1. The currently approved mine plan provides underground access to UG4 via the northern OC1 void and underground access to UG1 and UG2 via the southern OC1 void (Figure 2).

In accordance with Condition 32 of Schedule 3 of the Stage 1 Project Approval (05_0117) (Attachment 1), MCO is required to line the Ulan Seam outcrop in the northern OC1 final void with a low permeable material. The intention of this condition is to reduce the potential recirculation of stored water in the northern OC1 void through the Ulan Seam and into the underground workings.

2.14.3 Rehabilitation Monitoring

In accordance with the MOP and Rehabilitation and Offset Management Plan, MCO currently conducts annual Ecosystem Function Analysis (EFA) monitoring and reporting which comprises:

- Landscape Function Analysis;
- Landscape Organisation Index;
- Soil Surface Assessment (producing stability, infiltration and nutrient indices); and
- Vegetation Dynamics (for woodland areas).

The EFA is used to assess the progress of rehabilitation sites against relevant reference sites located outside the disturbance footprint and is used to assess whether rehabilitation areas are satisfying rehabilitation objectives and are on a trajectory toward self-sustainability. Rehabilitation monitoring results are reported in the Annual Review.

2.15 ENVIRONMENTAL MANAGEMENT AND MONITORING

Environmental management and monitoring at the Moolarben Coal Complex is conducted in accordance with a range of plans required by Project Approvals (05_0117 and 08_0135) and EPBC 2013/6926.

Following the approval of Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project, the following environmental management plans are required under the state and federal approvals for the Moolarben Coal Complex²:

- Environmental Management Strategy.
- Noise Management Plan.
- Blast Management Plan.
- Air Quality Management Plan.
- Water Management Plan (including Site Water Balance, Surface Water Management Plan and Groundwater Management Plan).
- Biodiversity Management Plan.
- Heritage Management Plan.
- Rehabilitation Management Plan.
- Extraction Plan.
- Greenhouse Gas Minimisation Plan.
- Vegetation Clearance Protocol and Landscape Management Plan.
- Biodiversity Offset Management Plan.

The Moolarben Coal Complex has an extensive environmental monitoring regime. Environmental monitoring locations are shown on Figure 6.

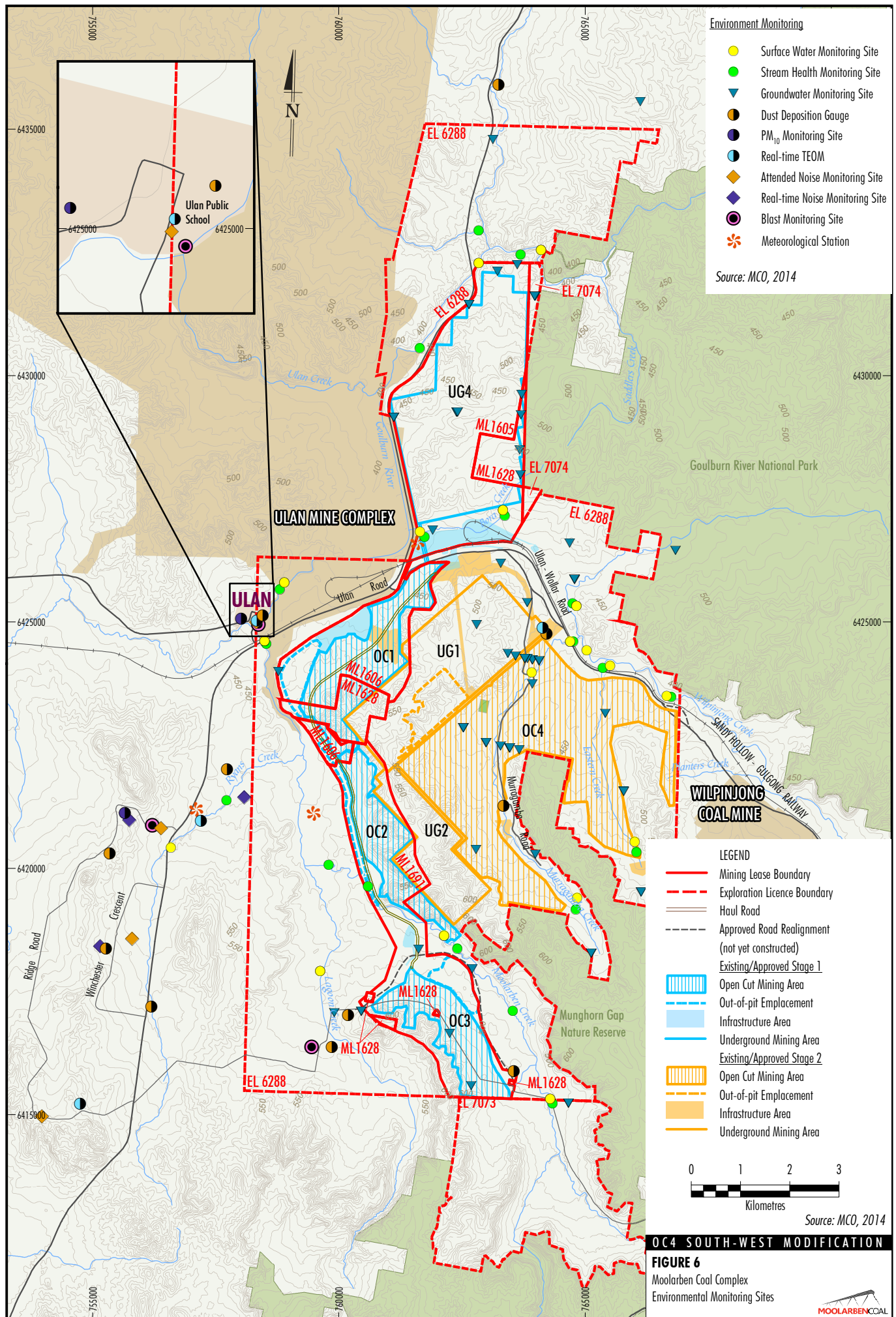
2.16 COMMUNITY CONTRIBUTIONS

MCO financial contributions to the MWRC are made in accordance with Moolarben Coal Complex Planning Agreements, Project Approval (05_0117) and Project Approval (08_0135).

UCML, WCPL, MCO and MWRC are also co-funding implementation of the Ulan Road Strategy that will result in significant upgrades to Ulan Road.

MCO also makes financial contributions to a number of non-Government and community organisations in the region. MCO financial contributions (in the form of sponsorships and donations) to various education, community development, health, environmental, arts, culture, and youth services in the region in the 2014 calendar year has totalled approximately \$215,000.

² On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing complex-wide environmental management plans.



Examples of recent financial contributions have included support for the following groups:

- Mudgee Readers Festival;
- Ulan Public School;
- Mudgee Rugby Club;
- Gulgong Historical Society;
- Mudgee Gymnastics;
- Gulgong Prince of Wales Eisteddfod;
- Ulan Public School;
- Rotary Club Of Rylstone – Kandos;
- Life Skills;
- Gulgong Heritage Festival Committee;
- Mudgee District Netball;
- Pioneer Auxiliary Ladies;
- Westpac Helicopter;
- Mudgee Rescue Volunteer Association;
- Mudgee Junior Rugby league;
- Riding for the disabled – Mudgee;
- Gulgong Rural Fire Brigade;
- Mudgee District Tennis Club;
- Mudgee High School;
- Mudgee Basketball Association;
- Gulgong District Pony Club;
- Mudgee Amateur Softball Association;
- Rylstone and Kandos volunteer search and rescue; and
- Mudgee Police.

2.17 COMPLAINTS

In accordance with the requirements of the Environmental Management Strategy, MCO records and responds to all complaints and provides a complaints register summary in the Annual Review each year.

In the 2012-2013 reporting period, a total of 120 complaints were received (MCO, 2013) from some 18 complainants with 55% of the 120 complaints coming from a single resident. The majority of complaints were related to noise impacts. The total number of complaints (120) was a significant reduction from the 2011-2012 reporting period which had a total of 359 complaints.

Mine-related complaints are managed in accordance with the Community Complaints Procedure as outlined in the Environmental Management Strategy.

3 DESCRIPTION OF THE PROPOSED MODIFICATION

Following a review of mine planning, MCO has identified opportunities to streamline the coordination and integration of Stage 2 mining activities with the existing Stage 1.

The OC4 South-West Modification includes the following key components:

- construction of the OC4 south-west haul road between OC4 and OC1 (and therefore the approved Stage 2 Haul Road would not need to be constructed) (Figure 4);
- adjustments to the site water management system to contain surface water runoff from the south-west haul road and diversion of upslope water;
- refinements to the early stages of mining and associated infrastructure layout at OC4 (wholly located within the approved surface disturbance footprint); and
- backfilling of the northern OC1 final void to approximately pre-mining elevations with waste rock from OC1 (Figure 4).

3.1 MINING OPERATIONS

There would be no change to the open cut mining method due to the OC4 South-West Modification. (Section 2.3).

There would be no change to the approved underground longwall mining method (Section 2.3) due to the OC4 South-West Modification.

Mining activities at the Moolarben Coal Complex would continue to occur 24 hours per day.

3.1.1 Mining Extent

The OC4 South-West Modification does not include any alteration to the approved extent of open cut or underground mining (Figure 4).

3.1.2 Mine Schedule

The OC4 South-West Modification would not change the currently approved mine life (i.e. to 2038).

There would be no increase to the currently approved maximum annual ROM coal production or waste rock extraction rates for the OC4 South-West Modification.

An indicative mine schedule for the Moolarben Coal Complex incorporating the OC4 South-West Modification is provided in Table 2.

Table 2
Indicative Mine Schedule

Year	Waste Rock (Mbcm)	Open Cut ROM Coal (Mtpa)	Underground ROM coal (Mtpa)
2015	42.4	9.0	0
2016	55.0	13.0	4.0
2017	52.6	13.0	4.0
2018	52.6	13.0	4.0
2019	52.4	13.0	4.0
2020 to 2038	55.0*	13.0*	4.0*

* Anticipated maximum production rate per annum.

3.1.3 OC4 South-West Haul Road

The OC4 South-West Modification would involve the construction of the south-west haul road between OC4 and OC1 (Figure 4). As a result, the approved Stage 2 Haul Road would not be needed and consequently would not be constructed (Figure 4).

Approximately 5.1 ha of surface disturbance would be required for the OC4 south-west haul road.

Removal of the approved Stage 2 Haul Road would result in the following environmental benefits:

- up to approximately 18.5 ha of approved surface disturbance being avoided associated with the Stage 2 Haul Road, and therefore, a total net reduction in surface disturbance of 13.4 ha; and
- improved water management and reduced risk of uncontrolled sediment discharge due to the reduction in disturbed surface catchment.

The proposed south-west haul road route also provides significant operational benefits, including:

- shorter travel distances to the OC1 Workshop Facilities; and
- removal of the requirement for supporting administration facilities in the OC4 area associated with the temporary mine infrastructure area.

3.1.4 Mobile Fleet

Additional fleet items would be required to meet expected production

The additional fleet items would be of low noise emission standard (e.g. all new fleet would be XQ [extra quiet] models). An indicative revised mine fleet has been assessed and is provided in the Noise and Blasting Assessment (Appendix A).

3.1.5 Waste Rock Management

During the initial development of OC4, waste rock would either be placed in the approved out-of-pit emplacement area. Waste rock from OC4 would then be placed in-pit behind the advancing open cut.

There would be minor changes to the shape of the OC4 out-of-pit waste rock emplacement to accommodate the OC4 south-west haul road. There would be no increase to the extent or maximum height of the OC4 out-of-pit waste emplacement due to the OC4 South-West Modification.

3.1.6 Underground Access to UG4

The northern OC1 void would be backfilled to approximately pre-mining elevations with waste rock from OC1 (Figure 4) reducing the number of voids in the final landform to three.

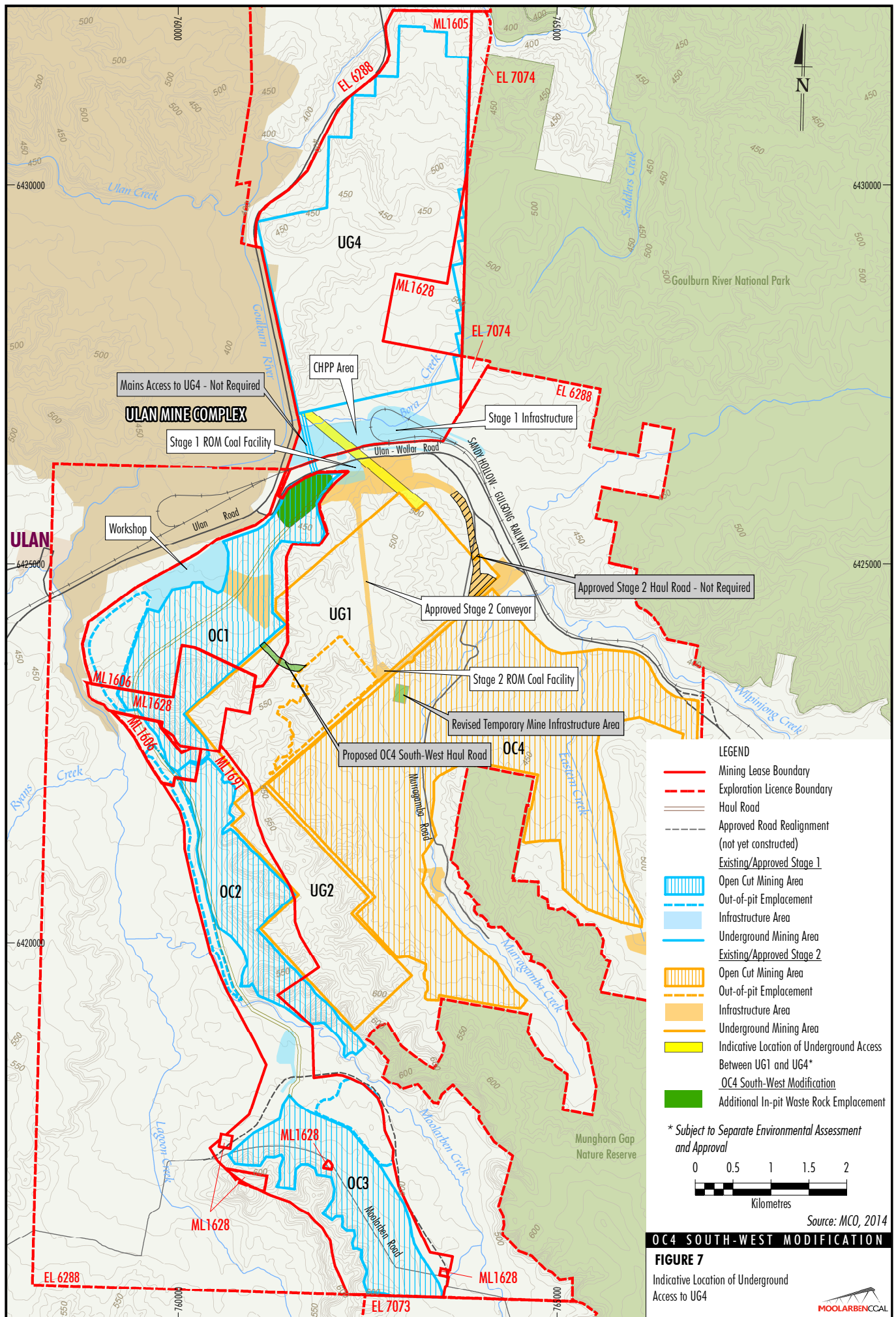
The backfilling of the northern OC1 void would result in the loss of access from the OC1 highwall to the approved UG4 which is scheduled to commence following the completion of UG1 and UG2. A revised access for UG4 would be sought as part of a separate EA and approval application. An indicative alternate access is shown on Figure 7.

3.1.7 Drill and Blast

There would be no change to the existing blasting technique, frequency or hours (Section 2.7) due to the OC4 South-West Modification.

3.1.8 Product Coal Transport

The OC4 South-West Modification would not change approved rates of maximum product transport (13 Mtpa) or the approved number of daily laden trains dispatched from site (up to five).



3.2 GENERAL INFRASTRUCTURE

Coal Handling and Preparation Infrastructure

There would be no change to the approved CHPP process or infrastructure (including Stage 1 ROM coal facility) or approved overland conveyors between OC4 and the Stage 1 ROM coal facility due to the OC4 South-West Modification.

Mine Infrastructure Area

Some Stage 2 administration facilities and mine infrastructure (e.g. muster area, crib room, car park and fuel farm) would be relocated to a temporary mine infrastructure area within the existing OC4 footprint (Figure 4).

Due to the shorter travel distance, mobile fleet operating within OC4 would use the OC1 Workshop Facilities.

The access road to OC4 off Ulan-Wollar Road would be retained.

3.3 WATER MANAGEMENT

Drainage structures would be constructed along the OC4 south-west haul road to capture and re-direct water from the haul road to mine water storages.

Runoff from the proposed OC4 south-west haul road would be captured in two water storages located within the currently approved disturbance area. The surface water management system already captures runoff from the OC4 south-west haul road area. In addition, the OC1 final void is not used as a water storage in the existing site water balance, and therefore backfilling the OC1 final void would not result in a loss of water storage capacity. Consequently negligible change to the water balance is anticipated (Appendix D). Notwithstanding, MCO would continue to undertake regular reviews of the water balance.

If stored water volume falls, MCO can source water through sharing arrangements with adjoining mines and/or from licensed water supply bores.

MCO can also manage excess water via off-site release in accordance with the requirements of EPL 12932, subject to stringent release criteria and conditions being met.

3.4 WASTE MANAGEMENT

The OC4 South-West Modification would not change the existing waste streams (Section 2.11) and accordingly, no changes to existing waste management practices at the Moolarben Coal Complex would be required.

3.5 MANAGEMENT OF DANGEROUS GOODS

The OC4 South-West Modification would not change the dangerous goods handled at the Moolarben Coal Complex (Section 2.12) and accordingly, no changes to the management of dangerous goods (e.g. hydrocarbons, explosives and chemicals) would be required.

3.6 WORKFORCE

The OC4 South-West Modification would not change the Moolarben Coal Complex operational workforce (Section 2.13).

3.7 CONSTRUCTION ACTIVITIES

There would be no additional construction activities associated with the OC4 South-West Modification.

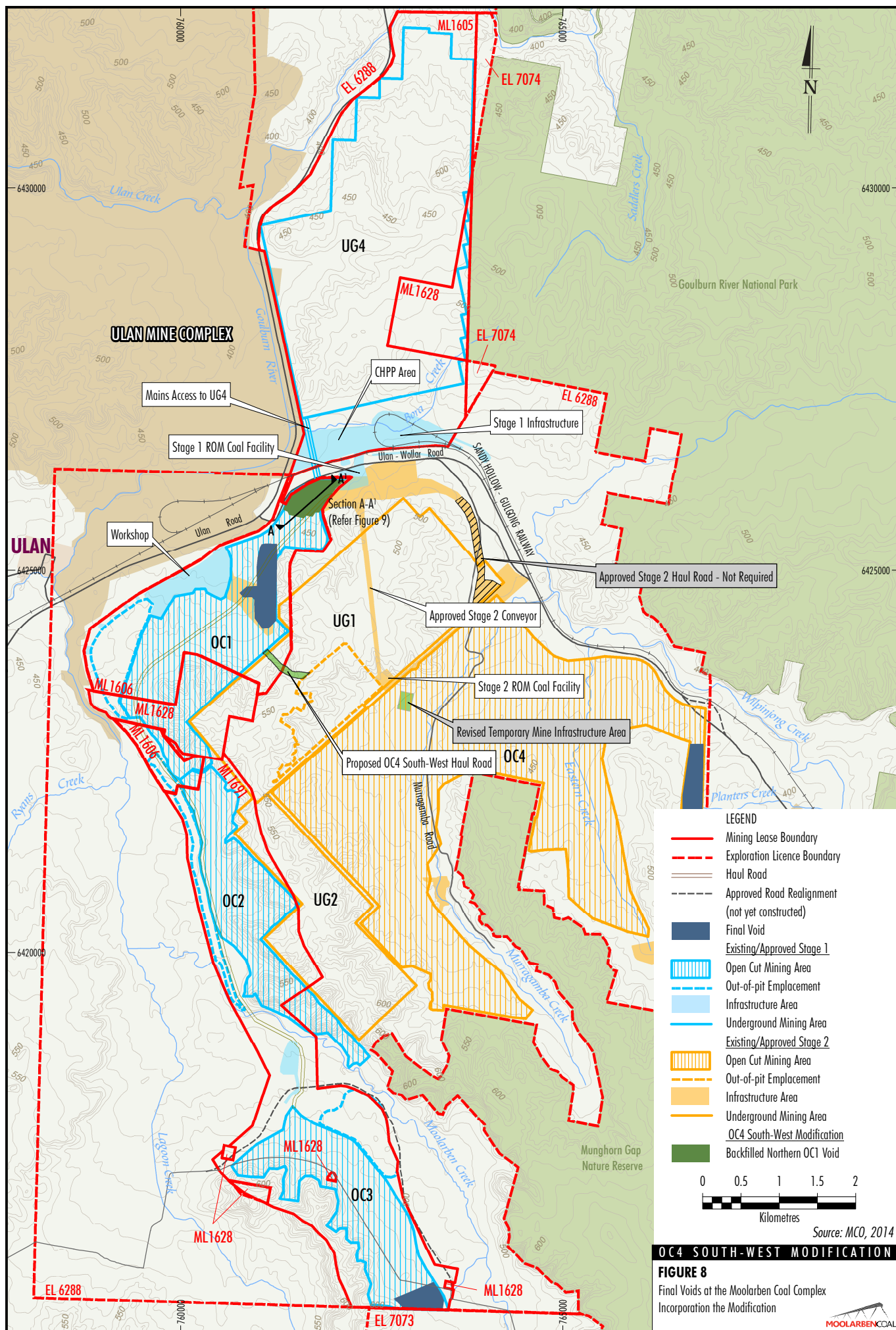
The proposed change to the haul road is considered to be part of the OC4 mining operations, as opposed to construction activities.

3.8 REHABILITATION AND FINAL LANDFORM

The approved rehabilitation objectives and concepts for the OC4 South-West Modification would remain generally unchanged with the exception of the following elements. Notwithstanding, a Rehabilitation Management Plan and MOP would be prepared to incorporate the OC4 South-West Modification.

3.8.1 Northern OC1 Final Void

The northern OC1 void would be backfilled to approximately pre-mining elevations with waste rock reducing the number of voids in the final landform across the Moolarben Coal Complex to three (Figure 8).

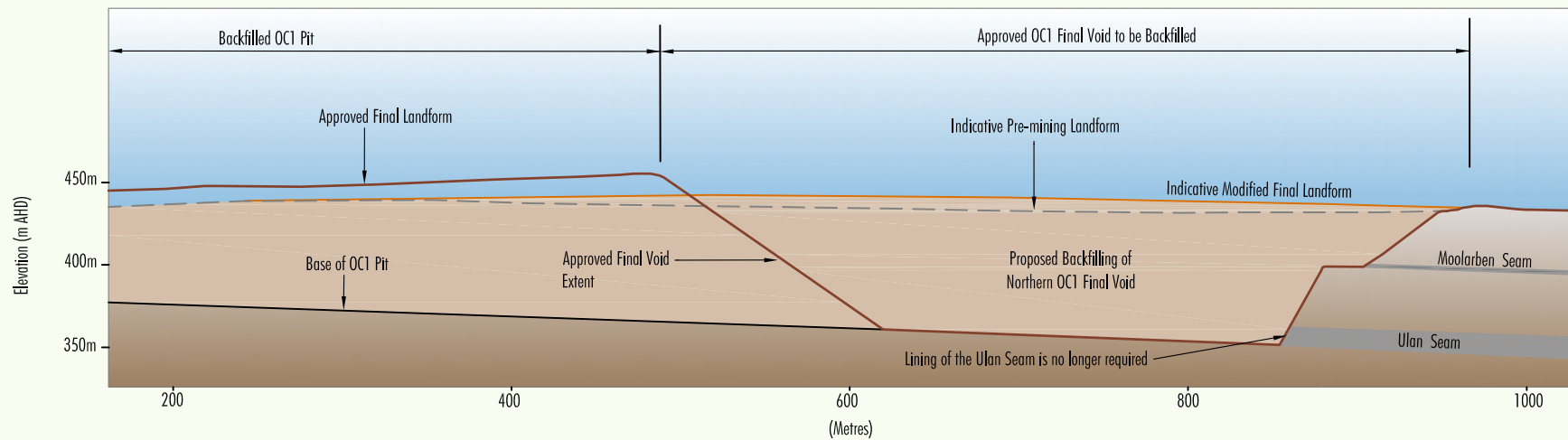


The backfilling of the northern OC1 final void would provide a beneficial post-mining rehabilitation outcome by integrating with the surrounding pre-mining landforms and reducing the amount of surface water that would be captured on-site by the post-mining landform. An indicative cross-section of the approved and proposed northern OC1 final landforms is shown on Figure 9.

As a consequence of backfilling the northern OC1 final void, there would no longer be a requirement to line the Ulan Seam as required by Condition 32 of Schedule 3 of the Stage 1 Project Approval (05_0117) (Attachment 1). MCO is seeking to remove this condition as part of the OC4 South-West Modification (Section 5.3.1).

3.8.2 OC4 South-West Haul Road

Rehabilitation of the OC4 south-west haul road would be undertaken prior to closure of the Moolarben Coal Complex. Following the cessation of mining, the OC4 south-west haul road would be re-profiled to free draining landforms, ripped and revegetated with woodland species.



Source: MCO, 2014

Section A-A¹
(Refer Figure 8)

OC4 SOUTH-WEST MODIFICATION

FIGURE 9

Conceptual Final Landform-Cross
Section of the Northern OC1 Final Void



4 ENVIRONMENTAL ASSESSMENT

The following sub-sections present the EA for the OC4 South-West Modification, including a description of the existing environment, an assessment of the potential impacts of the OC4 South-West Modification on the environment, and where relevant, a description of the measures that would be implemented to avoid, minimise, mitigate and/or offset the potential impacts.

4.1 NOISE

A Noise Assessment for the OC4 South-West Modification was undertaken by SLR Consulting (2015) (Appendix A).

Aspects relating to noise emissions are discussed in the subsections below.

Potential blasting impacts are discussed separately in Section 4.8.2.

4.1.1 Background

Project Approval Noise Limits

A number of noise assessments have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Project. The most recent assessment of operational noise impacts for the approved Moolarben Coal Complex (incorporating Stages 1 and 2) was conducted by EMGA Mitchell McLennan (EMM) (2013a).

The assessment predicted that six privately-owned residences would experience noise levels above the Project-specific noise limit (PSNL) of 35 A-weighted decibels (dBA) equivalent continuous noise level (dBA $L_{Aeq}(15\text{minute})$) (EMM, 2013a). MCO has since purchased one of these properties and a further property (Receiver 63) is subject to a private agreement with MCO.

These exceedances of the PSNL were approved, subject to the management, mitigation and monitoring of noise impacts from the Moolarben Coal Complex in accordance with the requirements of Project Approvals (05_0117 and 08_0135). This includes:

- the right to request property acquisition for Receiver 32 or where noise exceeds the Project Approval Land Acquisition Criteria at privately-owned residences or over 25% or more of privately-owned land;
- Project Approval noise limits for privately-owned residences;
- the right to request mitigation measures for residences where noise levels are greater than the Project Approval Noise Mitigation Criteria; and
- the right for the NSW Department of Education and Communities to request reasonable and feasible noise (and dust) mitigation measures to be implemented at the Ulan Public School or for MCO to contribute to or meet reasonable costs towards relocating the Ulan Public School.

Noise Management and Monitoring

The approved Noise Management Plan³ has been prepared to manage Project-specific and cumulative noise impacts associated with the Moolarben Coal Complex. The Noise Management Plan describes the noise monitoring program, which consists of a combination of operator-attended and continuous real-time noise monitoring, as well as two Automatic Weather Stations (AWS) (Figure 10). An additional AWS not described in the Noise Management Plan has been established near OC2 (Figure 10).

MCO implements a range of noise control and management measures at the Moolarben Coal Complex, including mine planning controls, operational controls, engineering controls, a real-time response protocol, meteorological forecasting and continuous improvement to identify and manage noise impacts aimed to achieve compliance with the approved noise criteria.

Reasonable and feasible on-site noise controls implemented to minimise noise emissions from the Moolarben Coal Complex include:

- attenuation of mobile equipment such as haul trucks, shovels and excavators, dozers and drills;
- fitting of a number of haul trucks with Dura-Trays to reduce the noise emissions associated with loading and unloading (Figure 11);
- locating mobile fleet (e.g. excavators) behind pit walls and at low elevations to shield noise emissions during adverse weather conditions (Figure 11);

³ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Noise Management Plan.

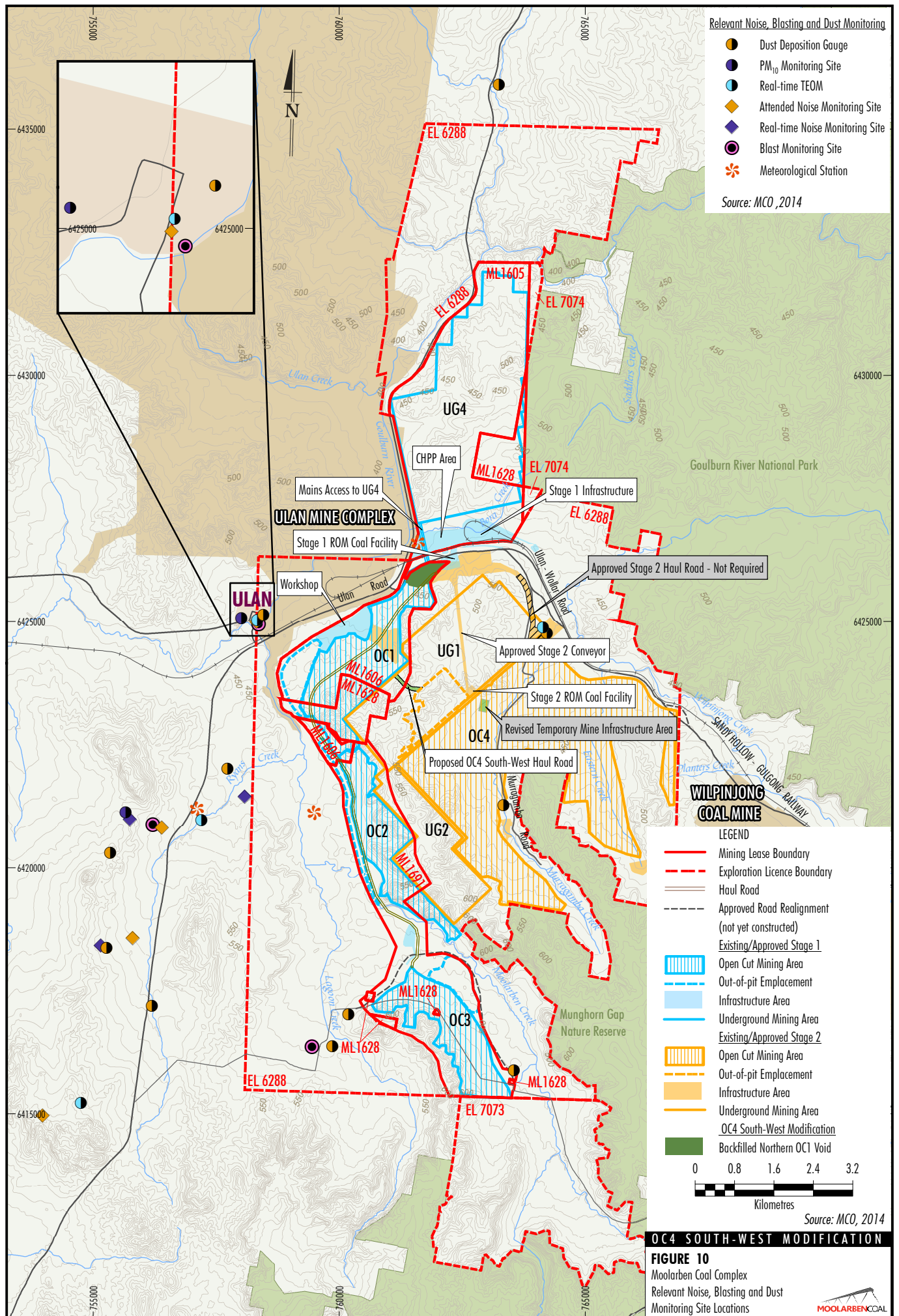




Plate 1 Haul truck fitted with Duratray



Plate 2 Excavator shielded by pit wall



Plate 3 Overburden dump area shielded by side of waste emplacement

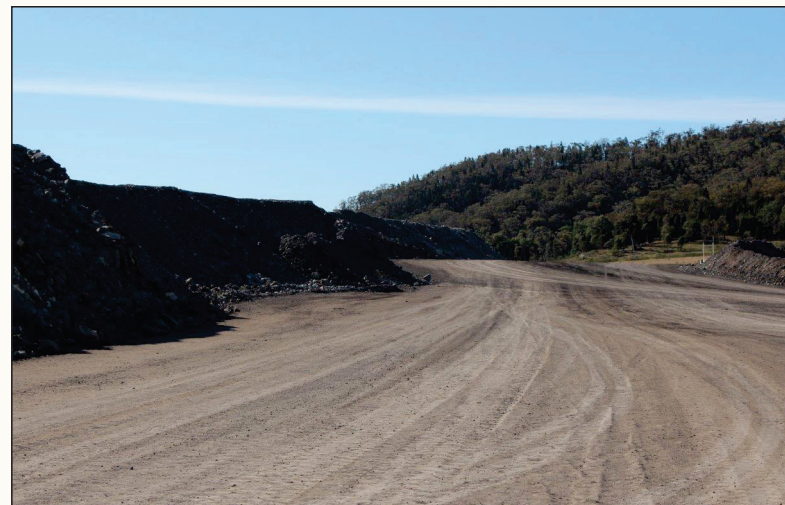


Plate 4 Typical berms/bunding along haul roads

Source: MCO, 2014

OC4 SOUTH-WEST MODIFICATION

FIGURE 11

Current Noise Management Measures



- construction of steps in waste emplacements to allow dumping to occur at lower elevations during adverse weather conditions (Figure 11);
- construction of berms/bunds along haul roads which are exposed to receivers (Figure 11);
- implementation of meteorological forecasting to inform daily operations;
- use of real-time noise monitoring data that incorporate automatic noise alarms to assist operational personnel in proactive management of noise impacts; and
- use of operational personnel to monitor real time noise data to assist production supervisors in proactive management of noise impact.

Operator-attended noise monitoring is used to demonstrate compliance with Project Approval noise criteria, whilst continuous real-time monitoring is used as a noise management tool to assist MCO to take pre-emptive noise management actions to avoid potential non-compliances.

MCO has also recently implemented new software that assists in pro-active management of noise (and dust) emissions. The system provides daily reports and predictions of upcoming meteorological conditions and potential noise risks. Based on prevailing wind conditions, MCO can strategically alter its operations to reduce these impacts.

A description of these management measures is provided in Appendix A.

MCO maintains a complaints register in accordance with its Project Approvals (05_0117 and 08_0135). All noise related complaints received by MCO are responded to and investigated in accordance with the Community Complaints Procedure detailed in the Noise Management Plan. A review of noise related complaints is provided in Appendix A.

MCO reports noise monitoring results in its Monthly Environmental Monitoring Report, Quarterly Environmental Noise Monitoring Report and Annual Environmental Management Report (AEMR)/Annual Review. A review of the noise monitoring reports is provided in Appendix A.

4.1.2 Environmental Review

Noise modelling was conducted by SLR Consulting (2015) to predict potential noise impacts from the Moolarben Coal Complex incorporating the OC4 South-West Modification.

SLR Consulting conducted a noise investigation survey in July and August 2014 to validate the Moolarben Coal Complex noise model, reflect as-built features and to review the model calibration (Appendix A).

Assessable Meteorological Conditions

The NSW *Industrial Noise Policy* assessable meteorological noise modelling parameters are presented in Appendix A, and are generally consistent with the previously assessed meteorological conditions.

The Stage 1 Modification 9 noise assessment for the approved Moolarben Coal Complex assessed noise impacts during temperature inversions up to 3.9 degrees Celsius (°C) per 100 m.

Direct temperature gradient measurement at the 60 m high temperature tower at the Wilpinjong Coal Mine has provided additional data regarding temperature gradients that occur in the area (Appendix A).

Based on analysis of available data between August 2011 and July 2014, SLR Consulting identified that noise impacts during temperature gradients up to 5.2°C per 100 m were assessable under the NSW *Industrial Noise Policy*.

Modelling Scenarios

The OC4 south-west haul road would bring OC4-related haul truck movements closer to potential private receivers to the west of the Moolarben Coal Complex, in particular during the early years of the OC4 South-West Modification (Figure 4).

Therefore, SLR Consulting (2015) modelled two key scenarios in the early years of the OC4 South-West Modification to assess potential noise impacts associated with the modified Moolarben Coal Complex (2016 and 2018 mine scenarios). These scenarios are representative of potential maximum noise impacts at Ulan and Cooks Gap (Appendix A). Further justification for the scenario years is provided in Appendix A.

Reasonable and Feasible Mitigation Measures

Where relevant, existing mitigation measures (Section 4.1.1) were incorporated into the noise modelling conducted for the OC4 South-West Modification.

In addition, the following reasonable and feasible noise mitigation measures would be implemented for the OC4 South-West Modification (Appendix A):

- Extra-quiet (XQ or similar) mobile equipment fleet and “low noise” fixed plant (i.e. conveyor drives and conveyor idlers) would be purchased.
- Acoustic bunding would be established at selected locations around the site, targeting haul roads.
- From 2018, waste rock emplacement in OC4 during evening and night-time would occur at relatively lower elevations, using the main waste rock emplacement to shield receivers from Cooks Gap from potential noise impacts.
- In-pit hauling of waste rock in OC1 would be maximised (i.e. restricting fleet to lower elevations).

Potential Impacts

Noise modelling for the Moolarben Coal Complex incorporating the OC4 South-West Modification shows that, with the implementation of reasonable and feasible mitigation measures and the continued implementation of the noise management strategy, no exceedances of the current Project Approval noise limits are predicted at any privately-owned receiver.

Indicative noise contours for night-time operations under adverse meteorological conditions for the Moolarben Coal Complex incorporating the OC4 South-West Modification in Years 2016 and 2018 are shown on Figures 12 and 13, respectively.

4.1.3 Mitigation Measures, Management and Monitoring

MCO will continue to mitigate, monitor and manage potential noise impacts from the Moolarben Coal Complex in accordance with the Noise Management Plan, which would be updated to incorporate the OC4 South-West Modification, via a combination of the following:

- reasonable and feasible mitigation measures;
- predictive meteorological forecasting, and associated pre-emptive noise management measures when adverse meteorological conditions are predicted;
- real-time noise monitoring and associated pre-emptive noise management measures when trigger levels (set below Project Approval noise limits) are exceeded; and

- attended noise monitoring to confirm ongoing compliance with Project Approval noise limits.

Ulan Public School

In accordance with the requirements of the Project Approvals (Attachments 1 and 2), MCO would:

- consult with Department of Education and Communities and, if requested, implement agreed reasonable and feasible measures to ameliorate potential noise and/or dust impacts to Ulan Public School; or
- on a reasonable basis relating to the adverse effect of noise and/or dust from the Moolarben Coal Complex, negotiate with Department of Education and Communities to contribute to or meet reasonable costs toward relocating the Ulan Public School.

4.2 AIR QUALITY

An Air Quality Assessment for the OC4 South-West Modification was undertaken by Todoroski Air Sciences (2015) (Appendix B).

Aspects relating to dust emissions are discussed in the subsections below.

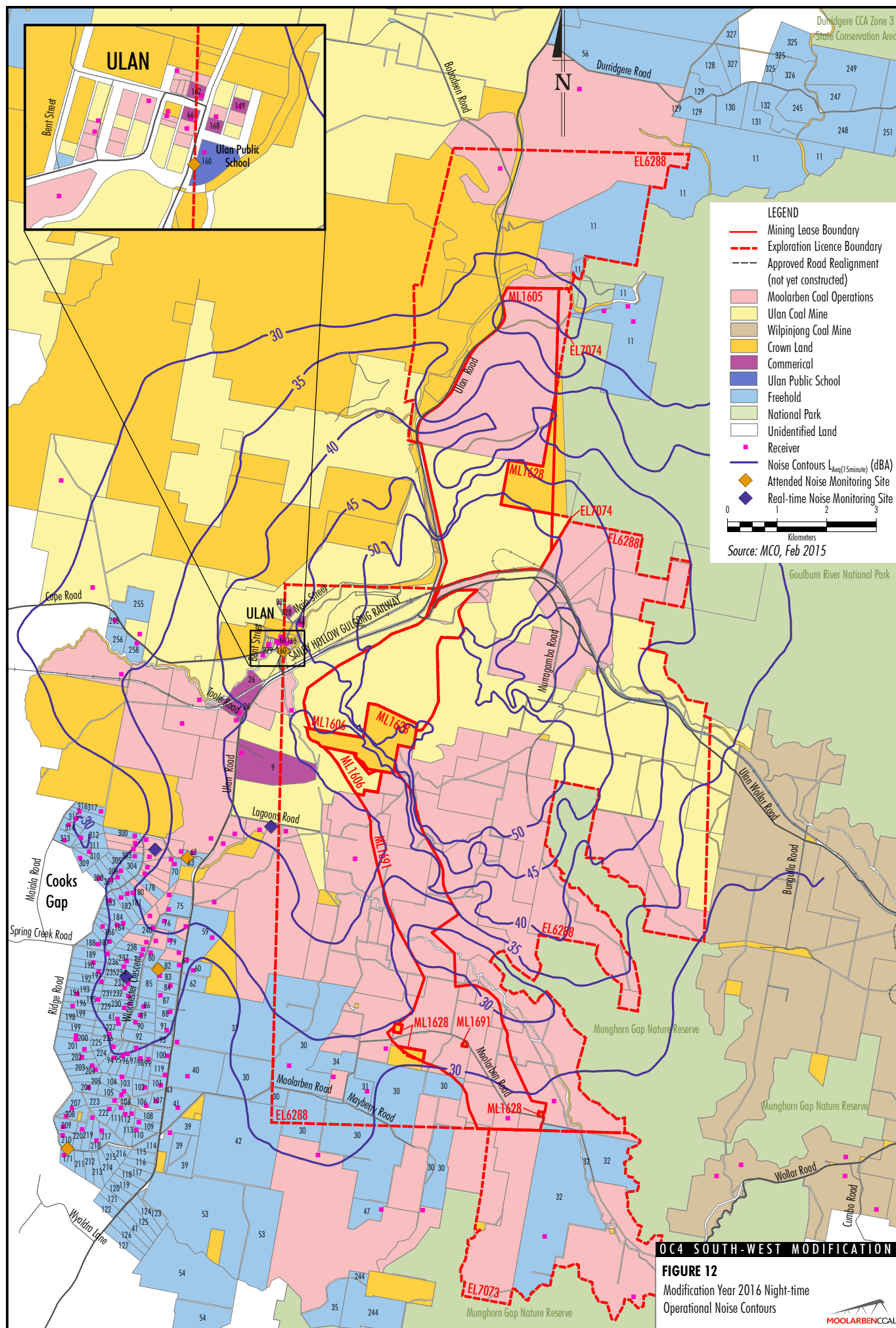
Greenhouse gas emissions are discussed separately in Section 4.8.3.

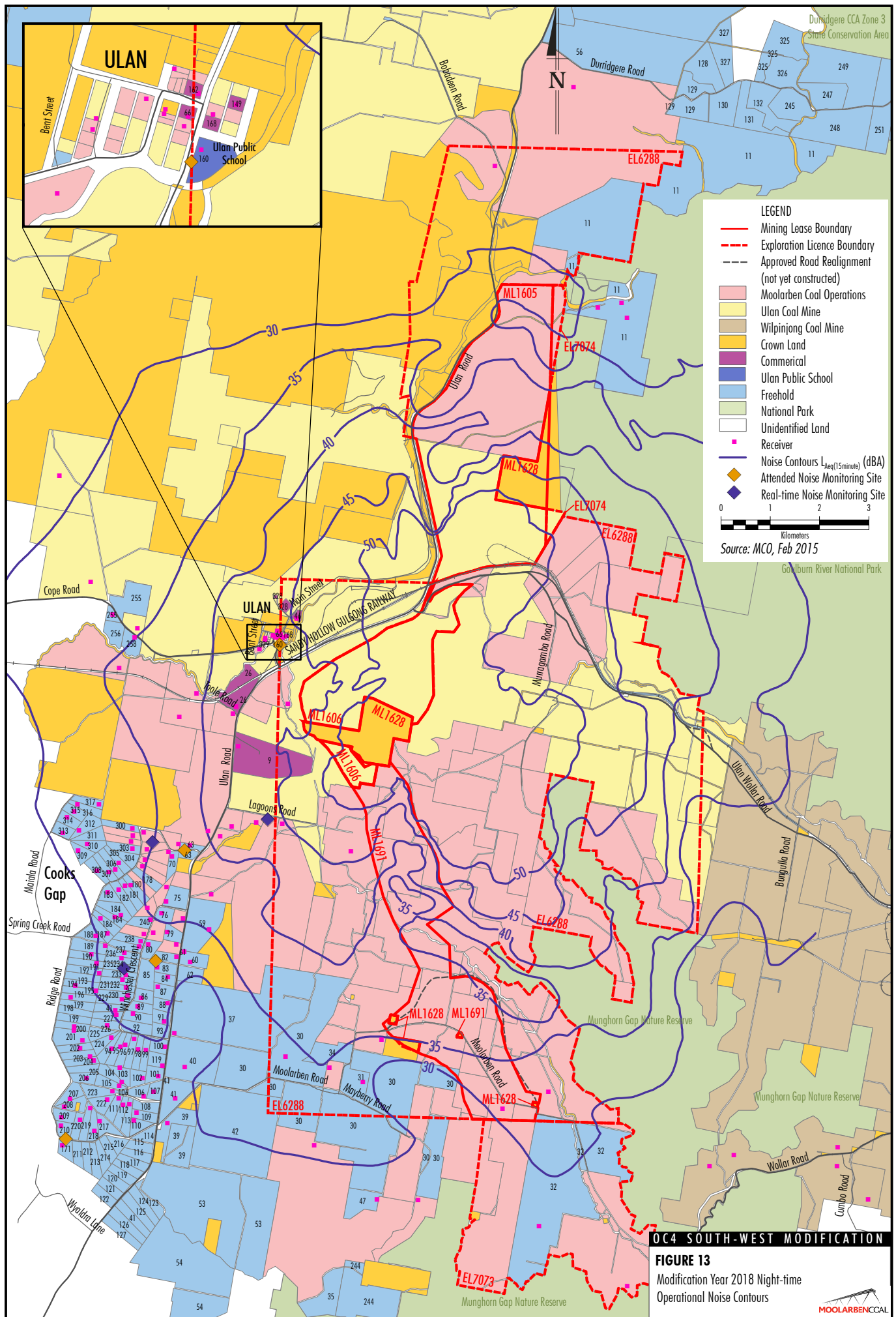
4.2.1 Background

Previous Assessment

A number of air quality assessments have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Project. The most recent assessment of the potential air quality impacts associated with the approved Moolarben Coal Complex (incorporating Stages 1 and 2) was undertaken by Todoroski Air Sciences (2013).

The assessment predicted there would be no exceedances of annual average criteria for particulate matter with diameter less than 10 microns (PM₁₀), total suspended particulate (TSP) or dust deposition levels due to emissions from the project only.





An exceedance of 24-hour average PM₁₀ criterion was predicted at one private-owned receiver on one day (Receiver 46⁴). An exceedance of the cumulative annual average PM₁₀ criterion was also predicted at Receiver 46 when emissions from the Moolarben Coal Complex were considered cumulatively with background sources (Todoroski Air Sciences, 2013).

Previous assessment of cumulative 24-hour average PM₁₀ impacts found there would be a low potential risk for cumulative 24-hour average PM₁₀ impacts due to the Moolarben Coal Complex (i.e. an exceedance for one day only was predicted when emissions from Moolarben Coal Complex were considered cumulatively with background sources) (Todoroski Air Sciences, 2013).

Air Quality Management and Monitoring

The approved Air Quality Management Plan (MCO, 2013)⁵ describes the air quality management and monitoring regime at the Moolarben Coal Complex.

The Air Quality Management Plan describes:

- Project Approval air quality criteria.
 - Dust monitoring locations and frequency, comprising (Figure 10):
 - TEOMs measuring PM₁₀ continuously (i.e. real-time monitoring);
 - High Volume Air Samplers (HVAS) measuring PM₁₀ on a one day in six cycle; and
 - dust deposition gauges.
 - Ongoing dust management measures.
 - Performance indicators (i.e. real-time response triggers set below Project Approval air quality criteria) which, if exceeded, trigger the implementation of additional dust management measures.
- limiting clearing and topsoil stripping activities as far as practicable during the drier months;
 - adoption of progressive rehabilitation of mining operations, to minimise exposed soils;
 - use of water carts on all trafficked areas to minimise dust generation as necessary and practicable;
 - use of constructed roads only, minimisation of access roads and removal of obsolete access roads;
 - employing appropriate dust suppression methods at the coal handling facilities;
 - maintaining coal handling areas and stockpiles in a moist condition using water carts and/or water sprays;
 - relocation, modification and/or temporarily ceasing mining operations in adverse meteorological conditions to minimise short term air quality impacts;
 - use of dust suppression systems on stationary and mobile plant (such as the dump hopper, transfer stations, drill rigs);
 - long term topsoil stockpiles, not used for over 6 months are revegetated with grass;
 - use of dust aprons and water injection systems on drills;
 - partial enclosure of coal transfer conveyors where possible;
 - watering of out-of-pit emplacement areas that would remain inactive for prolonged period where practicable creating a dry crust layer to reduce dust emissions associated with wind erosion; and
 - increasing excavator bench height when working on drier weathered rock near the surface to allow blending with underlying overburden which contains more moisture.

Air quality controls currently implemented at the Moolarben Coal Complex include:

- disturbance of only the minimum area necessary for mining (e.g. typically only one strip ahead of the active mining operations);

MCO has also recently implemented new software that assists in pro-active management of dust (and noise) emissions. The system provides daily reports and predictions of upcoming meteorological conditions and potential dust risks. Based on prevailing wind conditions, MCO can strategically alter its operations to reduce these impacts.

In accordance with the requirements of Project Approvals (05_0117 and 08_0135), MCO co-ordinates the air quality management on-site with air quality management at the Ulan and Wilpinjong Coal Mines to minimise cumulative air quality impacts.

⁴ Receiver 46 is a commercial property and is listed as a property that can request acquisition in the Ulan Coal Mine Development Consent (08_0184).

⁵ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Air Quality Management Plan.

MCO reports air quality monitoring results in its Monthly Environmental Monitoring Report and AEMR/Annual Review.

Pollution Reduction Programs

Pollution Reduction Programs (PRPs) are included as requirements of EPL 12932. As such, MCO implements dust control measures in accordance with the conditions of EPL 12932 described below:

- PRP U1: *Particulate Matter Control Best Practice Implementation - Wheel Generated Dust*, which requires a haul road dust control efficiency of 80% or more to be achieved and maintained at the Moolarben Coal Complex. A monitoring program demonstrated a control efficiency of 93 to 99% was achieved through the use of watering of haul roads, and that a control efficiency of 90% could be maintained on a day-to-day basis (Appendix B).
- PRP U2: *Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions*, which requires MCO to alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions.
- PRP U3: *Particulate Matter Control Best Practice Implementation – Trial of Best Practice Measures for Disturbing and Handling Overburden*, which requires MCO to assess the effectiveness of implementing dust management controls while loading and dumping overburden.

Existing Air Quality

Air quality monitoring results reported in the 2012 - 2013 AEMR and 2013 - 2014 AEMR show cumulative dust levels were below Project Approval criteria, with the exception of isolated exceedances of the 24-hour PM₁₀ criterion, which were attributable to regional smoke haze events and/or local background sources not associated with the Moolarben Mine Complex.

Complaints

MCO maintains a complaints register in accordance with its Project Approvals (05_0117 and 08_0135). All dust related complaints received by MCO are responded to and investigated in accordance with the Community Complaints Procedure detailed in the Air Quality Management Plan.

There was one complaint reported in the 2012-2013 AEMR relating to dust. There have been a total of three complaints reported over the last three AEMR reporting periods (i.e. 2010 to 2013). There have been two dust related complaints between 1 January 2014 and 30 November 2014.

4.2.2 Environmental Review

Modelling Methodology

Air quality dispersion modelling has been conducted by Todoroski Air Sciences (2015) to assess potential impacts for the operational scenario representative of maximum potential air quality impacts for the Moolarben Coal Complex incorporating the OC4 South-West Modification, particularly for receivers to the west.

Relevant to potential air quality impacts, 2016 was chosen for the air quality modelling scenario as this year includes (Appendix B):

- maximum ROM coal and waste rock extraction;
- first year of maximum fleet operations in OC4;
- maximum fleet using the proposed OC4 south-west haul road;
- fleet in OC4 focused in the west (i.e. potential maximum impacts at Ulan and Cooks Gap); and
- emplacement of waste rock on the OC4 out-of-pit waste emplacement.

Emissions Estimation

Emissions of TSP (i.e. dust) associated with the 2016 modelling were estimated by Todoroski Air Sciences (2015) using contemporary emission estimation methodologies.

Annual emissions of TSP for the Moolarben Coal Complex incorporating the OC4 South-West Modification were estimated to be generally similar or marginally lower than those estimated for the approved Moolarben Coal Complex in the previous assessment (Appendix B).

Meteorological Conditions

The CALMET meteorological model developed by Todoroski Air Sciences for the Stage 1 Modification 9 assessment was revised to incorporate changes in topography for the Year 2016 mine plan (Appendix B).

Predicted Impacts

Project Only

Concentrations of TSP, PM₁₀ and particulate matter 2.5 microns or less in diameter (PM_{2.5}) as well as dust deposition levels were predicted by Todoroski Air Sciences (2015).

With the implementation of proactive and reactive management measures, there were no predicted exceedances of the 24-hour average PM₁₀ criteria, or annual average TSP, PM₁₀ or dust deposition criteria at any privately-owned residence due to emissions from the project only (i.e. the Moolarben Coal Complex incorporating the OC4 South-West Modification) (Appendix B).

In addition, 24-hour average and annual average PM_{2.5} concentrations were predicted to be below reporting guidelines at all privately-owned residences (Appendix B).

Contours showing predicted project only 24-hour PM₁₀ concentrations are provided on Figure 14.

Cumulative

Given annual dust emissions are estimated to be similar or lower than those previously assessed for the Moolarben Coal Complex, and no additional project only exceedances of air quality criteria are predicted, Todoroski Air Sciences (2015) concluded it is unlikely there would be any increase in potential cumulative air quality impacts due to the OC4 South-West Modification (Appendix B).

4.2.3 Mitigation Measures, Management and Monitoring

MCO would continue to implement the existing air quality management measures described in the Air Quality Management Plan and required by the PRPs to minimise dust emissions and comply with relevant dust criteria in Project Approvals (05_0117 and 08_0135). The Air Quality Management Plan would be updated, where necessary, to incorporate the OC4 South-West Modification.

Ulan Public School

In accordance with the requirements of the Project Approvals (Attachments 1 and 2), MCO would:

- consult with Department of Education and Communities and, if requested, implement agreed reasonable and feasible measures to ameliorate potential dust and/or noise impacts to Ulan Public School; or
- on a reasonable basis relating to the adverse effect of dust and/or noise from the Moolarben Coal Complex, negotiate with Department of Education and Communities to contribute to or meet reasonable costs toward relocating the Ulan Public School.

4.3 ECOLOGY

A Flora and Fauna Impact Assessment was prepared for the OC4 South-West Modification by EcoLogical Australia (2015) and is presented in Appendix C.

4.3.1 Background

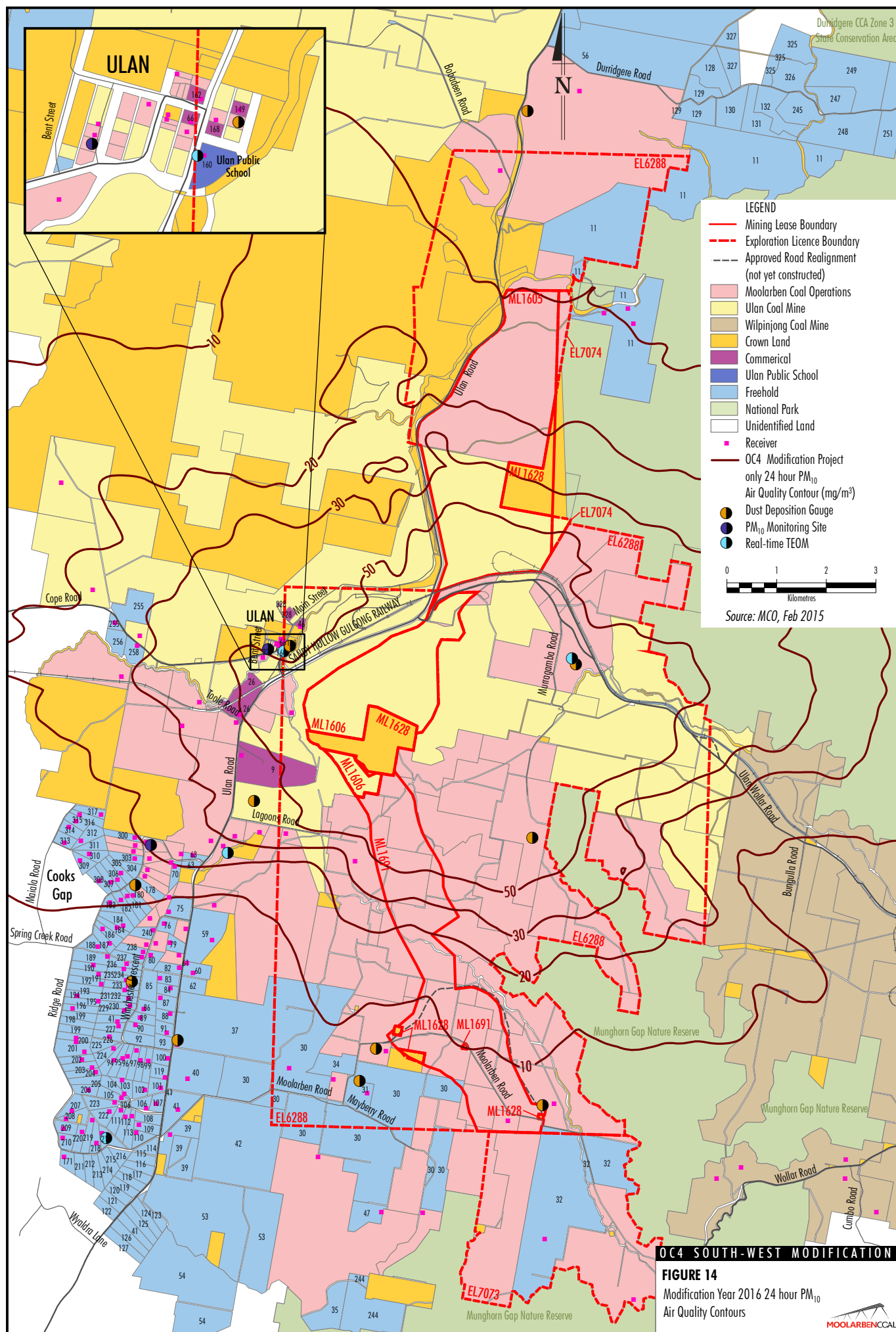
Detailed ecological impact assessments were prepared by Moolarben Biota (2006) and Ecovision (2008) for Stages 1 and 2 of the Moolarben Coal Project respectively. An ecological impact assessment was also undertaken in 2012 for the Moolarben Coal Project Stage 1 Modification 9 EA (EMM, 2013b).

In addition to the above, specific flora and fauna field surveys were conducted in the OC4 South-West Modification disturbance area (i.e. associated with the OC4 south-west haul road) and surrounds in July 2014 by EcoLogical Australia (Appendix C).

The 2014 surveys consisted of validating BioMetric vegetation types, identifying floristic structure, targeting threatened flora and fauna searches and undertaking habitat assessment. Whilst some threatened species were out of season for survey (e.g. *Diuris tricolor*), potential habitat for these species was targeted during the field survey (Appendix C).

Vegetation Communities

Vegetation communities were mapped within the OC4 South-West Modification disturbance area by EcoLogical Australia (2015) based on BioMetric vegetation types. Vegetation communities mapped by EcoLogical (Appendix C) are shown on Figure 15 and described in Table 3.



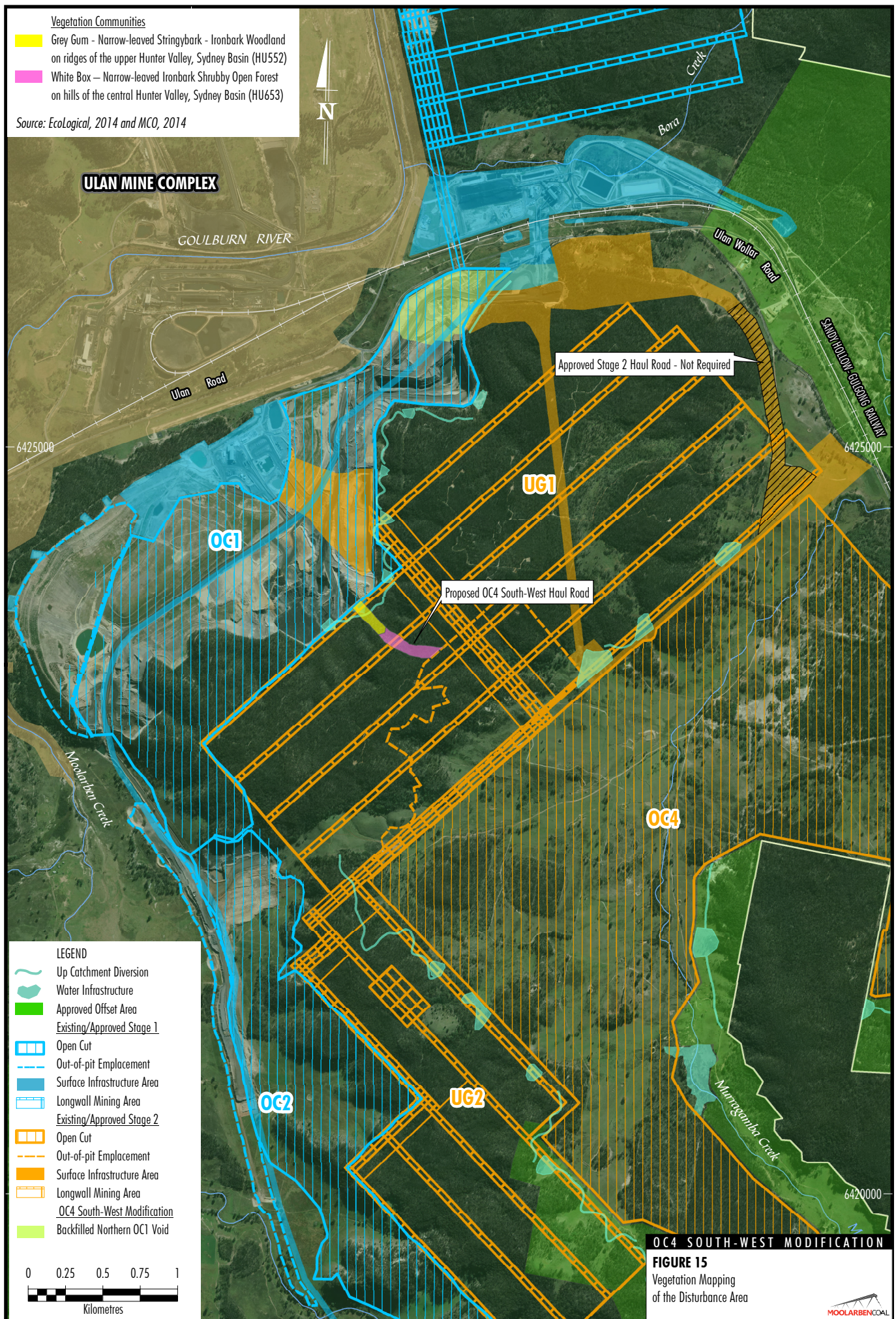


Table 3
Native Vegetation Communities Recorded in the
OC4 South-West Modification Disturbance Area

Biometric Vegetation Types	Approximate Area (ha)
Grey Gum – Narrow-leaved Stringybark – Ironbark Woodland on ridges of the upper Hunter Valley, Sydney Basin (HU552)	1.8
White Box – Narrow-leaved Ironbark Shrubby Open Forest on hills of the central Hunter Valley, Sydney Basin (HU653)	3.3
Total	5.1

Source: Appendix C.

Threatened Flora Species and Populations

No threatened flora species or populations listed under the TSC or EPBC Acts were recorded within the OC4 South-West Modification disturbance area by the 2014 surveys undertaken by EcoLogical. Nor have they been recorded in this area by any other surveys conducted at the Moolarben Coal Complex for past assessments (Appendix C).

The OC4 South-West Modification disturbance area is not considered potential habitat for *Diuris tricolor* or any other threatened flora species (Appendix C).

Threatened Fauna Species and Populations

No threatened fauna species or populations listed under the TSC Act and/or the EPBC Act were recorded within the OC4 South-West Modification disturbance area by the 2014 surveys undertaken by EcoLogical. Nor have they been previously recorded in this area by any of the other surveys conducted at the Moolarben Coal Complex for past assessments (Appendix C).

Fauna Habitat

Fauna habitat in the vicinity of OC4 South-West Modification disturbance area consists of a suite of broad habitat elements including:

- derived native grasslands;
- shrubbery;
- mature woodland and paddock trees (flower, lerp and mistletoe bearing);
- hollow-bearing live trees and dead trees (stags);
- large woody debris (log and bark on the ground);
- sandstone outcrops and overhangs; and

- water impoundments (dams and ponds).

A detailed description of each habitat element is provided in Appendix C.

4.3.2 Environmental Review

Potential Impacts

Vegetation and Fauna Habitat Clearance

The approved Stage 2 haul road requires the clearance of approximately 18.5 ha of native vegetation (including woodland and derived native grassland). The proposed OC4 south-west haul road requires clearing of approximately 5.1 ha of native vegetation, some 13.4 ha less than the approved clearance. Therefore, the OC4 South-West Modification would result in a net reduction of native vegetation required to be cleared at the Moolarben Coal Complex.

Fragmentation of habitat occurs where areas that were once continuous become divided into separate, isolated fragments by non-woodland areas. The approved Stage 2 disturbance footprint includes a conveyor (and associated access track) through the same vegetation and parallel with the proposed OC4 south-west haul road. The approved Stage 2 disturbance footprint also includes a haul road around the north east edge of the woodland vegetation as well as clearance for ancillary works. Therefore, the proposed OC4 south-west haul road would not significantly alter potential disturbance/fragmentation impacts (i.e. in comparison to the currently approved Moolarben Coal Complex).

Threatened Species, Populations and Communities

Given no threatened species, populations or communities have been identified in the OC4 South-West Modification disturbance area, and given there would be a total net reduction in disturbance, EcoLogical Australia (2015) concluded there would be no significant impact on threatened species, populations and communities and migratory species listed under the EPBC Act and/or TSC Act (Appendix C).

Pest Species

MCO would continue to implement mitigation measures including feral animal management and control in accordance with the Biodiversity Management Plan.

Cumulative Impacts

No additional ecological impacts are expected as a result of the OC4 South-West Modification, and therefore, no additional cumulative impacts are expected.

4.3.3 Mitigation Measures, Management, Monitoring and Offset

The nature and scale of the vegetation to be cleared as part of the OC4 South-West Modification is considered minor when compared with the native vegetation within the currently approved Stage 2 disturbance footprint, and the significant Biodiversity Offset Strategy developed for Stage 2.

In addition, the OC4 South-West Modification would result in a reduction (i.e. of 13.4 ha) in the total approved native vegetation disturbance area at the Moolarben Coal Complex (Section 4.3.2).

Therefore, the Biodiversity Offset Strategy developed for Stage 2 adequately offsets the proposed impacts from the OC4 South-West Modification, with surplus area (Appendix C).

Notwithstanding, MCO would continue to implement management and mitigation measures at the Moolarben Coal Complex in accordance with the Biodiversity Management Plan, including:

- implementation of a vegetation clearance protocol including delineation of areas to be cleared, pre-clearing surveys, management of impacts to fauna, vegetation clearance procedures, collection and reuse of habitat features, where feasible;
- clear demarcation of clearing zones to restrict access;
- preparation of Ground Disturbance Permits to be approved by the Environment and Community Manager prior to the commencement of clearing activities;
- management measures for weeds and pests; and
- topsoil removed during construction works would be stockpiled and used in rehabilitation areas.

The Biodiversity Management Plan would be updated, where necessary, to incorporate the OC4 South-West Modification.

4.4 SURFACE WATER RESOURCES

A Surface Water Assessment Review for the OC4 South-West Modification was undertaken by WRM Water & Environment (2015). The Surface Water Assessment Review is presented in Appendix D.

4.4.1 Background

Regional Hydrology

The Moolarben Coal Complex is located in the Upper Goulburn River and Wollar Creek sub-catchments, which have catchment areas of approximately 2,455 square kilometres (km²) and 532 km², respectively. Both sub-catchments drain to the Goulburn River which flows in an easterly direction, eventually joining the Hunter River approximately 150 km downstream of the Moolarben Coal Complex.

Moolarben Creek and Bora Creek are tributaries of the Upper Goulburn River sub-catchment and flow along the western and northern boundaries of the Moolarben Coal Complex (Figure 16).

Wilpinjong Creek is a tributary of Wollar Creek sub-catchment and flows along the east and north-eastern boundaries of the Moolarben Coal Complex into Wollar Creek, before joining the Goulburn River approximately 26 km downstream of the Moolarben Coal Complex (Figure 1).

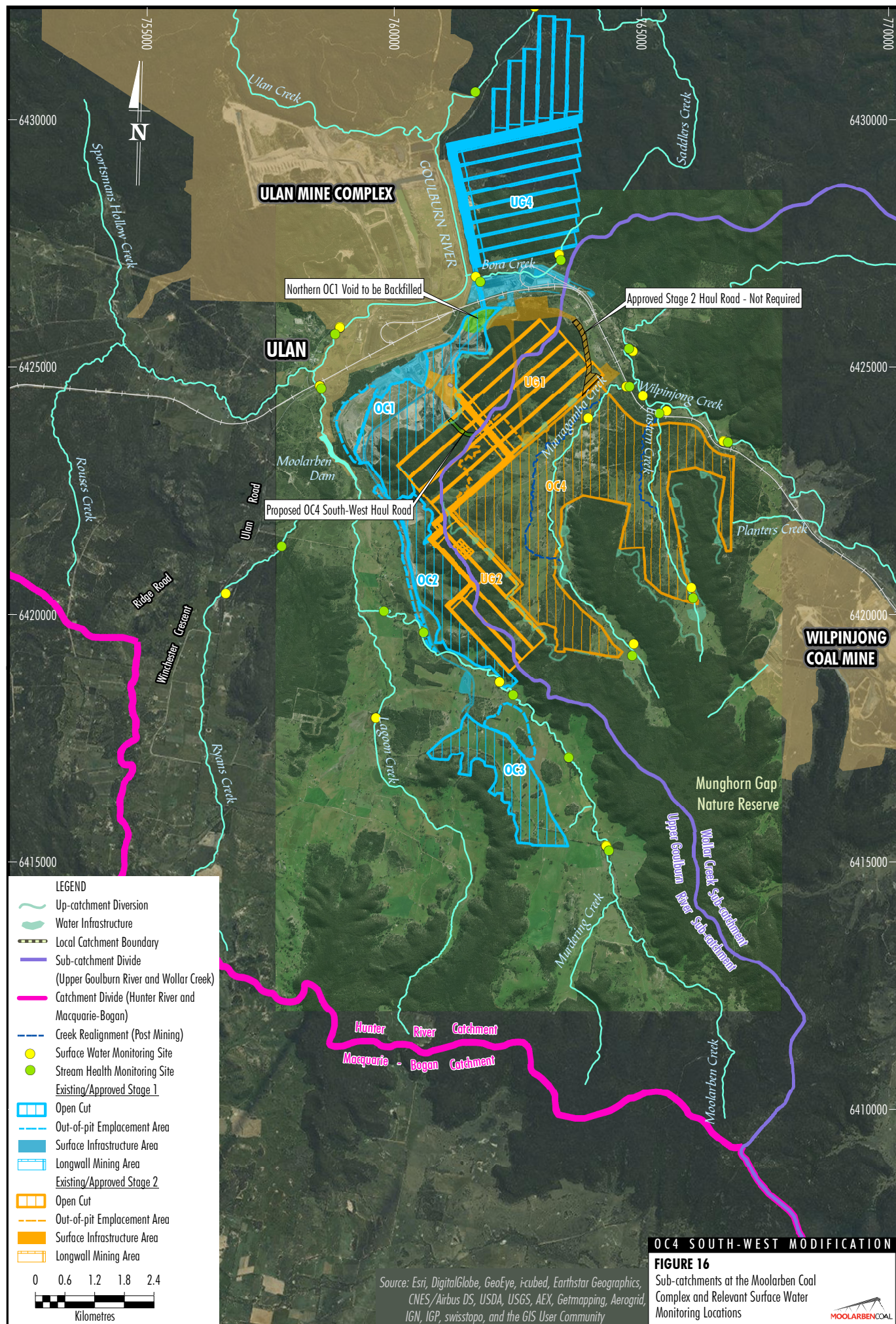
Site Water Management and Monitoring

Surface water monitoring and management at the Moolarben Coal Complex is conducted in accordance with the Water Management Plan, including Erosion and Sediment Control Plan, Surface Water Monitoring Program and Surface and Ground Water Response Plan⁶.

A review of the available surface water monitoring data conducted by WRM Water & Environment in 2013 concluded that the existing operations were not adversely affecting the quality of receiving waters (WRM Water & Environment, 2013).

The Moolarben Coal Complex surface water monitoring sites are shown on Figure 16.

⁶ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Water Management Plan.



4.4.2 Environmental Review

Site Water Management

A description of the water management system for the OC4 South-West Modification is described in Section 3.3.

WRM Water & Environment (2015) reviewed the site water balance for the OC4 South-West Modification. It was concluded there would be no significant change to the site water balance, given (Appendix D):

- The OC4 south-west haul road is located within a catchment area currently reporting to water storages in the approved water management system (i.e. there would be no increase in catchment area reporting to the water management system).
- The OC1 final void (to be backfilled) was not proposed to be used as a water storage in the currently approved water management system, and therefore, there would be no loss of water storage.

Stream Flows

The disturbance associated with the approved Stage 2 haul road would not be required as a result of the OC4 South-West Modification (i.e. 18.5 ha of disturbance would be avoided). Runoff from this area would no longer be required to be collected in the water management system. Therefore, the OC4 South-West Modification would result in a reduction in potential impacts to flows in Wilpinjong Creek (i.e. in comparison to the currently approved Moolarben Coal Complex) due to the reduction in catchment excision.

The OC1 final void would be backfilled to approximately pre-mining elevations creating a final landform that, following rehabilitation, would drain to Bora Creek and the Goulburn River. Therefore, the OC4 South-West Modification would also result in a reduction in potential impacts to flows in Bora Creek and the Goulburn River (i.e. in comparison to the currently approved Moolarben Coal Complex) due to the reduction in catchment excision in the long-term.

Surface Water Quality

Given no significant change to the site water balance is expected as a result of the OC4 South-West Modification (Appendix D), no change to the existing controlled release limits specified in EPL 12932 would be required. Therefore, no additional potential impacts to surface water quality in the receiving environment are expected as a result of the OC4 South-West Modification (Appendix D).

4.4.3 Mitigation Measures, Management and Monitoring

Surface water monitoring and management for the Moolarben Coal Complex would continue to be conducted in accordance with the Water Management Plan.

The Water Management Plan would be reviewed and, where necessary, updated to incorporate the OC4 South-West Modification. Regular reviews of the site water balance would continue to be undertaken over the life of the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.5 GROUNDWATER RESOURCES

4.5.1 Background

A number of groundwater investigations, assessments and reviews have been undertaken since 2006 to assess the potential impacts of Stages 1 and 2 of the Moolarben Coal Complex. Recent groundwater assessments undertaken for the approved Moolarben Coal Complex include:

- Moolarben Coal Complex Stage 2 PPR Groundwater Impact Assessment November 2011 (RPS Aquaterra, 2012);
- Moolarben Coal Complex Stage 2 PPR Response to Submissions Additional Groundwater Impact Assessment (RPS Aquaterra, 2012); and
- Moolarben Coal Project Stage 1 Optimisation Modification Groundwater Assessment (AGE, 2013).

RPS Aquaterra (2012) predicted that drawdown impacts on privately-owned bores from the approved Moolarben Coal Complex would not exceed 0.6 m and therefore potential impacts to groundwater users would be minimal.

Groundwater monitoring and management at the Moolarben Coal Complex is conducted in accordance with the Water Management Plan, including the approved Surface and Ground Water Response Plan⁷.

The Moolarben Coal Complex groundwater monitoring sites are shown on Figure 6.

4.5.2 Environmental Review

The OC4 South-West Modification would not change the approved extent of the open cut pits or underground mines, or increase the maximum mining rate. Therefore, no increase in previously predicted groundwater inflow or drawdown is expected as a result of the OC4 South-West Modification.

Given the above, no additional water licence entitlements would be required as a result of the OC4 South-West Modification.

4.5.3 Mitigation Measures, Management and Monitoring

Groundwater monitoring and management for the Moolarben Coal Complex would continue to be conducted in accordance with the Water Management Plan.

4.6 VISUAL

4.6.1 Background

A number of visual impact assessments have been prepared for the approved Moolarben Coal Complex including:

- Moolarben Coal Project Stage 1 Optimisation Modification Visual Impact Assessment (EMM, 2013c) which assessed the impacts of Stage 1 Modification 9.

Key potential viewpoints assessed in previous visual impact assessments for the Moolarben Coal Complex included Ulan, Ulan Road, Ulan-Wollar Road, Ridge Road, Moolarben Road, Winchester Crescent and Cope Road (Figure 17).

The level of visual impact of the approved mine from potential viewpoints varies with the progress of the open cuts. Views of the Moolarben Coal Complex are unimpeded from Ulan Road and Ulan-Wollar Road and include the approved out-of-pit emplacements, open cut pits, infrastructure and progressively rehabilitated mine landforms.

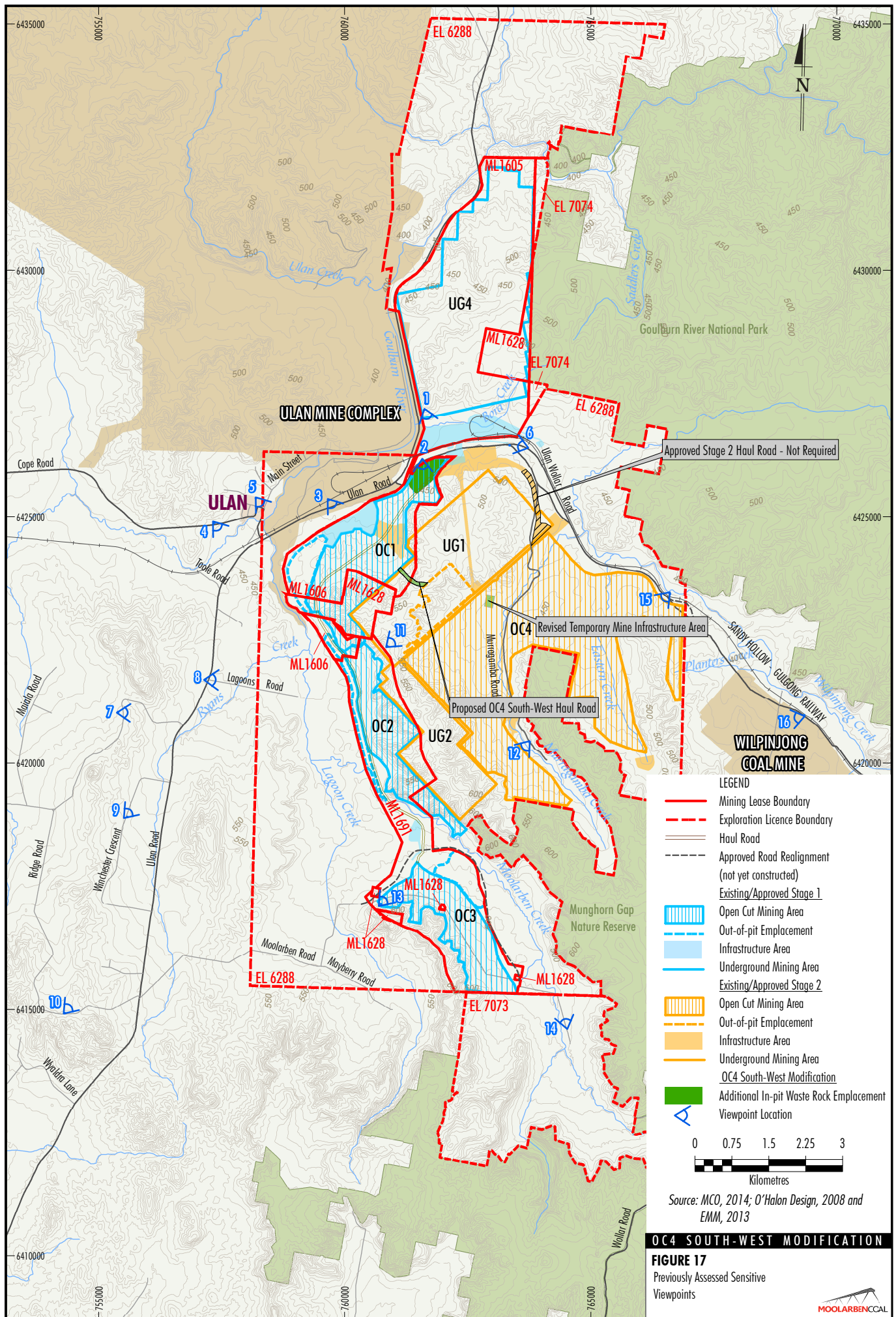
O'Hanlon Design (2006) concluded that viewpoints around the Stage 1 infrastructure area (e.g. from Ulan Road and Ulan-Wollar Road) would be significantly impacted by Stage 1 of the Moolarben Coal Complex (Figure 17). O'Hanlon Design (2006) concluded that potential impacts at viewpoints located further south and into the rural residential areas would be significantly lower due to the distance between the mine and receiver and shorter duration of impact.

O'Hanlon Design (2008) predicted that visual impacts from Stage 2 of the Moolarben Coal Complex would be generally equivalent of those predicted for Stage 1 with the exception of views of the OC4 pit from Ulan-Wollar Road.

EMM (2013c) predicted that the potential visual impacts of the approved Moolarben Coal Complex prior to the implementation of any management and mitigation measures would be slight to moderate at the majority of the 12 viewpoints assessed (Figure 17), with some residents along Ridge Road predicted to experience moderate to substantial potential visual impacts (EMM, 2013c). However, the assessment concluded that with the implementation of mitigation measures (e.g. vegetative screening), the potential visual impact would be reduced to an acceptable level at relevant sensitive receivers (EMM, 2013c).

A total of 16 viewpoints were assessed for Stages 1 and 2 of the Moolarben Coal Complex (Figure 17).

⁷ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Water Management Plan.



To ameliorate the visual impacts of Stage 1 of the Moolarben Coal Complex the following visual management measures have/will be implemented in accordance with the Stage 1 Project Approval Statement of Commitments (Attachment 1):

- Trees and shrubs would be planted to provide a visual screen:
 - to the switch and bore pads located adjacent to Saddlers Creek Road, where required.
 - along the southern edge of Cope Road, where views of OC1 Stage 1 Modification 9 extension areas would be possible, subject to landowner consent.
- The Rehabilitation Management Plan would be reviewed and updated to describe the measures that would be implemented to manage visual impacts associated with the OC1 and OC2 Stage 1 Modification 9 extension areas, such as:
 - vegetation screen planting, subject to landowner's consent, along the southern edge of Cope Road, in areas visually affected by direct views of the OC1 Stage 1 Modification 9 extension areas;
 - investigating the feasibility of targeted vegetation screen planting for affected properties along Ridge Road (with direct views from the residence to both OC1 and OC2 Stage 1 Modification 9 extension areas), to mitigate the visual and lighting impacts of OC1 and OC2 Stage 1 Modification 9 extension areas, subject to landowner consent;
 - building-up out-of-pit embankments first so that continued operations are obscured by the embankment. Wherever possible out-of-pit emplacements around the perimeter would be established first, providing a visual screen while work is undertaken in the central part of the emplacement;
 - seeding and grassing embankment outer faces visually exposed to private residents as soon as practically possible to soften the view;
 - where possible, maintaining a strip of vegetation along the leading face of the ridgeline associated with the OC1 Stage 1 Modification 9 extension area to provide a visual screen to workings for as long as practical;
- use of operational screening measures such as landform re-establishment sequencing and lighting management; and
- progressive rehabilitation.
- As far as practically possible, and where mine safety allows, management protocols would be established and implemented to:
 - locate mobile lighting plant to be directed away from private residences;
 - direct stationary lighting sources below the horizontal to minimise potential light spill;
 - design lighting systems that minimise light spillage; and
 - avoid lighting of light coloured surfaces that have greater reflectivity.

The following mitigation and management measures will also be implemented for Stage 2 of the Moolarben Coal Complex:

- progressive rehabilitation of disturbed areas;
- revegetation of existing cleared lands to increase the vegetation within the existing landscape;
- retaining existing vegetation around Stage 2 infrastructure areas and on road fringes of OC4 where it is not required to be cleared for safety purposes;
- construction of bunding and planting along the edge of Ulan-Wollar Road in areas where it abuts OC4; and
- operation of night lighting in accordance with AS 4282: 1997 - *Control of the Obtrusive Effects of Outdoor Lighting* and AS/NZS 1158: 2010 – *Lighting for Roads and Public Spaces*.

The progressive rehabilitation of disturbed areas and revegetation species selection would be described in the Rehabilitation Management Plan.

4.6.2 Environmental Review

A review of the potential visual impacts from the previously assessed sensitive viewpoints was undertaken for the OC4 South-West Modification (Figure 17). For each viewpoint, an assessment of intervening topography and vegetation was undertaken based on previous viewpoint simulations, landform contours and photos to determine whether there would be any views of the components of the OC4 South-West Modification from public or private vantage points.

A summary of potential visual impacts from the previously assessed viewpoints for the OC4 South-West Modification is provided in Table 4.

South-West Haul Road

The OC4 south-west haul road would be cut (up to approximately 5 m) into the ridgeline along the majority of its length, which would minimise direct views of the OC4 south-west haul road.

Therefore, it is unlikely that any previously assessed viewpoints or privately owned residences would have direct views of the proposed OC4 south-west haul road (Table 4 and Figure 17).

However, potential views of the proposed OC4 south-west haul road would likely be available from a small section of Ulan Road that is south of Ulan-Wollar Road and north of the OC1 Pit. The northern end of the OC4 south-west haul road disturbance area would be located approximately 1.6 km from the closest section of Ulan Road.

Where the limited views of the OC4 south-west haul road may be available, there would also be views of existing/approved mining infrastructure (e.g. OC1 pit and out-of-pit waste emplacement, OC1 workshop and ancillary infrastructure, Ulan Coal Mine CHPP and product stockpiles). As such, in consideration of this existing mining infrastructure, the level of visual modification associated with the OC4 south-west haul road would be minimal.

The OC4 south-west haul road connects two open cut mining areas approved to operate 24 hours per day (i.e. OC1 and OC4). As such, additional lighting requirements for the OC4 south-west haul road would be minor in comparison to the lighting requirements for the open pits and associated waste rock emplacement areas. As such, the scale and intensity of night-lighting for the OC4 South-West Modification would be similar to the approved Moolarben Coal Complex.

Following the completion of mining, the OC4 south-west haul road would be revegetated with woodland species, which would reduce any potential visual impacts in the long-term.

**Table 4
Summary of Visual Impacts**

Figure ID	Viewpoint Location	Significance of Approved Visual Impact (maximum during operations) ¹	Visual Impact with the OC4 South-West Modification
1	Ulan Road	High	Unchanged – direct views unlikely.
2	Ulan-Wollar Road (west)	High to very high	Unchanged.
3	Ulan Road	Moderate to high	Views of the OC4 south-west haul road from a small section of Ulan Road between VP2 and VP3 are likely.
4	Cope Road	Moderate	Unchanged – direct views unlikely.
5	Ulan	Moderate to high	Unchanged – direct views unlikely.
6	Ulan-Wollar Road (rail loop and CHPP area)	High to very high	Unchanged – direct views unlikely.
7	Ridge Road (north)	Moderate to very high	Unchanged – direct views unlikely.
8	Ulan Road (at Lagoons Road)	Slight	Unchanged – direct views unlikely.
9	Winchester Avenue	Moderate	Unchanged – direct views unlikely.
10	Ridge Road (south)	Low	Unchanged – direct views unlikely.
11	Carrs Gap Road ²	High	N/A
12	Murragamba Valley ²	High to very high	N/A
13	Moolarben Road (west)	High to very high	Unchanged – direct views unlikely.
14	Moolarben Road (south)	High to very high	Unchanged – direct views unlikely.
15	Ulan-Wollar Road (OC4 pit)	Moderate to high	Unchanged – direct views unlikely.
16	Ulan-Wollar Road (south)	Moderate to high	Unchanged – direct views unlikely.

Note 1: Maximum visual impact assessed under the Stage 1 and Stage 2 Moolarben Coal Project Visual & Lighting Impact Assessment (O'Hanlon Design, 2006; 2008) and/or Stage 1 Modification 9 Visual Impact Assessment (EMM, 2013c).

Note 2: Road currently subject to road closure application.

Backfilled OC1 Pit

The OC1 pit final void would be backfilled to approximately pre-mine levels and revegetated with Box Gum Woodlands and Sedimentary Ironbark Forests with stands of *Allocasurina*. As such, the backfilling of the OC1 final void would reduce potential visual impacts in the long-term (i.e. in comparison to the currently approved OC1 final void).

4.6.3 Mitigation Measures, Management and Monitoring

The mitigation and management measures described in Section 4.6.1 would continue to be implemented at the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.7 ABORIGINAL HERITAGE

4.7.1 Background

An Aboriginal Cultural Heritage Assessment (ACHA) was prepared for the OC4 South-West Modification by Niche Environment and Heritage (2015) and is presented in Appendix E.

The ACHA for the OC4 South-West Modification has been undertaken in consideration of the following codes and guidelines (Appendix E):

- *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010a).
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b).
- *Guide to investigating, assessing and reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

Previous Archaeological Investigations

A number of Aboriginal cultural heritage surveys, assessments and salvage programmes have been undertaken within the Moolarben Coal Complex and surrounds.

Key Aboriginal cultural heritage surveys and assessments were undertaken for Stages 1 and 2 of the Moolarben Coal Project in 2006, 2008, 2011 and 2012 (Archaeological Risk Assessment Services, 2006, 2008; AECOM, 2011; South East Archaeology, 2013). Various other minor surveys and assessment have also been undertaken.

A detailed description of previous archaeological assessments and surveys undertaken at the Moolarben Coal Complex and surrounds is provided in Appendix E.

At the time of drafting the ACHA (Appendix E), a total of 531 Aboriginal sites had been identified at the Moolarben Coal Complex and surrounds, including artefact scatters, isolated finds, potential archaeological deposits, grinding grooves, ochre quarries, scarred trees and rock shelters (with or without artefacts, art and/or grinding grooves) (Appendix E).

The management of Aboriginal heritage at the Moolarben Coal Complex is currently conducted in accordance with the measures outlined in the Aboriginal Heritage Management Plan (Stage 1)⁸.

4.7.2 Environmental Review

Consultation

The ACHA included consultation with eight Registered Aboriginal Parties, identified via a registration process consistent with the *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECCW, 2010a) (Appendix E). Participation of Registered Aboriginal Parties in the field surveys was in accordance with the existing engagement system in place at the Moolarben Coal Complex.

Consultation with Registered Aboriginal Parties regarding the existing Moolarben Coal Complex has been extensive and involved various methods of communication including public notices, meetings, written and verbal correspondence, archaeological survey attendance and site inspections.

A detailed description of the consultation undertaken for the OC4 South-West Modification is provided in Appendix E.

Desktop Review

An AHIMS search was undertaken in February 2014 (Appendix E) for the OC4 South-West Modification disturbance area and surrounds. This search identified no Aboriginal sites located within the OC4 South-West Modification disturbance area.

⁸ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Heritage Management Plan.

Archaeological Survey Design

Archaeological surveys of the OC4 South-West Modification disturbance area were undertaken in consultation with the Registered Aboriginal Parties in March and July 2014.

Archaeological Findings

No Aboriginal objects were identified during either the March 2014 or July 2014 surveys.

Archaeological and Cultural Heritage Values

There were no specific areas or places of cultural value identified by the Registered Aboriginal Parties during the archaeological survey undertaken for the OC4 South-West Modification. Previous assessments and surveys have identified and documented cultural values for the Moolarben Coal Complex and surrounds, which are documented in Appendix E.

Potential Impacts

The OC4 South-West Modification would not impact known Aboriginal archaeological or cultural heritage values (Appendix E).

The approved Stage 2 haul road that would be avoided as a result of the OC4 South-West Modification would have impacted a single Aboriginal site (AECOM, 2011). As a result of the OC4 South-West Modification, this site would no longer be impacted.

4.7.3 Management and Mitigation Measures

MCO would implement the management and mitigation measures described in Appendix E and the Heritage Management Plan, including monitoring and management measures to be implemented during the construction of the OC4 South-West Modification.

4.8 OTHER ENVIRONMENTAL ASPECTS

4.8.1 LAND RESOURCES

Site Inspection and Surveys

Site inspections and soil surveys were conducted in May and October 2014 and January 2015 to support a site verification certificate application for an area that included the OC4 South-West Modification disturbance area. Twenty-two soil test pits were surveyed, including nine detailed soil samples which were sent for laboratory analysis (Attachment 3).

The soil samples were assessed against the BSAL criteria in accordance with the *NSW Government Interim Protocol for Site Verification and Mapping of BSAL* (Interim Protocol) (NSW Government, 2013) and lodged in July 2014, November 2014 and February 2015. The soil sampling, visual observations and laboratory analysis indicated no sites met the BSAL criteria.

Therefore, Dr McKenzie (McKenzie Soil Management, 2014) concluded that the site verification certificate application area, which included the OC4 South-West Modification disturbance area, is not BSAL.

A site verification certificate was granted on 31 March 2015 verifying that the OC4 South-West Modification disturbance area is not BSAL. The site verification certificate is provided in Attachment 3.

Potential Impacts

The OC4 South-West Modification would result in the disturbance of approximately 5.1 ha of woodland. The disturbed areas would be rehabilitated with woodland vegetation.

As no BSAL is located within the OC4 South-West Modification disturbance area, and given no agricultural activities are currently undertaken in this area, there would be no impact to agricultural productivity as a result of the OC4 South-West Modification.

Mitigation Measures, Management and Monitoring

Land resource mitigation measures, management and monitoring would be conducted in accordance with an approved MOP and Rehabilitation and Offset Management Plan.

Rehabilitation of the Moolarben Coal Complex incorporating the OC4 South-West Modification is described in Section 3.8.

4.8.2 Blasting

As there would be no change to blast locations, sizes or frequencies as a result of the OC4 South-West Modification, there would be no additional blast impacts. Blasting would continue to be managed and monitored in accordance with the Blast Management Plan.

4.8.3 Greenhouse Gas Emissions

MCO calculates and reports annual greenhouse gas emissions and energy consumption from the Moolarben Coal Complex in accordance with the existing requirements of the Commonwealth National Greenhouse and Energy Reporting System (NGERS).

No material change to annual greenhouse gas emissions from the Moolarben Coal Complex is expected as a result of the OC4 South-West Modification.

Annual reporting of greenhouse gas emissions from the Moolarben Coal Complex would continue in accordance with the NGERS requirements, and the existing abatement measures would continue to be implemented.

4.8.4 Non-Aboriginal Heritage

Non-Aboriginal Heritage Assessments were prepared for Stages 1 and 2 of the Moolarben Coal Project. Collectively, these studies assessed the impacts associated with the Moolarben Coal Complex disturbance areas, including the OC4 South-West Modification disturbance area.

Previous surveys conducted in 2005 and 2008 (Wells Environmental Services, 2006 & 2008) did not identify any non-Aboriginal heritage sites in the OC4 South-West Modification disturbance area. Therefore, the OC4 South-West Modification is not considered likely to impact on non-Aboriginal heritage.

MCO would continue to implement its approved Heritage Management Plan⁹ at the Moolarben Coal Complex incorporating the OC4 South-West Modification.

4.8.5 Road Transport

There would be no change to the Moolarben Coal Complex operational workforce or ongoing deliveries to the Moolarben Coal Complex due to the OC4 South-West Modification. Accordingly there would be no change to road traffic movements generated by the Moolarben Coal Complex, and there would be no additional impacts on the capacity, condition, safety or efficiency of the surrounding road network due to the OC4 South-West Modification.

4.8.6 Aquatic Ecology

No threatened fauna listed under the NSW *Fisheries Management Act, 1994* are likely to be affected by the OC4 South-West Modification as there is no aquatic habitat within the OC4 South-West Modification disturbance area, and ephemeral watercourses nearby the OC4 South-West Modification disturbance area are unlikely to provide potential aquatic habitat.

4.8.7 Hazard and Risk

Preliminary Hazard Analyses (PHAs) were conducted for the Stage 1 Modification 9 EA and the Stage 2 PPR to assess the potential hazard and risk associated with the approved Moolarben Coal Complex. It is considered that the OC4 South-West Modification would not change the existing potential risks or hazard consequences identified in the PHAs as the proposed activities associated with the OC4 South-West Modification (e.g. open cut mining activities, transport to site and on-site storage) are consistent with those for the approved Moolarben Coal Complex.

⁹ On 30 January 2015, Stage 2 and Stage 1 Modification 3 of the Moolarben Coal Project were approved by the Planning Assessment Commission (as a delegate of the NSW Minister for Planning). To address the requirements of the Project Approvals (Attachments 1 and 2), MCO is preparing a complex-wide Heritage Management Plan.

5 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the OC4 South-West Modification. It also provides a consideration of the OC4 South-West Modification against the objects of the EP&A Act.

5.1 GENERAL STATUTORY CONSIDERATIONS

5.1.1 State Legislation

Environmental Planning and Assessment Act, 1979

The Moolarben Coal Project Stage 1 was approved under Part 3A of the EP&A Act by the NSW Minister for Planning on 24 October 2007 (Project Approval (05_0117) [Attachment 1]). The Moolarben Coal Project Stage 2 was approved under Part 3A of the EP&A Act by the Planning Assessment Commission (as a delegate to the NSW Minister for Planning) on 30 January 2015 (Project Approval 08_0135 [Attachment 2]).

The Moolarben Coal Project Stage 1 and Stage 2 are 'transitional Part 3A projects' under clause 2 of Schedule 6A of the EP&A Act and therefore section 75W of the EP&A Act continues to apply to modifications to Project Approvals (05_0117 and 08_0135), despite its repeal¹⁰.

As outlined in Section 1.4, MCO consulted with the DP&E in May 2014 with regards to seeking the necessary approvals for the OC4 South-West Modification and based on this consultation, this EA has been prepared under section 75W of the EP&A Act.

Section 75W of the EP&A Act states:

75W Modification of Minister's Approval

(1) *In this section:*

Minister's approval means an approval to carry out a project under this Part, and includes an approval of a concept plan.

Modification of approval means changing the terms of a Minister's approval, including:

(a) *revoking or varying a condition of the approval or imposing an additional condition of the approval, and*

(b) *changing the terms of any determination made by the Minister under Division 3 in connection with the approval.*

(2) *The proponent may request the Minister to modify the Minister's approval for a project. The Minister's approval for a modification is not required if the project as modified will be consistent with the existing approval under this Part.*

(3) *The request for the Minister's approval is to be lodged with the Director-General. The Director-General may notify the proponent of environmental assessment requirements with respect to the proposed modification that the proponent must comply with before the matter will be considered by the Minister.*

(4) *The Minister may modify the approval (with or without conditions) or disapprove of the modification.*

...

The EP&A Act and the *Environmental Planning and Assessment Regulation, 2000* (EP&A Regulation) set the framework for planning and environmental assessment in NSW. As noted above, the OC4 South-West Modification is to be assessed under section 75W (Part 3A) of the EP&A Act.

Section 5 of the EP&A Act describes the objects of the EP&A Act as follows:

(a) *to encourage:*

(i) *the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,*

(ii) *the promotion and co-ordination of the orderly and economic use and development of land,*

(iii) *the protection, provision and coordination of communication and utility services,*

(iv) *the provision of land for public purposes,*

(v) *the provision and co-ordination of community services and facilities, and*

(vi) *the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and*

¹⁰ Part 3A of the EP&A Act (as in force immediately before its repeal) continues to apply for the Moolarben Coal Complex. The description and quotations of relevant references to clauses of Part 3A in this document are as if Part 3A of the EP&A Act is still in force.

- (vii) *ecologically sustainable development, and*
- (viii) *the provision and maintenance of affordable housing, and*
- (b) *to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and*
- (c) *to provide increased opportunity for public involvement and participation in environmental planning and assessment.*

The OC4 South-West Modification is considered to be generally consistent with the objects of the EP&A Act, because it is a modification that:

- incorporates measures for the management and conservation of natural resources (Section 4);
- would enable more efficient integration of mining operations across the complex;
- would not affect the ongoing provision of community services and facilities;
- would result in no significant impact on threatened species, population and ecological communities or their habitats;
- allows continued development of the State's mineral resources (i.e. coal resources) in a manner that minimises environmental impacts through the implementation of the Moolarben Coal Complex Environmental Management Strategy (Section 2.15) and other measures (Section 4); and
- involves public involvement and participation through consultation activities (Section 1.4), which would be ongoing following the public exhibition of this EA document and DP&E assessment of the OC4 South-West Modification in accordance with the requirements of the EP&A Act.

5.1.2 Other State Legislation

In addition to the EP&A Act, the following NSW Acts may be applicable to the Moolarben Coal Complex, incorporating the OC4 South-West Modification:

- *Crown Lands Act, 1989;*
- *Fisheries Management Act, 1994;*
- *Heritage Act, 1977;*
- *Mine Subsidence Compensation Act, 1961;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974 (NPW Act);*

- *Native Vegetation Act, 2003;*
- *Protection of the Environment Operations Act, 1997 (PoEO Act);*
- *Roads Act, 1993;*
- *TSC Act;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011; and*
- *Work Health and Safety (Mines) Act, 2013.*

Relevant licences or approvals required under these Acts would continue to be obtained for the Moolarben Coal Complex as required. Key plans, licences and agreements that would require revision to incorporate the OC4 South-West Modification are outlined in Section 5.3.

Additional detail on the likely requirements under some of these key Acts is provided in the subsections below.

Mining Act, 1992

MCO applied for Mining Lease Application (MLA) 327 on 20 March 2009. MCO applied for MLA 331 on 21 April 2009. The grant of MLA 327 and MLA 331 would be required for the OC4 South-West Modification.

Under the *Mining Act, 1992*, environmental protection and rehabilitation are regulated by conditions of MLs, including requirements for the submission of a MOP prior to the commencement of operations, and subsequent AEMRs (or Annual Reviews).

The Moolarben Coal Complex MOP would be updated to include the proposed layout of the OC4 South-West Modification prior to the commencement of OC4 (Section 5.3).

Protection of the Environment Operations Act, 1997

Construction and operations at the Moolarben Coal Complex are currently undertaken in accordance with an existing EPL 12932 issued under the PoEO Act.

If required, any variations to existing EPL 12932 for the OC4 South-West Modification would be undertaken in consultation with the EPA.

Water Management Act, 2000 and Water Act, 1912

The *Water Management Act, 2000* and the *Water Act, 1912* contain provisions for the licensing, allocation, capture and use of water resources. Under the *Water Management Act, 2000*, water sharing plans are being introduced for water sources. Water sharing plans establish rules for sharing water between different users (including the environment).

Licensing requirements under the *Water Management Act, 2000* and *Water Act, 1912* were evaluated as a component of the Stage 1 Modification 9 EA and Stage 2 PPR EA.

The OC4 South-West Modification would not involve any increase in pit inflows, water demand or mining rate, and hence no additional water licence entitlements would be required as a result of the OC4 South-West Modification (Section 4.5).

MCO would continue to obtain and hold sufficient licences required under the *Water Management Act, 2000* and *Water Act, 1912*.

National Parks and Wildlife Act, 1974

The NPW Act contains provisions for the protection and management of national parks, historic sites, nature reserves and Aboriginal heritage in NSW.

Section 75U(1) of the EP&A Act outlines authorisations that are not required for a transitional Part 3A project, such as the Moolarben Coal Complex. An Aboriginal heritage impact permit under section 90 of the NPW Act is not required for the Moolarben Coal Complex, including the OC4 South-West Modification.

Notwithstanding, an ACHA for the OC4 South-West Modification has been undertaken in consultation with Registered Aboriginal Parties in accordance with the existing engagement system in place at the Moolarben Coal Complex (Section 4.7).

Heritage Act, 1977

The *Heritage Act, 1977* regulates the conservation of items listed on the State Heritage Register or subject to an interim heritage order.

No items on the State Heritage Register or subject to an interim heritage order have been identified within the OC4 South-West Modification development areas (Section 4.8.4), therefore the *Heritage Act, 1977* is not relevant to the OC4 South-West Modification.

Threatened Species Conservation Act, 1995

The TSC Act protects threatened species and provides a framework for the assessment of a development's impacts on threatened species and ecological communities.

The potential impact of the OC4 South-West Modification on threatened species, populations and ecological communities was assessed as part of the Flora and Fauna Impact Assessment (Appendix C). Ecological (2015) concluded the OC4 South-West Modification would not have a significant impact on threatened species, populations and ecological communities with the implementation of the proposed management measures (Sections 4.3).

There would be an overall reduction in the disturbance area of approximately 13.4 ha due to the OC4 South-West Modification (Section 4.3.2).

5.1.3 Environmental Planning Instruments

The Stage 1 EA and Stage 2 PPR EA provided a detailed consideration of the Moolarben Coal Complex against State environmental planning policies and local environmental plans.

State environmental planning policies and local environmental plans that may be relevant to the OC4 South-West Modification are discussed below.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

The *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) regularises the various environmental planning instruments that previously controlled mining activities.

Part 3 of the Mining SEPP outlines the matters to be considered when determining development applications. Relevant clauses are discussed further below.

Clause 12

Clause 12 of the Mining SEPP requires that, before determining an application for consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must:

- (a) consider:
 - (i) the existing uses and approved uses of land in the vicinity of the development, and

- (ii) *whether or not the development is likely to have a significant impact on the uses that, in the opinion of the consent authority having regard to land use trends, are likely to be the preferred uses of land in the vicinity of the development, and*
- (iii) *any ways in which the development may be incompatible with any of those existing, approved or likely preferred uses, and*
- (b) *evaluate and compare the respective public benefits of the development and the land uses referred to in paragraph (a) (i) and (ii), and*
- (c) *evaluate any measures proposed by the applicant to avoid or minimise any incompatibility, as referred to in paragraph (a) (iii).*
- (b) *any advice by the Director-General of the Department of Trade and Investment, Regional Infrastructure and Services as to the relative significance of the resource in comparison with other mineral resources across the State.*
- (2) *The following matters are (without limitation) taken to be relevant for the purposes of subclause (1) (a):*
 - (a) *employment generation,*
 - (b) *expenditure, including capital investment,*
 - (c) *the payment of royalties to the State.*
- (3) *The Director-General of the Department of Trade and Investment, Regional Infrastructure and Services is, in providing advice under subclause (1) (b), to have regard to such matters as that Director-General considers relevant, including (without limitation):*
 - (a) *the size, quality and availability of the resource that is the subject of the application, and*
 - (b) *the proximity and access of the land to which the application relates to existing or proposed infrastructure, and*
 - (c) *the relationship of the resource to any existing mine, and*
 - (d) *whether other industries or projects are dependent on the development of the resource.*

The OC4 south-west haul road is located within the Application Areas in Project Approvals (05_0117 and 08_0135), and connects to approved open pits (i.e. OC1 and OC4). As such, the OC4 south-west haul road is compatible with the existing land use (i.e. coal mining).

The backfilling of the northern OC1 final void would improve compatibility with surrounding land-uses, as this area would be returned to approximately pre-mining levels.

No additional potential impacts to land-uses outside the Application Areas in Project Approvals (05_0117 and 08_0135) are expected due to the OC4 South-West Modification (e.g. no additional impacts associated with noise, air quality, visual amenity or groundwater [Section 4]).

Clause 12AA

Clause 12AA of the Mining SEPP requires:

- (1) *In determining an application for consent for development for the purposes of mining, the consent authority must consider the significance of the resource that is the subject of the application, having regard to:*
 - (a) *the economic benefits, both to the State and the region in which the development is proposed to be carried out, of developing the resource, and*
- (4) *In determining whether to grant consent to the proposed development, the significance of the resource is to be the consent authority's principal consideration under this Part.*
- (5) *Accordingly, the weight to be given by the consent authority to any other matter for consideration under this Part is to be proportionate to the importance of that other matter in comparison with the significance of the resource.*
- (6) *To avoid doubt, the obligations of a consent authority under this clause extend to any application to modify a development consent.*

The proposed OC4 South-West Modification would enable more efficient integration of mining operations at the Moolarben Mining Complex.

Clause 14

Clause 14(1) of the Mining SEPP requires that, before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring that the development is undertaken in an environmentally responsible manner, including conditions to ensure the following:

- (a) *that impacts on significant water resources, including surface and groundwater resources, are avoided, or are minimised to the greatest extent practicable,*
- (b) *that impacts on threatened species and biodiversity, are avoided, or are minimised to the greatest extent practicable,*
- (c) *that greenhouse gas emissions are minimised to the greatest extent practicable.*

In addition, clause 14(2) requires that, without limiting clause 14(1), in determining a development application for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider an assessment of the greenhouse gas emissions (including downstream emissions) of the development, and must do so having regard to any applicable State or national policies, programmes or guidelines concerning greenhouse gas emissions.

The potential impacts of the OC4 South-West Modification on groundwater and surface water resources are discussed in Sections 4.4 and 4.5, including measures to minimise potential impacts which are described in Sections 4.4.3 and 4.5.3. The potential impacts of the OC4 South-West Modification on threatened species and biodiversity are described in Section 4.3, including measures to minimise potential impacts which are described in Sections 4.3.3.

Existing greenhouse gas abatement measures at the Moolarben Coal Complex and the potential increase in greenhouse gas emissions associated with the OC4 South-West Modification are described in Section 4.8.3.

Clause 15

Clause 15 of the Mining SEPP requires that:

- (1) *Before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider the efficiency or otherwise of the development in terms of resource recovery.*

- (2) *Before granting consent for the development, the consent authority must consider whether or not the consent should be issued subject to conditions aimed at optimising the efficiency of resource recovery and the reuse or recycling of material.*
- (3) *The consent authority may refuse to grant consent to development if it is not satisfied that the development will be carried out in such a way as to optimise the efficiency of recovery of minerals, petroleum or extractive materials and to minimise the creation of waste in association with the extraction, recovery or processing of minerals, petroleum or extractive materials.*

The proposed OC4 South-West Modification would enable more efficient integration of mining operations across at the Moolarben Mining Complex.

Clause 17

Clause 17 of the Mining SEPP requires that before granting consent for development for the purposes of mining, petroleum production or extractive industry, the consent authority must consider whether or not the approval should be issued subject to conditions aimed at ensuring the rehabilitation of land that will be affected by the development. In particular, the consent authority must consider whether conditions of the consent should:

- (a) *require the preparation of a plan that identifies the proposed end use and landform of the land once rehabilitated, or*
- (b) *require waste generated by the development or the rehabilitation to be dealt with appropriately, or*
- (c) *require any soil contaminated as a result of the development to be remediated in accordance with relevant guidelines (including guidelines under section 145C of the Act and the Contaminated Land Management Act 1997), or*
- (d) *require steps to be taken to ensure that the state of the land, while being rehabilitated and at the completion of the rehabilitation, does not jeopardize public safety.*

The approved rehabilitation objectives and concepts for the OC4 South-West Modification would remain generally unchanged.

Backfilling of the OC1 final void to approximately pre-mine levels would provide a beneficial post-mining rehabilitation outcome as the backfilled final void would improve compatibility with the surrounding landform and reduce the amount of surface water captured on-site post-mining.

The Rehabilitation Management Plan and MOP would be revised to incorporate the OC4 South-West Modification.

**State Environmental Planning Policy No. 33
(Hazardous and Offensive Development)**

Clause 13 of SEPP 33 requires the consent authority, in considering a Development Application for a potentially hazardous or a potentially offensive industry, to take into account:

- (c) *in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application)...*

The OC4 South-West Modification would not change existing potential risks or hazard consequences as the proposed activities associated with the OC4 South-West Modification are consistent with those for the approved Moolarben Coal Complex (Section 4.8.7).

Notwithstanding, environmental management plans and monitoring programs would be reviewed, and if necessary, revised by MCO to include the OC4 South-West Modification and manage any associated environmental risks.

**State Environmental Planning Policy No. 44
(Koala Habitat Protection)**

SEPP 44 requires the consent authority for any Development Application in certain LGAs to consider whether land subject to a Development Application is "potential Koala habitat" or "core Koala habitat".

EcoLogical Australia (Appendix C) considers the OC4 South-West Modification disturbance area comprises potential Koala habitat, but does not comprise core Koala habitat.

**State Environmental Planning Policy No. 55
(Remediation of Land)**

SEPP 55 aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

Under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

Because the OC4 South-West Modification is within the Project Application Areas in Project Approvals (05_0117 and 08_0135), no change of use is proposed and no preliminary land contamination investigation is required.

Mid-Western Regional Local Environmental Plan 2012

The Moolarben Coal Complex is located wholly within the Mid-Western Regional LGA and is covered by the *Mid-Western Regional Local Environmental Plan 2012* (MWR LEP).

Clause 2.3(2) of the MWR LEP relevantly provides:

The consent authority must have regard to the objectives for development in a zone when determining a development application in respect of land within the zone.

As outlined above, the consent authority for transitional Part 3A projects is the Minister for Planning.

The approved Stage 1 and Stage 2 of the Moolarben Coal Complex were considered by the relevant consent authorities to be consistent with the land-use objectives of the MWR LEP.

The OC4 South-West Modification would not change land-use within the Application Areas in Project Approvals (05_0117 and 08_0135), and therefore, would also be consistent with the land-use objectives of the MWR LEP.

5.1.4 Commonwealth Legislation

The current Stage 1 mining operations are undertaken in accordance with Approval Decisions (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 EPBC Act.

A Variation of Proposal to take Action (EPBC 2008/4444) under the EPBC Act for Moolarben Coal Project (Stage 2) was accepted on 26 April 2012. The Variation of Proposal to take Action (EPBC 2008/4444) requires separate approval under the EPBC Act.

The potential impacts of the OC4 South-West Modification on flora and fauna have been assessed in Appendix C and summarised in Section 4.3. The assessment indicates that there would be no significant impact on threatened species, populations and communities and migratory species listed under the EPBC Act as a result of the OC4 South-West Modification.

The OC4 South-West Modification would result in a reduction to the total surface disturbance footprint (i.e. the proposed area to be avoided [18.5 ha] would be larger than the new surface disturbance [5.1 ha]).

It is expected the OC4 South-West Modification would reduce potential impacts to water resources (i.e. in comparison to the currently approved Moolarben Coal Complex) (Sections 4.4 and 4.5).

5.2 NSW GOVERNMENT POLICY

5.2.1 Strategic Regional Land Use Plan

As part of the Strategic Regional Land Use Policy, the NSW Government has introduced a 'Gateway Process' for the upfront assessment of the impacts of State Significant mining and coal seam gas proposals on Strategic Agricultural Land (NSW Government, 2012b).

The Strategic Regional Land Use Policy and the 'Gateway Process' apply to new State Significant Development applications or modifications for mining projects located outside of existing mining lease areas (NSW Government, 2012b).

MLA 327 and MLA 331 have not been granted for the area that covers the OC4 South-West Modification disturbance area and therefore the Gateway Process and Strategic Regional Land Use Policy have been considered for the OC4 South-West Modification.

The Upper Hunter Strategic Regional Land Use Plan does not map any Strategic Agricultural Land in the OC4 South-West Modification disturbance area.

Soil surveys in the OC4 South-West Modification disturbance area were undertaken in May and October 2014 and January 2015 to assess the land against the *Interim Protocol for site verification and mapping of biophysical strategic agricultural land* (NSW Government, 2013).

A site verification certificate issued on 31 March 2015 (Attachment 3) verified the OC4 South-West Modification disturbance area as non-BSAL.

5.2.2 Aquifer Interference Policy

The AIP (NSW Government, 2012c) has been developed by the NSW Government as a component of the NSW Government's Strategic Regional Land Use Policy. The AIP applies Statewide and details water licence and impact assessment requirements.

The AIP has been developed to ensure equitable water sharing between various water users and proper licensing of water taken by aquifer interference activities such that the take is accounted for in the water budget and water sharing arrangements. The AIP will also enhance existing regulation, contributing to a comprehensive framework to protect the rights of all water users and the environment in NSW.

The *Water Management Act, 2000* defines an aquifer interference activity as that which involves any of the following:

- *the penetration of an aquifer;*
- *the interference with water in an aquifer;*
- *the obstruction of the flow of water in an aquifer;*
- *the taking of water from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations; and*
- *the disposal of water taken from an aquifer in the course of carrying out mining or any other activity prescribed by the regulations.*

The OC4 South-West Modification would not involve any increase in pit inflows, water demand or mining rate, and hence no additional water licence entitlements would be required as a result of the OC4 South-West Modification (Section 4.5). One of the two approved voids within OC1 would be backfilled under the OC4 South-West Modification. The OC4 South-West Modification would not result in any additional interference with the groundwater aquifers (Section 4.5) and therefore the AIP has not been considered any further.

MCO would continue to hold licence entitlements to account for the water-take as required.

5.3 APPROVALS, LICENCES AND PLANS

5.3.1 Project Approval Conditions

Condition 32, Schedule 3 of Project Approval (05_0117) (Attachment 1) includes a water management performance measure to line the Ulan Seam sub-crop of the northern OC1 final void with a suitably lined material to comply with a permeability standard of less than 1×10^{-9} m/s.

MCO is seeking to remove Condition 32, Schedule 3 of Project Approval (05_0117) as a component of the OC4 South-West Modification (Section 3.8.1).

In addition to the above, the following components of the Project Approvals would require amendment to incorporate the proposed layout of the OC4 South-West Modification:

- Appendix 2 (General Layout of Project) of Project Approval (05_0117);
- Appendix 2 (General Layout of Project) of Project Approval (08_0135);
- Appendix 8 (Aboriginal Heritage) of Project Approval (08_0135); and
- Appendix 10 (Rehabilitation Plan) of Project Approval (08_0135).

5.3.2 Management/Monitoring Plans

Some management plans may require revision to reflect updated environmental management measures or changes to Project Approval conditions resulting from the OC4 South-West Modification.

These are expected to include the Rehabilitation Management Plan, Water Management Plan, Heritage Management Plan, Noise Management Plan and Air Quality Management Plan.

5.3.3 Mining Operations Plan

The Moolarben Coal Complex MOP would be updated to include the proposed layout of the OC4 South-West Modification prior to the commencement of OC4 (Section 5.3.1).

6 REFERENCES

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