Moolarben Coal Project

OC4 South-West Modification
Surface Water Assessment Review

Moolarben Coal Operations Pty Ltd

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For and on behalf of WRM Water & Environment Pty Ltd
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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.

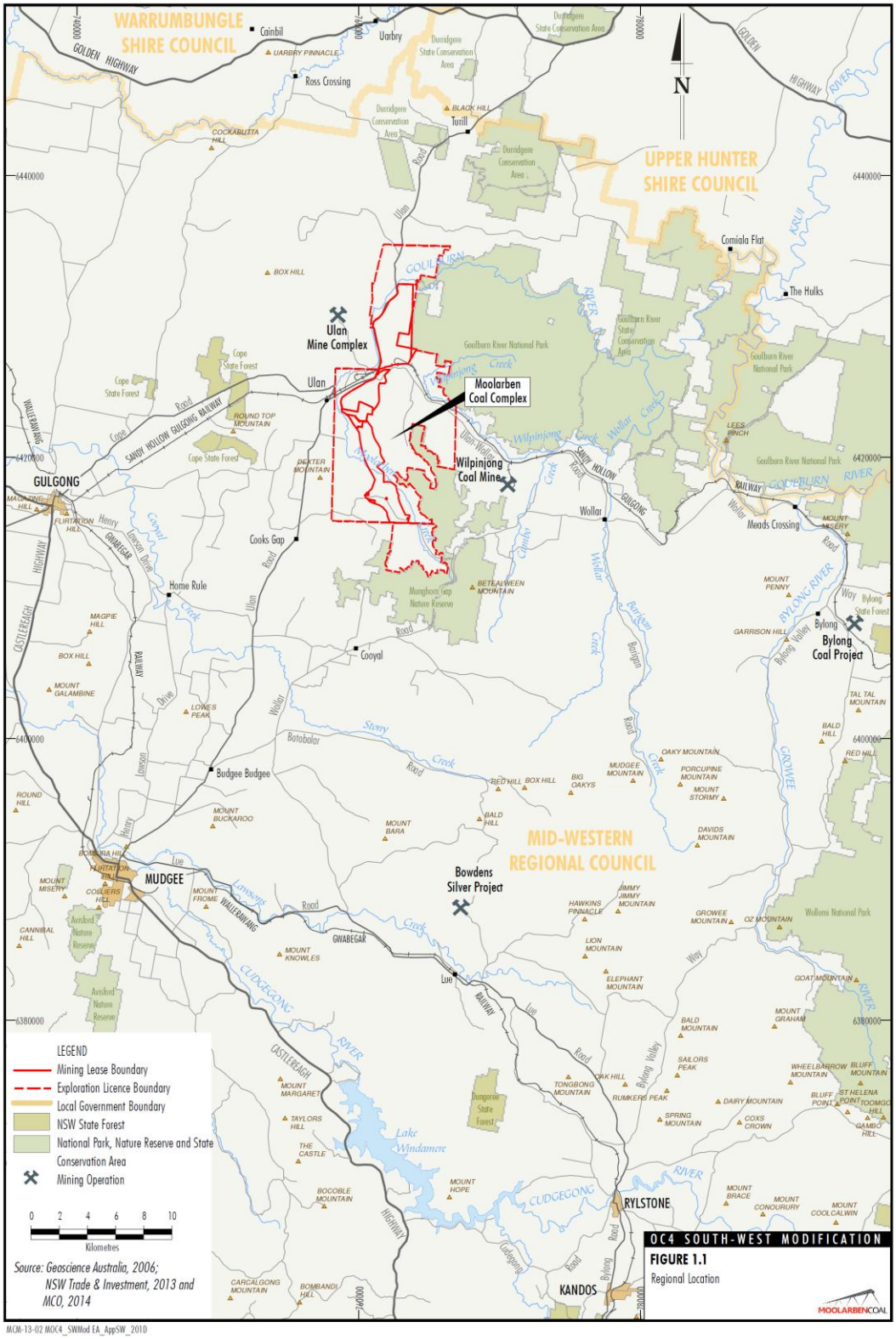

Figure 1.1 – Regional Location

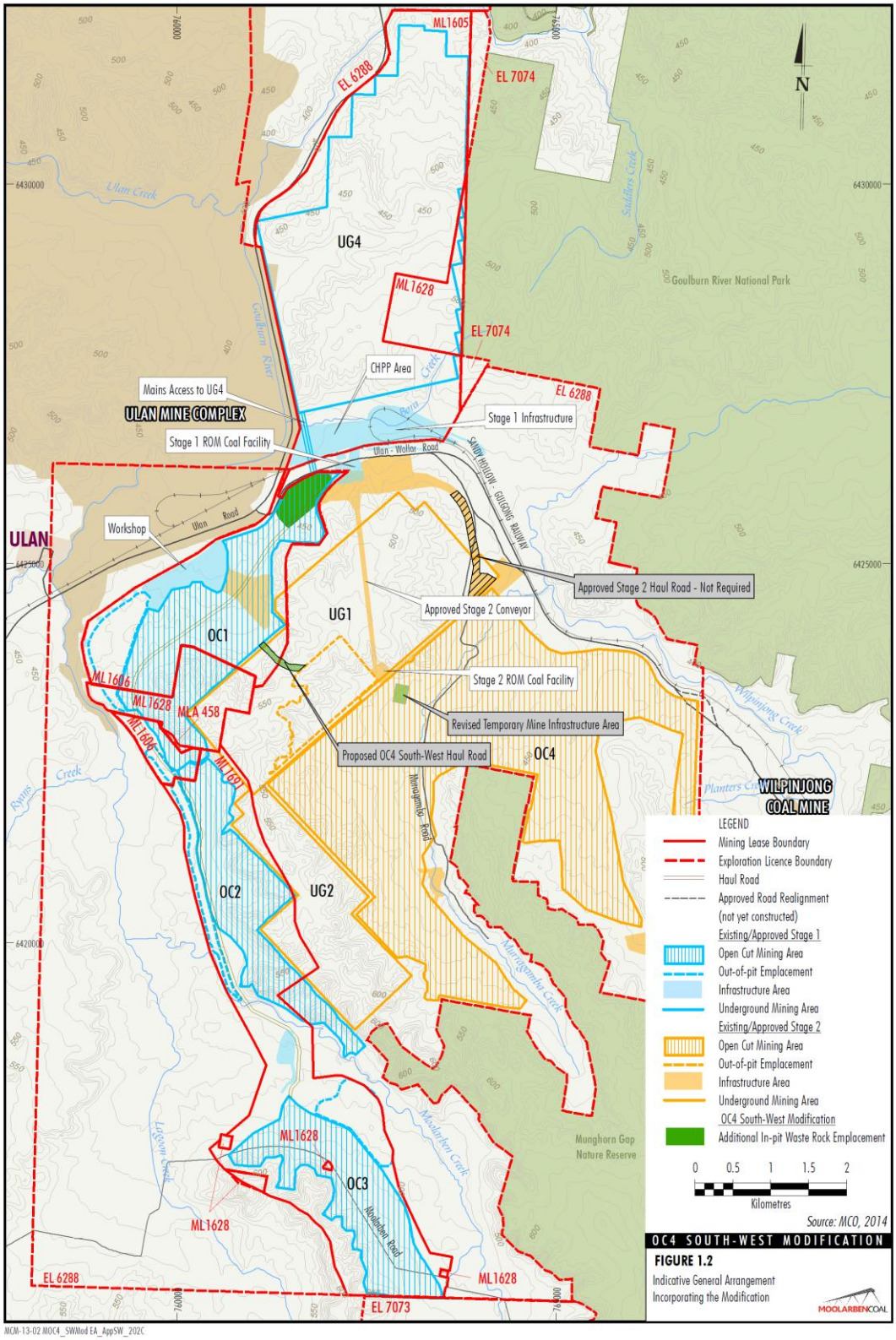

Figure 1.2 – Indicative General Arrangement Incorporating the Modification

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.

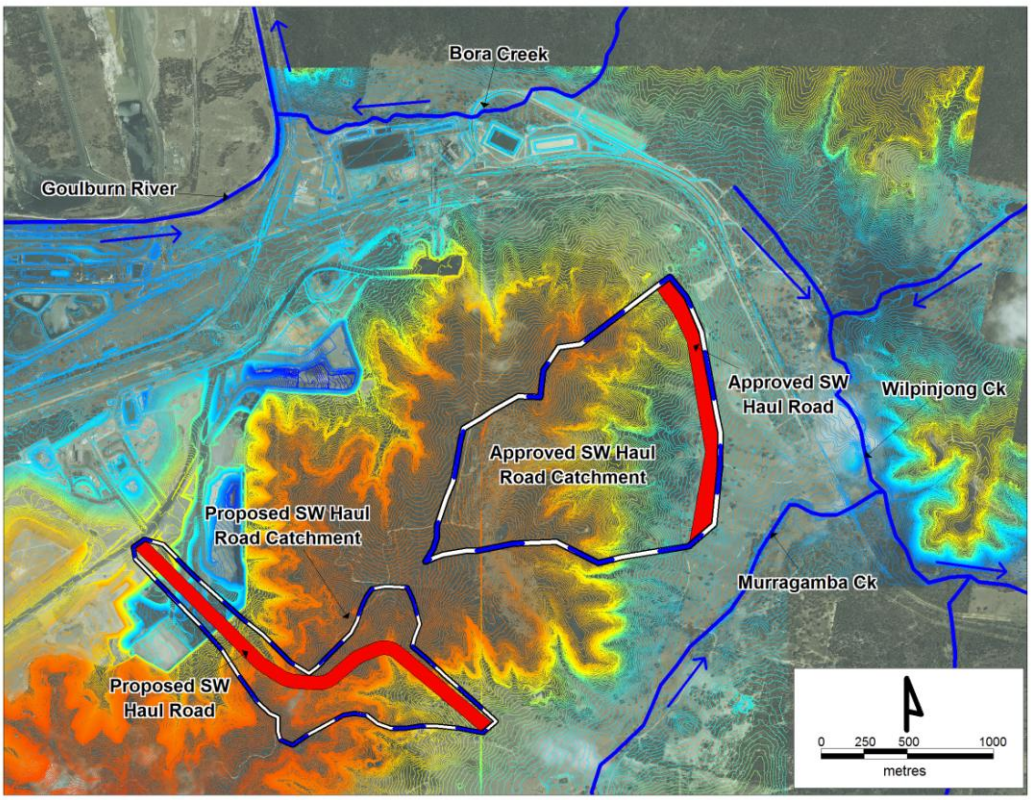

Figure 4.1 – Change in Catchment Area

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.

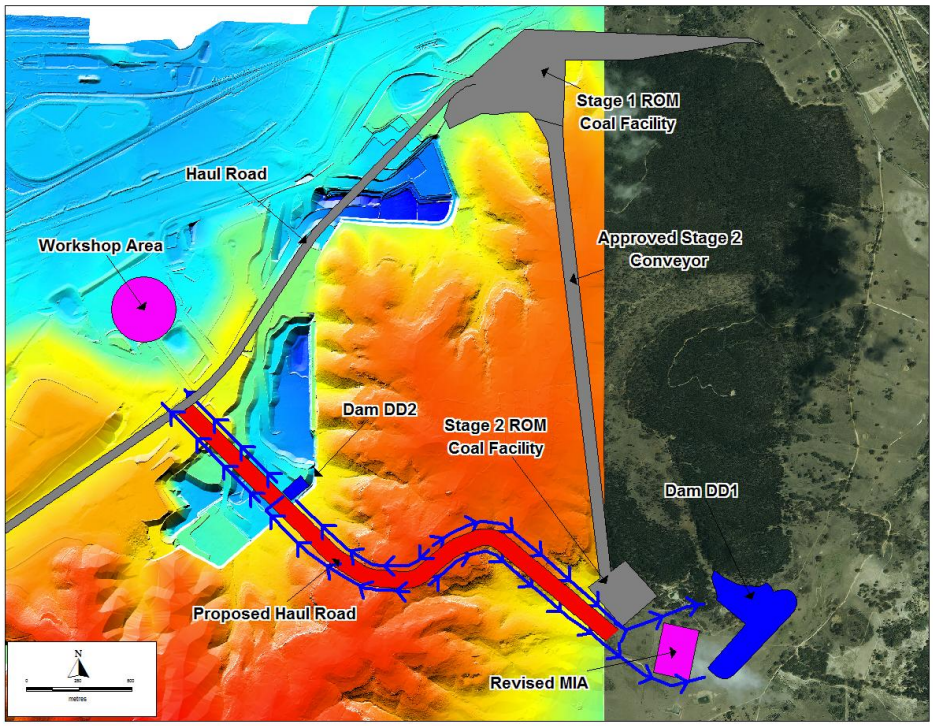

Figure 5.1 – Haul Road Concept Drainage Configuration

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.