DURALIECOAL
Part of the Yancoal Australia Group

Duralie Open Pit Modification
Environmental Assessment






SECTION 3

MODIFICATION DESCRIPTION

YANCOAL
兖煤澳大利亚有限公司

Resource Strategies

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3 MODIFICATION DESCRIPTION

The Modification would involve the continuation of mining at the DCM, with no change to the existing mining tenements, the currently approved mine life or ROM coal production rate.

To reflect the results of ongoing mine exploration and mine planning the Modification would involve the following minor changes to the DCM mine layout and progression:

- Increase in the maximum depth of the Clareval open pit.
- A minor increase in the extent of surface development of the DCM of approximately 2.5 ha (Figure 1-2), resulting from:
  - a reduction in low wall angles of the Clareval open pit and the removal of a pillar between the Clareval and Weismantel open pits to improve geotechnical stability; and
  - associated relocation of the up-catchment diversion to the west of the Clareval open pit.
- Revised mining sequence (i.e. progression of mining in the Clareval and Weismantel open pits).
- Increased height of the waste emplacement (i.e. the backfilled open pit) from the currently approved elevation of approximately 110 m AHD to approximately 135 m AHD.

3.1 COAL RESOURCE AND GEOLOGICAL FEATURES

The Modification would not change the coal seams mined at the DCM (i.e. Weismantel Coal Seam and Clareval Coal Seam).

Consistent with the DEP EA, mine exploration activities have been undertaken ahead of the open pit mining operations to investigate geological structures and seam morphology as input to detailed mine planning.

The results of ongoing mine exploration activities have shown the Clareval Coal Seam is up to 70 m deeper in some areas of the Clareval open pit than was assumed for the DEP EA. This change is due to ongoing exploration providing a better understanding of the complex geology of the Clareval Seam, which includes faults and folds within the Clareval open pit.

No change to the depth of the extraction of Weismantel Coal Seam described in the DEP EA has been identified.

3.2 MINING OPERATIONS

The Modification would involve the continuation of mining at the DCM within ML 1427 and ML 1646.

Mining activities at the DCM would continue to occur 24 hours per day.

3.2.1 Mining Schedule

Mining at the DCM is scheduled to complete in approximately 2019. The Modification would not change the currently approved mine life.

The mine schedule for the DCM incorporating the Modification includes mining of up to 3 Mtpa and waste rock extraction of up to 10.6 Mbcm per annum (i.e. there would be no increase to the currently approved maximum annual ROM coal production or waste rock extraction rates).

An indicative mine schedule for the DCM incorporating the Modification is provided in Table 3-1. The mine schedule would be determined by the requirements of the coal market, product specification and/or blending requirements, and as such, coal extraction rates may vary over the remaining life of the DCM incorporating the Modification.

Table 3-1
Indicative Mine Schedule

Year	Waste Rock (Mbcm)	ROM Coal (Mtpa)
2015	10.6	3.0
2016	7.9	2.3
2017	5.0	1.6
2018	2.5	0.7
2019	2.1	0.7

3.2.2 DCM Open Pits

Clareval Open Pit

The Modification would access the same coal reserves within the Clareval open pit described in the DEP EA (i.e. the Clareval Coal Seam). However, based on the results of ongoing mine exploration activities (Section 3.1) accessing these same coal reserves would require the depth of the Clareval open pit to increase by up to approximately 70 m in some areas.

The Clareval open pit would be up to approximately 260 m deep (i.e. in comparison to the surrounding natural topography) for the Modification.

The ongoing exploration activities have also resulted in a revision to the previously assumed geotechnical characteristics of the strata within the Clareval open pit.

Based on the findings of geotechnical investigations, a reduction in low wall angles of the Clareval open pit (i.e. on the western side) and the removal of a pillar between the Clareval and Weismantel open pits is required for the Modification to improve geotechnical stability. The reduction in low wall angles and the removal of the pillar have been designed in consideration of maintaining factors of safety appropriate for operating conditions and for the long-term stability of the final voids.

There would be a minor increase in the surface development extent of the Clareval open pit due to the reduction in low angles and removal of the pillar (Figure 1-2).

Weismantel Open Pit

As described above, the Modification would involve the removal of the pillar between the Clareval and Weismantel open pits to improve geotechnical stability.

No requirement to change to low wall angles of the Weismantel open pit has been identified. Accordingly, there would be no other change to the size of the Weismantel open pit due to the Modification (Figure 1-2).

3.2.3 Mining Method

There would be no change to the DCM mining method or general mining sequence (Section 2.2.3) due to the Modification.

3.2.4 Mine Progression

As described in the DEP EA, the staging of the development of the open pits is determined by the requirements of the coal market, product specification and/or blending requirements. As such, the actual mine progression since approval of the DEP has varied from that indicatively described in the DEP EA, which was the completion of mining in the Weismantel pit followed by mining in the Clareval open pit.

During the life of the DCM incorporating the Modification, mining would occur in the Clareval open pit between approximately 2015 and 2017, followed by the completion of mining in the Weismantel open pit.

Indicative general arrangements for mining activities in 2015 (i.e. active mining in the Clareval open pit) and 2018 (i.e. active mining in the Weismantel open pit) are shown on Figures 3-1 and 3-2, respectively.

3.2.5 Mine Fleet

The existing DCM mine fleet would be maintained for the Modification, with reductions in the mine fleet later in the mine life consistent with the reduction in ROM coal production and waste rock extraction (Table 3-1).

Further detail regarding the mine fleet is provided Appendix A.

The expected mobile fleet may change over the life of the DCM based on operational requirements, subject to maintaining compliance with the impact assessment criteria of Project Approval (08_0203).

3.2.6 Overburden Drill and Blast

There would be no change to the existing blasting techniques, frequency or hours (Section 2.2.6) due to the Modification.

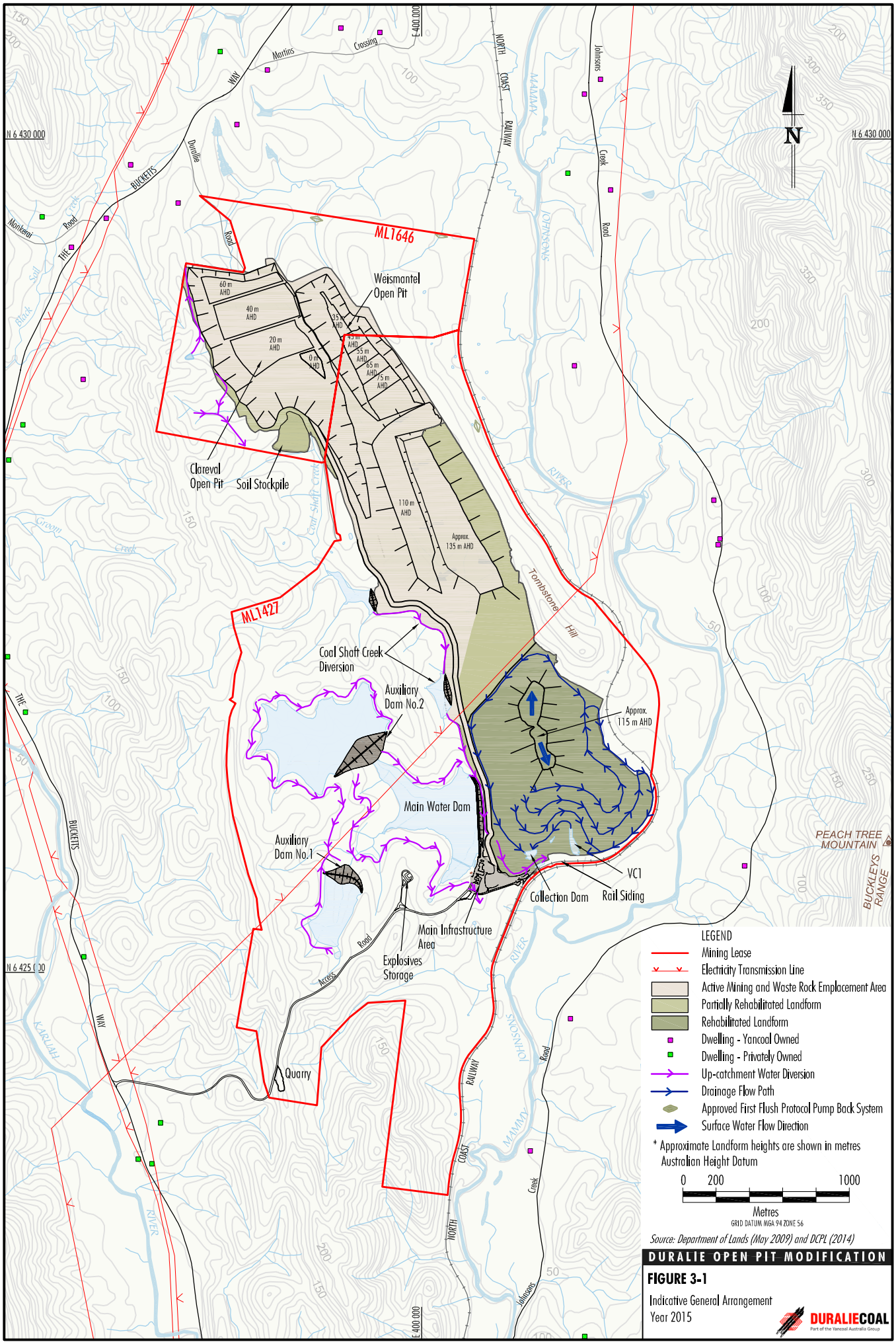
3.2.7 Coal Mining, Handling and Transportation

There would be no change to ROM coal mining, handling or transportation due to the Modification (Section 2.2.7).

As the Modification would not increase the currently approved maximum ROM coal production rate of 3 Mtpa, there would be no increase to the currently approved Duralie shuttle train movements or hours of operation.

3.2.8 Waste Rock Management

Up to 10.6 Mbcm per annum of waste rock would be mined during the Modification. Mined waste rock would be generally backfilled in the open pit voids, consistent with the DEP.



DURALIE OPEN PIT MODIFICATION

FIGURE 3-1

Indicative General Arrangement
Year 2015

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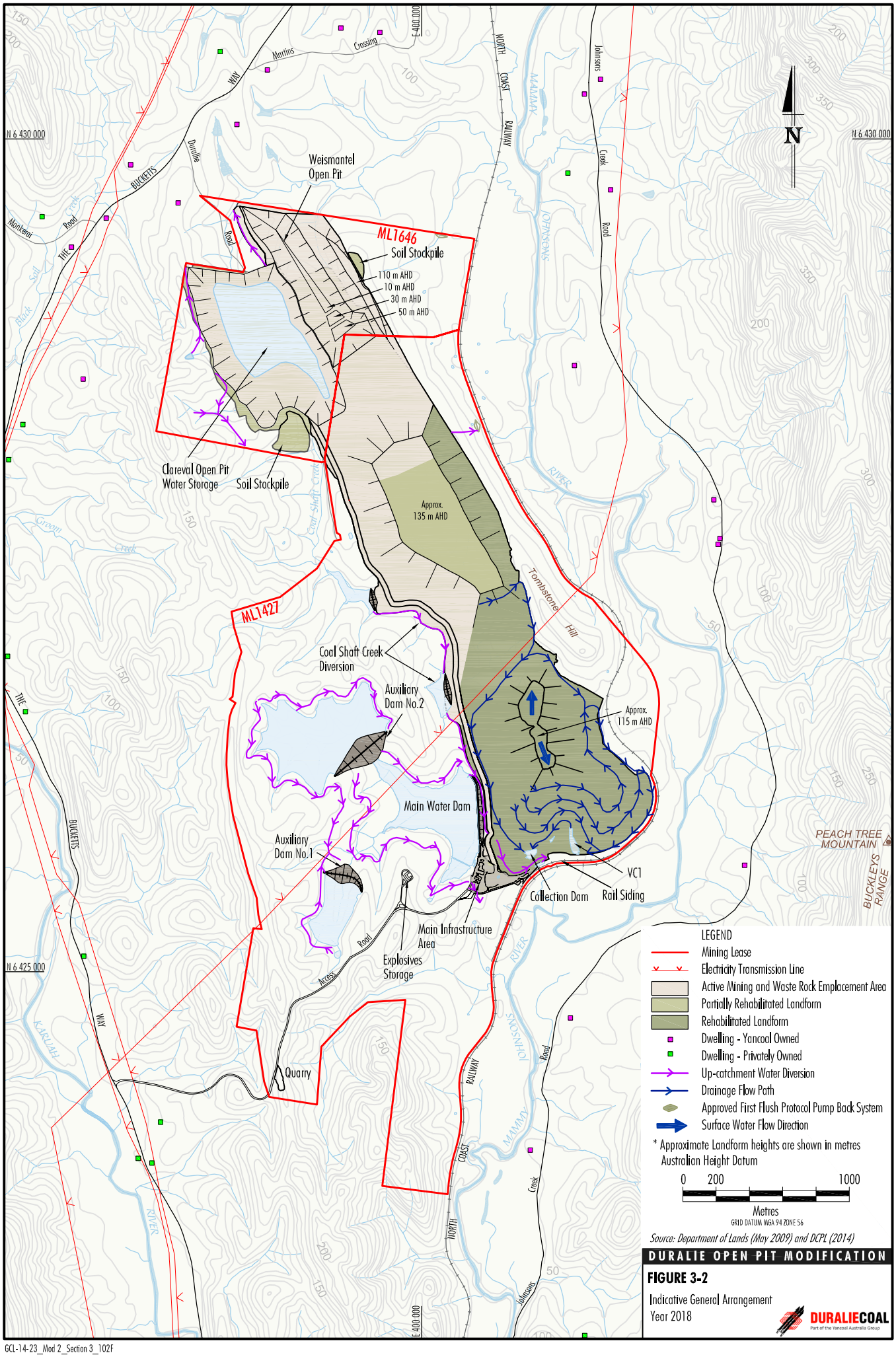

DURALIE OPEN PIT MODIFICATION

FIGURE 3-2

Indicative General Arrangement
Year 2018

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Revised waste rock emplacement design, resulting from the proposed changes to the open pits and a revision to the waste rock swell factor (i.e. the increase in volume of a tonne of waste rock in an emplacement relative to its *in situ* volume) assumed for the DEP, has determined an increase in the currently approved waste rock emplacement elevation is required to accommodate the waste rock to be mined over the remaining life of the DCM (incorporating the Modification).

Therefore, an increase in the waste rock emplacement elevation to 135 m AHD (Figures 3-1 and 3-2) is proposed as part of the Modification.

The increased elevation of the waste rock emplacement is proposed to avoid any increase in the waste rock emplacement footprint (i.e. to avoid additional surface disturbance), and to avoid the costs associated with the rehandling of significant quantities of waste rock.

Waste Rock Geochemistry

The Modification would involve mining of the same material in the open pits, for which the geochemical characteristics were determined for the DEP EA. As such, no change to the previously identified geochemistry of the waste rock is expected for the Modification.

Therefore, no change to the existing waste rock geochemistry management practices (Section 2.2.8) would be required for the Modification.

3.3 EXISTING INFRASTRUCTURE

No changes to the main infrastructure area would be required for the Modification (Section 2.3.1).

Similarly, no changes would be required to existing rail infrastructure (Section 2.3.3), electricity supply or distribution (Section 2.3.4) or other supporting infrastructure (Section 2.3.5).

Water Management Infrastructure/Storages

A portion of the existing up-catchment diversion to the west of the Clareval open pit would be relocated to accommodate the additional surface development extent of the Clareval open pit (Figures 3-1 and 3-2).

No other changes to existing water management infrastructure (Section 2.3.2) would be required for the Modification.

3.4 WATER MANAGEMENT

3.4.1 Water Supply and Demand

The Modification would not change water demand at the DCM.

Water captured by the water management system (Section 2.4.2) from rainfall runoff and groundwater inflow to the open pit would continue to be used to meet the on-site water demand.

A revised site water balance has been prepared for the Modification by Gilbert & Associates (2014), and is described further in Section 3.4.3.

3.4.2 Water Management System

In general, there would be no changes to the existing water management system (Section 2.4.2) as a result of the Modification (i.e. the water management system schematic shown in Figure 2-2 would not change).

Notwithstanding the above, the Modification would result in a portion of the existing up-catchment diversion to the west of the Clareval open pit being relocated to accommodate the additional surface development extent of the Clareval open pit (Section 3.3.2) (Figures 3-1 and 3-2).

The proposed changes to the dimensions of the Clareval open pit and the revised progression of mining in the open pits would also change the timing of the availability of water storage in comparison to the simulated water balance for the DEP.

In addition, the proposed increased waste emplacement elevation (Section 3.2.8) would change the catchment area for surface runoff captured by the water management system.

3.4.3 Revised Site Water Balance

To account for the changes described in Section 3.4.2, a revised site water balance has been conducted for the life of the DCM incorporating the Modification, and for post-mining.

Consistent with the DEP site water balance, the revised site water balance predicts no releases of water from the MWD or the Auxiliary Dams to the surrounding environment in any of the 1,000 climatic sequences simulated (Appendix D).

3.5 FINAL VOIDS

At the cessation of mining, the currently approved final voids in the Clareval open pit and Weismantel open pit (Section 2.5) would remain for the Modification.

The Modification would result in minor changes to the sizes of the final voids consistent with the proposed changes to the open pits (Section 3.2.2).

Consistent with the DEP, the surface catchment of the final voids would be reduced to a practicable minimum by maximising partial backfilling of open pits to the natural surface and the use of up-catchment diversions and contour drains around their perimeter.

The revised final void water balance conducted by Gilbert & Associates (2014) for the Modification indicates the final voids would slowly fill over time and the final water levels in the Clareval open pit and Weismantel open pit would stabilise below the spill levels, consistent with the predictions for the DEP (Section 2.5).

3.6 WASTE MANAGEMENT

The Modification would not change the existing waste streams (Section 2.6) and accordingly, no changes to existing waste management practices at the DCM (Section 2.6) would be required.

3.7 MANAGEMENT OF DANGEROUS GOODS

The Modification would not change the dangerous goods handled at the DCM (Section 2.7) and accordingly, no changes to the management of dangerous goods (e.g. hydrocarbons, explosives and chemicals) would be required.

3.8 WORKFORCE

The Modification would not change the DCM workforce (Section 2.8).

3.9 CONSTRUCTION ACTIVITIES

The proposed changes to the open pits (Section 3.2.2) and waste rock emplacement (Section 3.2.8) are considered to be part of the continuation of mining operations at the DCM, as opposed to construction activities.

The Modification would involve minor, short-term construction activities associated with the excavation of the relocated upstream diversion adjacent to the Clareval open pit (Figure 3-1). This construction activity would be short-term and minor, and, therefore, is expected to be indistinguishable to the ongoing development of the open pits.