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ULAN COAL MODIFICATION 6 – UNDERGROUND MINING EXTENSION

Amendment Report

FINAL

May 2024

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Amendment Report

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Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Ulan Coal Mines Pty Limited

Project Director: Kirsty Davies
Project Manager: Matthew Copeland
Report No. 20020/R15
Date: May 2024

Environmental & Social Consultants

This report was prepared using Umwelt's ISO 9001 certified Quality Management System.

Acknowledgement of Country

Umwelt would like to acknowledge the traditional custodians of the country on which we work and pay respect to their cultural heritage, beliefs, and continuing relationship with the land. We pay our respect to the Elders – past, present, and future.

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
Final	Kirsty Davies	10 May 2024	Kirsty Davies	10 May 2024

Executive Summary

The Ulan Coal Complex (UCC) is located approximately 38 kilometres (km) north-east of Mudgee and 19 km north-east of Gulgong in New South Wales (NSW). The UCC is owned by Glencore Coal Pty Limited (Glencore) and operated by Ulan Coal Mines Pty Limited (UCMPL), a subsidiary of Glencore.

Approved mining operations within the UCC consist of underground mining in the Ulan Underground and Ulan West Underground areas as well as open cut mining, and associated coal handling, processing and transport through to 30 August 2033. The open cut operations are currently in care and maintenance.

UCMPL submitted a modification to PA 08_0184 in November 2022 (the Proposed Modification) to maximise resource recovery from the existing underground mining operations by extending some of the currently approved longwall panels. The Modification Report was placed on public exhibition during November and December 2022. Following the submissions phase, UCMPL submitted its Submissions Report which included refinements to the proposed surface infrastructure to support the additional underground mining at the UCC as a result of:

- ongoing mine design and operational constraints
- improved understanding of mining and geological conditions
- further consultation with government agencies.

In consideration of operational constraints (including development float, dewatering infrastructure and ventilation), UCMPL is now seeking to amend the proposed underground mine plan with a reduced underground mining area within the original modification footprint (Amended Modification). The proposed amendments also result in a set back from the 4th order Mona Creek stream banks, limiting the potential for additional direct impacts on Mona Creek from the Amended Modification.

The Amended Modification includes a reduction of the previously proposed underground mining area and associated changes to supporting surface infrastructure. The Amended Modification now proposes:

- extension of Ulan Underground Longwall (LW) panels LWW9 to LWW11 to the west, albeit at a reduced length compared to the Proposed Modification
- widening of Ulan Underground LWW11 by approximately 30 metres
- extension of Ulan West LW10 to LW12 to the north, noting the removal of the extension to LW9 which was included in the Proposed Modification.

UCMPL is also proposing some minor changes to surface infrastructure to support underground mining activities including provision of:

- one ventilation shaft and associated infrastructure corridor
- two dewatering bores and associated infrastructure corridors
- an infrastructure corridor and service borehole (to deliver gravel and other construction materials and to provide access and power to the underground mine) to the south-west of Ulan West

- other associated infrastructure required to service the approved and proposed underground mining operations.

The additional access track included as part of the Proposed Modification is no longer required and has been removed.

This Amendment Report has been prepared to satisfy the requirements of the EP&A Regulation and the State significant development guidelines – preparing an amendment report (DPE, 2022). Additional environmental assessments have been undertaken to evaluate the potential impacts associated with the Amended Modification, and where required additional or revised mitigation measures have been proposed. Key assessment findings are summarised below.

Subsidence

Compared to the previous assessment for the mine layout options presented in the Proposed Modification, the amended mining plan is expected to result in similar magnitudes of subsidence effects to the landform but over a smaller footprint.

A reduction in impacts (relative to the Proposed Modification) to other surface features including watercourses, particularly the 4th order main channel of Mona Creek, dams, Aboriginal heritage sites, private property and infrastructure is also expected. Overall subsidence impacts are predicted to be compliant with the subsidence performance measures outlined in PA 08_0184, and consistent with the monitoring conducted since that time.

Ongoing subsidence monitoring will continue in a similar manner to that currently undertaken in accordance with approved Extraction Plans, including before, during and after mining survey of monitoring lines and surface and landscape feature visual monitoring inspections.

Groundwater

The amended mine plan will result in a decrease in the area subject to potential groundwater impacts compared to that assessed in the Proposed Modification, particularly in the Mona Creek sediments. Following the Modification Report being submitted, the groundwater modelling has been updated based on Agency advice. As a consequence, the model predictions for the Proposed Modification and Amended Modification are not directly comparable.

Mine inflow is one of the key predictions that changes under the Amended Modification, with the predicted inflow for the amended mine plan shown to be significantly less than previously predicted for the Proposed Modification mine plan. This is due to:

- less mine footprint below saturated Triassic areas
- timing of panels and mining progressing across the mine footprint.

There is a reduced level of drawdown in the alluvium and colluvium relative to that predicted for the Proposed Modification due to the shortening of Ulan Underground longwall panels to no longer extend under Mona Creek.

The predicted peak inflow and timing within the North Coast Fractured and Porous Rock – Sydney Basin (North Coast Groundwater Source) is unchanged from the approved operations, while the peak inflow from the NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 (Sydney Basin MDB (Other) Management Zone) is predicted to increase slightly. Glencore holds sufficient licensing capacity across its operations to cover the inflow peak within both sources.

Peak indirect water takes from the Jurassic sediments water sources are slightly decreased under the amended mine plan compared to the approved mine plan, due to changes in individual longwall panel timings. These indirect takes are predicted to peak 40 to 50 years post mining and UCMPL is acquiring allocations within the relevant water sources to account for this.

Impacts to private bores as a result of the Amended Modification are limited to incremental changes to the predicted extent of drawdown in some bores already predicted to be impacted under the currently approved mine plan.

There will be no impacts to Groundwater Dependent Ecosystems or riparian vegetation as a result of the Amended Modification and the lack of incremental predicted drawdown and negligible reductions in baseflow result in negligible impacts on streamflow or persistence of pools between approved, proposed, and no-mining conditions in Cockabutta Creek and the Talbragar River.

Surface Water

The amended mine plan will reduce the area subject to potential surface water impacts compared to that assessed in the Proposed Modification, particularly in the Mona Creek catchment. As a result of the amended subsidence impacts there are no predicted changes to catchment areas in Mona Creek or baseflow to the creek system and as such, the Amended Modification is not expected to have any impact on streamflow sequences in Mona Creek.

The amended flood modelling found that the impacts to flood depths and velocities do not extend beyond the predicted vertical subsidence affectation area. Model results do not differ substantially from the approved condition model results.

The predicted subsidence for the Amended Modification results in patterns of remnant ponding consistent with the approved subsidence (i.e. typically located in-channel or on predominantly grassed areas).

No additional impacts are predicted to water quality, geomorphological/hydrological values, riparian/ecological values or downstream users/basic landholder rights as a result of the Amended Modification.

Greenhouse Gas and Energy

Greenhouse gas emissions will be reduced relative to the Proposed Modification due to the reduced coal extraction volumes. Future projections of coal extraction, coal export, fuel usage and electricity consumption, provided by UCMPL, were used to determine the greenhouse gas emissions.

The total direct emissions from the Amended Modification (97,984 t CO_2-e per year) are approximately 75% of those estimated for the Proposed Modification (130,000 t CO_2-e per year) and represent a very small contribution to the overall NSW (0.01%) and Australian (0.002%) emissions totals.

Biodiversity

The Amended Modification will reduce direct impacts to biodiversity due to the removal of some surface infrastructure previously included in the Proposed Modification, and will reduce indirect impacts from subsidence due to the reduced extent of the underground longwall panels. The area of direct surface impact under the Amended Modification is 17.4 ha (previously 23 ha under the Proposed Modification) while the indirect impact area is now 634.4 ha (previously 852.9 ha).

The Amended Modification comprises only surface infrastructure considered essential to the underground mining operation, and the footprints of these infrastructure areas have been reduced to the smallest extent possible. Refinements have focussed on avoiding impacts on biodiversity values, in particular to the NSW and Commonwealth listed Critically Endangered Ecological Community (CEEC) White Box – Yellow Box – Blakely's Red Gum Woodland (Box-Gum Woodland CEEC).

Direct impacts are expected to four Plant Community Types (PCTs) across 17.4 ha, one of which (with an area of 2.7 ha) also conforms to the Box-Gum Woodland CEEC. Threatened flora species *Commersonia procumbens* and *Monotaxis macrophylla* are both assumed to be present, as the specific survey conditions required for these species (i.e. after a burn or disturbance) could not be met.

Following the application of appropriate avoidance and mitigation measures, the assessment identified the following biodiversity credits are required to offset the biodiversity impacts of the Amended Modification:

- 402 ecosystem credits for four PCTs (PCT 476, 478, 479 and 481)
- 537 species credits for *Monotaxis macrophylla*
- 537 species credits for *Commersonia procumbens*.

Aboriginal Cultural Heritage

The Amended Modification will result in a decrease in both the area subject to potential subsidence impacts and the area of disturbance required for surface infrastructure compared to that assessed in the Proposed Modification. As a result, there will be a decrease in predicted impacts to Aboriginal cultural heritage sites.

The Amended Modification will result in five Aboriginal sites previously located within the area of direct surface disturbance associated with the Proposed Modification no longer being impacted.

Significantly, as for the Proposed Modification, no impacts are predicted to any other Aboriginal sites of high heritage significance, the Mona Creek rock shelter sites or the Brokenback Conservation Area or Grinding Groove Conservation Areas.

Economics

The Amended Modification has been assessed to provide a net benefit to NSW, estimated to be $345.6 million in net present value (NPV) terms. The estimated net benefit in NPV terms is comprised of $249.6 million and $96 million in direct and indirect benefits respectively. Incremental indirect costs to NSW are estimated to be $0.03 million in NPV terms. Relative to the Proposed Modification, the net benefits for the Amended Modification have increased, while costs have remained generally consistent.

Conclusion

The Amended Modification will result in a range of positive benefits at a local, regional and State level. These benefits include:

- continued employment of approximately 930 full time equivalent employees for an additional two years
- the Amended Modification is estimated to provide a net benefit of $345.6 million to NSW, in NPV terms
- the Amended Modification is estimated to provide a net benefit of $33.6 million to the Lithgow-Mudgee region, in NPV terms.

On the basis of the findings in the Modification Report and this Amendment Report, it would be reasonable to consider that, with the implementation of the management, mitigation and offset measures proposed by UCMPL, the Amended Modification will result in a net benefit to the NSW community.

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1.0 Introduction

1.1 Background

The Ulan Coal Complex (UCC) is located approximately 38 kilometres (km) north-east of Mudgee and 19 km north-east of Gulgong in New South Wales (NSW) (refer to **Figure 1.1**). The UCC is owned by Glencore Coal Pty Limited (Glencore) and operated by Ulan Coal Mines Pty Limited (UCMPL), a subsidiary of Glencore.

Coal mining has been undertaken in the Ulan area since the 1920s. UCMPL was granted its current Project Approval (PA) 08_0184 under the then Part 3A of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) on 15 November 2010 for the Ulan Coal – Continued Operations Project (UCCO Project). PA 08_0184 has since been modified on six occasions. The UCC also holds approvals 2009/5252 and 2015/7511, issued under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Approved mining operations within the UCC consist of underground mining in the Ulan Underground and Ulan West Underground areas as well as open cut mining, and associated coal handling, processing and transport through to 30 August 2033 (refer to **Figure 1.2**). The open cut operations are currently in care and maintenance.

UCMPL submitted a modification to PA 08_0184 in November 2022 to maximise resource recovery from the existing underground mining operations by extending some of the currently approved longwall panels to extract additional coal within existing mining lease (ML) and exploration licence (EL) areas. The Modification Report was placed on public exhibition during November and December 2022 and in response to community and government agency submissions, a Submissions Report was lodged to the then Department of Planning and Environment (DPE) (now Department of Planning, Housing and Infrastructure [DPHI]) in August 2023. In the Submissions Report, UCMPL made refinements to the proposed surface infrastructure to support the additional underground mining at the UCC as a result of:

- ongoing mine design and operational constraints
- improved understanding of mining and geological conditions
- further consultation with government agencies.

Following lodgement of the Submissions Report, further advice was received from the then DPE Water (now DPHI Water) and the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC), in relation to undermining of a 4th order stream section of Mona Creek.

In consideration of operational constraints (including development float, dewatering infrastructure and ventilation), UCMPL is seeking to amend the proposed underground mine plan with a reduced underground mining area within the original modification footprint (refer to **Figure 1.3**). The proposed amendments also result in a set back from the 4th order Mona Creek stream banks, limiting the potential for additional direct impacts on Mona Creek from the Amended Modification.

The originally Proposed Modification is referred to throughout this document as the Proposed Modification (described in detail in **Section 1.3**), and the amended modification application is referred to as the Amended Modification (described in detail in **Section 1.4**).

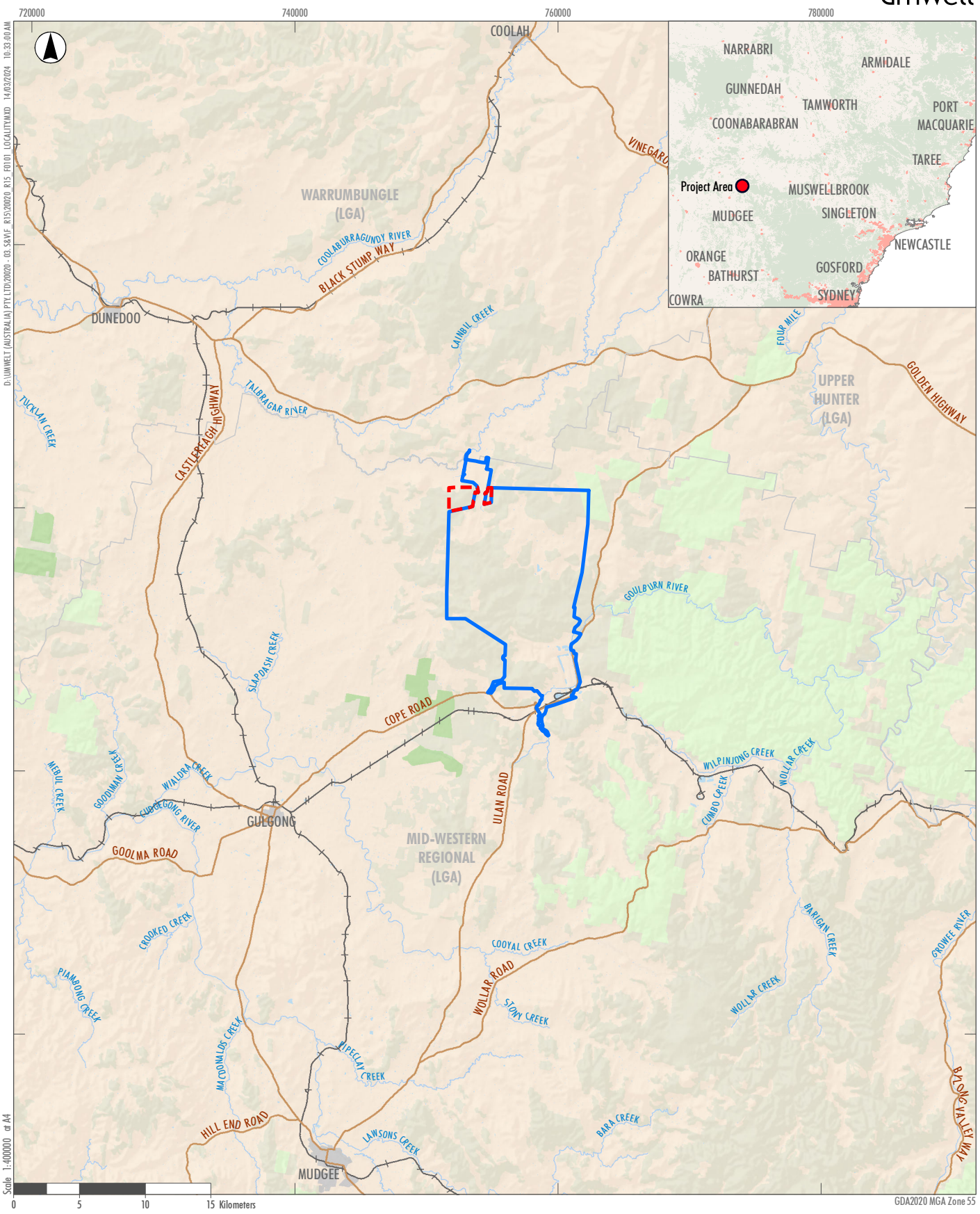
The proposed amendment does not influence the strategic or statutory context relevant to the Proposed Modification which continue to be consistent with that outlined in the Modification Report. This Amendment Report provides a revised project description, overview of the engagement undertaken in relation to the proposed Amendment, an assessment of the associated impacts and an updated project justification and has been prepared to satisfy the requirements of the EP&A Regulation and the *State significant development guidelines – preparing an amendment report* (DPE, 2022).

1.2 Applicant Details

UCMPL is the applicant for the Proposed Modification and Amended Modification and the operator of the UCC. UCMPL is a wholly owned subsidiary of Glencore. Applicant details are provided in **Table 1.1**.

Table 1.1 Applicant Details

Requirement	Details
Full Name/s	Ulan Coal Mines Pty Limited
Postal Address	Private Mail Bag 3006, Mudgee NSW 2850
Street Address (Project Location)	4505 Ulan Road, Ulan NSW 2850
ABN	80 000 189 248
Contact Person	Bradley Tanswell
Contact Details	0429 598 542 or Bradley.Tanswell@glencore.com.au



Legend

- Project Approval Boundary
- Proposed Mod 6 Project Approval Boundary
- Local Government Area (LGA)
- Road
- Railway
- Watercourses
- State Forest
- NPWS Estate
- Native Vegetation

Image Source: ESRI Basemap Data source: NSW DFSI (2020), Ulan (2020)

FIGURE 1.1

Locality Map

1.3 The Proposed Modification

The originally Proposed Modification (as detailed in the Modification Report, herein referred to as the Proposed Modification) was designed to maximise resource recovery within the existing ML and EL areas by extending currently approved longwall panels into these areas to enable the extraction of an additional approximately 25 million tonnes (Mt) of product coal. The Proposed Modification would not change the current approved coal extraction rate of up to 20 Mt per annum (Mtpa) of product coal but would extend the life of the approved UCC operation by approximately two years allowing mining to continue until August 2035.

Under the Proposed Modification, the UCC would continue to utilise the existing approved mine facilities, including the Coal Handling and Preparation Plant (CHPP) and train loading facilities. To allow for the proposed extension of the underground mining area, the Proposed Modification included changes to the surface infrastructure associated with underground operations, including ventilation, power and dewatering infrastructure.

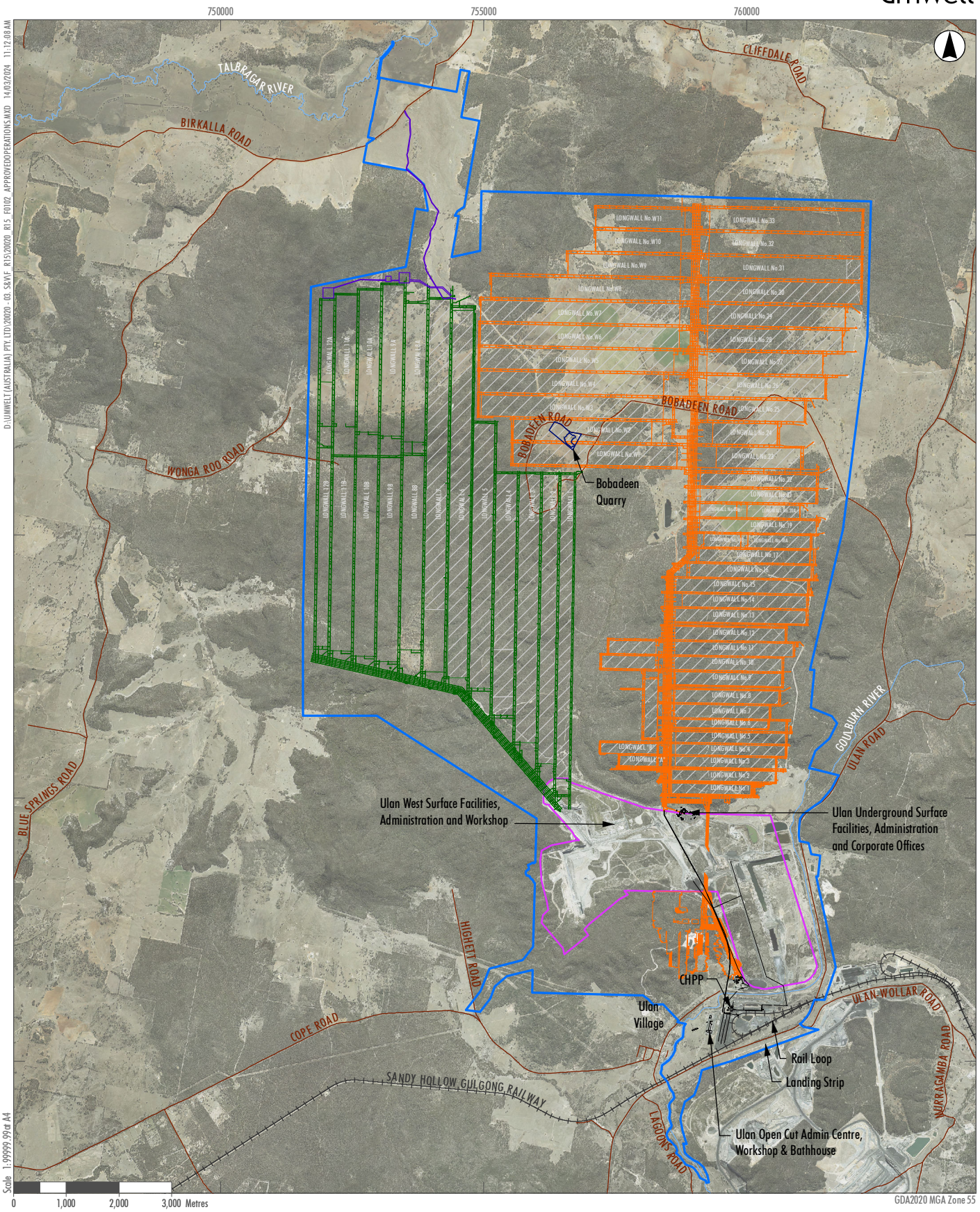
Figure 1.2 illustrates the approved UCC operations, while **Figure 1.3** shows the Proposed Modification in relation to the currently approved mining operations at the UCC.

The Proposed Modification comprised:

- extension of Ulan Underground longwall (LW) panels LWW9 to LWW11 to the west
- widening of Ulan Underground LWW11 by approximately 30 metres
- extension of Ulan West LW9 to LW12 to the north.

The Proposed Modification also proposed some minor changes to surface infrastructure to support underground mining activities including provision of:

- three ventilation shafts and associated infrastructure corridors
- five dewatering bores and associated infrastructure corridors
- an alternate access track
- an infrastructure corridor and service borehole (to deliver gravel and other construction materials and to provide access and power to the underground mine) to the south-west of Ulan West
- other associated infrastructure required to service the approved and proposed underground mining operations.



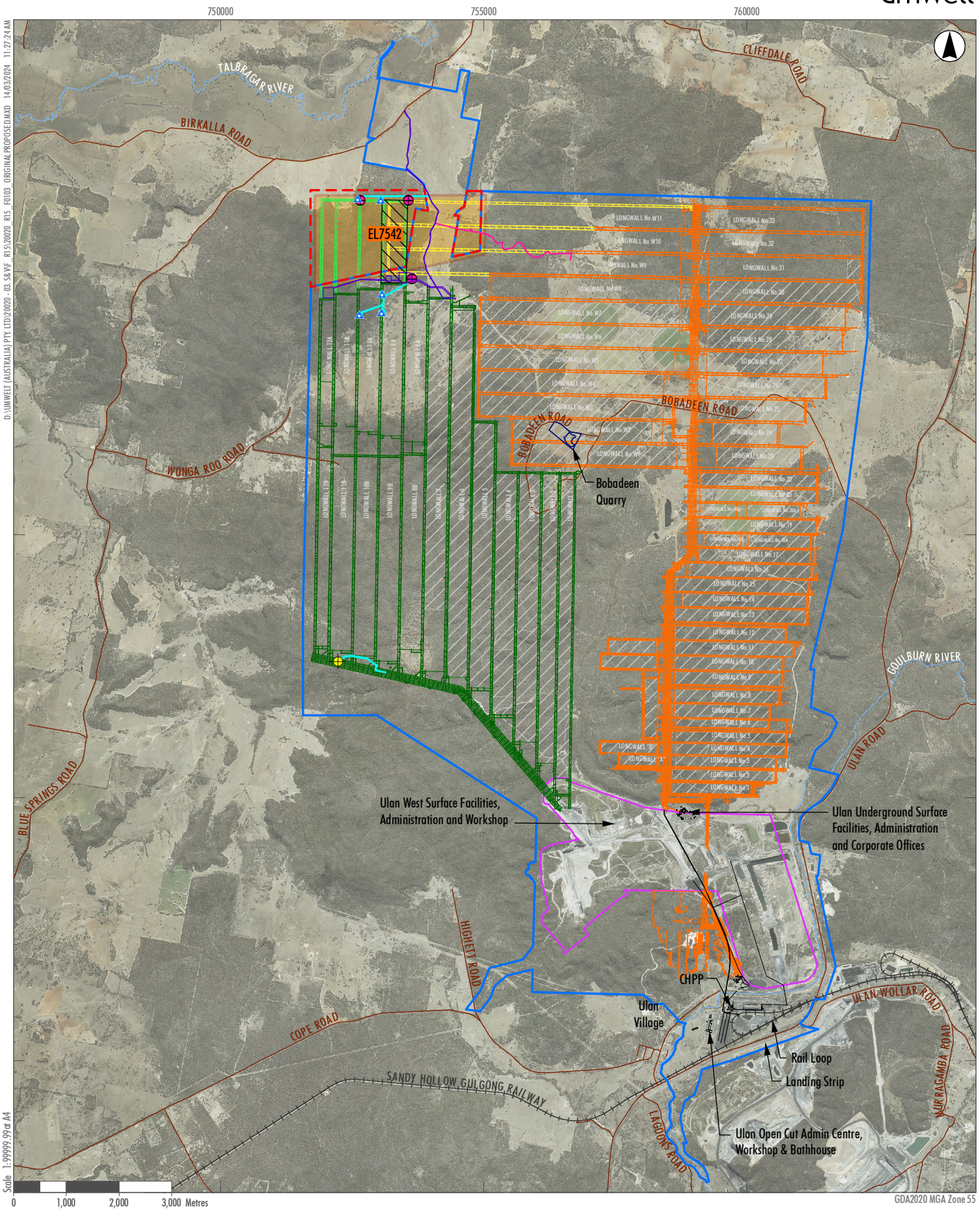
Legend

- Project Approval Boundary
- Bobadeen Quarry
- Approved Ulan Open Cut Area
- Roads
- Railway
- Major Watercourses
- Approved Infrastructure related to Mod 6
- Approved Ulan Underground Mine Plan
- Approved Ulan West Mine Plan
- Previously Mined

FIGURE 1.2

Approved Operations

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)



Legend

- Project Approval Boundary
- Proposed Mod 6 Project Approval Boundary
- Exploration Lease - EL7542
- Bobadeen Quarry
- Roads
- Railway
- Major Watercourses
- Approved Infrastructure related to Mod 6
- Approved Ulan West Mine Plan
- Approved Ulan Underground Mine Plan
- Previously Mined
- Approved Ulan Open Cut Area
- Proposed Borehole
- Proposed Vent Shaft
- Proposed Dewatering Bores
- Proposed Infrastructure
- Proposed Access Track Corridor
- Proposed Ulan Underground Mine Plan Modification
- Proposed Ulan West Underground Mine Plan Modification
- Longwall Option Area

FIGURE 1.3

Originally Proposed Modification

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)

1.4 Proposed Amendments

The Amended Modification includes a reduction of the previously proposed underground mining area and associated changes to supporting surface infrastructure. The Amended Modification now proposes (refer **Figure 1.4**):

- extension of Ulan Underground Longwall (LW) panels LWW9 to LWW11 to the west, albeit at a reduced length compared to the original Modification 6
- widening of Ulan Underground LWW11 by approximately 30 metres
- extension of Ulan West LW10 to LW12 to the north, noting the removal of the extension to LW9 which was included in the Proposed Modification.

UCMPL is also proposing some minor changes to surface infrastructure to support underground mining activities including provision of:

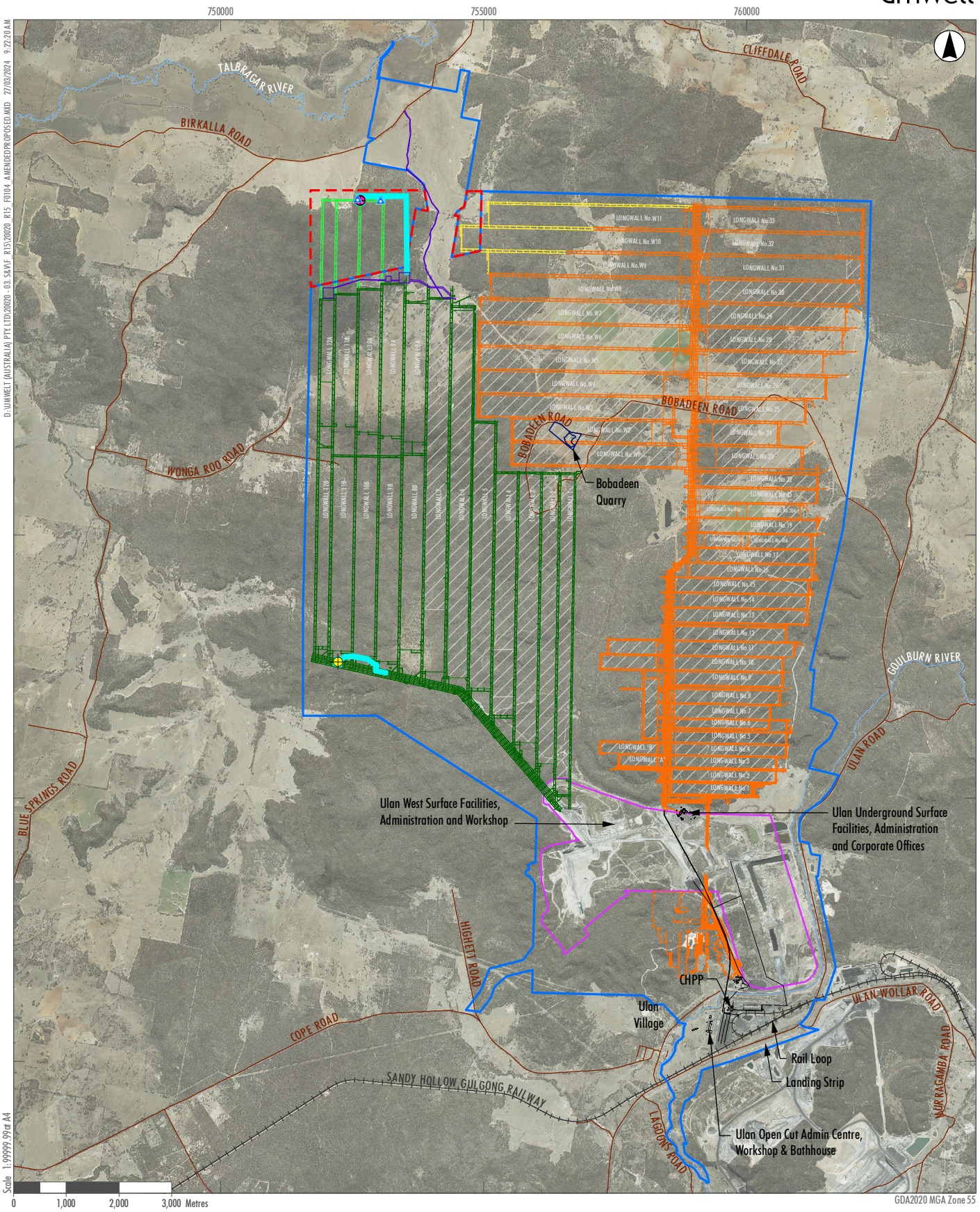
- one ventilation shaft and associated infrastructure corridor (the additional ventilation shaft originally proposed associated with Ulan Underground has been removed due to the reduced length of longwall panels and one of the ventilation shafts at Ulan West originally proposed has been removed following removal of the proposed extension to LW9)
- two dewatering bores and associated infrastructure corridors (an additional three dewatering bores that were originally proposed have been removed)
- an infrastructure corridor and service borehole (to deliver gravel and other construction materials and to provide access and power to the underground mine) to the south-west of Ulan West
- other associated infrastructure required to service the approved and proposed underground mining operations.

The additional access track included as part of the originally Proposed Modification is no longer required and has been removed.

A comparison between the approved development under PA 08_0184, the Proposed Modification and the Amended Modification is provided in **Table 1.2**. The Amended Modification is shown in **Figure 1.4**.

Table 1.2 Comparison between Approved Operations, Proposed Modification and Amended Modification

Aspect	Approved Operations	Proposed Modification	Amended Modification
Mine life	Mining operations until 30 August 2033	Extension of life of mine until 30 August 2035 (an additional 2 years)	Extension of life of mine until 30 August 2035 (an additional 2 years)
Limits of extraction	20 million tonnes of product coal per annum (including a maximum of 4.1 Mtpa ROM from the Open Cut)	No change Additional 25 Mt of product coal from the Proposed Modification	No change Additional 16.3 Mt of product coal from the Amended Modification
Operating hours	24 hours per day, 7 days per week	No change	No change
Project boundary	As per PA 08_0184 (refer to **Figure 1.2)**	Extension of Project Approval Boundary to include the northern part of EL 7542 (refer to **Figure 1.3**)	Extension of Project Approval Boundary to include the northern part of EL 7542 (refer to **Figure 1.4**)
Mine plan	As per PA 08_0184 0184 (refer to **Figure 1.**2)	Extension of Ulan Underground LWW9 to LWW11, and Ulan West LW9 to LW12. Widening of Ulan Underground LWW11 (refer to **Figure 1.3**).	Extension of Ulan Underground LWW9 to LWW11, and Ulan West LW10 to LW12. Widening of Ulan Underground LWW11 (refer to **Figure 1.4**).
Mining method	Retreat longwall method	No change	No change
Surface infrastructure	As per PA 08_0184	Minor changes to infrastructure including dewatering bores, ventilation shafts and associated infrastructure to accommodate the proposed mine plan.	Minor changes to infrastructure including dewatering bores, one ventilation shaft and associated infrastructure to accommodate the amended mine plan.
Coal Handling and Preparation Plant	As per PA 08_0184	No change	No change
Coal Transportation	All coal transported from the site by rail. No more than 10 laden trains leave the site each day.	No change	No change
Workforce numbers	Approximately 931 people (UCC)	No change	No change



Legend

- Project Approval Boundary
- Proposed Mod 6 Project Approval Boundary
- Bobadeen Quarry
- Roads
- Railway
- Major Watercourses
- Approved Infrastructure related to Mod 6
- Approved Ulan West Mine Plan
- Approved Ulan Underground Mine Plan
- Previously Mined
- Approved Ulan Open Cut Area
- Proposed Borehole
- Proposed Vent Shaft
- Proposed Dewatering Bores
- Amended Proposed Infrastructure
- Amended Proposed Ulan West Underground Mine Plan Modification
- Amended Proposed Ulan Underground Mine Plan Modification

FIGURE 1.4

Amended Modification

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)

2.0 Strategic Context

The strategic context for the Amended Modification remains unchanged from that of the originally Proposed Modification. As identified by the NSW Government's 2020 *Strategic Statement on Coal Exploration and Mining in NSW* (NSW Strategic Statement) coal mining is an important industry for NSW and will continue as such for the next few decades. The NSW Strategic Statement acknowledges the need to recognise existing industry investment by continuing to consider responsible applications to extend the life of current coal mines. As an established operation with access to significant coal reserves beyond the term of PA 08_0184, the Amended Modification is consistent with the NSW Strategic Statement in supporting responsible coal production.

The NSW Strategic Statement recognises that the use of thermal coal will decline in NSW over the coming decades as aging coal-fired infrastructure is replaced with other forms of energy generation, however it also acknowledges that ending or reducing NSW thermal coal exports while there is still strong long-term global demand would likely have little or no impact on global carbon emissions. On this basis, the Amended Modification is appropriately placed to continue to meet this existing global demand in line with the NSW Strategic Statement.

As an established underground operation, the proposed expansion of mining at UCC will also fit within the NSW Strategic Statement's plan for reducing the impact of mining on environmental and social outcomes, particularly in relation to its reduced air, noise, biodiversity, visual and other impacts in comparison to open cut coal mining operations. The amended mine plan proposed as part of the Amended Modification further reduces potential impacts on water resources through the avoidance of mining under a 4th order section of Mona Creek, as a result of changes to the mine plan due to operational constraints.

The Amended Modification also meets the policy aims of *State Environmental Planning Policy (Resources and Energy) 2021* by demonstrating a continued ability to mine the State's resources in an environmentally and socially acceptable manner through the implementation of design features, operational controls and safeguards to minimise adverse effects on the surrounding environment.

Despite only accounting for less than 1% of the total land area, mining remains a key driver in the growing population and economy of the Mid-Western Regional Local Government Area (LGA). Mining is the top employment industry with employment in the sector increasing since 2006, and in 2021, mining represented approximately 15% of all employment in the Mid-Western Regional LGA (Australian Bureau of Statistics, 2021). According to the NSW Mineral Council's *NSW Mining Industry Expenditure Impact Survey 2020/21* (NSW Minerals Council, 2022), mining also represents over half of the Gross Regional Product (GRP) of the Mid-Western Regional LGA. The Mid-Western Regional Council's Towards 2040 Community Plan outlines the strategic direction for the LGA and includes the delivery of a prosperous and diversified economy as one of its five themes. The Towards 2040 Community Plan recognises the need to support the attraction and retention of a diverse range of businesses and industries to provide this economic prosperity.

3.0 Description of Amendments

As described in **Section 1.4** above, in consideration of operational constraints (including development float, dewatering infrastructure and ventilation), UCMPL is seeking to revise the proposed underground mine.

A detailed description of the changes is provided in the following sections. A consolidated, detailed description of the Amended Modification is provided in **Appendix 1**.

3.1 Mine Plan Changes

UCMPL is seeking to amend the proposed underground mine plan with a reduced underground mining area within the original modification footprint (refer to Figure 1.4) The proposed amendments also result in a set back from the 4th order Mona Creek stream banks, limiting the potential for additional direct impacts on Mona Creek from the Amended Modification.

Specifically, the amended mine plan removes the northerly extension to Ulan West LW9, and significantly reduces the length of the westerly extensions to Ulan Underground LWW9 to LWW11 that were included in the originally Proposed Modification.

Details of changes to the longwalls are itemised in **Table 3.1** below.

Table 3.1 Change in Length of Proposed Longwall Extensions

Longwall	Approximate Length of Proposed Longwall Extensions (m)	
	Proposed Modification [1]	Amended Modification
Ulan West		
LW9	1,580	0
LW10	1,685	1,685
LW11	1,790	1,790
LW12	1,890	1,890
Ulan Underground		
LWW9	2,970	1,525
LWW10	3,490	2,555
LWW11	3,495	2,050

Source: SCT Operations Pty Ltd

Notes: 1. Longwall extension lengths are provided for the base case option only (i.e., not the flexibility layout which was also assessed for the Modification Report)

These amendments to the mine plan will result in a reduced product coal extraction volume, from the additional 25 Mt associated with the Proposed Modification to an additional 16.3 Mt for the Amended Modification, a reduction of 8.7 Mt.

3.2 Surface Infrastructure Changes

As a result of the proposed amendments to the mine plan, and based on continued improvements in the understanding of mining and geological conditions at the UCC, further amendments to the surface infrastructure required to support the underground mining extension are also proposed.

Specifically, the changes to surface infrastructure from the Proposed Modification are as follows:

- removal of two proposed ventilation shafts and associated infrastructure corridors (previously located between LWW9 and LWW10 at Ulan Underground)
- removal of three dewatering bores that were originally proposed for Modification 6
- removal of the alternate access track previously proposed in the area above Ulan Underground LWW9 and LWW10.

The removal of this infrastructure will result in a reduction in the area of surface disturbance and therefore reduce the area of direct impact to biodiversity. Noise and air emissions during construction and operation will also be reduced.

4.0 Statutory Context

This section provides an overview of the statutory context for the Amended Modification and discusses the application of key legislation and planning provisions. The Amended Modification requires approval under both NSW and Commonwealth environmental and planning legislation.

The EPBC Act is the primary environmental and planning regulatory instrument relevant to the Amended Modification at the Commonwealth level. Under the EPBC Act, approval from the Commonwealth Minister for the Environment and Water is required for any action that may have a significant impact on Matters of National Environmental Significance (MNES). If an 'activity' is likely to have a significant impact on a MNES then it may be a 'controlled action' and require approval from the Commonwealth Minister for the Environment and Water.

The Proposed Modification was referred under the EPBC Act the Minister via the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) and was determined to be a controlled action (EPBC 2022/09292) on 12 September 2022. The referral determination found that the Proposed Modification requires assessment and approval under the EPBC Act due to potential impacts on:

- Commonwealth listed threatened species and communities.
- A water resource, in relation to coal seam gas development and large coal mining development.

The Amended Modification will be assessed under the Bilateral Agreement made under section 45 of the EPBC Act between the Commonwealth of Australia and the State of New South Wales.

The NSW EP&A Act is the primary instrument which regulates the environmental impact assessment and approval process for development in NSW.

Under section 113 of the *Environmental Planning & Assessment Regulation 2021* (EP&A Regulation), the applicant for a modification application may, with the agreement of the consent authority, amend an application at any time before it is determined. This Amendment Report has been prepared to satisfy the requirements of the EP&A Regulation and the *State significant development guidelines – preparing an amendment report* (DPE, 2022) to assess the environmental social and economic impacts of the proposed amendments allowing the consent authority to make an informed decision on the merits of the amended project.

In accordance with the DPE EIS Guideline (DPE, 2022), **Table 4.1** provides a summary of compliance requirements under Commonwealth, State and local legislation relevant to the Amended Modification including NSW SEPPs and LEPs.

The statutory context for the Amended Modification remains largely unchanged from that of the Proposed Modification. Updated statutory compliance tables are provided in **Appendix 2**.

Table 4.1 Statutory Requirements Summary

Category	Comment
Power to grant approval	The Amended Modification seeks to modify PA 08_0184 pursuant to section 4.55 of the EP&A Act. As SSD, the Minister for Planning and Homes, or their delegate, will be the consent authority. Modifications sought under section 4.55 must be substantially the same development for which the original consent was granted. The Amended Modification is considered to be substantially the same development as that approved under PA 08_0184 as: • The overall nature of the development remains unchanged. • There is no proposed change in annual production rates, mining method, transportation, CHPP and key infrastructure. • The majority of the key project components remain unchanged from that which is currently approved, as outlined in **Section 3.0**. • As outlined in **Section 6.0**, there are no substantive changes to environmental impacts. The Amended Modification can be undertaken in accordance with the approved environmental impact criteria contained in the current conditions of PA 08_0184. Furthermore, consultation with DPHI confirmed that section 4.55 of the EP&A Act is the appropriate approval pathway for the Amended Modification.
Permissibility	The UCC, including the additional land subject to the Amended Modification, is located wholly within the area to which the *Mid-Western Regional Local Environmental Plan 2012* (Mid-Western Regional LEP) applies. The land which is the subject of the proposed additional underground mining area is within the Mid-Western Regional LEP zones RU1 – Primary Production and C3 – Environmental Management. Underground mining is permitted with consent in the RU1 – Primary Production Zone but prohibited in the C3 – Environmental Management Zone. Section 2.9 of *State Environmental Planning Policy (Resources and Energy) 2021* (Resources and Energy SEPP) provides that development for the purposes of underground mining may be carried out on any land with development consent. The Resources and Energy SEPP prevails over the Mid-Western Regional LEP (refer to Section 2.6 of the Resources and Energy SEPP) and therefore the Amended Modification is permissible with development consent.

Category	Comment
Commonwealth Approvals	Environment Protection and Biodiversity Conservation Act 1999 The UCC currently operates under EPBC Approvals EPBC 2009/5252 and EPBC 2015/7511 (granted in 2010 and 2016 respectively). It should be noted that Modification 4 was determined to be not a controlled action under the EPBC Act (EPBC 2018/8337) on 31 January 2019. The components of the Proposed Modification that are not covered under current approvals were referred under the EPBC Act. The referral specifically covers: • additional underground mining areas for Ulan Underground and Ulan West Underground • additional disturbance to accommodate minor changes to surface infrastructure to support underground mining activities. On 12 September 2022, the Proposed Modification, as referred under the EPBC Act, was determined to be a controlled action (EPBC 2022/09292) requiring assessment and approval under the EPBC Act due to controlling provisions related to listed threatened species and communities, and impacts to a water resource. The Amended Modification will be assessed under the Bilateral Agreement made under section 45 of the EPBC Act between the Commonwealth of Australia and NSW. Native Title Act 1993 The Native Title Act is administered by the National Native Title Tribunal (the Tribunal). The Tribunal is responsible for maintaining a register of native title claimants and bodies to whom native title rights have been granted. These native title holders and claimants must be consulted prior to the granting of a mining lease over land to which the native title claim or right applies. This process is designed to ensure that Indigenous people who have an interest in the land (or any part thereof) have the opportunity to express this interest formally, and to negotiate with the government and the applicant about the proposed grant or renewal, or consent to access native title land. The Native Title Act prescribes that native title can be extinguished under certain circumstances, including the granting of freehold land. The NSW *Mining Act 1992* must be administered in accordance with the Native Title Act. As such, native title holders and claimants must be provided with the 'right to negotiate' in relation to the grant and some renewals of exploration and mining titles. There are two Native Title claimants over the Ulan area, Warrabinga-Wiradjuri #7 and the Gomeroi People. When UCMPL seeks to undertake a 'future act' in this area (such as applying for a new mining lease for the Amended Modification), the Right to Negotiate process will be initiated by the issue of a section 29 Notice under the Native Title Act. The Native Title claimants will then have the opportunity to register as Native Title parties and UCMPL will engage in negotiations in accordance with the process set out in the Native Title Act.

Category	Comment
Other State approvals	Approvals that are not required Section 4.41 of the EP&A Act specifies authorisations which are not required for approved SSD. Those are listed below: • *Fisheries Management Act 1994* – a permit under section 201, 205 or 219. • *Heritage Act 1977* – an approval under Part 4, or an excavation permit under section 139. • *National Parks and Wildlife Act 1974* – an Aboriginal heritage impact permit under section 90. • *Rural Fires Act 1997* – a bushfire safety authority under section 100B. • *Water Management Act 2000* – a water use approval under section 89, a water management work approval under section 90 or an activity approval (other than an aquifer interference approval) under section 91. • Approvals that must be applied consistently. Section 4.42 of the EP&A Act requires that several approvals, if required for a SSD, cannot be refused if a development consent is granted and must be substantially consistent with the terms of any development consent granted for the development. Of relevance to the Amended Modification, is the *Protection of the Environment Operations Act 1997* as the existing environment protection licence will require updating to accommodate the Amended Modification.
Pre-conditions to exercising the power to grant consent	Refer to **Appendix 2** for a summary of all relevant pre-conditions to exercising the power to grant consent for the Project and where these have been addressed in the EIS.
Mandatory matters for consideration	Section 4.15 of the EP&A Act describes the matters for consideration in assessing SSD, which includes the provisions of relevant environmental planning instruments, proposed instruments that have been the subject of public consultation, development control plans, planning agreements and statutory regulations. The assessment of SSD must also consider the likely impacts of the development, suitability of the site, and submissions received and the public interest. All relevant matters are addressed in the EIS based on the outcomes of environmental assessments to be undertaken (refer to **Section 6.0**). Mandatory matters for consideration have been addressed in detail in **Appendix 2**.

5.0 Engagement

UCMPL has an established relationship with the surrounding community and other stakeholders and has implemented a process for ongoing engagement regarding its mining operations. UCMPL is committed to working with the community to ensure they can continue to coexist.

As outlined in the Modification Report (Umwelt, 2022), UCMPL has an ongoing community engagement program which includes regular engagement with both individuals and groups from the local and regional communities via a range of mechanisms including:

- regular newsletters to update the community on operations and UCMPL initiatives
- meetings with individuals and/or groups as required/requested, including any meetings required in response to complaints
- regular meetings with the UCC Community Consultative Committee (CCC).

Since the Submissions Report for the Proposed Modification was lodged, UCMPL has continued to consult in relation to the Proposed Modification and Amended Modification.

The community has continued to be updated on progress in relation to the Proposed Modification and Amended Modification through existing mechanisms, refer to **Table 5.1** for details.

Table 5.1 Community Consultation

Activity	Date	Details
Newsletters	May 2023	Update on the Proposed Modification and provision of contact details of appropriate UCC personnel for further information.
	December 2023	Update on the Amended Modification and provision of contact details of appropriate UCC personnel for further information.
CCC	6 December 2023	Update on the Proposed Modification and Amended Modification at the CCC meeting, including the proposed amendments to the mine plan.
	14 March 2024	Update on the Proposed Modification and Amended Modification at the CCC meeting, including the proposed amendments to the mine plan.

Ongoing Government consultation is summarised in **Table 5.2**.

Table 5.2 Government Consultation

Agency	Date	Activity	Details
DPE	5 October 2023	Meeting	Meeting with DPE to discuss BCS' comments on the Submissions Report
DPE	17 October 2023	Meeting	Meeting with DPE to discuss the Independent Expert Advisory Panel for Mining (IEAPM) review, UCMPL's proposed mine plan changes and documentation requirements for the mine plan changes.
DPE	6 November 2023	Meeting	Briefing to the Independent Expert Advisory Panel for Mining (IEAPM) in relation to the Proposed Modification

Agency	Date	Activity	Details
DPE and IEAPM	5 December	IEAPM Inspection	Inspection of the proposed MOD 6 by DPE and IEAPM
DPE	22 December 2023	Letter	Amendment Report Scoping Letter outlining the proposed amendments and approach to the Amendment Report.
DPHI	16 January 2024	Letter	Correspondence confirming that the Amendment Report must be prepared having regard to the *State significant Development guidelines – preparing an amendment report*. DHPI requested: • the Amendment Report should have regard to relevant greenhouse gas emissions legislation, including the Climate Change (Net Zero Future) Act 2023 and the NSW Environment Protection Authority's Climate Change Policy and Climate Change Action Plan 2023-26 • details of the proposed methodology for assessing options and staging for surface infrastructure in the Amended BDAR, consistent with previous consultation with BCS.
DPHI	14 February 2024	Letter	Confirmation of the details of the proposed methodology for assessing options and staging for surface infrastructure in the Amended BDAR, consistent with previous consultation with BCS.
BCS	23 February 2024	Letter	Correspondence in relation to the assessment methodology for the Amended BDAR, as detailed in correspondence dated 14 February 2024.
BCS	28 February 2024	Meeting	Meeting to discuss the proposed assessment methodology for the Amended BDAR.
BCS	6 March 2024	Meeting	Meeting to discuss the proposed assessment methodology for the Amended BDAR. After discussions, BCS confirmed they agree with the approach of including all vegetation integrity plots in the BAM-C assessment, despite some not falling within the current Development Footprint. BCS agreed the plots appear to be representative of the vegetation zones present in the Development Footprint. BCS requested that further justification of this be included in the BDAR.

6.0 Assessment of Impacts

6.1 Assessment Approach

The Modification Report provided a detailed assessment of relevant environmental and social aspects associated with the Proposed Modification. **Table 6.1** lists the environmental, social and economic issues relevant to the Proposed Modification and identifies those requiring additional assessment as part of this Amendment Report and those for which additional technical assessment is not required. The required level of assessment was confirmed by DPHI in correspondence dated 16 January 2024.

This section has been prepared having regard to the relevant guidance in the *State significant development guidelines – preparing an amendment report* (DPE, 2022) and provides a summary of the additional assessments undertaken to evaluate the potential impacts associated with the Amended Modification. Where required, additional or revised mitigation measures have been proposed. A consolidated summary of all proposed commitments identified both in this Amendment Report, and previously within the Modification Report (where relevant), is presented in **Appendix 3**.

Table 6.1 Assessment Approach

Issue	Comment	Reference
Social	There are no proposed changes to mining methods, workforce numbers, operating hours or the proposed life of mine as a result of the Amended Modification. Potential impacts on nearby private land holdings will be reduced as a result of the amended mine plan and the removal of some surface infrastructure proposed as part of the Proposed Modification. The Social Impact Assessment prepared as part of the Modification Report provides an appropriate level of detail on potential social impacts and mitigation measures and remains relevant for the proposed Amendment.	No additional technical assessment required
Subsidence	The amended mine plan will result in a decrease in the area subject to potential subsidence impacts compared to that assessed in the Proposed Modification. Changes to subsidence predictions have been assessed and documented in an amended Subsidence Assessment prepared by SCT Operations Pty Limited.	**Section 6.2** and **Appendix 4**
Groundwater	The amended mine plan will result in a decrease in the area subject to potential groundwater impacts compared to that assessed in the Proposed Modification, particularly in relation to Mona Creek. Changes to groundwater impacts have been assessed and documented in an amended Groundwater Impact Assessment prepared by Australasian Groundwater and Environmental Consultants Pty Limited.	**Section 6.3** and **Appendix 5**
Surface Water	The amended mine plan will result in a decrease in the area subject to potential surface water impacts compared to that assessed in the Proposed Modification, particularly in the Mona Creek catchment. Changes to surface water impacts have been assessed in an amended Surface Water Impact Assessment prepared by Engeny Australia Pty Ltd.	**Section 6.3.2.2** and **Appendix 6**

Issue	Comment	Reference
Agriculture, Soils and Land Capability	The amended mine plan will result in a decrease in the area subject to potential agricultural and soils impacts compared to that assessed in the Proposed Modification. Therefore, no additional technical assessment of agricultural and soil impacts has been undertaken for this Amendment Report. The Soils and Land Impact Assessment (which included an Agricultural Impact Assessment) prepared as part of the Modification Report provides an appropriate level of detail on potential impacts and mitigation measures and remains relevant for the proposed Amendment.	No additional technical assessment required
Air Quality	The Amended Modification will result in a decrease in potential air emissions during construction and operation due to the removal of some surface infrastructure previously included in the Proposed Modification. As the Proposed Modification was predicted to comply with all relevant dust (particulate matter) criteria, it is expected that the Amended Modification would also comply. Therefore, no additional technical assessment of air quality impacts has been undertaken for this Amendment Report. The Air Quality Impact Assessment prepared as part of the Modification Report provides an appropriate level of detail on potential impacts and mitigation measures and remains relevant for the proposed Amendment.	No additional technical assessment required
Greenhouse Gas and Energy	Greenhouse gas emissions will be reduced due to the decrease in coal extraction volumes associated with the Amended Modification. Changes to greenhouse gas emissions and energy usage have been assessed and documented in an amended Greenhouse Gas and Energy Assessment prepared by Airen Consulting.	**Section 6.5** and **Appendix 7**
Noise	The Amended Modification will result in a decrease in potential noise emissions during construction due to the removal of some surface infrastructure previously included in the Proposed Modification. As the Proposed Modification was predicted to comply with the relevant criteria during both construction and operation activities, it is expected that the Amended Modification would also comply. Therefore, no additional technical assessment of noise impacts has been undertaken for this Amendment Report. The Noise Impact Assessment prepared as part of the Modification Report provides an appropriate level of detail on potential impacts and mitigation measures and remains relevant for the proposed Amendment.	No additional technical assessment required
Biodiversity	The Amended Modification will result in a decrease in direct impacts to biodiversity due to the removal of some surface infrastructure previously included in the Proposed Modification, in addition to a decrease in indirect impacts as a result of the amended mine plan. Changes to biodiversity impacts have been assessed and documented in an amended Biodiversity Development Assessment Report (amended BDAR) prepared by Umwelt.	**Section 6.6** and **Appendix 8**
Aboriginal Cultural Heritage	The amended mine plan will result in a decrease in the area subject to potential subsidence impacts compared to that assessed in the Proposed Modification. In addition, the removal of surface infrastructure components will also result in a reduction to direct surface impacts to that assessed in the Proposed Modification. As a result, there will be a decrease in predicted impacts to Aboriginal cultural heritage sites. The Aboriginal Cultural Heritage Assessment prepared as part of the Modification Report provides an appropriate level of detail on potential impacts and mitigation measures and remains relevant for the proposed Amendment. A detailed technical assessment has not been undertaken, however a revised qualitative assessment of potentially impacted sites has been prepared.	**Section 6.7**

Issue	Comment	Reference
Historic Heritage	There are no known historic heritage sites located within the direct impact areas or subsidence affectation areas associated with either the Proposed Modification or the Amended Modification. Therefore, no detailed technical assessment of historic heritage has been undertaken for this Amendment Report.	No additional technical assessment required
Visual	The Amended Modification will result in a decrease in potential visual impacts due to the removal of some surface infrastructure previously included in the Proposed Modification. Therefore, no detailed technical assessment of visual impacts has been undertaken for this Amendment Report. The visual assessment included within the Modification Report provides an appropriate level of detail on potential impacts and mitigation measures and remains relevant for the proposed Amendment.	No additional technical assessment required
Economics	The Amended Modification will result in a decrease in coal extraction volumes compared to the Proposed Modification. The associated changes to economic impacts have been assessed and documented in an amended Economic Impact Assessment prepared by Ernst and Young Services Pty Limited.	**Section 6.8** and **Appendix 9**
Traffic and Transport	There are no proposed changes to workforce numbers, operating hours or transport methods/routes as a result of the Amended Modification, therefore no detailed technical assessment of traffic and transport impacts has been undertaken for this Amendment Report.	No additional technical assessment required

6.2 Subsidence

The amended mine plan will result in a decrease in the area subject to potential subsidence impacts compared to that assessed for the Proposed Modification. Changes to subsidence predictions have been assessed in an amended Subsidence Assessment prepared by SCT Operations Pty Limited (SCT) and included as **Appendix 4**. A summary of key outcomes is provided below.

6.2.1 Amended Impact Assessment

SCT has undertaken additional assessment to forecast the likely subsidence effects and assess impacts from the revised mine plan for the Amended Modification. The approach to estimating subsidence effects was the same as that previously used for assessing the Proposed Modification, based on subsidence monitoring data obtained at the UCC since 1986. This method is an empirical approach suitable for providing a comprehensive and site-specific estimate of the upper limits of key subsidence parameters. Measured subsidence at the UCC has generally been within predicted subsidence levels, providing a high level of confidence in the subsidence predictions for the additional underground mining area.

The SCT assessment concluded that, compared to the previous assessment for the layout options presented in the Proposed Modification, the amended mine plan is expected to result in similar magnitudes of subsidence effects to the landform but over a smaller footprint.

As with the Proposed Modification, the Amended Modification will result in a maximum vertical subsidence of 2.1 m for the shallower areas where the overburden depth is 130 m, reducing to 1.7 m for the deeper areas where the overburden depth is up to 250 m. Forecast maximum subsidence effects for conventional subsidence behaviour are provided in **Table 6.2** below and are consistent with those predicted for the Proposed Modification.

Table 6.2 Primary Subsidence Parameters

Overburden depth	130 m	250 m
Vertical subsidence (m)	2.1	1.7
Tilt (mm/m)	85	40
Compression strain (mm/m)	35	20
Tensile strain (mm/m)	25	15

A reduction in impacts (relative to the Proposed Modification) to other surface features including watercourses, particularly the 4th order main channel of Mona Creek, dams, Aboriginal heritage sites, private property and infrastructure is also expected. The main changes to surface impacts as result of the amended mine plan include:

- The surface along the 4th order section of creek in the broader Mona Creek valley now lies outside the amended predicted subsidence area and is protected from mining induced impacts by substantial offsets in excess of the barrier based on a distance equal to 0.5 times depth from the position of the main channel. Further information on potential impacts to Mona Creek is provided in **Section 6.3.2.2**.
- The amended Subsidence Assessment identified 10 small dams within the amended predicted subsidence area (previously 13 dams for the Proposed Modification), with four of these directly above the proposed longwall extension areas. Most of these are farm dams constructed on or near drainage lines on land owned by UCMPL or Crown Land leased by UCMPL. The more substantial local farm dam, known as the 'Etheridge Dam', is located on the main channel of Mona Creek which is now located outside the amended predicted subsidence area. Subsequently, there are no significant impacts expected to the Etheridge Dam wall and/or Mona Creek at this location.
- The amended Subsidence Assessment identified 117 Aboriginal heritage sites within or immediately adjacent to the amended predicted subsidence area (previously 159 sites for the Proposed Modification). Impacts to these sites are expected to be consistent with or less than the maximum impacts forecast for the Proposed Modification. Further information on potential heritage impacts is provided in **Section 6.7**.
- A single pole overhead powerline, owned by Essential Energy, and a telecommunications (Telstra) cable that service the dwelling sites on the Woodbury and Billir properties (owned by UCMPL) traverse the surface in the broader Mona Creek valley but no longer intersect the predicted subsidence area due to the amended mine plan. Impacts to this infrastructure previously reported for the Proposed Modification will no longer occur under the amended mine plan.

Overall, subsidence impacts are expected to be consistent with or less than the predictions for the approved operations, compliant with the subsidence performance measures outlined in PA 08_0184, and consistent with the monitoring undertaken since PA 08_0184 was granted.

Impacts to land within the Amended Modification assessment area that are not owned or leased by UCMPL are expected to be minor. Any impacts to natural, built and sub-surface features on privately owned land are expected to be manageable via provisions in Extraction Plans for private property, public safety, built features and water.

6.2.2 Monitoring and Management

UCMPL currently operates in accordance with approved Extraction Plans which prescribe the monitoring and management measures to be implemented for each longwall area. Longwall extraction in the additional mining areas will be undertaken in accordance with an approved Extraction Plan as required by PA 08_0184. Ongoing subsidence monitoring in a similar manner to the standards detailed in the existing subsidence monitoring programs required by the current Extraction Plans will be undertaken, including before, during and after mining survey of monitoring lines and surface and landscape feature visual monitoring inspections.

The amended Subsidence Assessment concluded that additional subsidence monitoring lines specifically for the Amended Modification longwall extension areas would not be necessary. Current subsidence monitoring for the western longwall panels at Ulan Underground includes H Line which has recently been extended to the northern lease boundary and the proposed extensions to Longwalls W10 and W11 would mine below this line. Subsidence monitoring at Ulan West includes C and D Lines across the southern sections of the longwall panels and it is expected that these lines will be extended to the west in due course to maintain a distance of 2 km from active subsidence areas or to the western lease boundary.

A new cross-panel subsidence monitoring line (I Line) was recently installed over the northern end of Longwall 7 and Longwalls 8A-9A at Ulan West. This line was established to provide site specific monitoring data for compliance reporting with insights into the subsidence behaviour and potential impacts to surface features in the vicinity of private properties near this line. It is also expected this line will be extended to the west to maintain a distance of 2 km from active subsidence areas or to the western lease boundary.

High resolution monitoring of the sandstone outcrop formation that hosts the Mona Creek Rock Shelter Sites (Brokenback Conservation Area) is planned to commence before the start of mining in Longwall W8 at Ulan Underground. These rock shelter sites are fully protected from impacts of previous mining and impacts from mining in the Amended Modification due to their distance from the closest longwall, however the high resolution monitoring will provide insights into any far-field regional effects of mining in the proposed longwall extension areas.

6.3 Groundwater

The amended mine plan will result in a decrease in the area subject to potential groundwater impacts compared to that assessed in the Proposed Modification, particularly in the Mona Creek sediments. Changes to groundwater impacts have been assessed in an amended Groundwater Impact Assessment (GIA) prepared by Australasian Groundwater and Environmental Consultants Pty Limited (AGE) and included as **Appendix 5**.

The amended GIA expands upon previous groundwater assessments undertaken for the UCC in 2016 and 2018, in addition to the assessment undertaken for the Proposed Modification, with a sound understanding of the local groundwater regime and mining impacts existing with the long history of mining and groundwater investigations at the site. Key outcomes from the updated assessment are detailed in the sections below.

6.3.1 Conceptual Model

The hydrogeological conceptual understanding for the UCC has remained largely unchanged from that previously presented in the groundwater assessment undertaken by AGE for the Modification 4 assessment in 2018. The only relevant major changes are to:

- the nature of the Mona Creek sediments which were initially assumed to be alluvium but further investigation and testing has indicated the sediments are colluvium in nature (refer to Section 4.1 of **Appendix 5**) and
- the expectation that the open voids in the area will be backfilled post mine closure, rather than left open as previously assumed (refer to Section 4.4 of **Appendix 5**).

A conceptual hydrogeological cross section for the UCC is provided in **Figure 6.1**.

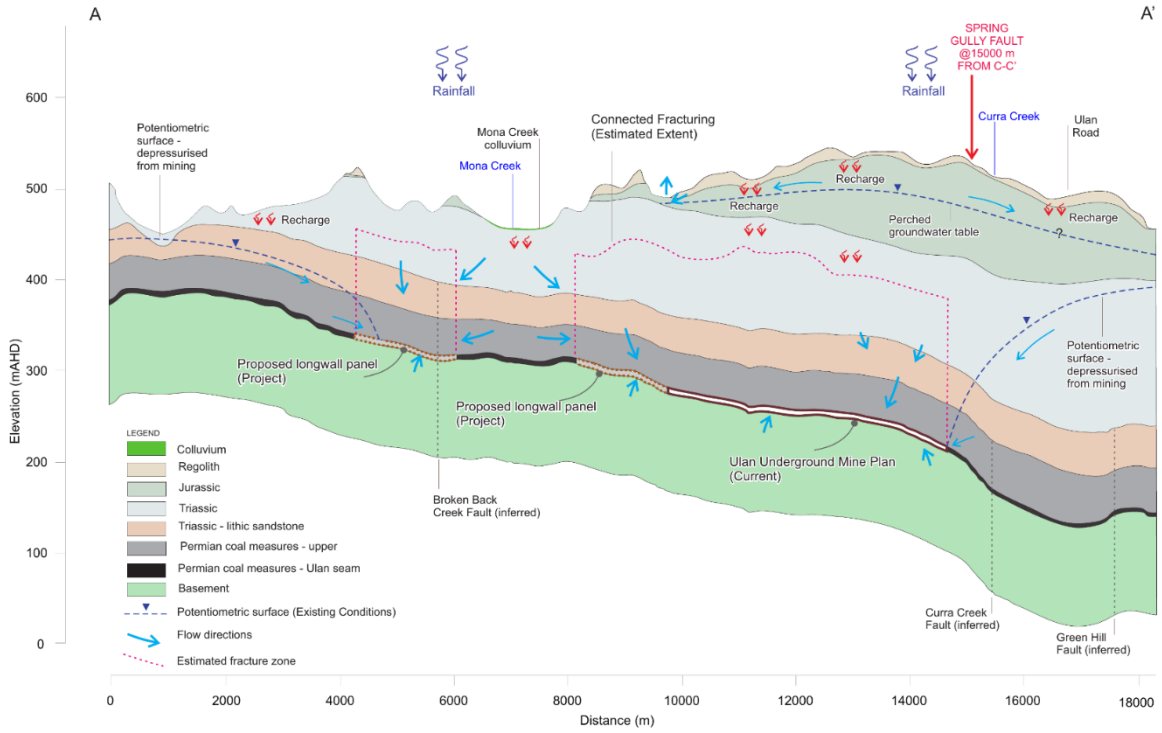


Figure 6.1 Hydrogeological Conceptual Cross Section

Source: Groundwater Impact Assessment, AGE 2024

Impacts from the amended mine plan were assessed by modifying the existing numerical groundwater model developed for the Proposed Modification, and subsequently the Amended Modification, by replacing the mine plan and running the simulation forward in time.

The objectives of the predictive modelling were to:

- predict groundwater inflow into the underground mine
- simulate and predict the extent and area of influence of mining on the water table and deeper groundwater pressures

- predict additional loss and water take from the water bearing units on site for licensing estimates, including losses to baseflow.

6.3.2 Amended Impact Assessment

6.3.2.1 Mine inflows

Mine inflow is one of the key predictions that changes under the Amended Modification. **Figure 6.2** shows the difference between the approved mine plan, the Proposed Modification and the Amended Modification. The predicted inflow for the Amended Modification mine plan is expected to be greater than the approved mine plan (given the larger mine footprint) but significantly less than previously predicted for the Proposed Modification mine plan (refer to **Table 6.3**). This is due to:

- less mine footprint below saturated Triassic areas
- timing of panels and mining progressing across the mine footprint.

The change in timing has the largest impact on the peak inflow because in the Amended Modification the two mining areas (Ulan West Underground and Ulan Underground) finish mining at the same time and the modelling assumes the dewatering continues across both mining domains until post mining conditions start. The Proposed Modification mine plan had the northern end of the Ulan Underground continuing to dewater for an additional two years after its scheduled completion prior to Ulan West Underground completing mining. This northern area is critical because it is the location of the thickest saturated Triassic formations, and where mining has fractured through to the lower portions of the formation thickness, meaning more water is captured through the mining period.

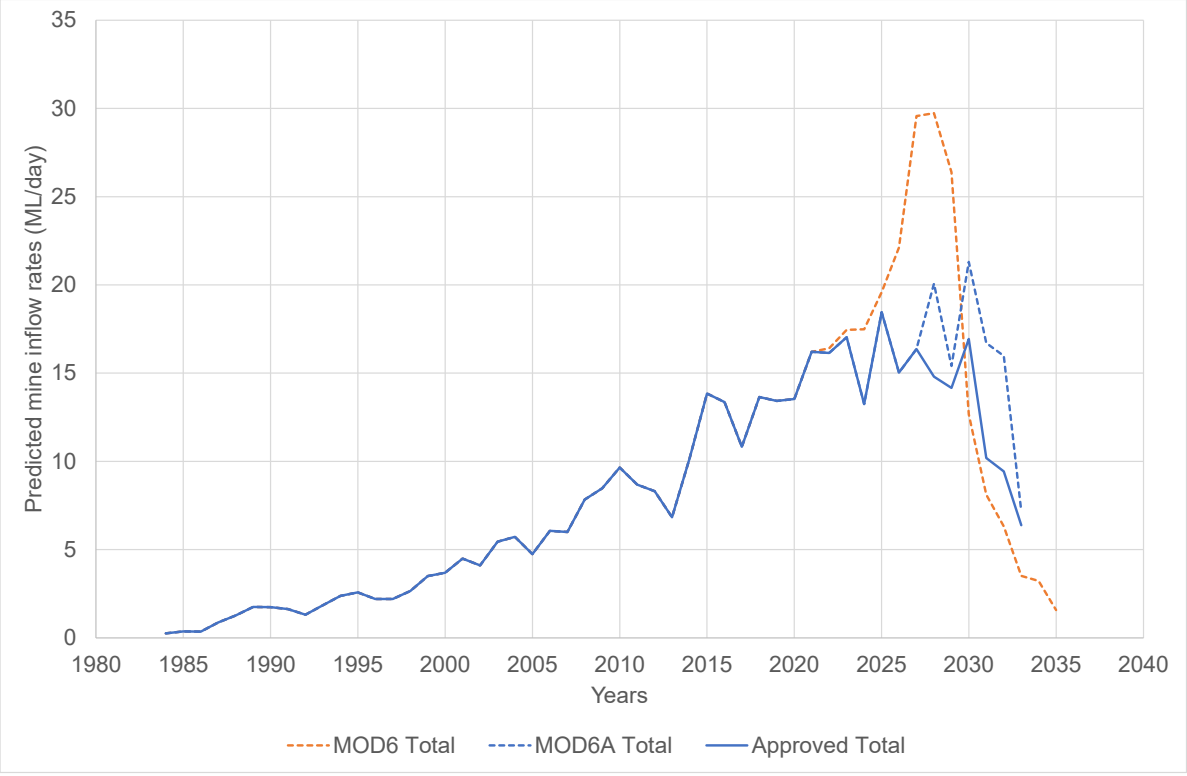


Figure 6.2 Comparison of Predicted Mine Inflow

Source: Groundwater Impact Assessment, AGE 2024

Table 6.3 shows that peak inflows for the Amended Modification are predicted to be significantly less than the Proposed Modification (21.3 ML/day compared to 29.6 ML/day), mainly due to the reduced mine footprint.

Table 6.3 Comparison of Peak Mine Inflow

	Proposed Modification (ML/day)	Amended Modification (ML/day)	Change (ML/day)
Ulan West peak inflow	9.0	7.0	-2.0
Ulan Underground peak inflow	23.1	14.2	-8.9
Total peak inflow	29.6	21.3	-8.3

6.3.2.2 Drawdown

Incremental drawdown

The numerical model calculates the extent of groundwater depressurisation within each of the model layers due to the Amended Modification through comparison of two models:

- one simulating the approved and Amended Modification mine plan
- one simulating the approved mine plan only.

The difference in predicted groundwater levels between the two models represents the additional drawdown directly due to the Amended Modification mine plan.

The predicted drawdown in the alluvium and colluvium did not register any areas greater than 2 m drawdown due to the Amended Modification only. This is a reduced level of drawdown relative to that predicted for the Proposed Modification model, where there was a small area along the colluvium of Mona Creek that would have experienced greater than 2 m of additional drawdown. The difference in the Amended Modification model responsible for this is the shortening of Ulan Underground longwall panels to no longer extend under Mona Creek. Since there is no additional mining directly under Mona Creek in the Amended Modification model (relative to approved), there is no mechanism for enhanced hydraulic connection due to vertical propagation of fracturing above longwall panels.

There was also no predicted drawdown greater than 2 m in the Jurassic strata at the end of the Amended Modification mining, mainly due to the limited extent and limited saturation of Jurassic sediments above the Amended Modification footprint.

The drawdown is more extensive in the Triassic formations compared to overlying strata but is limited to directly above the Amended Modification longwall panels, due to the enhanced vertical connection due to fracturing, as described above.

The Ulan Seam will be completely depressurised by mining however this is not a significant concern as there are no known beneficial users of this resource in the area and it was already predicted to be completely depressurised due to the approved mining.

Maximum cumulative drawdown

The maximum drawdown in the Ulan Seam can be expected at the end of mining, but all other parts of the model are likely to experience the maximum drawdown during the post mining period. This 'residual' drawdown is due to groundwater continuing to flow into the depressurised seams after mining has ended and will continue until a new equilibrium is reached in the regional groundwater regime.

In most areas of the mine site and surrounds, including the area near the Amended Modification mine footprint, there is no discernible change in the 2 m drawdown with the addition of the Amended Modification mine plan relative to the approved plan in the alluvium-colluvium, Jurassic, or quartzose Triassic layers. Only within the lithic Triassic unit is there a notable deviation with inclusion of the Amended Modification mine plan and this is localised to the area directly overlying the Amended Modification longwall panel extensions. The extent of drawdown is less under the Amended Modification than previously predicted for the Proposed Modification due to the reduction in panels. The Ulan Seam is not predicted to experience a considerable change in depressurisation, and thus change in the extent of the 2 m drawdown contour, from the Amended Modification compared to the approved mine plan because it was already predicted to be completely depressurised locally under the approved mining.

6.3.2.3 Post-mining Predictions

In the period following the cessation of mining, the drawdown presented in previous sections will continue to propagate outwards until there is sufficient recovery of groundwater levels throughout the mined area. The rate at which the 2 m drawdown extent expands will reduce as the gradient back to the dewatered area decreases. Open cut pits that are backfilled with unconsolidated sediments (spoil) are areas where groundwater is expected to mound up (relative to pre-mining) due to an increase in groundwater recharge.

Eventually the groundwater system will reach a new equilibrium. Due to the changes in hydraulic properties due to fracturing above the longwall panels, the recovered groundwater levels across the mine area will form a relatively uniform level. This is because the system is more connected post mining than the pre-mining conditions. As a result, some groundwater levels will be lower and some will be higher than pre-mining groundwater levels.

The Amended Modification assessment has treated the recharge volume into the void areas in a more conservative way than the Proposed Modification assessment by assigning a recharge rate that is consistent with spoil (5% of rainfall) rather than open pits (recharge equal to 110% of rainfall). This impacts the long-term residual drawdown and mounding predicted by the model but is not a reflection of a change in impacts due to mining. As a result of this change in model assumptions, the Amended Modification model predicts there will be areas where groundwater levels will be lower than pre-mining, creating a residual drawdown of water.

The cumulative residual post mining model, incorporating the approved UCC mining plus the Amended Modification and the neighbouring Moolarben mine, shows that the colluvium associated with Mona Creek is expected to see continued lower water levels post mining. It also shows that mounding is predicted in the mapped alluvium adjacent to Moolarben mine and this is likely the result of the high recharge into adjacent spoil piles at Moolarben and is unrelated to mining at UCC.

6.3.2.4 Water Take

Direct water take from water sources

The modelled take for the Amended Modification mine plan is presented in **Table 6.4** for the two key Water Sharing Plan (WSP) areas. The annual take will increase over time, reaching the peaks shown in **Table 6.4** then reducing as the Ulan Seam becomes increasingly desaturated towards the end of mining.

The peak water take for the approved mine plan for the North Coast Fractured and Porous Rock – Sydney Basin (North Coast Groundwater Source) is 5,193 ML/year, which has already occurred in 2014/2015. The peak for NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 (Sydney Basin MDB (Other) Management Zone) is predicted to be 5,667 ML/year and occurs in 2026/2027 for the approved mining.

With the addition of the Amended Modification mine plan, the predicted peak inflow and timing within the North Coast Fractured and Porous Rock – Sydney Basin (North Coast Groundwater Source) is unchanged from the approved operations. It is understood that UCMPL has sufficient licensing capacity across its operations to cover the inflow peak within this source.

The NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 (Sydney Basin MDB (Other) Management Zone) peak inflow for the Amended Modification is predicted to increase slightly to 5,963 ML/year and occur in 2027/2028. The predicted take including the Amended Modification mine plan is still less than the licensed units held by UCMPL, provide the ML/unit share does not drop significantly below 1.0.

It is noted that the estimated takes for the approved mine plan have been updated from those presented for the Proposed Modification due to actual progress since that mine plan was proposed and because some of those panels are scheduled to be mined in between the mining of the amended panels.

Table 6.4 Comparison of Underground Direct Take from Groundwater Sources

Water Sharing Plan/Water Source	Licence (units)	Approved Peak (ML/year)	Proposed Modification Peak (ML/year)	Amended Modification Peak (ML/year)
North Coast Fractured and Porous Rock – Sydney Basin (North Coast Groundwater Source)	7,060[1]	5,193 (2014/15)	5,222 (2014/15)	5,193 (2014/15)
NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 (Sydney Basin MDB (Other) Management Zone)	6,950	5,667 (2026/27)	8,339 (2026/27)	5,963 (2027/28)

Note: 1. Licence at time of peak take, currently being transferred to this water source after being incorrectly assigned. Current licence allocation of 4,000 units sufficient for predicted future peak inflows of up to 2,730 ML in 2029/30.

Indirect take

Peak indirect takes from the Jurassic sediments water sources are slightly decreased during mining under the Amended Modification mine plan compared to the approved mine plan and the Proposed Modification, due to changes in individual longwall panel timings. These indirect takes are predicted to peak 40 to 50 years post mining and UCMPL is undertaking acquisition of allocations within the relevant water sources to account for this.

The Amended Modification post-mining peak take on the Talbragar River baseflow will be 54.35 ML/year and occur approximately 100 years post mining, after which, take will decrease to a residual long-term take of 10.33 ML/year. The Amended Modification take for the Talbragar alluvial groundwater source is 8.31 ML/year at the completion of mining, which is predicted to increase to a peak take of 14.86 ML/year post mining before reducing to a long-term take of 1.5 ML/year. The passive take occurs over a large area and thus impacts on baseflows or changes to the persistence of pools are unlikely to be observable. UCMPL holds adequate units in the affected water sources to the end of mining, however additional units may be required post-mining in the Macquarie-Bogan Unregulated Rivers Water Sources 2012 (Upper Talbragar River Water Source) although further model development and reduction in uncertainty may result in this prediction reducing.

Indirect peak take from the Upper Goulburn River water source (part of the Hunter River Unregulated and Alluvial Water Sources 2009 WSP) does not change with the inclusion of the Amended Modification mine plan (139.06 ML/year under both the approved and the Amended Modification scenarios). At present UCMPL holds enough units to cover this take. Post-mining the take from this water source is predicted to decrease (starting at 128.4 ML/year) due to continued propagation of drawdown as dewatered mine workings and the fracture zones rewet and groundwater levels rebound. This results in an overall increase in baseflow compared to pre-mining conditions for the Upper Goulburn River water source of 70.9 ML/year.

6.3.2.5 Impact at Private Bores

Predictions for existing approved operations indicate that 10 of the 51 private bores in the local area will potentially experience greater than 2 m drawdown and may experience some loss of yield during mining (i.e. up the end of predicted mining). Simulation of the Amended Modification does not impact on any additional bores, and only changes the predicted extent of drawdown in some bores already predicted to be impacted under the currently approved mine plan. The results indicate that there are only small incremental changes (<0.3 m) predicted at private bores due to the Amended Modification, with some bores (e.g. PB33) experiencing a lower predicted drawdown under the Amended Modification mine plan due to the changes in timing of individual panels.

Consistent with the impacts predicted for the approved mine plan and the Proposed Modification, post-mining under the Amended Modification the number of bores potentially impacted by more than 2 m of drawdown increases to 20, based on the changes to post-mining recharge. In post-mining predictions, some bores are predicted to recover higher than the pre-mining water levels in the long term due to mounding, however most private bores impacted during mining are predicted to maintain some long-term minor drawdown. On average, the maximum drawdown in impacted bores does not change significantly between the Proposed Modification mine plan and the Amended Modification mine plan but long-term residual (equilibrium) drawdown is less for all impacted bores under the Amended Modification (compared to the Proposed Modification) due to changes to the post-mining recharge regime (refer to **Section 6.3.2.3**).

Annual voluntary monitoring of groundwater levels and water quality for privately owned bores is undertaken for potentially impacted private bores. Where drawdown at private bores is greater than 2 m, 'make good' measures apply under the existing conditions of consent where UCMPL refurbishes the bore to address the supply change, or provides an alternative water supply.

6.3.2.6 Impact to Groundwater Dependent Ecosystems

No high priority Groundwater Dependent Ecosystems have been identified in WSPs covering the UCC. Riparian vegetation is present in areas of the UCC, however, the shallow water table potentially accessible by this riparian vegetation will not be impacted by the Amended Modification. Additionally, no significant additional impacts on baseflow have been predicted.

Cockabutta Creek will not be impacted by the Amended Modification. Incremental impacts to the Talbragar River (less than 4 ML/annum surface flows and <0.4 ML/year base flow) are also unlikely to be significant. The lack of incremental predicted drawdown and negligible reductions in baseflow result in negligible impacts on streamflow or persistence of pools between approved, proposed, and no-mining conditions.

The Drip is also not predicted to be impacted by the Amended Modification as it is disconnected from the regional groundwater system and exists as an isolated perched spring system recharge entirely via local rainfall. The Amended Modification does not affect the integrity of this perched aquifer nor its recharge.

The two springs identified approximately 6 km north of UCC ('Unnamed' Spring and 'Kelly's Spring') are predicted to potentially be impacted by the Amended Modification due to the conservative connection existing in the model. The impacts are predicted to peak 300 to 500 years post mining, with the Unnamed Spring peaking with a drawdown of 15 cm and Kelly's Spring with a peak drawdown of 3 m. In reality, the hydrogeological units sourcing the springs (Jurassic sediments and basalts) are considered perched systems and will not to be impacted by changes to the regional water table, however the model has conservatively provided a connection between these units and the mine dewatering. These springs are not sourced from groundwater within the Ulan Seam and the proposed mining does not affect the integrity of the perched aquifer system associated with these springs nor their recharge.

6.3.3 Management Measures

UCMPL currently operates the UCC under the approved Water Management Plan (WMP) (2021), which describes the management of environmental and community aspects, impacts and performance relevant to the site's water management system. The WMP includes a detailed Groundwater Management Plan (GWMP) (2019) which outlines a monitoring program to collect data on groundwater levels and quality to allow actual impacts to the local groundwater system to be compared to the predictions of previous environmental assessments. Monitoring piezometers are located both within and outside the approved mining boundary and previously mined areas to address the following elements of both the alluvial and hardrock/coal aquifers:

- groundwater inflows to open cut pit and underground mine workings
- groundwater levels and groundwater quality
- seepage/leachate from the mine water management system
- baseflows in watercourses
- monitoring of 'The Drip'.

The monitoring network is continually being updated with new sites to provide additional data for predicting and confirming groundwater impacts. The two springs north of the UCC (Unnamed Spring and Kelly's Spring) will also be included in regular monitoring (focussing on flow estimates and water chemistry)

to identify any unexpected change in spring conditions that may be attributable to mining and to commence the establishment of a long-term dataset.

In addition to the groundwater monitoring network, annual voluntary monitoring of groundwater levels and water quality for privately-owned bores within the area is undertaken. This monitoring program extends to approximately 12 km away from the approved mine footprint.

If an exceedance of any groundwater impact assessment criteria is identified, then the Surface Water and Groundwater Response Plan (SWGWRP) is activated to provide appropriate TARPs. The SWGWRP provides response protocols for the following events:

- impact assessment criteria (trigger level) exceedance
- Environment Protection Licence (EPL 394) criteria exceedance (non-compliance)
- surface water and groundwater impacts on adjacent private landowners
- variations from the predictions made in the groundwater model
- potential impacts on groundwater dependent ecosystems
- unauthorised off-site discharges
- environmental incident (i.e. unforeseen hazard, unplanned event or unauthorised discharge)
- community complaints (relating to surface water and groundwater)
- potential make good provision.

The existing WMP will be updated to accommodate the Amended Modification and will continue to be implemented.

6.4 Surface Water

The amended mine plan will result in a decrease in the area subject to potential surface water impacts compared to that assessed in the Proposed Modification, particularly in the Mona Creek catchment. Changes to surface water impacts have been assessed in an amended Surface Water Impact Assessment (SWIA) prepared by Engeny Australia Pty Ltd (refer to **Appendix 6**). Key outcomes are summarised in the sections below.

6.4.1 Amended Impact Assessment

The regulatory context and surface water context for the Amended Modification remain largely unchanged from those described for the Proposed Modification. The Amended Modification now includes a set back from the 4th order Mona Creek stream banks, limiting the potential for additional direct impacts on Mona Creek.

The predicted surface water impacts of the Amended Modification are described below.

6.4.1.1 Catchment Areas

A review of the catchment boundaries was undertaken using the amended subsidence contours (refer to **Section 6.2**). No measurable changes to catchment boundaries were found as a result of predicted subsidence from the Amended Modification.

6.4.1.2 Flow Regimes

Flow regimes in the river and creek systems which are expected to be impacted by the Amended Modification were modelled to assess the impact of any potential reduction in baseflows. The estimated baseflow loss provided by the amended GIA prepared by AGE (refer to **Section 6.3** above) was applied to the calibrated models previously prepared for the Proposed Modification to determine any changes to impacts on baseflows to affected rivers and creeks.

Consistent with the predictions for the Proposed Modification, the model for the Amended Modification indicates negligible impacts to the estimated frequency of no flow periods and no increase in average annual dry days (defined as flows less than 0.1 ML/day) in the Talbragar River (at SW09, Dunedoo and Elong Elong) relative to the currently approved mining operations.

As a result of the predicted subsidence impacts there are no predicted changes to catchment areas in Mona Creek or baseflow to the creek system (refer to **Appendix 5**). As such, the Amended Modification is not expected to have any impact on streamflow sequences in Mona Creek.

6.4.1.3 Flooding

Overview of modelling

A flood impact assessment was undertaken using an updated TUFLOW model. The Amended Modification was modelled and compared to the approved subsided landform when assessing impacts. Since the last approval, additional data on depth of cover and more complex algorithms for computing predicted subsidence bowls have been applied to the UCC mine plan. As such there are some minor changes to subsidence bowls outside of the areas of the Amended Modification. This results in some areas with minor changes to the flood modelling outcomes. It should be noted that these changes are within the range of the subsidence predictions and are considered to be of no consequence.

Impacts to flood depths, velocities and stream health were assessed for the 50%, 10%, 1%, 0.1% Annual Exceedance Probability (AEP) events and the Probable Maximum Flood (PMF). Generally, it was found that the modelled impacts to flood depths and velocities do not extend beyond the predicted vertical subsidence affectation area.

Flood depth and velocity

The modelling results for the Amended Modification indicate that the impacts of the predicted subsidence typically include:

- increased flood depths and decreased peak flood velocities on the upstream side of each chain pillar due to the localised flattening of the floodplain
- decreased flood depths and increased peak flood velocities on the downstream side of each chain pillar due to localised steepening of the floodplain

- minimal change to flood depths or velocities predicted downstream of the updated longwalls, and downstream of the farm dam on Mona Creek.

For the 1% AEP event (sometimes referred to as the 1 in 100-year event), model results for the Amended Modification show localised flood depths up to 3.2 m within the Mona Creek channel above the extended longwalls to the east, and depths up to 1.1 m in the Mona Creek tributary above the extended longwalls to the west. As per the Proposed Modification, these model results do not differ substantially from the approved condition model results. The maximum predicted increase in flood depth above the longwall extension or Ulan West LW7 retraction areas is 0.9 m and the maximum decrease in flood depth modelled is 0.7 m. It should be noted that Ulan West LW7, upstream of the farm dam on Mona Creek, has been shortened by approximately 350 m for the Amended Modification, which has led to some changes in flood behaviour compared to the approved landform. Flood depth decreases by up to 0.8 m and a reduced flood extent are observed where the approved Ulan West LW7 extends to, while upstream of the proposed longwall retraction, a typical increase in flood depth by up to 0.4 m is modelled. The modelling indicates that flood durations do not noticeably change for the 1% AEP flood event.

Modelled results for the 50% AEP show that velocities in the channel of Mona Creek range from 0.5 to 3.2 m/s in approved conditions. The predicted subsidence from the Amended Modification results in increases in velocities up to 0.5 m/s in the channel sections above the proposed chain pillars, while a decrease in velocities of up to 0.7 m/s is predicted in areas of the channel where the floodplain is flattening due to predicted subsidence (or where Ulan West LW7 and LW8A below Mona Creek have been shortened from the approved layout). Typically, reaches show an increase or decrease in velocity due to the predicted subsidence range between 150 m and 300 m depending on the alignment of the channel relative to subsidence bowls.

The modelled velocities for the 1% AEP above the proposed longwall extensions have increased by up to 1.1 m/s and decreased by up to 1.2 m/s. The Mona Creek channel section above the northern extents of Ulan West LW8A to LW7 has largely decreased in velocity by up to 1.1 m/s, with some increases by up to 0.9 m/s.

Channel Stability

As was previously reported for the Proposed Modification, modelled increases to velocities and tractive stresses could potentially result in an increase to the erosive potential in the channel of Mona Creek. Areas within the channel at risk of potential erosion all occur within landholdings owned by UCMPL. Due to the increased risk of erosion, monitoring of creek stability will continue to be undertaken by UCMPL. Additionally, minor in-channel works may be required to prevent scouring. The need for any such works will be determined through monitoring implemented as part of the Extraction Plan process.

6.4.1.4 Remnant Ponding

Remnant ponding analysis considers the modelled depressions in the landform based on the survey data and the subsidence predictions to infer areas that could potentially hold water following rainfall events. As for the Proposed Modification, the analysis undertaken in the amended SWIA indicates that the predicted subsidence for the Amended Modification results in patterns of remnant ponding consistent with the approved subsidence. That is, increases to areas affected by remnant ponding are typically located in-channel or on predominantly grassed areas.

The currently approved potential maximum area of remnant ponding is approximately 33 ha. Under the Amended Modification, the potential maximum amount of remnant ponding is estimated to be approximately 39 ha (noting that the Proposed Modification predicted 53 ha of remnant ponding). The increase in remnant ponding from the pre-mining landform is primarily associated with the extension of the proposed longwall panels into the area to the north of the existing approved longwall mining areas. Two minor areas of increased remnant ponding are evident from the analysis. All other predicted ponding is isolated in minor areas throughout the project vicinity. Predicted increases in ponding occur within extensions of mining, within troughs where the maximum predicted subsidence occurs. An area of decreased remnant ponding is also predicted in the area where the Amended Modification has been retracted from the approved longwall location.

Historical site inspections indicate that in most areas where the topographical survey indicates existing remnant ponding, water does not pond in these areas as the soils are sandy and relatively free draining. As such, it is considered unlikely, based on the analysis of the predicted subsidence, that any additional remnant ponding will occur within the predicted subsidence affectation area. This is due to both the steepness of the existing landform in the upper reaches and typically sandy, free draining soils.

6.4.1.5 Water Quality

Subsidence impacts

The amended SWIA indicates that within the Amended Modification area the potential subsidence impacts will be comparable to those previously approved for the UCC and those predicted in the Proposed Modification, and the predicted subsidence impacts will not result in any substantial changes to watercourse stability relative to the current approved impacts.

UCMPL will continue to monitor all second order and above watercourses for potential impacts. If required, remediation works will be undertaken to maintain channel grades and take into consideration channel stabilities and existing channel characteristics.

During any required remediation works, potential short-term impacts on water quality will be considered, both in regard to downstream water users and downstream ecosystems. To mitigate potential water quality impacts UCMPL proposes to implement a number of erosion and sediment control measures (refer to **Section 6.4.2**).

Surface infrastructure

The proposed changes to surface infrastructure for the Amended Modification are not expected to result in appreciable changes to the quantity or quality of surface water. Construction works for each surface infrastructure area will require erosion and sediment controls to manage sediment laden water generated both during construction and operational phases. The required management measures are set out in detail in the approved Water Management Plan.

Loss of baseflows

The amended GIA predicts negligible changes to the potential loss of baseflows in the Talbragar River system with the Amended Modification when compared to the approved operations (or predicted impacts for the Proposed Modification) (refer to **Section 6.3**). The predicted impacts of increased numbers of dry days, increased duration of dry periods and reductions in annual flow volumes are consistent with the approved operations. There are negligible changes to these aspects with the Amended Modification.

As such any influence on water quality, based on historical data analysis in the Talbragar River, is not predicted to occur as a result of the Amended Modification.

6.4.1.6 Geomorphological/Hydrological Values

The amended SWIA has determined that the Amended Modification is not expected to have a significant impact on the geomorphological and hydrological values of local surface water systems. Potential impacts on geomorphological stability and changes to potential erodibility and scour as a result of the Amended Modification have been assessed and indicate that there is a risk of increased erosion or scour (refer to **Section 6.4.1.3** above). The predicted areas of risk are consistent with the approved Project and are located within the sandy channel of Mona Creek downstream of the chain pillars.

6.4.1.7 Riparian and Ecological Values

The predicted changes to flow regimes both during and following the mining operations associated with the Amended Modification are predicted to be negligible in the context of ephemeral streams, as well as on the Talbragar River. The changes to flow regimes are also considered to be negligible on a regional scale. The Amended Modification is consequently considered likely to have negligible impact on ecosystems and downstream users as the predicted impact is within the natural variation of the existing creek systems.

6.4.1.8 Water Users

No private landholders have been identified using the surface waters of Mona Creek within or downstream of the additional underground mining area associated with the Amended Modification, except for stock access via basic landholder rights. Consistent with the predictions for the Proposed Modification, the Amended Modification is not expected to have an impact on basic landholder rights as no change is predicted to baseflows in Mona Creek (refer to **Section 6.3**).

Based on the previous subsidence assessments undertaken by SCT, it is considered that there is limited potential for minor runoff capture during the time between mining and completion of any required subsidence remediation works. The potential volume and duration of capture is considered minimal due to:

- limited upslope catchment areas
- sequential mining will affect only short sections of the creek at any time
- routine monitoring will identify works areas promptly for progressive remediation as required.

Similarly, as any cracking will appear very rapidly on the surface after mining, regular cracking and resealing of any in-channel cracks will be undertaken. Progressive remediation works will further limit the potential for loss of surface flows due to subsidence cracking.

The amended SWIA predicts that potential surface water take and downstream impacts following subsidence in both watercourses and out of channel areas are expected to be negligible (refer to **Section 6.4.1.2**). This assessment is based on consideration of the potential for impact on watercourses due to remnant ponding both in and out of drainage lines, surface cracking, as well as consideration of catchment boundaries and watercourse stability. As such it is considered that the Amended Modification will not adversely impact on the potential use of water for downstream users or basic landholder rights on local creek systems or rivers.

Gauging stations have been installed at locations downstream of approved mining operations, with a gauging station now in place on the Talbragar River. The monitoring results from these gauging stations will be utilised to assist in understanding surface water flows in the catchment areas and potential impacts of underground mining in the long term. The results from subsidence and watercourse monitoring will be reported in the Annual Reviews.

6.4.1.9 Cumulative Impacts

As assessed for the Proposed Modification, the amended SWIA found that the Amended Modification would have negligible impacts on both surface water quantity and quality to downstream catchment areas. No other mining operations have surface or underground operations in the Mona Creek catchment area. The assessments undertaken to consider the potential impacts of the Amended Modification on flow regimes, flooding, remnant ponding and water quality all consider the existing mining impacts, including the currently approved impacts. As such the impacts associated with the Amended Modification are considered to be the same as the cumulative surface water impacts for the Mona Creek catchment. On this basis it is considered that the Amended Modification will not result in adverse cumulative impacts on water use, flows or qualities in the surrounding surface water systems.

6.4.1.10 Climate Change Assessment

A climate change assessment was undertaken as part of the amended SWIA to understand the sensitivity of streamflow and flood impacts to climate change. Projected changes to the storm rainfall intensity were obtained for the Representative Concentration Pathway 4.5 (RCP 4.5) emission scenarios and modelled for mean predictions for 2050 and 2090. Further details of the adopted methodology are contained in Section 4.10 of the amended SWIA (refer to **Appendix 6**).

Flow Regimes

The modelling indicates negligible impact to the estimated frequency of no flow periods and no increase in average annual dry days (defined as flows less than 0.1 ML/day) in the Talbragar River at both SW09 and Dunedoo as a result of the Amended Modification relative to the currently approved mining operations for the 2050 and 2090 climate scenarios. The impacts indicated in the modelling are consistent with the existing approved mine plan.

Flooding

An increase in flood extent, compared to the baseline results, has been observed with the RCP 4.5 emission scenarios applied. This displays that, with climate change accounted for, flooding impacts are predicted to worsen in the future. This is shown to be the case under all landform options: i.e., existing site conditions and with the Amended Modification. Detailed results are provided in Section 4.10 of the amended SWIA (refer to **Appendix 6**).

While the predicted flooding extent increases under a climate change scenario, the overall conclusions of the flooding impact assessment for the Amended Modification do not change.

6.4.1.11 Commonwealth Significant Impact Guidelines

A summary of the potential surface water impacts against the *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments - impacts on water resources* (DoE, 2013) undertaken to support the Amended Modification is included in Section 5 of the amended SWIA (refer to **Appendix 6**).

6.4.2 Mitigation Measures

UCMPL will continue to utilise subsidence remediation methods and associated erosion and sediment control measures and monitoring programs to manage potential subsidence impacts on watercourses. The monitoring will inform the need for any remediation measures.

Watercourse subsidence remediation measures, if required, may include both hard and soft remediation options. The remediation approach will consider the creek bank stability as well as vegetation areas and runoff flow paths. Hard options may include rock armouring of the bed and/or bank, as well as managing bank slopes. Soft options may include revegetation of banks.

For all watercourse remediation works, suitable erosion and sediment control measures will be designed and constructed to a standard consistent with:

- Managing Urban Stormwater: Soils and Construction (the Blue Book) Volume 1 (Landcom, 2004) and Volume 2E Mines and Quarries (NSW Department of Environment and Climate Change, 2008).
- Draft Guidelines for the Design of Stable Drainage Lines on Rehabilitated Minesites in the Hunter Coalfields (NSW Department of Infrastructure, Planning and Natural Resources, undated).

Water quality and erosion and sediment control measures proposed to be implemented for the Amended Modification are consistent with those included in the existing approved UCC WMP and Erosion and Sediment Control Plan (ESCP) and include:

- clear identification and limiting of areas to be disturbed
- construction of erosion and sediment control measures prior to the commencement of any substantial construction works
- construction and regular maintenance of sediment fences downslope of disturbed areas
- soil amelioration, as required, to minimise potential erosion of disturbed or rehabilitated areas
- regular monitoring and maintenance of erosion controls works and rehabilitation areas
- prompt revegetation/surfacing of areas as earthworks are complete.

The existing approved WMP includes a number of associated sub-plans including a surface water monitoring program. The current surface water monitoring gauge located on Mona Creek (SW10) will no longer be undermined with the Amended Modification. However, it is only approximately 500 m downstream of the predicted subsidence bowls. Therefore, it is still proposed that an additional monitoring point further downstream of subsidence impacted areas (potentially immediately upstream of Blue Springs Road) is added to continue to monitor potential water quality impacts in Mona Creek. The exact location of the additional gauge will be determined as part of updates to the WMP.

6.5 Greenhouse Gas and Energy

Greenhouse gas (GHG) emissions will be reduced due to the decrease in coal extraction volumes associated with the Amended Modification. Changes to emissions and energy usage have been assessed in an amended Greenhouse Gas and Energy Assessment prepared by Airen Consulting and included in **Appendix 7**. A summary of key outcomes is provided below.

6.5.1 Amended Impact Assessment

The greenhouse gas inventory for the Amended Modification was calculated in accordance with the principles of the Greenhouse Gas Protocol (WRI and WBCSD, 2004) and the Technical Guidelines for the Estimation of Greenhouse Gas Emissions by Facilities in Australia (DEE, 2017).

The Greenhouse Gas and Energy Assessment has been developed in consideration of the following:

- the NSW Government's Climate Change Policy
- Climate Change Policy Framework
- Climate Change Action Plan 2023–26
- Climate Change (Net Zero Future) Act 2023.

These policies and legislation support and build on the NSW Government's climate change policies and initiatives, and aim to help industry decarbonise and build greater preparedness and resilience to climate change risks.

The *Climate Change (Net Zero Future) Act 2023* was legislated on 11 December 2023. This Act establishes guiding principles for action to address climate change, sets NSW's targets to reduce emissions by 50% by 2030 and 70% by 2035 to achieve net zero GHG emissions by 2050, and allows regulations to prescribe interim GHG emissions targets. It also establishes the Net Zero Commission to monitor, review and report on progress towards the 2030 and 2050 targets and the objective and to exercise other related functions.

The results of the assessment are presented in terms of Scope 1, 2 and 3 emissions to help understand the direct and indirect impacts of the Amended Modification. The GHG Protocol (and similar reporting schemes) dictates that reporting Scope 1 and 2 sources is mandatory, whilst reporting Scope 3 sources is optional but recommended. Scope 3 emissions are a consequence of the activities of the company, but from sources not owned or controlled by the company. Some examples of Scope 3 activities include the extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services. The inventory includes all significant sources of GHGs (Scopes 1, 2 and 3) associated with the Amended Modification.

Future projections of coal extraction, coal export, fuel usage and electricity consumption, provided by UCMPL, were used to determine the greenhouse gas emissions. Estimated emissions are conservative as the calculations do not consider the potential improvements to vehicle efficiency in the future (for example, through electrification or alternative fuel sources).

The annual average direct (i.e. Scope 1) emissions from the Amended Modification are estimated to be 12,248 t CO_2-e per year. The total direct emissions from the Amended Modification (97,984 t CO_2-e) are approximately 75% of those estimated for the Proposed Modification (130,000 t CO_2-e).

The annual average Scope 2 emissions from the Amended Modification are estimated to be 4,619 t CO_2-e per year. The total Scope 2 emissions from the Amended Modification (36,954 t CO_2-e) are approximately 15% of those estimated for the Proposed Modification (247,000 t CO_2-e). The difference in Scope 2 emissions is partially driven by the reduced mine plan, but is primarily due to the recent updates made to the emission estimation methodology. In 2022, the Commonwealth DCCEEW released updated emission factor projections which decrease over time. At the time of preparing the Proposed Modification, the emission factor was higher and did not reduce progressively.

Using the DPHI data from the Net Zero Emissions Dashboard and DCCEEW (2022) projections for comparison, the calculated annual average Scope 1 GHG emissions from the Amended Modification would be in the order of 0.01% of NSW emissions, and 0.002% of Australia's emissions. These Scope 1 incremental emissions would be small in the context of global greenhouse gas emissions (which total approximately 37 gigatonnes CO_2-e [IEA, 2023]). It is acknowledged that all sources of greenhouse gas emissions will contribute in some way towards the potential global, national, state and regional effects of climate change.

6.5.2 Mitigation Measures

Energy use by underground coal mines in Australia averages between 140 and 490 Megajoules (MJ) per product tonne (Energetics 2009). The forecast energy use intensity associated with the Amended Modification is approximately 60 MJ/product tonne making it lower than the average for underground coal mines in Australia. The Amended Modification is expected to operate with a low energy demand, as a large proportion of high-quality ROM coal bypasses the CHPP. The Amended Modification avoids significant washing, separation and dewatering processes, which reduces the energy demands of the CHPP, and the energy demands associated with emplacing tailings and reject materials.

UCMPL implements reasonable and feasible management controls to mitigate Scope 1 and 2 greenhouse gas emissions associated with current operations. These are documented in the Air Quality and Greenhouse Gas Management Plan for the Ulan Complex.

UCMPL incorporated a range of measures into the Proposed Modification with the aim of minimising potential greenhouse gas emissions and improving energy efficiency. These measures have been retained in the Amended Modification. UCMPL will continue to mitigate greenhouse gas emissions through ongoing energy efficiency initiatives and optimising productivity, which will continue to be assessed and, where reasonable and feasible, implemented over the life of the operation.

Energy efficiency was a key driver for the design of the extended mine plan, as energy usage is a direct driver of cost as well as greenhouse gas emissions. The design inherently minimises greenhouse gas emissions generated from the mining operations (Scope 1 emissions) through measures including:

- limiting the number of drive headings, minimising the size of the ventilation system and shortening travel distances, as part of operational planning to reduce diesel and electricity consumption
- utilising existing mining equipment that has high energy efficiency and optimised motor sizes

- scheduling activities so that equipment operation is optimised and automatically shutting down equipment when not in use
- optimising the operation of the CHPP for energy efficiency.

As a result of ongoing energy efficiency measures across approved operations, energy and greenhouse gas intensities remain lower than predicted in the 2009 Environmental Assessment (Umwelt, 2009) resulting in lower than predicted Scope 1 and Scope 2 emissions for approved operations at the UCC.

More broadly, Glencore participates and supports a range of low emission technology initiatives that seek to reduce greenhouse gas emissions from mining operations and provide a pathway to reduce emissions from the use of its products. Glencore has stated it is committed to supporting a transition to a low-carbon economy and has announced publicly that to assist in meeting the growing needs of a lower carbon economy, globally the company aims to prioritise its capital investment to grow production of commodities essential to the energy and mobility transition and to limit its global coal production capacity broadly to current levels.

During 2021, Glencore also strengthened its commitment to reducing its total emissions footprint (Scope 1, 2 and 3) which underpins its ambition to be a net-zero emissions company by 2050. Glencore has stated short, medium and long term climate change emission reduction group targets, including:

- a 15% reduction by the end of 2026
- a 50% reduction by the end of 2035 against a 2019 baseline
- a longer-term ambition of achieving net zero emissions by the end of 2050.

The Amended Modification will extend the life of the existing operation providing production for a further two years. In this regard the Amended Modification fits within the production cap as per Glencore's commitment as it is focused on sustaining current coal production in order to extend the life of the existing UCC and is not proposing an increase in production. This additional two years of production meets existing market demand for coal. The Amended Modification and its direct and indirect emissions have been taken into consideration as part of Glencore's broader climate change commitments, and have been included in Glencore's decarbonisation pathway and its emissions reduction targets.

The Amended Modification will not materially increase the national or State effort required to reach Australia's and NSW's 2030 greenhouse gas reduction targets. Further it is unlikely to limit Australia or NSW achieving their reduction targets. As part of implementing the Amended Modification, UCMPL will seek to mitigate greenhouse gas emissions through ongoing energy efficiency initiatives and optimising productivity.

While it is acknowledged that the Amended Modification will result in increased Scope 1 and Scope 2 greenhouse gas emissions which will contribute to climate change impacts, the Amended Modification does not create the demand for the coal which it would produce. That is, if the coal is not mined at the UCC, the demand for this product would be met through coal mined elsewhere in the world which would still be burnt and would still produce CO_2 emissions with the same corresponding climate change impacts to NSW, or arguably more emissions depending on the quality of the alternative coal source. The Scope 3 emissions associated with the combustion of coal mined by the Amended Modification comprise approximately 99.6% of the total emissions of the Amended Modification.

6.6 Biodiversity

Relative to the Proposed Modification, the Amended Modification will result in a decrease in direct impacts to biodiversity due to the removal of some surface infrastructure previously included in the Proposed Modification, in addition to a decrease in indirect impacts as a result of the amended mine plan. Potential biodiversity impacts have been assessed by Umwelt in an amended Biodiversity Development Assessment Report (amended BDAR) in line with the NSW Biodiversity Assessment Method (BAM) (DPIE, 2020) and in accordance with the NSW *Biodiversity and Conservation Act 2016* (BC Act) (included as **Appendix 8**). The key findings of the amended BDAR are outlined in the sections below.

6.6.1 Impact Areas

6.6.1.1 Development Footprint

The BAM requires the definition and assessment of the direct impact area for a development, referred to as the Development Footprint. The Amended Modification Area is approximately 942.4 ha, within which there will be direct surface impact to 17.4 ha (the Development Footprint, previously 23 ha under the Proposed Modification) and Potential Indirect Impacts to 634.4 ha (associated with subsidence due to longwall mining, previously 852.9 ha under the Proposed Modification).

The Development Footprint includes the preferred configuration of the proposed surface infrastructure (dewatering bores and ventilation shafts) and ancillary services associated with the proposed longwall mining operations. There are three separate areas of the Development Footprint, referred to as Areas 1 to 3, as shown on **Figure 6.3**. The Development Footprint has undergone refinements since first submission of the BDAR, some of which are the result of project planning changes following further exploration work, with some changes also the result of a commitment by UCMPL to the avoidance of impacts on biodiversity values. The Development Footprint presented in the amended BDAR has been reduced to the smallest extent possible, while still maintaining the required functionality to facilitate mining operations.

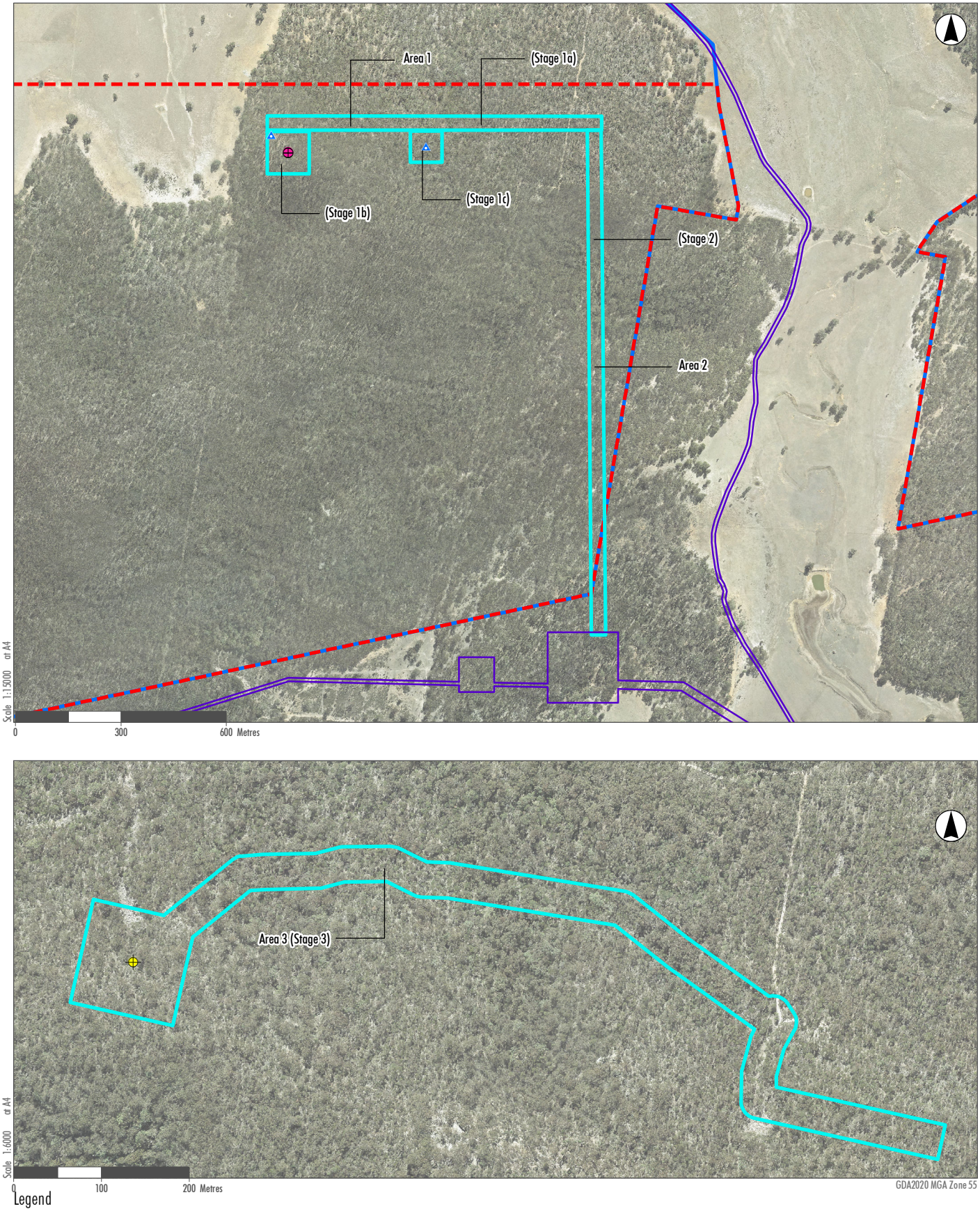


FIGURE 6.3

Development Footprint (Preferred Direct Impact Area)

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)

6.6.1.2 Indirect Impact Area

The Potential Indirect Impact Area is approximately 634.4 ha (previously 852.9 ha under the Proposed Modification) and is the area that has potential for subsidence impacts associated with underground mining of the proposed longwalls (i.e. the maximum subsidence affectation area). This area excludes any areas of overlap with the Development Footprint which are subject to direct impacts. Detailed monitoring surveys of the vegetation above underground mining areas within the UCC have been undertaken since 1980, with studies in the Ulan West area commencing in 2006. Predictions for previous longwall mining modifications at the UCC did not anticipate any impact on the viability of any native vegetation communities within the subsidence affectation area. These predictions have been confirmed and backed up by years of ecological monitoring, which has not recorded any perceptible change in vegetation health or viability that could be attributed to subsidence. As such, targeted field surveys and assessment has focused on the direct impacts associated with surface infrastructure (i.e. the Development Footprint).

6.6.1.3 Assessment of Worst Case Impact

While UCMPL has provided the preferred surface infrastructure configuration to be assessed as the Development Footprint, the final location of surface infrastructure is subject to further exploration and detailed mine planning and cannot be definitively confirmed at this point in time. This is typical for the needs of an underground mining operation where geological variations and other detailed design considerations affect the final locations of infrastructure above underground mining areas.

UCMPL is seeking flexibility for the positioning of the Area 1 surface and ancillary infrastructure to service the proposed additional underground mining. The final location of surface infrastructure will be subject to further exploration and detailed mine planning, and as a result the final impact footprint may lie outside the areas defined here as the Development Footprint.

Acknowledging this need for flexibility, and in order to establish worst-case impact thresholds for the Amended Modification, in particular on areas of significant conservation significance such as the Critically Endangered Ecological Community (CEEC), UCMPL has confirmed a number of additional infrastructure locations and desired optionality within the proposed additional mining area for further consideration of direct impacts within the BDAR. Nine contingency options for the Ulan West surface infrastructure (potentially to replace the current Area 1) are proposed. The maximum potential impact on native vegetation should any of the nine contingency options be selected in lieu of Area 1 is the same as that of the direct impact area (17.4 ha), as none of the nine options are larger than the footprint for Area 1 (i.e. 6 ha).

The adopted approach has been subject to extensive consultation with DPHI and Biodiversity, Conservation and Science (BCS) as outlined in **Section 5.0**. Should the Amended Modification be approved, and there is any variation to the preferred Development Footprint, then a subsequent minor modification would be required to accurately determine the biodiversity offset credits required at that time using the existing data presented in the Amended BDAR. This would ensure that the credits retired are based on the final detailed design of the required surface infrastructure and resulting disturbance footprint.

6.6.2 Results

6.6.2.1 Native Vegetation Assessment

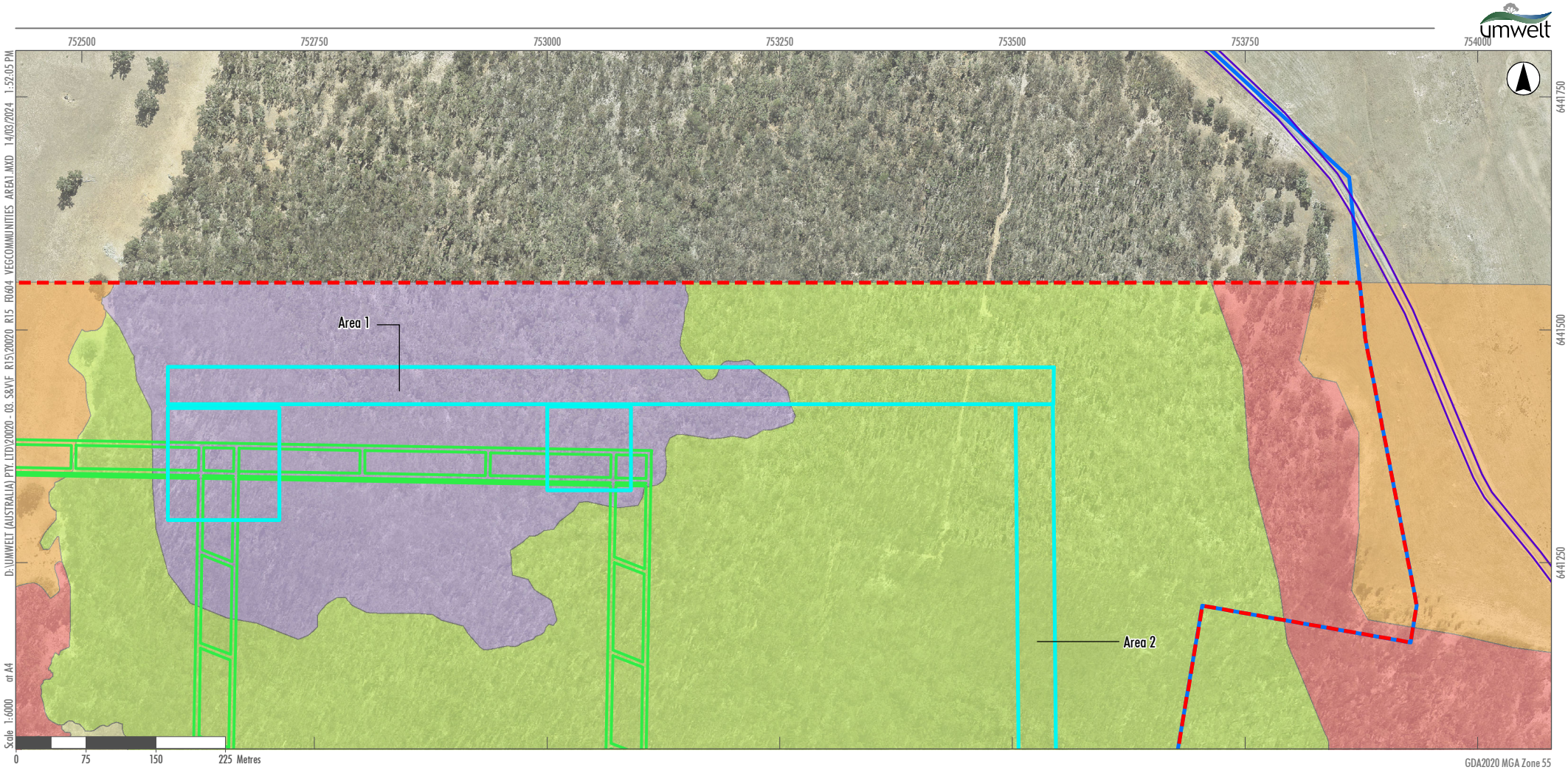
Surveys of the Development Footprint identified four Plant Community Types (PCTs) with only one condition class for each PCT stratified (refer to **Table 6.5**). The vegetation zones for each area of the Development Footprint are shown in **Figure 6.4**, **Figure 6.5** and **Figure 6.6**. Three vegetation zones previously recorded and described for the Proposed Modification are now no longer impacted under the amended Development Footprint, however they are retained in **Table 6.5** for context. For ease of reference, the previous impact area anticipated as a result of the Proposed Modification is also shown in **Table 6.5** in brackets and *italicised*.

No areas of non-native vegetation or Category 1 – Exempt Land under the NSW *Local Land Services Act 2013* (LLS Act) have been mapped for the BDAR.

One of the four vegetation zones (Zone 7) mapped within the Development Footprint for the Amended Modification also conforms to the State and Commonwealth listed CEEC White Box – Yellow Box – Blakely's Red Gum Woodland (Box-Gum Woodland CEEC), and this is also shown in **Table 6.5**.

Table 6.5 Vegetation Zones, PCTs and CEEC within the Development Footprint

Zone	PCT	Condition Class	Area (direct impact) ha	Area CEEC (ha)
1	PCT 281 Rough-barked Apple – Red Gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South-Western Slopes Bioregion and Brigalow Belt South Bioregion	Derived Native Grassland	0 *(0.3)*	0 *(0.3)*
2	PCT 281 Rough-barked Apple – Red Gum – Yellow Box woodland on alluvial clay to loam soils on valley flats in the northern NSW South-Western Slopes Bioregion and Brigalow Belt South Bioregion	Intact	0 *(1.0)*	0 *(1.0)*
3	PCT 476 Narrow-leaved Wattle low open forest / very tall shrubland on ridges in northern NSW South-Western Slopes Bioregion and southern Brigalow Belt South Bioregion	Intact	4.8 *(4.8)*	0 (0)
4	PCT 478 Red Ironbark – Black Cypress Pine – stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong – Mendooran region, southern Brigalow Belt South Bioregion	Intact	4.2 *(3.4)*	0 (0)
5	PCT 479 Narrow-leaved Ironbark – Black Cypress Pine – stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion	Intact	5.7 *(9.7)*	0 *(0)*
6	PCT 481 Rough-barked Apple – Blakely's Red Gum – Narrow-leaved Stringybark +/- Grey Gum sandstone riparian grass fern open forest on the southern Brigalow Belt South Bioregion and Upper Hunter region	Derived Native Grassland	0 *(2.7)*	0 *(2.7)*
7	PCT 481 Rough-barked Apple – Blakely's Red Gum – Narrow-leaved Stringybark +/- Grey Gum sandstone riparian grass fern open forest on the southern Brigalow Belt South Bioregion and Upper Hunter region	Intact	2.7 *(3.4)*	2.7 *(3.4)*
8	PCT 618 White Box x Grey Box – red gum – Rough-barked Apple grassy woodland on rich soils on hills in the upper Hunter Valley	Thinned/ Disturbed	0 *(2.1)*	0 *(2.1)*
Total			**17.4 *(27.4)***	**2.7 *(9.5)***



Legend

- Project Approval
- Proposed Mod 6 Project Approval
- Approved Infrastructure related to Mod
- Amended Proposed Infrastructure
- Amended Proposed Ulan West Underground Mine Plan

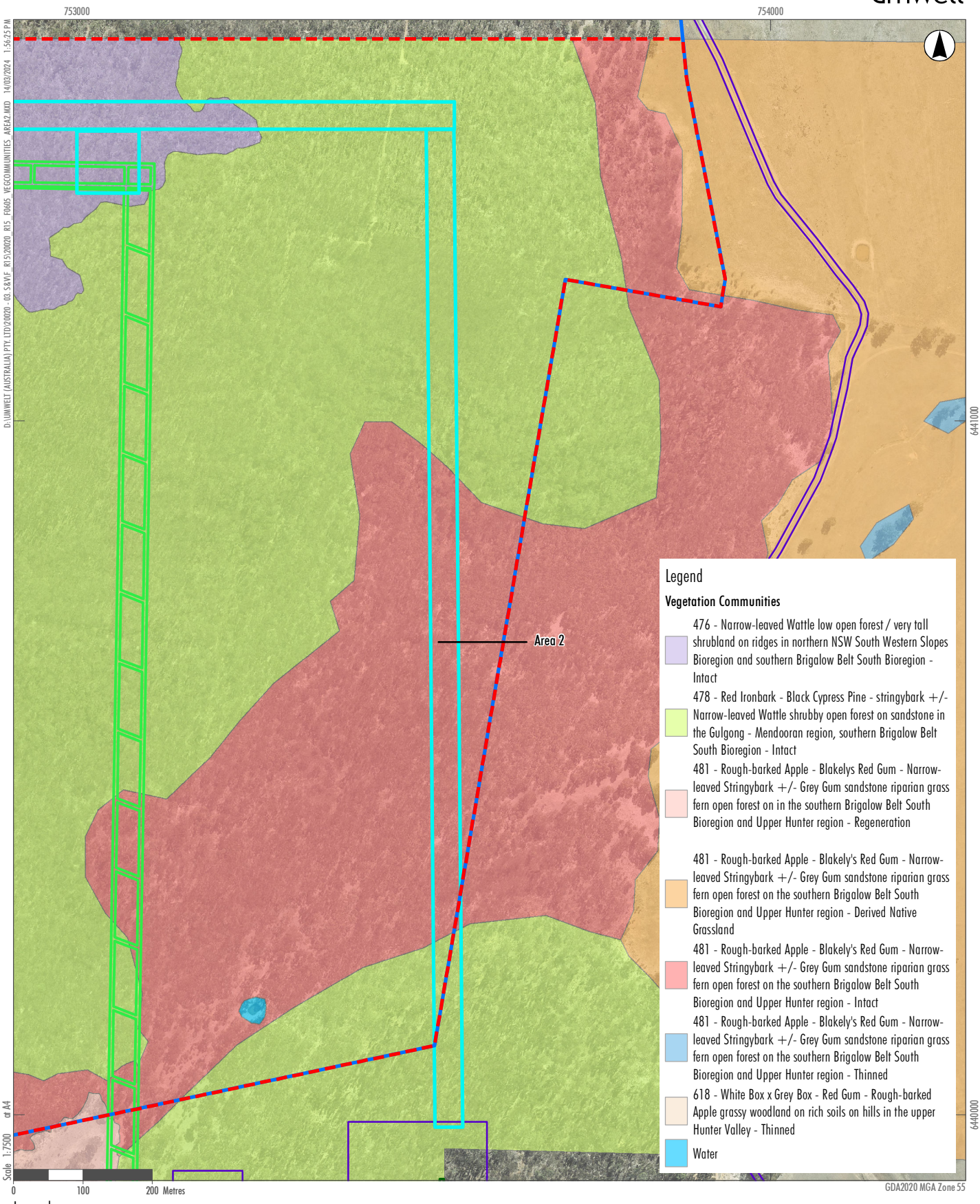
Vegetation Communities

- 476 - Narrow-leaved Wattle low open forest / very tall shrubland on ridges in northern NSW South Western Slopes Bioregion and southern Brigalow Belt South Bioregion - Intact
- 478 - Red Ironbark - Black Cypress Pine - stringybark +/- Narrow-leaved Wattle shrubby open forest on sandstone in the Gulgong - Mendooran region, southern Brigalow Belt South Bioregion - Intact
- 479 - Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion - Intact
- 481 - Rough-barked Apple - Blakely's Red Gum - Narrow-leaved Stringybark +/- Grey Gum sandstone riparian grass fern open forest on the southern Brigalow Belt South Bioregion and Upper Hunter region - Derived Native Grassland
- 481 - Rough-barked Apple - Blakely's Red Gum - Narrow-leaved Stringybark +/- Grey Gum sandstone riparian grass fern open forest on the southern Brigalow Belt South Bioregion and Upper Hunter region - Intact

FIGURE 6.4

Vegetation Zones in the Development Footprint (Area 1)

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)



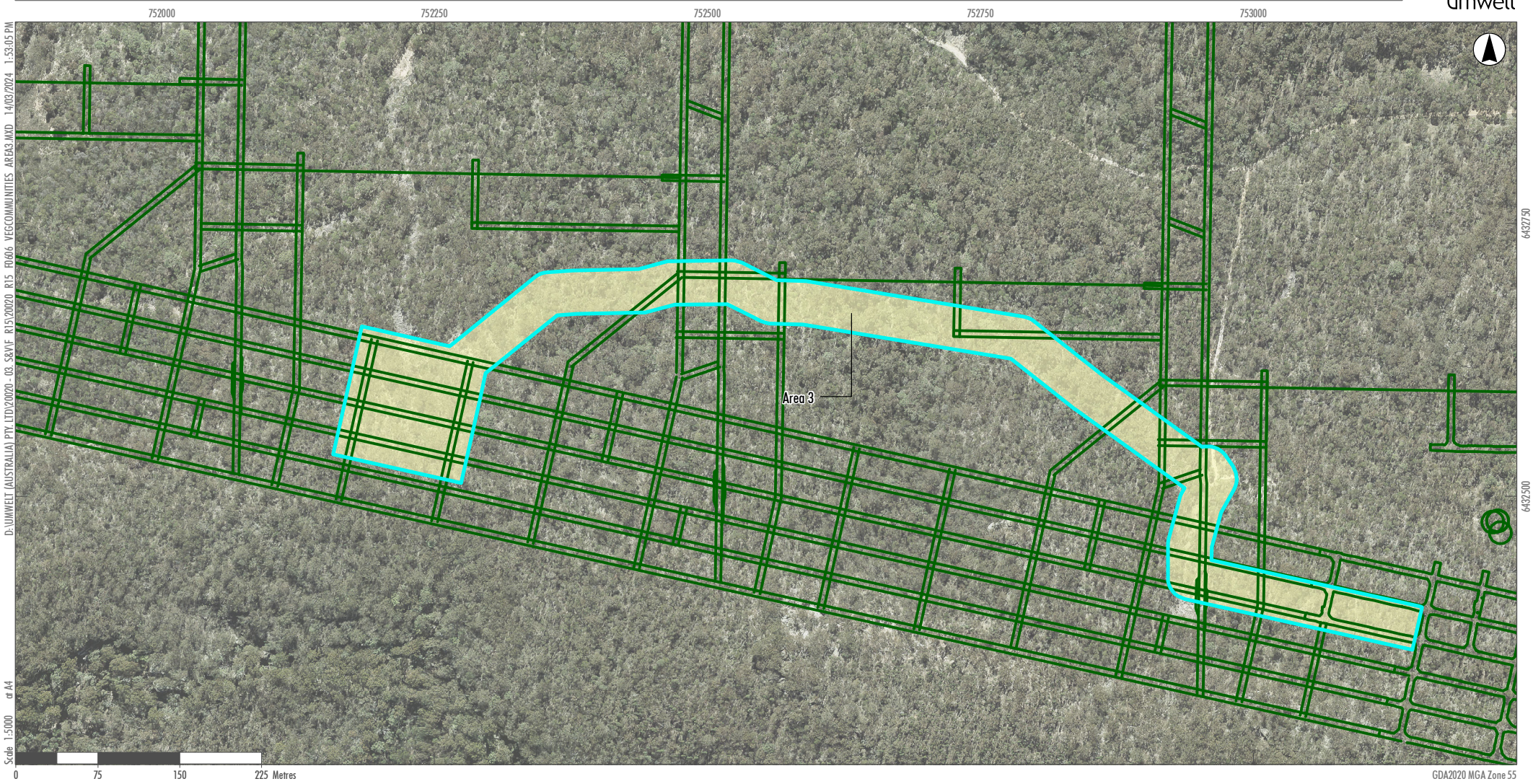
Legend

- Project Approval Boundary
- Proposed Mod 6 Project Approval Boundary
- Approved Infrastructure related to Mod 6
- Amended Proposed Infrastructure
- Approved Ulan West Mine Plan
- Amended Proposed Ulan West Underground Mine Plan Modification

FIGURE 6.5

Vegetation Zones in the Development Footprint (Area 2)

Image Source: Glencore (2018) Data source: Glencore (2000), NSW DFSI (2020)



Legend

Amended Proposed Infrastructure

Approved Ulan West Mine Plan

Vegetation Communities

479 - Narrow-leaved Ironbark- Black Cypress Pine - stringybark +/- Grey Gum +/- Narrow-leaved Wattle shrubby open forest on sandstone hills in the southern Brigalow Belt South Bioregion and Sydney Basin Bioregion - Intact

FIGURE 6.6

Vegetation Zones in the Development Footprint (Area 3)

Image Source: Glencore (2018) Data source: Glencore (2020); NSW DFSI (2020)

6.6.2.2 Threatened Species Assessment

The NSW BAM categorises threatened species as either ecosystem-credit species or species-credit species. Credits are required for impacts on species-credit species but not for ecosystem-credit species as they are considered to be already covered by credits generated for impacts on native vegetation. The BAM calculator used for the amended BDAR predicts the species-credit species that may occur, and requires consideration of these species in the assessment.

Targeted species-credit surveys were undertaken across the Development Footprint for those species-credit species predicted to occur by the BAM calculator and/or the literature review. The south-eastern glossy black-cockatoo (*Calyptorhynchus lathami*) was recorded within the Development Footprint, however this was a non-breeding record so no species credits are generated.

The following species credit species were recorded in the wider potential indirect impact area:

- large-eared pied-bat (*Chalinolobus dwyeri*)
- large bentwing-bat (*Miniopterus orinae oceanensis*)
- barking owl (*Ninox connivens*) (non-breeding record)
- little eagle (*Hieraaetus morphoides*).

Species habitat polygons have been prepared for threatened flora species *Commersonia procumbens* and *Monotaxis macrophylla*. Both species have been assumed present for the amended BDAR, as the specific survey conditions required for the species (i.e. after a burn or disturbance) could not be met. Extensive surveys were undertaken within the appropriate season and the Proposed Modification considered that these surveys were sufficient to rule out the presence of these species, however, as there has not been any recent fire or disturbance, these surveys are not deemed to be valid by BCS. Accordingly, the Amended Modification has assumed presence and assessed potential impacts to these species.

6.6.3 Amended Impact Assessment

6.6.3.1 Direct Impacts

The Amended Modification would result in direct impacts on biodiversity values associated with the construction of the proposed surface infrastructure to support the proposed underground mine plan.

As indicated in **Table 6.5**, the Amended Modification has been assessed as potentially having a direct impact of up to 17.4 ha of direct impacts to native vegetation communities as well as species polygons for two flora species (*Commersonia procumbens* and *Monotaxis macrophylla*). Up to 2.7 ha of PCTs comprising the Box Gum Woodland CEEC are also indicated.

It has been assumed for assessment purposes that all vegetation within the 17.4 ha amended Development Footprint would be removed. Where practicable, infrastructure areas would be rehabilitated, in accordance with UCC approved rehabilitation strategies, when no longer required.

6.6.3.2 Indirect Impacts

Potential indirect biodiversity impacts associated with the Amended Modification largely relate to subsidence due to underground mining and the potential for it to impact on biodiversity values. In addition, some minor indirect impacts associated with habitat connectivity and cumulative habitat loss, fugitive light emissions, air quality, noise, weeds and feral animals, and groundwater and water quality impacts have been assessed.

For the Amended Modification, the Potential Indirect Impact Area associated with underground mining covers an area of approximately 634.4 hectares. As per the Proposed Modification, the indirect impacts predicted for the Amended Modification are not expected to result in any perceptible change in the condition or viability of native vegetation and habitats and are not expected to result in loss of vegetation in terms of direct tree failure or death. Subsidence is not expected to cause significant cracking or alteration to hydrology such that would result in material impacts on vegetation.

Previous predictions for the potential impacts of subsidence on biodiversity at the UCC also anticipated that there would not be any impact on the viability of any native vegetation communities as a result of subsidence. These predictions have been confirmed by years of ecological monitoring which has been undertaken within the UCC since 1980, with studies at Ulan West commencing in 2006. These surveys were completed before, during and after underground mining in various locations across the UCC and have not recorded any perceptible change in vegetation health or viability that could be attributed to subsidence.

Further to this, Eco Logical Australia undertook a detailed study of vegetation communities up to 20 years post-mining in 2015, with the aim of determining whether longwall mine-related subsidence at UCC has had an impact upon the condition of vegetation communities on-site. The study found no statistically significant difference between vegetation communities where mining had previously occurred and vegetation communities remote to mining (Eco Logical, 2015).

6.6.3.3 Impacts on Microbat Species

There is potential for impacts to cliff line landforms that occur within the subsidence affection area for the Amended Modification. These cliff line landforms have potential to support breeding habitat for threatened microbat species.

Extensive survey and monitoring of microbats within the UCC to date has indicated that subsidence impacts on caves have had no perceptible impact on bat activity, despite a previous cave collapse event in April 2020. No maternity roosts for any threatened bat species were recorded within the subsidence affection area for the Amended Modification, however if one were to occur there is some potential, albeit very low, that cave collapse could occur, based on the previous event.

UCMPL has confirmed that based on a potential risk of damage to cave-roosting bat species, close monitoring of impact areas will continue to be undertaken so that any changes are detected as soon as possible and can be addressed through implementation of management and mitigation measures. Pre-mining monitoring will be undertaken in potential cliff line habitats within the subsidence affection area for the Amended Modification to investigate potential cave roosts and therefore to prioritise ongoing monitoring focus.

6.6.4 Avoidance and Minimisation

UCMPL has sought to avoid and minimise potential impacts on ecological values throughout the Amended Modification planning process. This included designing the Amended Modification to maximise the use of existing mining facilities and siting proposed surface infrastructure based on the findings of ecological and other field assessment work within the areas to be disturbed.

Following ongoing refinements to project design both prior to and subsequent to the first submission of the BDAR, the Amended Modification comprises only surface infrastructure considered essential to the underground mining operation, and the footprints of these infrastructure areas have been reduced to the smallest extent possible. Areas proposed to be directly impacted for surface infrastructure have been sited to minimise disturbance as far as practicable, however there is limited flexibility in placement as the infrastructure needs to be positioned above the underground longwall mining panels it is servicing.

The Development Footprint has undergone numerous refinements in the process of avoiding impacts on biodiversity, in particular to the Box-Gum Woodland CEEC. This resulted in further reduction in the footprint of surface infrastructure and a therefore a reduction in the overall impact to the Box Gum Woodland CEEC, and to biodiversity values overall. The review also determined there are no additional changes that can be made that would not compromise future mining operations.

UCMPL has committed to the design and implementation of a comprehensive biodiversity mitigation strategy to manage the unavoidable impacts of the Amended Modification. The following specific control measures, as detailed in the existing approved UCC Biodiversity Management Plan (BMP), are considered to be integral to the mitigation of impacts on the biodiversity features of the UCC and will be implemented for the Amended Modification:

- monitoring and reporting of subsidence impacts
- performance measures, triggers and contingency measures for impacts relating to subsidence
- disease management and hygiene controls
- salvage of biodiversity features for habitat augmentation
- revegetation methodologies (in the event that vegetation is impacted by subsidence)
- creek and drainage line remediation
- pre-clearance surveys
- weed and vertebrate pest management
- seed collection and propagation
- waste management
- erosion, sediment and soil management
- dust minimisation and suppression measures

- environmental management measures to minimise the potential for indirect impacts (e.g., dust, noise and lighting controls)
- workforce education and training.

Each of these control measures will contribute to the maintenance of habitat quality in proximity to the Development Footprint outside the existing approved disturbance. Should the Amended Modification be approved, UCMPL will review and revise the existing approved BMP in accordance with any additional development consent requirements. The revised BMP will guide the implementation of the mitigation steps and will be reviewed and adapted in response to new information. The existing approved BMP will be reviewed and adapted if necessary to ensure compliance with SMART principles and inclusion of quantifiable triggers for adaptive management in accordance with Section 2.6 of the BAM Operational Manual Stage 2.

6.6.5 Biodiversity Credit Impact Summary

Following the application of appropriate avoidance and mitigation measures, the BAM assessment identified the following biodiversity credits are required to offset the biodiversity impacts of the Amended Modification. The Development Footprint impacts on 2.7 ha of vegetation consistent with the Box-Gum Woodland CEEC.

Development Footprint (preferred approach):

- 402 ecosystem credits for four PCTs (PCT 476, 478, 479 and 481)
- 537 species credits for *Monotaxis macrophylla*
- 537 species credits for *Commersonia procumbens*.

Worst-case impacts:

- Up to 17.4 ha of native vegetation
- Up to 5.9 ha of Box-Gum Woodland CEEC
- The maximum area of impact on each vegetation zone and species polygon that could occur are listed below. This combines the largest impact from either Area 1 or the nine contingency footprints, plus the Area 2 and 3 footprints. Note that the total of all these zones is more than 17.4 ha, however the maximum total impact on native vegetation will not exceed 17.4 ha:
    - 4.8 ha of PCT 476 – Intact
    - 8.3 ha of PCT 478 – Intact
    - 6.0 ha of PCT 479 – Intact
    - 5.6 ha of PCT 481 – Intact
    - 1.4 ha of PCT 481 – Regeneration
    - 17.4 ha of *Commersonia procumbens* (*syn. Androcalva procumbens*) species polygon area

- 17.4 ha of *Monotaxis macrophylla* species polygon area
- 0.3 ha of *Tylophora linearis* species polygon area
- 12.6 ha of Koala (*Phascolarctos cinereus*) species polygon area
- 10.4 ha Barking owl (*Ninox connivens*) species polygon area.

UCMPL is continuing to assess a range of options for offsetting for the Amended Modification, which may include one or a combination of:

- payment into the Biodiversity Conservation Fund
- establishing a suitable local Stewardship Agreement Site
- purchasing of biodiversity credits on the market.

6.7 Aboriginal Cultural Heritage

The Aboriginal Cultural Heritage Assessment (ACHA) undertaken for the Proposed Modification by South East Archaeology Pty Ltd (SEA) identified potential impacts on Aboriginal heritage as either direct impacts from ground disturbance for the establishment of surface infrastructure or indirect impacts through underground mining induced subsidence. The Amended Modification will result in a decrease in both the area subject to potential subsidence impacts and the area of disturbance required for surface infrastructure compared to that assessed in the Proposed Modification. As a result, there will be a decrease in predicted impacts to Aboriginal cultural heritage sites.

6.7.1 Amended Impact Assessment

6.7.1.1 Potential Direct Surface Impacts

Five Aboriginal sites were located within the area of surface disturbance associated with the Proposed Modification. As a result of the mine plan amendments and reductions in surface disturbance, none of these known sites are now predicted to be impacted by surface disturbance associated with the Amended Modification (refer to **Table 6.6**).

Table 6.6 Potential Direct Surface Impacts to Aboriginal Heritage Sites

Site ID	Significance[1]	Impact under Proposed Modification	Impact under Amended Modification
783	Moderate-high	Partial	None
784	Moderate	Partial	None
785	Moderate	Partial	None
804	Moderate-high	Total	None
1660	Potentially moderate	Partial	None

1 Several Aboriginal stakeholders have expressed the view that all sites/places are of high cultural significance and make no differentiation on the comparative level of value between any site or place. This is acknowledged and respected.

6.7.1.2 Potential Subsidence Impacts

The primary potential impacts of the approved operations and the Amended Modification on Aboriginal heritage relate to underground mining induced subsidence. The subsidence impacts and consequences associated with the Amended Modification are expected to be similar to those previously predicted and subsequently observed, and compliant with the subsidence performance measures within PA 08_0184, including some subsidence induced impacts e.g. cracking.

Excluding artefact scatters and isolated finds (as subsidence associated with the Amended Modification will have no material impact on these site types), a total of 53 Aboriginal sites/Potential Archaeological Deposits (PADs) susceptible to subsidence related impacts are known to occur within the zone of potential subsidence impacts (refer to **Appendix 4**). These sites/PADs include rock shelters, potential grinding groove sites, an ochre quarry and a possible stone arrangement. This represents a reduction of 13 sites from those potentially impacted under the Proposed Modification (previously a total of 66 Aboriginal sites/PADs).

According to the amended Subsidence Assessment prepared by SCT (refer to **Appendix 4**), the probability of subsidence impacts to the ochre quarry and the stone arrangement are expected to be low. Any impacts are expected to be negligible, consistent with forecasts for the approved Project and subsequent modifications and the monitoring experience since those assessments were prepared.

Conversely, rock shelter and potential grinding groove sites are expected to be sensitive to subsidence movements. The amended Subsidence Assessment predicted that impacts to these types of sites are expected to be consistent with the impacts forecast for the approved Project and subsequent modifications, based on monitoring experience.

Consistent with the approved UCC and Proposed Modification, the amended Subsidence Assessment predicts that rock falls can be expected on up to 20% of the length of sandstone formations located directly over longwall panels and the inter-panel chain pillar between extracted panels. Rock falls are not usually observed outside the longwall mining area. Perceptible cracking is expected at up to 50-70% of the length of sandstone formations located directly over extracted longwall panels or chain pillars and to a distance of up to about 0.4 times overburden depth outside the goaf edge.

Significantly, as for the Proposed Modification, no impacts are predicted to any other Aboriginal sites of high heritage significance, the Mona Creek rock shelter sites (MC23-30 or Ulan ID# 180-187) or the Brokenback Conservation Area or Grinding Groove Conservation Areas as a result of the Amended Modification. Many of the Aboriginal sites/PADs that may be susceptible to an increase in subsidence impacts have been assessed as being of low heritage significance. However, it is noted that several Aboriginal stakeholders have expressed the view that all of the sites/places are of high cultural significance, and this is acknowledged and respected.

6.7.2 Management and Mitigation

The mitigation measures and commitments made for the Proposed Modification also remain relevant to the Amended Modification. UCMPL currently implements a comprehensive Heritage Management Plan (HMP) which provides detailed guidance for the management of heritage evidence across the UCC. The HMP, developed in consultation with Aboriginal stakeholders and regulators, provides sufficient policies and actions for the management of Aboriginal heritage for the Amended Modification.

As previously described in **Section 6.6** it is acknowledged that the final location of surface infrastructure is subject to further exploration and detailed mine planning, and may be subject to change. This is consistent with the needs of an underground mining operation where geological variations and other detailed design considerations affect the final locations of infrastructure above underground mining areas. Any refinements to infrastructure locations will seek to avoid archaeological sites as far as practicable. Where required, further due diligence assessment will be undertaken and any impacts to sites or values will be managed in accordance with the HMP, consistent with current practice at UCC.

6.8 Economics

The Amended Modification will result in a decrease in coal extraction volumes compared to the Proposed Modification. The associated changes to economic impacts have been assessed in an amended Economic Impact Assessment prepared by Ernst and Young Services Pty Limited (refer to **Appendix 9**).

The assessment followed the economic assessment framework set out in the *Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* (the Guidelines) released by the NSW Government in December 2015 and the accompanying *Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals* (NSW DPE, 2018). Key outcomes from the updated assessment are provided in the sections below.

6.8.1 Cost-Benefit Analysis

The Cost-Benefit Analysis provides an estimate of the net benefits of the proposed development to NSW through the evaluation of:

- direct benefits – a function of the profitability of the proposed development which, in turn, depends on the prevailing coal price and the mines' cost structure. The analysis shows that the combination of relatively high value of thermal coal and relatively low capital requirements, extraction and processing costs underpins the direct economic viability of the Amended Modification.
- indirect benefits – related to the linkages that the development has to the NSW economy through both the labour market and suppliers.
- indirect costs – related to the costs borne by the NSW community through the generation of externalities which have not been offset by investments by UCMPL, which in this case includes greenhouse gas emissions costs.

The Amended Modification is expected to provide a net benefit to NSW, estimated to be $345.6 million in net present value (NPV) terms. The estimated net benefit is comprised of $249.6 million and $96 million in direct and indirect benefits respectively. Incremental indirect costs to NSW are estimated to be $0.03 million in NPV terms.

These estimates are based on central case assumptions in relation to the Amended Modification and replacement and sustaining capital expenditure of $46.9 million in NPV terms and a realised coal price ranging between $219 and $179 per tonne for thermal coal in real 2021 Australian Dollar terms. It is noted that the net benefit of the Proposed Modification was estimated to be $292.6 million, with the difference accounted for by an increase in the forecast coal prices.

Consistent with the Guidelines, a systematic sensitivity analysis of the estimated net benefits was undertaken and showed that the estimated net benefits are robust in the sense that they remain (strongly) positive after testing all key assumptions underpinning the analysis.

6.8.2 Local Effects Analysis

The Local Effects Analysis considered the costs and benefits of the Amended Modification on residents of the Lithgow-Mudgee region of NSW. The analysis shows an estimated net benefit of $33.6 million to the Lithgow-Mudgee region in NPV terms. This is driven largely by:

- benefits to local workers of $15.4 million in NPV terms, as most of the employees at the UCC live around the Lithgow-Mudgee region
- benefits to local suppliers of $18.2 million in NPV terms, based on the assumption that 19% of the inputs to production are sourced from the region.

The sensitivity analysis also demonstrated that the estimated local effects are robust, with a pessimistic estimate of net benefits to the Lithgow-Mudgee region of $26.2 million and optimistic estimate of $43.4 million in NPV terms.

6.8.3 Economy-wide Modelling

To corroborate the above findings, the economy-wide impacts of the Amended Modification were assessed using the EY General Equilibrium Model (EYGEM); a large scale, dynamic, multi-region, multi-sector model of the global economy, with an explicit representation of the Lithgow-Mudgee region and the NSW economy.

Using this alternate assessment technique, the Amended Modification is projected to provide significant positive economy-wide impacts to both the local region of Lithgow-Mudgee and to NSW. In the Lithgow-Mudgee region, the Amended Modification is projected to increase Gross Regional Product (GRP) by $1,363.2 million in NPV terms. For NSW, the projected increase in Gross State Product (GSP) is $1,441.6 million in NPV terms. Gross Regional Income (GRI) or regional welfare, is projected to increase by $266.3 million in NPV terms. The projected increase in GRI is significant to the relatively small region of Lithgow-Mudgee. Gross State Income (GSI) is projected to increase by $788.2 million.

7.0 Justification of Amendments

This section provides an updated conclusion discussing the justification for the Amended Modification, having regard to the economic, environmental and social impacts of the Amended Modification and the principles of ecologically sustainable development (ESD).

7.1 Environmental and Social Impacts

As detailed in **Section 6.0**, the environmental, social and economic impacts of the Amended Modification have been identified and subject to a detailed environmental assessment based on:

- assessment of the site characteristics (existing environment)
- focused consultation with relevant government agencies
- engagement with local community and other stakeholders
- application of the principles of ESD, including the precautionary principle, inter-generational equity and conservation of biological diversity and ecological integrity
- expert technical assessment.

The key issues identified were subject to comprehensive specialist assessment to identify the potential impacts of the Amended Modification on the existing environment. These assessments are detailed in the Modification Report (where relevant) and **Section 6.0** and the appendices to this document for amended assessments.

Based on the detailed impact assessments undertaken, it is concluded that the Amended Modification can proceed within acceptable environmental standards, with the implementation of feasible and reasonable mitigation measures. The impacts of the Amended Modification have been kept to a minimum through:

- obtaining a detailed understanding of the issues and impacts by scientific evaluation and stakeholder engagement
- commitment to proactive and appropriate strategies to avoid, minimise, mitigate, offset or manage a range of potential environmental impacts, building on the experience gained from many years of mining operations at the UCC site.

Relative to the Proposed Modification, the Amended Modification is predicted to result in the same, or reduced impacts, for the majority of the environmental and social aspects assessed. Changes for peak groundwater take from specific sources are discussed in detail in **Section 6.3.2**, and are associated with changes made to the recharge rate assumptions in the model. It is anticipated that, if these same changes were applied to the Proposed Modification model, there would be a corresponding increase in predicted take (therefore resulting in a reduction being associated with the Amended Modification).

A summary of the key components predicted to experience impacts as a result of the Proposed Modification and Amended Modification is provided in **Table 7.1**.

Table 7.1 Key Impacts Due to Amended Modification Compared with Proposed Modification

Aspect	Key Element/Details	Proposed Modification Impact	Amended Modification Impact
Subsidence			
Primary subsidence parameters (overburden depth 130 m)	Vertical subsidence	2.1 m	Unchanged, but occurs over **reduced area** due to updated mine plan
	Tilt	85 mm/m	
	Compressive Strain	35 mm/m	
	Tensile Strain	25 mm/m	
Primary subsidence parameters (overburden depth 250 m)	Vertical subsidence	1.7 m	Unchanged, but occurs over **reduced area** due to updated mine plan
	Tilt	40 mm/m	
	Compressive Strain	20 mm/m	
	Tensile Strain	15 mm/m	
Groundwater			
Water Take (Peak)	North Coast Fractured and Porous Rock – Sydney Basin (North Coast Groundwater Source)	5,222 ML/year	5,193 ML/year
	NSW Murray Darling Basin Porous Rock Groundwater Sources 2020 (Sydney Basin MDB (Other) Management Zone)	8,339 ML/year	5,963 ML/year
	North Coast Fractured and Porous Rock Groundwater Sources 2016 - Oxley Basin Coast Groundwater Source	35.2 ML/year	32.05 ML/year
	NSW Murray Darling Basin Porous Rock Groundwater Sources Order 2020 - Sydney Basin MDB (Macquarie Oxley) Management Zone	32.0 ML/year	33.43 ML/year
	Hunter River Unregulated and Alluvial Water Sources 2009 – Upper Goulburn River water source	122.6 ML/year	139.06 ML/year
	Macquarie Bogan Unregulated Rivers Water Sources 2012 - Upper Talbragar River Water Source	49.11 ML/year	54.35 ML/year
	Macquarie - Castlereagh Groundwater Sources Order 2020 - Talbragar Alluvial Groundwater Source	13.86 ML/year	14.86 ML/year
Incremental Drawdown (greater than 2 m)	Alluvium and colluvium along Mona Creek	Small area of drawdown > 2 m in colluvium	No drawdown > 2 m in alluvium or colluvium
Private Bores	Greater than 2 m drawdown at private bores (during mining)	Ten bores (consistent with approved)	No change
	Greater than 2 m drawdown at private bores (post mining)	20 bores (consistent with approved)	No change
Impact to GDEs	-	Negligible or no impacts	No change
Surface Water			
Catchment Areas	-	No change	No change
Flow Regimes	Frequency of no flow periods	Negligible change	No change

Aspect	Key Element/Details	Proposed Modification Impact	Amended Modification Impact
	Average annual dry days	No increase	No increase
Flooding within Mona Creek channel	Flood Depth (1% AEP)	Peak of 3.4 m within Mona Creek channel	Peak of 3.2 m within Mona Creek channel
	Flood Velocities (1% AEP)	Peak of 4.7 m/s within Mona Creek channel.	Peak of 4.6 m/s within Mona Creek channel.
Remnant Ponding	Increased potential remnant ponding area relative to approved	20 ha	6 ha
Greenhouse Gas and Energy			
Annual Average Emissions	Scope 1	16,164 t CO_2-e	12,248 t CO_2-e
	Scope 2	30,815 t CO_2-e	4,618 t CO_2-e
	Scope 3	8,073,804 t CO_2-e	5,209,939 t CO_2-e
Total Emissions	Scope 1	129,308 t CO_2-e	97,984 t CO_2-e
	Scope 2	246,517 t CO_2-e	36,954 t CO_2-e
	Scope 3	64,590,429 t CO_2-e	41,679,513 t CO_2-e
Contribution to Australian Emissions	% of NSW annual Scope 1 emissions	0.014%	0.01%
	% of Australian annual Scope 1 emissions	0.003%	0.002%
Biodiversity			
Impact Areas	Development Footprint	27.4 ha	17.4 ha
	Indirect Impact Area	852.9 ha	634.4 ha
	Maximum Parameters Area	54.7 ha	N/A
Biodiversity Credit Impact Summary (based on preferred Development Footprint)	Ecosystem credits	602 (seven PCTs)	402 (four PCTs)
	Large-eared pied bat (*Chalinolobus dwyeri*)	58	0
	Eastern cave bat (*Vespadelus troughtoni*)	58	0
	Monotaxis macrophylla	N/A	537
	Commersonia procumbens	N/A	537
Impact on CEEC	*White Box – Yellow Box – Blakelys Red Gum Grassy Woodland and Derived Native Grassland CEEC*	9.5 ha	2.7 ha (Development Footprint) (5.9 ha Worst Case)
Aboriginal Cultural Heritage			
Sites potentially impacted	Direct disturbance	5 sites	0 sites
	Indirect disturbance	66 sites	53 sites
Economics			
Economic Benefits	Direct benefit to State of NSW	$144.9 million	$249.6 million
	Indirect benefit to State of NSW	$147.7 million	$96 million
	Net benefit to State of NSW	$292.6 million	$345.6 million
Economic Impacts	Direct costs to State of NSW	N/A	N/A
	Indirect costs to State of NSW	$0.019 million	$0.03 million
	Net costs to State of NSW	$0.019 million	$0.03 million

7.2 Suitability of the Site

The Amended Modification is located in an area that has a long history of coal mining, with the Project Area itself subject to mining activity since the 1920s. The UCC is a well-established mining operation situated within the Western Coalfields of NSW.

The Amended Modification will involve the extension of existing longwalls into adjacent exploration leases, and construction of related infrastructure to support these additional underground mining activities. These longwall extensions adjoin and are continuous with the existing approved mining areas providing an efficient mine plan to recover the coal resources in this area. The Amended Modification will ensure that recovery of the coal resource present at the UCC is maximised and will build upon existing approved activities and utilise existing infrastructure wherever possible. There would be minimal additional impacts on private and public assets or environmental features, consistent with those previously approved under PA 08_0184. The Amended Modification will not limit the continued use of private landholdings for agricultural or residential purposes. Existing management and monitoring programs are in place to identify and manage the potential impacts on these land uses.

The Amended Modification would allow for the efficient recovery of a valuable resource by maximising resource utilisation and use of existing infrastructure and workforce, thereby reducing capital costs and minimising environmental impacts compared with recovering this resource by another means.

7.3 Ecologically Sustainable Development

The EP&A Act aims to encourage ESD within NSW. The Amended Modification requires approval from the Minister under section 4.55 of the EP&A Act. As such, the Minister needs to be satisfied that the Amended Modification is consistent with the principles of ESD.

To justify the Amended Modification with regard to the ESD principles, the benefits of the Amended Modification in an environmental and socio-economic context should outweigh any negative impacts. The principles of ESD encompass the following:

- the precautionary principle
- inter-generational equity
- conservation of biological diversity
- valuation and pricing of resources.

Essentially, ESD requires that current and future generations should live in an environment that is of the same or improved quality than the one that is inherited.

As outlined in Section 8.3 of the Modification Report (Umwelt, 2022), the Proposed Modification was assessed against the principles of ESD as required by the EP&A Act. This assessment concluded that the Proposed Modification was consistent with the principles of ESD. The same assessment is relevant to Amended Modification, which will result in reduced potential impacts compared to the Proposed Modification, while maintaining the majority of the potential benefits.

7.4 Conclusion

The Amended Modification proposes the efficient recovery of a valuable resource by maximising resource utilisation and use of existing infrastructure and workforce, thereby reducing capital costs and minimising environmental impacts compared with recovering this resource by another means.

As identified by the NSW Government's 2020 Strategic Statement on Coal Exploration and Mining in NSW (NSW Strategic Statement) coal mining is an important industry for NSW and will continue as such for the next few decades. Coal mining is a significant source of direct and indirect jobs in regional NSW and underpins many local economies. The NSW Strategic Statement acknowledges the need to recognise existing industry investment by continuing to consider responsible applications to extend the life of current coal mines. As an established operation with access to significant coal reserves beyond the term of PA 08_0184, the Amended Modification fits within the Plan of Action proposed in the NSW Strategic Statement for supporting responsible coal production.

The NSW Strategic Statement also recognises that the use of thermal coal will decline in NSW over the coming decades as aging coal-fired infrastructure is replaced with other forms of energy generation, however it also acknowledges that ending or reducing NSW thermal coal exports while there is still strong long-term global demand would likely have little or no impact on global carbon emissions. On this basis, the Amended Modification is appropriately placed to continue to meet this existing global demand in line with the NSW Strategic Statement.

As an established underground operation, the proposed expansion of mining at UCC will also be consistent with the objective in the NSW Strategic Statement to reduce the impact of mining on environmental and social outcomes, particularly in relation to its reduced air, noise, biodiversity, visual and other impacts in comparison to open cut coal mining operations.

The comprehensive environmental and social impact assessment undertaken for the Amended Modification found that with the continued implementation of existing management and mitigation measures and the addition of the new measures identified, the Amended Modification can proceed within acceptable environmental standards, without significantly increasing the impacts of the approved operations.

The Economic Impact Assessment (refer to **Appendix 9**) describes a range of positive benefits from the Amended Modification that will result at a local, regional and State level. These benefits include:

- continued employment of approximately 930 full time equivalent employees for an additional two years
- the Amended Modification is estimated to provide a net benefit of $345.6 million to NSW, in NPV terms
- the Amended Modification is estimated to provide a net benefit of $33.6 million to the Lithgow-Mudgee region, in NPV terms.

On the basis of the findings in the Modification Report and this Amendment Report, it would be reasonable to consider that with the implementation of the management, mitigation and offset measures proposed by UCMPL, the Amended Modification will result in a net benefit to the NSW community.

8.0 References

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