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ULA5378

Dear Robyn

ULAN WEST: SUBSIDENCE ASSESSMENT FOR UCCO APPROVAL - FIRST WORKINGS VARIATION APPLICATION FOR LONGWALL 7

Ulan Coal Mines Pty Ltd (UCM) owns and operates Ulan West (UW) Mine approximately 45km north of Mudgee in the Central West of NSW. Due to adverse in-seam geotechnical conditions, UCM is seeking to shorten the northern end of Longwall 7 at UW by approximately 255m and revise the approved mine plan with a variation to the first workings. UCM commissioned SCT Operations Pty Ltd (SCT) to assess the proposed first workings variation to meet the requirements of Condition 25 of Schedule 3 in modified approval PA08_0184 (MOD5) for the Ulan Coal Continued Operations (UCCO) Project under which the mine operates. This report presents the results of our assessment.

Our assessment indicates:

- The proposed variation to the first workings involves forming roadways and pillars that are generally consistent with the approved mine plan, albeit in a slightly different location.

- A reduction in length of Longwall 7 would cause similar subsidence effects as currently approved but over a marginally smaller footprint (a reduction of 3.5% by area) with reduced impacts to surface features above or within the vicinity of the affected area.

- The pillars formed by the proposed first workings are expected to be stable and non-subsiding both in the short-term and longer term even after the secondary extraction of Longwall 7.

- Subsidence effects, impacts and consequences are expected to be the same or less than, and generally in accordance with, the approved mine and those predicted in the original UCCO Project Environmental Assessment (EA) and subsequent EAs for the approved modifications.

- Subsidence effects, impacts and consequences resulting from the changes are expected to be compliant with the subsidence performance measures of the UCCO Project Approval conditions.

Table 1 summarises the UCCO Project Approval subsidence performance measures, as outlined in Table 14 of Section 24 from Schedule 3, and the changes to impacts expected from the proposed variation to first workings and, if approved, the reduction in length to Longwall 7.

Table 1: Subsidence Performance Measures for UCCO Project

Subsidence Performance Measure		*Expected change from proposal*
Water		
Ulan, Mona & Cockabutta Creeks	No greater environmental consequences than predicted in the EA	Reduced impacts to Mona Creek expected – no change to Ulan & Cockabutta Creeks
Biodiversity		
Threatened species, populations, habitat or ecological communicates	Negligible impact	No change expected
Land		
Cliffs in the Brokenback Conservation Area	Nil environmental consequences	No change expected (proposed mining is remote)
Other Cliffs	Minor environmental consequences	No change expected (proposed mining is more remote from Mona Creek cliffs)
Heritage		
Aboriginal Sites	Nil impact in the Brokenback Conservation Area, Grinding Groove Conservation Areas; and on Mona Creek Rock Shelter sites	No change expected (proposed mining is more remote from Mona Creek Rock Shelter sites)
Talbragar Fish Fossil Reserve	Negligible impact	No change expected (proposed mining is remote)
Other Heritage Sites	No greater impact than predicted in EA	Reduced potential for impacts to Aboriginal heritage items (proposed mining is remote from European heritage sites)
Built Features		
All built features	Safe, serviceable and repairable unless the owner agrees otherwise in writing	Reduced impacts expected
Public Safety		
Public Safety	No additional risk due to mining	No change expected

1. Introduction and Background

This assessment is provided in the context of a first workings application, but also includes detail of the reduced subsidence impacts as a result of the revised longwall geometry defined by these first workings, given Longwall 7 would be shortened under the proposed variation.

It is recognised that long-term stable first workings do not have potential to cause perceptible subsidence effects and impacts to surface features except insofar as they may be impacted by approved second workings. They do, however in this case, redefine (shorten) the length of Longwall 7 from that approved by MOD4 to PA08_0184.

UCM is proposing to relocate the longwall installation roadway, companion roadway and associated cut-through driveages due to adverse geotechnical conditions encountered underground at the location of the approved installation roadway. The installation of longwall equipment typically requires the formation of a wider roadway than standard width first workings development roadways. UCM has determined that the geotechnical conditions associated with elevated horizontal stresses encountered at the approved installation roadway location presents an unacceptably high health and safety risk and increased financial risk to the mining operation. To reduce this risk UCM is seeking approval to move the position of the longwall installation roadways to the south by approximately 255m.

The reduction in length to Longwall 7 would represent about 3.5% of the total panel length approved under MOD4 to PA08_0184. MOD4 extended Longwall 7 to the north by 420m. This proposal would reduce this extension from 420m to 165m.

2. Site Description

Figure 1 shows the current mine workings, the approved and proposed first workings for the installation of Longwall 7, superimposed onto an aerial image with surface features.

The land above the section of Longwall 7 that would no longer be subsided is owned by UCM within the flatter Mona Creek valley catchment.

Surface features above this reduced area of Longwall 7 (or within the Assessment Area for MOD4) include:

- A section of the main channel and a tributary of Mona Creek.
- The upper reaches of the 'Etheridge' farm dam storage.
- Short sections of steep slopes.
- Several Aboriginal heritage sites (Five artefact scatters and one isolated find).
- One pole on an overhead powerline owned by Essential Energy.
- A section of a buried telecommunications (Telstra) cable.
- A section of an unsealed access road to the 'Woodbury' property.

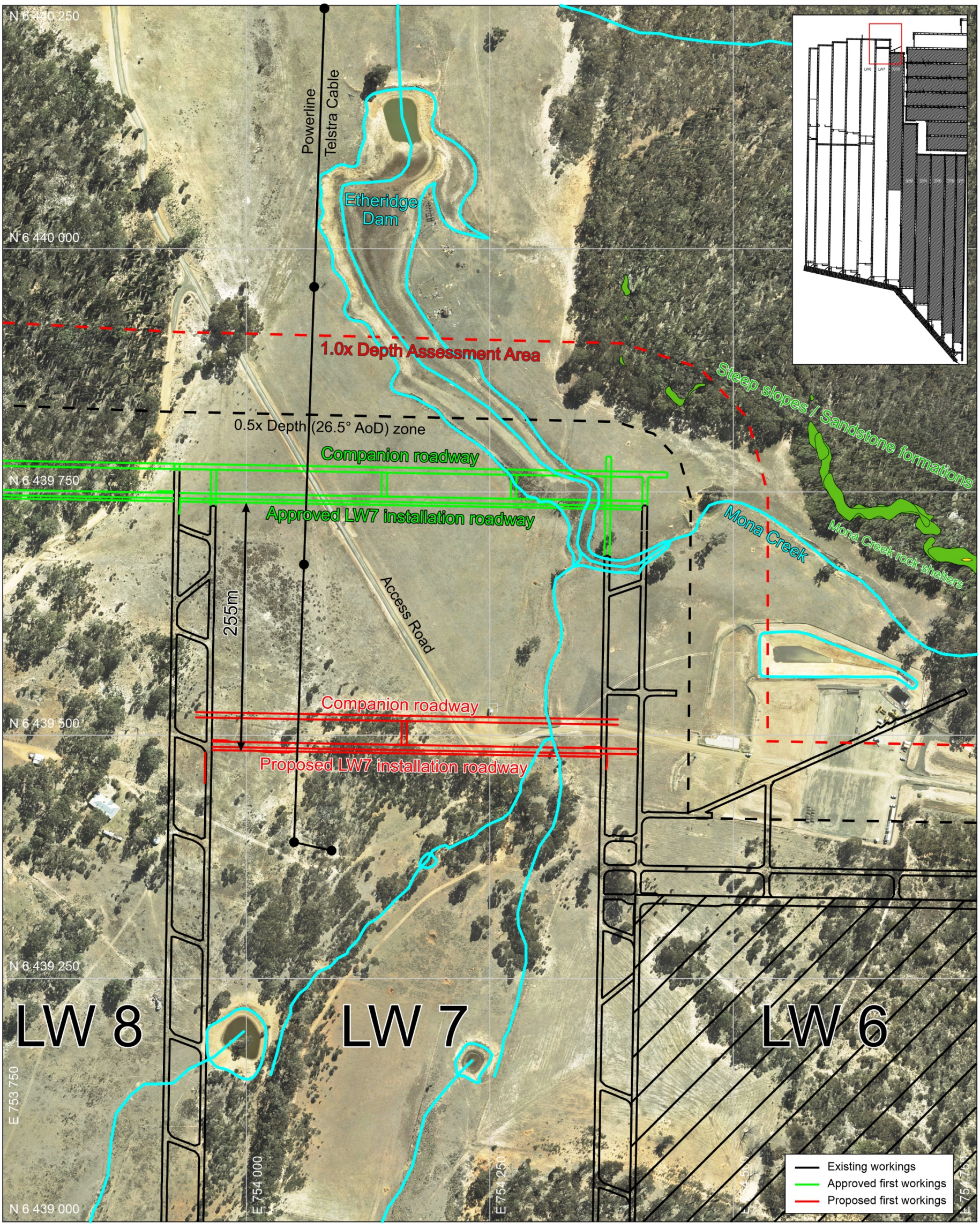


Figure 1: Site plan of proposed variation to first workings for Longwall 7.

The overburden depth to the mining horizon in the D working section (DWS) of the Ulan Seam is 160-165m. The DWS thickness and mining height at this location is 3.0m.

3. Assessment of Pillar Stability, Subsidence Effects and Impacts

The proposed variation to the first workings involves forming roadways and pillars that are generally consistent with the approved mine plan, albeit in a slightly different location.

The subsidence effects from Longwall 7 would be the same as currently approved but over a smaller footprint with reduced impacts to surface features in the northern part of the panel.

Subsidence effects and impacts from the overall mining plan are generally in accordance with the approved mine plan and the original UCCO Project Environmental Assessment (EA) and subsequent EAs for the approved modifications.

3.1 Pillar Stability

The pillars formed by the proposed first workings driveage of the longwall installation roadway and the companion road, parallel to the installation roadway, are expected to be stable and non-subsiding both in the short-term and longer term even after the secondary extraction of Longwall 7.

These pillars are nominally 24.6m wide and greater than 100m long. At 3.0m high, these pillars have a width to height ratio of 8.2. These pillars are large enough to continue to gain load-bearing capacity if they were to become overloaded. Using the UNSW (1999) pillar design methodology, at 165m depth, with the strong roof and floor condition expected, these pillars have a calculated factor of safety in excess of 2.11 for both first workings development and under Longwall 7 end abutment loading. The 2.11 factor of safety corresponds to a probability of instability of 1 in 1,000,000.

No perceptible subsidence effects or impacts are expected above or in the vicinity of the proposed roadways and pillars during first workings and secondary extraction other than those associated with the usual goaf edge subsidence profiles for longwall mining at UW.

3.2 Subsidence Effects

No change to the magnitude of maximum subsidence effects forecast in MOD4 for longwall extension areas, where overburden depth is 160-170m, are expected from the proposed reduction in length of Longwall 7.

The forecast of primary subsidence parameters in the vicinity of the revised start line for Longwall 7 remain unchanged from those approved in MOD4 and summarised in Table 2.

Table 2: Summary of Approved Subsidence Parameters for Longwall 7

Subsidence Parameter	Maximum
Vertical Subsidence (m)	1.7
Tilt (mm/m)	55
Compression Strain (mm/m)	25
Tensile Strain (mm/m)	20

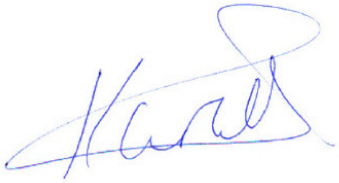
3.3 Subsidence Impacts

The reduced footprint of Longwall 7 is expected to reduce the subsidence impacts to surface features in or within the vicinity of the affected area including:

- No physical impacts to the ground surface in the main channel of Mona Creek.
- No physical impacts to the tributary creek above the start of Longwall 7 at the confluence with the main channel.
- No physical impacts to ground level at the high-water mark of the Etheridge dam.
- No changes to steep slopes – none of which are located in this area.
- Potential impacts would be reduced to zero at two Aboriginal heritage artefact sites and one isolated find site and almost zero at three Aboriginal heritage artefact scatter sites. Typically, impacts to these types of sites are not expected in open terrain above longwalls.
- Reduced impact to the overhead powerline with one less pole to be mined under.
- Reduced impacts to the Telstra cable, located in the same corridor as the powerline, with a shorter section of the cable mined under.
- Reduced impacts to the access road on UCM land as most of this road would no longer be mined under.

If you have any queries or require further clarification of any of the issues raised, please don't hesitate to contact me directly.

Yours sincerely



Ken Mills
Principal Geotechnical Engineer

4. REFERENCES

UNSW 1999 - Galvin, J M, Hebblewhite, B K and Salamon, M D G, 1999. UNSW coal pillar strength determinations for Australian and South African mining conditions, in Proceedings Second International Workshop on Coal Pillar Mechanics and Design, Pittsburgh, NIOSH IC9448.

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