

RUSSELL VALE COLLIERY STAGE 1 EXTRACTION PLAN

Reasons for Approval

In granting a conditional approval of Wollongong Coal's Stage 1 Extraction Plan application, the following matters have been carefully considered.

1. PROJECT APPROVAL STATUS

- The Russell Vale Colliery Revised Underground Expansion Project (MP 09_0013) was approved by the Independent Planning Commission of NSW (IPC) on 8 December 2020. The approval provides for extraction of up to 3.7 million tonnes (Mt) of coal over 5 years.
- The approved development involves mining within the Metropolitan Special Area to the west of the Illawarra Escarpment by means of non-caving bord and pillar mining techniques, with workings designed to be long term stable with negligible subsidence impacts.
- MP 09_0013 requires an Extraction Plan to be approved by the Secretary prior to the extraction of coal from bord and pillar workings (referred to as second workings). First workings, such as development headings, do not require the approval of an Extraction Plan, provided they are designed to be stable and non-subsiding.
- Bord and pillar mining will be completed in a staged approach, with separate Extraction Plans prepared for each stage of mining.

2. ASSESSMENT BACKGROUND

- Extensive multi-seam underground mining has been undertaken at Russell Vale Colliery since 1887. Extraction of the uppermost Bulli Seam occurred in the early to mid-1900's using pillar extraction techniques. The underlying Balgownie Seam was extracted using longwall mining techniques between 1970-1982 and 2001-2003, and areas of the lower Wongawilli Seam were extracted using longwall methods between 2012 and early 2014.
- The Colliery went into "care and maintenance" in 2015 awaiting approval of the Underground Expansion Project. Coal production from first workings recommenced in September 2021, following approval of MP 09_0013.
- The long-term stable bord and pillar mine plan approved under MP 09_0013 was developed in response to uncertainty associated with subsidence and groundwater impacts from previously proposed longwall mining in the multi-seam mining environment present at Russell Vale.
- Risks associated with multi-seam mining were extensively considered in the determination of MP 09_0013. The IPC concluded that it was highly unlikely that large areas of remnant pillars existed in overlying seams and that if remnant pillars did exist, there was a very low probability that the planned mining would result in collapse of these pillars.
- Russell Vale Colliery is located within the Metropolitan Special Area of the Sydney drinking water catchment. The Special Area is managed by WaterNSW. WaterNSW has adopted a set of principles that establish the outcomes it considers essential to protect the drinking water supplies from mining impacts. WaterNSW confirmed, through the assessment process for MP09_0013, that the project adequately addressed its mining principles.

3. EXTRACTION PLAN APPLICATION

- On 8 October 2021, Wollongong Coal submitted an application for approval of an Extraction Plan in accordance with condition C10 of MP 09_0013. The plan covered Stage 1 mining, comprising bord and pillar extraction of seven panels, PC07, PC08 and PC21 to PC25 (refer to **Figure 1**).
- The plan proposes pillar dimensions of 22.5m by 24.5m and 24.5m by 24.5m. All pillars have a high factor of safety, equivalent to a risk of failure of less than 1 in 1,000,000. SCT Operations

advise that there are no examples in Australia or South Africa of pillars failing at this factor of safety.

- The Wongawilli Seam has a thickness of around 8 - 12 metres, with the proposed mining targeting the lower 2.4 metres. The maximum roadway width will be 5.5m. The depth of cover ranges from 250 metres to 340 metres.
- The total recoverable reserve from the extraction area is approximately 732,200 tonnes of coal and the panels will be extracted over a two-year period.
- During the Department's assessment of the Extraction Plan, revisions were made to the Extraction Plan and a number of component management plans. The revised plan considered by the Department in this determination was the *Russell Vale Colliery revised Underground Expansion Project Extraction Plan Stage One – PC07, PC08 & PC21 to PC25 RVE EC PLN 010 Version 2* (dated 19 November 2021)

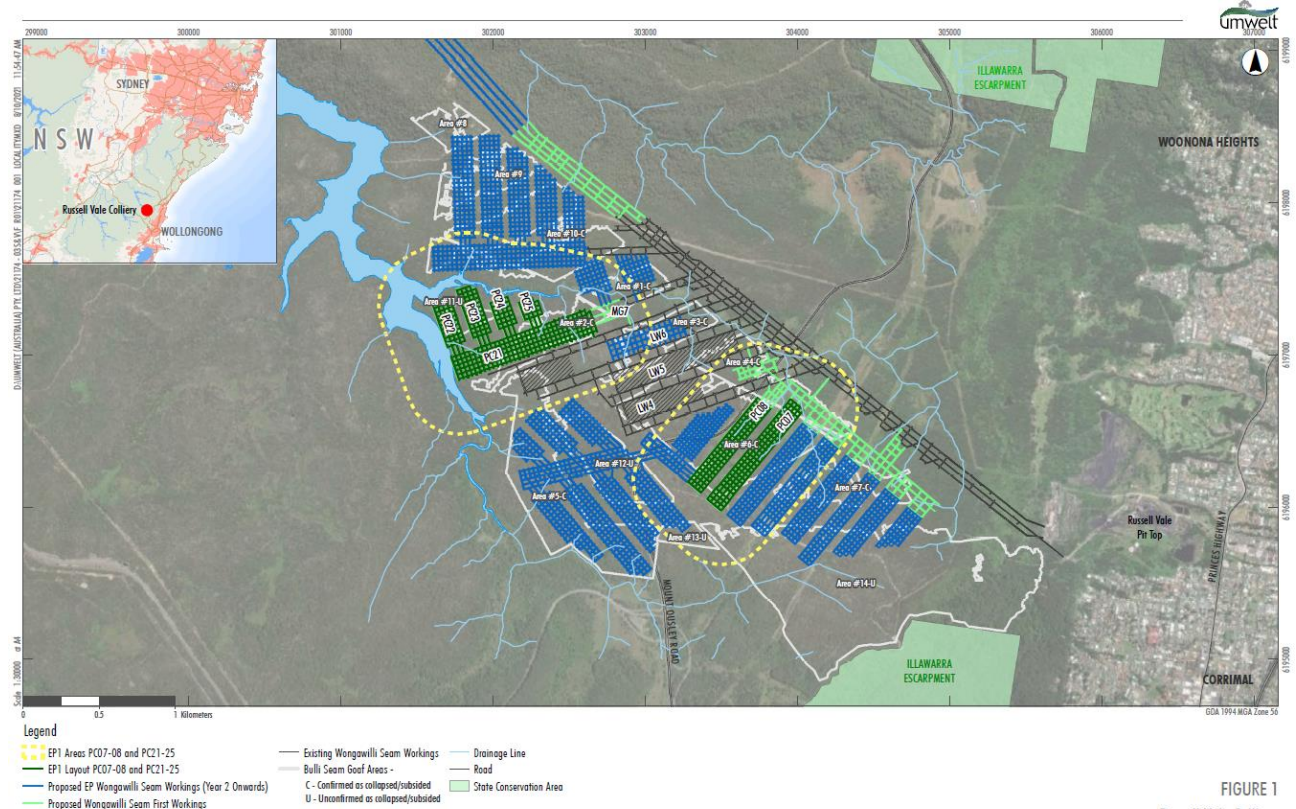


FIGURE 1
Russell Vale Colliery

Figure 1: Stage 1 Extraction Plan Area and Mine Plan

4. KEY MINING PARAMETERS

- The bord and pillar mine plan has been assessed as being long term stable with negligible risk of pillar failure.
- Vertical subsidence directly above the bord and pillar mining panels is predicted to be less than 100mm and generally less than 30mm. Outside the footprint of the bord and pillar mining panels, vertical subsidence is predicted to be negligible (less than 20mm).
- Due to the mine design, subsidence impacts on natural and built features within the Extraction Plan area are predicted to be negligible.

5. CONSIDERATION BY AGENCIES

- The Department sought comments from relevant State agencies, including the Department's Biodiversity and Conservation Division (BCD), the Natural Resources Access Regulator (NRAR), Environment Protection Authority, Transport for NSW / Roads and Maritime (RMS), Heritage NSW – Aboriginal Cultural Heritage (ACH), Heritage Council of NSW, Resources Regulator and Mining Exploration and Geoscience.
- The Department also sought comments from key stakeholders, including WaterNSW, Wollongong Council (Council), TransGrid and Endeavour Energy.

- The Department considered the following to be key issues by agencies and stakeholders:
 - BCD raised concerns regarding the potential for greater than expected impacts due to cumulative subsidence, the adequacy of proposed monitoring for Giant Burrowing Frog and the adequacy of baseline monitoring in the context of the *Upland Swamps Offset Policy*. BCD also recommended traditional subsidence survey lines be utilised for monitoring, rather than relying on remote survey techniques and requested access to all current monitoring data. A further recommendation was made by BCD that extraction of a further 25 metres of Longwall 6 to enable removal of longwall equipment should not be accepted. The Department notes that this activity is outside the scope of this Extraction Plan and is already approved.
 - Heritage Council of NSW recommended amendments to the Heritage TARP addressing the potential for elevated subsidence within the curtilage of the State Heritage listing for Cataract Dam.
 - Resources Regulator recommended that key infrastructure operators provide written endorsement of proposed risk control measures prior to approval of the Extraction Plan;
 - EPA made recommendations regarding coal processing infrastructure, which are separate to the assessment of this Extraction Plan.
 - Transport for NSW advised that an internal risk assessment has been completed and a Technical Committee has been established to work with the Applicant in developing agreed monitoring plans and TARPs to manage potential impacts on road infrastructure. These works are ongoing and likely to be resolved in December 2021.
- WaterNSW confirmed it does not have any concerns regarding the approval of the Extraction Plan as it has taken into consideration WaterNSW's Mining Principles, poses low risk to overlying catchment values and water resources, and is likely to meet the performance measures set in the development consent.
- Comments were not received from NRAR, Council or Endeavour Energy.
- On 19 November 2021, the Applicant provided a response to agency submissions. These comments were provided to BCD for any residual comment on 23 November 2021.

6. KEY ISSUES

7.1 Bulli Seam goaf

- The IPC recommended in its determination of the project that the status of Bulli Seam goaf areas be confirmed as part of the Extraction Plan process.
- The Extraction Plan provides further detailed analysis of the status of overlying workings. This analysis found that:
 - Panels PC07 and PC08 are located below Balgownie Seam longwall goaf areas and Bulli Seam goaf areas confirmed as collapsed. Therefore, there is no potential for any significant further subsidence from the Bulli or Balgownie Seams in these locations.
 - Panel PC21 is located below a Bulli Seam goaf area that is confirmed as collapsed.
 - Panels PC22 to PC24 are located below a Bulli Seam goaf area that is unable to be confirmed as collapsed due to lack of access or other mining below this area. While considered highly unlikely, the potential for further subsidence should this goaf area collapse cannot be ruled out.
- The Department accepts that based on mine design parameters and expert peer review:
 - the likelihood of this Bulli Seam goaf area not already being fully collapsed is remote;
 - the potential for additional subsidence associated with any future collapse of this goaf area exists irrespective of the planned mining; and
 - the planned mining is not expected to cause any significant movement or change at the Bulli Seam mining horizon that would cause a collapse.
- The Department acknowledges that in the unlikely event that remnant pillars are still standing and were to collapse at the time of mining, additional subsidence associated with the collapse of these pillars is expected to be less than 300mm over an area with a radius of approximately 50m.
- The Department accepts that extensive efforts have been made to confirm the status of Bulli Seam goaf areas, and that the only feasible method now available is the monitoring of roadway conditions

as mining progresses. The Department notes that the bord and pillar mining method is highly flexible and enables changes to the mine plan to be implemented quickly should observations or monitoring indicate the potential for greater than expected subsidence.

- The Extraction Plan proposes a program of mapping changes to the observed vertical and horizontal underground roadway conditions in the Wongawilli Seam as mining progresses. These observations provide a strong indicator of the status of Bulli Seam goafs and the potential for greater than expected subsidence, and is expected to identify where Bulli Seam mine workings have been fully extracted and where they might still be standing.
- Further, subsidence monitoring above the unconfirmed goaf area will identify any anomalous subsidence movements that could be associated with pillar failure. A GNSS monitoring unit is located above panel PC23 and will provide subsidence monitoring data in near real time.
- The Department notes that the proposed Subsidence Monitoring Plan TARP focuses on vertical subsidence movements to inform adaptive management associated with Bulli Seam goaf areas yet to be confirmed as collapsed. The TARP does not however formalise any adaptive management associated with monitoring of underground roadway conditions. The Department has recommended a condition requiring the Subsidence Monitoring Plan TARP be amended to include a TARP specifically targeting response to changes in underground roadway conditions. This TARP is to identify assessment criteria and parameters that would trigger a review or change to the mine plan.

7.2 Key public infrastructure

- Key public infrastructure located within or in proximity to PC07 and PC08 includes:
 - Princess Motorway and Picton Road Interchange, both managed by RMS;
 - 330kV transmission line and towers, managed by TransGrid; and
 - 132kV and 33kV transmission lines and towers/pylons, managed by Endeavour Energy.
- PC21 to PC25 are located adjacent to the full supply level of Cataract Reservoir, however no built features are located in the vicinity of these panels.
- The Department accepts that the planned mining is not predicted to have any observable impacts on Cataract Reservoir or Cataract dam wall, which is located more than 9 kilometres from the planned mining. WaterNSW has confirmed it has no concerns regarding impacts on the water catchment from the planned mining.
- The Applicant has developed a range of risk control measures to monitor and manage potential subsidence impacts on key public infrastructure. These measures have been developed in consultation with the infrastructure operators and include:
 - Real-time subsidence monitoring, pavement monitoring and periodic survey of the Princess Motorway, with a particular focus on closure monitoring at the crossing of Cataract Creek; and
 - Real-time subsidence monitoring of transmission towers and pylons, as well as quarterly LiDAR and survey measurements of tilt or differential movement.
- The Resources Regulator has reviewed the proposed risk controls and recommended that relevant infrastructure operators provide their written endorsement of the proposed controls.
- The Department acknowledges that the Applicant has consulted with relevant stakeholders in the development of proposed risk controls, however written confirmation from infrastructure operators has not been received at the time of approval of this Extraction Plan.
- The Department also notes that mining is proposed to commence in PC21, an area that is remote from built features, providing an opportunity to finalise negotiations with infrastructure owners, validate subsidence predictions and confirm the adequacy of proposed risk controls prior to mining beneath key public infrastructure.
- The Department has therefore recommended a condition requiring that prior to mining PC07-PC08, the Applicant review the risk control measures proposed for key public infrastructure and seek the written endorsement of these measures from the infrastructure operators.

7.3 Key Natural Features

Coastal Upland Swamps

- Stage 1 mining will occur directly beneath two coastal upland swamps (CCUS1 and CCUS5) and within a 35° angle of draw of a further eight swamps (CCUS2, CCUS4, CCUS17, CCUS18, CCUS

19, CCUS20, CRUS1, CRUS3). CCUS1 and CCUS5 are predicted to experience vertical subsidence of up to 100mm, the remaining swamps are predicted to experience less than 20mm vertical subsidence. These low levels of subsidence are not predicted to result in any observable impacts to Coastal Upland Swamps and planned mining is predicted to achieve the negligible environmental consequences performance measures for coastal upland swamps established by the consent.

- These predictions are consistent with those assessed and approved under MP 09_0013. The IPC noted in its Statement of Reasons that:

Based on the subsidence predictions and outcome of the quantitative risk assessment, the Commission is of the view that impacts to swamps as a result of the proposed mining would be negligible.

- A program of monitoring is proposed for swamps, including subsidence monitoring, photo point monitoring, vegetation monitoring, Giant dragonfly monitoring, soil moisture and shallow groundwater level monitoring, groundwater quality monitoring and swamp outflow monitoring.
- TARPs have been developed based on the monitoring program to inform adaptive management should monitoring exceed predictions or indicate potential for environmental consequences greater than negligible.
- Given the high level of confidence that the long term stable mine design would not result in any goaf related subsidence effects that could impact swamp hydrology, and the ephemeral nature of the swamps within the mining area, the primary data informing adaptive management will be the near real time subsidence monitoring. This will be supported by the ecological and groundwater monitoring.
- The scope and frequency of ecological and groundwater monitoring has been determined based on swamp specific risk assessments, which take into consideration swamp size, sub-community complexity and the historical and predicted subsidence levels affecting each swamp. This approach prioritises ongoing monitoring of higher risk swamps. The Department notes that lower risk swamps have been subject to baseline ecological monitoring and would continue to be subject to subsidence monitoring, which can trigger the need for additional ecological monitoring via the TARP process.
- BCD raised concerns regarding the adequacy of baseline monitoring in the context of the *Upland Swamps Offset Policy*. The Department notes that a minimum of twelve months of baseline monitoring is required under the Commonwealth approval (EPBC 2020/8702). For the two swamps directly undermined by the planned mining, there is at least six years of baseline ecological monitoring and seven years of baseline groundwater monitoring available for CCUS5. For CCUS1, there is at least six years of baseline ecological monitoring, however less than twelve months of groundwater monitoring is currently available, with groundwater monitoring equipment installed in August 2021.
- The Department has therefore recommended a condition requiring the Applicant demonstrate a minimum of twelve months of baseline groundwater data has been collected prior to commencing extraction of panels PC07 and PC08, which are located beneath CCUS1 and in the vicinity of other category 1 swamps.
- The Department considers the potential for greater than negligible impacts on coastal upland swamps from the planned mining is very low and is satisfied that the proposed monitoring and TARP process outlined in the Upland Swamp Monitoring Plan is suitable for assessing compliance with relevant performance measures.

Cataract Reservoir and water courses

- The planned mining is located within the upper catchment of the Cataract Reservoir, adjacent to the reservoir's full supply level. Cataract Creek and Cataract River and associated tributaries are located above the Extraction Plan area.
- Due to the bord and pillar mining method, no observable impacts or environmental consequences are predicted for Cataract Reservoir, water courses or groundwater systems within or surrounding the Extraction Plan area.
- The Applicant has consulted with WaterNSW in relation to proposed monitoring and TARPs for this Extraction Plan and WaterNSW has stated that the planned mining would result in negligible impacts on water resources and catchment environmental values, the proposed monitoring and management measures are appropriate and that the TARPs for water and swamp monitoring are reasonable and appropriate.

7. SOCIO-ECONOMIC ISSUES

- The total recoverable reserve from Stage 1 mining is 732,200 tonnes of coal.
- The Department estimates that extraction of the coal reserves in Stage 1 would generate approximately \$16.6 million in State Government revenue through royalties.
- Russell Vale Colliery produces metallurgical coking coal, which is transported by road to Port Kembla Coal Terminal for shipping to overseas customers.
- The company provides around 205 direct jobs at the mine.

8. EVALUATION

- The Department has assessed the Extraction Plan application in accordance with the relevant requirements of the development consent and has carefully considered the potential impacts of the extraction of PC07-PC08 and PC21-PC25 on the surrounding environment.
- The Department considers that the adoption of a long term stable bord and pillar mine plan is a highly effective risk control measure that will avoid subsidence related impacts on the surrounding environment.
- The Department considers that the impacts of the planned mining on the surrounding environment would be negligible. In particular, the planned mining would have negligible impacts on swamps and a neutral impact on water quality within the catchment.
- The Department acknowledges that, while unlikely, there remains a residual risk of increased subsidence associated with areas of the Bulli Seam goaf that are yet to be confirmed as collapsed. The Department agrees that this risk is remote and exists regardless of whether the planned mining proceeds or not, and that the planned mining will not change this existing risk. This risk would be monitored during mining with opportunity for adaptive management through changes to the mine plan if required. The Department has recommended a TARP be developed to formalise this adaptive management process.
- In order to ensure sufficient baseline data can be collected prior to mining, and that key public infrastructure operators are satisfied with proposed risk control measures, a staged approval process has been recommended.
- The Department is satisfied that PC07, PC08 and PC21 to PC25 can be extracted with a low risk of exceeding the subsidence impact performance measures under MP 09_0013.
- Extraction would allow the recovery of valuable coal resources, generate revenue for the State and provide employment for 205 people in the region.
- On balance, the Department considers that the extraction of PC07, PC08 and PC21 to PC25 is in the public interest and that the Extraction Plan application should be approved subject to conditions, as discussed below.

9. CONDITIONS OF APPROVAL

The Department has imposed the following conditions on the Stage 1 Extraction Plan approval for panels PC07, PC08 and PC21 to PC25:

Staged Approval

1. This approval is limited to the secondary extraction of PC21. Approval of secondary extraction in subsequent panels would be subject to demonstrating to the satisfaction of the Secretary that conditions 2 to 5 have been met, and any further agency advice is adequately addressed.
2. Prior to second workings commencing in PC22, PC23, PC24, PC25, PC07 or PC08, the Applicant must demonstrate to the satisfaction of the Planning Secretary that subsidence movements from the extraction of PC21 are within predicted levels and that the subsidence impact performance measures outlined in Table 6 and Table 7 of MP 09_0013 are expected to be met across the Stage 1 Extraction Plan area.
3. Prior to second workings commencing in PC07 or PC08, the Applicant must review and confirm the risk control measures proposed for the key public infrastructure outlined in Condition C7 of MP 09_0013, based on the results of monitoring from the extraction of PC21. This review is to be undertaken in consultation with key public infrastructure operators and the Applicant is to provide evidence to the Planning Secretary of the endorsement of the risk control measures by key public infrastructure operators.

4. Prior to second workings commencing in PC07 or PC08, the Applicant must demonstrate to the satisfaction of the Planning Secretary that a minimum of 12 months of baseline groundwater data has been collected for all category 1 swamps located within 350 metres of PC07 and PC08, and suitable reference swamps.

Subsidence Monitoring Program

5. Prior to second workings commencing in PC22, PC23 or PC24, the Applicant must update the Subsidence Monitoring Program and Master Trigger Action Response Plan to include a suitable Trigger Action Response Plan to enable adaptive management in response to changes in underground roadway conditions that indicate the potential for greater than expected subsidence, to the satisfaction of the Planning Secretary. The Trigger Action Response Plan must identify assessment criteria and parameters that would trigger a review or change to the mine plan.



Jessie Evans

Director Resource Assessments

As nominee of the Planning Secretary