Russell Vale Colliery

Stage 2 Extraction Plan – Reasons for Approval

In granting a conditional approval of Wollongong Resources Pty Ltd (WRPL) Stage 2 Extraction Plan application, the following matters have been carefully considered.

Development Consent

On 8 December 2020, the Independent Planning Commission of NSW (IPC) approved the Russell Vale Colliery Revised Underground Expansion Project (MP 09_0013). The approved development involves the non-caving bord and pillar extraction of up to 3.7 million tonnes (Mt) of coal over 5 years within the Metropolitan Special Area.

MP 09_0013 requires an Extraction Plan to be approved by the Planning Secretary prior to the extraction of coal from second workings. Second workings are defined as the extraction of coal from bord and pillar workings and do not include the development headings.

The Stage 1 Extraction Plan for the development was approved by the Planning Secretary on 3 December 2021, subject to conditions.

Assessment Background

Extensive multi-seam underground mining has been undertaken at Russell Vale Colliery since 1887, with the Bulli Seam extraction in the early to mid-1900's, the underlying Balgownie Seam via longwall methods between 1970 and 2003, and areas of the lower Wongawilli Seam via longwall methods between 2012 and early 2014.

The long-term stable bord and pillar mine plan approved under MP 09_0013 was developed to manage uncertainty associated with subsidence and groundwater impacts in the multi-seam mining environment. The IPC concluded that it was highly unlikely that large areas of remnant pillars existed in overlying seams and if remnant pillars did exist, there was a very low probability that the planned mining would result in the collapse of the pillars.

Russell Vale Colliery is located within the Metropolitan Special Area of the Sydney drinking water catchment, which is managed by WaterNSW. WaterNSW confirmed, that the project adequately addressed its mining principles through the assessment process for MP 09_0013. WaterNSW previously supported the approval of the Stage 1 Extraction Plan.

Stage 2 Extraction Plan Application

WRPL applied for approval of an extraction plan for their Stage 2 extraction area in accordance with condition C10 of MP 09_0013 on 13 April 2022. The submitted Extraction Plan is a consolidated plan covering the approved Stage 1 mining (PC07, PC08 and PC21 to PC25) and proposed Stage 2 mining (PC27 to PC34) the subject of this Extraction Plan application (refer to **Figure 1**).

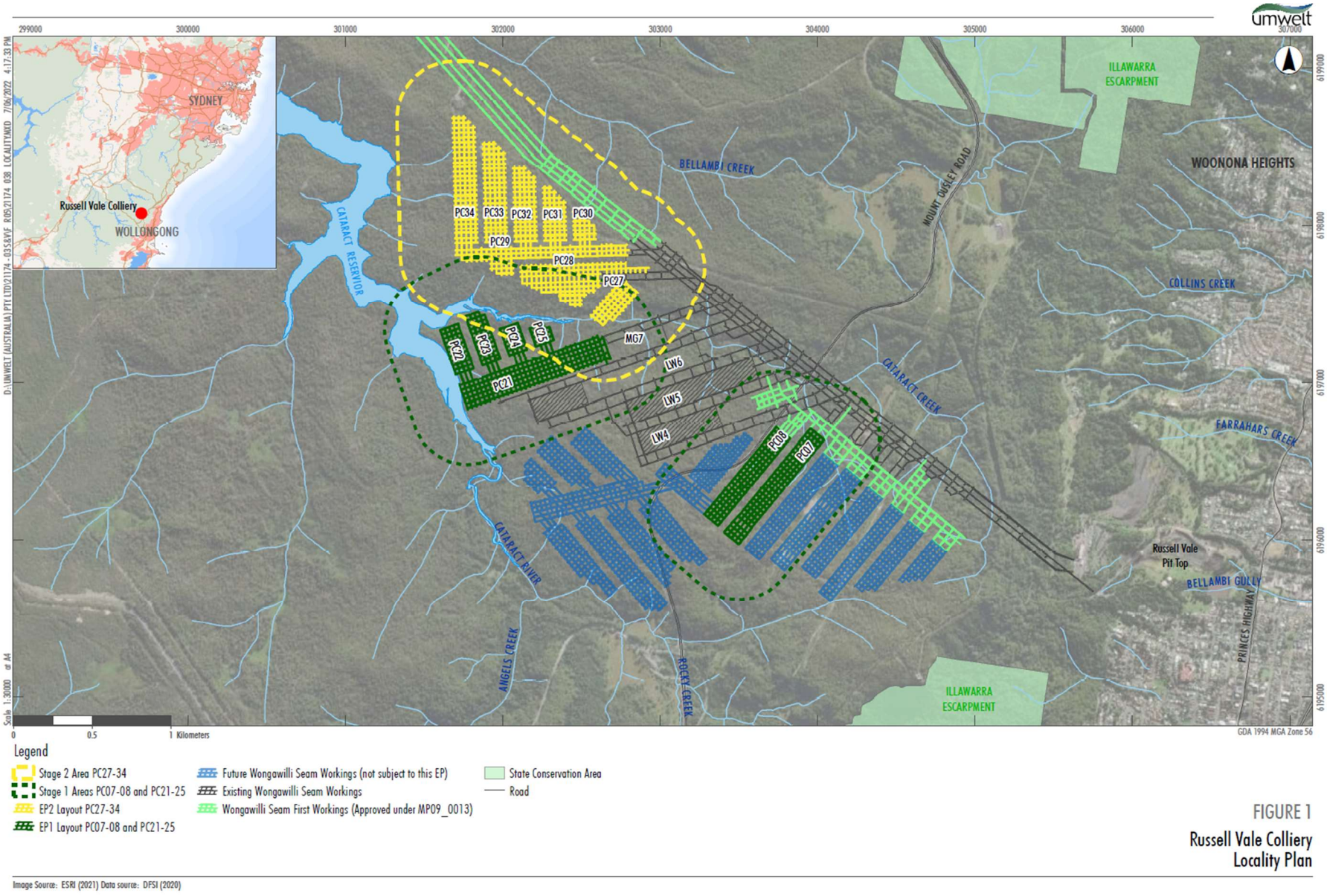

Figure 1 – Stage 1 and Stage 2 Extraction Plan Areas

The mining design outlined in the plan includes the following:

Panel, pillar dimensions	Five headings of 5 m wide roadway, separated by solid coal barrier Pillar dimensions: PC07-PC08, PC21-PC25 - unchanged | PC27-34: minimum 24.5 x 24.5 m
Wongawilli Seam	Ranges in thickness from 8-12m and is approximately 20m below the Balgownie Seam 2.4 m mining height, with mining targeting the base of the seam Depth of cover ranges from 250 m to 390 m
Resource recovery	Stage 2 – approximately 900,000 t over four years
Subsidence	Stage 2 extraction area vertical subsidence – expected to be generally less than 100mm. Where historical pillars may not have collapsed, it is possible additional vertical subsidence could occur if the pillars destabilise. The tilt and strain and horizontal subsidence predicted for Stage 2 mining is consistent with the Stage 1 predictions. Some ongoing low-level movements from historical mining will continue.

During the assessment process, WRPL submitted two revisions of the Extraction Plan and several management plans. The revised plan considered by the Department in this determination was the *Russell Vale Colliery – Revised Underground Expansion Project – Extraction Plan Stages One and Two – PC07, PC08 & PC21 to PC25 and PC27 to PC34 – RVE EC PLN 010 – Version 1.1 (published 7/10/22)*.

Consideration by agencies

The Department sought comments from relevant State agencies and key stakeholders. Heritage NSW – Aboriginal Heritage, WaterNSW and Mining, Exploration and Geoscience were satisfied with the plan and provided no additional feedback since commenting on the Stage 1 Extraction Plan in 2021. The Environment Protection Authority (EPA) had no comment, and a response was not received from Transport for NSW.

The Department considered the key issues raised by agencies as outlined in **Table 1**.

Table 1 – Agency advice

Agency	Comments
NSW Resource Regulator	Recommended conditions requiring WRPL to undertake a review of subsidence monitoring during the mining of extraction panels PC21-PC25 and PC27-PC34 to update their understanding of risks to key public infrastructure above PC07 and PC08.

Agency	Comments
DPE – Environment and Heritage Group (EHG)	EHG raised concerns relating to the residual risk of surface impacts in the multi-seam environmental and the use of subsidence monitoring methodologies which are not sensitive enough to measure the subsidence performance measures under the State and Federal approvals as well as the location and number of monitoring points. EHG raised concerns regarding the adequacy of the swamp monitoring designs and the inclusion of frog species in the swamp monitoring program and provided additional advice regarding frog species and survey requirements for the Stage 2 extraction area.
Heritage NSW – Historic Heritage	Heritage Council of NSW recommended amendments to the Heritage Trigger Action Response Plan (TARP) relating to Cataract Dam in the Stage 1 extraction area.
DPE Water	DPE Water recommended that the existing approval conditions for the Stage 1 Extraction Plan continue to apply to any secondary workings.

Key Issues – Stage 2 Extraction Area

Bulli Seam Goaf

The IPC recommended in its determination of the project that the status of overlying Bulli Seam goaf areas be confirmed as part of the Extraction Plan process. Condition C10(g)(i) of MP 08_0013 requires WRPL to develop a monitoring program to confirm the status of the Bulli Seam goaf areas as part of an Extraction Plan.

The Stage 2 Extraction Plan provides further detailed analysis of the status of workings overlying the Stage 2 extraction area, finding:

- the Balgownie Seam has not been extracted in the Stage 2 extraction area;
- the Bulli Seam has been extracted in the Stage 2 extraction area and contains five goaf areas formed by the secondary extraction of first workings. Based on available mine records, these goaf areas are expected to be collapsed, however cannot be confirmed as collapsed because of limited access.

The Department accepts that based on mine design parameters, analysis of mine plan records and expert peer review undertaken during the development assessment phase:

- the areas of the Bulli Seam goaf within the Stage 2 extraction area have likely collapsed;
- the potential for subsidence associated with any future collapse of Bulli Seam goaf areas exists irrespective of the planned mining;
- no significant movement or change at the Bulli Seam mining horizon capable of causing collapse is expected to result from planned mining; and

- the mining environment for Stage 2 is more simplistic than the Stage 1 extraction area. Historical mining did not include the Balgownie Seam, and there is a greater overburden depth.

The Department acknowledges that in the unlikely event that remnant pillars collapse during mining, additional subsidence is expected to be less than 300mm, with potential for small and isolated areas of >500mm. However, the risk of additional subsidence exists regardless of planned mining.

The Department accepts that WRPL has invested extensive effort in seeking to confirm the status of the Bulli Seam goaf and that the only feasible method available is the monitoring of roadway conditions as mining progresses. WRPL proposes a combination of roof, rib, pillar, and surface subsidence monitoring to monitor the status of the goaf areas as mining progresses, supported by a TARP outlining an adaptive management framework in response to changes in underground roadway conditions.

Key Public Infrastructure

Cataract Reservoir is located within 1 kilometre of the Stage 2 extraction area. No extraction is proposed within the full supply level of the Reservoir and no perceptible impacts are predicted to the Reservoir. The Cataract dam wall is more than 8 kilometres from the planned mining and not expected to be impacted.

Other public infrastructure within the Stage 2 extraction area, including fire roads, survey control stations and a mine-owned decommissioned 33kV powerline, are not predicted to be impacted and would be monitored and managed in accordance with existing procedures.

WaterNSW noted that WRPL had addressed residual concerns from the Stage 1 extraction plan and was satisfied that the Stage 2 extraction plan, including proposed subsidence and environmental monitoring were satisfactory and could be managed in accordance with the plan.

The NSW Resources Regulator recommended that WRPL review subsidence monitoring results from PC21-25 and PC27-34 to inform the extraction of PC07-08, and if warranted, update the risk management plans for key public infrastructure. The Department notes that the extraction of PC07-08 was approved as part of the Stage 1 extraction plan application, subject to WRPL confirming that subsidence from the extraction of PC21 was within predicted levels, and undertaking a review of the risk control measures for key public infrastructure in consultation with relevant infrastructure owners prior to extraction of PC07 and PC08.

Based on subsidence monitoring from the extraction of PC21 to date, the Department is satisfied that subsidence levels are well within predictions and extremely low (<30mm). Considering the Resources Regulator's comments on the Stage 2 extraction plan, the Department has clarified the current conditional approval relating to PC07-08 to confirm that the review of risk control measures for key public infrastructure must be based on subsidence monitoring from the full length of PC21.

Key Natural Features

Coastal Upland Swamps

Stage 2 extraction would directly undermine 12 upland swamps, including one category 1 upland swamp (BCUS4). Category 1 swamps are those considered potentially at higher risk of impact based on swamp size, sub-community complexity and historical and predicted subsidence levels. Swamp BCUS4 is located above an area of Bulli Seam goaf unconfirmed as collapsed. BCUS4 has experienced historical vertical subsidence of up to 600mm, with additional subsidence of less than 100mm predicted due to Stage 2 extraction.

The remaining swamps directly undermined by Stage 2 are considered lower risk category 3 or 4 swamps. These swamps are predicted to experience vertical subsidence of less than 100mm.

No observable impacts are predicted to any upland swamps within or surrounding the Stage 2 extraction area. Planned mining is predicted to achieve the negligible environmental consequences performance measures for swamps established by the consent. These predictions are consistent with those assessed and approved under MP 09_0013.

The proposed swamp monitoring program builds on the program approved for Stage 1 and is based on swamp-specific risk assessments that consider the swamp size, status of underlying goaf, and pre-existing tensile strains. Monitoring would be undertaken at all swamps regardless of the assigned risk category, however more intensive monitoring is undertaken at category 1 swamps. The monitoring program includes subsidence monitoring, groundwater monitoring, surface water monitoring and biodiversity monitoring (vegetation monitoring, total species richness, species composition, and giant dragonfly monitoring).

Subsidence monitoring remains the primary data informing adaptive management at upland swamps. The ecological and groundwater monitoring supports the subsidence monitoring. EHG raised concerns relating to the subsidence monitoring methodology. WRPL amended the TARPs to account for the accuracy limitations of LiDAR as a monitoring method. The Department notes that GNSS monitoring is the primary method of subsidence monitoring used for the project.

WRPL has collected sufficient baseline groundwater data at the category 1 swamps inside the Stage 2 extraction area (BCUS4) and within 350 m of the Stage 2 extraction area (CCUS5).

EHG raised concerns relating to the BACI (before-after-control-impact) design for swamp monitoring, particularly regarding groundwater baseline at reference swamps and the pairing of the groundwater baseline and the ecological baseline data sets. WRPL has used reference swamps within the Stage 2 extraction area. The Department does not consider groundwater reference sites inside or within 350 m of the extraction area to be suitable. The Department has therefore imposed a condition requiring WRPL to commence baseline groundwater monitoring at suitable reference sites that are more than 350m from the current and future extraction areas within three months of the extraction plan approval, with a minimum of two of the reference sites being co-located with the ecological monitoring sites.

The Department notes that Commonwealth approval (EPBC 2020/8702) requires a minimum of twelve months of baseline groundwater monitoring at swamps that will be directly undermined.

WRPL commenced baseline groundwater monitoring at several swamps within 350 m of the Stage 2 extraction area in June 2022. Groundwater monitoring in accordance with the Commonwealth approval is a matter for the Department of Environment, Climate Change and Water.

Threatened Frog Records and Monitoring

The submitted Extraction Plan states that the Giant Burrowing Frog and Little John's Treefrog are not present within the Stage 2 extraction area, and that ongoing monitoring is not required. EHG raised concerns regarding the baseline monitoring and survey adequacy for these species several times during consultation with WRPL, and when providing the Department with agency advice. At the Department's request, WRPL provided additional information detailing the survey and monitoring conducted for the Giant Burrowing Frog and Little John's Treefrog.

The Department notes that surveys for both species have not been completed within the Stage 2 extraction area, except for a tributary north of BCUS2 approximately 300m from the planned mining.

WRPL revised the Extraction Plan to assume both species are present for offsetting purposes in the habitat areas mapped in **Figure 2** and to include baseline monitoring for both species prior to mining in areas of assumed habitat between September 2022 and May 2023. The Extraction Plan does not include detailed survey designs for baseline monitoring.

The Department considers the potential for greater than negligible impacts on coastal upland swamps, or species associated with these swamps, from the planned mining is very low. However, Condition C10(g)(iv) of MP09_0013 requires WRPL to establish baseline data for existing habitat for threatened species. Therefore, the Department has imposed a condition requiring WRPL to undertake baseline monitoring for the Giant Burrowing Frog and Little John's Treefrog in areas of assumed habitat prior to undermining, and to update the Upland Swamp Monitoring Plan, Biodiversity Management Plan and Master TARP to include a suitable TARP to manage remediation and offsetting if greater than expected impacts occur.

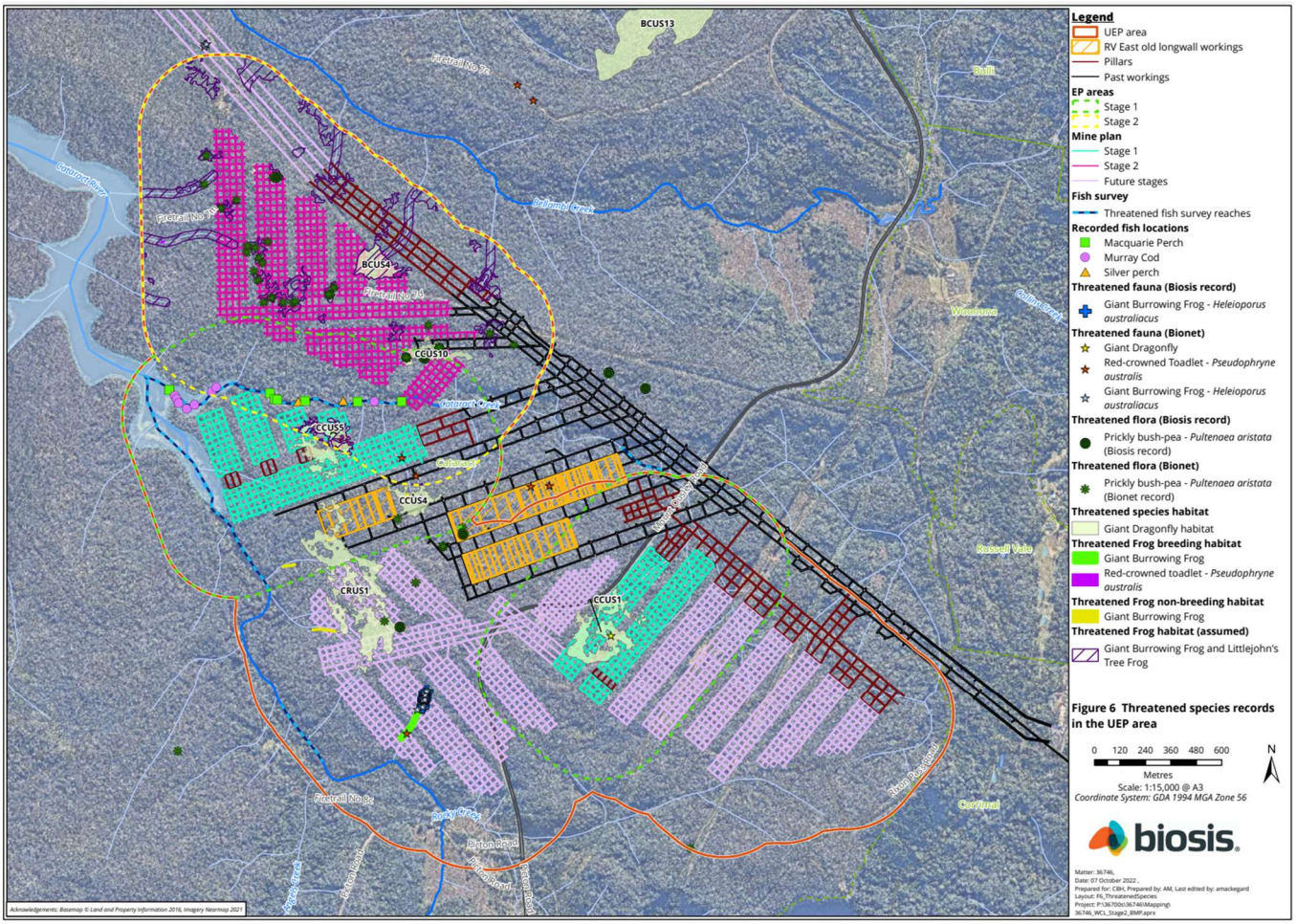

Figure 2 – Threatened Species Records – Assumed habitat – Giant Burrowing Frog and Little John's Treefrog

Water courses

The Stage 2 extraction area underlies sections of Cataract Creek and tributaries of Cataract Creek, Cataract River and Bellambi Creek. Due to the bord and pillar mining method, no observable impacts or environmental consequences are predicted for water courses or groundwater systems within or surrounding the Extraction Plan area.

Evaluation

The Department has assessed the Stage 2 Extraction Plan application in accordance with the relevant requirements of the development consent and has carefully considered the potential impacts of the extraction of PC27-PC34 on the surrounding environment.

The Department considers the long-term stable bord and pillar mining method to be a highly effective risk control measure that will have negligible impacts on the surrounding environment, including upland swamps and water quality and quantity within the catchment. These predictions are consistent with those assessed and approved under MP09_0013.

Monitoring demonstrates that subsidence movements from mining undertaken to date in Stage 1 (PC21) are within predicted levels (less than 30mm) with no perceptible surface impacts expected.

The Department acknowledges that while unlikely, there is a residual risk of increased subsidence in areas where the Bulli Seam goaf may not have collapsed, noting the risk exists regardless of the planned mining and will not change as a result of the planned mining. Stage 2 also presents a less complex mining environment due to the Balgownie Seam not being extracted in this area. WRPL has proposed monitoring and a TARP based on roadway conditions to confirm the status of Bulli Seam goaf areas and, where required, implement adaptive management actions.

The Department approved the previous Stage 1 Extraction Plan as a staged approval, requiring WRPL to collect sufficient baseline data and ensure key public infrastructure operators are satisfied with proposed risk control measures. These conditions remain in place.

To ensure adequate baseline data collection for Stage 2 extraction, the Department has imposed a condition requiring WRPL establish a baseline data set for the Giant Burrowing Frog and Little John's Treefrog, along with a relevant trigger action response plan. The Department has also imposed a condition requiring WRPL establish suitable groundwater monitoring reference sites aligned with the existing ecological reference sites.

The Department is satisfied that Stage 2 panels PC27-PC34 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 for ongoing employment in the region.

On balance, the Department considers that the extraction of Stage 2 is in the public interest and that the Extraction Plan application should be approved subject to the conditions outlined in the approval.