Advice to decision maker on coal mining project

IESC 2025-154: Rolleston Coal Mine Continuation Project (EPBC 2023/09547) - Expansion

Requesting agency	The Australian Government Department of Climate Change, Energy, the Environment and Water
Date of request	2 April 2025
Date request accepted	3 April 2025
Advice stage	Assessment

The Independent Expert Scientific Committee on Unconventional Gas Development and Large Coal Mining Development (the IESC) provides independent, expert, scientific advice to the Australian and state government regulators on the potential impacts of unconventional gas and large coal mining proposals on water resources. The advice is designed to ensure that decisions by regulators on unconventional gas or large coal mining developments are informed by the best available science.

The IESC was requested by the Australian Government Department of Climate Change, Energy, the Environment and Water to provide advice on the Rolleston Coal Holding's Rolleston Coal Mine Continuation project in Queensland. This document provides the IESC's advice in response to the requesting agency's questions. These questions are directed at matters specific to the project to be considered during the requesting agency's assessment process. This advice draws upon the available assessment documentation, data and methodologies, together with the expert deliberations of the IESC, and is assessed against the IESC Information Guidelines (IESC 2024).

Summary

The Rolleston Coal Mine Continuation Project (the 'project') is a proposed extension to the existing Spring Creek open-cut pit within the Rolleston Open Cut Mine (ROC), located 16 km west of the township of Rolleston in the Bowen Basin, Queensland (MetServe 2025, p. 1). The project will disturb 592 hectares (ha) of land while continuing to mine northwards on mining leases (ML) 70307 and 70415 (Met Serve 2025, p. 1). It will extract approximately 19 million tonnes (Mt) of thermal Run-of-Mine (ROM) coal per annum (MetServe 2025, p. 1).

The project is a continuation of the current open-cut mining activities and includes dewatering and removal of vegetation. The project will use current ancillary infrastructure such as electricity lines, water supply pipelines, water management infrastructure, coal-handling facilities, train load-out facilities, haul

roads and rail infrastructure (MetServe 2025, p. 6). The project will build some new infrastructure, including a new clean-water diversion drain at the north-western end of the project, and extend the existing Spring Creek pit dewatering pipeline to the north (MetServe 2025, p. 6).

The project is in the Comet River catchment in the Fitzroy Basin. Three named creeks run north to south in the ROC: Bootes, Sandy and Meteor creeks (MetServe 2025, p. 21). Spring Creek has an existing diversion into Bootes Creek. Two unnamed creeks north of the project area drain into Meteor Creek and eventually into the Comet River (MetServe 2025, p. 21). Aldebaran and Canopus creeks also lie north of the project area.

The proponent has identified high- and moderate-potential terrestrial, aquatic and subterranean groundwater-dependent ecosystems (GDEs) along creek lines and within the alluvium and basalt aquifers in, and surrounding, the project area. Species listed as Matters of National Significance (MNES) by the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and their habitats occur within the project area: koala (*Phascolarctos cinereus*), squatter pigeon (*Geophaps scripta scripta*), bluegrass (*Dichanthium setosum*) and king bluegrass (*Dichanthium queenslandicum*), along with the Threatened Ecological Community (TEC) Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin (E2M 2025, pp. 22 – 53).

Key potential impacts from this project are:

- clearing of 592 ha of habitat for EPBC-listed species and the Natural Grasslands TEC;
- reduction in alluvial water availability to riparian vegetation communities, especially terrestrial groundwater-dependent ecosystems (GDEs);
- reduction in transient baseflow contributions from drawdown in the Tertiary basalt and Quaternary alluvium to reaches of unnamed creeks 1 and 2 which support high-potential aquatic GDEs;
- groundwater drawdown in Tertiary basalt and Quaternary alluvium reducing water and saturated habitat availability for subterranean GDEs, including stygofauna;
- permanent reduction in alluvial water availability due to the post-closure landform and conditions, mainly impacting Aldebaran, Canopus and Bootes creeks; and
- cumulative impacts to groundwater levels and pressures, receiving surface water quality and flow regimes in ephemeral streams, and water-dependent ecosystems and their biota (including in Albinia National Park) from this project and existing operations, and from other mining complexes.

The IESC has identified areas in which additional work is required to address the key potential impacts, as detailed in this advice. These include:

- Installation of additional monitoring bores and collection of further baseline groundwater data to monitor for drawdown impacts from the project and improve the modelling predictions of project-specific and cumulative drawdown.
- Further groundwater modelling to investigate the influence of vertical hydraulic conductivity and of the Inderi Fault on assessment of potential groundwater impacts.
- Collection of baseline surface water data, including flow regimes and baseflow contributions for all surface water features within and surrounding the project area, to enable detailed impact assessment on surface water resources.

- Collection of sufficient baseline surface water quality data.
- Collection of adequate baseline data on stygofaunal community composition and the condition of other GDEs located within the potential zone of project-specific and cumulative groundwater drawdown.
- Provision of detailed mitigation and monitoring plans for water resources and their assets, along with Trigger Action Response Plans to ensure prompt follow up to any impacts that may occur.

Context

The project is a proposed expansion of the current Spring Creek open-cut pit within the Rolleston Open Cut Mine (ROC). The ROC lies 16 km west of the township of Rolleston and 275 km west of Gladstone, Queensland, within the Bowen Basin and will mine approximately 19 Mtpa of ROM thermal coal (MetServe 2025, p. 2). It will use existing infrastructure and processes within the ROC, including electricity lines, water supply pipelines, water management infrastructure, coal-handling facilities, train load-out facilities, haul roads and rail infrastructure (MetServe 2025, p. 6). Additional infrastructure includes construction of one new clean-water diversion drain and the extension of the current Spring Creek pit dewatering pipeline (MetServe 2025, p. 6).

The project is in the Comet River catchment, with three named and two unnamed ephemeral creeks that flow from west to east across the project area (MetServe 2025, p. 21). The proponent identified high- and moderate-potential GDEs along the creek lines. *Melaleuca bracteata* and *Corymbia tessellaris,* terrestrial GDEs along creek lines on the margins of the project area (Hydrobiology 2024, p. 49), are mostly likely accessing moisture retained in shallow clay soils that are recharged through rainfall events (Hydrobiology 2024, p. 58). High-potential aquatic GDEs were identified along unnamed creeks 1 and 2 as well as a High Ecological Significance (HES) wetland in the adjacent Albinia National Park (Figure 4-5, Hydrobiology 2024, p. 68). A pilot study in 2014 for subterranean GDEs recorded stygofauna within the Tertiary basalt and Quaternary alluvium (Hydrobiology 2024, pp. 80 – 82).

A basalt aquifer extends across the majority of the project area. The Permian-aged Blackwater Group is the major water-bearing unit, and predominantly sits between Basalt and the basement Black Alley Shale and Aldebaran Sandstone (Umwelt 2025, p. 49). There is no alluvium within the project area; however, alluvium is associated with Spring Creek and Bootes Creek (the closest alluvium to the project site) approximately 2 km south (Umwelt 2025, 40).

Existing mining includes 10 pits within the surrounding ROC area to the south and southwest of the project area. The only other nearby mine is the Meteor Downs South mine, which is adjacent to the ROC lease boundary, and located west of the project area (Figure 1.3, Umwelt 2025, p. 15).

A total of 592 ha of vegetation is planned to be cleared during the excavation of the open-cut pit. This includes habitat for three EPBC Act-listed species: 413 ha of koala breeding habitat and 137 ha of dispersal habitat, 124 ha of bluegrass habitat and 537 ha of king bluegrass habitat, as well as 124 ha of the Natural Grasslands of the Queensland Central Highlands and northern Fitzroy Basin TEC (Table 6, E2M 2025, pp. 55 – 56). Habitats being cleared include riparian vegetation along unnamed creeks within the project area, which provide vital vegetation corridors across an already heavily cleared landscape. The proponent plans to offset this clearing of vegetation (MetServe 2025, p. 256).

Response to questions

The IESC's advice in response to the requesting agency's specific questions is provided below.

Question 1: Has the proponent adequately identified local and regional impacts to groundwater resources and water-dependant assets?

Question 2: Does the committee consider that the information provided in the PER is sufficiently robust for assessing potential impacts to surface water and groundwater resources, GDEs and other third-party users with particular regard to:

a. the baseline data,
b. confidence in modelling and impact predictions, and;
c. cumulative impacts.

Question 3: Does the committee consider that any additional information is required to enable assessment of impacts to surface and groundwater resources, particularly to delineate potential impacts of the proposed project from the approved mine?

1. The information provided in the Public Environmental Report (PER) (Metserve 2025) was not adequate to identify local and regional impacts with enough certainty to reliably assess potential impacts to surface water and groundwater resources, GDEs and other third-party users. No information is provided on observed impacts to water resources from existing mining operations. Following collection of the additional data and information outlined in Paragraphs 2–17, an updated evidence-based ecohydrological conceptualisation and associated impact pathway diagrams (described in Commonwealth of Australia 2024) should be developed for all water resources and their ecological components in the project area, to ensure that all potential impact pathways are identified and assessed. This will also help guide the development of appropriate monitoring, mitigation and management actions (see response to Question 4). The following paragraphs collectively address the related Questions 1, 2 and 3.

Groundwater

2. The groundwater assessment has attempted to define local and regional groundwater impacts from the project, including cumulative impacts in combination with existing adjacent mining operations. The additional drawdown is predicted to largely impact confined units in the basalt and Permian coal measures (Umwelt 2025, p. 83). The Permian strata (containing the Blackwater Group coal measures) are conceptualised as having variable connectivity with upper geological layers (basalt and alluvium). The bore monitoring network is spatially limited within the Permian coal measures and the alluvium, and installation of additional bores is needed to provide data to better inform model calibration and to monitor for drawdown impacts from the project.

3. The proponent has discussed the potential impacts of indirect take from the project within the alluvium, during operations and permanently afterwards. The proponent indicates an additional take of 49 ML/year between Bootes Creek, Meteor Creek and their tributaries (Umwelt 2025, p.112). Each creek is described as a gaining system (Umwelt 2025, p. 117), and this additional take will amount to a cumulative drawdown increase that could reduce baseflow to each of the creeks. The documentation should discuss how such cumulative reduction in baseflow might alter flow regimes and what impacts this may have on water quality and water-dependent assets in these creeks.

4. Drawdown associated with the unnamed creeks 1 and 2 is anticipated to increase. Potential impacts of this drawdown on sensitive receptors are not adequately assessed.

    a. Unnamed Creek 1 is assumed to be ephemeral, with an existing depth to groundwater of 7 metres below ground level (Umwelt 2025, p. 117). Unnamed Creek 2 is a larger incised creek. The impact to peak recharge events on Unnamed Creek 1 is noted by the proponent, but the extent to which future recharge events may be impacted by additional drawdown should be investigated.

b. Unnamed Creek 2 is expected to have a 25% greater baseflow reduction between the pre-project and post-project mining scenarios, which equates to an additional 1.7 ML/year reduction in baseflow (from 6.8 to 5.1 ML/year) from the project (Umwelt 2025, p. 117). Potential impacts from this reduction in baseflow should be further investigated (see Paragraph 3).

5. The baseline data for the groundwater assessment are not adequate to conceptualise and calibrate the groundwater model scenarios for the project, with limited monitoring sites for the Permian coal measures and the alluvium (App. B in Umwelt 2025, p. 20). Additional baseline data are needed to address these information gaps and allow for a greater level of confidence in future model calibration, especially regarding connectivity between the Permian coal measures and their interactions with other strata.

6. The proponent notes the limited site-specific data, and the model's capacity to over-predict connectivity between layers, especially within the deeper (Permian) strata (Umwelt 2025, p. 78). Future additional monitoring bores (Paragraph 2) and better constraining estimates of hydraulic connectivity and spatial variability within the groundwater system should be undertaken to help address these issues.

7. The historical groundwater model struggles to replicate transient observations of groundwater levels. The parameter identifiability (App. B in Umwelt 2025, p. 60) indicates that the calibration does not adequately constrain vertical hydraulic conductivities. This means that the pathways for the propagation of drawdown through the more permeable coal seams through to the water table within the basalt and the alluvium may not be fully explored. As there are limited data to constrain these values, the model should explore higher values as part of the uncertainty analysis, separately from the horizontal hydraulic conductivities.

8. The groundwater model does not include regional faulting. The proponent justified not modelling the Inderi Fault because of seismic and geological evidence of lower hydraulic conductivity formations to the east of the fault (Umwelt in App B 2025, p. 76). However, this faulting could alter the modelled drawdown distribution and magnitude. Including the fault in the model based on this evidence will improve the assessment of potential cumulative drawdown on wetlands (including the HES wetland in Albinia National Park) to the east of the project area.

<u>Surface water</u>

9. Information about surface water and water-dependent assets was not provided in detail. The proponent assumes that impacts to the surface water system will be negligible; however, they have not provided any baseline data or monitoring data from current operations to justify such assumptions. Baseline streamflow and water quality data from the current operations should be provided in the context of this project to better understand the ephemeral connection between surface water and groundwater systems and the potential impacts from changes in water quality and drawdown. These baseline data should include additional monitoring sites to better spatially understand these connections. Although all mine-affected water releases (MAW) will be via existing water management infrastructure, it is not clear if this will result in larger volumes or more frequent releases. The proponent should discuss the implications (if any) of additional releases on the downstream environment.

10. The flood modelling assessment focused on pre-development scenarios and did not include the proposed project to assess the performance of the north-western diversion drain and the potential impacts of floods on the landscape as a result of the project. It would also appear that the increases in rainfall intensities due to global warming (acknowledged in Table 2.8, Engeny 2025, p. 25) have not been included in the flood assessment. Further modelling of scenarios of the proposed project, including during and after operations, should be conducted to understand how

project infrastructure could alter movement of flood waters in the landscape and potentially into the final voids. Potential impacts of flood waters interacting with the pit lakes, and the likelihood of overtopping and changes in water quality downstream, need to be assessed.

11. There was limited discussion of cumulative impacts (Engeny 2025, p. 56). Information provided did not discuss the cumulative impacts that the proposed project and current operations may have on the surface water system surrounding and downstream of the mine site. Additional assessment of how all proposed and current final voids will alter the landscape, as well as potential water quality issues from overtopping of the final voids, should be conducted to improve the cumulative impact assessment, including any impacts from surrounding mining operations.

Ecology

12. The proponent has identified terrestrial, aquatic and subterranean GDEs within and surrounding the proposed project area. Potential impact pathways (e.g. potential surface water-groundwater connections between Unnamed Creek 2 and the basalt layer) need to be investigated during the proponent's field surveys to confirm their validity. Once further field surveys are conducted and the information has been used to revise the conceptualisation (Paragraph 1), the proponent can reassess potential impacts to GDEs and propose suitable mitigation and management options.

13. Field surveys of GDEs in the zone of predicted drawdown were limited. Subterranean GDEs (stygofauna) were last surveyed in 2014, and the proponent acknowledges that there is a high risk of impacts to these GDEs due to mine pit excavation and groundwater drawdown (Hydrobiology 2024, p. 5). Given this high risk and that over a decade has elapsed since the last stygofaunal survey, the proponent should conduct comprehensive surveys following the DSITIA (2015) guidelines and take advantage of improvements in taxonomic knowledge since 2014 so that a more reliable baseline dataset can be generated. This dataset, with its greater taxonomic resolution and sampling intensity, will better enable the proponent to identify whether endemic or rare taxa may be affected by the project. Sampling should include multiple reference bores outside the zone of predicted drawdown so that the proponent can determine whether there are significant differences in stygofaunal community composition in the zone of predicted project-specific or cumulative drawdown.

14. Potential aquatic GDEs occur within the predicted extent of drawdown (Hydrobiology 2024, p. 60) and there may be a hydrological connection between Unnamed Creek 2 and the underlying basalt aquifer (Hydrobiology 2024, p. 90). However, the proponent claimed that as these GDEs are supplied only infrequently from groundwater, they are unlikely to be impacted by drawdown (Hydrobiology 2024, p. 88). This assertion needs more convincing evidence to support it, especially given risks to volumes and persistence of refugial pools during dry periods (Paragraph 15). Additional baseline data surveys and the establishment of monitoring bores near high-potential aquatic GDEs are needed to further understand seasonal usage of groundwater and potential connections between groundwater aquifers and creeks so that potential impacts to these GDEs can be assessed and, if necessary, mitigated.

15. The proponent plans to dewater the pit during operations which is predicted to occasionally reduce the groundwater supply to aquatic GDEs along unnamed creeks 1 and 2. Cessation or reductions in groundwater contributions to these creeks will likely reduce the persistence and volumes of refugial pools. Adequate baseline information describing which aquatic taxa might be impacted by loss or reduction in refugial pools during particularly dry seasons is required so that potential impacts can be fully evaluated and, if needed, mitigated or managed.

16. Baseline ecological information about aquatic biota and fringing vegetation of the Queensland HES wetland located within the Albinia National Park (Figure 4-1, Hydrobiology 2024, p. 60) was not provided in the documentation. The proponent acknowledges that there is a potential impact

pathway of groundwater drawdown but that this is predicted to result in a less than 0.1-m change in water level (Hydrobiology 2024, p. 62). However, there are no ecological data to indicate what potential impacts this change in water level may have on this HES wetland. Collection of reliable baseline data on the composition and condition of fringing vegetation and aquatic biota is needed to inform a detailed impact assessment on the potential risks of groundwater drawdown to this HES wetland and guide suitable mitigation strategies.

17. Cumulative impacts from drawdown from the previous approved mining operations and the proposed project on GDEs have not been discussed. The proponent acknowledges that there will be cumulative groundwater drawdown (Figure 4.8, Umwelt 2025, p. 91) but does not describe how previous drawdown has affected GDEs or how all the GDEs in and near the project area might be impacted by cumulative drawdown. This information is needed to adequately assess potential cumulative impacts of drawdown on these GDEs and guide mitigation and management strategies.

Question 4: Can the committee provide comment on the adequacy of the proposed mitigation, management and monitoring measures? Are any additional measures needed for the project to remain within the projected levels of impact or sufficiently reduce the risks to surface and groundwater resources, GDEs and other third-party users?

18. No project-specific mitigation, monitoring or management plans have been provided for assessment of the risks to surface and groundwater resources, GDEs and other third-party users. Management measures in the available documentation are high-level and reference existing management plans or best-practice guidelines.

19. As the impact assessment concluded that no project-specific impacts to surface water or water-dependent resources are likely, the proponent proposes to adopt the existing water management plans and Environmental Authority (EA) permit (Queensland Government 2024). Further work is required to provide more robust justification for this conclusion, given the limitations with the impact-pathway conceptualisation and limited site-specific data and field surveys (Paragraphs 9 and 10).

20. Once detailed monitoring and mitigation measures have been defined, project-specific Trigger Action Response Plans (TARPs) should be developed for all potential impact pathways. These TARPs should be designed based on the improved mitigation and management measures, and implemented to ensure timely detection and mitigation of potential impacts.

<u>Groundwater</u>

21. Groundwater monitoring is conducted in line with the monitoring program within the EA, as determined by the Queensland Government. Future monitoring programs have been earmarked for an additional four groundwater monitoring bores (Umwelt 2025, p. 129). These bores should target under-represented strata, including Permian strata and alluvium, and should include at least one nested bore site and at least one bore between the project and Albinia National Park. At least one bore site should also be north-west of the project area to monitor the extent of the drawdown towards Aldebaran Creek.

<u>Surface Water</u>

22. Specific mitigation and monitoring measures proposed for surface water impacts were limited due to the proponent's conclusion of negligible impacts (Paragraph 9). The assessment proposes to adopt the existing Rolleston Open Cut water management plan and monitoring procedures. The Water Management Plan was not provided and the monitoring procedures described in the EA (Queensland Government 2024) are currently high-level. The adequacy of the monitoring

procedures described in the EA cannot be determined until completion of the work recommended in the responses to Questions 1, 2 and 3.

23. The impending Australian and New Zealand Governments' tiered water quality framework for the metals copper, zinc and nickel will require the measurement of dissolved organic carbon (DOC) to enable assessment of metal bioavailability. The IESC recommends that DOC is routinely monitored in all future surface water samples so that these new bioavailability-based guidelines can be met.

Ecology

24. Monitoring of terrestrial GDEs is proposed to commence after 2 years of groundwater drawdown from the project has occurred. If the monitoring shows no signs of change in GDE condition, the frequency of monitoring is to be reduced because the proponent assumes that if no impact occurs after a certain amount of time, then terrestrial GDEs will not be impacted (Hydrobiology 2024, p. 99). Monitoring should commence prior to groundwater drawdown beginning (to provide reliable pre-drawdown baseline data) and then conducted at a frequency that allows for timely detection of any impacts.

25. Monitoring of aquatic and subterranean GDEs is proposed to occur annually post-wet season (Hydrobiology 2024, p. 100). Monitoring across multiple seasons, especially at the end of long dry periods, will allow for detection of impacts during vital times of groundwater supply to creeks and potentially alluvium. Monitoring during these periods will also allow the proponent to detect whether groundwater supply to aquatic GDEs declines or ceases, and whether groundwater from the alluvium may infiltrate into lower aquifers at increased rates, reducing water levels in the alluvium and potentially impacting subterranean GDEs.

26. Detailed justification supported by evidence from relevant case studies is needed for any mitigation options to address project-specific or cumulative impacts (e.g. drawdown, impaired groundwater water quality) detected on subterranean, aquatic and terrestrial GDEs in or near the project area. Monitoring programs should also be capable of measuring ecological responses to mitigation measures and evaluating their success.

Date of advice	19 May 2025
Source documentation provided to the IESC for the formulation of this advice	MetServe 2025. *Public Environment Report EPBC 2023/09547 Spring Creek North Continuation Project.* Prepared by Mining and Energy Technical Services Pty Ltd (MetServe) on behalf of Rolleston Coal Holdings Pty Ltd, 28 March 2025.
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