



## Advice to decision maker on coal mining project

### IESC 2024-147: New Lenton Coal Project (EPBC 2020/8778) – New Development

<b>Requesting agency</b>	The Australian Government Department of Climate Change, Energy, the Environment and Water
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<b>Advice stage</b>	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 Bowen Coking Coal Limited's New Lenton Coal 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 New Lenton Coal Project (the 'project') is a proposed new metallurgic coal mine located in the Bowen Basin in Queensland. The mine lease is in the Isaac River headwaters and includes Ti-Tree Creek, an unnamed tributary of the Isaac River, and the confluence of Hill Creek with the Isaac River (WRM 2024, p. 34). The project includes the development of two open-cut pits (East and West pits), mine infrastructure areas, haul roads, a water management system and multiple crossings of the Isaac River (Reach Environmental 2024a, pp. 3-1 to 3-2). Ti-Tree Creek upstream of the pits will be permanently diverted to the unnamed tributary north of the project area. The diversion will replace approximately 4.95 km of Ti-Tree Creek with a 2.8-km diversion (WRM 2024, p. 81).

The project proposes to extract up to 1.9 Mt per annum of run-of mine (ROM) coal over 18 years, targeting the Rangal Coal Measures (Reach Environmental 2024a, p. 3-1 and 3-18). Coal handling and preparation and train loadout facilities at the adjacent Burton Coal Mine will be utilised to process the ROM coal and transport it to export facilities (Reach Environmental 2024a, p. 3-1). Although West Pit will be backfilled, East Pit will only be partially backfilled, leaving a residual, progressively saline final void lake in the landscape (Reach Environmental 2024a, p. 3-1). Waste overburden rock will be stored at the project site in in-pit and out-of-pit stores, with tailings to be stored at Burton Coal Mine (Reach Environmental 2024a, p. 3-1 and 3-36).

The project is located in an area of active and historic coal mining, with some coal seam gas projects also planned (SLR 2023a, Table 3-2, p. 28). The other primary land use in the area is cattle grazing. Remnant vegetation occurs along and near watercourses, including the Isaac River, Hill Creek and Ti-Tree Creek (Reach Environmental 2024a, p. 3-9). Riparian vegetation in the region is habitat for several species listed by the *Environment Protection and Biodiversity Conservation Act* (EPBC Act 1999) as Matters of National Environmental Significance (MNES) such as the Greater Glider (*Petauroides volans*) and Koala (*Phascolarctos cinereus*). It also provides important landscape connectivity in an area that has already been extensively cleared. Groundwater drawdown and changes to runoff and surface water flows from the project are likely to adversely affect the riparian vegetation in and adjacent to the project area. The proponent has hypothesised that groundwater-dependent riparian vegetation in the project area only uses perched groundwater (Reach Environmental 2024c, p. 5-37) although insufficient evidence has been provided in the documentation to support this.

Key potential impacts from this project are:

- Permanently reduced water availability for terrestrial groundwater-dependent ecosystems (GDEs), potentially impacting the health of remnant vegetation and reducing habitat availability and landscape connectivity in a largely cleared landscape, via the following potential pathways:
  - reduced recharge to perched groundwater
  - altered recharge to alluvial aquifers (also potentially impacting stygofauna and other aquatic GDEs)
  - drawdown of the watertable.
- Removal of approximately 4.95 km of Ti-Tree Creek and its replacement with a 2.8-km diversion into the unnamed tributary which are likely to:
  - isolate the vegetated lower reaches of Ti-Tree Creek from episodic streamflow and hyporheic recharge of its alluvial sediments, potentially reducing condition and persistence of remnant vegetation
  - remove riparian and instream habitat and pool refugia along 4.95 km of the current watercourse, reducing aquatic habitat availability and potentially impacting downstream water quality
  - change the flow regime and increase flows in the unnamed tributary downstream of the diversion, potentially resulting in erosion and sedimentation of the tributary downstream to the Isaac River.
- Disturbance of 886 ha, including clearing of approximately 397 ha of remnant and high-value regrowth vegetation (including 112.2 ha of the Poplar Box Grassy Woodland on Alluvial Plains Threatened Ecological Community) that provides habitat for native wildlife, including multiple EPBC Act-listed species, in a landscape largely cleared for agriculture.

- Multiple waste rock dumps, both in-pit and out-of-pit, which could provide a source of contaminants and sediment, potentially affecting water quality downslope.
- A progressively saline final void lake which will remain in the floodplain, with long-term legacy risks to downstream and subsurface receiving waters and their biota.

The IESC has identified additional work required to address the key potential impacts, as detailed in this advice. These are summarised below.

- Further field-based data and information must be collected and analysed to provide a more rigorous evidence-based conceptualisation of the groundwater systems and their connectivity, especially recharge to both the perched groundwater and the alluvial aquifer, and groundwater usage requirements of GDEs such as riparian vegetation to ensure that potential impacts are fully assessed and appropriately monitored and managed.
- Informed by refined conceptualisation as described above, improvements are needed to the groundwater modelling, including parameterisation, representation of shallow groundwater processes, representation of faulting, consideration of climate change in the post-mining predictions and greater clarity of modelling outputs. All of these will increase confidence in the predicted range of potential impacts.
- Further characterisation is needed of the Ti-Tree Creek instream habitats and flow regime components relevant to ecological function and geomorphological performance to ensure appropriate design of the proposed diversion channel.
- Assessment of the likely effects of the diversion on the unnamed tributary (e.g. channel form, benthic habitat availability, riparian zone condition) to ensure appropriate monitoring and management measures (e.g. of increased erosion) are adopted.
- Given the use of perched groundwater by terrestrial GDEs, the proponent should consider installing shallow bores in areas where remnant vegetation is likely to be impacted by altered recharge of the perched groundwater and at unimpacted reference sites.
- Proposed monitoring and management plans should be developed and provided for assessment of their likely adequacy.

## Context

Bowen Coking Coal Limited's New Lenton Coal Project (the 'project') is located approximately 50 km north of Moranbah and 120 km southwest of Mackay in central Queensland (Reach Environmental 2024a, p. 3-1). Although the project is a new coal mine, the proponent already operates the adjacent Burton Coal Mine, and water management, coal handling and coal transport will be integrated for the two mines (Reach Environmental 2024a, p. 3-9). The project will disturb approximately 886 ha, clearing about 397 ha of remnant and high-value regrowth vegetation (AARC 2023, p. 80) which will directly impact habitat for EPBC Act-listed species including Greater Glider and Squatter Pigeon (*Geophaps scripta*) as well as areas of the Poplar Box Grassy Woodland on Alluvial Plains TEC.

The project is located in the headwaters of the Isaac River with on-lease watercourses including Ti-Tree Creek, an unnamed tributary of the Isaac River, and the confluence of Hill Creek with the Isaac River (WRM 2024, p. 34). Burton Gorge Dam is downstream of the project and, when full, may influence river levels adjacent to the project area (WRM 2024, p. 38). Watercourses draining the project area to Isaac River are ephemeral, with flows only occurring for a short period after rainfall events (WRM 2024, p. 30). Diversion of Ti-Tree Creek will replace approximately 4.95 km of natural watercourse with a 2.8-km constructed diversion (WRM 2024, p. 81) to enable access to the coal resource. Most riparian vegetation along Ti-Tree Creek within the project area will be removed by mining. The diversion will join the

unnamed tributary, with flows from the Ti-Tree Creek catchment upstream of the project area entering the Isaac River approximately 4.7 km upstream of its current confluence (WRM 2024, p. 79).

For this advice, it is useful to distinguish two different types of shallow groundwater systems (cf. Figure 38 in 3D Environmental 2023) because they likely support different GDEs and will be affected by different impact pathways associated with the project. We use the term ‘perched groundwater’ to refer to groundwater primarily recharged by infiltration from surface runoff and ephemeral stream channels, that support terrestrial GDEs but probably lack stygofauna, and that are frequently disconnected from the regional watertable (and hence not captured by conventional groundwater models). The term ‘alluvial aquifer’ refers to aquifers in the alluvium (and sometimes the regolith) associated with watercourses and primarily recharged by river flow, used by stygofauna and terrestrial GDEs. The alluvial aquifer is connected to and part of the regional groundwater system, simulated by the proponent’s groundwater model.

The perched groundwater is conceptualised by the proponent to occur only within the Isaac River alluvium and to be the only water source utilised by terrestrial GDEs (Reach Environmental 2024c, p. 5-37). The proponent considers impacts to GDEs are unlikely because drawdown will not affect the perched groundwater which is recharged by seasonal surface flows (Reach Environmental 2024c, Table 5-15, pp. 5-107 to 5-110). The assessment has not considered how the project could impact recharge of the perched groundwater by, for example, altering overland flows and flood extents, nor that perched groundwater could be used by vegetation outside the Isaac River alluvial corridor. Reduced availability of perched groundwater could increase reliance of terrestrial GDEs on the alluvial and other watertable aquifers which will be permanently drawn down by up to 20 m (SLR 2023a, Figure 6-21, p. 129).

The approved Queensland Environmental Authority (EA) (EPML00475513) outlines requirements for monitoring and management plans. The proponent has indicated that monitoring and management plans will likely be developed for groundwater, the receiving environment and groundwater-dependent ecosystems (GDEs) in order to comply with the EA (e.g., Reach Environmental 2024c, pp. 5-87 to 5-88). However, only high-level summaries of the proposed plans were provided, preventing detailed assessment of their adequacy.

## Response to questions

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

### Water resources and assets

Question 1: Advice is sought on whether the proponent has adequately characterised surface and groundwater resources to allow for an adequate assessment of the proposed project’s impacts on surface and groundwater water resources, and water-related assets.

Question 2: Advice is sought on whether the PER has identified and assessed the key risks and impacts to water resources and related assets as a result of the proposed project, in particular to:

- a. groundwaters and surface waters;
- b. groundwater-surface water interactions; and
- c. groundwater-dependent ecosystems (GDEs), including the PER’s conclusion in relation to terrestrial GDEs relying on a perched aquifer likely to be minimally impacted by drawdown.

1. The characterisation of water resources and assessment of impacts to these provided in the project documentation has several limitations as outlined in further detail in the following paragraphs. These limitations reduce the confidence that can be placed on the proponent’s conclusions relating to the

extent and magnitude of impacts arising from the project to groundwater and surface water resources and GDEs.

### Groundwater

2. There is no assessment of the impact of the project on the perched groundwater. However, this groundwater source is likely to be the principal water source for terrestrial GDEs in and near the project area. The existence, spatial extent and temporal persistence of the perched groundwater should be characterised through additional field work so that potential impacts to the GDEs which utilise this water source can be fully assessed and adequately monitored and managed.
3. A key risk relating to groundwater drawdown caused by the project is the potential for adverse impacts to GDEs using the alluvial groundwater. The proponent predicts that lowering of the watertable will be extensive and permanent (SLR 2023a, Figure 6-21, p. 129), but that this will not affect GDEs because these are supported by perched groundwater which will not be drawn down (Reach Environmental 2024c, Table 5-15, pp. 5-107 to 5-110). The evidence provided as the basis for this conceptualisation and associated conclusions is insufficient because:
  - a. the reliance of riparian vegetation on only the perched groundwater has not been established. The proponent hypothesised that depth to water and water quality could preclude use by riparian vegetation (Reach Environmental 2024c, p. 5-43). However, neither the quality of the alluvial groundwater (EC<20,000 µS/cm, Reach Environmental 2023c, p. 5-36) nor depth (10-14 m, Reach Environmental 2024c, p. 5-27) exceeded the criteria suggested by the proponent (EC>30,000 µS/cm, depth ≥15m, Reach Environmental 2023c, p. 5-43). As noted by the proponent, it is likely that riparian vegetation such as Red Gums use water sources within their root zone depending on availability (Reach Environmental 2024c, p. 5-43), with the alluvial aquifer potentially a more important water source during dry periods when perched groundwater becomes unavailable. Losing access to this groundwater could threaten the long-term condition and viability of the riparian vegetation.
  - b. leaf water potential, soil moisture potential and isotopic data provided for the alluvial groundwater, perched groundwater, soil water and xylem water are from a single point in time (3D Environmental 2023, p. 37), and are too limited to be able to demonstrate that plants do not use the alluvial aquifer, especially during dry conditions when other sources are likely depleted or entirely dried.
4. Predictions of the spatial extent and magnitude of watertable drawdown and associated impacts to GDEs in and near the project area rely upon the groundwater modelling provided. To improve confidence in these impact predictions, the following work is required.
  - a. Additional data should be collected and included in modelling updates to improve the parameterisation of the groundwater model. The additional data should include aquifer tests for hydraulic conductivity (including anisotropy, given the faulting) and storage parameters. Burton Coal Mine inflows should be included as calibration targets. Sampling of spoil should also be undertaken to provide site-specific (the project or Burton Coal Mine) data for the modelling.
  - b. The representation of alluvial aquifer recharge processes needs to be improved as the natural variation in the watertable is poorly matched by the groundwater model. Recharge from direct rainfall and episodic overland runoff will likely change due to the project and will need to be represented at temporal and spatial scales relevant to the governing physical processes.
  - c. Further justification is needed of how faulting is implemented in the numerical modelling and how this affects the model predictions. The Burton Range Fault is represented via the layer

structure (SLR 2023a, p. 97) but it is not clear how much flow occurs across it. Other faults do not seem to be included. Site-specific data should be presented on the influence of the faults on flows or on hydraulic conductivity anisotropy. Potentiometric head maps should be provided for layers west of the fault.

- d. Clarification is needed of the remaining saturated thickness of the alluvial aquifer under post-mining equilibrium conditions and whether the alluvial aquifer will be dewatered at any time, and if so, for how long. The ability of riparian vegetation to withstand groundwater drawdown, and the potential for stygofauna to survive or recolonise defaunated habitats, will be considerably reduced if prolonged dewatering occurs.
- e. Clarification is needed of predicted inflows to the void during and after mining. Inflows during mining are inconsistently reported (Reach Environmental 2023c, Figure 5-14, p. 5-55; SLR 2023a, Figure 6-1, p. 103; SLR 2023b, Figure 3-21, p. 97). Post-mining void inflows are not clearly explained in terms of how the component parts sum (SLR 2023b, Tables 6-3 and 6-4, p. 134) to provide a total inflow. Both these inflows need to be accurately predicted to provide confidence in the conclusions on water management during mining and the likelihood of discharge from the final void lake. Given the final void lake will be hypersaline (WRM 2024, Figure 7.6, p. 118), adverse impacts are likely if it discharges to the environment.
- f. Consideration is needed of climate change. The groundwater modelling does not incorporate climate change because the proponent assumes the 18-year project life is too short to warrant consideration (SLR 2023a, p. 103). This assumption is questionable during mining and not appropriate for the post-mining simulations which continue to 2770. Post-mining modelling should be updated to consider relevant plausible climate scenarios (e.g., CSIRO and BOM 2024).

### Surface water

5. The characterisation of surface water resources is limited:

- a. water quality data for Ti-Tree Creek and the upper reaches of the Isaac River (WRM 2024, p. 47 and Tables 3.4 and 3.5, pp. 49-51) are insufficient for adequately determining baseline conditions due to infrequent sampling and limited recent data. Additional sampling is needed to establish current baseline conditions for flow and water quality in these watercourses. Ideally, frequent sampling at multiple locations upstream and downstream of the project on each watercourse would occur over two years as a minimum for establishing baseline conditions.
- b. although refugial pools are expected to retain water for extended periods (WRM 2024, p. 30), baseline water quality and water level data have not been provided, nor have there been any baseline surveys of the fluvial geomorphology. This information and data are needed to understand the occurrence and characteristics (e.g. persistence, water quality) of these pools.
- c. the most recent field data on aquatic biota in watercourses within and near the project area and sampled when water was present are from two sites in Ti-Tree Creek and three sites on the Isaac River, all from a single sampling date in summer 2018 (AARC 2019, Table 6, p. 27). Low numbers of macroinvertebrates, fish and tadpoles were collected, interpreted as reflecting the brevity of the sampling window in these ephemeral systems (AARC 2019, p. 44). More up-to-date data on aquatic biota and values of the watercourses in the project area, especially those that will be lost when Ti-Tree Creek is diverted, are needed as a baseline against which to assess impacts and any recovery in the diverted channel.

6. The assessment of potential impacts related to the diversion is insufficient because:

- a. the assessment does not clearly characterise the existing fluvial geomorphology of the unnamed tributary and the likely impacts of increased flows from Ti-Tree Creek diversion. Baseline conditions for the unnamed tributary are not clearly defined, nor are modelled changes to velocities, shear stress and stream power resulting from the diversion identified. Given the increase in water flow in the unnamed tributary following the diversion of Ti-Tree Creek, there is an increased potential for erosion and altered water quality. Baseline conditions and predicted changes to these parameters need to be clearly identified to enable appropriate monitoring, mitigation and management.
  - b. no consideration has been given to the inclusion of channel form variability (including provision of refugial pools and natural meanders) in the design and construction of the diversion.
  - c. uncertainty has not been explored in modelling related to the geomorphology, hydrology or hydraulic assessments, limiting the reliability of obtained results.
7. Modelled changes to velocities, shear stress and stream power are higher than ACARP guideline values within the diversion (WRM 2024, pp. 143-148) and should incorporate variability in channel design and construction (White et al. 2014). There is the potential for erosion-related impacts if the diversion is not carefully monitored and managed. Should erosion occur, water quality in the receiving waters of the Isaac River could be adversely affected, pools may fill with fine sediment which would reduce their capacity to provide refuge, and benthic habitats may be smothered, reducing aquatic habitat availability for fish and macroinvertebrates. Further assessment of these potential impact pathways and how proposed monitoring and management (including the final fluvial geomorphology of the diversion channel) will prevent such impacts should be provided.
  8. It is anticipated that there is likely to be a “measurable reduction in flow rates and volumes” in the downstream reach of Ti-Tree Creek (up to 18.4% of catchment will be captured due to the diversion, see WRM 2024, p. 176). The Ti-Tree Creek riparian corridor provides habitat and landscape connectivity which will be reduced considerably by mining in the project area. The remaining vegetation of the isolated lower reach down to the Isaac River, including habitat mapped as ‘important’ to Koala (AARC 2023, Figure 14, p. 73), will be potentially further impacted by the loss of surface water flows due to catchment reduction and groundwater drawdown. These impacts have not been adequately considered in the project documentation. The cumulative effects of these multiple stressors on the Ti-Tree Creek riparian corridor and, post mining, the isolated lower reach, requires further consideration and explanation of how these impacts will be managed.
  9. Given the large uncertainty involved in the flood estimates due to the long-term legacy impacts and lack of relevant data, some account should be given to the performance of the works under developed conditions and after mine closure. An indication of the likely uncertainties involved should be determined through sensitivity analysis of key parameters and reference to uncertainties associated with other regional techniques (Ball et al. 2019, Book 3, Chapter 3). Consideration should also be given to the impacts of climate change on rainfall intensities and catchment losses (Ball et al. 2019, Book 1, Chapter 6; DCCEEW 2023).

#### Groundwater-Dependent Ecosystems

10. The proponent states that terrestrial GDEs are only utilising the perched groundwater (Reach Environmental 2024c, p. 5-37). However, there is inadequate evidence to support this conceptualisation as discussed in Paragraphs 2 and 3. To improve the characterisation of GDEs and the understanding of potential impacts of the project, the following is needed:
  - a. additional field data. Field data on potential groundwater use by vegetation were collected only once (February 2023) following several months of above-average rainfall (3D

Environmental 2023, p.18). Further field data should be collected at different times of the year, including after long dry periods, to capture the temporal variability in the availability and use of water sources by GDEs across the project area, particularly in the region of predicted drawdown.

- b. improved characterisation and conceptualisation of the perched groundwater and alluvium. Further data are needed on the spatial extent and temporal persistence of the perched groundwater, and any connections with the underlying alluvial aquifer, to support the proponent's conclusions that there will be no impacts of the project on terrestrial GDEs.
11. Stygofauna were collected in 8 of the 15 bores that were sampled (frc environmental 2023, pp. 12-13) and were especially diverse in the alluvial sediments along the Isaac River. The predicted reduction in the extent and saturated thickness of the alluvium and regolith groundwater systems (frc environmental 2023, Maps 4.2 and 4.3, p. 21-22) due to drawdown arising from the project will reduce stygofauna habitat and pose a 'moderate risk' (frc environmental 2023, p. 19). Should the groundwater systems where stygofauna occur be dewatered, then stygofauna are likely to become locally extinct. To better understand this potential impact, further information is needed on how long drawdown is expected to persist in the alluvial sediments and, if only temporary, what potential exists for stygofaunal recovery.
12. No field assessment of aquatic GDEs within the project area was undertaken, despite the Isaac River and the unnamed tributary being identified as 'High Potential' aquatic GDEs in the desktop assessment (3D Environmental 2023, p. 29). Field surveys are required to determine whether aquatic GDEs occur in the project area, especially in the region of predicted drawdown. If aquatic GDEs are found, baseline surveys will be required to characterise the ecological condition and groundwater-dependence of these GDEs and what impacts are likely to occur from the predicted drawdown.
13. Following collection of the data and information outlined in Paragraphs 3-5, 7-8 and 10-12, an evidence-based ecohydrological conceptual model and associated impact pathway diagrams should be developed for all water resources and their ecological components in and near the project area, to ensure that all potential impact pathways are identified and assessed (Commonwealth of Australia 2024). This will also allow consideration and adoption of appropriate monitoring, mitigation and management actions.

#### Matters of National Environmental Significance

14. The project area includes habitat suitable for a range of EPBC Act-listed species that were identified on-site, including the Greater Glider, Glossy Ibis (*Plegadis falcinellus*) and Squatter Pigeon as well as the Koala which has been recorded near the project area. It also provides potential habitat for Ornamental Snake (*Denisonia maculata*), Ghost Bat (*Macroderma gigas*) and Black Ironbox (*Eucalyptus raveretiana*). Much of this habitat occurs along riparian corridors. Impacts on riparian vegetation from direct removal and drawdown associated with the project will likely reduce the amount of habitat for these listed species in the area and reduce connectivity of habitats in an already fragmented landscape.
15. Seven patches of Poplar Box Grassy Woodland on Alluvial Plains TEC were identified in the project area (AARC 2023, p. 91) although not all are within the disturbance footprint. The project will remove approximately 112.2 ha of 141.1 ha of this TEC within the project boundaries (AARC 2023, Table 14, pp. 91-92). Groundwater drawdown from the project of the watertable beneath undisturbed areas (including beyond the project boundaries) appears to be up to approximately 5 m (AARC 2023, Figure 12, p. 64 and SLR 2023a, Figure 6-21, p. 129) and could impact a further approximately 54 ha (based on information in AARC 2023, Table 14, pp. 91-92 and Figure 12, p. 64). The proponent does not expect hydrological changes to impact these areas of TEC. However, this appears to be based on the vegetation either not being considered a terrestrial GDE (although Kath et al. (2014) provide evidence



that Poplar Box uses groundwater down to 26.6 m), or if it is, being reliant on the perched groundwater (AARC 2023, p. 91). Given the limitations with the proponent's conceptualisation of the GDEs outlined in Paragraphs 3 and 10, insufficient evidence has been provided to support this conclusion. Further field work is required to determine whether vegetation in the areas of TEC which is not removed is groundwater-dependent to enable an assessment and subsequent management and monitoring of potential impacts to the TEC.

### **Cumulative impacts**

Question 3: Advice is sought on whether the PER has sufficiently addressed the cumulative impacts on water resources and related assets (including in the project area, other mining activities) and whether the conclusions on cumulative impacts are appropriately supported.

16. The assessment of cumulative impacts in relation to groundwater resources was limited.
  - a. The numerical modelling boundaries were set such that several mines intersect the boundaries but are not included within the model domain (SLR 2023b, Figure 2-1, p. 8). Current cumulative drawdown predictions (during mining: SLR 2023b, Figures 3-16 to 3-20, pp. 92-96; post-mining: SLR 2023b, Figures 6-21 to 6-25, pp. 145-149) approach some model boundaries in some layers, and thus it is unclear whether there would be interactions between the zones of drawdown predicted for the project and Burton Coal Mine with any other neighbouring mines.
  - b. Two potential CSG projects were identified in the area of the project: the Bowen Gas Project and Eureka Petroleum (SLR 2023a, Table 3-2, p. 28). These projects have not been included in the numerical modelling. Discussion of why these projects are not included in the numerical modelling is needed to determine whether cumulative impacts are adequately assessed. The numerical modelling may require updating to include these projects to enable a full assessment of the potential magnitude and extent of cumulative impacts.
17. The cumulative impacts of an extreme flood scenario (given projected long-term climate changes) in which the final void is overtopped and poor-quality water spills into the Isaac River should be considered.

### **Mitigation and management**

Question 4: Can the committee provide comment on the adequacy of the proposed monitoring, mitigation and management activities?

Question 5: Does the committee consider that any additional measures are needed to adequately reduce risks and projected levels of impacts to water resources and related assets?

18. It is stated that monitoring and management for the project will meet the requirements of the approved EA from the Queensland Government (e.g., SLR 2023a, p. 171). However, only high-level information has been provided to the IESC on these proposed management plans which will include groundwater, the receiving environment, GDEs and erosion and sediment control plans. This current level of information is insufficient to enable detailed comments on the adequacy of the proposed plans. From the limited information provided, the following potential issues are noted.
  - a. Groundwater level triggers are proposed to be updated to align with predictions from the current groundwater model (SLR 2023a, p. 177). These triggers sometimes relate to the 90th percentile values of drawdown (SLR 2023a, p. 177). As outlined in Paragraph 4, there are several issues with the groundwater model that need to be addressed to improve confidence in its predictions. This should be done prior to level triggers being finalised.

- b. A potential management measure outlined for addressing impacts to riparian vegetation was infill planting with Forest Red Gums (*Eucalyptus tereticornis*) should GDE vegetation health decline due to groundwater drawdown (Reach Environmental 2024c, p. 5-101). The proponent needs to explain why the replanted trees would not also be affected by drawdown and how this measure would be effective at replacing lost habitat, considering it would take approximately 100 years for these trees to develop hollows that could provide replacement habitat for Greater Gliders (DCCEE 2022, p. 5).
  - c. Although there are proposals for a GDE monitoring and management plan (GDEMMP) with early-detection triggers (3D Environmental 2023, p.102) and an operational-phase stygofauna monitoring plan with triggers (frc environmental 2023, p.19), it is not clear what these triggers will be, how they will be identified and monitored, and what are the specific thresholds for each management response. These details are required to assess the adequacy of the proposed programs.
  - d. Due to the risk of erosion within the diversion (Paragraphs 6 and 7), and the potential for subsequent impacts on water quality in the Isaac River, at least one location for monitoring water quality and flow should be established upstream of the confluence of the unnamed tributary and the Isaac River. Baseline data should be obtained for at least two years from this site. Ongoing monitoring should be undertaken and used as part of a trigger action response plan (TARP) to ensure adequate management and mitigation of potential erosion-related impacts. There also needs to be an assessment of the risk of sedimentation of pools and benthic habitats in the unnamed tributary and Isaac River and, if this risk exists, information is needed on what mitigation and remediation options are planned.
  - e. Management of potential impacts to habitat (e.g., riparian vegetation) of MNES is proposed to occur through implementation of the GDEMMP (e.g., AARC 2023, p. 98). As this plan has not been provided, the IESC cannot determine whether the proposed measures will be adequate.
  - f. The proposed waste rock dumps could provide a source of contaminants and sediment which could adversely impact groundwater and surface water quality. Limited information was provided on the geochemistry and waste material (WRM 2024, pp. 66-68) and soil sampling noted the presence of sodic soils that would require specific management practices (WRM 2024, pp. 65-66). Further information is needed on proposed monitoring and management to ensure that these potential impacts will be adequately addressed.
19. Given the use of perched groundwater by terrestrial GDEs, the proponent should consider installing shallow bores in areas where remnant vegetation is likely to be impacted by altered recharge of the perched groundwater and at unimpacted reference sites. Changes in water level in these bores would indicate how the project is altering recharge, and should be integrated into the GDEMMP.

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<b>Date of advice</b>	16 April 2024
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<b>Source documentation provided to the IESC for the formulation of this advice</b>	<p>3D Environmental 2023. <i>New Lenton Project groundwater dependent ecosystem assessment</i>. Prepared by 3D Environmental for Bowen Coking Coal Ltd. Revision 4_Final_14 December 2023. Appendix 10 of the New Lenton Coal Project PER.</p> <p>AARC 2019. <i>New Lenton Mine aquatic ecology assessment</i>. Prepared for New Lenton Coal Pty Ltd. August 2019. Appendix 14 of the New Lenton Coal Project PER.</p> <p>AARC 2023. <i>MNES Terrestrial ecology impact assessment report</i>. New Lenton Coal Project. Prepared for Bowen Coking Coal. December 2023. Appendix 12 of the New Lenton Coal Project PER.</p>
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- frc environmental 2023. *New Lenton Coal Project. Stygofauna pilot study*. Prepared for Reach Environmental on behalf of Bowen Coking Coal. frc reference 221101. Appendix 11 of the New Lenton Coal Project PER.
- Manewell Groundwater 2023. *New Lenton Project. Independent peer review of the New Lenton Project numerical groundwater model*. Appendix 9 of the New Lenton Coal Project PER.
- Queensland Government 2021a. *Environmental Authority*. New Lenton Coal Pty Ltd. New Lenton Coal Project. Appendix 4 of the New Lenton Coal Project PER.
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