

## **Advice to decision maker on Mount Pleasant Optimisation coal mining project**

### **IESC 2021-121: Mount Pleasant Optimisation Project (EPBC 2020/8735 and NSW SSD 10418) – Expansion**

<b>Requesting agency</b>	The Australian Government Department of Agriculture, Water and the Environment and the New South Wales Department of Planning, Industry and Environment.
<b>Date of request</b>	27/01/2021
<b>Date request accepted</b>	28/01/2021
<b>Advice stage</b>	Assessment

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

The IESC was requested by the Australian Government Department of Agriculture, Water and the Environment and the New South Wales Department of Planning, Industry and Environment to provide advice on MACH Energy Pty Ltd's Mount Pleasant Optimisation Project expansion in the Hunter Valley of New South Wales. The NSW Department of Planning, Industry and Environment and the Commonwealth Department of Agriculture, Water and the Environment have jointly referred the development to the IESC for its consideration and advice, as part of the bilateral assessment process. This document provides the IESC's advice in response to the requesting agencies' questions. 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, 2018).

### **Summary**

The Mount Pleasant Operation (MPO) is an existing open-cut thermal coal mine and associated infrastructure located approximately three kilometres northwest of Muswellbrook in the Upper Hunter Valley of New South Wales, targeting multiple coal seams within the northern coalfield of the Sydney Basin. The proponent is seeking to modify the existing approval by mining deeper coal seams and so increase coal production from 10 million tonnes per annum (Mtpa) to 21 Mtpa and to extend the life of the mine from 2026 to 2048. The proposed expansion (the 'project') would also involve upgrading the existing

coal handling processing plant, workshops and other infrastructure as well as constructing new water management and storage infrastructure and developing an integrated waste rock emplacement landform. However, a significant area that is currently approved to be disturbed as part of the MPO will be relinquished, including some 490 ha of native vegetation. The project is close to the Dartbrook mine (currently in care and maintenance) and the operational Bengalla and Mount Arthur mines. Consequently, the project will contribute to the cumulative impacts of these mines and the current MPO.

Key potential impacts from this project are:

- a long-term (decadal) incremental increase in the cumulative take of water from Dart Brook and the Hunter River and their associated alluvium; and
- further reduction in baseflow and a change in flow regime in Sandy Creek, to the west of the MPO, resulting in potential impacts to riparian vegetation and aquatic habitat.

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

- Field-based studies to assess the presence of groundwater-dependent ecosystems (GDEs) (e.g. stygofauna and groundwater-dependent vegetation) along Sandy Creek. If GDEs are present, their condition and reliance on groundwater should be measured to guide prediction of likely impacts of the project.
- Assessment of changes in flow regime of Sandy Creek to identify increases in no- or low-flow days and other ecologically relevant components of the flow regime.
- Extension of the groundwater monitoring program as recommended in AGE (2020, p.109), particularly in areas of the relinquished Forest Red Gum Grassy Open Woodland, a potential GDE and part of the White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland listed as a critically endangered ecological community (CEEC) under the *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999).
- Field-based assessment of groundwater usage by native vegetation (especially CEECs) in the relinquished area to identify potential vulnerability to drawdown monitored by the bores suggested above.

## Context

The Mount Pleasant Operation (MPO) is an existing open-cut thermal coal mine and associated infrastructure located approximately three kilometres northwest of Muswellbrook in the Upper Hunter Valley of New South Wales targeting multiple coal seams within the northern coalfield of the Sydney Basin. The original development consent for the mine was granted in December 1999 and the current mine is approved to December 2026.

The proposed extension (the 'project') will result in a progressive increase in coal production to December 2048 from the currently approved 10.5 million tonnes per annum (Mtpa) to 21 Mtpa by mining additional coal reserves, including deeper coal seams in the North Pit. The project will also require staged upgrades to the coal handling and other associated infrastructure, new water storages and the development of an integrated waste rock emplacement as part of the final landform. A significant area that is currently approved to be disturbed as part of the MPO will be relinquished, including some 490 ha of largely contiguous native vegetation, some of which is *EPBC Act*-listed as CEECs. Although other areas will be cleared as part of the project, an additional 22-26 ha of native vegetation will be preserved as part of the proposed expansion.

There is already extensive coal mining in the area including Dartbrook mine (currently in care and maintenance) to the north, Bengalla and Mount Arthur mines to the south, Muswellbrook mine to the east, and Mangoola mine to the west. The proposed project will result in an incremental increase in the predicted cumulative impacts of the currently approved Mount Pleasant mine and these surrounding mines.

The project is in the vicinity of the areas covered by the Water Sharing Plans for the *Hunter Regulated River Water Source (2016)* and the *Hunter Unregulated and Alluvial Water Sources 2009*, and the Permian aquifers are part of the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016: Sydney Basin – North Coast Groundwater Source*.

No high-priority groundwater-dependent ecosystems (GDEs) are identified in the project area. Approximately three hectare of Forest Red Gum Grassy Open Forest, identified as a Type 3 GDE, is located in the northwest of the project area, and the current mine's approval permits its removal. However, under this proposal, this vegetation would be retained, although it is likely to experience groundwater drawdown which will require long-term monitoring.

### Response to questions

The IESC notes that the Mount Pleasant Mine (MPO) is currently approved to extract 10.5 Mtpa to 2026 and that impacts from this current operation have been approved. Therefore, this advice concerns only the proposed expansion and the incremental increase to the cumulative impacts from the increased extraction to 21 Mtpa and the extension of the life of the mine to 2048.

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

Question 1: To what extent can decision makers have confidence in the predictions of potential impacts on surface water resources provided in the EIS, having regard to potential stream flow losses, water quality, controlled releases, uncontrolled discharges and flooding?

- a. Has an appropriate water balance model been selected and used by the Applicant? Are the assumptions used in the model reasonable?
- b. Has the model been validated with sufficient monitoring data to provide meaningful predictions, including worst-case impacts on surface water resources?
- c. Has an appropriate sensitivity analysis been undertaken, including consideration of the potential impacts of climate change?

1. Overall, the surface water assessment reasonably predicts potential impacts on surface water resources, although the water balance model appears not to have been calibrated or validated to monitoring data. However, several areas require further data and clarification.
2. The IESC notes that discharge dam DW1 will be constructed for controlled releases and is planned to be commissioned in early 2022. The proponent has described the location of the dam to be west of Bengalla Road; however, they have not shown the location of the dam discharge point into the Hunter River (HEC 2020, p. 49). This location should be clearly identified to assist in assessing if the current Hunter River monitoring sites are still sufficient to assess any potential impacts.
3. The predicted average EC (electrical conductivity) of release waters to the Hunter River from DW1 is 739  $\mu\text{S}/\text{cm}$  based on the median model results. Although this exceeds the default guideline value of 350  $\mu\text{S}/\text{cm}$  for upland rivers in NSW (HEC 2020, p. 27), it is within the range of EC values recorded in the Hunter River upstream of the MPO (GS 210056), of which 70% of values exceed the guideline.

4. Based on the predicted total release volume, the average EC of overflow from the sediment dams to Rosebrook Creek is 394  $\mu\text{S}/\text{cm}$  (HEC 2020, p. 78). Although this exceeds the default guideline value, HEC (2020, p.78) states that it is within the range of baseline EC values recorded for local and regional surface water systems (HEC 2020, Section 3.5).
5. While the IESC commends the proponent for predicting contaminant concentrations to be released into the Hunter River (including Al, Li, Mn and turbidity), these were based on only three samples from the mine water dam. Additional data will need to be collected from on-site storages, as well as upstream and downstream of the discharge site to confirm these predictions.
6. Disposal of sediment from sediment dams after removal has not been outlined, and details should be provided on the disposal and management of excess sediment waste.
7. Water management is simulated using the Goldsim model, a tool which is commonly used by the mining industry and is considered well suited for such purposes. Rainfall runoff in the water balance model was simulated using the Australian Water Balance Model (AWBM) (Boughton 2004, cited by HEC 2020, p. 60). The AWBM is a nationally recognised catchment-scale water balance model that estimates catchment yield (flow) from rainfall and evaporation. Although this water balance model is based on reasonable assumptions, no discussion is provided on how the parameters were derived (Table 22, HEC 2020). It would also appear that no calibration or validation of model performance was undertaken using water-level monitoring data from the existing water management system.
8. The proponent has provided several modelled outcomes for various scenarios, including river extraction, rainfall and on-site sediment dam overflows, for either 5% or 95% chance annual exceedance events. However, modelled outcomes of potential overflow events for 5%, 2%, 1% and 0.1% chance AEP events should also be presented to indicate that there will be no potential impacts due to overflow or breaching of the sediment dams. The proponent has not done a formal sensitivity analysis, but has assessed the distribution of outcomes based on shifted sequences of historical climate (HEC 2020, App. D, Section 6).
9. The proponent predicts outcomes of several climate-change scenarios on surface water levels (Table 31) (HEC 2020, p. 82), and states (without modelling) that there would be “lower rainfall and higher evapotranspiration conditions than the Representative Concentration Pathway (RCP) 4.5 scenario, that would result in the final void water level being lower again (i.e. further reducing spill risk)” (HEC 2020, p. 82). From the results presented, it seems reasonable to conclude that climate change will not increase the risk of spills from the remaining voids under a notional worst-case scenario.

Question 2: To what extent can decision makers have confidence in the predictions of potential impacts on groundwater resources provided in the EIS, paying particular attention to the impacts on alluvial aquifers associated with the Hunter River and Sandy Creek, as well as impacts on privately-owned groundwater bores?

- a. In relation to groundwater, has an appropriate model been selected and used by the Applicant? Are the assumptions used in the model reasonable?
- b. Has the model been validated with sufficient monitoring data to provide meaningful predictions, including worst-case impacts on groundwater resources?
- c. Has an appropriate sensitivity analysis been undertaken, including consideration of the potential impacts of climate change?

10. The proponent has developed a 3D numerical model using MODFLOW-USG to assess the impacts from the project (AGE 2020, p. 77). This is an appropriate model to assess the potential impacts from this project.

11. The proponent states that the throw from the Mount Ogilvie thrust fault has resulted in a displacement of 100-200 m below Sandy Creek (AGE 2020, p. 26) and, due to the resultant juxtaposition of sediments, it is used as a no-flow boundary. However, only part of the Mount Ogilvie thrust fault is co-incident with the no-flow boundary (AGE 2020, Appendix A, Figure A2.1). Further justification for the no-flow boundary on the western side of the model domain should be provided, including any potential influence on the modelled results.
12. The assumptions used in the groundwater model, as described in AGE (2020, Section 5.9) are generally appropriate. However, greater confidence in the model predictions could be achieved if justification of the numerical model assumptions were provided. For example, the Permian sediments are considered to be one aquifer system (AGE 2020, p. 69) but further information should be provided by the proponent to support this. Further, no data are provided to confirm the stated lack of groundwater in the Permian interburden or changes in groundwater salinity of the Permian sediments.
13. The groundwater model was calibrated to a pre-mining steady-state water level and then a transient calibration water level using a total of 114 monitoring sites and mine inflow data for the period 1991 to 2017. The sites generally have good spatial distribution and associated groundwater level time series information. However, the model calibration may be non-unique because of the limited availability of project area-specific hydraulic parameter data and the lack of model-independent checks on recharge and groundwater flow, such as use of environmental water tracer data (OWS 2020).
14. The model has been validated with the available data. However, these data are unlikely to encompass the extreme conditions that may constitute a notional worst-case scenario. The uncertainty analysis is used to evaluate combinations leading to plausible extreme conditions. The proponent should clarify whether the current uncertainty analysis encompasses a notional worst-case scenario.
15. An extensive and useful uncertainty analysis, which implicitly includes a routine sensitivity analysis, using a range of valid parameters has been undertaken (AGE 2020, Section 9 and Appendix A, p. 34). The proponent has not reported the sensitivity analysis of the groundwater model. However, it is important for the proponent to thoroughly document the sensitivity analysis and the range of parameters used in both the sensitivity and uncertainty analysis. This uncertainty analysis presents the potential impacts across five probability classes using the methods described in Middlemis and Peeters (2018) to assess:
  - a. mine inflow rate;
  - b. the reduction in baseflow to the Hunter River, Dart Brook and Sandy Creek;
  - c. the indirect take from the Hunter River, Dart Brook and Sandy Creek alluvium; and
  - d. the zone of 2 m drawdown.
16. A climate sensitivity analysis has also been undertaken. This involved reducing rainfall recharge by 20% and an increase in evapotranspiration by 8% and is based on the adopted extremes from the GFDL-ESM2M and ACCESS1-0 global climate models (AGE 2020, Appendix A, p. 35). The IESC considers this to be adequate.
17. The impacts on privately owned bores are assessed adequately.

Question 3: Does the EIS provide an adequate assessment of the cumulative impacts to surface and groundwater resources during the mining operations and during post-mining recovery phase, including changes in catchment areas, the rate of recovery of groundwater levels and saturation of alluvial
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aquifers? Do these assessments adequately differentiate impacts due to the project, historical mining already undertaken and currently approved operations (i.e. mining yet to occur)?

18. The groundwater model has assessed the impacts from the project in isolation as well as the cumulative impact with the current approved Mount Pleasant Operation, Dartbrook, Bengalla and Mount Arthur mines (AGE 2020, p. 6). Three other mines are within the vicinity of the project and the IESC agrees with the proponent that, for the geological reasons provided (AGE 2020, p. 6), they do not need to be included in the cumulative assessment.
19. The rate of recovery of groundwater levels has been appropriately investigated through simulations of post-mining conditions over 1000 years. The proponent acknowledges the increasing uncertainty in the predicted results caused by modelling for such a length of time. These results indicate that the groundwater levels will not return to pre-mining levels, with some residual impacts remaining in the Hunter River alluvium and the Permian groundwater levels, the latter driven by the project's final void as well as the Bengalla mine void (AGE 2020, p. 85 and figure 7.5).
20. These assessments adequately differentiate groundwater and water quality impacts due to the project, historical mining already undertaken and currently approved operations (i.e. mining yet to occur). However, the cumulative impacts of the project on flow regimes of streams outside the project area are less comprehensively described. This is important because changes to ecologically relevant components of flow regimes (see Paragraph 22) may have greater impacts on aquatic biota and ecological processes than minor (<5%) changes to total flows, especially in ephemeral streams.
21. Overall, the proponent has used appropriate groundwater and surface water modelling to predict potential incremental (project only) and cumulative hydrological and hydrogeological changes (e.g. drawdown). However, there is no comprehensive assessment of the likely impacts of these changes on water quality, GDEs, riparian vegetation and aquatic biota (including fish passage) along Sandy Creek or other creeks (e.g. lower reaches of Rosebrook Creek) downstream of the project area. These potential impacts on local and regional aquatic ecological values are discussed in more detail in the response to Question 4 below.

Question 4: Have the surface water and groundwater impacts of the project on the local and regional aquatic ecological values (aquatic biota and riparian habitat) and groundwater dependent ecosystems (including stygofauna) been adequately described and assessed?

22. The proponent has predicted losses of baseflow to the Hunter River, Dart Brook and Sandy Creek at the annual scale (HEC 2020, p. 85); however, there has been no modelling to assess whether there will be an increase in low- or no-flow days and other ecologically important components of the flow regime. Consequently, it is difficult to verify the predicted impacts, especially on aquatic biota and riparian vegetation. Changes in flow regimes (e.g. flow duration, timing of onset of flow) in ephemeral creeks can have major repercussions for biodiversity and composition of their aquatic and riparian communities (Datry *et al.* 2017).
23. The proponent states that the hydrological impacts to the Hunter River, Dart Brook and Sandy Creek will be minimal. A maximum 63% loss of catchment area for Rosebrook Creek is likely to cause material habitat degradation; however, this is not an increase relative to the already approved mine and the proponent has committed to rehabilitating this catchment post-closure.
24. The potential cumulative impact of baseflow reduction on riverine biota (e.g. fish, invertebrates) has not been assessed at temporal scales appropriate to ecological processes such as migration (fish) or use of inundated streamside habitats. This is especially where the collective change in flow might exceed an ecological threshold (tipping point) such as preventing native fish passage during low flows or alienating aquatic benthic habitat along the river margins.



25. Groundwater drawdown appears to have been adequately modelled. The proponent has predicted that ecological impacts from drawdown will be minimal (AGE 2020, p. 93). AGE (2020, p. 109) have also recommended that an additional shallow monitoring bore be constructed in the area of the Forest Red Gum Grassy Open Woodland, a potential Type 3 GDE. The depth of this bore is not detailed and it is assumed that this bore would be completed in the weathered overburden. The IESC recommends that a deeper monitoring bore also be drilled into the overburden to a depth just above the Warkworth seam to provide an early indicator of any depressurisation propagating towards the surface. Ideally, there would be similar nested bores at the northern, central and southern end of this woodland. Data from these bores could also be used to supplement assessments of groundwater use by vegetation depending on findings from the work suggested in Paragraph 37.
26. The proponent has sampled for stygofauna over two days in November 2018, identifying three taxa and concluding that impacts to stygofauna will be insignificant as the identified taxa are widespread throughout the Hunter region and significant drawdown is not predicted (Bio-Analysis 2020, p. 66). However, the conclusion that the taxa are widespread is probably because they were only identified to family level; species-level identification is needed to confirm that the sampled stygofauna are not endemic species with a highly restricted range and potentially vulnerable to drawdown.
27. Stygofaunal sampling of other Hunter River bores revealed that new taxa were still being collected after four sampling periods in over half the bores (Hancock and Boulton 2009). This indicates that a single set of samples is inadequate to reliably document taxa richness or seasonal variability in community composition.
28. As groundwater invertebrates facilitate many ecosystem services (Boulton *et al.* 2008, Hose and Stumpff 2019) that may be impaired by altered stygofaunal community composition, the IESC recommends further sampling by the proponent (including the alluvium of Sandy Creek where saturated sediments may persist when surface flow ceases). Collection of seasonal samples and annual monitoring of alluvial bores for stygofauna will enable the proponent to support their predictions that impacts of the project on stygofauna will be negligible. Mitigation measures, if any, should be described if drawdown is likely to impact stygofaunal communities or sever metapopulations.
29. The proponent has used appropriate sampling methods for stream habitat assessment and aquatic invertebrates, and conducted targeted surveys of threatened species that may occur in the area. It was concluded that no significant ecological impacts of the project on aquatic biota or threatened species are likely (Bio-Analysis 2020, Section 8.0). The IESC agrees with this assessment but recommends stream health monitoring should continue at sites within the project area and downstream, complemented by an appropriate management plan to mitigate any detected impacts of altered streamflows, water quality or aquatic habitat caused by the project.
30. The IESC considers that the project area and surrounding ecosystem could provide suitable habitat for the Green and Golden Bell Frog (*Litoria aurea*), Green-thighed Frog (*Litoria brevipalmata*) and Booroolong Frog (*Litoria booroolongensis*), particularly after substantial rainfall. Surveys undertaken after such events will be useful because they will increase the understanding of the environmental values of this area under a changing climatic regime.

Question 5: Does the EIS provide reasonable strategies to effectively avoid, mitigate or minimise the likelihood, extent and significance of impacts, including cumulative impacts, to significant water-related resources?

31. The EIS is generally lacking in detailed avoidance, mitigation and minimisation strategies which are outlined in greater depth in the proponent's Water and Biodiversity Management plans, dated from 2017 and 2018 respectively. The IESC notes that these documents do not sufficiently reflect the most recent research conducted by the proponent presented in the EIS, including:

- a. surface water and groundwater reports (HEC 2020; AGE 2020);
  - b. the latest vegetation mapping (Hunter Eco 2021, Appendix E); and,
  - c. stygofauna surveys (Bio-Analysis 2020).
32. In particular, no strategies to minimise or avoid impacts to Sandy Creek have been presented as the proponent considers that impacts to this system will be negligible (Bio-Analysis 2020, pp. 65-66). The additional recommended work (Paragraph 37) may indicate that some impacts are possible (especially to GDEs from drawdown and to aquatic biota from altered flow regimes), necessitating the presentation of appropriate mitigation and monitoring strategies.
33. If vegetation (especially of CEECs) in the relinquished area is found to be groundwater-dependent (Paragraph 37) and if drawdown occurs in this area that may exceed root depths of these Type 3 GDEs, strategies to avoid this drawdown need to be presented because it is unlikely that mitigation is feasible. Failing to do this and avoid excessive drawdown may compromise the benefits and biodiversity values of the remnant native vegetation in the relinquished area.

Question 6: Are there any additional mitigation, monitoring, management or offsetting measures that should be considered by decision makers to address the residual impacts of the Project on water resources?

34. The proponent has detailed three appropriate protocols for assessing changes in groundwater level, groundwater quality and privately owned bores (AGE 2020, Tables 10.3-5, pp. 113-114). Outside of these protocols, there are recommendations to increase the number of groundwater monitoring locations (AGE 2020, p. 109) and a continued commitment to the current Water Management Plan (AGE 2020, p. 107), both of which are supported by the IESC.
35. An increase in the suite of analytes in groundwaters, primarily metals, being tested is also recommended (AGE 2020, Table 10.2) and the IESC supports this recommendation. The Groundwater Management Plan suggests that groundwater quality monitoring data should be assessed against the ANZECC/ARMCANZ (2000) recreational water quality guidelines. However, the IESC recommends that these data be assessed against either guidelines for aquatic ecosystem protection (in the absence of groundwater guidelines for contaminants) or, as previously, using guidelines for irrigation, livestock or drinking water if these are the intended beneficial uses.
36. If chemical dust suppressants are to be used during low rainfall periods (HEC 2020, p. 75), additional information is needed on which chemical suppressants may be used, how they will be applied, and their potential impacts on nearby waters.
37. The proponent has committed to monitoring the health of the Forest Red Gum Grassy Open Woodland GDE. The IESC recommends that the proponent use direct techniques (e.g. stable isotopes, leaf water potential and soil water potential) suggested by Doody *et al.* (2019) and Jones *et al.* (2020) to assess groundwater use by this community as well as vegetation in the relinquished area (especially CEECs and riparian vegetation) and vegetation along Sandy Creek. With this information, the proponent will be able to state more confidently if these communities are GDEs, whether mitigation is required, and how impacts (both incremental and cumulative) on this vegetation from groundwater drawdown can be managed.
38. The IESC further recommends that dedicated vegetation surveys and mapping be extended west of the project area, particularly surrounding Sandy Creek, and where groundwater drawdown is predicted. Where appropriate, groundwater-dependence of this vegetation should be assessed so that predictions of potential impacts can be refined and suitable mitigation plans can be developed.



39. The IESC recommends that additional stygofauna sampling be undertaken that accounts for seasonal and rainfall variation, that all collected specimens be identified as far as practical (to ensure that endemic species are not being overlooked because of coarse taxonomic assessment) and that potential impacts of drawdown and altered groundwater quality on their ecological value and ecosystem services be considered (see Paragraphs 26 and 28). These surveys should be extended to the Sandy Creek alluvium (see Paragraph 28).
40. Additional monitoring of aquatic biota should be conducted following substantial or extended rainfall. These measures will provide an important means of assessing climate change impacts and will contribute to a better understanding of potential cumulative impacts.

<b>Date of advice</b>	15 March 2021
<b>Source documentation provided to the IESC for the formulation of this advice</b>	<p>AGE (2020). <i>Mount Pleasant Optimisation Project - Groundwater Impact Assessment</i> (Appendix C).</p> <p>Bioanalysis (2020). <i>Mount Pleasant Optimisation Project – Aquatic Ecology Assessment</i> (Appendix F).</p> <p>HEC (2020). <i>Mount Pleasant Optimisation Project - Surface Water Assessment</i> (Appendix D).</p> <p>Hunter Eco (2021). <i>Mount Pleasant Optimisation Project – Biodiversity Development Assessment report</i> (Appendix E).</p> <p>MACH Energy (2020a). <i>Mount Pleasant Optimisation Project – Environmental Impact Statement</i>.</p> <p>MACH Energy (2020b). <i>Preliminary Hazard Analysis</i> (Appendix Q).</p> <p>RGS (2020). <i>Geochemistry Assessment – Mount Pleasant Optimisation Project</i> (Appendix K).</p> <p>RM (2020). <i>Mount Pleasant Optimisation Project – Environmental Risk Assessment</i>.</p>
<b>References cited within the IESC’s advice</b>	<p>ANZECC/ARMCANZ (2000). Australian and New Zealand Guidelines for Fresh and Marine Water Quality. Australian and New Zealand Environment and Conservation Council (ANZECC) &amp; Agriculture and Resource Management Council of Australia and New Zealand. Available [online]: <a href="https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000">https://www.waterquality.gov.au/anz-guidelines/resources/previous-guidelines/anzecc-armcanz-2000</a>.</p> <p>Boulton AJ, Fenwick GD, Hancock PJ, Harvey MS (2008). Biodiversity, functional roles and ecosystem services of groundwater invertebrates. <i>Invertebrate Systematics</i>, 22, 103–116.</p> <p>Datry T, Bonada N, Boulton AJ (2017). (Eds.) <i>Intermittent Rivers and Ephemeral Streams: Ecology and Management</i>. Amsterdam: Elsevier.</p> <p>Doody TM, Hancock PJ, Pritchard JL (2019). <i>Informational Guidelines Explanatory Note: Assessing groundwater-dependent ecosystems</i>. Report prepared for the Independent Expert Committee on coal seam gas and large coal mining development through the Department of Environment and Energy, Commonwealth of Australia. Available [online]:</p>

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