

Advice to decision maker on coal mining project

IESC 2025-158: Metropolitan Coal Project Modification 4 (EPBC 2025/10103) – Expansion

Requesting agency	The Australian Government Department of Climate Change, Energy, the Environment and Water
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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 Metropolitan Collieries Pty Ltd's Metropolitan Coal Project Modification 4 in New South Wales. 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

Metropolitan Coal Project Modification 4 (the 'project') is a proposed continuation of an existing underground mine and facilities, 30 kilometres (km) north of Wollongong and immediately west of Helensburgh, New South Wales. Mining operations are approved until 22 June 2032 at a maximum run-of-mine (ROM) coal extraction rate of 3.2 million tonnes per annum (Mtpa) of metallurgical and thermal coal. The project will allow the mine to continue production up to the current approved date of 2032, instead of closing in 2029 (Peabody undated a, p. 5). Due to geotechnical and geological constraints, safety and environmental conditions, the longwalls in the 300 series (LW301-316) have been shortened, reducing the mining area footprint by 253 hectares (ha) (Peabody undated a, pp. 23 and 26). The proposed project includes reconfiguration of existing Longwall 317, addition of Longwall 318 and repositioning of (the previously approved but not constructed) Ventilation Shaft 4.

The proponent estimates the project to have a subsidence footprint of 417.6 ha, whilst the construction of the ventilation shaft will result in direct disturbance of 3.8 ha of high-condition native forest (Peabody undated a, Table 6-6 p. 72). Construction of an additional access road within the approved disturbance area requires reinstating rock armouring along a section of the embankment toe at the Surface Facilities area near Camp Gully Creek (Peabody undated a, p. 21).

The project is in the Southern Coalfield in the southern Sydney Basin, situated on the Woronora Plateau, in the Woronora Reservoir and Hacking River catchments (Peabody undated a, p. 58). The reservoir supplies drinking water to the Sutherland Shire Local Government Area and north Wollongong, and its near-pristine catchment comprises Water NSW's Woronora Special Area, which has largely intact native forest that is contiguous with surrounding National Parks.

The proposed project longwalls are located below the sub-catchments of Honeysuckle Creek and Tributaries R, S and U that all feed Woronora Reservoir. The proponent acknowledges that project-related ground movements (e.g. subsidence) may impact refugial pools and the flow regime of Honeysuckle Creek (ATC Williams 2025, p. 19). The proposed longwalls also underlie six swamps comprising part of the Coastal Upland Swamps in the Sydney Basin Bioregion Threatened Ecological Community (TEC) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). One of these six swamps is Swamp 106, the largest in the area, which is classified as a high-priority groundwater-dependent ecosystem (GDE) listed under the Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2023, and which supports flow in a tributary of Honeysuckle Creek. These six swamps, along with eight others nearby, may be impacted by subsidence and drawdown associated with the project (McGregor 2025, Appendix N, Table 1, p. 7).

Not only are these swamps the Coastal Upland Swamps TEC, they also provide crucial habitat for multiple State- and EPBC Act-listed water-dependent species such as giant dragonfly (*Petalura gigantea*), giant burrowing frog (*Heleioporus australiacus*), Littlejohn's tree frog (*Litoria littlejohni*), red-crowned toadlet (*Pseudophryne australis*) and prickly bush-pea (*Pultenaea aristata*) (McGregor 2025, Table 8-9, p. 193). Other GDEs in the project area likely include terrestrial vegetation and stygofauna that may also be impacted by project-related drawdown and ground movements.

Collectively, these water resources and their water-dependent flora and fauna, many of which are Matters of National Environmental Significance (MNES), comprise the near-pristine catchment for the Woronora Reservoir and contribute to its water quality and ecological integrity. Longwall mining nearby has already caused irreversible damage to some of the overlying creeks, swamps and water-dependent vegetation (ATC Williams 2025, Table 21, p. 94) and the proposed project may further exacerbate some of these impacts (McGregor 2025, Appendix L, Table L-1, p. 3).

Key potential impacts from this project are:

- ground movements (e.g. subsidence) from longwall mining that will likely impact the Coastal Upland Swamps TECs, Honeysuckle Creek and its tributaries, refugial pools, and habitats for State- and EPBC Act-listed species;
- irreversible changes to the fauna, flora and ecological processes of at least six Coastal Upland Swamps TEC;
- groundwater drawdown which may impact swamps within the Coastal Upland Swamps TEC and other GDEs, including stygofauna in the Hawkesbury Sandstone;
- permanent alterations to flow regimes in intermittent Honeysuckle Creek, increasing the frequency and duration of low- and no-flow days (especially during periods of low rainfall), thereby reducing aquatic habitat and water quality;

- reductions in habitats and local populations of water-dependent flora and fauna, including giant dragonfly, giant burrowing frog, Littlejohn's tree frog, red-crowned toadlet and prickly bush-pea in the project area;
- surface water diversion through new underground pathways that may degrade surface water quality;
- direct removal of 3.8 ha of high-condition native forest; and
- cumulative impacts of increased drawdown and subsidence, added to existing mining effects, on swamps, GDEs, creeks and their refugial pools, and the habitats of multiple State- and EPBC Act-listed species.

Given the sensitivity of the protected swamps and the difficulty of reversing potential impacts, the IESC considers that the only effective way to minimise or mitigate potential impacts is to avoid longwall mining beneath all swamps and waterways in this near-pristine catchment of Woronora Reservoir. The proposed Adaptive Management Plan (AMP) cannot protect these significant water resources because impacts are likely to materialise too late to mitigate them.

The IESC considers that offset strategies will not compensate for the loss of EPBC-Act listed species and Coastal Upland Swamps TECs in this current landscape context.

Context

Metropolitan Coal Project Modification 4 (the 'project') is a continuation of an existing underground mine and facilities, 30 km north of Wollongong and adjacent to Helensburgh, NSW. Mining operations are approved until 22 June 2032 at a maximum ROM coal extraction rate of 3.2 Mtpa of metallurgical and thermal coal. The project will allow the mine to continue production up to the current approved date of 2032, instead of closing in 2029. The project entails a reduced underground mine layout, incorporating shortened commencing (i.e. northern) and finishing (i.e. southern) ends of Longwalls 301-316, as well as shortening of the commencing end of LW26 (Peabody undated a, p. 5). It reconfigures the existing Longwall 317 and adds Longwall 318 (with a subsidence footprint of 417.6 ha), plus construction of the repositioned Ventilation Shaft 4 (which entails clearing of 3.8 ha of high-condition native vegetation). The modification of the 300 series longwalls reduces the mining area footprint by 253 ha (Peabody undated a, pp. 23 and 26). The proposed construction of an additional access road within the approved disturbance area requires reinstating rock armouring along a section of the embankment toe at the Surface Facilities area near Camp Gully Creek (Peabody undated a, p. 7).

The project is in the Southern Coalfield in the southern Sydney Basin. The main aquifers are the regolith/alluvium, Hawkesbury Sandstone and Bulgo Sandstone. Below the Bulgo Sandstone are deeper Triassic sandstone and claystone units, below which is the target Bulli Coal Seam.

The proposed longwall mining occurs beneath a highly sensitive environment within Water NSW's Woronora Special Area, which has largely intact native forest that is contiguous with surrounding National Parks. The Indirect Impact Footprint has many MNES, including the Coastal Upland Swamps TEC, along with diverse flora and fauna, with varying dependence on Coastal Upland Swamps and other waterways draining into Woronora Reservoir. This reservoir supplies drinking water to the Sutherland Shire Local Government Area and north Wollongong. The proponent's documentation predicted serious and irreversible impacts to 13 Commonwealth and/or State-listed entities and assessed potential for impacts for up to 35 MNES (Peabody undated a, Table 7-1, p. 113, McGregor 2025, Appendix L). The project will also directly remove 3.8 ha of near-pristine native vegetation (McGregor 2025, p. 44). Ground movements (e.g. subsidence, valley closure) are likely to impact the Coastal Upland Swamps TEC and habitats for

many State- and EPBC Act-listed species of plants and animals (Peabody undated a, p. 76, McGregor 2025, Appendix N, p. 6).

In the predicted subsidence area, there are 68 ha of high-condition Coastal Upland Swamps TEC (McGregor 2025, Appendix B, Table 2-1, p. 27). This area comprises over forty Coastal Upland Swamps, of which six (Swamps 74, 75, 106, 117, 119 and 130) occur directly over the proposed longwalls 317 and 318 (AGE 2025, Figure 5-10, p. 50), and an additional eight neighbouring swamps (Swamps 76, 77, 91, 113, 114, 115, 128 and 139) may experience up to 1.5 m in conventional subsidence impacts beyond those predicted for previous approvals (MSEC 2025, p. 20). Historical impacts of ground movements (e.g. subsidence and upsidence) have been observed on swamps and watercourses near previous longwall panels (ATC Williams 2025, Map 20, p. 93, Table 21, p.106) in the Woronora Special Area.

Mitigation measures are proposed (McGregor 2025, Table 8-9, pp. 193-207); however, most of the necessary plans are yet to be developed and the plans that have been developed to date mostly focus on monitoring of impacts. An AMP (McGregor 2025, Appendix N) has been provided, and is for the management of 'infrequent, uncertain or difficult to measure' impacts in the place of mitigation measures 'that are difficult to implement' (McGregor 2025, p. 208). For those impacts that have been identified, for example on the Coastal Upland Swamps TEC, the proponent will consider the application of the offset Biodiversity Assessment Method under the NSW *Biodiversity Conservation Act 2016* (McGregor 2025, p. 227).

Response to questions

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

Question 1: To what extent can decision makers have confidence in the predictions of potential impacts on water resources provided in the Modification Report, including in regard to surface water quality, groundwater drawdown, and potential impacts on Coastal Upland Swamps TEC, groundwater dependent ecosystems, Woronora Reservoir and other water users?

- a. Has an appropriate model been selected and used by the Applicant? Are the assumptions used in the model reasonable, appropriately conservative and appropriately justified?
- b. Has the model been calibrated with sufficient monitoring data to provide meaningful predictions, including worst-case impacts on surface and groundwater resources?
- c. Has the model been appropriately conceptualised?
- d. Has appropriate sensitivity and uncertainty analyses been undertaken, including consideration of the potential effects of climate change?
- e. Have the surface and groundwater assessments sufficiently assessed surface and groundwater interactions?

1. The investigations and modelling approaches adopted by the proponent do not provide an adequate or defensible basis for predicting the impacts of the project on Coastal Upland Swamps TECs and GDEs, and creeks that flow into Woronora Reservoir. The proponent acknowledges that there will be subsidence-related impacts on MNES (McGregor 2025, Appendix L, p. 4). Historical evidence from other parts of the proponent's operations (ATC Williams 2025, pp. 76-92) has shown that surface cracking from ground movement is highly likely to cause irreversible impacts to swamps and creek lines (see response to Question 2). Independent monitoring and modelling of swamps in this and nearby areas have documented drying of swamps undermined by longwalls (Cairns et al. 2025).
2. In this landscape context, modelling can only partly predict the impacts of ground movement associated with longwall mining. While conventional subsidence predictions are generally reliable, it is

not possible to predict anomalous subsidence and uncertainties remain in quantifying non-conventional subsidence of longwall mining in irregular terrain (Hebblewhite 2023). Thus, localised impacts on creeks, pools, rockbars and swamps (e.g. valley closure, valley floor upsidence or far-field horizontal movement) are not fully predictable and interactions can be underestimated.

3. Given the inherent uncertainties, and the absence of suitable methods and feasible mitigation options, the IESC does not consider that answers to sub-questions a-e are relevant to improving confidence in the proponent's assessment of the project's impacts on water resources.

Question 2: Are conclusions reached in relation to the impacts of the proposed action on groundwater resources, including Coastal Upland Swamps TECs and groundwater dependent ecosystems, privately owned bores and local watercourses, and the Woronora Reservoir supported by the evidence having regard to:

- a. available monitoring data for defining baseline, current impact and proposed impact scenarios;
- b. conceptualisation of the groundwater systems, including inter-aquifer connectivity and interactions with the surface;
- c. post-mining recovery; and
- d. adequacy of existing water management infrastructure and processes to manage the groundwater impacts of the proposed action.

Question 3: If not, what additional information is required to enable a full assessment of the potential impacts to groundwater resources?

4. In general, the proponent's predictions of the project's impacts on water resources are supported by limited evidence. The IESC notes some major omissions in the proponent's assessment, including the amount of information on surface water and groundwater quality, and the assessment of water-dependent MNES (e.g. amphibians, dragonflies) and specific swamps that will be potentially impacted by the project. Furthermore, the proponent has likely underestimated the severity of impacts from ground movement (Paragraph 2) and the collective interactions of impact pathways (e.g. drawdown, subsidence, valley closure). Although additional information and monitoring data could be collected, the IESC does not consider that these additional data will reduce the risks associated with the project or guide any useful mitigation (see response to Question 4).

Question 4: Are the proposed measures to avoid, mitigate and minimise the impacts (including cumulative impacts) to water related resources adequate? What, if any, additional measures are needed to avoid and minimise impacts to water resources?

5. To mitigate and minimise impacts, the proponent has proposed a suite of long-term conservation and management actions. These include adaptive management, ongoing hydrological and ecological monitoring, sealing cracks, targeted revegetation and erosion control measures (McGregor 2025, Appendix N, pp. 26-27). Although these actions aim to reduce the severity of impacts, they cannot fully compensate for the loss of ecosystem processes in impacted Coastal Upland Swamps TECs.
6. The IESC cannot envisage any feasible mitigation measures, including offsets, that could safeguard these irreplaceable water resources and water-dependent MNES. Instead, it is strongly recommended that the proponent avoid longwall mining below all Coastal Upland Swamps TECs and waterways in the project area.

Date of advice 9 November 2025

Source documentation provided to the IESC for the formulation of this advice	<p>AGE 2025. <i>Metropolitan Coal Longwalls 317 & 318 Modification – Groundwater Impact Assessment</i>. Prepared by Australasian Groundwater & Environmental Consultants for Metropolitan Collieries Pty Ltd. 13 June 2025. (Appendix B of the Metropolitan Coal Longwalls 317 & 318 Modification Report)</p> <p>ATC Williams 2025. <i>Metropolitan Coal Longwalls 317 & 318 Modification</i>. Prepared by ATC Williams Pty Ltd on behalf of Peabody Energy Inc. 30 June 2025. (Appendix C of the Metropolitan Coal Longwalls 317 & 318 Modification Report)</p> <p>Bio-Analysis 2025. <i>Aquatic Ecology Assessment, Metropolitan Coal Longwalls 317-318 Modification</i>. Prepared by Bio-Analysis Pty Ltd on behalf of Metropolitan Collieries Pty Ltd. 19 June 2025.</p> <p>Hgeo 2025. <i>Attachment 4 Groundwater Impact Assessment and Surface Water Assessment Peer Reviews</i>. Prepared by Hgeo Pty Ltd on behalf of Peabody Energy Inc. 17 June 2025.</p> <p>JBS&G 2025. <i>Metropolitan Coal Modification Land Contamination Assessment</i>. Prepared by JBS&G on behalf of Peabody Energy Inc. 29 May 2025.</p> <p>McGregor K 2025. <i>Biodiversity Development Assessment Report, Metropolitan Coal Longwalls 317-318</i>. Prepared by Kayla McGregor on behalf of Peabody Energy Inc. 18 July 2025. (Appendix D of the Metropolitan Coal Longwalls 317 & 318 Modification Report)</p> <p>MSEC 2025. <i>Subsidence Predictions and Impact Assessments for Metropolitan Longwalls 317 and 318</i>. Report produced to support the Modification for submission to the Department of Planning, Housing and Infrastructure (DPHI) 16 June 2025. (Appendix A of the Metropolitan Coal Longwalls 317 & 318 Modification Report)</p> <p>Peabody undated a. <i>Metropolitan Coal Longwalls 317 & 318 Modification Report</i>. Prepared by Peabody Energy Inc. (Including Attachments 1 and 4, and Appendices A-E and H)</p> <p>Peabody undated b. <i>SEAR Metropolitan Coal Longwalls 317 & 318 Modification Report</i>. Prepared by Peabody Energy Inc.</p>
References cited within the IESC's advice	<p>Cairns J, Glamore W, Johnson F 2025. Environmental water requirements and climate sensitivity of Australia's upland swamps. <i>Science of the Total Environment</i>. 966,25 February 2025, 178792 https://doi.org/10.1016/j.scitotenv.2025.178792</p> <p>Hebblewhite B 2023. <i>Information Guidelines Explanatory Note: Subsidence associated with underground coal mining</i>. Report prepared for the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development through the Department of Climate Change, Energy, the Environment and Water, Commonwealth of Australia 2023. Available [online]: Information Guidelines Explanatory Note - Subsidence associated with underground coal mining iesc accessed 6 November 2025.</p> <p>IESC 2024. <i>Information Guidelines for proponents preparing coal seam gas and large coal mining development proposals</i>. Available [online]: Information guidelines for proponents preparing coal seam gas and large coal mining development proposals iesc accessed August 2025.</p>