Metropolitan Coal Mine

Longwalls 317 & 318 Modification

Modification Report

Peabody

EXECUTIVE SUMMARY

The Metropolitan Colliery (Metropolitan Coal Mine) is an existing underground mining operation located approximately 30 kilometres north of Wollongong, adjacent to the township of Helensburgh, New South Wales (NSW) (Figure ES-1).

The Metropolitan Coal Mine is owned and operated by Metropolitan Collieries Pty Ltd (Metropolitan Coal), a wholly owned subsidiary of Peabody Energy Australia Pty Ltd.

The Metropolitan Coal Mine currently operates under Project Approval (08_0149), which was supported by a Preferred Project Report, including the continuation, upgrade and extension of underground coal mining operations (Longwalls 20 - 27 and Longwalls 301 - 317) and surface facilities at the Metropolitan Coal Mine.

As mining operations have progressed at the Metropolitan Coal Mine, ongoing exploration activities have identified geological and geotechnical constraints which affect the available coal resource. To maintain safe and efficient operations, a reduced underground mine layout has been implemented. In addition, longwalls have been shortened to reduce subsidence effects on watercourses.

It is anticipated that the Metropolitan Coal Mine would cease operations in 2029, approximately three years earlier than the approved mine life of 2032, due to a reduced underground mine layout compared to the approved underground mine layout presented in the Preferred Project Report.

Metropolitan Coal proposes to optimise the approved underground mine layout to allow for the extraction of additional resources through the northern extension of Longwall 317 and addition of Longwall 318 to the west within existing mining and exploration tenements (hereafter referred to as the Modification) (Figure ES-2). The Modification would therefore provide for an additional two years of operations at the Metropolitan Coal Mine (i.e. coal extraction until approximately 30 June 2031).

The Modification also includes the relocation of the approved (but not yet constructed) Ventilation Shaft 4.

The Modification is being sought under section 4.55 (2) of the NSW *Environmental Planning and Assessment Act 1979.*

This Modification Report has been prepared to support the modification application in consideration of the *State Significant Development Guidelines* (Department of Planning, Housing and Infrastructure, 2024a), in particular, the *State significant development guidelines – preparing a modification report* (Department of Planning and Environment, 2022a).

STRATEGIC CONSIDERATIONS

The Metropolitan Coal Mine has played an important role in the Illawarra region from a social and economic perspective through its ongoing production of metallurgical coal product for BlueScope's Port Kembla Steelworks and sale of product to international market via Port Kembla.

The Modification would also continue the benefits for the region and the State in terms of employment opportunities (direct and indirect), income and value added for a further two years.

Approximately 90 percent of the 400-strong workforce reside in the Wollongong, Shellharbour and Sutherland Shire Local Government Areas. Further, local businesses already provide goods and services to Metropolitan Coal, with the company spending approximately $217 million (M) with local suppliers and business in financial year 2024. Metropolitan Coal had a total direct expenditure of approximately $324M in the NSW economy in financial year 2024.

The Modification has been proposed as a logical extension of the existing Metropolitan Coal Mine to maximise the recovery of coal resources within the currently approved mine life. Under the approved mine plan, underground mining and employment of the operational workforce at the Metropolitan Coal Mine would cease in 2029 following the completion of Longwall 316 (as Longwall 317 cannot be economically mined in its current arrangement).

The extended Longwall 317 and additional Longwall 318 would provide for the continuation of approximately 400 personnel for a further two years, as well as the generation of benefits such as $49M in royalties to NSW, that would otherwise not be realised.

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Source: Geoscience Australia, 2006; NSW Saptial Services (2025)
Metropolitan Coal (2025)

LEGEND
- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Road
- Railway
- National Parks and Wildlife Estate
- Local Government Area
- Mining Operation

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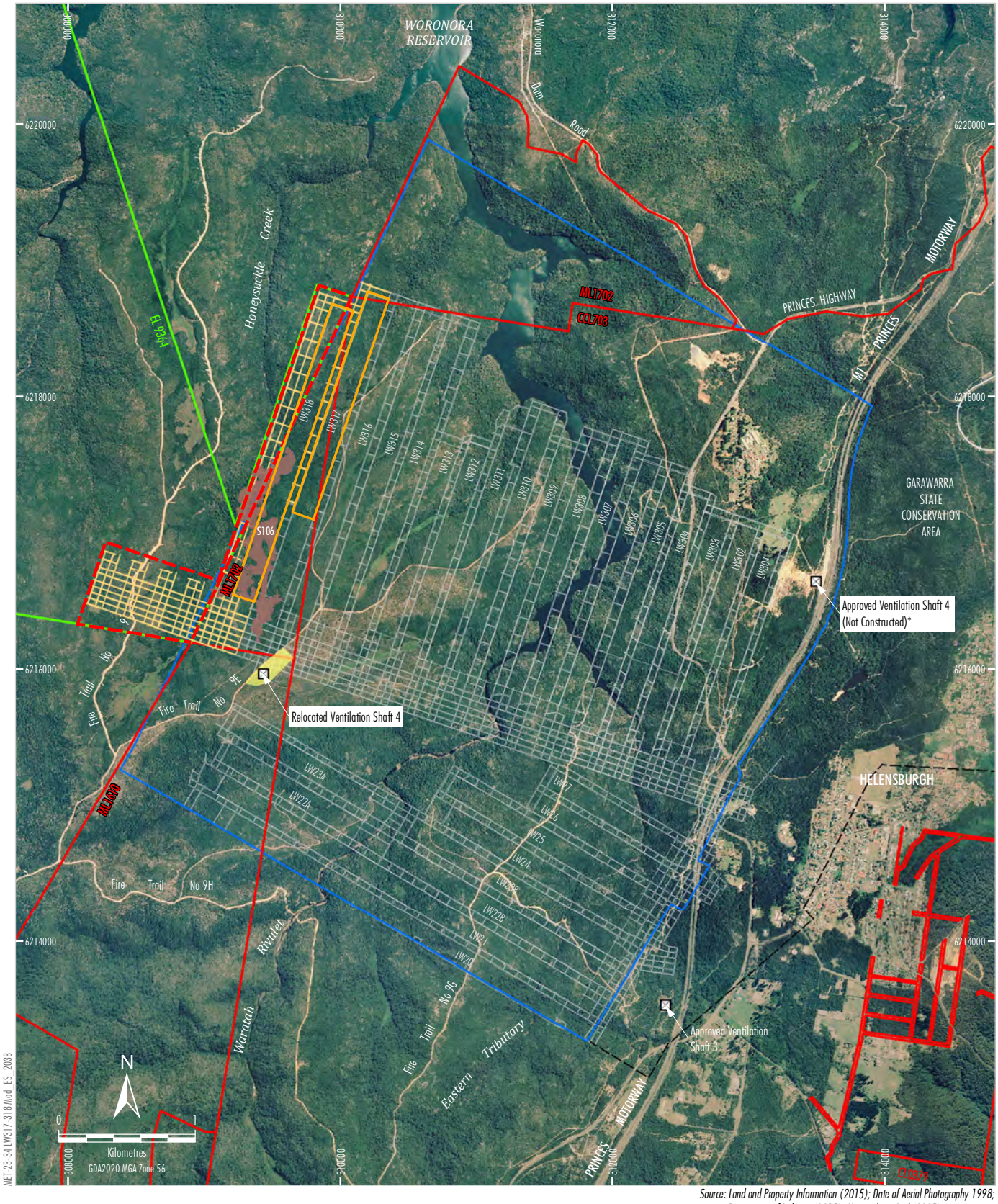
METROPOLITAN COAL

Regional Location

Figure ES-1



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Upland Swamp
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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METROPOLITAN COAL

Modified General Arrangement

Figure ES-2

If the Modification does not proceed:

- the Metropolitan Coal Mine is most likely to close after the completion of Longwall 316 in 2029, leading to significant job losses at the Metropolitan Coal Mine and likely flow on effects to the local region and the Southern Coalfield economic ecosystem including Port Kembla Coal Terminal and BlueScope's Port Kembla Steelworks;
- the approved Longwall 317 cannot be economically mined in its current arrangement (Figure 1-2) and therefore would likely be sterilised; and
- high quality metallurgical coal and thermal coal in the Modification area and Exploration Licence 9364 would likely be sterilised as there is no other viable opportunity to mine this resource.

The Modification would represent the continuation of mining in the Woronora Special Area. Mining within the Woronora Special Area has occurred for more than 100 years.

The coexistence between underground mining and the provision of drinking water supplies in the Woronora Special Area is expected to continue should the Modification be approved.

Mining operations and nearby land uses, such as state conservation areas and suburban areas, have historically co-existed and this would continue for the Modification (e.g. no evidence of significant loss of water, or changes in water quality from mining, or concern to water supply). The Modification would also be developed in a manner that is responsible and considers the benefits and consequences of the development for other land uses, including coexistence with the Woronora Special Area.

The site is considered suitable for the Modification, as the Modification would not adversely impact on, or be inconsistent with, adjoining existing or future land uses.

DESCRIPTION OF THE MODIFICATION

The Modification would provide for the continued employment of the existing 400-strong workforce for a further two years and comprise the following key components (Figures ES-2 and ES-3):

- extension of the approved Longwall 317 to the north;
- addition of Longwall 318 to the west of the approved longwalls;
- extension of the approved 300-series Mains to the west;
- extraction of an additional 3.2 million tonnes (Mt) of run-of-mine (ROM) coal;
- relinquishment of 14 Mt of approved ROM coal;
- relocation of the approved (but not yet constructed) Ventilation Shaft 4;
- continued transportation of coal rejects off-site for the life of the mine via a combination of rail and road; and
- relinquishment of approved surface development and underground mining areas.

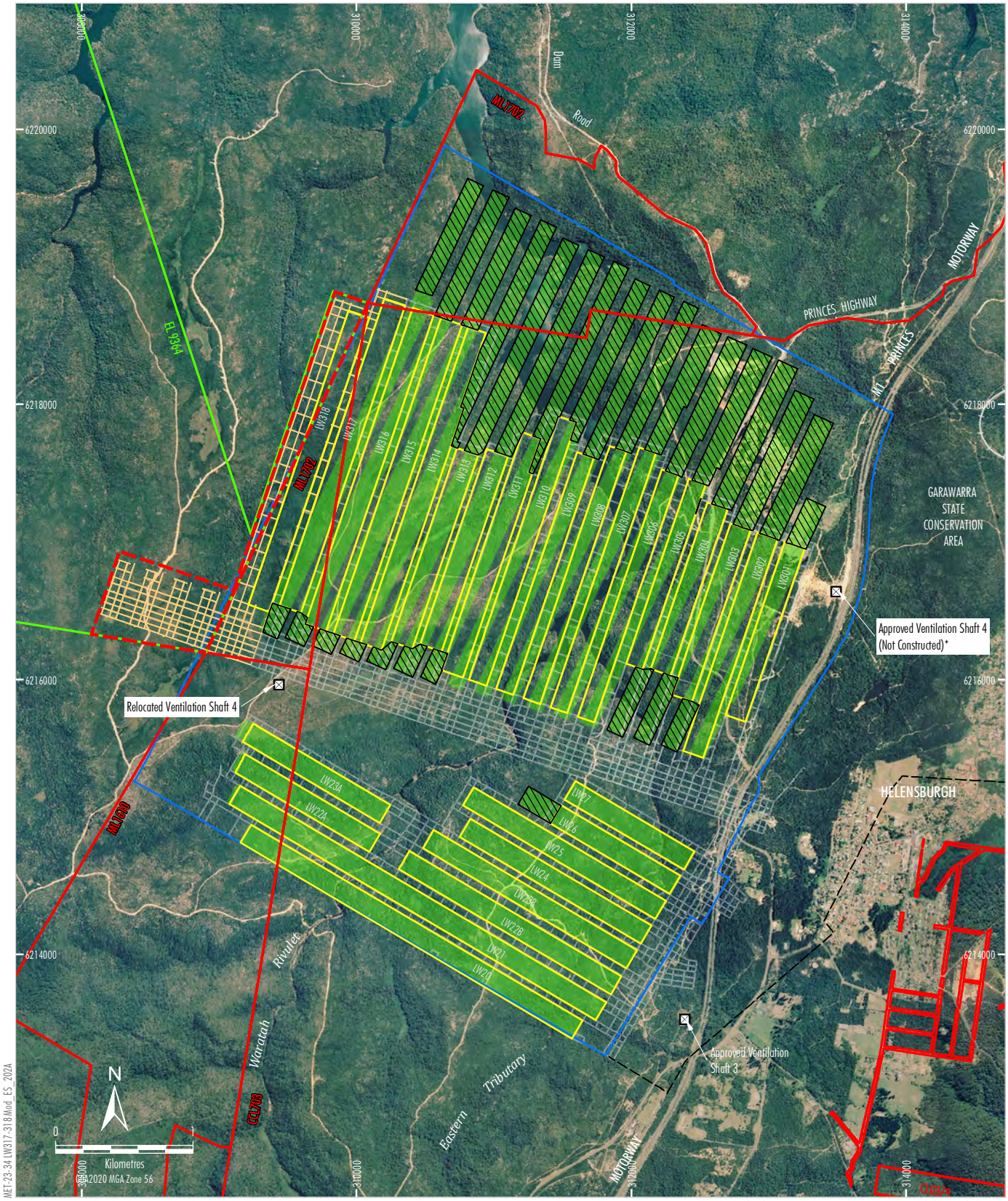
The Modification would involve no change to the:

- existing approved mine life (i.e. until June 2032);
- existing operational workforce;
- annual ROM coal extraction, processing and transportation limits; and
- existing infrastructure and Surface Facilities Area.

Consistent with the approved underground mine layout, Longwalls 317 and 318 have been designed using conservative longwall geometry to reduce subsidence effects and therefore potential environmental impacts. The design includes narrow panel voids of 163 metres (m) and wider chain pillars of 55 m (i.e. 10 m wider than the approved mine design) to reduce subsidence effects on upland swamps and watercourses.

The design also incorporates shortening of Longwall 317 by approximately 67 m at the southern end reduce subsidence effects on Swamp 106.

In consideration of the revision of the mine layout, as part of the Modification, Metropolitan Coal proposes to formally relinquish the unmined areas of the approved mine layout. This would result in a reduction of 253 hectares (ha) of longwall mining area (with a larger area no longer subject to subsidence effects) and a net reduction of 10.8 Mt of ROM coal mined. This results in an avoidance of residual biodiversity and environmental impacts from the approved layout. These relinquished areas are shown in Figure ES-3.



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Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing/Approved Underground Development
- Proposed First Workings
- Completed and Proposed Secondary Extraction
- Preferred Project Report Longwall Layout
- Approved Longwall Mining Areas to be Relinquished

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Approved Longwall Mining Areas to be Relinquished

Figure ES-3

STAKEHOLDER ENGAGEMENT OVERVIEW

Metropolitan Coal has consulted with a number of stakeholders during the development of this Modification Report, including:

- key Federal and State government agencies;
- local council;
- the local community;
- Aboriginal stakeholders; and
- the Metropolitan Coal Community Consultive Committee.

Key comments raised during consultation have been considered and addressed in preparation of the Modification Report.

SUMMARY OF ASSESSMENT OF IMPACTS

Metropolitan Coal has undertaken a review of the potential environmental impacts of the Modification. A summary of the environmental outcomes in this Modification Report is provided in Table ES-1.

Generally, potential impacts due to the Modification were found to be consistent with those predicted and observed for the Approved Layout. Avoidance measures have been considered and residual impacts are proposed to be managed and/or offset. By comparison to the approved layout, there would be a reduction in 253 ha of approved mining areas as a result of the reduced mine layout.

Impacts from the surface disturbance associated with the Relocated Ventilation Shaft 4 (approximately 3.8 ha) have been assessed and are considered to be minor, noting residual impacts are proposed to be managed and/or offset. Upon completion of construction, the development area of the shaft would be less than 0.1 ha.

CONCLUSION

The Modification is an extension of the existing approved Metropolitan Coal Mine, that would comply with applicable statutory requirements and relevant strategic and statutory planning policy objectives (Sections 2 and 4, and Attachment 3).

The Modification has been designed to avoid or minimise potential impacts to key natural features in the local area.

The Metropolitan Coal Mine, incorporating the Modification, would remain substantially the same as the development that was originally granted for the Metropolitan Coal Mine, as approved under Project Approval (08_0149).

The Metropolitan Coal Mine (as modified) would continue to comply with existing criteria, performance measures and limits described in Project Approval (08_0149).

Metropolitan Coal would continue to operate the Metropolitan Coal Mine (as modified) in accordance with the existing environmental management plans and environmental monitoring programs, which would be updated to incorporate the Modification.

In weighing up the main environmental impacts (costs and benefits) assessed and described in this Modification Report, the Modification, on balance, is considered to have merit.

Table ES-1
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Subsidence	• Maximum predicted total vertical subsidence, tilt and sagging curvature for the Modification is the same as predicted for the approved Metropolitan Coal Mine underground mine layout. • No changes to Subsidence Impact Performance Measures outlined in the Project Approval (08_0149) would be required for the Modification (noting these do not currently cover the coastal upland swamps community).	• The longwall layout proposed for the Modification has been designed by Metropolitan Coal to reflect the adoption of a number of longwall mine constraints to minimise potential impacts, including amendment of Longwalls 317 and 318 to reduce subsidence impacts on upland swamps. • Metropolitan Coal would develop a Subsidence Monitoring Program for Longwalls 317 and 318, consistent with that prepared for the Longwalls 311-316 Extraction Plan.
Groundwater	• The majority of the drawdown associated with the Metropolitan Coal Mine is due to the approved mining. • Temporary short-term reductions in groundwater discharge are predicted; however, long-term impacts are expected to be negligible. • It is unlikely that any significant effect on water quality on a receptor would eventuate. • Predicted long-term impacts of the Modification on groundwater flux to Honeysuckle Creek, Woronora Reservoir, the Woronora River and Waratah Rivulet are all negligible (i.e. less than 1 Megalitres per year). • The Modification would not materially change any approved impacts at privately owned bores.	• Metropolitan Coal holds sufficient licences in the Sydney Basin Central Groundwater Source for the Metropolitan Coal Mine incorporating the Modification. • Metropolitan Coal would obtain licences in the Woronora River Water Source – Upper Woronora Management Zone for net take from the source due to the predicted temporary impact on Honeysuckle Creek. • Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan.
Surface Water	• It is unlikely that subsidence effects associated with the Modification would result in significant impacts to overland flow. • Where cracking of a creek bed and/or fracturing underlying strata occurs, this would likely lead to increased leakage from pools and redirection of surface flow. • The proposed relinquished areas (253 ha) would reduce the areas subject to bedrock cracking and associated pool water level, streamflow and water quality effects. • The potential impacts on water quality on Honeysuckle Creek and tributaries within the Study Area are expected to be similar to previously recorded (i.e. transient pulses of iron, manganese and aluminium), however, based on historical effects, it is unlikely to result in a persistent change. • The Modification would have a neutral effect on water quality with respect to underground mining and neutral to beneficial effect on water quality with respect to the construction of the relocated Ventilation Shaft 4.	• Metropolitan Coal would install additional pool water level, surface water quality and gauging stations as recommended by ATC Williams Pty Ltd (2025). • Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan. • Metropolitan Coal would undertake remediation works as required, where cracks/fractures do not naturally seal post-cessation of subsidence movements associated with the Modification, consistent with that undertaken to date at impacted locations in Eastern Tributary and Waratah Rivulet.

Table ES-1 (Continued)
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Upland Swamps	• There are six upland swamps that have a low potential risk of greater than negligible environmental consequence. • The remaining 35 swamps have a negligible risk of greater than negligible environmental consequence. • Predicted tilts associated with the Modification are not expected to have a significant effect on the overall gradient of the swamps or the flow of surface water through the swamps • Temporary drawdown to the regional groundwater table would result in some drawdown and some additional induced leakage from parts of a small number of swamps which extend close to larger creeks and longwall panels.	• Swamp monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan and Biodiversity Management Plan. • An Adaptive Management Plan would be prepared to manage potential impacts on swamps. • Trigger action response plans would be established for swamps to inform proactive management. • The existing SEEP/W model would be updated to incorporate the latest monitoring data, and to develop trigger action response plans for the swamps.
Biodiversity	• The Biodiversity Development Assessment Report (BDAR) has assessed direct impacts associated with the construction of relocated Ventilation Shaft 4 as well as indirect and prescribed impacts (including subsidence impacts). • Niche prepared a Serious and Irreversible Impacts (SAII) Impact Assessment for 13 entities. The BDAR describes how impacts to SAII entities would be avoided, minimised, mitigated, offset and/or subject to additional appropriate measures. • Niche also assessed 35 Matters of National Environmental Significance (MNES) in relation to the Modification. The potential impacts to three MNES listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (Coastal Upland Swamps, Giant Burrowing Frog [*Heleioporus australiacus australiacus*], Littlejohn's Tree Frog [*Litoria littlejohni*]) are uncertain as they relate to subsidence effects on upland swamps and Honeysuckle Creek. Conservatively, it is assumed the Modification is likely to have a significant impact on these MNES entities in the absence of considering proposed remediation, offset and compensatory measures. • The remaining 32 MNES entities were assessed as unlikely to be significantly impacted by the Modification.	• The BDAR outlines key mitigation measures which would be implemented in carrying out the Modification, such as a Vegetation Clearing Protocol. • In relation to offsetting, biodiversity credit obligation for the Modification would be discharged in accordance with the *Biodiversity Assessment Method* (BAM) (Department of Planning, Industry and Environment, 2020b). • Key biodiversity management measures at the Metropolitan Coal Mine would continue to be implemented for the Modification, including the Biodiversity Management Plan and Water Management Plan. • An Adaptive Management Plan would be prepared to manage potential impacts on swamps. • Trigger action response plans would be established for swamps and Honeysuckle Creek to inform proactive management, including for the three MNES species (Coastal Upland Swamps, Giant Burrowing Frog, Littlejohn's Tree Frog).

Table ES-1 (Continued)
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Aquatic Ecology	• The Modification is considered unlikely to cause a significant decline in the composition or distribution of aquatic macrophytes within the Study Area or downstream reaches of Honeysuckle Creek and other tributaries. • The Modification is unlikely to result in significant long-term impacts to aquatic macrophytes, aquatic macroinvertebrates or fish assemblage. • No threatened aquatic biota listed under the *Fisheries Management Act 1991* or EPBC Act are known to occur within the Study Area or Woronora Reservoir. • The Modification is unlikely to result in the introduction of new invasive species of aquatic flora or fauna. • During high and median flow periods, pool water levels in affected areas are anticipated to remain comparable to pre-impact levels. During low flow, affected pools may exhibit altered recessionary behaviour.	• Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan. • Aquatic ecology monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Biodiversity Management Plan. • Metropolitan Coal would undertake remediation works as required.
Aboriginal Cultural Heritage	• Comprehensive assessment and engagement was conducted with registered Aboriginal stakeholders. • There are no Aboriginal cultural heritage sites within the relocated Ventilation Shaft 4 surface disturbance area. • The Modification has the potential to indirectly impact 15 Aboriginal cultural heritage sites located outside of the approved approved Metropolitan Coal Mine extent, which 14 are assessed as being of low scientific significance and one is assessed as moderate scientific significance. • The Modification would not result in any significant cumulative impact on Aboriginal heritage in the region.	• Avoidance measures adopted for Longwalls 317 and 318 would result in four Aboriginal cultural heritage sites not experiencing additional subsidence impacts as a result of the amended Modification layout. • Thirteen Aboriginal cultural heritage sites located within the proposed relinquishment areas would experience a reduction or complete avoidance of subsidence impacts approved for the Metropolitan Coal Mine. • Aboriginal cultural heritage monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Heritage Management Plan.
Greenhouse Gas	• There would be an estimated net reduction in ROM coal recovery of approximately 10.8 Mt and decreased Scope 1 greenhouse gas emissions of 1.1 Mt carbon dioxide equivalent compared to the Metropolitan Coal Mine as approved. • The continued compliance with the Safeguard Mechanism would result in the Modification making a meaningful contribution to the NSW emission reduction targets.	• Metropolitan Coal would prepare a Climate Change Mitigation and Adaptation Plan to document reasonable and feasible Scope 1 and Scope 2 greenhouse gas mitigation measures that could be applied at the Metropolitan Coal Mine. • Metropolitan Coal would continue to comply with its obligations to report greenhouse gas emissions and energy consumption/production under the *National Greenhouse and Energy Reporting Act 2007* and the associated Safeguard Mechanism.

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1 INTRODUCTION

The Metropolitan Colliery (Metropolitan Coal Mine) is located approximately 30 kilometres (km) north of Wollongong, adjacent to the township of Helensburgh, New South Wales (NSW) (Figure 1-1).

The Metropolitan Coal Mine is owned and operated by Metropolitan Collieries Pty Ltd (Metropolitan Coal), a wholly owned subsidiary of Peabody Energy Australia Pty Ltd (Peabody).

The potential environmental impacts of the existing Metropolitan Coal Mine were assessed in the *Metropolitan Coal Project Environmental Assessment* (Metropolitan Coal Project EA) (Helensburgh Coal Pty Ltd, 2008a). A Preferred Project Report (PPR) was submitted to the then NSW Department of Planning in April 2009. The key changes in the PPR were a reduction to the extent of the longwall mining area to avoid subsidence impact to pool drainage along the downstream section of Waratah Rivulet and reorientation of the longwall panels.

Project Approval (08_0149) for the Metropolitan Coal Mine was granted on 22 June 2009 by the Minister for Planning under former section 75J of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). The Metropolitan Coal Project included the continuation, upgrade and extension of underground coal mining operations (Longwalls 20-27 and Longwalls 301-317) and surface facilities at the Metropolitan Coal Mine. The Project Approval (08_0149) longwall layout is presented on Figure 1-2.

The Metropolitan Coal Project action was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in 2008. The Assistant Secretary for the then Department of the Environment, Water, Heritage and the Arts determined the Metropolitan Coal Project action to be not a controlled action on 4 February 2009 (EPBC 2008/4519).

In April 2015, the then Secretary of the NSW Department of Planning and Environment (DPE; now known as the NSW Department of Planning, Housing and Infrastructure [DPHI]) approved a revised first workings layout of the Metropolitan Coal Mine in accordance with Condition 5, Schedule 3 of the Project Approval (08_0149). The revised underground mine layout included a rotation of the longwalls by approximately six degrees (°) such that Longwalls 301-317 are square with the 300-series Mains. This reorientation of the 300-series longwall panels resulted in the shortening of Longwall 317 compared to that presented in the PPR.

Metropolitan Coal is proposing to modify Project Approval (08_0149) to allow for the optimisation and continued operations at the Metropolitan Coal Mine (hereafter referred to as the Modification).

The Modification is being sought under section 4.55(2) of the EP&A Act. Metropolitan Collieries Pty Ltd is the applicant for the Modification.

This Modification Report has been prepared to support the modification application in consideration of the *State Significant Development Guidelines* (DPHI, 2024a), in particular *State significant development guidelines – preparing a modification report* (DPE, 2022a).

1.1 SUMMARY OF THE APPROVED METROPOLITAN COAL MINE

The Metropolitan Coal Mine is one of the longest continually running coal mining operations in Australia, with a history dating back to the 1880s. The Metropolitan Coal Mine is located in the Southern Coalfield of NSW within the Wollongong Local Government Area (LGA) (Figure 1-1).

The Metropolitan Coal Mine is located within Mining Lease (ML) 1610, ML 1702, Mining Purpose Lease (MPL) 320, Coal Lease (CL) 379 and Consolidated Coal Lease (CCL) 703 (Figure 1-2), targeting the Bulli Seam. Metropolitan Coal also holds Exploration Licence (EL) 9364, which is located west of the approved underground mining area (Figure 1-1).

The Metropolitan Coal Mine comprises an Underground Mining Area and Surface Facilities Area. Since the approval for the reorientation of the longwall panels in April 2015, the 300-series longwall layout has been revised to reflect geological and geotechnical constraints which affect the ability to mine the coal resource. To maintain safe and efficient operations, a reduced underground mine layout has been implemented for the northern area of the 300-series longwalls. In addition, longwalls have been shortened to reduce subsidence effects on watercourses. This has resulted in a reduction in run-of-mine (ROM) coal extraction compared to the approved underground mine layout.

The current longwall layout incorporating the shortened longwalls is shown on Figure 1-3. Metropolitan Coal plans to commence secondary extraction of Longwall 312 in July 2025.

Source: Geoscience Australia, 2006; NSW Saptial Services (2025) Metropolitan Coal (2025)

LEGEND
- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Road
- Railway
- National Parks and Wildlife Estate
- Local Government Area
- Mining Operation

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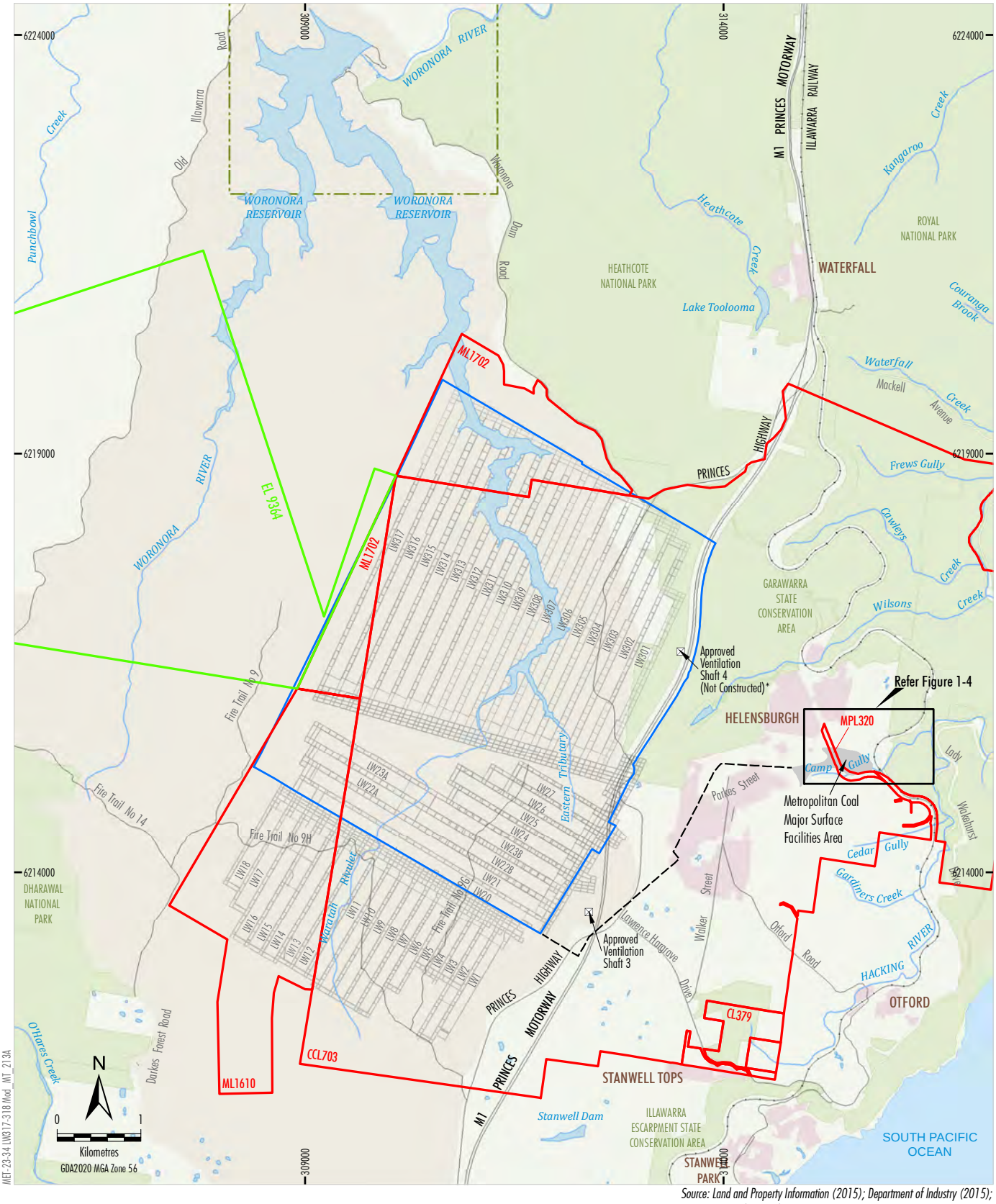
METROPOLITAN COAL

Regional Location

Figure 1-1



Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Project Underground Mining Area Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Woronora Special Area
- Railway
- Road
- Woronora Notification Area
- Approved Metropolitan Coal Mine Longwall Layout

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the Preferred Project Report.
* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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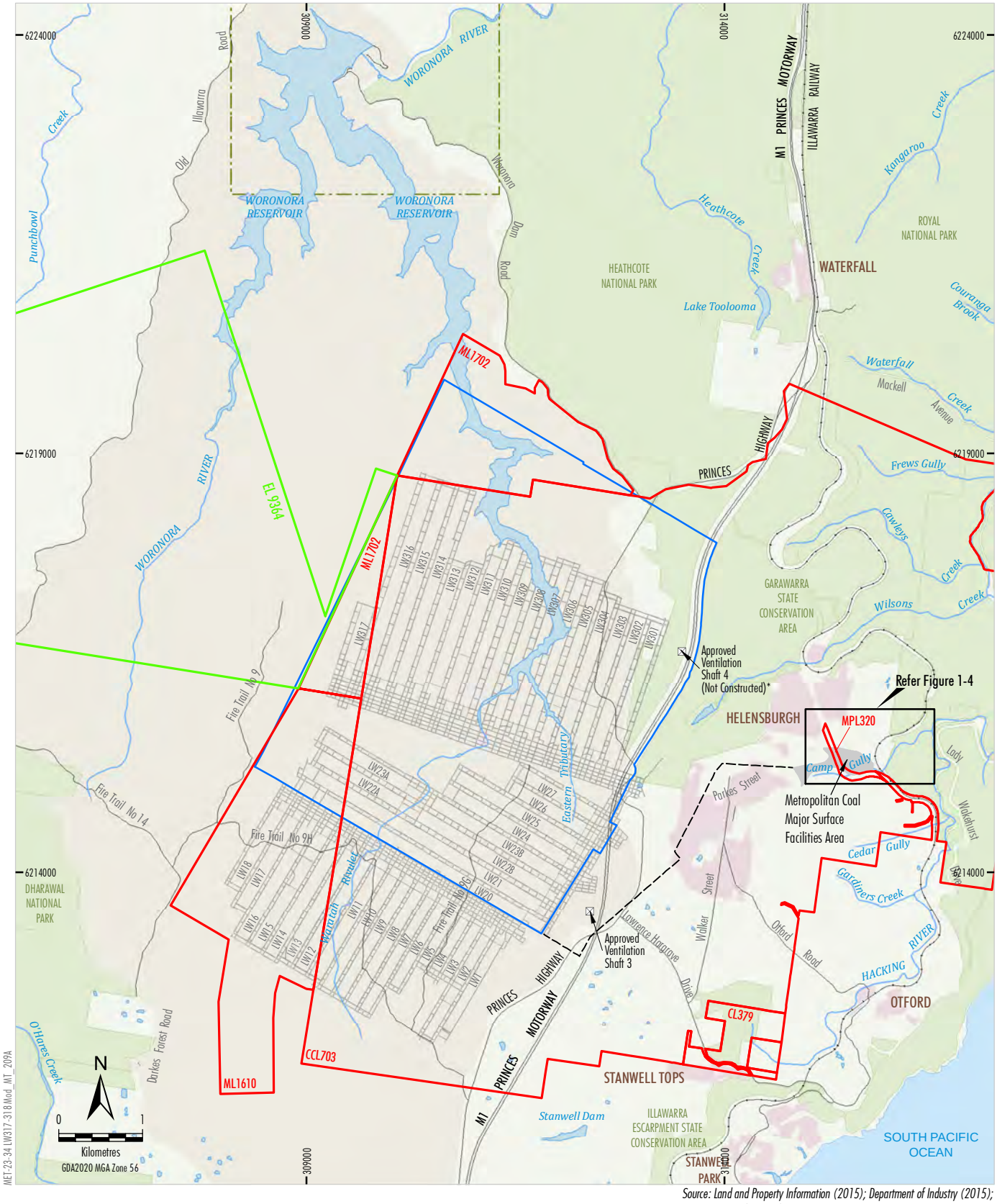
METROPOLITAN COAL

Approved Metropolitan Coal Mine Longwall Layout

Figure 1-2



Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Woronora Special Area
- Railway
- Road
- Woronora Notification Area
- Current Metropolitan Coal Mine Longwall Layout

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.
* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Current Metropolitan Coal Mine Longwall Layout

Figure 1-3

Mining operations at the Metropolitan Coal Mine are approved until 22 June 2032 at a maximum ROM coal extraction rate of 3.2 million tonnes per annum (Mtpa).

The Surface Facilities Area includes administration buildings, workshop, bath house and ablution facilities, haul roads, access road, fuel and consumables storage facilities, hardstand areas, water management infrastructure, a Coal Handling and Preparation Plant (CHPP), stockpiles (including ROM coal, product coal and coal reject stockpiles) and associated coal handling infrastructure (e.g. conveyors, transfer points and buffer bins) (Figure 1-4).

The Metropolitan Coal Mine includes an air ventilation system to maintain suitable gas concentrations and air quality within the underground mining area. Ventilation Shaft 3 was constructed in 1975 east of the 200-series longwalls and operates as an upcast system (Figure 1-3). The approved Metropolitan Coal Mine also includes the installation of an upcast shaft and associated fan adjacent to the main underground roadways to the west of M1 Princes Motorway and east of Longwall 301 (i.e. Ventilation Shaft 4) as shown on Figure 1-3. As a result of the reduced extent of the underground mine layout compared to the approved underground mine layout, construction of the approved Ventilation Shaft 4 has not been required at that location to date to maintain suitable gas concentrations and air quality within the underground mining area.

Construction of a methane flare unit to allow flaring of coal seam gas in a controlled manner is currently approved at Ventilation Shaft 3 (Figure 1-3). The unit has not been constructed to date as methane levels have not been amendable to flaring. Metropolitan Coal plans to construct the flaring unit at Ventilation Shaft 3 in the next 18 months. Metropolitan Coal is proposing to construct the unit on the basis the reduction in greenhouse gas emissions is material based on the remaining mine life inclusive of the Modification. The unit is planned to be constructed as a 'no-regrets' measure that would reduce emissions during the approved operations (i.e. prior to the Modification commencing).

ROM coal at the Metropolitan Coal Mine is washed in the CHPP producing product coal and coal rejects. The metallurgical product coal is transported via rail to BlueScope Steel Limited's (BlueScope's) Port Kembla Steelworks or to Port Kembla Coal Terminal for international markets.

Coal reject material is railed to Port Kembla Coal Terminal and is currently sold internationally for energy producing purposes (i.e. as a thermal coal) or for use in manufacturing processes.

Metropolitan Coal currently has approval from the Secretary of the DPHI for the transport of coal rejects off-site by road to 31 December 2026. Coal rejects were transported off-site by road for beneficial reuse between 2009 and 2019, and since 2019 have been blended with other products to produce a saleable product. As described above, this product is transported via rail to Port Kembla Coal Terminal and shipped to international markets.

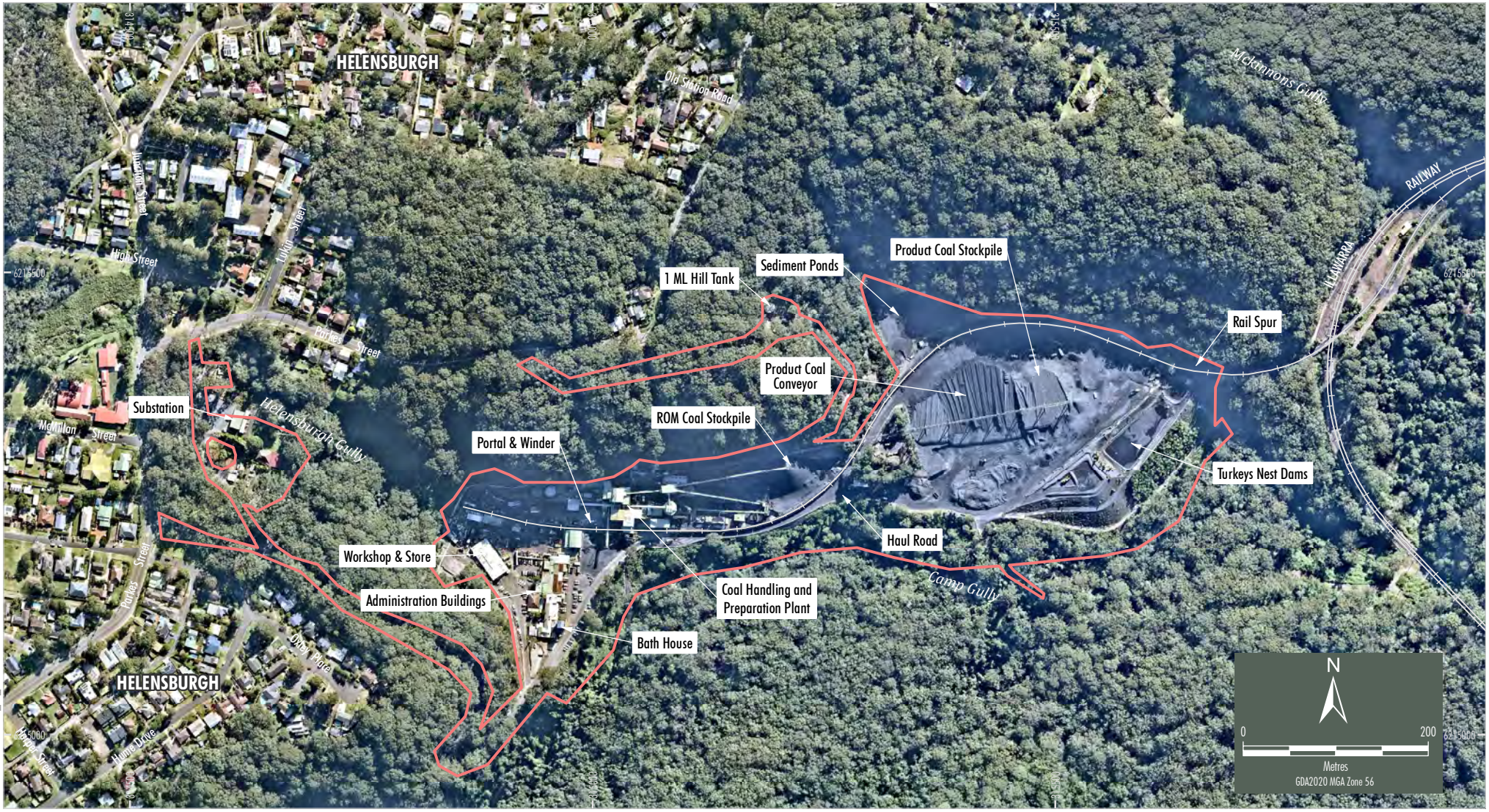
1.2 OVERVIEW OF THE MODIFICATION

Background to the Modification

The reduced underground mine layout incorporates shortened commencing (i.e. northern) and finishing (i.e. southern) ends of Longwalls 301-316 as well as shortening of the commencing end of Longwall 26 compared to the approved underground mine layout. Underground mining operations are therefore expected to be completed in 2029, which is approximately three years earlier than the approved mine life (i.e. until June 2032).

Exploration data indicates that the Bulli Seam to the west of the approved underground mining area can be economically extracted via longwall mining methods. Consistent with the approved Metropolitan Coal Mine, the Bulli Seam coal can be processed to produce a high quality metallurgical coal that is used for steelmaking. As a result, Metropolitan Coal is proposing a modification to maximise efficient coal extraction and allow for the continuation of underground mining operations at the Metropolitan Coal Mine until approximately 30 June 2031.

Coal processing and off-site transportation activities would continue until approximately 31 December 2031. Underground roadway development associated with the Modification would commence in 2027.



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LEGEND

Approximate Extent of Major Surface Facilities Area

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METROPOLITAN COAL

General Arrangement of the Surface Facilities Area

Source: NSW Spatial Services (2020)
Orthophoto: Nearmap (2021)

Figure 1-4

Description of the Modification

In summary, the Modification would provide for the continued employment of the existing 400-strong operational workforce for a further two years and comprise the following key components:

- extension of the approved Longwall 317 to the north;
- addition of Longwall 318 to the west of the approved longwalls;
- extension of the approved 300-series Mains to the west;
- extraction of an additional 3.2 million tonnes (Mt) of ROM coal;
- relinquishment of 14 Mt of approved ROM coal;
- relocation of the approved (but not yet constructed) Ventilation Shaft 4;
- continued transportation of coal rejects off-site for the life of the mine via a combination of rail and road; and
- relinquishment of approved surface development and underground mining areas.

The Modification would also include the establishment of an access track within the approved disturbance area to reinstate rock-armouring along a section of the embarkment toe at the Surface Facilities area near Camp Gully Creek.

No other changes to the approved Metropolitan Coal Mine (including the existing surface facilities and infrastructure at the Surface Facilities area) would be required for the Modification.

Section 3 includes further details and figures showing the key components of the Modification.

Reasons for the Modification

The Modification is required to allow for the continued operations of the Metropolitan Coal Mine.

Throughout operation of the Metropolitan Coal Mine, Metropolitan Coal has continued to evaluate the recoverable coal reserves in the Bulli Seam. Under the approved underground mine plan, underground mining and employment of the operational workforce at the Metropolitan Coal Mine would cease in 2029 following the completion of Longwall 316 (as Longwall 317 cannot be economically mined in its current arrangement).

Ongoing exploration activities in the underground mining area have identified a number of geological structures alongside geotechnical and environmental constraints which have impacted the approved underground mine layout at both the commencing (i.e. northern) and finishing (i.e. southern) ends of the longwalls, resulting in a reduction of coal recovery and total underground mining area compared to the approved Metropolitan Coal Mine.

The approved Metropolitan Coal Mine underground mining area and the completed/planned 200-series longwalls and 300-series longwalls mining area are approximately 988 hectares (ha) and 713 ha, respectively. This represents a 26 percent (%) reduction in underground mining area across the Metropolitan Coal Mine, resulting in a reduction in ROM coal recovery of approximately 14 Mt.

The extension of Longwall 317 and the addition of Longwall 318 are proposed as part of the Modification to offset the ROM coal resources that are not able to be efficiently or safely mined due to the identified geological structures, and geotechnical and environmental constraints.

Ongoing detailed mine planning has also identified an opportunity to optimise the existing ventilation system of the Metropolitan Coal Mine by relocating the approved, but not yet constructed, Ventilation Shaft 4. The revised location allows for targeted gas management and ventilation to support safe and efficient operations as longwall mining progresses.

Metropolitan Coal intends to continue the rail transport of coal reject product for the life of the Metropolitan Coal Mine for sale to local and international customers. Notwithstanding, unforeseeable changes or disruptions to the international market may result in an increased stockpile of coarse coal reject at the Metropolitan Coal Mine. As such, the continued ability to truck coarse coal reject off-site beyond the approved timeframe (i.e. 31 December 2026) is being proposed as part of the Modification to provide a long-term contingency transport method (should this be required).

1.3 ANALYSIS OF FEASIBLE ALTERNATIVES

The key feasible alternatives to the Modification considered were as follows:

- Not proceeding with the Modification.
- Alternative mining method within the Modification underground mining area.

- Alternative longwall layouts and geometry within the Modification underground mining area.
- Alternative Ventilation Shaft 4 location and design.

Not Proceeding with the Modification

As the approved layout for Longwall 317 is not considered economical to mine, the only realistic alternative to the Modification would be to cease mining activities at the Metropolitan Coal Mine following completion of Longwall 316 and transition into a care and maintenance phase.

If the Modification did not proceed there would be reduced environmental impacts, however there would also be adverse socio-economic implications following the completion of Longwall 316 in approximately 2029. This would include discontinuation of employment opportunities for the existing operational workforce, royalties payments, taxes and expenditure with regional businesses. The Modification would provide for the further employment of the Metropolitan Coal Mine operational workforce for a further two years.

If the Modification did not proceed, the coal resources within the Modification area and EL 9364 would also likely be sterilised as there is no other feasible alternative access to mine this resource.

Alternative Underground Mining Methods

The Metropolitan Coal Mine currently employs conventional longwall underground mining methods to extract coal from the Bulli Seam.

While bord and pillar mining is an underground mining technique that can be viable for some shallow coal seams, it is considered uneconomic to use bord and pillar mining as the primary extraction method at depths from the surface that are greater than approximately 200 metres (m) (NSW Department of Planning, 2008). The depth of the Bulli Seam in the Modification area is generally greater than 500 m from the surface.

Bord and pillar mining methods have not been adopted as they are not economically viable at the Metropolitan Coal Mine and would not maximise the extraction of the State resource.

Alternative Longwall Layout Design

The Metropolitan Coal Mine has implemented a conservative longwall geometry since the commencement of longwall mining in the Woronora Special Area in 1995. This includes narrower longwall panel (voids) of approximately 163 m and wider pillars of approximately 45 m compared to traditional longwall mine designs (which often have panels of approximately 300 m width). This geometry substantially reduces subsidence effects. With the implementation of this conservative geometry, there has been no instances of connective surface to seam cracking at the Metropolitan Coal Mine which can result in loss of surface water to the underground workings.

The original Longwalls 317 and 318 layout geometry for the Modification, as per the Scoping Letter submitted in October 2023, was based on pillar widths of 45 m (solid) consistent with the longwall geometry in Project Approval (08_0149). The Modification Longwalls 317 and 318 geometry was changed to pillar widths of 55 m (i.e. 10 m wider than the original design). This results in a reduced tensile strain at the surface of 0.5 millimetres per metre (mm/m) or less for all upland swamps in the Modification area.

It is common in subsidence engineering to associate the onset of tensile cracking with a tensile strain of 0.5 mm/m (Independent Advisory Panel for Underground Mining, 2020). The revised pillar width with less tensile strain would reduce (minimise) subsidence effects at upland swamps and their associated tributaries within the Modification area to a point below where it is considered that tensile cracking could occur.

If the Modification was to adopt a traditional longwall geometry (i.e. with wider panels and narrower pillars), there would be a substantial improvement in operating costs. However, there would also be significantly greater subsidence effects on surface features including watercourses and upland swamps.

A traditional longwall geometry has not been adopted for the Modification due to the potential for unacceptable impacts to watercourses and upland swamps.

Alternative Ventilation Shaft 4 Design

The original design of the ventilation system incorporated an upcast powered ventilation system. To power the upcast system, an 11 kilovolt (kV) powerline corridor (approximately 20 m wide and 4 km long) would have needed to be developed from the south to the proposed relocated Ventilation Shaft 4 site.

A downcast ventilation system was adopted for the Modification to avoid the impacts on biodiversity values associated with the development of a powerline easement (approximately 8 ha of direct vegetation disturbance avoided).

In addition to the above system design change, the original design for the ventilation system was refined to minimise the construction footprint of the stockpile, laydown, access and water management areas. This has reduced the total footprint by approximately 0.4 ha. Further footprint reductions are not feasible due to safety and water management requirements.

1.4 APPLICANT DETAILS

The Applicant for the Modification is:

Metropolitan Collieries Pty Ltd
31 Duncan Street
Fortitude Valley QLD 2330

1.5 STRUCTURE OF THIS MODIFICATION REPORT

An overview of the main text of this Modification Report is presented below:

Section 1	Provides a summary of the approved Metropolitan Coal Mine and an overview of the Modification.
Section 2	Outlines the strategic context relevant to the Modification.
Section 3	Provides a detailed description of the Modification.
Section 4	Outlines the statutory provisions relevant to the Modification.
Section 5	Describes the consultation and engagement undertaken in relation to the Modification and process for ongoing community involvement.
Section 6	Details the environmental assessment of the Modification and describes the existing environmental management systems and measures that would be available to manage and monitor any potential impacts.
Section 7	Provides an evaluation of the Modification, having regard to economic, environmental, and social impacts.
Section 8	References.
Section 9	Abbreviations.

Attachments 1 to 6 and Appendices A to H provide supporting information as follows:

Attachment 1	Secretary's Environmental Assessment Requirements.
Attachment 2	Development Application Area and Real Property Descriptions.
Attachment 3	Detailed Statutory Compliance Reconciliation Table.
Attachment 4	Peer Review Letters.
Attachment 5	Consideration of National Heritage Places listed under the EPBC Act.
Attachment 6	Site Verification Certificate.
Appendix A	Subsidence Assessment.
Appendix B	Groundwater Impact Assessment.
Appendix C	Surface Water Assessment.
Appendix D	Biodiversity Development Assessment Report.
Appendix E	Aquatic Ecology Assessment.
Appendix F	Aboriginal Cultural Heritage Assessment.
Appendix G	Greenhouse Gas Assessment.
Appendix H	Land Contamination Assessment.

2 STRATEGIC CONTEXT

2.1 REGIONAL OVERVIEW

The Metropolitan Coal Mine is an existing underground coal mining operation located in the Southern Coalfield, adjacent to the township of Helensburgh and approximately 30 km north of Wollongong, within the Wollongong LGA.

The Metropolitan Coal Mine has played an important role in the region from a social and economic perspective, through its ongoing production of metallurgical coal product for BlueScope's Port Kembla Steelworks and sale of product to international market via the Port Kembla Coal Terminal.

The *Wollongong Economic Development Strategy 2019-2029* (Wollongong City Council, 2019) notes:

> *The coal mined in the area also has important linkages across the local economy, via its direct use in steel making and its shipment to export markets via Port Kembla. These supply linkages, through high-skilled well-paying largely full-time jobs, also support economic growth across the broader population-serving sectors of the economy.*

Approximately 90% of the 400-strong Metropolitan Coal Mine workforce reside in the Wollongong, Shellharbour and Sutherland Shire LGAs. Further, local businesses already provide goods and services to Metropolitan Coal, with the company spending approximately $217 million (M) with local suppliers and business in financial year 2024. Metropolitan Coal had a total direct expenditure of approximately $324M in the NSW economy in financial year 2024.

2.2 PROJECT CONTEXT

The Metropolitan Coal Mine is one of the earliest established and longest running coal mining operations in Australia, with history dating back to the 1880s.

The approval of the Metropolitan Coal Project in 2009 included underground mining of Longwalls 20-27 and Longwalls 301-317 until June 2032 (Figure 1-2).

Product coal produced at the Metropolitan Coal Mine is primarily sold as a metallurgical coal used in steelmaking with more than half of the metallurgical product being sold to BlueScope's Port Kembla Steelworks. The remaining metallurgical product coal is sold to overseas markets. The Metropolitan Coal Mine also produces coal rejects which are exported via rail to Port Kembla Coal Terminal and typically sold for energy producing purposes (i.e. as a thermal coal) or for use in manufacturing processes.

The underground mining operations at the Metropolitan Coal Mine are supported by surface facilities (Figure 1-2). The existing Metropolitan Coal Mine Surface Facilities Area include administration buildings, workshop, bath house and ablution facilities, haul roads, access road, fuel and consumables storage facilities, hardstand areas, water management infrastructure, a CHPP, stockpiles (including ROM coal, product coal and coal reject stockpiles) and associated coal handling infrastructure (e.g. conveyors, transfer points and buffer bins).

The Metropolitan Coal Mine currently employs a workforce of approximately 400 people. The majority of workers reside in the local area or within 50 km of the Metropolitan Coal Mine. As far as practicable, the Metropolitan Coal seeks to employ local contractors, supply companies and services during the course of its operations.

As mining operations have progressed at the Metropolitan Coal Mine, ongoing exploration activities have identified geological and geotechnical constraints which affect the available coal resource. To maintain safe and efficient operations, a reduced underground mine layout has been implemented. In addition, longwalls have been shortened to reduce subsidence effects on watercourses. This has resulted in a reduction in ROM coal extraction compared to the approved underground mine layout.

The reduced underground mine layout incorporates shortened commencing (i.e. northern) and finishing (i.e. southern) ends of Longwalls 301-316 and shortened starting position of Longwall 26 compared to the approved underground mine layout.

Due to the reduction in the underground mining area, longwall mining would finish in 2029, in absence of the Modification. The Modification proposes to continue mining for a further two years.

In February 2022, Metropolitan Coal was granted EL 9364, located west of the current 300-series longwalls by the NSW Minister for Regional New South Wales (Figure 1-1). The Bulli Seam continues west of the Modification area across EL 9364. Metropolitan Coal plans to seek approval to continue the Metropolitan Coal Mine further in EL 9364 beyond 2032 through a separate project application. The Modification would provide for additional mine life to facilitate the preparation and assessment of a separate project application to extend underground mining operations in EL 9364 (i.e. continuity of longwall mining could be maintained).

If the Modification does not proceed:

- the Metropolitan Coal Mine is most likely to close after the completion of Longwall 316 in 2029, leading to significant job losses at the Metropolitan Coal Mine and likely flow on effects to the local region and the Southern Coalfield economic ecosystem including Port Kembla Coal Terminal and BlueScope's Port Kembla Steelworks;
- the approved Longwall 317 cannot be economically mined in its current arrangement (Figure 1-3) and therefore would likely be sterilised; and
- high quality metallurgical coal and thermal coal in the Modification area and EL 9364 would likely be sterilised as there is no other viable opportunity to mine this resource.

Metropolitan Coal accepts all commercial risk associated with the development of the 300-series Mains west of Longwall 318 under the Modification prior to the determination of any subsequent application and Extraction Plan for future longwalls associated with EL 9364.

2.3 LOCAL METALLURGICAL COAL SUPPLY

The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically. The Metropolitan Coal Mine has supplied metallurgical coal to the steelworks for over 25 years.

BlueScope blends coal from its supply base to produce a coke product for use in its operation and for export, with current operations at BlueScope designed to primarily utilise coal produced in the Illawarra Region, supplemented by imported coal and iron ore.

Local supply provides significant benefits to BlueScope. These benefits relate to, but are not limited to, coal quality, delivered cost, supply chain certainty, just-in-time supply with associated working capital benefits, and the maintenance of a competitive supply base, whilst minimising their carbon footprint associated with raw material freight.

The dependency of BlueScope's Port Kembla Steelworks on the continued supply of metallurgical coal from local sources in the Southern Coalfield was acknowledged by the NSW Legislative Council (5 May 2021), the NSW Department of Planning, Industry and Environment (DPIE) (2020a), and an independent economic study commissioned by the DPE (BAEconomics Pty Ltd, 2020). BlueScope has actively supported the continuation of mining in the Southern Coalfield in its submission to the NSW Independent Planning Commission (IPC) on the Dendrobium Mine – Plan for the Future: Coal for Steelmaking application stating (15 December 2020):

> *The purpose of BlueScope's submission is to firstly emphasise to the Independent Planning Commission, and the state of NSW, the critical importance of a continuation of mining in the Southern Coalfield of NSW for the ongoing production of iron and steel at the Port Kembla Steelworks.*
>
> *Metallurgical coal supplies for BlueScope are reliant upon an ongoing commercially viable coal mining sector in the Southern Coalfield. BlueScope understands that export sales are critical to the mining operations remaining commercially viable. Further, local supplies of metallurgical coal are vital for the continuing economic health of the Illawarra Region and NSW at large, including the 4,500 direct jobs and contractors, supporting around 8,900 jobs that rely on Port Kembla Steelworks, the largest steel production facility in Australia.*
>
> *This importance has only been enhanced as the production of domestic steel has become a critical part of:*
>
> *a) The development of sustainable and secure supply chains post the COVID pandemic; and*
>
> *b) the significant step up in investment in renewable energy projects across NSW because of recently announced NSW Government policies.*

In addition, the importance of multiple local metallurgical coal supplies to the BlueScope's Port Kembla Steelworks is outlined by the Australian Competition and Consumer Commission (2017) which noted the disadvantages BlueScope's Port Kembla Steelworks may face if it were required to source metallurgical coal from the Bowen Basin in Queensland (rather than the Illawarra Region):

> *… there is significant additional cost associated with transporting substitute coking coal from alternative sources to the Australia steelmakers as well as potential capacity constraints limiting the ability of one steelmaker to import large volumes of coal by ship.*
>
> *…*
>
> *In relation to transportation cost, BlueScope would incur significantly higher freight logistics costs to ship coal from the Bowen Basin via the Queensland coal exporting ports to its steel mill at Port Kembla compared to the costs associated with the supply of coal from South32 and Metropolitans mines in the Illawarra to its steelworks and Port Kembla. Market inquiries indicate that the cost of transporting coal from the Bowen Basin to Port Kembla is likely to be between $US10 -15 per tonne.*

BlueScope is a major contributor to the Illawarra region, NSW and Australia, employing approximately 3,000 people and supporting approximately 10,000 jobs in the Illawarra region. As a consequence, BlueScope's proposed Port Kembla Steelworks Blast Furnace Reline Project gained Critical State Significant Infrastructure status.

The Port Kembla Steelworks Blast Furnace Reline Project, currently under construction, is expected to extend the life of its blast furnace operations by approximately 20 years. BlueScope is continuing with current blast furnace technology given the prevailing view that 'green steel' is still under development. This creates ongoing metallurgical coal demand for the life of the blast furnace (i.e. well beyond the Modification life).

2.4 WORONORA SPECIAL AREA

The existing and Modification underground mining areas at the Metropolitan Coal Mine are located within the Woronora Special Area (Figure 1-3) which was first established in 1941 and is currently declared under the *Water NSW Act 2014*. Public access to the Woronora Special Area is restricted to maintain drinking water quality. Mining within the Woronora Special Area has occurred for more than 100 years.

The *Principles for Mining in the Declared Sydney Catchment Area* (WaterNSW, 2021) were developed to provide a safe and reliable supply of raw water suitable for treatment to drinking water standards in the Greater Sydney Declared Catchment Area in relation to the management of mining impacts. The Principles are as follows (emphasis added):

> ***1. Water Supply Infrastructure***
>
> *WaterNSW's water supply infrastructure is extensive and includes dams, associated storages, canals, bridges, tunnels, and pipelines. WaterNSW also operates monitoring sites that are critical for its water resource assessment and operational management.*
>
> ***Principle: The integrity of water supply infrastructure must not be compromised.***
>
> ***2. Water Quantity***
>
> *In the declared Sydney catchment area, WaterNSW has a primary function to protect and enhance the quantity of water. Permanent surface water losses attributed to mining can be classified in three ways:*
>
> *1) Leakage from reservoirs*
>
> *2) Reduction in baseflow due to depressurisation of regional groundwater systems (i.e. groundwater drawdown), and*
>
> *3) Diversion of stream flow into deeper fracture storages or to the mine itself.*
>
> *To avoid or minimise surface water losses, mining companies should adopt a precautionary approach and base mine design on preventing the height of free drainage from extending to the surface or interacting with surface fracture networks. This could be achieved through narrower longwall panels, wider pillars, reduced extraction heights, increased setbacks from sensitive features, or alternative mining methods.*
>
> ***Principles:***
>
> ***Leakage from reservoirs as a result of mining activities must be avoided.***
>
> ***Regional depressurisation and diversion of surface water flows must be avoided and minimised by adopting a precautionary approach to mine design.***

3. Water Quantity

…

There is a statutory requirement that all development applications for future mining should have a neutral or beneficial effect on water quality in the declared Sydney catchment area. This should apply during all phases of mining, including exploration, extraction, production, closure and rehabilitation

Principle: All mining activities must have a neutral or beneficial effect on water quality.

4. Ecological Integrity

The Special Areas are mostly undisturbed bushland with significant ecological values, and they play a vital role to protect water quality and quantity. There are statutory requirements under the Biodiversity Conservation Act 2016 to protect and maintain biodiversity, including threatened species such as Coastal Upland Swamps.

The importance of upland Swamps in the hydrological cycle is now recognised. It is also accepted that rehabilitation of upland swamps affected by mining is not possible.

Principle: The ecological integrity of the Special Areas must be maintained and protected

The Modification longwalls would not result in any measurable subsidence effects at WaterNSW supply infrastructure.

The Modification adopts a precautionary approach by incorporating conservative longwall geometry and a setback from Swamp 106 to minimise subsidence effects on watercourses and upland swamps (Section 3.2). Using this geometry, there would be no surface to seam cracking at the Metropolitan Coal Mine including the Modification (which could result in loss of surface water to the underground workings).

An assessment of neutral or beneficial effect on water quality has been undertaken for the Modification by ATC Williams Pty Ltd (ATC Williams) (2025) and concludes the Modification would have a neutral effect on water quality with respect to underground mining and neutral to beneficial effect on water quality with respect to the construction of the relocated Ventilation Shaft 4 (Appendix C).

The Modification has been designed in accordance with the avoid, mitigate, offset hierarchy and NSW biodiversity requirements (Section 6.7).

2.5 JUSTIFICATION OF THE MODIFICATION

The Modification has been proposed as a logical extension of the existing Metropolitan Coal Mine to maximise the recovery of coal resources within the currently approved mine life. The mining of an additional 3.2 Mt of ROM coal would generate approximately $49M in royalties to NSW that would otherwise not be realised.

The Modification would also continue its supply of metallurgical coal to BlueScope's Port Kembla Steelworks, a major employer in the Illawarra region, for a further two years. There is currently no other economically viable, commercial-scale alternative to the use of metallurgical coal in making steel using the blast furnace method, which is employed at BlueScope's Port Kembla Steelworks. The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically.

The Modification would also continue the benefits for the region and the State in terms of employment opportunities (direct and indirect), income and value added for a further two years.

As far as practicable, Metropolitan Coal Mine employs local contractors, supply companies and services during the course of its operations. This would continue under the Modification for a further two years.

Metropolitan Coal has made a number of significant donations to support the community of Helensburgh and the greater Illawarra region throughout the Metropolitan Coal Mine life. Community donations and sponsorship during 2024 amounted to over $190,000 (Section 6.12.4). Metropolitan Coal plans to continue support community initiatives throughout the life of the Metropolitan Coal Mine including the Modification (i.e. a two year increase).

2.6 KEY STRATEGIC PLANNING DOCUMENTS

2.6.1 Strategic Statement on Coal Exploration and Mining in NSW

The *Strategic Statement on Coal Exploration and Mining in NSW* (the Strategic Statement) outlines how the NSW Government will continue to support responsible resource development for the benefit of the State (NSW Government, 2020a). The Strategic Statement recognises the importance of metallurgical coal supply for use in the steelmaking process (NSW Government, 2020a):

> *The use of coal in the manufacture of steel (coking coal) is likely to be sustained longer as there are currently limited practical substitutes available.*

The Strategic Statement also recognises the value of coal production to the NSW economy, including:

- The long history of coal mining in NSW and its close ties with regional communities in the Illawarra region.
- The potential for coal production to provide significant benefits to local communities, including jobs and investment.
- Coal production's significant contributions to export earnings as the State's biggest single export earner.

The Modification would be consistent with the Strategic Statement as it is primarily a metallurgical coal mine and would facilitate further access to the State's coal resources.

2.6.2 Other Relevant Planning Documents

The following strategic planning documents have also been considered in the planning of the Modification and the preparation of this Modification Report:

- *NSW Net Zero Plan Stage 1: 2020-2030* (NSW Government, 2020b).
- *Our Wollongong Our Future 2032 Community Strategic Plan* (Wollongong City Council, 2022).
- *Principles for Mining in the Declared Sydney Catchment Area* (WaterNSW, 2021).
- *Special Areas Strategic Plan of Management 2015* (WaterNSW and NSW Office of Environment and Heritage [OEH], 2015).
- *Illawarra Shoalhaven Regional Plan 2041* (DPIE, 2021).

2.7 OTHER NEARBY OPERATIONS

Nearby mining operations in the Wollongong LGA and other adjacent LGAs that may potentially interact with, or have potential cumulative impacts with the Modification, include:

- Appin Mine;
- BlueScope's Port Kembla Steelworks;
- Dendrobium Mine;
- Tahmoor South Coal Project; and
- Russell Vale Underground Mine.

Figure 1-1 shows the locations of these developments relative to the Metropolitan Coal Mine.

Potential interactions with other major developments in the region are usually limited to shared use of supporting contractors, contributions to regional traffic movements and socio-economic effects on the region.

3 DESCRIPTION OF THE MODIFICATION

3.1 OVERVIEW

The Modification would provide for the continued employment of the existing 400-strong workforce for a further two years and comprise the following key components (Figures 3-1 and 3-2):

- extension of the approved Longwall 317 to the north;
- addition of Longwall 318 to the west of the approved longwalls;
- extension of the approved 300-series Mains to the west;
- extraction of an additional 3.2 Mt of ROM coal;
- relinquishment of 14 Mt of approved ROM coal;
- relocation of the approved (but not yet constructed) Ventilation Shaft 4;
- continued transportation of coal rejects off-site for the life of the mine via a combination of rail and road; and
- relinquishment of approved surface development and underground mining areas.

The Modification would involve no change to the:

- existing approved mine life (i.e. until June 2032);
- existing operational workforce;
- annual ROM coal extraction, processing and transportation limits; and
- existing infrastructure and Surface Facilities Area.

Table 3-1 provides a comparison between the currently approved Metropolitan Coal Mine and the Metropolitan Coal Mine incorporating the proposed Modification.

The following sub-sections provide a description of the Modification components.

3.2 MODIFICATION LONGWALL LAYOUT

The approved Metropolitan Coal Mine underground mine layout includes Longwalls 20-27 and Longwalls 301-317. Metropolitan Coal plans to commence secondary extraction of Longwall 312 in July 2025 (Figure 3-1).

This Modification would optimise the approved underground mine layout to allow for the extraction of additional resources identified north and west of the approved underground mine layout.

The Modification includes the following changes to the approved underground mine layout (Figure 3-1):

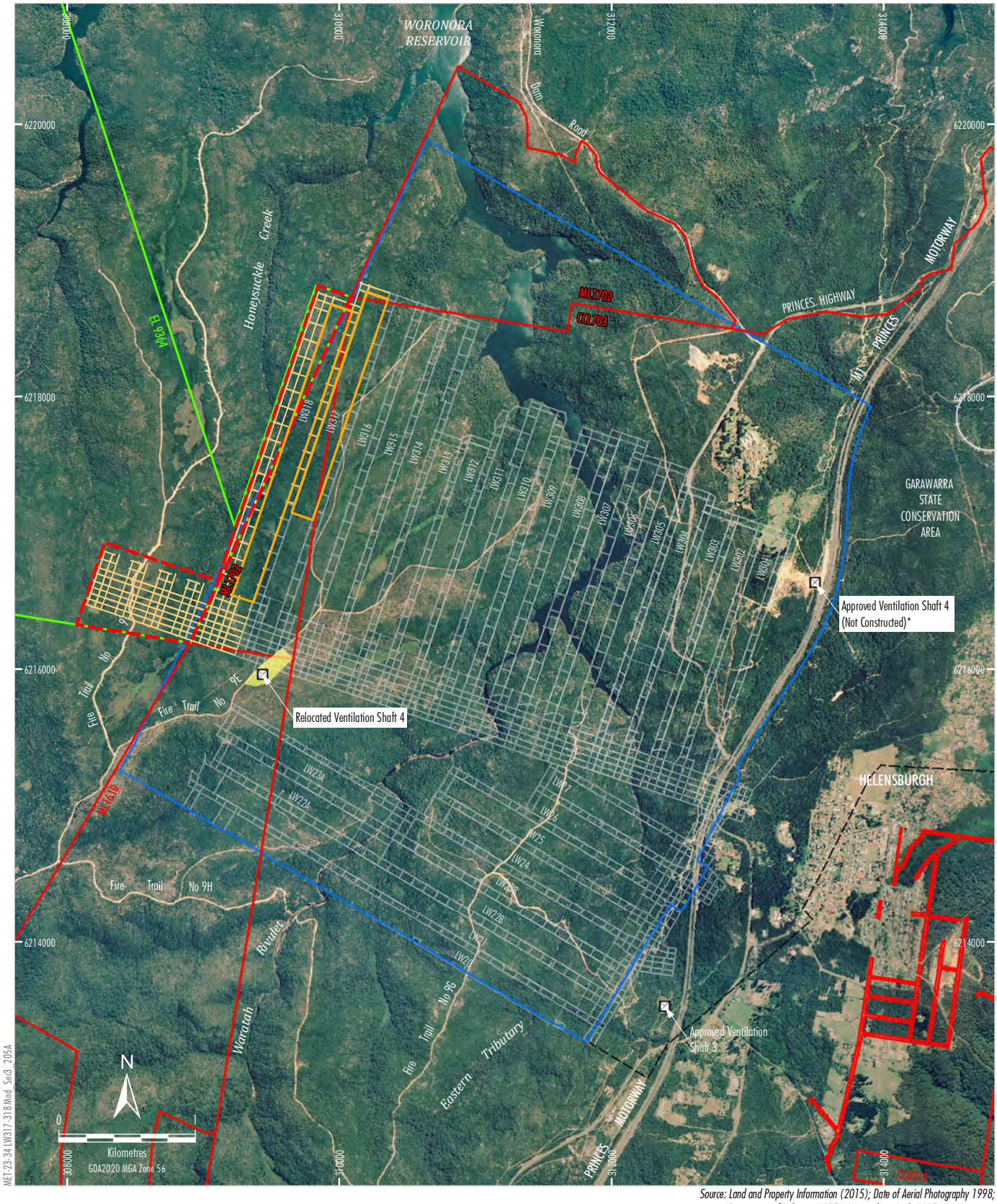
- **Longwall 317** – northern extension of the approved Longwall 317 inside of the currently approved underground mining area.
- **Longwall 318** – addition of Longwall 318 partially outside of the currently approved underground mining area.
- **300-series Mains** – western extension of the approved 300-series Mains outside of the currently approved underground mining area.

Since the submission of the Scoping Letter to DPHI, the finishing and starting positions (i.e. southern and northern ends, respectively) of Longwall 317 have been shortened by approximately 67 m and 75 m respectively, compared to the layout presented in the Scoping Letter. The change to the finishing position has been made to reduce subsidence effects on Swamp 106. The change to the starting position has been made based on further geological data gathered since the submission of the Scoping Letter. The shortening of Longwall 317 by 67 m at the southern end would result in lost revenue of approximately $8M.

Consistent with the approved underground mine layout, Longwalls 317 and 318 have been designed using conservative longwall geometry to reduce subsidence effects. The Longwalls 317 and 318 design includes narrow panel voids of 163 m and wider chain pillars of 55 m. The width of the chain pillars has been increased from 45 m to 55 m since the submission of the Scoping Letter to further reduce subsidence effects.

The combination of wider pillars and shortening of Longwall 317 would result in a reduction of tensile strains on swamps in the Modification area to 0.5 mm/m or less, which is associated with the onset of tensile cracking in subsidence engineering (Appendix A).

Consistent with the approved Metropolitan Coal Mine, the Modification extraction would occur from north to south using retreating longwall mining methods for secondary extraction with a minimum extraction height of 2.8 m.



MET-23-34 LW317-318 Mod Set3 205A

Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

Peabody

METROPOLITAN COAL

Modified General Arrangement

Figure 3-1

Table 3-1
Summary Comparison of Approved and Modified Metropolitan Coal Mine

Project Component	Metropolitan Coal Mine Project Approval (08_0149) (as modified)	Metropolitan Coal Mine Project Approval (08_0149) (including this Modification)
Underground Mining Area	As per Appendix 3 of Project Approval (08_0149). Total secondary extraction area (i.e. longwall voids) of approximately 988 ha.	Extension of Longwall 317, addition of Longwall 318 and addition of the extended 300-series Mains to the west. Metropolitan Coal will formally relinquish the approved underground mining areas shown on Figure 3-3, resulting in a reduction in the total secondary extraction area of approximately 253 ha and in a revised total secondary extraction area of approximately 735 ha.
Hours of Operation	Mining operations can be carried out 24 hours per day, seven days per week.	No change.
Operational Mine Life	Underground mining operations may be carried out until 22 June 2032.	No change.
Coal Resource	Extraction of approximately 54.4 Mt of ROM coal from the 300-series longwalls.	Extraction of approximately 3.2 Mt of additional high quality metallurgical and thermal ROM coal associated with the extended Longwall 317, addition of Longwall 318 and the extended 300-series Mains. Due to the relinquishment of longwall areas (Figure 3-3), approximately 40.4 Mt of ROM coal would be extracted from the 300-series longwalls over the life of the Metropolitan Coal Mine.
ROM Coal Extraction Limits	Up to 3.2 Mt from the underground mining area in any calendar year.	No change.
Product Coal Transport Limits	Up to 2.8 Mt may be transported from the Metropolitan Coal Mine in any calendar year.	No change.
Coal Rejects Management	Transport of coal rejects off-site by train or road to 31 December 2026 as a contingency measure[1].	Continued transportation of coal rejects off-site to international customers via rail to Port Kembla Coal Terminal. Temporary transportation of coal rejects off-site by road to domestic customers as a contingency measure.
	No emplacement of coal rejects on the surface of the Metropolitan Coal Mine.	No change.
Longwall Layout and Panel Design[2]	As per Appendix 3 of Project Approval (08_0149) and correspondence from the Secretary of DPHI approving the re-orientation of the longwall panels. Longwall void width of between 138 m and 163 m for the 300-series[2]. Pillar widths between 45 m and 70 m for the 300-series.	Extension of Longwall 317 and addition of Longwall 318 (Figure 3-1). Shortened Longwall 317 finishing position. Longwall void width of 163 m for Longwalls 317 and 318. Increased pillar widths of 55 m for Longwalls 317 and 318 to reduce subsidence effects.
Underground Mine Target Seams	Extraction from the Bulli Seam.	No change.
Surface Facilities	As per Appendix 4 of Project Approval (08_0149).	No change.
Gas Management	Operation of ventilation shafts to manage gas emissions.	Relocation of the approved (but not yet constructed) Ventilation Shaft 4 (Figure 3-2). Relinquishment of the currently approved Ventilation Shaft 4 development footprint.
Mining Tenements	CL 379, CCL 703, ML 1610, ML 1702, MPL 320, EL 9364.	New ML to be sought over part of Longwall 318 and extension of the 300-series Mains.
Operational Workforce	Current workforce of approximately 400 personnel at the Metropolitan Coal Mine.	No change to the operational workforce. Continued employment for a further two years.

1 Condition 7, Schedule 2 of Project Approval (08_0149) prohibits the export of coal rejects from the site after 2021 without the written approval of the Director-General (now Secretary of DPHI). On 14 November 2023, the Secretary of the DPHI provided approval of the transport of coal rejects off-site by train or road to 31 December 2026 as a contingency measure.

2 Narrower longwalls and wider panels have been used within 500 m of the Woronora Reservoir. The Modification longwalls would be greater than 500 m from the Woronora Reservoir.

LEGEND

- Mining Lease Boundary
- Existing /Approved Underground Development
- Proposed First Workings
- Shaft Infrastructure
- Collection Drain
- Culvert
- Road
- Sediment Dam Bund
- Sediment Fence Perimeter
- Ventilation Shaft 4 Construction Area
- Ventilation Shaft
- Liner Fabrication Area
- Liner Storage
- Spoil Stockpiles
- Construction Water Pond
- Sediment Basin
- Concrete Lined Sediment Receiving Basin
- Clean Water Tanks
- Concrete Pad
- Transformer, Switchroom and Boreholes
- Car Park
- Site Office
- Service and Return Water Boreholes

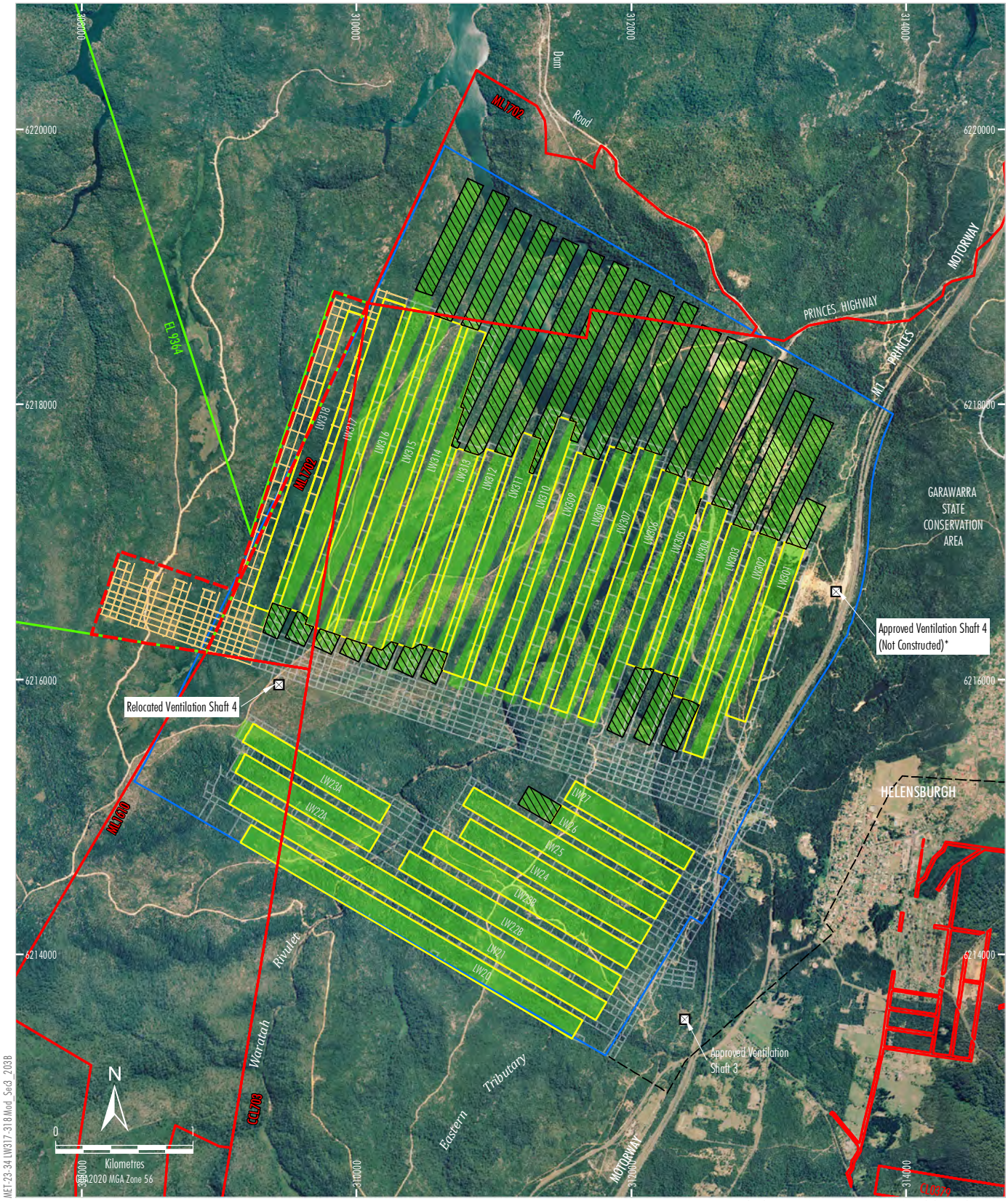
Source: ATC Williams (2025); Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025)

Peabody

METROPOLITAN COAL

Indicative General Arrangement
Relocated Ventilation Shaft 4

Figure 3-2



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing/Approved Underground Development
- Proposed First Workings
- Completed and Proposed Secondary Extraction
- Preferred Project Report Longwall Layout
- Approved Longwall Mining Areas to be Relinquished

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

Peabody

METROPOLITAN COAL

Approved Longwall Mining Areas to be Relinquished

Figure 3-3

The Modification includes the continued development of the 300-series Mains to the west to allow for access to potential future coal resources (within EL 9364) subject to separate mine planning, environmental assessment and approval processes. These first workings would be stable and non-subsiding in the long-term (except insofar as they may be impacted by any future approved secondary workings).

The proposed layout of the Modification is within existing Metropolitan Coal mining and exploration tenements (i.e. ML 1610, ML 1702, CCL 703 and EL 9364). A new mining lease would be sought over part of EL 9364 to cover Longwall 318 and the extended 300-series Mains (Figure 3-1).

3.3 MODIFICATION MINE LIFE

Under the approved underground mine plan, underground mining and employment of the operational workforce at the Metropolitan Coal Mine would cease in 2029 following the completion of Longwall 316 (as Longwall 317 cannot be economically mined in its current arrangement).

The extended Longwall 317 and additional Longwall 318 would provide for an additional two years of operations at the Metropolitan Coal Mine (i.e. coal extraction until approximately 30 June 2031). No extension of the approved life of the Metropolitan Coal Mine beyond 22 June 2032 would therefore be required under the Modification.

3.4 VENTILATION SHAFT 4

The approved Metropolitan Coal Mine includes the installation of an upcast shaft and associated fan adjacent to the main underground roadways to the west of M1 Princes Motorway and east of Longwall 301 (i.e. Ventilation Shaft 4) (Figure 3-1).

Ventilation Shaft 4 was required to maintain a safe working environment within the underground mining area as approved underground mining extended further north.

As a result of the reduced extent of the underground mine layout compared to the approved underground mine layout, construction of the approved Ventilation Shaft 4 was not required to maintain suitable gas concentrations and air quality within the underground mining area.

The Modification proposes the relocation of the Ventilation Shaft 4 and the change in the ventilation system design from upcast to downcast (Figures 3-1 and 3-2). The relocated Ventilation Shaft 4 area would be constructed immediately south of Longwall 316 and requires a maximum development area during construction of approximately 3.8 ha.

As a downcast ventilation system is proposed, the approved infrastructure (including fans, power transformers, sheds, cooling tower, etc) would no longer be required. Upon completion of construction, the relocated Ventilation Shaft 4 development area would be less than 0.1 ha.

Construction Activities

Construction of the relocated Ventilation Shaft 4 is planned to commence as soon as all relevant approvals are in place.

The construction process for the relocated Ventilation Shaft 4 would involve sinking of a new shaft between the surface and underground mine workings using a blindsink method.

Construction of the relocated Ventilation Shaft 4 would be conducted 24 hours per day, up to seven days per week. Heavy vehicle movements to and from the construction site would be restricted to daytime hours (7.00 am to 6.00 pm) up to seven days per week for a period of up to approximately 18 months. Construction is planned to commence within the first year of approval of the Modification.

It is expected that the construction activities would generate five daily light vehicle trips and 10 daily heavy vehicle trips on average. Vehicle access from Darkes Forest Road to the relocated Ventilation Shaft 4 area would be via Fire Trails 14, 9 and 9E.

A conceptual layout of the relocated Ventilation Shaft 4 construction phase is provided on Figure 3-2 and would include the establishment of the following:

- spoil stockpiles;
- water management areas (e.g. sediment ponds, stormwater detention basin, drains);
- site office and parking areas;
- transformer and switchroom;
- liner fabrication and storage areas;
- access and laydowns; and
- service and water boreholes to the underground workings.

All equipment and hardstands would be removed following the completion of construction, and areas except for the ventilation shaft would be rehabilitated with native species that are generally consistent with the surrounding vegetation. Stockpiles would be seeded and maintained during mining operations.

At the completion of mining, the ventilation shaft would be removed and decommissioned. This would involve:

- Removal of shaft collar and disposal off-site.
- Backfilling/sealing of the ventilation shaft with stockpiled spoil material. Some materials may be imported for the backfilling/sealing of the shaft.
- Placement of topsoil over disturbed areas.

Rehabilitation activities would be described in the Metropolitan Coal Mine Forward Programs and Rehabilitation Management Plan.

Water Management

The water storages, erosion and sediment control structures required during the construction of the relocated Ventilation Shaft 4 would be designed, constructed and maintained in accordance with the series *Managing Urban Stormwater: Soils and Construction – Volume 2E Mines and Quarries* (Department of Environment and Climate Change, 2008) and *Best Practice Erosion and Sediment Control* (International Erosion Control Association, 2008).

Potable water will be trucked in for construction of the ventilation shaft, suitable for use in the Woronora Reservoir drinking water catchment. A steel lined bore would be sunk to the underground workings to enable transfer of construction water to the underground workings, and then to the water treatment plant at the surface facilities, as required.

Surface water runoff from rainfall within the construction area would be directed to the stormwater basin in keeping with *Best Practice Erosion and Sediment Control* (International Erosion Control Association, 2008), and where water quality satisfies the neutral or beneficial water quality effects requirements, could be released (Appendix C). Alternatively, water within the stormwater basin may also be transferred to the underground workings via the return water borehole to maintain suitable freeboard (Figure 3-2).

Sealing of Fire Trails

As the proposed Modification would result in a temporary increase in traffic using the access tracks within the Woronora Special Area, Metropolitan Coal proposes to seal the section of Fire Trails 14, 9 and 9E between Darkes Forest Road and the construction area prior to commencing regular heavy vehicle movements to the relocated Ventilation Shaft 4.

The sealing of this access track would be undertaken in consultation with WaterNSW.

3.5 ACCESS TRACK

The Modification would include the establishment of an access track within the approved disturbance area to reinstate rock-armouring along a section of the embarkment toe at the Surface Facilities area near Camp Gully Creek.

The access track would allow for Metropolitan Coal to undertake further stabilisation works through the reinstallation of sandstone boulders and native revegetation.

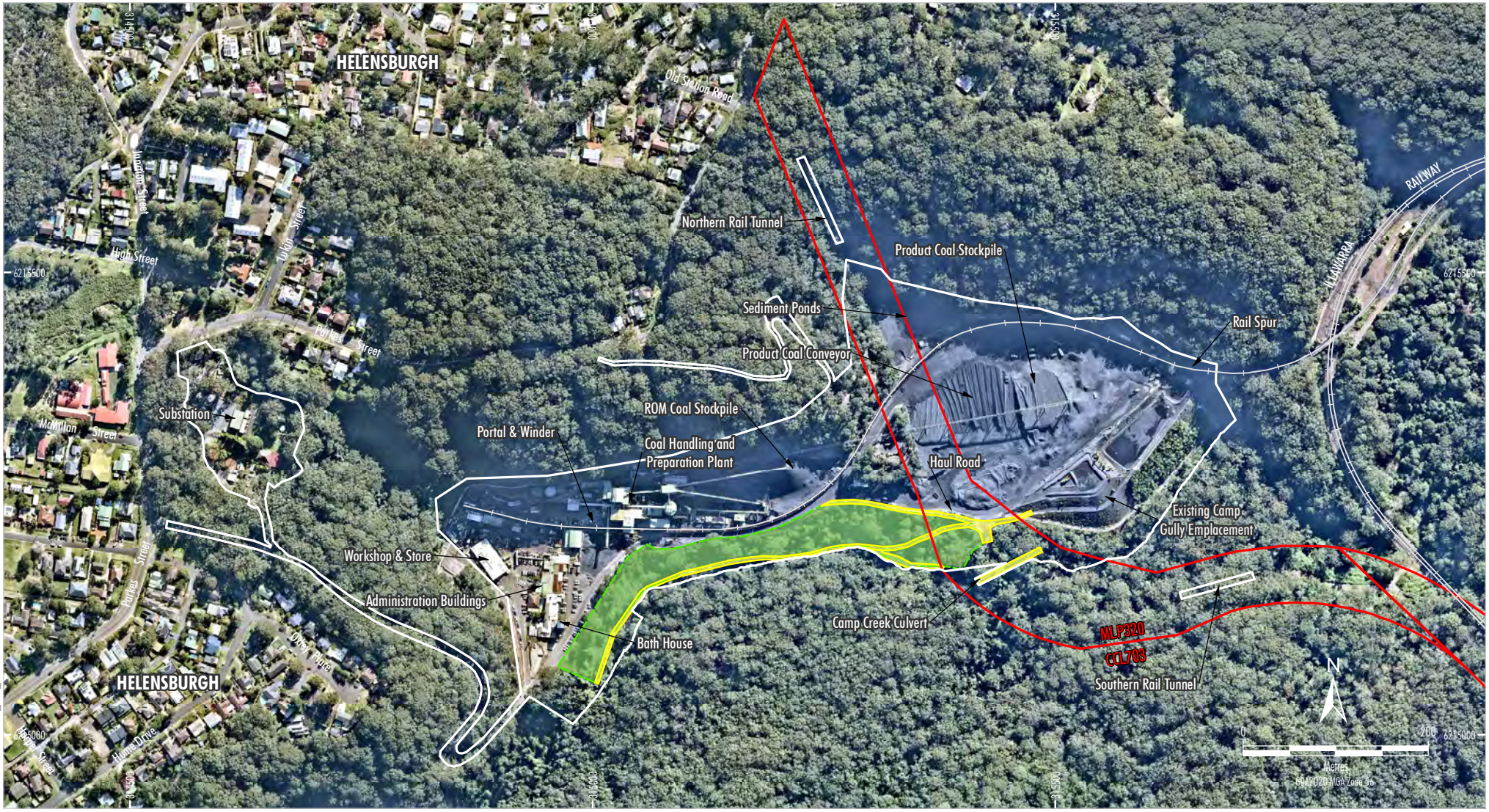
The indicative new access track layout is shown on Figure 3-4.

3.6 RELINQUISHMENT OF APPROVED AREAS

As part of the Modification, Metropolitan Coal would not develop components of the approved Metropolitan Coal Mine as described below. The relinquishment of these approved development areas would reduce the residual environmental impacts from the Metropolitan Coal Mine, which is further described in Section 6.

Underground Mining Area

As mining operations have progressed at the Metropolitan Coal Mine, ongoing exploration activities have identified geological and geotechnical constraints which affect the available coal resource. To maintain safe and efficient operations, a reduced underground mine layout has been implemented for the Metropolitan Coal Mine. In addition, longwalls have been shortened to reduce subsidence effects on watercourses. This has resulted in a reduction in ROM coal extraction compared to the approved underground mine layout.



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LEGEND

- Mining Lease Boundary
- Railway
- Indicative Access Tracks
- Ongoing Revegetation and Stabilisation Works Area
- Extent of Approved Disturbance Area

Source: NSW Spatial Services (2020)
Orthophoto: Nearmap (2021)

Peabody
METROPOLITAN COAL

Indicative Access Track to Embankment Revegetation and Stabilisation Area

Figure 3-4

The reduced underground mine layout incorporates shortened starting (i.e. northern) and finishing (i.e. southern) ends of Longwalls 301-316 and shortened starting position of Longwall 26 compared to the approved underground mine layout. Approximately 26% of the Metropolitan Coal Mine approved underground mining area would not be mined resulting in a reduction in ROM coal recovery of approximately 14 Mt.

The Modification would include the relinquishment of these approved underground mining areas.

Ventilation Shaft

As the Modification proposes to relocate Ventilation Shaft 4, the approved Ventilation Shaft 4 would no longer need to be developed to maintain a safe working environment within the underground mining area.

The Modification would include the relinquishment of the approved Ventilation Shaft 4 development (Figure 3-3).

3.7 COAL REJECTS STRATEGY

Metropolitan Coal currently has approval from the Secretary of DPHI for the transport of coal rejects off-site by road to 31 December 2026.

Coal rejects were transported off-site by road for beneficial reuse between 2009 and 2019, and since 2019 have been blended with other products to produce a saleable product transported to international market via rail to Port Kembla Coal Terminal.

Metropolitan Coal plans to continue the blending and transporting of all coal rejects to international markets via rail to the Port Kembla Coal Terminal, with trains operating up to 24 hours per day, seven days per week. Metropolitan Coal has established contracts for the supply of its coal rejects with international customers and the demand for this coal rejects product is expected to continue for the life of the mine.

As a contingency measure, Metropolitan Coal may need to temporarily transport coal rejects by road to urban developments in the Wollongong and Shellharbour LGAs for beneficial reuse in accordance with an approved Traffic Management Plan. It is expected that this contingency trucking would only be required for a period of up to six months to enable Metropolitan Coal to re-establish transportation of coal rejects to international markets via rail to the Port Kembla Coal Terminal.

3.8 PROJECT APPROVAL (08_0149) CONDITIONS TO BE MODIFIED

The conditions of the Metropolitan Coal Mine Project Approval (08_0149) listed in Table 3-2 would require amendment to incorporate the Modification.

The Project Application Area shown in Appendix 2 of the Project Approval (08_0149) would be extended into Lot 1/DP830604 owned by WaterNSW. This area is represented by the Mining Lease Application (MLA) Area and Development Application Area for the Modification (Figure 3-1 and Attachment 2).

Table 3-2
Proposed Project Approval (08_0149) Condition Modifications

Condition Reference	Metropolitan Coal Mine Project Approval (08_0149) Condition	Proposed Condition
Condition 7, Schedule 2	*The Proponent shall not export any coal reject from the site after 2021 without the written approval of the Director-General.*	Condition proposed to be deleted.
Condition 17, Schedule 4	*By the end of 2010, the Proponent shall:* *a) undertake a road safety audit of the Parkes Street and Colliery Road intersection, in consultation with the RTA and WCC; and* *b) implement any recommendations of this audit, to the satisfaction of the Director-General.*	Condition proposed to be deleted on the basis that Wollongong City Council was not supportive of an upgrade to the Parkes Street and Colliery Road (now Camp Gully Road) intersection.
Condition 5, Schedule 5	*The Proponent shall not carry out first workings in the mining area that are not consistent with the approved mine plan without the written approval of the Director-General.*	Contemporise condition as follows: *The Applicant may carry out first workings within the underground mining area of the approved mine plan, other than in accordance with an approved Extraction Plan, provided that the Resources Regulator is satisfied that the first workings are designed to remain stable and non-subsiding in the long term, except insofar as they may be impacted by approved second workings.*
Appendices 2 to 6	Figures showing the Metropolitan Coal Mine layout, haulage routes and environmental features.	Figures to be updated to reflect the proposed Modification layout and activities.

4 STATUTORY CONTEXT

This section outlines the statutory requirements relevant to the assessment of the Modification.

In accordance with the guideline *State Significant Development Guidelines* (DPHI, 2024a), in particular *State significant development guidelines – preparing a modification report* (DPE, 2022a), Attachment 3 provides a detailed statutory compliance table for the Metropolitan Coal Mine incorporating the Modification that identifies all the relevant statutory requirements and the relevant sections in this Modification Report that address these requirements.

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979

The EP&A Act and NSW *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) sets the framework for planning and environmental assessment in NSW.

Assessment Pathway

The potential environmental impacts of the Metropolitan Coal Mine were assessed in the Metropolitan Coal Project EA (Helensburgh Coal Pty Ltd, 2008a). A PPR was submitted to the then NSW Department of Planning in April 2009. The key changes in the PPR were a reduction to the extent of the longwall mining area to avoid subsidence impact to pool drainage along the downstream section of Waratah Rivulet and reorientation of the longwall panels.

Project Approval (08_0149) for Metropolitan Coal Mine was granted by the NSW Minister for Planning under former section 75J of the EP&A Act on 22 June 2009.

Project Approval (08_0149) has been modified three times since approval of the Metropolitan Coal Mine, most recently in 2013 under section 75W of the EP&A Act.

Metropolitan Coal is seeking to modify Project Approval (08_0149) under section 4.55(2) of the EP&A Act.

Section 4.55(2) of the EP&A Act relevantly provide the following regarding the Modification:

> ***4.55 Modification of consents—generally***
>
> *…*
>
> *(2) Other modifications*
>
> *A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if—*
>
> *(a) it is satisfied that the development to which the consent as modified relates is the same or substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*
>
> *(b) it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*
>
> *(c) it has notified the application in accordance with—*
>
> *(i) the regulations, if the regulations so require, or*
>
> *(ii) a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
>
> *(d) it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.*
>
> *…*

Substantially the Same Development

Clause 3BA(6) of Schedule 2 of the NSW *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017* relevantly provides:

> ***3BA Winding-up of transitional Part 3A modification provisions on cut-off date of 1 March 2018 and other provisions relating to modifications***
>
> …
>
> *(6) In the application of section 4.55(1A) or (2) or 4.56(1) of the Act to the following development, the consent authority need only be satisfied that the development to which the consent as modified relates is substantially the same development as the development authorised by the consent (as last modified under Section 75W)—*
>
> *(a) development that was previously a transitional Part 3A project and whose approval was modified under Section 75W,*
>
> *…*

The consent authority is, therefore, required to satisfy itself that the Metropolitan Coal Mine incorporating the Modification would remain substantially the same development as was last modified under section 75W of the EP&A Act (i.e. Modification 3), inclusive of consideration of the changes arising from previously approved modifications (i.e. Modifications 1 and 2).

The Metropolitan Coal Mine has conducted underground longwall operations since the 1880s. The approved mine life of the Metropolitan Coal Project is until June 2032. There would be no change in the mine life under the Modification.

The proposed Modification would:

- be consistent with the approved mine life, mining method, and maximum ROM coal extraction rate of the Metropolitan Coal Mine;
- be adjacent to the existing longwalls at the Metropolitan Coal Mine;
- be located predominantly within approved ML 1610 and ML 1702;
- result in a net reduction in ROM coal resource mined by approximately 10.8 Mt due to the relinquishment of approved coal resources;
- limit additional surface infrastructure as far as possible and not increase total disturbance compared to the approved Metropolitan Coal Project (i.e. Ventilation Shaft 4 is being relocated but remains of a similar size as originally planned); and
- reuse existing surface infrastructure and the associated approved development footprint, where practicable, to avoid additional surface disturbance.

As described in Section 3, as part of the Modification, Metropolitan Coal would not develop components of the approved Metropolitan Coal Project, which would reduce the residual environmental impacts from the Metropolitan Coal Project.

Metropolitan Coal proposes to formally relinquish the unmined areas of Longwall 26 and Longwalls 301-316 (refer Figure 3-3) as part of the Modification. This would result in a net reduction of 10.8 Mt of ROM coal mined (i.e. 26% of the approved underground mine layout), and a reduction of 253 ha of longwall mining area (with a larger area no longer subject to subsidence effects).

In consideration of the above, the consent authority can be satisfied that the Metropolitan Coal Mine, incorporating the Modification would remain "substantially the same" as the development as last modified under section 75W of the EP&A Act.

Site Verification Certificate

Clause 103 of the EP&A Regulation states the following regarding the development application for the Modification:

> ***103 Modification applications for mining and petroleum development consents***
>
> *…*
>
> *(2) The application must be accompanied by—*
>
> *(a) for development on other land shown on the Strategic Agricultural Land Map as critical industry cluster land—a current gateway certificate that applies to the development to be carried out under the modified consent, or*
>
> *(b) for development on other land—*
>
> *(i) a current gateway certificate that applies to the development to be carried out under the modified consent, or*

> *(ii) a site verification certificate that certifies that the land on which the development will be carried out is not biophysical strategic agricultural land.*

A site verification certificate issued on 16 July 2024 for the Modification confirmed that the Modification area outside of the existing mining tenements is not Biophysical Strategic Agricultural Land (Attachment 6).

4.1.1 NSW Environment Planning and Assessment Act 1979 Objects

Section 1.3 of the EP&A Act describes the objects of the EP&A Act as follows:

> *(a) to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*
>
> *(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
>
> *(c) to promote the orderly and economic use and development of land,*
>
> *…*
>
> *(e) to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
>
> *(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
>
> *…*
>
> *(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
>
> *(j) to provide increased opportunity for community participation in environmental planning and assessment.*

The Modification is considered to be generally consistent with the objects of the EP&A Act, as it:

- would contribute to the financial resilience of the Metropolitan Coal Mine, which would be achieved through the efficient development of the existing available resources (e.g. additional resource can be extracted with no change to the existing/approved infrastructure other than relocation of Ventilation Shaft 4);
- would facilitate ecologically sustainable development (ESD), as economic efficiencies can be achieved with no change to the currently accepted environmental performance measures, and no increase in the duration of existing impacts of Metropolitan Coal Mine; and
- would be developed in a manner that incorporates community engagement, with a wide range of stakeholders consulted through the preparation of this Modification Report (Section 5).

4.1.2 Evaluation under Section 4.55(3) of the Environmental Planning and Assessment Act 1979

Section 4.55(3) of the EP&A Act states:

> *(3) In determining an application for modification of a consent under this section, the consent authority must take into consideration such of the matters referred to in section 4.15(1) as are of relevance to the development the subject of the application. The consent authority must also take into consideration the reasons given by the consent authority for the grant of the consent that is sought to be modified.*

In accordance with section 4.55(3) of the EP&A Act, Section 4.1.3 provides an evaluation of the Modification under section 4.15(1) of the EP&A Act.

In relation to the obligation to take into consideration reasons given by the consent authority for the grant of the consent that is sought to be modified, this obligation is to take into consideration such reasons as have been given by the consent authority for the grant of the consent that is sought to be modified.

For the original Metropolitan Coal Mine development application, the consent authority (the then Minister for Planning) did not give a (detailed) statement of reasons for the grant of the Project Approval (08_0149).

However, it is noted that the then Minister's signed statement on page 1 of the Project Approval (08_0149) states as follows:

> *I approve the project application referred to in schedule 1, subject to the conditions in schedules 2 to 7.*
>
> *These conditions are required to:*
>
> - *prevent, minimise and/or offset adverse environmental impacts;*
> - *set standards and performance measures for acceptable environmental performance;*
> - *require regular monitoring and reporting; and*
> - *provide for the ongoing environmental management of the project.*

The consent authority should take these reasons for the imposition of conditions into consideration in determining the Modification.

It is also noted that the then Minister was advised by the Director-General in assessing the original proposed development.

The Director-General (2009) noted that the application would result in some adverse residual environmental impacts, primarily by the way of subsidence impacts on natural features, particularly in limited sections of Waratah Rivulet and the Eastern Tributary and other watercourses. The Department provided conditions to monitor, mitigate, and remediate the impacts, and was ultimately satisfied that the project should be approved subject to conditions. The Department noted that the project offered a number of social and economic benefits for the region and was satisfied the project would be able to be conducted in a manner that is consistent with the objects of the EP&A Act (NSW Department of Planning, 2009).

This Modification represents a continuation of socio-economic benefits associated with the Metropolitan Coal Mine, which were cited by the Director-General (2009) in favour of the original proposed development.

While the Modification is proposing an extension to the currently approved development footprint, Metropolitan Coal plans to relinquish approved unmined areas resulting in a net reduction of 10.8 Mt of ROM coal mined and a reduction of 253 ha of longwall mining area compared to the approved underground mine layout. This results in an avoidance of impacts anticipated with the approved layout (Section 6). The Modification does not seek to extend the approved mine life.

4.1.3 Evaluation under Section 4.15(1) of the Environmental Planning and Assessment Act 1979

In evaluating the Modification, the consent authority is required to take into consideration the matters referred to in section 4.15(1) of the EP&A Act as they are of relevance to the subject of the application, including:

> *(1)* ***Matters for consideration—general***
>
> *In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application—*
>
> *(a) the provisions of—*
>
> *(i) any environmental planning instrument, and*
>
> *(ii) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and*
>
> *(iii) any development control plan, and*
>
> *(iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and*
>
> *(iv) the regulations (to the extent that they prescribe matters for the purposes of this paragraph),*
>
> *…*
>
> *that apply to the land to which the development application relates,*
>
> *(b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,*
>
> *(c) the suitability of the site for the development,*
>
> *(d) any submissions made in accordance with this Act or the regulations,*
>
> *(e) the public interest.*

This Modification Report has been prepared to address the matters in section 4.15(1) of the EP&A Act, as follows:

- Consideration of the requirements of relevant environmental planning instruments is provided in Attachment 3.
- Clause 2.10 of the *State Environmental Planning Policy (Planning Systems) 2021* states that development control plans do not apply to State Significant Developments (SSDs).
- This Modification Report has been prepared in consideration of the relevant provisions of the EP&A Regulation.
- A description of the existing environment, an assessment of the potential environmental impacts associated with the Modification, and a description of the potential measures to avoid, mitigate, rehabilitate, remediate, monitor and/or offset the potential impacts of the Modification are described in Section 6 and Appendices A to H.
- The suitability of the proposed site for the Modification has been considered in Section 7 and Appendices A to H.
- Consideration of whether, on evaluation, the Modification is considered to be in the public interest is provided in Section 7.1.4.

4.2 OTHER RELEVANT NSW LEGISLATION

In addition to the EP&A Act, the following NSW legislation may be applicable to the Project, incorporating the Modification:

- NSW *Water Management Act 2000* (WM Act);
- NSW *Biodiversity Conservation Act 2016* (BC Act)*;*
- NSW *Mining Act 1992* (Mining Act)*;*
- NSW *National Parks and Wildlife Act 1974* (NPW Act)*;*
- NSW *Protection of the Environment Operations Act 1997* (PoEO Act);
- NSW *Crown Land Management Act 2016*;
- *Climate Change (Net Zero Future) Act 2023* (Net Zero Future Act); and
- *Water NSW Act 2014.*

Relevant licences or approvals required under these Acts would continue to be obtained for the Metropolitan Coal Mine incorporating the Modification.

Additional details on the likely requirements of key acts are provided in the sub-sections below.

4.2.1 Water Management Act 2000

The WM Act contains provisions for the licensing, allocation, capture and use of water resources.

Under the WM Act, water sharing plans establish rules for sharing water between different users and between the various environmental sources (namely rivers or aquifers).

Metropolitan Coal would continue to obtain and hold licences required under the WM Act for licensable take (Section 6.4 and Appendix B).

4.2.2 Biodiversity Conservation Act 2016

The BC Act provides the legislative framework to be followed to assess a development's impacts on threatened species and ecological communities.

More specifically, Part 7 of the BC Act provides for biodiversity assessment and approvals under the EP&A Act.

In this regard, clause 30 in the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* (BC S&T Regulation) states:

> ***New Act applies to modification of planning approvals granted before commencement of new Act***
>
> *The new Act* [i.e. the BC Act] *applies to the modification of a planning approval even if the planning approval was granted before the commencement of the new Act (unless the application for the modification of the planning approval is a pending or interim planning application).*

In accordance with this clause, the BC Act applies to this Modification (noting that Project Approval 08_0149 was granted before the commencement of the BC Act and that this Modification is not a "pending or interim planning application").

Clause 30A in the BC S&T Regulation relevantly provides for how the BC Act applies to the Modification. This clause states:

> *(1) The provisions of Division 4 of Part 7 of the new Act* [i.e. the BC Act] *apply to*

applications for the modification of a planning approval—

(a) where the planning approval was granted before the commencement of the new Act, and

(b) where the planning approval was granted on or after the commencement of the new Act, as a result of the determination of a pending or interim planning application.

(2) For that purpose—

(a) the provisions apply in relation to the original development as proposed to be modified, and

(b) a biodiversity development assessment report is required to be submitted and taken into consideration if Division 4 of Part 7 of the new Act would have applied to the original development (as proposed to be modified) if planning approval had been granted after the commencement of the new Act, and

(c) however a biodiversity development assessment report is not required to be submitted if the authority or person determining the application for modification (or determining the environmental assessment requirements for the application) is satisfied that the modification will not increase the impact on biodiversity values, and

(d) the biodiversity development assessment report submitted with the application for modification—

(i) is to take into account any measures already taken to avoid, minimise or offset the impact on biodiversity values in connection with the planning approval before the proposed modification, and

(ii) is to take into account only the additional impact on biodiversity values resulting from the modification of the development and not those associated with the development as approved, and

(e) if an application for the original development as proposed to be modified would have been required to be refused because of serious and irreversible impacts on biodiversity values, the application for modification is required to be refused.

A BDAR has been prepared for the Modification by Niche Environment and Heritage Pty Ltd (Niche) (2025a) and is provided in Appendix D. The BDAR was prepared in consideration of the *Biodiversity Assessment Method* (BAM) (DPIE, 2020b), and relevant provisions of both the *Biodiversity Conservation Regulation 2017* (BC Regulation) and BC S&T Regulation.

In accordance with clause 30A(2)(d) of the BC S&T Regulation (see above), the BDAR for the Modification takes into account:

- measures already taken to avoid, minimise or offset the impact on biodiversity values in connection with Project Approval (08_0149) before this Modification; and
- the additional impact on biodiversity values resulting from the Modification (as distinct from the impact associated with the Metropolitan Coal Project as approved by the Project Approval [08_0149]).

Clause 30A(2)(e) is not enlivened in relation to the Modification application because a development application for "an application for the original development as proposed to be modified" would not have been required to be refused under section 7.16 of the BC Act.

The Modification also considers the *Addendum to NSW Biodiversity Offsets Policy for Major Projects: Upland swamps impacted by longwall mining subsidence* (OEH, 2016a) (the Swamp Offset Policy) which has been read in conjunction with the BAM.

The Swamp Offset Policy extends the BAM to the calculation and provision of biodiversity offsets for subsidence impacts on longwall coal mining on upland swamps and associated threatened species as part of the Extraction Plan process.

An Adaptive Management Plan has also been prepared for the Modification and is provided in the BDAR (Appendix D).

4.2.3 Mining Act 1992

The Modification is considered to be consistent with the objects of the Mining Act, including the object of encouraging and facilitating development of mineral resources in NSW, having regard to the need to encourage ESD.

Metropolitan Coal would lodge a MLA with the NSW Department of Primary Industries and Regional Development – NSW Resources (NSW Resources) over part of EL 9364 where there is currently no mining lease (shown as Indicative MLA Area on Figure 3-1).

Under the Mining Act, environmental protection and rehabilitation are regulated by conditions included in all mining leases, including requirements for the submission of a Rehabilitation Management Plan and Annual Rehabilitation Report.

Under subsection 4.42(1)(c) of the EP&A Act, if the Modification is approved as SSD, the grant of one or more mining leases under the Mining Act cannot be refused if those leases are necessary for the carrying out of the approved Modification, and the leases are to be substantially consistent with the Development Consent issued for the Modification.

The proposed MLA area consists of densely vegetated slopes within the Woronora Special Area. The land within the proposed MLA area is not available for agriculture use as it is located within the Woronora Special Area. Notwithstanding, under the EP&A Regulation, a development application must be accompanied by a gateway certificate or site verification certificate. As noted above, a site verification certificate has been obtained for the MLA area (Attachment 6).

Section 380AA of the Mining Act specifies restrictions on planning applications for coal mining, relevantly including:

> *(1) An application for development consent, or for the modification of a development consent, to mine for coal cannot be made or determined unless (at the time it is made or determined) the applicant is the holder for an authority that is in force in respect of coal and the land where mining for coal is proposed to be carried out, or the applicant has the written consent of the holder of such an authority to make an application.*
>
> …

Metropolitan Collieries Pty Ltd is the applicant for the Modification (Section 1.4). All mining leases within the Development Application Area are held by the applicant.

4.2.4 National Parks and Wildlife Act 1974

The NPW Act contains provisions for the establishment, preservation and management of national parks, historic sites, nature reserves and Aboriginal cultural heritage in NSW.

An Aboriginal Cultural Heritage Assessment (ACHA) for the Modification has been undertaken for the Modification by Niche (2025b) to assess the potential impacts of the Modification on Aboriginal cultural heritage (Appendix F).

In accordance with Section 4.41 of the EP&A Act, Aboriginal Heritage Impact Permits are not required for projects classified as SSD and approved under Part 4 of the EP&A Act. Impacts to Aboriginal heritage values associated with the Metropolitan Coal Project are managed under the approved Heritage Management Plan required under Condition 6(f), Schedule 3 of the Project Approval (08_0149).

4.2.5 Protection of the Environment Operations Act 1997

The PoEO Act and the *Protection of the Environment Operations (General) Regulation 2022* set out the general obligations for environmental protection for industry in NSW, which is regulated by the NSW Environment Protection Authority (EPA).

Operations and monitoring at the Metropolitan Coal Mine are currently undertaken in accordance with the current (Environment Protection License) EPL 767 held by Metropolitan Coal issued under the PoEO Act.

EPL 767 would be varied to incorporate the Modification area within the premises boundary.

4.2.6 Water NSW Act 2014

Under section 47(1) of the *Water NSW Act 2014*, an area of land may be declared to be a “Special Area”.

Section 47(2) of the *Water NSW Act 2014* states that land may be declared to be a Special Area if it is necessary for either or both of the following purposes:

> ***47 Special areas***
>
> …
>
> *(a) protecting the quality of stored waters, whether intended for use for drinking or other purposes,*
>
> *(b) maintaining the ecological integrity of an area of land to be declared to be a special area in a manner that is consistent with Water NSW’s objectives.*

The Metropolitan Coal Mine and proposed Modification is located within the Woronora Special Area, which was established in 1941 (WaterNSW and OEH, 2015) prior to the *Water NSW Act 2014*.

Section 52 of the *Water NSW Act 2014* states that for each Special Area a plan of management must be prepared. Of relevance to the Modification, the *Special Areas Strategic Plan of Management 2015* (WaterNSW and OEH, 2015) was developed to provide the strategic framework for the planning, delivery and reporting of land management activities within the Special Areas, including the Woronora Special Area, to secure high quality water for the storages, maintain ecosystem integrity and manage cultural values.

The *Special Areas Strategic Plan of Management 2015* (WaterNSW and OEH, 2015) is discussed further in Attachment 3.

4.2.7 Crown Land Management Act 2016

The NSW *Crown Land Management Act 2016* provides for the management of Crown land in NSW.

No Crown land is located within the proposed Modification area.

4.2.8 NSW Climate Change (Net Zero Future) Act 2023

The Net Zero Future Act sets out NSW's approach to effective action on climate change and legislates whole-of-government climate action to deliver net zero by 2050.

Neither the Net Zero Future Act nor any other relevant policies in NSW impose specific requirements on the Modification to implement measures to reduce, avoid and monitor greenhouse gas emissions.

Generally speaking, any specific requirements for the Modification to implement measures to reduce, avoid and monitor greenhouse gas emissions for the Modification would likely be contained in any modified Development Consent granted under Part 4 of the EP&A Act for the Modification, consistent with the current approach for the Metropolitan Coal Mine. The Metropolitan Coal Mine Project Approval (08_0149) imposes specific requirements on Metropolitan Coal with respect to greenhouse gas management at the Metropolitan Coal Mine.

Greenhouse gas emissions are further addressed in Section 6.10 and the Greenhouse Gas Assessment for the Modification (Appendix G).

4.3 STATE ENVIRONMENTAL PLANNING POLICIES

Detail on potential Modification requirements under the key environmental planning instruments is included in the statutory compliance table provided in Attachment 3.

4.4 COMMONWEALTH LEGISLATION

A summary of the relevant Commonwealth legislation relevant to the operation of the Metropolitan Coal Mine and Modification is provided below.

4.4.1 Environment Protection and Biodiversity Conservation Act 1999

The objective of the Commonwealth EPBC Act is to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance (MNES).

Proposals that are likely to have a significant impact on a MNES are defined as a controlled action under the EPBC Act. A proposal that is, or may be, a controlled action is required to be referred to the Commonwealth Department of Climate Change, Energy, the Environment and Water (Cth DCCEEW) to determine whether or not the action is a controlled action.

The Modification was referred to the Commonwealth Minister for the Environment and Water in January 2025 (EPBC 2025/10103) (the proposed Action).

A delegate of the Commonwealth Minister determined on 22 April 2025 that the proposed Action is a "Controlled Action". Therefore, the proposed Action requires approval under the EPBC Act due to potential impacts on the MNES under Chapter 2 of the EPBC Act:

- National heritage values of a National Heritage place (section 15B and section 15C);
- unconventional gas or large coal mining development with impact on water resources (sections 24D and 24E); and
- listed threatened species and communities (Sections 18 and 18A).

The delegate of the Commonwealth Minister also determined that the proposed Action is to be assessed under the Assessment Bilateral Agreement with the NSW Government. Therefore, this Modification Report provides an assessment of potential impacts of the proposed Action on the above MNES.

The proposed Action would be assessed in accordance with the Assessment Bilateral Agreement and would require approval under both the EP&A Act and the EPBC Act.

Consideration of the Modification against the objects of the EPBC Act is provided in Attachment 3.

The potential impacts of the Modification on national heritage values under the EPBC Act is considered in Appendices A to F and Attachment 5.

The potential impacts of the Modification on water resources have been assessed in the Groundwater Impact Assessment (Appendix B) and Surface Water Assessment (Appendix C) and summarised in Sections 6.4 and 6.5, respectively.

The potential impacts of the Modification on listed threatened species and communities have been assessed in the BDAR (Appendix D) and summarised in Sections 6.6 and 6.7.

Section 324S of the EPBC Act must be considered for the Modification:

> ***324S Management plans for National Heritage Places in Commonwealth areas***
>
> *(1) The minister must make a written plan to protect and manage the National Heritage values of each National Heritage place that is entirely within one of more Commonwealth areas. The Minister must do so as soon as practicable after the first time the place satisfies both of the following paragraphs:*
>
> *(a) the place is included in the National Heritage List;*
>
> *(b) the place is entirely within one of more Commonwealth areas.*
>
> *…*

The relevant international conventions, management plans and principles for the relevant National Heritage places to the Modification have been considered and are discussed in Attachment 5.

4.4.2 National Greenhouse and Energy Reporting Act 2007

The Commonwealth *National Greenhouse and Energy Reporting Act 2007* (NGER Act) introduced a single national reporting framework for the reporting and dissemination of corporations' greenhouse gas emissions and energy use.

Additionally, the Safeguard Mechanism (underpinned by the Commonwealth *National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015*) was established through the NGER Act.

The Safeguard Mechanism provides baseline emissions and offset requirements for applicable facilities, whereby facilities are required to achieve this baseline or otherwise account for emissions in exceedance of the baseline (e.g. carbon offsets).

Greenhouse gas emissions from the Metropolitan Coal Mine are currently measured and reported annually. Metropolitan Coal would continue to comply with its reporting obligations under the NGER Act should the Modification be approved.

Safeguard Mechanism Reforms

The Safeguard Mechanism Reforms (Cth DCCEEW, 2024a) introduced an amendment to the NGER Act and other legislation (including the Commonwealth *Climate Change Act 2022*) to establish a framework to give effect to key elements of the reforms, such as introducing a requirement for facilities to achieve greenhouse abatement via annual downward adjustment of baseline levels.

The reforms of the Safeguard Mechanism apply a declined rate to facilities' baselines so that they are reduced gradually on a trajectory consistent with achieving Australia's net emission reduction targets of 43% below 2005 levels by 2030 and net zero by 2050 (Cth DCCEEW, 2024b). The reformed Safeguard Mechanism came into effect on 1 July 2023.

Metropolitan Coal Mine is and will continue to be a designated large facility as defined by the NGER Act. The Safeguard Mechanism therefore applies to Metropolitan Coal and will continue to apply to the Metropolitan Coal Mine including the Modification.

Greenhouse gas emissions are further addressed in Section 6.10 and the Greenhouse Gas Assessment for the Modification (Appendix G).

4.5 ENVIRONMENTAL PLANNING INSTRUMENTS

4.5.1 State Environmental Planning Policies

The following State Environmental Planning Policies (SEPPs) may potentially be relevant to the Modification:

- *State Environmental Planning Policy (Planning Systems) 2021.*
- *State Environmental Planning Policy (Resources and Energy) 2021* (Resources and Energy SEPP).
- *State Environmental Planning Policy (Resilience and Hazards) 2021.*
- *State Environmental Planning Policy (Transport and Infrastructure) 2021.*
- *State Environmental Planning Policy (Biodiversity and Conservation) 2021.*

Relevant provisions and objectives of the above SEPPs are considered in Attachment 3.

4.5.2 Local Environmental Plans

The Development Application Area is within the Wollongong LGA which is covered by the *Wollongong Local Environmental Plan 2009* (Wollongong LEP). The aim of the Wollongong LEP and special provisions is discussed in Attachment 3. Permissibility of the Modification is discussed below.

Permissibility

At the time Project Approval (08_0149) was originally granted, the proposed mining development was permissible with conditions under the EP&A Act.

The Modification Development Application Area is within the Wollongong LEP area. The proposed MLA (which will be added to the Development Application Area) is wholly located on land zoned under the Wollongong LEP as C2 (Environmental Conservation). Other components of the Modification such as the Modification underground mine layout and relocated Ventilation Shaft 4 are located on land zoned as C2 (Environmental Conservation) under the Wollongong LEP.

The existing Surface Facilities area that would continue to be used for the Modification is located on land zoned as RU1 (Primary Production) and C2 (Environmental Conservation) under the Wollongong LEP.

The Wollongong LEP defines "mining" as follows:

> ***mining*** *means mining carries out under the* Mining Act 1992 *or the recovery of minerals under the* Offshore Minerals Act 1999, *and includes-*
>
> *(a) the construction, operation and decommissioning of associated works, and*
>
> *(b) the rehabilitation of land affected by mining.*

The Wollongong LEP also defines "underground mining" as follows:

> ***underground mining*** *means --*
>
> *(a) mining carried out beneath the earth's surface, including bord and pillar mining, longwall mining, top-level caving and sub-level caving and auger mining, and*
>
> *(b) shafts, drill holes, gas and water drainage works, surface rehabilitation works and access pits associated with that mining (whether carried out on or beneath the earth's surface),*
>
> *but does not include open cut mining.*

Within Zones RU1 (Primary Production) and C2 (Environmental Conservation), the Wollongong LEP provides that development for the purpose of underground mining is prohibited.

It is noted that the Development Application Area is also located on the following land zones under the Wollongong LEP (where the Modification does not propose any change to approved activities):

- RU2 (Rural Landscape).
- E3 (Productivity Support).
- E4 (General Industrial).
- SP2 (Infrastructure).
- SP3 (Tourist).
- RE1 (Public Recreation).
- RE2 (Private Recreation).
- C1 (National Parks and Nature Reserves).
- C3 (Environmental Management).

However, clause 2.5 of the Resources and Energy SEPP provides that the policy applies to the State of NSW, and clause 2.6(1) of the Resources and Energy SEPP relevantly gives it primacy where there is any inconsistency between the provisions in the SEPP and the provisions in the Wollongong LEP.
Clause 2.9(1) of the Resources and Energy SEPP provides that certain mining development is permissible with development consent.
Clause 2.9(1)(b) states:

> ***(1)*** ***Mining*** *Development for any of the following purposes may be carried out only with development consent --*
>
> *(a) underground mining carried out on any land,*
>
> *(b) mining carried out—*
>
> *(i) on land where development for the purposes of agriculture or industry may be carried out (with or without development consent), or*
>
> *(ii) on land that is, immediately before the commencement of this section, the subject of a mining lease under the Mining Act 1992 or a mining licence under the Offshore Minerals Act 1999,*
>
> *…*
>
> *(d) facilities for the processing or transportation of minerals or mineral bearing ores on land on which mining may be carried out (with or without development consent), but only if they were mined from that land or adjoining land,*

The practical effect of clause 2.6(1) of the Resources and Energy SEPP is that where there is any inconsistency between the provisions of the Resources and Energy SEPP and those contained in the Wollongong LEP, the provisions of the Resources and Energy SEPP will prevail.

To the extent that the provisions in the Wollongong LEP and Resources and Energy SEPP relating to the permissibility of proposed development are relevant to determining this proposed modification of development which is already authorised by the Project Approval (08_0149), Metropolitan Coal considers that the consent authority can be satisfied that the Modification is consistent with these provisions.

5 ENGAGEMENT

This section provides an overview of the engagement undertaken during the preparation of this Modification Report and the key issues raised during this engagement.

5.1 ENGAGEMENT APPROACH

The engagement undertaken during preparation of this Modification Report is in accordance with Metropolitan Coal's Scoping Letter for the Modification and has been undertaken in consideration of the requirements of *Undertaking Engagement Guidelines for State Significant Projects* (DPHI, 2024b).

Key objectives of the engagement undertaken for the Modification are to:

- engage with key government and public stakeholders about the Modification;
- seek input from key stakeholders on elements of the Modification; and
- continue the ongoing dialogue between Metropolitan Coal and key stakeholders regarding the development of the Metropolitan Coal Mine.

A summary of consultation with key stakeholders is provided below.

It is anticipated that consultation will continue during the public exhibition of this Modification Report and the assessment of the Modification application.

5.2 FEDERAL GOVERNMENT AGENCIES

Commonwealth Department of Climate Change, Energy, the Environment and Water

Metropolitan Coal consulted with the Cth DCCEEW on 9 January 2024 during the preparation of the EPBC Referral regarding the Modification (the proposed Action).

The Modification (the proposed Action) was referred to the Commonwealth Minister in January 2025 (EPBC 2025/10103). A delegate of the Commonwealth Minister determined on 22 April 2025 that the proposed Action is a "Controlled Action' and therefore, requires approval under the EPBC Act.

Assessment requirements for this Modification under the EPBC Act were issued on 9 May 2025.

5.3 NSW GOVERNMENT AGENCIES

NSW Department of Planning, Housing and Infrastructure

Metropolitan Coal held a meeting with DPHI on 20 March 2023 to provide an initial briefing on the Modification including an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing. Feedback provided by DPHI during this meeting has been considered in this Modification Report.

Metropolitan Coal consults with DPHI on a regular basis in relation to the ongoing activities at the Metropolitan Coal Mine and provided an update on the status of the Modification to DPHI on 10 July 2023.

On 12 October 2023, Metropolitan Coal submitted a Scoping Letter to DPHI providing an overview of the Modification, proposed approval pathway and the proposed scope of the environmental assessment.

Pre-lodgement meetings were held with DPHI in May and June 2025 to provide an update on the key assessment outcomes of the Modification and seek feedback from DPHI prior to lodgement.

Feedback received from DPHI during this consultation has been considered in this Modification Report.

Metropolitan Coal will continue to consult with DPHI throughout the Modification assessment process to respond to any issues raised during the Modification exhibition process.

Other NSW Government Agencies

Metropolitan Coal consulted with the following regulatory agencies to provide an overview description of the Modification and proposed scope of environmental assessment relevant to their respective areas of interest:

- NSW Department of Climate Change, Energy, the Environment and Water (NSW DCCEEW) Environment and Heritage – Conservation Programs, Heritage and Regulation (CPHR; formerly Biodiversity, Conservation and Science);
- NSW DCCEEW Water – Water Group;
- NSW DCCEEW Environment and Heritage – Heritage NSW (Heritage NSW);
- Department of Primary Industries – Fisheries (DPI – Fisheries);
- Transport for NSW (TfNSW);

- NSW DCCEEW Environment and Heritage Group – Soils Group;
- NSW Resources (formerly Mining, Exploration and Geoscience);
- NSW Resources Regulator (within NSW Resources);
- NSW National Parks and Wildlife Service;
- EPA;
- WaterNSW;
- Dam Safety NSW; and
- Subsidence Advisory NSW.

A summary of consultation undertaken with key Government agencies is regarding the Modification is provided in Table 5-1.

Feedback received from the above agencies was incorporated within this Modification Report where relevant.

5.4 LOCAL COUNCILS

Wollongong City Council

The Metropolitan Coal Mine is located within the Wollongong LGA.

Metropolitan Coal held a meeting with Wollongong City Council on 7 February 2024 to provide an initial briefing on the Modification including an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing. No particular matters requiring attention in the Modification Report were raised in the meeting.

Representatives of the Wollongong City Council are also members of the Community Consultative Committee (CCC) for the Metropolitan Coal Mine and have been provided with updates on the Modification through the regular CCC meetings.

Metropolitan Coal would continue to consult with the Wollongong City Council during the Modification assessment process to response to any issues or concerns.

Sutherland Shire Council

On 22 February 2024, Metropolitan Coal provided a briefing letter to the Sutherland Shire Council and offered to meet to discuss the details of the proposed Modification.

A meeting was held with Sutherland Shire Council on 15 March 2024 to provide an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing.

Metropolitan Coal would continue to consult with the Sutherland Shire Council during the Modification assessment process to response to any issues or concerns.

5.5 COMMUNITY ENGAGEMENT

Community Consultative Committee

A CCC for the Metropolitan Coal Mine is in place and provides a mechanism for ongoing communication between Metropolitan Coal and representatives of the local community, including an independent chairperson, representatives from the Wollongong City Council, local residents and community members.

Metropolitan Coal provided a briefing regarding the Modification, including an overview of the Modification and proposed scope of environmental assessment, at the CCC meetings in March and November 2023 and July 2024. Metropolitan Coal provided an update on the Modification during the CCC meetings in March and July 2025.

Meeting minutes for the CCCs are publicly available on the Peabody website.

Aboriginal Stakeholders

Metropolitan Coal consulted with Aboriginal stakeholders as part of the ACHA prepared for the Modification. Consultation was conducted with reference to the *Aboriginal cultural heritage consultation requirements for proponents 2010* (NSW Department of Environment, Climate Change and Water [DECCW], 2010a) (the Consultation Requirements) and the NPW Act.

Further detail on consultation with Aboriginal stakeholders, and how comments have been considered, is provided in Section 6.9 and Appendix F.

Public Consultation

The Peabody website (https://www.peabodyenergy.com) provides regular updates on the Metropolitan Coal Mine, and provides access to relevant environment and community information, including compliance reports and approval documents.

The Metropolitan Coal Mine community line (1800 115 003) allows members of the public to contact Metropolitan Coal with enquiries or complaints.

A copy of this Modification Report will be made available on the Metropolitan Coal website.

Table 5-1
Summary of Consultation Undertaken with Key NSW Government Agencies

Stakeholder	Date	Summary/Issue Raised
NSW Resources	7 November 2023	Metropolitan Coal held a meeting with the Mine Development Panel division of the NSW Resources to provide a description of the Modification, preliminary geology and geotechnical information, proposed tonnage, mine design and timeline, and economic information. No particular matters requiring attention in the Modification Report were raised in the meeting.
Dam Safety NSW	12 February 2024	Metropolitan Coal held a meeting with Dam Safety NSW to provide an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing. No particular matters requiring attention in the Modification Report were raised in the meeting.
Water NSW	8 March 2024	Metropolitan Coal held a meeting with WaterNSW providing an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing. No particular matters requiring attention in the Modification Report were raised in the meeting.
	22 May 2025	Metropolitan Coal held a meeting with WaterNSW providing an update on the Modification. No issues were raised.
NSW Resource Regulator	14 March 2024	Metropolitan Coal held a meeting with the NSW Resources Regulator providing an overview of the Modification, the supporting environmental assessments to be undertaken and the proposed approval process and timing. The NSW Resources Regulator provided feedback on the proposed remediation activities of the embankment at the Surface Facilities Area, consideration of post-mining land uses and the potential to amend the Metropolitan Coal Project Approval (08_0149) conditions to consider more contemporary regulations. Feedback received from the NSW Resources Regulator was considered within this Modification Report where relevant.
NSW DCCEEW Environment and Heritage Group – Soils Group	6 June 2024	Metropolitan Coal held a meeting with NSW DCCEEW Environment and Heritage Group – Soils Group to provide an overview of the Modification, the Site Verification Application and Biophysical Strategic Agricultural Land Assessment being undertaken by Metropolitan Coal. No particular matters requiring attention in the Modification Report were raised in the meeting.
NSW DCCEEW Water – Water Group	23 August 2024	Metropolitan Coal held a meeting with NSW DCCEEW Water – Water Group to discuss the Modification, and the Groundwater Impact Assessment and Surface Water Assessment approach. NSW DCCEEW Water – Water Group outlined relevant technical aspects to be considered in the Groundwater Impact Assessment and Surface Water Assessment for the Modification. Feedback received from the NSW DCCEEW Water – Water Group was considered within this Modification Report where relevant.

Table 5-1 (Continued)
Summary of Consultation Undertaken with Key NSW Government Agencies

Stakeholder	Date	Summary/Issue Raised
CPHR	24 February 2025	Metropolitan Coal held a meeting with CPHR to discuss the Modification, and the assessment approach to biodiversity values. CPHR outlined relevant technical aspects to be considered in the BDAR. Feedback received from the CPHR was considered within this Modification Report where relevant.
Heritage NSW	7 March 2025	Metropolitan Coal provided a Modification briefing letter Heritage NSW providing an overview of the Modification and proposed scope of environmental assessment relevant to heritage considerations including consultation approach with Registered Aboriginal Parties (RAPs). No issues were raised.
TfNSW	7 March 2025	Metropolitan Coal provided a Modification briefing letter to TfNSW providing an overview of the Modification and proposed scope of environmental assessment relevant to road transport considerations. TfNSW recommended the Subsidence Assessment include consideration of likely ground movements at TfNSW infrastructure. TfNSW also stated there was no objection to the Modification relevant to the proposed extension of current transport contingency measures.
DPI – Fisheries	10 April 2025	Metropolitan Coal provided a Modification briefing letter to DPI – Fisheries providing an overview of the Modification and proposed scope of environmental assessment relevant to groundwater, surface water and aquatic ecology. No issues were raised.
National Parks and Wildlife Services	10 April 2025	Metropolitan Coal provided a Modification briefing letter to NSW National Parks and Wildlife Services providing an overview of the Modification and proposed scope of environmental assessment relevant to groundwater and surface water. No issues were raised.
Subsidence Advisory NSW	17 April 2025	Metropolitan Coal provided a Modification briefing letter to Subsidence Advisory NSW providing an overview of the Modification and proposed scope of environmental assessment relevant to subsidence. No issues were raised.
EPA	15 May 2025	Metropolitan Coal provided a Modification briefing letter to the EPA providing an overview of the Modification and proposed scope of environmental assessment relevant to groundwater, surface water and greenhouse. No issues were raised.

6 ASSESSMENT OF IMPACTS

6.1 IDENTIFICATION OF THE KEY ISSUES

Metropolitan Coal has undertaken a review of the potential environmental impacts of the Modification to identify key potential environmental issues requiring assessment.

The key potential environmental impacts of the Modification relate to:

- the potential subsidence effects due to the northern extension of the approved Longwall 317 and addition of Longwall 318; and
- the relocation of Ventilation Shaft 4, which would require clearing of approximately 3.8 ha of native vegetation, and associated construction related impacts.

The assessment of environmental impacts has focussed on the incremental changes due to the Modification when compared to the approved Metropolitan Coal Mine.

These potential environmental impacts have been assessed incrementally, taking into account both the additional components proposed under the Modification and the relinquishment of approved areas that would no longer be developed (Section 3.6). The reduction in approved underground mining areas and infrastructure results in a corresponding avoidance and/or reduction in approved environmental impacts. Cumulative impacts have also been considered.

A discussion of the predicted subsidence effects and impacts is provided in Section 6.3 to 6.9 and 6.11 and the relevant appendices for:

- natural and built features;
- groundwater;
- surface water;
- terrestrial ecology;
- upland swamps;
- aquatic ecology;
- Aboriginal cultural heritage; and
- land resources and land uses.

Potential impacts of the relocation of Ventilation Shaft 4 on surface water, terrestrial ecology, Aboriginal cultural heritage and land resources and land use are considered in Sections 6.5, 6.7, 6.9 and 6.11 and the relevant appendices.

In addition, an assessment of the potential changes to greenhouse gas emissions due to the Modification is provided in Section 6.10.

Sections 6.3 to 6.10 and the relevant appendices include a description of the methodology undertaken for each assessment, the existing environment, an assessment of the potential impacts of the Modification, and, where relevant, a description of measures that would be implemented to avoid, minimise and/or mitigate the potential impacts.

Section 6.12 discusses the potential environmental impacts of the Modification on other aspects, including non-Aboriginal heritage, visual, road transport, socio-economic, amenity (including noise and air quality) and hazard and risk.

6.1.1 Assessment Context for the Modification

It is anticipated that the Metropolitan Coal Mine would cease operations in 2029, approximately three years earlier than the approved mine life of 2032, due to a reduced underground mine layout compared to the approved underground mine layout presented in the PPR (Section 1.2).

The reduced underground mining layout represents a 26% reduction in underground mining area and the relinquishment of 14 Mt of approved ROM coal (Figure 3-3).

The Modification would allow for the continuation of underground mining operations until 30 June 2031 and the extraction of an additional 3.2 Mt of ROM coal associated with the extension of Longwall 317 and the addition of Longwall 318. This represents a net reduction of 10.8 Mt of ROM coal compared to the approved Metropolitan Coal Mine longwall mining area.

This Modification Report assesses the potential benefits, including mitigation and avoidance measures achieved through the reduced underground mine layout.

6.2 CLIMATE AND TOPOGRAPHY

This sub-section provides a brief description of the local climate conditions at the Metropolitan Coal Mine. Long-term meteorological data is available from Bureau of Meteorology (BoM) weather stations from Lucas Heights, Woronora Dam and Darkes Forest. The BoM weather stations proximal to the Modification measure a number of meteorological parameters, including temperature, humidity and rainfall.

Short-term local meteorological data are also available from Metropolitan Coal pluviometers situated in the Waratah Rivulet catchment (site PV1), Woronora River catchment (site PV2), Honeysuckle Creek catchment (site PV5), Waratah Rivulet catchment (site PV6) and Eastern Tributary catchment (site PV7) along with the Metropolitan Coal weather station (located in Helensburgh), which is operated in accordance with EPL 767 (Appendix C).

A brief summary of key meteorological data in the vicinity of the Metropolitan Coal Mine is provided below. Details of the weather stations in the vicinity of the Modification are provided in Appendix C.

6.2.1 Existing Environment

Rainfall and Evaporation

As described in the Surface Water Assessment (ATC Williams, 2025), annual average rainfall at Metropolitan Coal pluviometers is higher to the east of the Modification area with an average of approximately 1,500 millimetres (mm) per year (site PV7) and decreases to the west with an average of approximately 1,120 mm per year (site PV5).

Generally, the rainfall records indicate no distinct dry season, with higher rainfall typically occurring between January and June, and the lowest rainfall recorded in September (Appendix C).

Pan evaporation tends to exceed rainfall in August to February, while evapotranspiration declines significantly in the winter months and only exceeds rainfall in October to January (Appendix C).

Temperature

Temperatures in the vicinity of the Metropolitan Coal Mine are warmer from November to March and cooler from May to October. The long-term average monthly temperature ranges from a minimum of 6.3 degrees Celsius (°C) to a maximum of 25.8°C (Appendix C).

The warmest maximum daytime temperatures are generally recorded in January, while the coolest are generally recorded in July (Appendix C).

Topography and Landscape

The Modification underground mining area is located to the west of the township of Helensburgh on the Woronora Plateau, which is characterised by undulating topography and naturally vegetated landscapes, with elevations generally higher than the Metropolitan Coal Mine surface facilities located east of the Helensburgh.

The Modification underground mining area is located entirely within the Woronora Catchment, and within a declared catchment area (i.e. the Woronora Special Area), and is characterised by Lake Woronora and its various connected watercourses and their associated tributaries (e.g. Woronora River, Waratah Rivulet, Honeysuckle Creek) (Appendix C).

The Woronora Reservoir's full supply level is located outside the Modification area, approximately 700 m northeast of Longwall 317 at its closest point (Appendix D).

The Modification area is generally undisturbed due to public access to the Woronora Special Area being restricted by WaterNSW (Figure 3-1).

The topography above Longwalls 317 and 318 varies, with elevations ranging from approximately 295 metres Australian Height Datum (m AHD) above Longwall 317 to approximately 230 m AHD above Longwall 318 (Appendix A) (Plate 6-1). The terrain predominantly slopes westward towards Honeysuckle Creek.

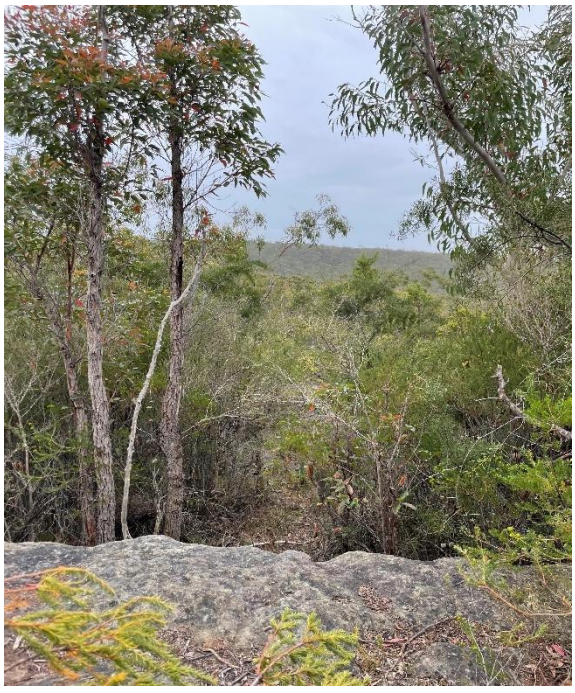


Plate 6-1 Example of Valley Slopes within the Vicinity of the Modification

6.3 SUBSIDENCE

A Subsidence Assessment has been prepared by Mine Subsidence Engineering Consultants Pty Ltd (MSEC) (2025) for the Modification and is provided in Appendix A.

6.3.1 Methodology

The Subsidence Assessment:

- provides predicted subsidence effects for the Modified Layout (i.e. extension of Longwall 317 and the addition of Longwall 318);
- compares the predicted subsidence effects for the Modified Layout with those for the approved underground mine layout (hereafter referred to as the Approved Layout);
- identifies the natural and built features located above and in the vicinity of the Modified Layout; and
- assesses the likely subsidence impacts on natural and built features based on the 35° angle of draw and/or 20 mm subsidence contour from the Modified Layout (hereafter referred to as the Subsidence Extent), in conjunction with other specialist consultants, in consideration of the predicted subsidence effects and existing performance measures.

A summary of the key findings of the Subsidence Assessment is provided below.

6.3.2 Background

Previous Assessments

Metropolitan Coal submitted the Metropolitan Coal Project PPR including a subsidence assessment prepared by MSEC (2009). The Metropolitan Coal Project was approved in June 2009 (Project Approval [08_0149]), based on the PPR underground mine layout.

Metropolitan Coal subsequently modified the northern series of longwalls (Longwalls 301 to 317) by rotating them in an anti-clockwise direction by approximately six degrees. MSEC prepared updated subsidence predictions and impact assessments in support of the application. This change of longwall layout was approved in April 2015 in accordance with Project Approval (08_0149). This underground mine layout change resulted in the shortening of Longwall 317 compared to that presented in the PPR.

References to the 'Approved Layout' in this section are to the underground mine layout approved in April 2015 (Appendix A).

The current underground mine layout as proposed under the Metropolitan Coal Mine Longwalls 311-316 Extraction Plan is shown on Figure 1-3.

Subsidence Impact Performance Measures

Condition 1, Schedule 3 of Project Approval (08_0149) provides subsidence impact performance measures for natural, environmental and built features (Table 6-1).

These subsidence impact performance measures were developed in consideration of the predicted subsidence impacts in the Subsidence Assessment (MSEC, 2009) for the Metropolitan Coal Project PPR.

Extraction Plan

Condition 6, Schedule 3 of Project Approval (08_0149) requires Metropolitan Coal to prepare an Extraction Plan for second workings prior to extraction.

The most recently submitted Extraction Plan was for Longwall 311-316.

Monitoring of Previous Secondary Extraction

In accordance with Condition 6(e), Schedule 3 of Project Approval (08_0149), Metropolitan Coal prepared the Longwalls 311-316 Subsidence Monitoring Program as part of the Longwalls 311-316 Extraction Plan. The Subsidence Monitoring Program includes post-mining monitoring and management of potential subsidence impacts and environmental consequences, subject to the previously approved Metropolitan Coal Extraction Plans for Longwalls 20-22, 23-27, 301-303, 304, 305-307 and 308-310. The Longwalls 311-316 Subsidence Monitoring Program comprises monitoring of subsidence lines, cliffs, landscape features, swamps, flora and fauna including habitats, surface water, groundwater and heritage.

The current underground mine layout incorporating the shortened longwalls is shown on Figure 1-3. Metropolitan Coal plans to commence secondary extraction of Longwall 312 in July 2025.

Table 6-1
Subsidence Impact Performance Measures

Feature	Subsidence Impact Performance Measure
Natural and Heritage Features	
Catchment yield to the Woronora Reservoir*	Negligible reduction to the quality or quantity of water resources reaching the Woronora Reservoir No connective cracking between the surface and the mine
Woronora Reservoir*	Negligible leakage from the Woronora Reservoir Negligible reduction in the water quality of Woronora Reservoir
Waratah Rivulet between the full supply level of the Woronora Reservoir and the maingate of Longwall 23 (upstream of Pool P)*	Negligible environmental consequences (that is, no diversion of flows, no change in the natural drainage behaviour of pools, minimal iron staining, and minimal gas releases)
Eastern Tributary between the full supply level of the Woronora Reservoir and the maingate of Longwall 26*	Negligible environmental consequences over at least 70% of the stream length (that is no diversion of flows, no change in the natural drainage behaviour of pools, minimal iron staining and minimal das release)
Threatened species, populations, or ecological communities#	Negligible impact
Swamps 76 and 77^	Negligible environmental consequences to Threatened Species, Populations, and Ecological Communities
Swamp 92^	Negligible environmental consequences
Cliffs	Less than 3% of the total length of cliffs (and associated overhangs) within the mining area experience mining-induced rock fall
Aboriginal heritage sites	Less than 10% of Aboriginal heritage sites within the mining area are affected by subsidence impacts
Items of historical or heritage significance at the Garrawarra Centre	Negligible damage (that is fine or hairline cracks that do not require repair), unless the owner of the item and the appropriate heritage authority agree otherwise in writing
Built Features	
Built features	Safe, serviceable and repairable, unless the owner agrees otherwise in writing

After: Project Approval (08_0149).

* Features outside of the Subsidence Extent.

\# Coastal upland swamp ecological communities were not listed as threatened at the time of grant of Project Approval (08_0149) and are not captured by this performance measure.

^ Subsidence Impact Performance Measure set through Condition 4, Schedule 3 of Project Approval (08_0149).

6.3.3 Prediction of Subsidence Effects

Subsidence is the vertical and horizontal movement of the overburden and land surface as a result of the extraction of underlying coal. These land surface movements are generically referred to as subsidence effects. The type and magnitude of the subsidence effects are dependent on a range of variables (e.g. mine geometry, topography and geology).

The normal ground movements from the extraction of longwalls can be categorised as conventional or non-conventional subsidence movements.

Prediction Methodology

Predictions of systematic subsidence parameters for the Modification were made using the Incremental Profile Method, which consists of subsidence prediction curves based on monitoring data from mines extracting coal from the Southern, Newcastle, Hunter and Western Coalfields of NSW (Appendix A).

The Incremental Profile Method has a tendency to over-predict the systematic subsidence parameters where the proposed mining geometry and geology are within the range of the empirical database (i.e. the method is based on upper bound curves and is generally conservative) (Appendix A).

The standard Incremental Profile Method was calibrated to local data/conditions to account for the local geology at the Metropolitan Coal Mine (Appendix A).

The predicted subsidence effects for the Modification have been assessed for both the Approved Layout and Modified Layout.

Maximum Conventional Subsidence Effects

Conventional subsidence movements are described by the following parameters: vertical subsidence, tilt, curvature, and associated strains (tensile and compressive strains).

Table 6-2 presents a comparison of the maximum predicted subsidence effects from the Approved and Modified Layouts.

The maximum predicted total vertical subsidence, tilt and sagging curvature for the Modified Layout is the same as previously predicted subsidence for the Approved Layout (Table 6-2).

The maximum predicted hogging curvature for the Modified Layout is slightly less than the Approved Layout (Table 6-2).

The predicted total tensile strain due to the extraction of Longwalls 317 and 318 based on the Modification are reduced due to the widened tailgate pillars for Longwalls 316 to 318. As a result of lower predicted total tensile strain, the risk of tensile cracking in the bedrock is reduced (Appendix A).

Predictions of Non-conventional Subsidence Effects

Non-conventional subsidence movements include far-field horizontal movements, irregular subsidence movements and valley related movements, including upsidence and closure (Appendix A).

Potential impacts and consequences of predicted non-conventional subsidence movements are discussed below and in Appendix A.

Potential Environmental Consequences of Subsidence on Key Natural and Built Features

Subsidence impacts are the physical changes to the ground and its surface caused by the subsidence effects described above.

A summary of the potential environmental consequences of the predicted incremental subsidence impacts for the Modification is provided below, including cross-references to sub-sections with further detail.

Natural Features

Catchment Areas and Declared Special Area

The Modification area lies within the Woronora Special Area, which is controlled by WaterNSW. The Modified Layout and extent of predicted subsidence effects is situated greater than 3.2 km south of the Dams Safety NSW Notification Area for the Woronora Reservoir, which is also known as Lake Woronora. As such, there would be no predicted subsidence impacts to the Woronora Reservoir dam wall (Appendix A).

Woronora Reservoir

The Woronora Reservoir is located approximately 720 m from Longwall 317 and is unlikely to experience adverse subsidence effects from the Modification (Appendix A).

River, Creeks and Tributaries

Waratah Rivulet and Woronora River flow to the north-east into the Woronora Reservoir and form the two main arms of the reservoir. The Waratah Rivulet is located approximately 1.4 km south-east of Longwall 317 and the Woronora River is located approximately 2 km west of Longwall 318. At these distances, these features are unlikely to experience adverse subsidence effects from the Modification (Appendix A).

Honeysuckle Creek and unnamed tributaries, referred to as Tributary R, Tributary S and Tributary U, are within and in the vicinity of the Subsidence Extent. Tributary R and S are located above the approved Longwalls 311 to 316 and Tributary U is located above the northern end of Longwall 317. Honeysuckle Creek is located immediately west of Longwall 318 (void). Key subsidence predictions for these tributaries are summarised in Table 6-3.

Table 6-2
Comparison of Predicted Subsidence Effects for the Approved and Modified Layouts

Layout	Maximum Predicted Total Subsidence (mm)	Maximum Predicted Total Tilt (mm/m)	Maximum Predicted Hogging Curvature (km^{-1})	Maximum Predicted Sagging Curvature (km^{-1})
Approved Layout	1,500	6.5	0.08	0.08
Modified Layout	1,500	6.5	0.07	0.08

Note: km^{-1}= 1/kilometre.

Source: MSEC (2025).

Table 6-3
Maximum Predicted Total Subsidence, Upsidence, Closure and Compressive Strain for the Tributaries within the Modification Area

Tributary	Layout	Maximum Predicted Total Vertical Subsidence (mm)	Maximum Predicted Total Upsidence (mm)	Maximum Predicted Total Closure (mm)	Maximum Predicted Closure Strain based on a 20 m Bay Length (mm/m)
Tributary R	Approved Layout	1,500	925	1,050	11
	Modified Layout	1,500	950	1,050	11
Tributary S	Approved Layout	1,150	300	500	11
	Modified Layout	1,250	325	550	11
Tributary U	Approved Layout	140	140	200	11
	Modified Layout	875	425	525	11
Honeysuckle Creek	Approved Layout	< 20	< 20	< 20	4
	Modified Layout	225	150	350	11

Note: < = less than.
Source: MSEC (2025).

Although there are slight increases in predicted subsidence parameters and additional subsidence parameters for Tributary R and Tributary S, the subsidence impacts to these features would be unchanged due to the minor increase in predicted valley related movements (Appendix A).

The predicted subsidence parameters and impact assessments for Honeysuckle Creek and Tributary U increase as a result of the Modification. However, the magnitude of valley related movements for these features is similar or less than the predicted valley related movements for other tributaries located above the previously approved and extracted longwalls (Appendix A).

The overall potential impacts on the tributaries within the Subsidence Extent, based on the Modified Layout, are similar to those assessed for the Approved Layout (Appendix A).

Tributaries

There are other smaller tributaries located within and in the vicinity of the Modified Layout.

Although the predicted upsidence and closure at the tributaries are generally greater for the Modified Layout compared to the Approved Layout, as the maxima would be similar to or less than the Approved Layout, the overall potential impacts would be similar to the approved Metropolitan Coal Mine (Appendix A).

Potential impacts to the tributaries and creek are described in Section 6.5 and Appendix C.

Cliffs and Overhangs

A cliff is defined in Project Approval (08_0149) as a continuous rock face, including overhangs, having a minimum height of 10 m and a slope of greater than 66°.

There is one cliff referred to as Cliff COH19 located within 600 m from Longwalls 317 and 318. The predicted subsidence parameter and potential subsidence impacts to Cliff COH19 as a result of the Modification would be unchanged (Appendix A).

It is possible that isolated rock falls could occur as a result of the extraction of the proposed Modified Layout. However, it is not expected that any large cliff instabilities would occur outside the longwall footprints as a result of the extraction of the Modified Layout (Appendix A).

Rock Ledges

There are rock ledges located within and in the vicinity of the Modified Layout. Although there would be an increase in the predicted subsidence parameters above the extended Longwall 317 and additional Longwall 318, the maximum predicted subsidence parameters would be similar or less than compared to the Approved Layout. Therefore, the potential impacts on the rock ledges including fracturing and rockfalls would be unchanged (Appendix A).

Steep Slopes

The locations of steep slopes within and in the vicinity of the Modified Layout are shown on Figure 6-1. Steep slopes are represented based on the definition used in subsidence assessment for the Metropolitan Coal Project EA (i.e. a natural gradient between 18° and 63°) as well as the definition in Project Approval (08_0149) (i.e. a natural gradient between 33° and 66°).

There is one small area of steep slopes located above the Modified Layout, which is located at northern end of Longwall 317. The steep slopes are expected to experience only minor predicted subsidence parameters and negligible tilt and curvature. As such, subsidence impacts due to the Modification are not expected (Appendix A).

Upland Swamps

There are 41 swamps located within and in the vicinity of the Modified Layout and 10 swamps are located outside the Subsidence Extent but within 600 m of Longwalls 317 and 318.

There is a predicted increase in vertical subsidence at several swamps due to the extension of Longwall 317 and the addition of Longwall 318. Although the predicted tilt and curvature increase at a number of swamps, the maximum values are similar to or less than the maxima predicted for other swamps located above the previously extracted longwalls at the Metropolitan Coal Mine. Therefore, the potential impacts to these swamps would be generally consistent with the impacts observed for the Approved Layout (Appendix A).

The predicted maximum mining-induced tilts are generally much lower than the existing natural grades within the swamps. Whilst the predicted tilts may result in changes to grade within the swamps at some locations where natural grades are shallow, the predicted tilts would generally not be expected to have a significant effect on the overall gradient of the swamps or the flow of surface water (Appendix A).

The risk of surface tensile strain exceeding 0.5 mm/m across all upland swamps within the Subsidence Extent is reduced due to the increase in pillar width from 45 m to 55 m (Appendix A).

Performance measures have been set for Swamps 76, 77 and 92 in the Longwalls 311-316 Extraction Plan as per Condition 4, Schedule 3 of Project Approval (08_0149). Swamp 76 is located above the middle of Longwalls 315 and 316 and follows the alignment of Tributary S. Swamp 77 is located in the southern half of the Longwalls 312 to 315 and follows the alignment Tributary R. Swamp 92 is located outside the Subsidence Extent (Appendix A).

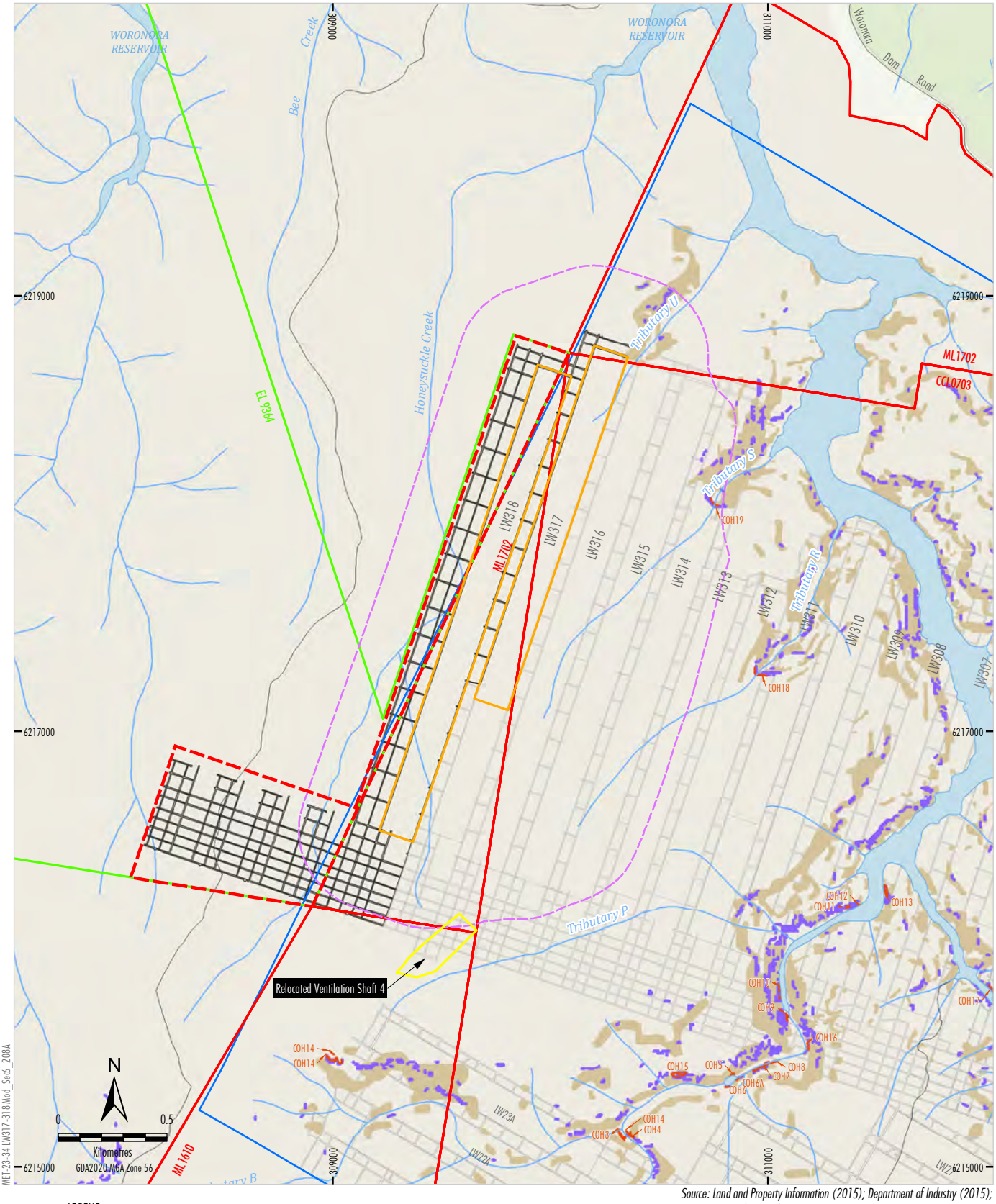
As Swamps 76 and 77 are located closer to Longwall 317, these features would experience incremental subsidence effects due to the extraction of Longwalls 317 and 318 of the Modified Layout. However, the maximum predicted subsidence parameters for these swamps are expected at the eastern sides of these swamps and do not change significantly compared to the Approved Layout. The maximum predicted subsidence parameters for Swamp 92 based on the Modified Layout are the same as those based on the Approved Layout (Appendix A).

The largest swamp within the Subsidence Extent is Swamp 106, which is located above the southern end of Longwall 318 and the finishing end of Longwall 317. The maximum predicted subsidence increases under the Modified Layout while the maximum predicted tilt and strains do not change (Appendix A). Despite predictions of valley closure at a small section of the swamp, which is located within the alignment of Honeysuckle Creek, the predicted valley closure is small and is not expected to result in valley related impacts to Swamp 106 (Appendix A).

Potential impacts to upland swamps are discussed in Section 6.6.

Built Features

The only built features in the Subsidence Extent are fire trails/access tracks.



MET-23-34 LW317-318 Mod_Set6_208A

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4
- 35 Degree Angle of Draw and/or 20 mm Subsidence Contour (Subsidence Extent)
- Woronora Special Area
- Cliffs and Overhangs
- Steep Slopes (as Defined in Project Approval)
- Steep Slopes (as Defined in Project Environmental Assessment)

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

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Cliffs and Overhangs, Steep Slopes and Land in General within the Vicinity of the Modification

Figure 6-1

Although the four wheel drive tracks and fire roads could experience surface cracking during the mining period, the size and extent of surface cracking is expected to be minor and similar to that observed during the extraction of the previous longwalls at the Metropolitan Coal Mine (Appendix A).

Given the large distances from the Modified Layout, other built features would not be subject to subsidence impacts due to the Modification (Appendix A).

Public Safety

Surface cracking has the potential to pose a safety hazard to users of existing unsealed roads and tracks in active subsidence areas. However, public access is restricted within the Woronora Special Area.

Metropolitan Coal would prepare and implement a Public Safety Management Plan as part of the Extraction Plan requirements to mitigate risk to public safety.

Aboriginal Cultural Heritage

A number of Aboriginal cultural heritage items, including sandstone overhangs, art, artefacts and grinding grooves have been identified within and in the vicinity of the Subsidence Extent. The potential impacts for these sites based on the Modified Layout, therefore, are similar to or less than those assessed and observed at other sites affected by the Approved Layout (Appendix A).

Potential consequences on Aboriginal cultural heritage sites as a result of subsidence impacts from the Modification are described in Section 6.8 and Appendix F.

Performance Measures

The existing subsidence performance measures in the Project Approval (08_0149) (Table 6-1) are still considered to be appropriate for the Modification as the subsidence impacts associated with the Modified Layout are similar to the Approved Layout (Appendix A).

The Subsidence Assessment indicates that the levels of impact on natural and built features can be managed by the preparation and implementation of the appropriate mitigation strategies (Appendix A). Monitoring and mitigation measures are described in Section 6.3.4 below.

6.3.4 Mitigation Measures, Management and Monitoring

Mitigation measures and management for potential consequences on groundwater, surface water, upland swamps, biodiversity, aquatic ecology and Aboriginal cultural heritage are described in Sections 6.4 to 6.9.

Extraction Plan

Metropolitan Coal Project Approval (08_0149) requires Metropolitan Coal to prepare an Extraction Plan prior to the commencement of secondary workings for the Modification longwalls.

The Extraction Plan is required to:

- demonstrate that the subsidence impact performance measures (Table 6-1) can be achieved; and
- develop detailed monitoring and mitigation measures to manage the potential impacts and/or environmental consequences on natural and built features.

Metropolitan Coal would implement management measures and monitoring in accordance with Condition 2, Schedule 7 of Project Approval (08_0149) so that subsidence impact performance measures (Table 6-1) are achieved at the Metropolitan Coal Mine, incorporating the Modification.

In the event that a subsidence impact or environmental consequence exceeds a performance measure, Metropolitan Coal would be required to remediate the impact in accordance with Condition 6, Schedule 6 of Project Approval (08_0149).

If subsidence remediation measures are not considered to be reasonable or feasible, or have not been successful in remediating the impact, Metropolitan Coal would provide an offset to compensate for the impact or environmental consequence in accordance with Condition 6, Schedule 6 of Project Approval (08_0149).

Built Features

Measures to manage the impacts of subsidence on built features would be developed as a component of the relevant Extraction Plan, and would be consistent with the requirements of Project Approval (08_0149).

Public Safety

The Extraction Plan that would be developed for the Modification would include a Public Safety Management Plan as required under Condition 6(g), Schedule 3 of Project Approval (08_0149).

6.4 GROUNDWATER

A Groundwater Impact Assessment has been prepared by Australasian Groundwater and Environmental Consultants Pty Ltd (AGE) (2025) for the Modification and is provided in Appendix B. The Groundwater Impact Assessment has been peer reviewed by Dr Stuart Brown (HGEO Pty Ltd, 2025a) and the review report is presented in Attachment 4.

The Groundwater Impact Assessment included a comprehensive review of the available hydrogeological information and groundwater monitoring data, and the development and use of regional numerical groundwater model. The update of the groundwater model by AGE (2025) meets contemporary groundwater guideline requirements.

6.4.1 Methodology

The Groundwater Impact Assessment has been prepared in consideration of the following:

- WM Act and relevant water sharing plans;
- *Australian Groundwater Modelling Guidelines* (Barnett et al., 2012).
- *NSW Aquifer Interference Policy* (AIP) (NSW Department of Primary Industries [DPI], 2012).
- *Groundwater assessment toolbox for major projects in NSW – Overview document Technical Guideline* (DPE, 2022b);
- *Information guidelines for proponents preparing coal seam gas and large coal mining development proposals* (Independent Expert Scientific Committee [IESC], 2024a), including the following supporting documents;
  - *Information Guidelines Explanatory Note – Uncertainty analysis for groundwater modelling* (IESC, 2023);
  - *Information Guidelines Explanatory Note – Using impact pathway diagrams based on ecohydrological conceptualisation in environmental impact assessment* (IESC, 2024b);
  - *Information guidelines explanatory note: Assessing Groundwater Dependent Ecosystems* (Doody et al. 2019); and
  - *Information Guidelines Explanatory Note – Characterisation and modelling of geological fault zones* (IESC, 2021).
- *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance* (Commonwealth Department of the Environment [DotE], 2013).
- *Significant Impact Guidelines 1.3: Coal seam gas and large coal mining developments – impacts on water resources* (Cth DCCEEW, 2022).

6.4.2 Background

Groundwater and surface water resources in the vicinity of the Metropolitan Coal Mine are regulated by the following water sharing plans under the WM Act:

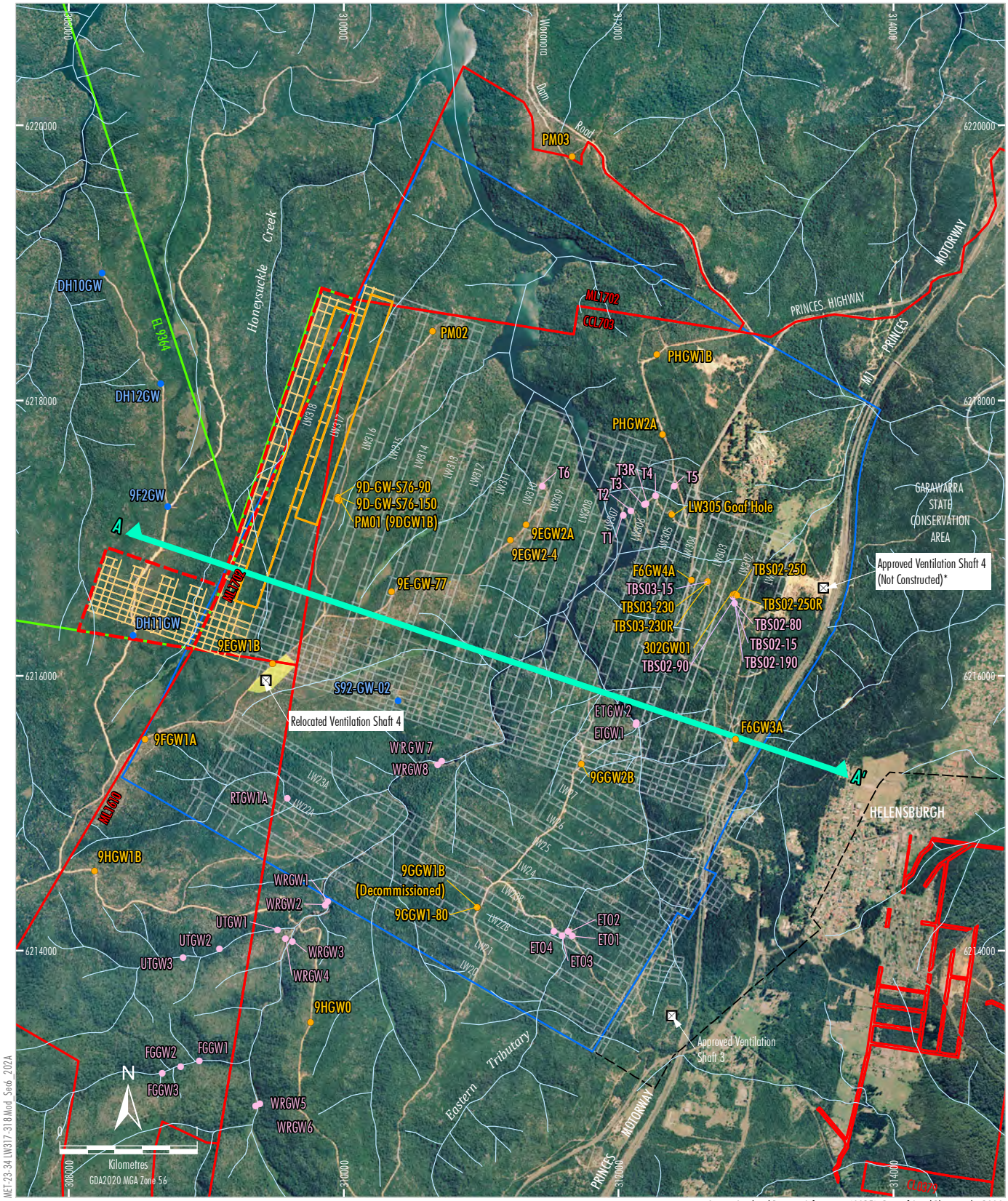
- *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023.*
- *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Source 2023.*

Hydrogeological Regime and Existing Monitoring

The Metropolitan Coal Mine is located in the Southern Coalfield. The Bulli Coal Seam of the Illawarra Coal Measures, which represents the sole target for the existing mine and proposed Modification, was laid down towards the end of the Permian and is overlain by Triassic sedimentary sandstone and claystone (Appendix B).

The total thickness of Triassic sedimentary sequence overlying the Bulli Seam in the Metropolitan Coal Mine area ranges between 400 to 500 m thick (Appendix B).

A conceptual hydrogeological model of the existing groundwater regime has been developed by AGE (2025), based on review of the available baseline groundwater monitoring data (Figure 6-2), hydrogeological data and relevant water sharing plans.



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); AGE (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing/Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4
- Hydroline

Existing Water Management Plan Groundwater Monitoring

- Groundwater Level Bore
- Groundwater Level/Pressure Bore

Proposed Groundwater Monitoring

- Groundwater Monitoring Site (Indicative Locations)
- Cross Section A-A' (Refer to Figure 6-3)

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Groundwater Monitoring Locations

Figure 6-2

The key hydrostratigraphic units controlling the transmission of potential impacts from the targeted Bulli Coal Seam to potential receptors and other surrounding units are shown in Table 6-4. The following hydrostratigraphic units support the primary receptors:

1. quaternary deposits supporting Upland Swamps;
2. Hawkesbury Sandstone where watercourses and water supply bores are located; and
3. Bulgo Sandstone where water supply bores are located.

Competent and continuous aquitards (i.e. Gosford Subgroup and Bald Hill Claystone) exist between the base of the Hawkesbury Sandstone and the top of the Bulgo Sandstone (Appendix B).

The existing groundwater levels and flow directions have been impacted by historical underground mining operations at the Metropolitan Coal Mine, which have occurred over the past 130 years. There has been no evidence that longwall mining has resulted in connective fracturing that extends from the mined seam to the surface (Appendix B).

For conceptualisation purposes, the Hawkesbury Sandstone was split into three sub-units (Upper, Middle and Lower) (Appendix B). In the Hawkesbury Sandstone Upper, groundwater levels and hence likely groundwater flow directions generally mirror the topography, with relatively low groundwater elevations observed in low lying areas, close to surface water features, and relatively high groundwater levels observed in interfluvial areas (Appendix B). Similarly, groundwater levels in the Hawkesbury Sandstone Middle show a relationship with the topography (Appendix B).

There is little or no evidence of any significant long-term drawdown in the Hawkesbury Sandstone Upper or Middle sub-units (Appendix B).

Drawdown due to the existing Metropolitan Coal Mine within the Hawkesbury Sandstone Lower and Bulgo Sandstone has been observed, with areas showing recovery of groundwater levels (Appendix B).

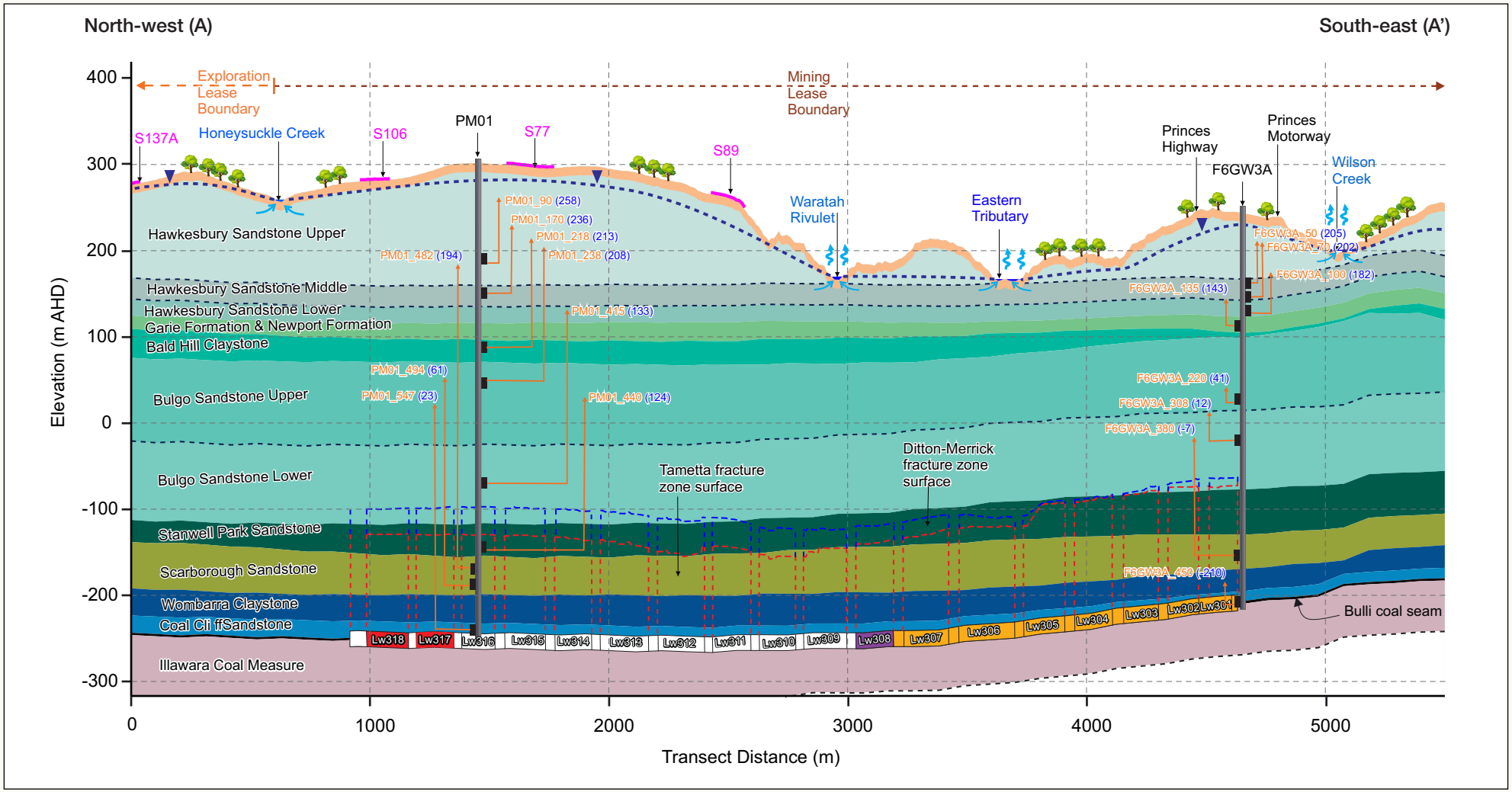
A conceptual cross-section through the Modification area is shown on Figure 6-3.

From a hydrogeological point of view, available data suggest the presence of a perched groundwater system in headwater swamps and near-surface sandstones, which is largely disconnected from the regional groundwater system.

Table 6-4
General Stratigraphy of the Southern Coalfield

Period	Group	Sub-group	Code	Formation and Members
Quaternary				-
Triassic	Wianamatta Group		WMSH	Bringelly Shale Minchinbury Sandstone Ashfield Shale
				Mittagong Formation
			HBSS	Hawkesbury Sandstone
	Narrabeen group	Gosford	GRFM	Newport Formation
				Garie Formation
		Clifton	BACS	Bald Hill Claystone
			BGSS	Bulgo Sandstone
			SPCS	Stanwell Park Claystone
			SBSS	Scarborough Sandstone
			WBCS	Wombarra Claystone
			CCSS	Coal Cliff Sandstone
Permian	Illawarra Coal Measures	Sydney	BUSM	**Bulli Coal [target seam]**
			UNM1	Loddon Sandstone

Not present in the Metropolitan Coal Mine area.
Competent and continuous aquitards.
Hydrostratigraphic unit supporting receptors.



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LEGEND

- Groundwater supported evapotranspiration in creek-side areas
- Regolith
- Hawkesbury Sandstone Upper
- Hawkesbury Sandstone Middle
- Hawkesbury Sandstone Lower
- Garie Formation & Newport Formation
- Groundwater Discharge to Surface
- Bald Hill Claystone
- Bulgo Sandstone Upper
- Bulgo Sandstone Lower
- Stanwell Park Claystone
- Scarborough Sandstone
- Wombarra Claystone
- Coal Cliff Sandstone
- Bulli Coal Seam
- Illawara Coal Measure
- Approved longwall panel
- Proposed Longwall panel
- Longwall Panel mined before March 2023
- Longwall panel under development in March 2023
- Swamp
- Estimated regional groundwater table (March 2023)

PM01_494 (61)
BoreID_Depth (Water level March 2023 (mAHD))

Note: Cross-section A – A' is shown on Figure 6-2

Source: AGE (2025)

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Conceptual Cross Section A-A'

Figure 6-3

Groundwater discharge from the Hawkesbury Sandstone to watercourses, including Waratah Rivulet and Honeysuckle Creek, and to the Woronora Reservoir is thought to be occurring (Appendix B). Recharge to the groundwater system (mainly within the Hawkesbury Sandstone) is expected to be dominated by rainfall infiltration following significant rainfall events (Appendices B and C).

Upland Swamp Hydrogeology

Upland swamps on the Woronora Plateau occur in small headwater valleys that are characteristically sediment choked and swampy (Young, 1986). The presence of upland swamps is related to their topographic position, the lithology of the bedrock and the hydrological balance on the plateau (Young, 1986). The eastern part of the Woronora Plateau has a favourable climate for upland swamp formation.

Topographically, upland swamps occur mainly on the eastern, higher parts of the Woronora Plateau. In more dissected catchments, the swamps are confined largely to headwater tributaries (Young, 1986). Hawkesbury Sandstone provides a low permeability base on which the quaternary deposits, swamp sediments and organic matter rest (Heritage Computing, 2008 and AGE, 2025). Hawkesbury Sandstone is also the predominant source of sediment for the upland swamps (Heritage Computing, 2008).

The sandy sediment accumulation in the swamps traps rainfall infiltration, seepage and low-flow runoff. Rainfall saturates the accumulating swamp material with drainage impeded by low floor slope, the low permeability sandstone base and the dense swamp vegetation (Heritage Computing, 2008). Partially decayed organic matter accumulates in the sediments, further increasing their water-holding capacity (Young, 1986).

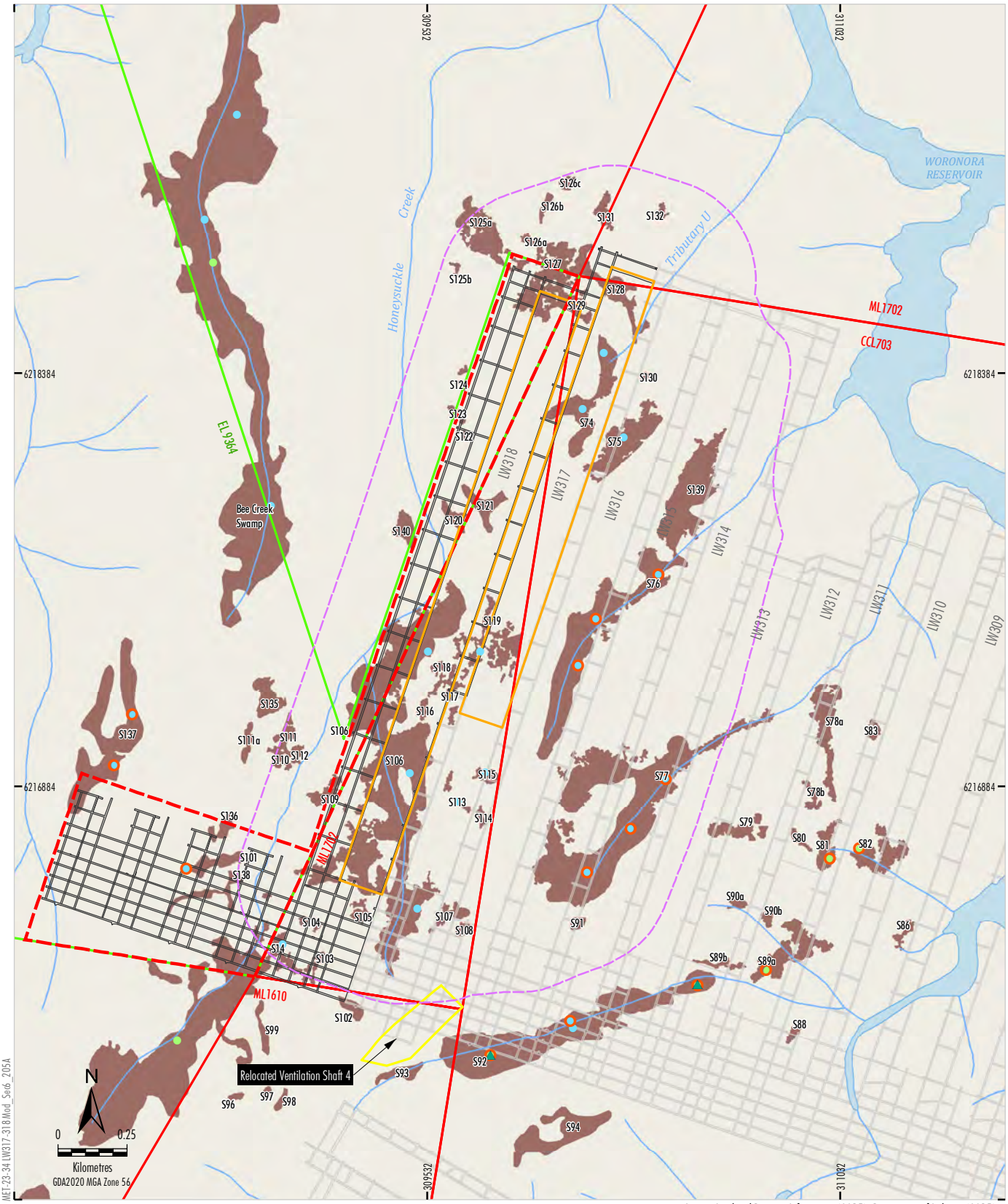
Broadly, upland swamps can be classified as headwater upland swamps, in-valley upland swamps or valley side upland swamps (Appendix C), as described below. All three swamps classes occur within the Subsidence Extent (Figure 6-4).

Headwater upland swamps occur in the headwaters or elevated sections of the topography on the plateau where the land surface is fairly flat. They are essentially rain-fed systems in which rainfall exceeds evaporation. The water levels within the swamps fluctuate seasonally with climatic conditions, as rain adds to soil moisture and evapotranspiration slowly removes moisture from storage. Excess rainfall produces a permanent perched water table within the sediments that is independent of the regional water table in the underlying Hawkesbury Sandstone. During rain events, some stream flow and runoff along indistinct braided channels occurs. The growth of dense vegetation and the low land gradient prevent the formation of an open drainage channel that would otherwise transport water and sediments. In some headwater upland swamps, there could be minor groundwater seepage from the outcropping sandstone at the edges of the swamp (Heritage Computing, 2008).

In-valley upland swamps (also called in-stream or valley floor swamps) occur along well defined drainage lines in the more deeply incised valleys, and are less common than headwater upland swamps on the eastern Woronora Plateau. They occupy relatively flat sections of streams within deeper valleys and are thought to be formed by deposition of sediments behind barriers such as piles of logs at choke points in the stream (Tomkins and Humphreys, 2006) or terminate at ‘steps’ in the underlying substrate where the gradient suddenly becomes steeper (Earth Tech Engineering Pty Ltd, 2003).

In-valley upland swamps have multiple sources of water. Primarily, they are sustained by stream flow along distinct channels, supplemented by rain infiltration. Given the incised nature of the axial stream, they are more likely to receive groundwater seepage from the sandstone walls at the edges of the swamp.

Valley side swamps occur on steeper terrain than headwater swamps and are sustained by small horizontal aquifers that seep from the sandstone strata and flow over unbroken outcropping rock masses. These ‘swamps’ have shallow soils because the gradient usually limits sediment accumulation. They tend to terminate either on a horizontal step in the bedrock, or where broken rock, scree or deeper soil occurs at the base of the outcropping rock.



Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025); Niche (2025); NPWS (2003), Bangalay Botanical Surveys (2008); Eco Logical Australia (2015; 2016; 2018) and Ecoplanning (2021; 2023)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318
- Relocated Ventilation Shaft 4
- 35 Degree Angle of Draw and/or 20 mm Subsidence Contour (Subsidence Extent)
- Upland Swamp
- Swamp Soil Moisture Probe
- Proposed Future Monitoring Sites
- Swamp Substrate and Shallow Groundwater Piezometer
- Swamp Substrate Groundwater Piezometer

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

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Upland Swamps in the Vicinity of the Modification

Figure 6-4

Groundwater monitoring data within and surrounding the Upland Swamps indicates the majority of swamps are 'losing disconnected' meaning the regional groundwater table is below the base of the swamp substrate such that the swamp gradually leaks to groundwater, and any changes to the regional groundwater table do not influence leakage rates (Appendix B). There might be occasions when the regional water table intersects the swamp sediments. In this case, depending on the relative elevations of the perched and regional water tables, groundwater could supplement swamp moisture or swamp moisture could drain towards the underlying aquifer (Appendix B).

Groundwater Use

The two main aquifers in the area, namely the Hawkesbury Sandstone and the Bulgo Sandstone, are defined as "less productive" aquifer based on AIP criteria.

According to the WaterNSW groundwater database and BoM National Groundwater Information System, there are 21 registered water supply bores within the Metropolitan Coal Mine groundwater model domain (Appendix B). Based on their depths and the geological model layering, 19 bores are thought to extract from the Hawkesbury Sandstone, with the remaining two bores thought to extract from the Bulgo Sandstone (Appendix B).

Groundwater Quality

An analysis of total dissolved solids (TDS) in groundwater at the Metropolitan Coal Mine and surrounds is provided in Appendix B.

Groundwater quality data suggest a minor increase in salinity with depth. Median salinity in the Hawkesbury Sandstone Upper is 130 milligrams per litre (mg/L), increasing slightly to around 175 mg/L in the Hawkesbury Sandstone Lower and 260 mg/L in the Bulgo Sandstone. However, almost all of the available TDS results in the Hawkesbury Sandstone and the Bulgo Sandstone fall in the 'fresh' range (i.e. < 500 mg/L) (Appendix B).

Metropolitan Coal maintains an extensive water quality monitoring network in both of the key overlying aquifers (the Hawkesbury and Bulgo Sandstone units), data for which tends to confirm that groundwater quality in these overlying aquifers has not been affected by operation of the existing workings (Appendix B).

6.4.3 Environmental Review

Groundwater Model

The Groundwater Impact Assessment prepared by AGE (2025) has evaluated the potential impacts of the Metropolitan Coal Mine incorporating the Modification on groundwater resources using a numerical regional groundwater model. A detailed description of the numerical groundwater model is provided in Appendix B.

The numerical groundwater model was considered suitable to simulate the potential impacts of the Metropolitan Coal Mine incorporating the Modification.

In the groundwater peer review report (HGEO Pty Ltd, 2025a), Dr Stuart Brown found "*the groundwater modelling methodology is in keeping with current best practice, is well support by hydrogeological observations and is fit for the purpose of hydrological impact assessment*" (Attachment 4) and the Groundwater Impact Assessment prepared by AGE (2025) is "*considered to be plausible in terms of magnitude and extent, based on the information provided and monitoring of previous mining effects*" (Attachment 4).

Groundwater Inflows

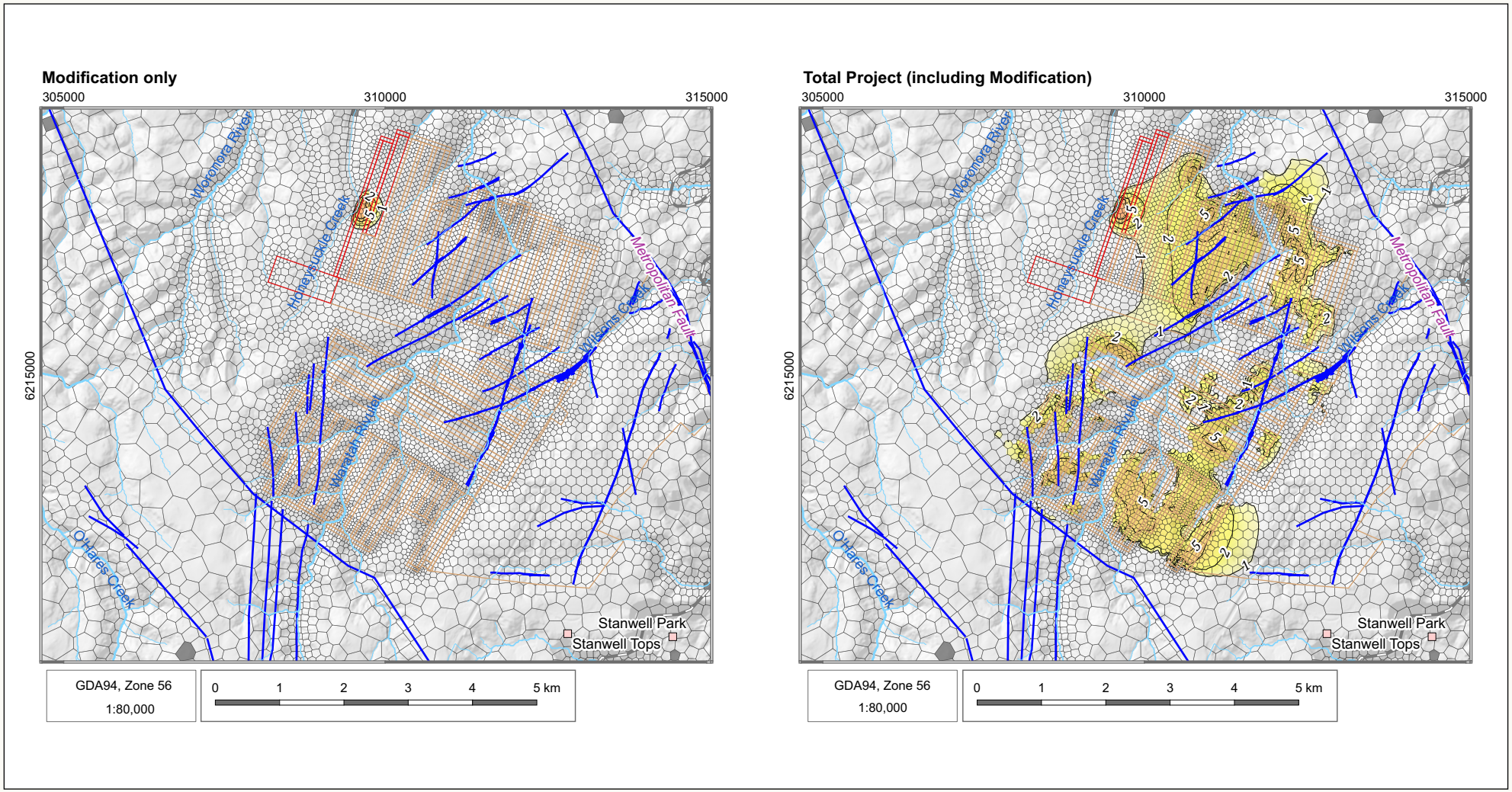
The total groundwater inflows to underground mine workings (as modified) are predicted to peak in the order of 132 megalitres per year (ML/year) in the 2027-2028 water year (Appendix B).

The maximum predicted annual inflow for the Metropolitan Coal Mine incorporating the Modification (approximately 132 ML/year) is slightly higher than the maximum predicted inflow that would occur for the approved Metropolitan Coal Mine (approximately 130 ML/year).

Groundwater Depressurisation

Numerical modelling conducted as part of the Groundwater Impact Assessment predicts a reduction in potentiometric head in the deeper groundwater system in the vicinity of the Modification area (Appendix B).

The majority of the drawdown associated with the Metropolitan Coal Mine incorporating the Modification is due to the approved mining operations.



MET-23-34 LW317-318 Mod_Sec6_002B

LEGEND

- Populated Place
- Site mapped fault
- Drawdown contour (m)
- Model boundary
- Model grid
- Approved Mine Area
- Modification Area

Drawdown (m)

1	10
2	20
5	50

Source: AGE (2025)

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Maximum Predicted Drawdown in the Hawkesbury Sandstone Upper

Figure 6-5

Drawdown is greatest in the Bulli Coal Seam (approximately 500 m below surface) and decreases with height above the coal seam. Drawdown in the Hawkesbury Sandstone Upper is relatively limited in extent compared to the total Metropolitan Coal Mine drawdown (Figure 6-5).

Recovery of the regional groundwater water table and pressures is predicted to occur gradually following the cessation of underground mining (Appendix B). Groundwater levels in the Hawkesbury Sandstone Upper are predicted to recover relatively quickly, with Modification-only drawdowns recovered 10 years after the end of underground mining (Appendix B).

Groundwater Quality

Groundwater inflows reporting to the underground area would be captured by the mine water management system before being re-used on-site.

Upon cessation of mining, Metropolitan Coal plans to seal current underground mine access and other locations where groundwater could discharge from the mine workings to the surface once groundwater levels have recovered.

During the post-mining period, groundwater may eventually discharge to the ocean around 5 km to the south-east passing through natural strata including undisturbed coal along the way. It is unlikely that any significant effect on water quality on the receptor (i.e. the ocean) would eventuate (Appendix B).

Surface Water Resources

The existing surface water resources and their characteristics (i.e. streamflow and water quality) are described in Section 6.5.2.

The groundwater model simulation demonstrates reductions in groundwater discharge to nearby surface water features including the Woronora Reservoir, the Woronora River and the Waratah Rivulet are all expected to be negligible (Appendix B).

A temporary reduction of up to approximately 57 ML/year in groundwater discharge to the Honeysuckle Creek is predicted in the short term due to subsidence. In the longer term, once the groundwater system re-adjusts post-subsidence, predicted impacts due to the Modification fall to less than 1 ML/year within a few years. As such, the predicted long-term impacts of the Modification on groundwater flux to Honeysuckle Creek, Woronora Reservoir, the Woronora River and Waratah Rivulet are all negligible (i.e. less than 1 ML/year) (Appendix B).

A detailed assessment of potential impacts to surface water resources is provided in Appendix C.

Groundwater Users

The Groundwater Impact Assessment presents drawdown predictions for all bores identified in the Government databases (Section 6.4.3).

A total of three bores on private property are predicted to experience drawdown exceeding 2 m due to cumulative impacts from the Metropolitan Coal Mine incorporating the Modification. The Modification's contribution to drawdown at these bores is up to 0.7 m. Assuming that the three bores are currently operational, then it is unlikely they would be further impaired by predicted additional drawdowns relating to the Modification.

A detailed assessment is provided in Appendix B.

Upland Swamps

The assessment of potential impacts to Upland Swamps is provided in Section 6.6.

6.4.4 Mitigation and Management Measures

Groundwater Licensing

The predicted annual groundwater volumes required to be licensed over the life of the Metropolitan Coal Mine incorporating the Modification and post-mining are provided in Appendix B.

Metropolitan Coal would comply with water licensing requirements under the WM Act over the life of the Metropolitan Coal Mine incorporating the Modification. Metropolitan Coal holds sufficient licences in the Sydney Basin Central Groundwater Source for the Metropolitan Coal Mine incorporating the Modification. Licences would be required (up to 27 units) in the Woronora River Water Source – Upper Woronora Management Zone for net take from the source due to temporary impact on Honeysuckle Creek.

Groundwater Monitoring and Management

Metropolitan Coal would install an additional groundwater monitoring site to the north-west of the Modification area, close to Honeysuckle Creek and a second site to the west of the Modification area, close to the Woronora River. Each monitoring site would comprise shallow and deep standpipe piezometers within the Hawkesbury Sandstone, an array of vibrating wire piezometers in key deeper horizons and where saturated alluvium is present, a further shallow sensor within the alluvium. The indicative locations of the proposed monitoring sites are shown on Figure 6-2.

The existing Water Management Plan, including the groundwater monitoring program, and the Biodiversity Management Plan would be reviewed and revised to reflect the Modification (including the new monitoring locations and revision of trigger actions response plans) subject to the conditions of any modified Development Consent.

6.5 SURFACE WATER

A Surface Water Assessment has been prepared by ATC Williams (2025) and is presented in Appendix C. The Surface Water Assessment includes assessment of potential impacts to surface water resources and upland swamps. The upland swamp component of ATC Williams' assessment has been peer reviewed by Dr Stuart Brown (HGEO Pty Ltd, 2025b) and the review report is presented in Attachment 4. Assessment of potential impacts to upland swamps is provided in Section 6.6.

6.5.1 Methodology

ATC Williams (2025) assessed a Study Area encompassing the Subsidence Extent and the relocated Ventilation Shaft 4 surface disturbance extent.

The baseline water quality characteristics of the Study Area have been assessed with consideration to the following guidelines:

- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Guidelines [ANZG], 2018).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council [ANZECC] and Agriculture and Resources Management Council of Australia and New Zealand [ARMCANZ], 2000).
- *Australian Drinking Water Guidelines Paper 6 National Water Quality Management Strategy* (National Health and Medical Research Council and National Resource Management Ministerial Council, 2011).

The proposed surface water monitoring program described herein has been developed with consideration to the following guidelines:

- *Water Monitoring Guidelines for Underground Mining Activities in the Special Areas* (WaterNSW, undated).
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018).

Assessment of the neutral or beneficial effect of the Modification on water quality, as required by clause 6.62(2) of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021,* has been undertaken with consideration to the *Neutral or Beneficial Effect on Water Quality Assessment Guideline* (WaterNSW, 2022).

The assessment has also considered the feedback from the Independent Expert Advisory Panel for Mining (IEAPM) on the Longwalls 311-316 Extraction Plan (IEAPM, 2024; 2025).

6.5.2 Background

Regional Hydrology

The Metropolitan Coal Mine is situated on the Woronora Plateau, within the Woronora Reservoir and the Hacking River catchments. The Woronora Reservoir is a public water supply dam which supplies water to consumers within the Sutherland Shire Council area and northern suburbs of Wollongong.

The Woronora Special Area (Figure 1-2) covers an area of 75 square kilometres and is predominantly comprised of native vegetation, although small areas of private land are located in the upper catchment where stock agistment, horse riding and horticulture occur (WaterNSW and OEH, 2015). The catchment area and the Woronora Reservoir facilities are managed by WaterNSW.

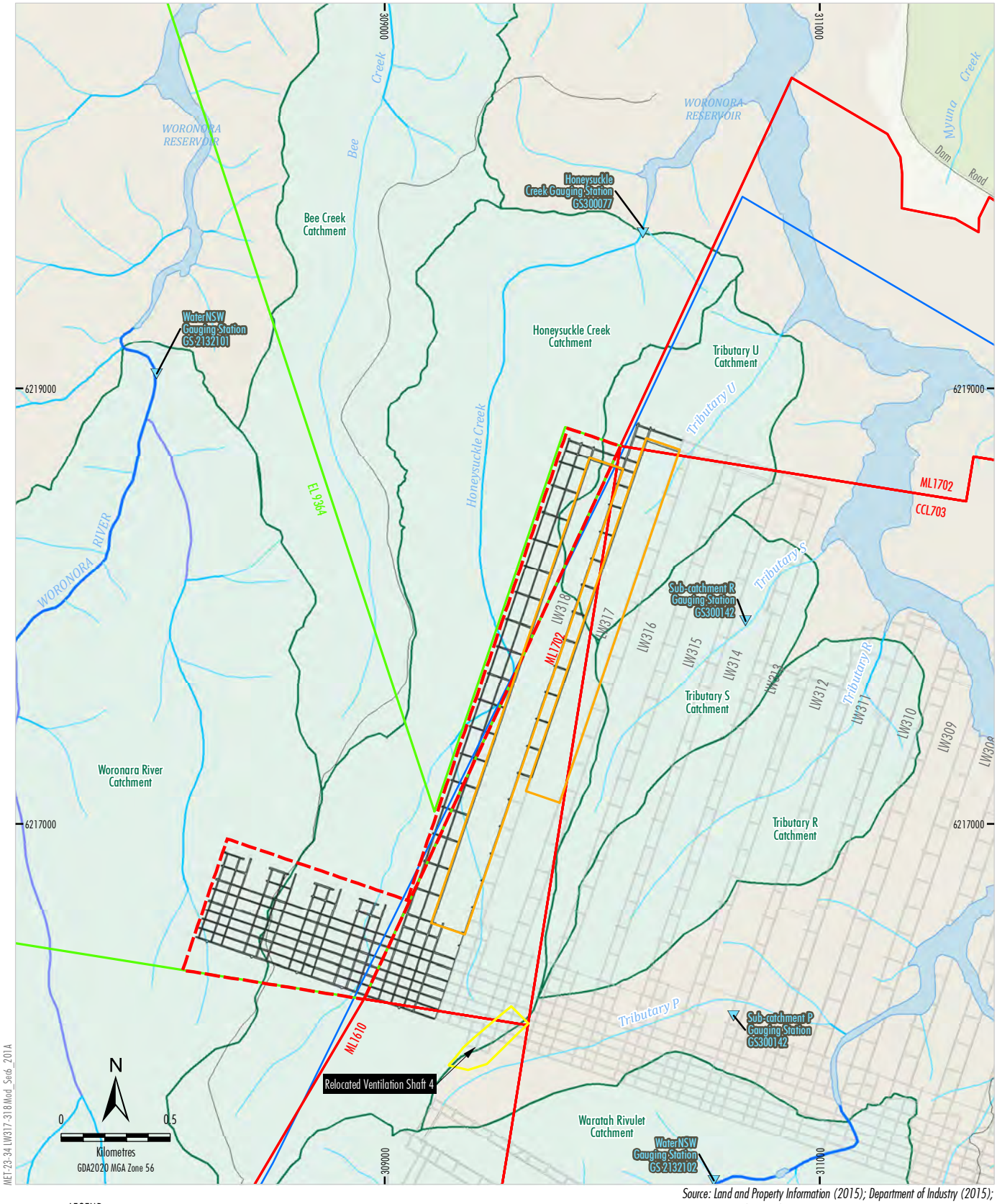
The Woronora River is a tributary of the Woronora Reservoir (Figure 1-3). Overflow from the Woronora Reservoir flows into the lower reaches of the Woronora River and ultimately the Georges River.

Local Hydrology

Honeysuckle Creek

The Modification longwalls are located primarily within the Honeysuckle Creek and Tributary U catchments (Figure 6-6) which are within the broader catchment of the Woronora Reservoir.

Honeysuckle Creek flows south to north within and adjacent to the western portion of the Study Area. The catchment area of Honeysuckle Creek is approximately 470 ha to the full supply level of the Woronora Reservoir (Figure 6-6) (Appendix C).



MET-23-34 LW317-318 Mod_Set6_201A

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Woronora Special Area
- Project Underground Mining Area Longwalls 20-27 and 301-317
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4
- Catchment Area

Strahler Stream Order

- 1st Order
- 2nd Order
- 3rd Order
- 4th Order

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

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Watercourse Stream Order Mapping

Figure 6-6

The upper section of Honeysuckle Creek is a first order stream. Honeysuckle Creek becomes a second order stream to the west of Longwall 318 and continues as a second order stream until it reaches the Woronora Reservoir to the north (Figure 6-6).

A large portion of the Honeysuckle Creek catchment area comprises coastal upland swamps. Swamp 14 is located in the upper reach of Honeysuckle Creek with flow from Swamp 14 contributing streamflow to Honeysuckle Creek (Figure 6-4). Swamp 106 encompasses the majority of the first order tributary of Honeysuckle Creek within the Study Area (Figure 6-4).

Stream mapping of Honeysuckle Creek, undertaken by ATC Williams in August 2024 following a period of above average rainfall, is presented in Appendix C.

Pools HSC A to HSC I along Honeysuckle Creek were mapped through visual inspection, while a desktop assessment, informed by aerial imagery and drone photography, was undertaken to map Pools HSC J to HSC AG (Figure 6-7), where safe access to the creek was not possible.

Pools HSC A and HSC B are located within Swamp 14, pools HSC C to HSC H within the first order reach of Honeysuckle Creek and pools HSC I to HSC AG within the second order reach of Honeysuckle Creek (Figure 6-7).

Permanent pools within Honeysuckle Creek were identified as bedrock confined with flow controlled by in-stream rockbars and/or boulder fields. In some reaches, flow was constrained by sediment/vegetation mounds creating temporary pools (Appendix C).

The base of Honeysuckle Creek was identified as comprising exposed sandstone with substrate/sediment deposition evident in some locations (Appendix C). Surface flow in Honeysuckle Creek at the time of the visual inspection (August 2024) was primarily confined to a narrow low flow channel incised in exposed bedrock. Where substrate was present, surface flow was observed as temporarily ceasing (i.e. flow was conveyed laterally through the substrate), reporting as surface flow to exposed bedrock at the downstream extent of the substrate layer (Appendix C).

Several geomorphological features, including potholes, rock ledges, natural fracturing, cascades and waterfalls, were observed and visually inspected within the reach of Honeysuckle Creek. In addition, naturally occurring iron staining was observed at several locations (Appendix C).

Tributaries of the Woronora Reservoir

Three tributaries (Tributary R, S and U) located within the Study Area flow into the Woronora Reservoir (Figure 6-6).

At the full supply level of the Woronora Reservoir, Tributary R is a second order stream with a catchment area of approximately 130 ha. Tributary R was characterised in April 2018 through visual inspection and photographic survey (Appendix C). Reaches of Swamp 77 accessed during the survey identified an ill-defined and discontinuous flow path with flow at the downstream extent constrained by a rockbar. The gradient of Tributary R increases downstream of Swamp 77 with the stream morphology becoming more incised. A series of rock and boulder cascades interspersed by shallow pools and rock shelves were observed in the reach of Tributary R, downstream of Swamp 77 (Appendix C).

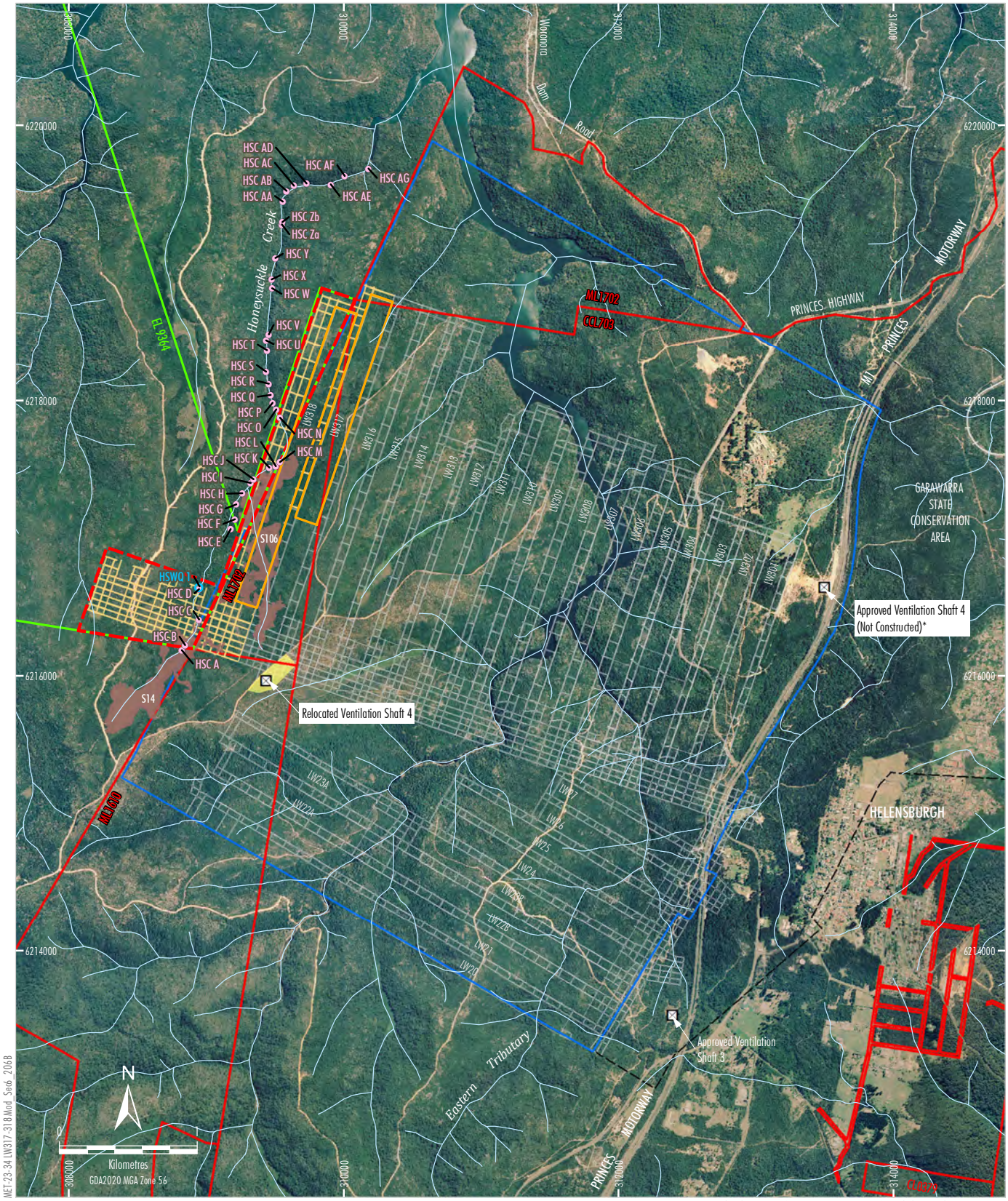
Tributary S is a first order stream with a catchment area of approximately 90 ha to the full supply level of the Woronora Reservoir (Figure 6-6). The upper reach of Tributary S comprises Swamp 76. Downstream of Swamp 76, the gradient of Tributary S increases, with low flow conveyed via a narrow, shallow channel incised in exposed bedrock (Appendix C).

Tributary U is a first order stream with a catchment area of approximately 90 ha to the full supply level of the Woronora Reservoir (Figure 6-6). The headwater of Tributary U comprises Swamp 74, traversing the eastern extent of Swamp 128 approximately 65 m downstream of Swamp 74. The gradient of Tributary U increases downstream of Swamp 128, with the channel becoming more incised (Appendix C).

Streamflow

Metropolitan Coal conducts streamflow monitoring at GS 300077 on Honeysuckle Creek, GS 300143 on Tributary P and GS 300142 on Tributary S (Figure 6-6). WaterNSW also operates gauging stations at GS 213102 on Waratah Rivulet, GS 2132101 on Woronora River and GS 213200 on O'Hares Creek.

Flow duration curves for the period September 2012 to December 2024 for Honeysuckle Creek, Woronora River, O'Hares Creek and Waratah Rivulet are shown on Chart 6-1.



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); ATC Williams (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing/Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4
- Hydroline
- Upland Swamps on Honeysuckle Creek
- Mapped Pool

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.
* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Honeysuckle Creek – Mapped Pools

Figure 6-7

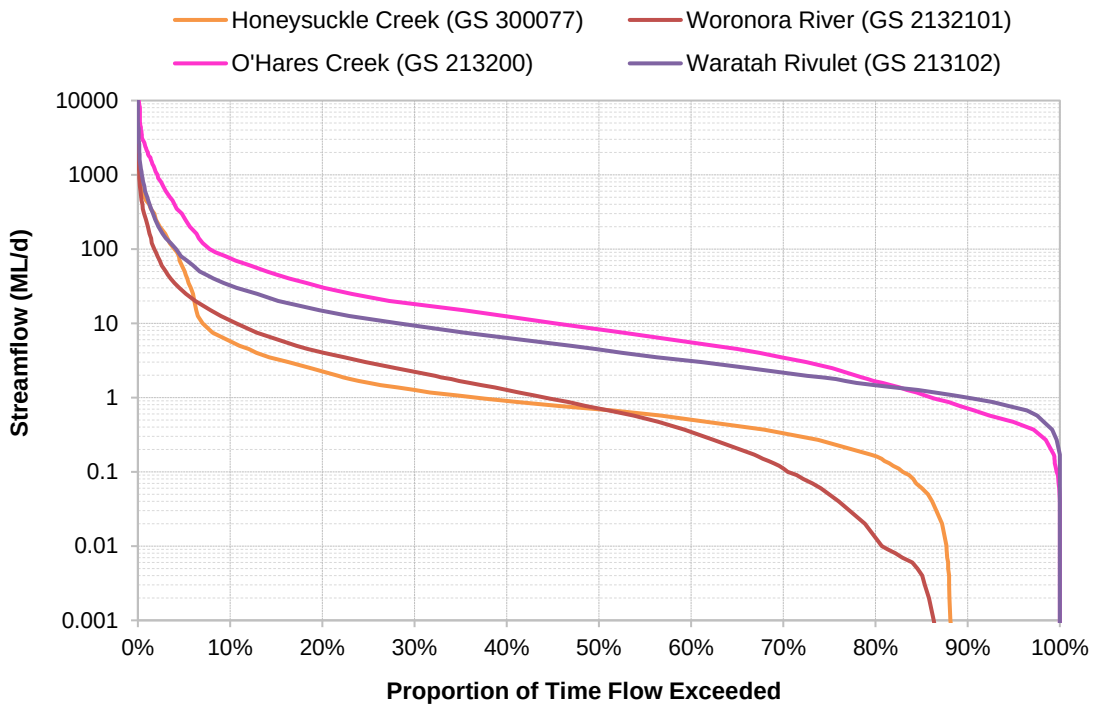


Chart 6-1 Flow Duration Curves for Key Watercourses

Source: ATC Williams (2025).

The flow duration curves indicate the following (Appendix C):

- O'Hares Creek and Waratah Rivulet were perennial for the period of record assessed, with a median flow rate of 8.3 (megaliters per day) ML/day and 4.4 ML/day recorded, respectively.
- Honeysuckle Creek and the Woronora River were intermittent for the period of record assessed, with a median flow rate of 0.69 ML/day and 0.7 ML/day recorded, respectively.
- Streamflow (catchment yield) of less than 0.001 millimetres per day (mm/day) was recorded approximately 12% of the time on Honeysuckle Creek and approximately 20% of the time on Woronora River.

Surface Water Management and Monitoring

Surface water management and monitoring within the underground mining area at the Metropolitan Coal Mine is currently undertaken in accordance with the Water Management Plan, including the surface water monitoring program. Surface water management and monitoring at the surface facilities is currently undertaken in accordance with the Surface Facilities Water Management Plan.

Surface Water Quality

A summary of the baseline water quality recorded at HCWQ 1 on Honeysuckle Creek (Figure 6-7) for select constituents, including the percentage of exceedances of the relevant default guidelines value, is provided in Table 6-5.

The pH values recorded at site HCWQ 1 indicate acidic to slightly acidic conditions for the period of record (median pH 4.6), with values predominantly recorded below the lower default guideline value (DGV) of pH 6.5 for upland rivers in NSW (Table 6-5). Dissolved oxygen was also generally below the DGV and dissolved aluminium generally exceeding the DGV Table 6-5 (Appendix C).

Detailed results of the water quality monitoring undertaken by Metropolitan Coal as part of the Water Management Plan are discussed in Appendix C.

Table 6-5
Honeysuckle Creek Water Quality

Parameter	Default Guideline Value (DGV)	No. of Samples	Minimum	Median	Maximum	Percentage of Samples Exceeding DGV
Field pH	6.5 – 8.0	211	2.1	4.6	7.6	97%
Field EC (µS/cm)	350	210	38	139	317	0%
Field TDS (mg/L)	-	210	17	72	182	-
Field Turbidity (NTU)	25	118	0.1	1.8	100	7%
Dissolved Oxygen (% saturation)	90 - 110	207	3.8	68.3	107.6	89%
Total Nitrogen (mg/L)	0.25	210	0.05	0.1	0.7	10%
Total Phosphorus (mg/L)	0.02	210	0.005	0.01	0.38	6%
Dissolved Aluminium (mg/L)	0.005	210	0.02	0.32	0.87	98%
Dissolved Barium (mg/L)	-	210	0.001	0.003	0.059	-
Dissolved Cobalt (mg/L)	0.0014	210	0.001	0.001	0.006	2%
Dissolved Manganese (mg/L)	1.9	210	0.001	0.007	0.19	0%
Dissolved Strontium (mg/L)	-	210	0.001	0.003	0.014	-
Dissolved Iron (mg/L)	-	210	0.01	0.1	3.7	-
Dissolved Zinc	0.008	210	0.001	0.007	0.1	36%

Note: EC = electrical conductivity; µS/cm = microSiemens per centimetre; NTU = Nephelometric Turbidity Unit.
Source: ATC Williams (2025).

6.5.3 Environmental Review

The maximum predicted subsidence effects at key surface water features are described in Section 6.3.

The following sub-sections describe the potential impacts of the Modification on surface water resources.

Relinquishment of Approved Mining Areas

The proposed relinquishment of approved underground mining areas as part of the Modification would reduce the area that is subject to cracking of sandstone bedrock and potential associated pool water level, streamflow and water quality effects. The total area of longwall mining that would be relinquished is approximately 253 ha (Appendix C).

In particular, impacts to Tributary U are expected to be reduced under the Modification underground mine layout. The approved underground mine layout extended beneath the entire reach of Tributary U, whereas the modified underground mine layout reduces the extent to approximately one-third of the reach of Tributary U. Accordingly, the extent of cracking of the creek bed, fracturing of the underlying strata and associated leakage from Tributary U is expected to be reduced due to the modified underground mine layout (Appendix C).

Additionally, water quality effects associated with flushing of newly exposed fractures is expected to be reduced as the extent of fracturing would likely be reduced (Appendix C).

Flow Regime

The maximum total conventional tilt due to the Modification longwalls is predicted at 6.5 mm/m for the approved Metropolitan Coal Mine and the Modification (Appendix A). Based on the natural gradient of the surface overlying the Study Area, it is unlikely that the Modification would result in a non-negligible effect to surface gradient (Appendix C). While minor changes to the natural drainage behaviour may occur in some locations, it is unlikely that subsidence effects associated with the Modification would result in significant impacts to overland flow (Appendix C).

Pool Water Levels

Where cracking of a creek bed and/or fracturing of the underlying strata occurs, this would likely lead to increased leakage from pools and redirection of surface flow by diversion through subsurface fractures (Appendix C).

Given the proximity of Honeysuckle Creek pools HSC K to HSC N to Longwall 318, these pools are considered at higher risk of impact due to the Modification than other pools within the Study Area (Appendix C).

Based on previous assessments of impacted pools in Waratah Rivulet and Eastern Tributary, where surface and/or sub-surface cracking occurs as a result of the Modification, the following pool water level behaviour is likely to occur (Appendix C):

- During high and median flow periods, pool water levels in affected areas are anticipated to remain comparable to pre-impact levels, as flow volumes are sufficient to maintain continuity within the channel.
- During low flow periods, affected pools may exhibit altered recessionary behaviour, with water levels potentially declining to levels not previously recorded during baseline (pre-impact) conditions.

Notwithstanding, monitoring of impacted pools in Eastern Tributary and Waratah Rivulet has shown that many pools retained water during extended dry periods prior to the implementation of remediation measures. It is considered that closing of fractures (due to subsidence movements associated with mining of additional longwalls) or filling of fractures (sediment deposition and/or rainfall recharge) may occur over time (Appendix C).

Streamflow

As stated above, where cracking of Honeysuckle Creek bed and/or fracturing of the underlying strata occurs, this would likely lead to increased leakage from pools and redirection of surface flow by diversion through subsurface fractures. Watercourse reaches above or in close proximity to Longwalls 317 and 318 are at greater risk of surface flow diversion through subsurface fractures, potentially resulting in localised areas of negligible surface flow during below average rainfall conditions (Appendix C).

However, surface flow that is diverted to the sub-surface fracture network is likely to re-emerge in the watercourse further downstream of the longwall panels (Appendix C). Despite localised subsidence related effects to pools in the Waratah Rivulet and Eastern Tributary, there has been no discernible effect on streamflow recorded at Waratah Rivulet (GS 2132102) or Eastern Tributary (GS 300078) (Appendix C).

Additionally, although a moderate impact to the upper HBSS underlying Swamp 50 is considered to have occurred as a result of mining-related effects, there is negligible indication of an effect to streamflow at the downstream extent of Sub-Catchment I (Appendix C).

Changes in groundwater-derived baseflow have been predicted by AGE (2025) and are presented in Appendix B and Section 6.4.3.

Woronora Reservoir Yield

Although a short-term reduction in baseflow contribution to Honeysuckle Creek is predicted due to the Modification (Section 6.4.3), this is considered to represent a re-distribution of shallow groundwater flows due to predicted near surface subsidence and associated changes in hydraulic properties, as opposed to loss of baseflow to the deeper groundwater system or underground workings. Accordingly, the Modification is expected to result in a negligible reduction in net discharge to the Woronora Reservoir (Appendix C).

Surface Water Quality

Underground Mining

Cracking of sandstone bedrock and flushing of newly exposed fractures has the potential to liberate constituents, resulting in localised and temporary increases in specific water quality constituents (Appendix C).

The effect of the Modification on the water quality of Honeysuckle Creek and local tributaries in the Study Area is expected to be similar to that previously recorded (i.e. transient pulses of iron, manganese and aluminium). However, based on historical effects associated with the Metropolitan Coal Mine, it is considered unlikely that the Modification would result in a persistent change in water quality or a material effect to the water quality of the Woronora Reservoir (Appendix C).

Neutral or Beneficial Use

In accordance with clause 6.62(2) of the *State Environmental Planning Policy (Biodiversity and Conservation) 2021*, ATC Williams (2025) concludes that the Metropolitan Coal Mine incorporating the Modification would have the same adverse impact on water quality when compared to the approved Metropolitan Coal Mine. The Modification would have a neutral effect on water quality with respect to underground mining and neutral to beneficial effect on water quality with respect to the construction of the relocated Ventilation Shaft 4 (Appendix C).

6.5.4 Mitigation and Management Measures

ATC Williams (2025) has recommended the current surface water monitoring program is continued and expanded. Metropolitan Coal would install additional pool water level, surface water quality and gauging stations as recommended by ATC Williams (2025). The additional monitoring sites to be installed are shown on Figure 6-8.

Subsidence caused by the extraction of Longwalls 317 and 318 may produce surface cracks/factures to Honeysuckle Creek. Where cracks/fractures do not naturally seal post-cessation of subsidence movements associated with the Modification, remediation works would be conducted consistent with that undertaken to date at impacted locations in Eastern Tributary and Waratah Rivulet. Metropolitan Coal would update the approved Stream Remediation Plan to include Honeysuckle Creek prior to commencing any remediation works.

The existing Water Management Plan, including the surface water monitoring program would be reviewed and revised to reflect the Modification (including the new monitoring locations and revision of Trigger Actions Response Plans) subject to the conditions of any modified Development Consent. The hydrogeological conceptualisation of the Study Area swamps would be reviewed and updated as necessary prior to commencement of mining of Longwalls 317 and 318 to include additional baseline data.

6.6 UPLAND SWAMPS

A BDAR containing an assessment of upland swamps has been prepared for the Modification by Niche (2025a) and is presented as Appendix D. Potential impacts to the hydrogeology of upland swamps has been assessed by ATC Williams (2025) and is presented as Appendix C. The upland swamp component of ATC Williams' assessment has been peer reviewed by Dr Stuart Brown (HGEO Pty Ltd, 2025b) and the review report is presented in Attachment 4.

Upland swamps have also been considered as part of the Subsidence Assessment (Appendix A) and Groundwater Assessment (Appendix B).

A description of the upland swamps occurring at the Metropolitan Coal Mine is provided in Section 6.3.3 and a description of their hydrogeology is provided in Section 6.4.2.

6.6.1 Methodology

ATC Williams (2025) has undertaken the following to assess potential impacts to upland swamps (Appendix C):

- Assessment of historically undermined swamps at the Metropolitan Coal Mine.
- Assessment of potential risks of swamps being subject to greater than negligible environmental consequence as defined in the Swamp Offset Policy (OEH, 2016a).
- Unsaturated zone modelling for Swamps 74 and 106 within the Modification area.

AGE (2025) has also predicted potential drawdown in the regional groundwater as discussed in Section 6.4 and Appendix B.

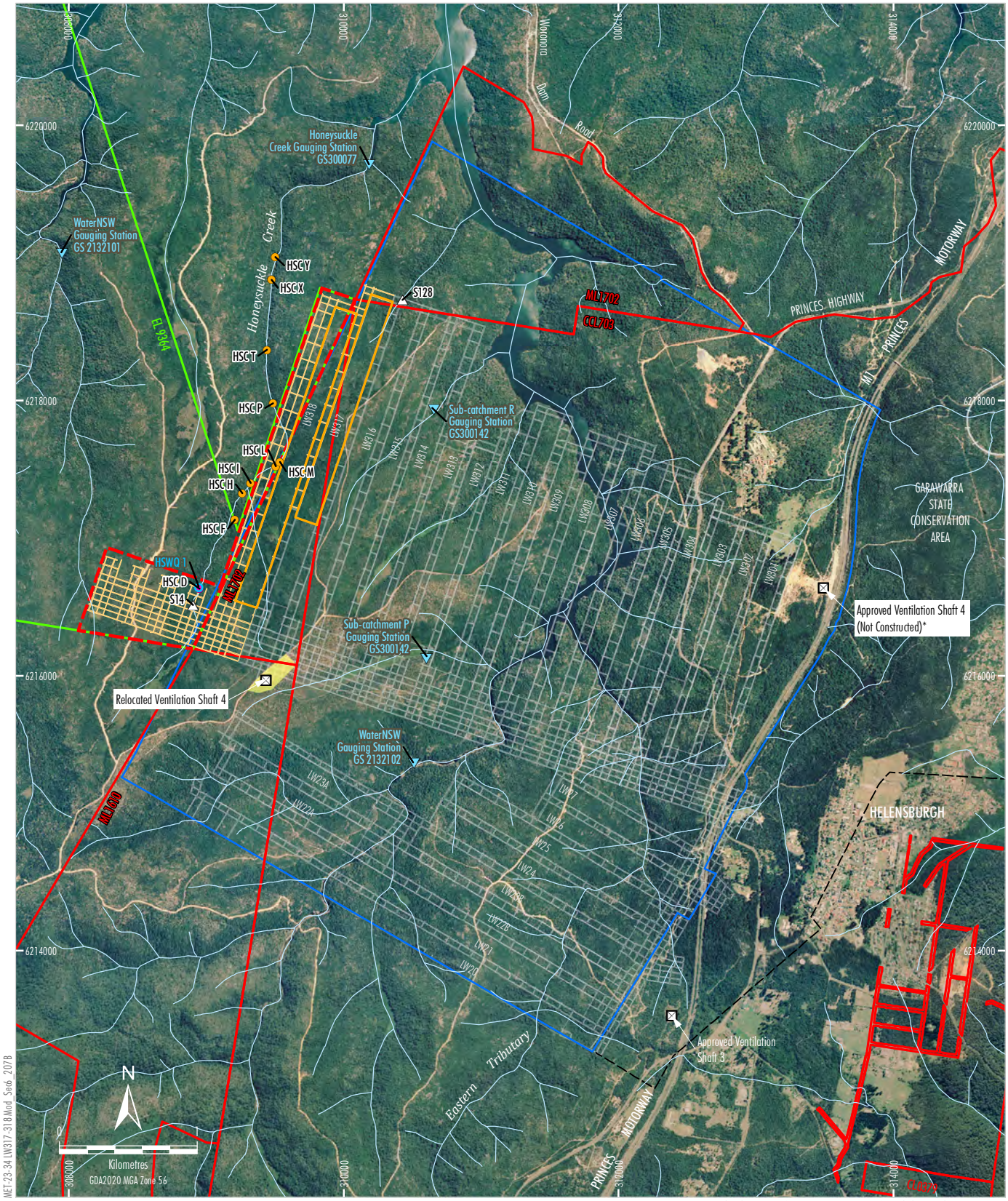
The BDAR has considered the potential impacts to upland swamps in accordance with the BAM and the Swamp Offset Policy (Appendix D).

The assessment has also considered the feedback from the IEAPM on the Longwalls 311-316 Extraction Plan (IEAPM, 2024; 2025).

6.6.2 Background

Assessment of Impacts to Historically Undermined Swamps

An assessment of potential impacts to historically undermined upland swamps at the Metropolitan Coal Mine has been undertaken by ATC Williams (2025). The assessment of historically undermined swamps expands on the previous assessment completed by ATC Williams (2024) for the Longwalls 311-316 Extraction Plan application, which was peer reviewed by Dr Noel Merrick of HydroAlgorithmics Pty Ltd (2024).



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); ATC Williams (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Existing/Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4
- Hydroline
- Existing Gauging Station
- Existing Water Quality Monitoring Site
- Proposed Water Level Monitoring Site
- Proposed Water Level and Quality Monitoring Site
- Proposed Water Quality Monitoring Site and Gauging Station

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.
Proposed monitoring locations are indicative only and subject to access and secondary approval considerations.
* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Additional Surface Water Monitoring Sites

Figure 6-8

Groundwater level monitoring data was assessed at 15 undermined upland swamps to determine whether subsidence had impacted substrate groundwater levels. In summary, ATC Williams (2025) found:

- Negligible impact has occurred to substrate and Hawkesbury Sandstone Upper[1] groundwater levels at nine swamps.
- A persistent or moderate impact to groundwater levels in the underlying Hawkesbury Sandstone Upper has occurred at six swamps. Of these six swamps:
  - Negligible impact has occurred to substrate groundwater levels at five swamps.
  - A persistent impact to groundwater levels in the swamp substrate has occurred at one swamp (Swamp 20).

Despite the persistent impact to substrate groundwater levels at Swamp 20, vegetation monitoring data and visual inspections indicate that the vegetation and species richness at Swamp 20 has improved over the past few seasons, and the population of the threatened flora species Prickly Bush-pea (*Pultenaea aristata*) continues to survive (Ecoplanning Pty Ltd, 2024).

Review of vegetation monitoring undertaken at the Metropolitan Coal Mine by Niche (2025a) found, overall, the results from the monitoring campaigns show consistent patterns in the vegetative responses of swamps over time, generally leading to the following conclusions (Appendix D):

- No statistically significant differences in the variation of species composition and abundance across flora monitoring plots across both control and impact swamps.
- Analysis of quadrat/transect data indicates that the vegetation in upland swamps overlying the longwalls has not experienced changes significantly different to those observed in control swamps.
- Monitoring of upland swamp vegetation has reported some random senescence of individual plants in both control and impact sites.
- Fluctuations in vegetation condition have also been recorded across multiple control and impact sites.
- Dieback was observed in both mined and unmined swamps, but also in native vegetation surrounding swamps.

6.6.3 Environmental Review

Measures to Avoid and Minimise Impacts

As described in Sections 1.3 and 3.2, the Modification incorporates a number of measures to avoid and minimise impacts to upland swamps and watercourses.

Key avoidance and minimisation measures implemented for upland swamps include:

- increasing the pillar widths for Longwalls 317 and 318 from 45 m to 55 m (i.e. a 22% increase) to reduce tensile strain at swamps across the Modification area to 0.5 mm/m or less; and
- shortening the finishing (southern) end of Longwall 317 by 67 m to reduce tensile strain at Swamp 106 to less than 0.5 mm/m.

These changes were made in consideration of the feedback from the IEAPM on the Longwalls 311-316 Extraction Plan.

These measures have been considered in the assessment of potential impacts to upland swamps in the Surface Water Assessment (Appendix C) and BDAR (Appendix D).

Direct Surface Impacts

Direct impacts to upland swamps as a result of Modification surface disturbance works (i.e. relocated Ventilation Shaft 4) would be avoided (Figure 3-1).

Surface Cracking Due to Subsidence

The majority of swamps in the Subsidence Extent are considered to be hydraulically disconnected from the regional groundwater table (Appendix C). On this basis, unsaturated zone modelling was undertaken to assess the potential effects of near surface subsidence-induced fracturing associated with the Modification on the hydrogeological behaviour of Swamps 74 and 106 (Appendix C).

[1] Groundwater level monitoring in the Hawkesbury Sandstone Upper is not undertaken in three swamps (Swamps 81, 82 and 89a).

SEEP/W models were developed to simulate longitudinal cross-sections aligned with the dominant groundwater flow direction through the swamp sediments and the underlying Hawkesbury Sandstone Upper (Appendix C). Peer reviewer Dr Stuart Brown found "*the approach is consistent with the conceptual model and achieves a reasonable fit between observed and simulated groundwater levels during the baseline periods"* (Attachment 4).

The results of the unsaturated zone modelling of Swamps 74 and 106 indicate that if fracturing of the underlying Hawkesbury Sandstone Upper occurs, this may induce additional leakage from the swamp substrate and associated water level decline (Appendix C).

Modelled scenario combinations included increasing the hydraulic conductivity of the Hawkesbury Sandstone Upper by a factor of 1.5 and factor of 2.0, under dry, median and wet climatic conditions. The dry climatic and doubling in hydraulic conductivity produced the largest water level decline (Appendix C).

Under the worst-cast modelled scenario (i.e. dry climatic conditions where hydraulic conductivity of the upper Hawkesbury Sandstone increases by a factor of two), the maximum water level decline of the swamp substrate was predicted at 0.42 m at specific locations of Swamp 74 and Swamp 106 (Appendix C).

However, as the substrate water level of only one historically undermined swamp has been affected to date, the assessment of potential effects to the swamps in the Modification area and surrounds is considered conservative (Appendix C).

Changes to Regional Groundwater Table

As described in Section 6.4.3, the majority of swamps are 'losing disconnected' meaning the regional groundwater table is below the base of the swamp substrate such that the swamp gradually leaks to groundwater, and any changes to the regional groundwater table do not influence leakage rates (Appendix B).

A small area of the downstream end of Swamp 106, where it extends close to the Honeysuckle Creek, is connected to the regional groundwater table and is predicted to experience up to 1.8 m of drawdown in the underlying regolith due to the Modification (Appendix B). This predicted drawdown is primarily related to subsidence above nearby Longwall 318 and, therefore, the drawdown is predicted to be temporary and dissipate within approximately one year (Appendix B).

The Modification is not expected to have any effect on leakage from the shallow groundwater system at any other upland swamps (Appendix B).

Swamp Hydrology

The predicted maximum mining-induced tilts are generally much lower than the existing natural grades of upland swamps in the Modification area and surrounds (MSEC, 2025). Accordingly, the predicted tilts associated with the Modification are not expected to have a significant effect on the overall gradient of the swamps or the flow of surface water through the swamps (MSEC, 2025).

Threatened Ecological Community and Threatened Species

There are six upland swamps that have a low potential risk of greater than negligible environmental consequence (ATC Williams, 2025). If changes to groundwater occur in any of the six swamps, it may result in changes to vegetation structure and composition within the swamp (Appendix D).

Under the BC Act, there is no requirement to generate a credit obligation for prescribed impacts such as potential impacts due to subsidence. However, in accordance with Section 8.3.4 of the BAM and the Swamp Offset Policy (OEH, 2016a), where it is predicted that mining will cause greater than negligible environmental consequences, a maximum predicted offset liability for the swamps must be calculated as part of the Extraction Plan for the longwalls. Accordingly, there is no requirement to include a credit liability for upland swamps in the Biodiversity Assessment Method Calculator (BAM-C) as there are no swamps where it is predicted greater than negligible impact will occur (only swamps where there is a low potential risk it may occur) and the Modification is at the application stage not the Extraction Plan stage. If required by the conditions of consent, the maximum credit offset liability for upland swamps will be included with the Extraction Plan associated with Longwalls 317 and 318.

For those six swamps with a low potential risk of greater than negligible environmental consequence, a partial loss scenario has also been calculated to assist the consent authority in its review of the Modification. A total of 165 credits or equivalent conservation contribution, could be considered by the consent authority in its assessment of prescribed impacts to upland swamps, based on a hypothetical partial loss of six swamps, consisting of 29.3 ha of Plant Community Type (PCT) 3924 (Appendix D).

Niche (2025a) also summarised potential additional conservation measures for residual indirect and prescribed impacts to upland swamps as well as the following threatened fauna species associated with upland swamps:

- Giant Burrowing Frog (*Heleioporus australiacus australiacus*).
- Littlejohn's Treefrog (*Litoria littlejohni*).
- Red-crowned Toadlet (*Pseudophryne australis*).
- Giant Dragonfly (*Petalura gigantea*).

6.6.4 Mitigation and Management Measures.

The SEEP/W model would be reviewed (including the hydrogeological conceptualisation) and recalibrated as part of the preparation of the Extraction Plan for Longwalls 317 and 318 to incorporate the latest monitoring data available at this time. The revised modelling would be used to develop trigger action response plan trigger levels.

The existing Water Management Plan and the Biodiversity Management Plan would be reviewed and revised to reflect the Modification (including the new monitoring locations and revision of trigger actions response plans) subject to the conditions of any modified Development Consent.

An Adaptive Management Plan can be used to address impacts that are infrequent, uncertain or difficult to measure, such as prescribed impacts. An Adaptive Management Plan would be prepared for the Modification to describe the management and monitoring of potential subsidence impacts to upland swamps. The Adaptive Management Plan would include trigger action response plans that incorporate the before-after-control-analysis framework, where feasible, to manage impacts to upland swamps and threatened species.

The Biodiversity Offset Strategy and a summary of the measures to mitigate and manage potential biodiversity impacts (including to upland swamps) is described in Section 6.7.4.

6.7 BIODIVERSITY

A BDAR has been prepared for the Modification by Niche (Appendix D). As explained in Section 4.2.2, the BDAR (Appendix D) was prepared in accordance with the relevant statutory requirements (including clauses 30 and 30A of the BC S&T Regulation) and the BAM (DPIE, 2020b).

6.7.1 Methodology

A BDAR Study Area was established such that the biodiversity survey effort for the Modification would encompass an area larger than the proposed Modification. The BDAR Study Area totals 475.8 ha (including areas of non-vegetated land) and is defined as the greater area of (Appendix D):

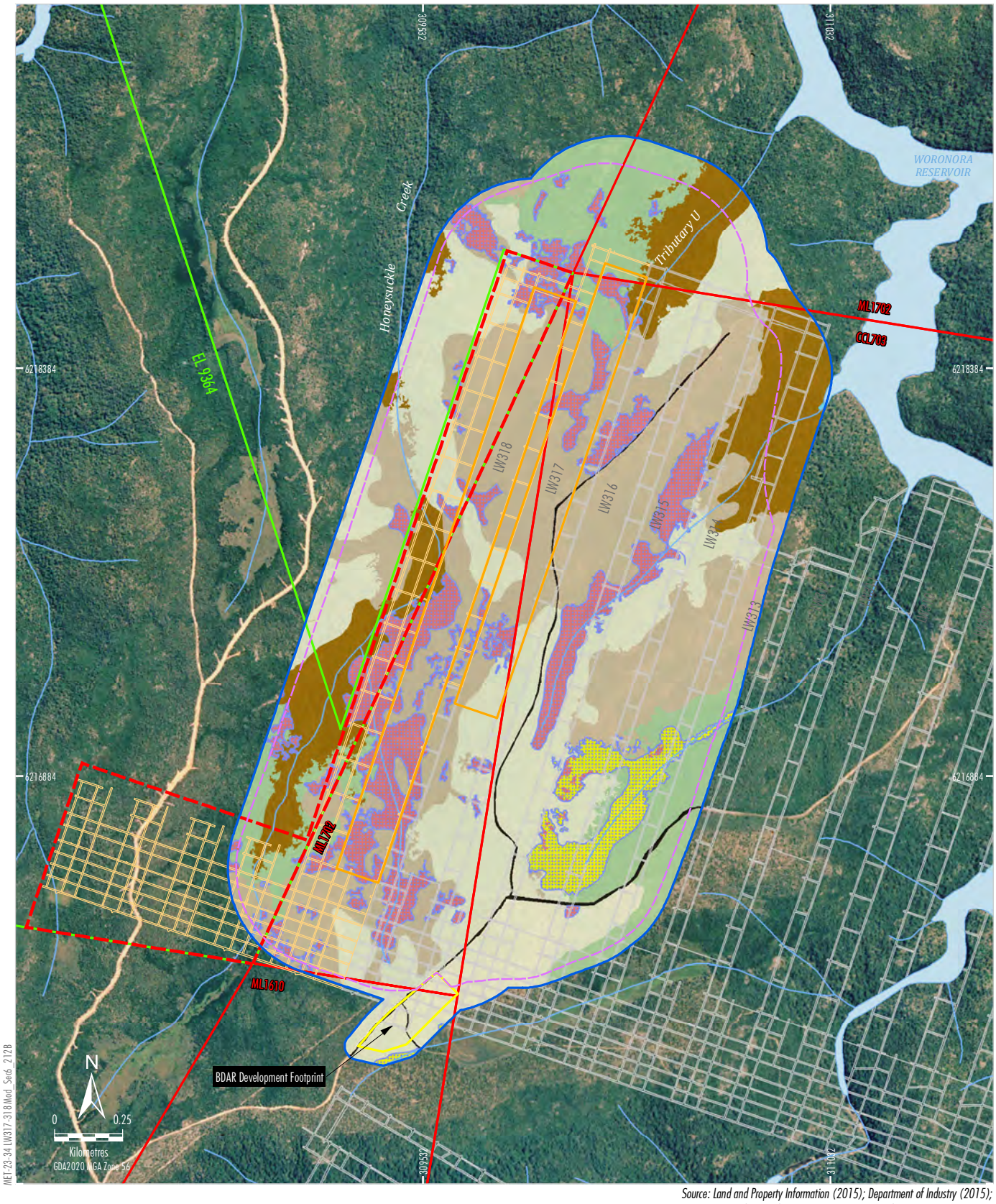
- the relocated Ventilation Shaft 4 footprint (referred to as the 'Development Footprint') plus a 50 m buffer;
- the 35° angle of draw and/or 20 mm subsidence contour from the Modification longwalls; and
- a 400 m buffer around proposed longwall voids, consistent with the Swamp Offset Policy.

Extensive fauna and flora surveys along with revisions to previous vegetation mapping have been completed (Appendix D). The methodology of the fauna and flora surveys is provided in Appendix D.

In consideration of subsidence impacts associated with underground mining, an 'Indirect Impact Footprint' which refers to the area within the 35° angle of draw and/or 20 mm subsidence contour from the Modification longwalls (i.e. the greater of the two) has been used to conservatively assess biodiversity impacts as it is uncertain the impacts that would occur. The BDAR assessed and separately describes both impacts within the Development Footprint and the Indirect Impact Footprint (Figure 6-9).

The field survey approach for the Development Footprint was in accordance with the BAM with no deviation. All candidate threatened flora and fauna species were considered and surveyed in accordance with the appropriate guidelines (Appendix D).

The threatened flora and fauna survey approach for the Indirect Impact Footprint was developed in consideration of the terrain (and inability to safely access areas), extensive size (approximately 417 ha) and potential to impact upland swamps through excessive foot traffic (Appendix D).



MET-23-34 LW317-318 Mod_SoS_212B

Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025); Niche (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- BDAR Study Area
- Indicative Mining Lease Application Area
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318
- BDAR Development Footprint
- Indirect Impact Footprint

Threatened Ecological Communities

- Coastal Upland Swamp in the Sydney Basin Bioregion

Vegetation Mapping

- PCT 3590 - Southern Sydney Scribbly Gum Woodland
- PCT 3595 - Sydney Coastal Sandstone Gully Forest
- PCT 3598 - Woronora Plateau Scribbly Gum Woodland
- PCT 3814 - Woronora Plateau Heath-Mallee
- PCT 3923 - Sydney Coastal Sandstone Creekline Swamp Heath
- PCT 3924 - Sydney Coastal Upland Swamp Heath
- Road and Track
- Waterbody

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

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Vegetation Mapping and Threatened Ecological Communities

Figure 6-9

For assessing the Indirect Impact Footprint, a preliminary run of the BAM-C was used to identify potentially occurring threatened flora and fauna species. Then, sensitive areas were assessed (i.e. swamps, ridgelines and riparian habitats). Further detail is provided in the BDAR (Appendix D).

There is an overlap of 0.48 ha between the Development Footprint and the Indirect Impact Footprint (Figure 6-9). This area is included in the Development Footprint and will be subject to direct impacts including full vegetation clearance (Appendix D).

Further, amphibian and reptile expert Dr Ross Wellington was engaged to assess areas sensitive to subsidence effects (i.e. swamps, ridgelines, riparian habitat) for the presence/absence of:

- threatened amphibians along Honeysuckle Creek and within swamps; and
- the Broad-headed Snake (*Hoplocephalus bungaroides*) and the presence of its rocky habitats across the BDAR Study Area.

6.7.2 Existing Environment

Landscape Setting

The Metropolitan Coal Mine is located within the Woronora Special Area, surrounded by woodland.

There are no State or Commonwealth mapped wetlands on, or adjacent to, the Metropolitan Coal Mine.

There are no Areas of Outstanding Biodiversity Value as declared by the NSW Minister for the Environment within the Study Area (Appendix D).

Native Vegetation and Threatened Ecological Communities

PCTs were mapped and split into vegetation zones.

Six PCTs were identified of relevance to the Modification (Figure 6-9) (Appendix D):

- PCT 3590 – *Southern Sydney Scribbly Gum Woodland* (Plate 6-2).
- PCT 3595 – *Sydney Coastal Sandstone Gully Forest*.
- PCT 3598 – *Woronora Plateau Scribbly Gum Woodland*.
- PCT 3814 – *Woronora Plateau Heath-Mallee.*
- PCT 3923 – *Sydney Costal Sandstone Creekline Swamp Heath*.
- PCT 3924 – *Sydney Coastal Upland Swamp Heath* (Plate 6-3).

The six PCTs present within the BDAR Study Area align with three vegetation classes (Table 6-6):

- Sydney Coastal Dry Sclerophyll Forests (PCTs 3590, 3595 and 3598);
- Sydney Coastal Heaths (PCT 3814); and
- Coastal Heath Swamps (PCTs 3923 and 3924).

Plate 6-2 PCT 3590 – Southern Sydney Scribbly Gum Woodland

Source: Niche (2025a).

Plate 6-3 PCT 3924 – Sydney Coastal Upland Swamp Heath

Source: Niche (2025a).

The area of each PCT is presented in Table 6-6. PCTs 3923 and 3924 have been assigned to the *Coastal Upland Swamps in the Sydney Basin Bioregion* endangered ecological community. There are no other threatened ecological communities (TEC) identified in the BDAR Study Area.

Table 6-6
Plant Community Types Relevant to the Modification

Veg Zone ID	PCT ID and Name	Area (ha)		Overall Impact Area (ha)
		Development Footprint	Indirect Impact Footprint	
3590_High	3590 *Southern Sydney Scribbly Gum Woodland*	3.8	108.9	112.7
3595_High	3595 *Sydney Coastal Sandstone Gully Forest*	0.0	41.3	41.3
3598_High	3598 *Woronora Plateau Scribbly Gum Woodland*	0.0	43.6	43.6
3814_High	3814 *Woronora Plateau Heath-Mallee*	0.0	152.1	152.1
3923_High[1]	3923 *Sydney Coastal Sandstone Creekline Swamp Heath*	0.0	12.6	12.6
3924_High[1]	3924 *Sydney Coastal Upland Swamp Heath*	0.0	55.4	55.4
Total Area		3.8	413.9	417.7

[1] *Coastal Upland Swamps in the Sydney Basin Bioregion endangered ecological community under the BC Act and EPBC Act.*

Source: Niche (2025a) (Appendix D).

Threatened Flora Species

The PCTs of relevance to the Modification were used to guide threatened flora targeted surveys in accordance with the BAM (2020).

No threatened flora species were identified within the Development Footprint. One threatened flora species, Prickly Bush-pea, was detected within the Indirect Impact Footprint (Figure 6-10) (Appendix D).

In accordance with the methodology described in Section 6.7.1, 24 threatened flora species were conservatively assumed present within the Indirect Impact Footprint.

Threatened Fauna Species

A number of 'ecosystem credit species' were recorded during targeted surveys (Appendix D).

Two threatened fauna species 'species credit species' were identified within the Development Footprint, including the Eastern Pygmy-possum (*Cercatetus nanus*) and the Powerful Owl (*Ninox strenua*) (recorded outside the Development Footprint but within 800 m). Further, a dual credit species, the Large Bent winged-bat (*Miniopterus orianae oceanensis*) was also recorded within the Development Footprint (foraging habitat only).

Four threatened fauna species 'species credit species' were recorded within the Indirect Impact Footprint, namely the Giant Burrowing Frog, Littlejohn's Tree Frog, Giant Dragonfly (*Petalura gigantea*) and Powerful Owl (Appendix D). One dual credit species, the Broad-headed Snake was recorded within the Indirect Impact Footprint.

Further, 18 threatened fauna species were assumed present within the Indirect Impact Footprint.

6.7.3 Environmental Review

The potential direct and indirect impacts of the Modification on biodiversity have been assessed in the BDAR and are summarised below.

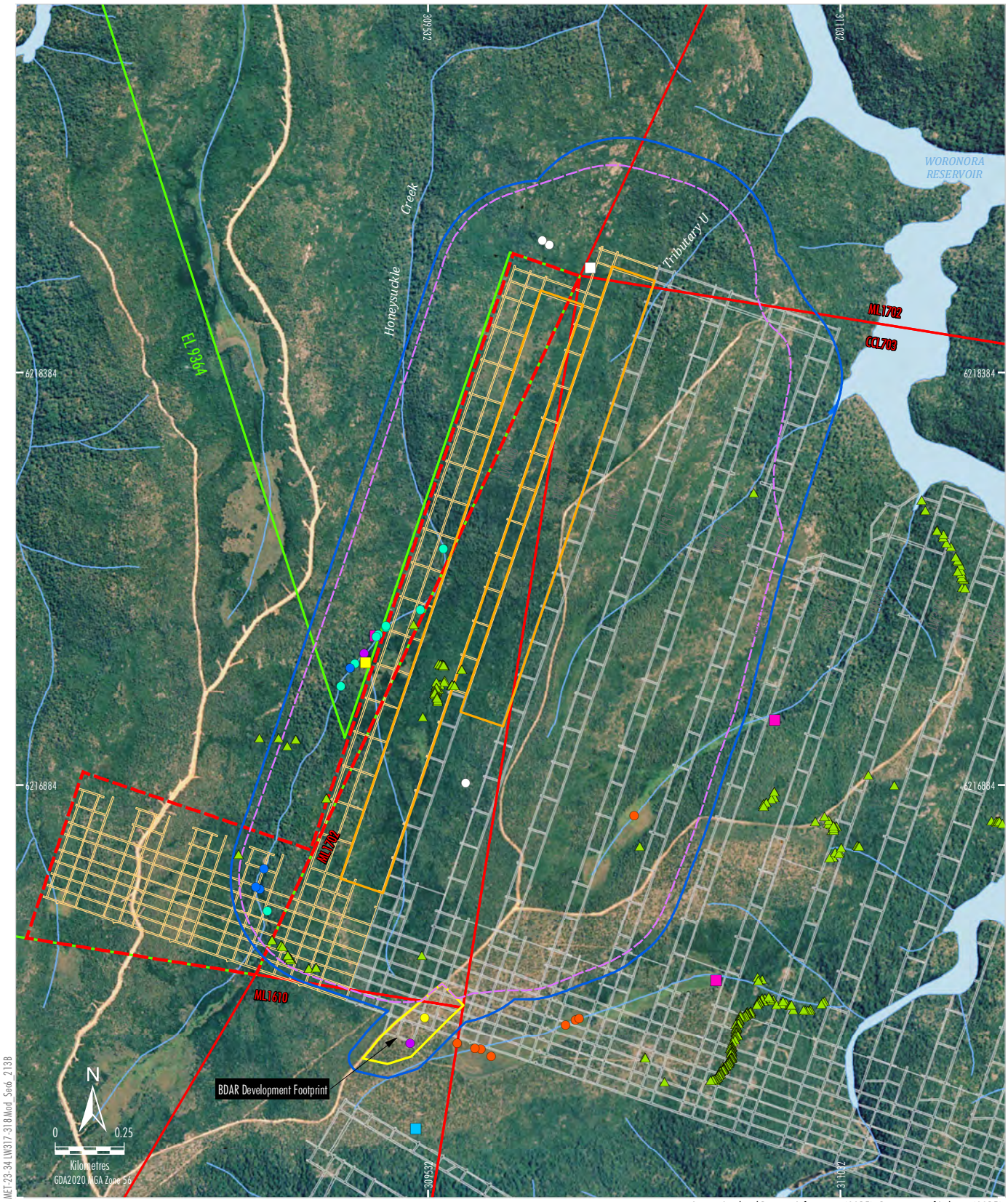
Measures to Avoid and Minimise Impacts

The BDAR provides further information in relation to how the Modification incorporates measures to avoid and minimise biodiversity impacts. These are also described in Sections 1.3, 3.2, 3.4 and 3.6.

Direct Impacts

The BDAR has assessed the Development Footprint associated with relocated Ventilation Shaft 4.

The ecosystem credits associated with the Development Footprint are outlined in Table 6-7. The species credits associated with the Development Footprint are provided in Table 6-8.



Source: Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025); Niche (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- BDAR Study Area
- Indicative Mining Lease Application Area
- Existing Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318
- BDAR Development Footprint
- Indirect Impact Footprint

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

Threatened Species Record

Fauna

- Broad-headed Snake (*Hoplocephalus bungaroides*)
- Eastern Pygmy-possum (*Cercartetus nanus*)
- Giant Burrowing Frog (*Heleioporus australiacus*)
- Giant Dragonfly (*Petalura gigantea*)
- Large Bent-winged Bat (*Miniopterus orianae oceanensis*)
- Littlejohn's Tree Frog (*Litoria littlejohni*)
- Powerful Owl (*Ninox strenua*)
- Red-crowned Toadlet (*Pseudophryne australis*)
- Varied Sittella (*Daphoenositta chrysoptera*)
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

Flora

- Prickly Bush-pea (*Pultenaea aristata*)

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Threatened Species Record

Figure 6-10

Table 6-7
Modification Ecosystem Credit Calculations

Vegetation Zone	PCT Name	TEC	Area (ha)	Number of Ecosystem Credits Required
Development Footprint				
3590_High	*Southern Sydney Scribbly Gum Woodland*	Not a TEC	3.8	79

Source: Niche (2025a) (Appendix D).

Table 6-8
Modification Species Credit Calculations

Scientific Name	Common Name	Number of Species Credits Required
Development Footprint		
Cercartetus nanus	Eastern Pygmy-possum	105
Ninox strenua	Powerful Owl	105
Petalura gigantea	Giant Dragonfly	158
	Total Credits	**368**

Source: Niche (2025a) (Appendix D).

The surface disturbance area (3.8 ha) associated with the Modification would be rehabilitated and revegetated to an area of 0.1 ha during mining operations. The area would be completely rehabilitated following the completion of underground mining.

Potential Subsidence

Underground mining activities would result in subsidence of the land surface (Section 6.3). The extent of predicted subsidence relative to native vegetation is shown in Appendix D.

An assessment of potential subsidence impacts was conducted by MSEC (2025) (Appendix A) and an assessment of the potential subsidence-related impacts on water resources was undertaken by AGE (2025) and ATC Williams (2025) (Appendices B and C). The extent of predicted conventional subsidence relative to native vegetation is shown on Figure 6-9 (Appendix D) and is based on the 35° angle of draw and/or 20 mm subsidence contour in Appendix A.

A summary of the predicted impacts that the Modification may have on natural surface features sensitive to subsidence and the associated potential impacts to biodiversity values is provided in Appendix D.

Measures to mitigate and manage potential impacts are described in Section 6.7.4.

Other Indirect Impacts

The potential for the Modification to result in indirect impacts on flora and fauna habitat and vegetation has also been assessed (Appendix D).

Any incremental increase in noise, dust and light spill on the adjacent habitat around the Development Footprint is unlikely to significantly impact any local fauna populations. The Modification is unlikely to increase the risk of weeds and pests given control programs are implemented at the Metropolitan Coal Mine (Appendix D).

Prescribed Biodiversity Impacts

Under section 6 of the BAM (2020) and clause 6.1 of the BC Regulation, subsidence or upsidence resulting from underground mining is classified as a prescribed impact. Accordingly, these impacts associated with the Modification are considered prescribed (Appendix D).

Prescribed impacts such as those affecting threatened species habitat that is not native vegetation (e.g. caves, cliffs) may be taken into account by the consent authority in the determination of biodiversity credits to be retired (or other conservation measures required to be taken) if impacts cannot be avoided or mitigated (Appendix D).

Of the prescribed biodiversity impacts listed within the BDAR, potential impacts to waterbodies, water quality and hydrological processes is the most relevant (Appendix D). The BDAR considered the conclusions of the Surface Water Assessment (ATC Williams, 2025), to assess potential impacts to species reliant on the hydrological regime within the BDAR Study Area (Appendix D).

An assessment of the prescribed biodiversity impacts in relation to the Modification is provided in Appendix D and summarised below.

Karst, Caves, Crevices, Cliffs, Rocks and Other Geological Features

An assessment of the impacts of the Modification on threatened entities associated with karst, caves, crevices, cliffs, rocks and other geological features of significance is provided in Appendix D.

MSEC (2025) identified COH19 within the eastern part of the Study Area, overlying Longwall 314. The Modification would not result in any material increase in subsidence effects compared to the approved Metropolitan Coal Mine (MSEC 2025). There is unlikely to be any material increase in potential rock fall risk associated with the Modification.

Water Quality, Water Bodies and Hydrological Processes that Sustain Threatened Species and Threatened Ecological Communities

Potential impacts on water quality, water bodies, and hydrological processes include cracking of bedrock, pool leakage and some diversion of surface water into the strata below (Appendix D).

Of the 41 swamps within the Indirect Impact Footprint, six have a low potential risk of greater than negligible environmental consequence (Swamps 74, 75, 106, 117, 119 and 130). The potential impacts to the hydrology of these swamps are discussed further in Section 6.5.

Environmental impacts could include reductions in soil moisture and pool availability, and potential impacts to water quality may impact species reliant on the hydrology such as the Giant Burrowing Frog, Littlejohn's Tree Frog, Red-crowned Toadlet and Southern Myotis (Appendix D).

Revised mine designs have reduced tensile strain to below the threshold for the onset of surface cracking (MSEC, 2025). Therefore, overall impacts are expected to be minor and localised, with the resilience of the landscape further minimising risk.

An assessment of the potential changes to hydrology due to the Modification that has the potential to impact biodiversity values is provided in Appendix D. An assessment of the potential changes to hydrology due to the Modification that has the potential to impact upland swamps is also provided in Section 6.5 and Appendix D.

Habitat Fragmentation

The impacts to connectivity of wooded habitat are considered minor due to the large areas of connected habitat remaining within the BDAR Study Area and surrounding the Development Footprint.

The proposed Modification would result in the removal of 3.8 ha of PCT 3590 *Southern Sydney Scribbly Gum Woodland* from the southern portion of the Study Area. The removal of this vegetation has the potential to reduce connectivity of wooded habitat utilised by a number of threatened species. Eastern Pygmy possum and Powerful Owl may also utilise the Development Footprint for shelter and breeding purposes (Appendix D).

While riparian habitat along the creek and tributaries, and swamps are likely to be indirectly impacted as a result of the longwall extractions, the impact is unlikely to contribute to material, if any, vegetation removal such that connectivity is affected (Appendix D).

Hydrological alterations resulting from subsidence-related processes may lead to minor reductions in habitat connectivity for amphibian species, such as the Giant Burrowing Frog, Littlejohn's Tree Frog, and Red-crowned Toadlet, reliant on moist, connected microhabitats. These impacts are expected to be localised and associated primarily with changes to ephemeral water flow and hydrological regimes (Appendix D).

Fauna Movement

The removal of 3.8 ha of vegetation associated with the Development Footprint is unlikely to significantly affect landscape-scale connectivity. The species recorded in the Development Footprint are capable of traversing fragmented habitats and utilising a broad range of roosting and foraging resources across the landscape. Further, habitat within the Study Area, and surrounding the Development Footprint will remain well-connected allowing for continuity of fauna movement. (Appendix D).

Vehicle Strike

The Modification would not result in an increase in the likelihood of vehicle strike of animals. There is a low likelihood; however, it is not expected to be of a magnitude that would result in the loss of any threatened species from the local area (Appendix D).

Measures to mitigate the potential for vehicle strikes for the Modification are described in Section 6.7.4.

Serious and Irreversible Impacts

Under the BC Act, there is a small list of threatened species and communities considered by the NSW Government to be at risk of a Serious and Irreversible Impact (SAII) (Appendix D). These species/ecological communities are named SAII entities.

Niche (2025a) provided an SAII Impact Assessment for 13 species, which conservatively assessed the potential clearance and subsidence impacts of the Modification (Appendix D). The BDAR describes how impacts on SAII entities would be avoided, minimised, mitigated, offset and subject to additional appropriate measures (Appendix D).

Matters of National Environmental Significance

Thirty-five MNES were assessed in relation to the Modification. Given the uncertainty of subsidence predictions, the assessment conservatively concluded that the Modification is likely to have a significant impact on three MNES listed under the EPBC Act in the absence of any remediation, offset or compensatory measures:

- Coastal Upland Swamps.
- Giant Burrowing Frog.
- Littlejohn's Tree Frog.

The remaining 32 MNES species were assessed as unlikely to be significantly impacted by the Modification.

The BDAR outlines the proposed avoidance and mitigation measures to manage and reduce the relevant impacts on these MNES entities. Indirect and prescribed impacts that remain after measures to avoid, minimise and mitigate have been applied, may be offset using additional biodiversity credits (above the baseline credit requirement generated by the BAM-C for direct impacts) and/or other conservation measures. (Appendix D).

6.7.4 Offset and Mitigation Measures

Impact avoidance and mitigation measures for the Metropolitan Coal Mine would be implemented for the Modification as outlined in Sections 1.3 and 3.1. Measures to mitigate impacts from the Modification are outlined in Table 6-9. Further details are provided in the BDAR (Appendix D).

Impacts associated with the Development Footprint such as vegetation clearing and related impacts on threatened species, will be appropriately offset in accordance with the BAM (Appendix D).

Under Section 6 of the BAM and Clause 6.1 of the BC Regulation, the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and TECs (including from subsidence or upsidence resulting from underground mining) is classified as a prescribed impact. As per Section 8.6 (5), the consent authority may take prescribed impacts, and any potential offsets or other measures to address these impacts, into account when it determines the number of biodiversity credits required to be retired and can require the retirement of additional biodiversity credits or alternative measures to address these impacts.

The Biodiversity Management Plan would be updated to incorporate the Modification.

Biodiversity Offset Strategy

The Biodiversity Offset Strategy has been developed to address the potential residual impacts on biodiversity values associated with the Modification in accordance with the offset rules under the BC Act.

As per the BAM (2020), the biodiversity credit obligation for this Modification is required to be discharged through one of the three options as provided by the NSW Biodiversity Offsets Scheme:

- Establishment of a Biodiversity Stewardship Site and retirement of required credits.
- Purchase and retirement of credits from the market.
- Payment into the Biodiversity Conservation Fund for the value of credits.
- Funding of a biodiversity conservation action(s).

Table 6-9
Measures to Mitigate and Manage Potential Biodiversity Impacts

Mitigation Measures	Techniques	Timing/Frequency
Subsidence Management (Adaptive management and monitoring)	Subsidence related impacts would be managed via an adaptive management plan (developed as part of the BDAR), and would be updated in consultation with NSW DCCEEW and approved by NSW DPHI prior to commencement.	Pre-operation During operation Post-operation
Construction Management Plan	A Construction Management Plan would be prepared in consultation with NSW DCCEEW and WaterNSW and approved by NSW DPHI prior to construction. The Construction Management Plan would be prepared with input from a qualified ecologist and include a plan for implementing, evaluating and reporting on the effectiveness of all mitigation measures outlined in the BDAR relevant to the construction of Ventilation Shaft 4 and any subsidence, groundwater and surface water monitoring sites.	Pre-construction Construction Post-construction
Biodiversity management training	All relevant personnel involved in vegetation clearance, including relevant sub-contractors, would be trained on biodiversity management protocols and the requirements for the Modification through inductions, toolbox talks and targeted training. All relevant project personnel would be provided with sensitive area maps (showing clearing boundaries and exclusion zones) and would be updated as required.	Pre-construction Construction
Vegetation and habitat clearance protocol	A vegetation clearance protocol would be implemented for the Modification as part of the Construction Management Plan. A suitably trained and qualified ecologist or wildlife handler would be present during the clearing of identified habitat features to manage animals that may be encountered/displaced during the process.	Pre-construction Construction
Alternative roosting and/or nesting habitat for threatened fauna	Nest boxes would be provided for alternative roosting and/or nesting habitat for threatened fauna displaced during clearing in accordance with a Supplementary Hollow and Nest Strategy.	Pre-construction Construction Operation
Re-use felled timber	Logs and tree hollows that could provide fauna habitat (the total length of wood at least 10 cm in diameter and at least 0.5 m long) would be relocated to adjacent woodland and/or suitable woodland locations where available/feasible.	Construction
Preparation and implementation of an Erosion and Sediment Control Plan	An Erosion and Sediment Control Plan would be implemented as part of the Construction Management Plan to manage water quality impacts during construction of the relocated Ventilation Shaft 4. Regular inspections and where necessary desilting of sediment control devices would be undertaken to ensure they are functioning properly and to prevent system failure during heavy rainfall events Consideration of sediment controls (e.g. coir logs, sediment fencing, revegetation) to avoid indirect sedimentation into sensitive habitats (e.g. swamps and riparian areas).	Pre-construction Construction
Preparation and Implementation of a Water Management Plan	A Water Management Plan would be implemented to enable surface flow, groundwater and associated ecosystem functions to be monitored and managed through a structured approach that includes regular monitoring, impact assessment, and adaptive management.	Pre-construction Operation Post-operation
Bushfire Management	Mitigation measures would be implemented to manage and reduce bushfire risk. They would focus on education and training, annually assessing the bushfire hazards, minimising and controlling ignition sources (e.g. by appropriate engineering design, where relevant) and revising existing responses and evacuation strategies for the Modification area.	Annual assessment of bushfire hazards

Table 6-9 (Continued)
Measures to Mitigate and Manage Potential Biodiversity Impacts

Mitigation Measures	Techniques	Timing/Frequency
Minimise noise, light spill and dust	Light spill would be managed as follows: • Wherever possible, artificial lighting required during construction would be directed away from remnant vegetation. • Temporary artificial light impacts during construction would be managed through shielding/directing light spill away from sensitive areas. Noise and vibration would be managed as follows: • The Construction Management Plan would detail the mitigation measures and strategies to mitigate noise and vibration impacts. • All feasible and reasonable measures would be applied to reduce the potential noise and vibration impacts from the Modification. Dust suppression would be addressed as follows: • Reduced vehicle speeds during the construction phase. • No dust generating work would be conducted during high winds. • Stockpiles would be kept covered with material to prevent the generation of dust. • Application of water as dust suppression during dust generating activities, where practicable. • Dust suppression through wetting of exposed surfaces, including access tracks.	Pre-construction Construction
Vehicle Strike	The Construction Management Plan to be prepared for the Modification would include measures to reduce the potential for vehicle strike such as speed limits for vehicles accessing Ventilation Shaft 4.	Pre-construction Construction
Weed and Pathogen Management Plan	A Weed and Pathogen Management Plan would be developed as a part of the Construction Management Plan, to be implemented during construction.	Pre-construction Construction

It is noted that the Commonwealth does not support application of the variation rules to satisfy an offset obligation for MNES in relation to a controlled action (see Clause 6.6A of the BC Regulation). As such, the offset obligation for each MNES would be addressed via one, or a combination of the following:

- The retirement of biodiversity credits based on the like-for-like provisions in the BC Regulation.
- The funding of a biodiversity conservation action(s).
- Undertaking ecological mine rehabilitation that creates the same ecological community or threatened species habitat.
- Payment into the Biodiversity Conservation Fund.

As described in Section 6.6.3, there is no requirement to include a credit liability for the Coastal Upland Swamps in the BAM-C as there are no upland swamps where it is predicted greater than negligible impact will occur (only swamps where there is a low potential risk it may occur) and the Modification is at the application stage, not the Extraction Plan phase. If required by the conditions of consent, the maximum credit offset liability for Coastal Upland Swamps will be included with the Extraction Plan associated with Longwalls 317 and 318.

For the six swamps with a low potential risk of greater than negligible environmental consequence, a hypothetical partial loss scenario has also been included in the BDAR to assist the consent authority in its review of the Modification and does not represent biodiversity credits required under the BDAR to be retired.

Adaptive Management

As required in Section 8.5 of the BAM (2020), an adaptive management plan can be used to address impacts that are infrequent, uncertain or difficult to measure, such as prescribed impacts.

Metropolitan Coal would implement an Adaptive Management Plan for the Modification. The Adaptive Management Plan is appended to the BDAR (Appendix N of Appendix D) and would be updated as part of the Extraction Plan stage for the Modification.

6.8 AQUATIC ECOLOGY

An Aquatic Ecology Assessment has been prepared by Bio-Analysis Pty Ltd (Bio-Analysis) (2025) and is presented in Appendix E.

6.8.1 Methodology

Bio-Analysis (2025) assessed a Study Area encompassing the Subsidence Extent and the relocated Ventilation Shaft 4 surface disturbance extent.

The Aquatic Ecology Assessment (Appendix E) was prepared in accordance with relevant State and Commonwealth requirements including the NSW *Fisheries Management Act 1994* (FM Act), BC Act, EPBC Act and *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (Update 2013)* (DPI, 2013).

The Aquatic Ecology Assessment has also been informed by the following:

- database searches of the species occurring in the area, including NSW *BioNet Atlas Database* (NSW DCCEEW, 2025), EPBC Act *Protected Matters Search Tool* (Cth DCCEEW, 2024c), *Fisheries NSW Spatial Data Portal* (DPI, 2025) and *Online Zoological Collections of Australian Museums* (Council of Heads of Australian Faunal Collections, 2024);
- subsidence (MSEC, 2025) groundwater (AGE, 2025) and surface water (ATC Williams, 2025) assessments for the Modification;
- *Key Fish Habitat Map for Wollongong* (DPI, 2007);
- aquatic ecology studies previously completed at the Metropolitan Coal Mine by Bio-Analysis (2008);
- aquatic ecology monitoring completed for the Metropolitan Coal Mine by Bio-Analysis between 2007 and 2025; and
- aquatic ecology studies previously completed within the Woronora Special Area by Bruce et al. (2001), Marine Pollution Research Pty Ltd (2003a, 2005a, 2005b), Ecowise Environmental Pty Ltd (2005a, 2005b, 2006) and The Ecology Lab Pty Ltd (2006a, 2006b).

Aquatic ecology surveys were undertaken for the Modification in February 2024. Field surveys included aquatic habitat assessment (including channel morphology, substratum, aquatic plants [macrophytes] and riparian vegetation), surface water quality sampling, aquatic macroinvertebrate assessment and fish surveys (Appendix E).

Aquatic habitat condition was assessed at each site using a modified Riparian, Channel and Environmental (RCE) inventory method (Chessman et al., 1997) to provide an index of habitat condition and enable the comparison of aquatic habitat quality between sites. Sites with a high RCE score indicate that the riparian zone is unmodified by human activity, while those with a low score have been substantially modified (Appendix E).

Other habitat features were assessed in accordance with the *NSW Australian River Assessment System (AUSRIVAS) Sampling and Processing Manual* (NSW Department of Environment and Conservation, 2004) (AUSRIVAS protocol), *Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (Update 2013)* (DPI, 2013) and *Survey Guidelines for Australia's Threatened Fish* (NSW Department of Sustainability, Environment, Water, Population and Communities, 2011).

Water samples collected during surveys were compared to guideline values recommended by the *National Water Quality Management Strategy: Australian and New Zealand Water Quality Guidelines for Fresh and Marine Water Quality* (ANZECC & ARMCANZ, 2000).

Macroinvertebrates were sampled using the AUSRIVAS protocol which provides an indication of aquatic ecological health (Appendix E). The Stream Invertebrate Grade Number-Average Level (SIGNAL2) score was also calculated to indicate sensitivity to pollution, water quality and aquatic habitat health (Chessman, 2003) (Appendix E). Lastly, the Ephemeroptera, Plecoptera and Trichoptera (EPT) Richness Index (the total number of distinct taxa within the EPT groups), was calculated to estimate water quality (given these species are considered to have low tolerance to water pollution)

Fish surveys were undertaken using electrofishing methods. Visual searches for other aquatic fauna, including frogs and turtles were also undertaken during the survey (Appendix E).

6.8.2 Existing Environment

Regional Setting

A description of the local hydrology of the Study Area and surrounds is provided in Section 6.5. As described in Section 6.5, the Modification area is located within the Woronora Reservoir Catchment and within the Woronora Special Area. Major watercourses which flow to the Woronora Reservoir adjacent to the Study Area include the Woronora River and the Waratah Rivulet. Tributaries of these watercourses (including Honeysuckle Creek, Tributary R, Tributary U, Tributary S and other unnamed tributaries) traverse or flow directly adjacent to the Study Area (Figure 6-6).

Aquatic Habitat

The upper and middle reaches of Honeysuckle Creek (i.e. upstream of the Woronora Reservoir full supply level) and other tributaries in the Study Area are not mapped as Key Fish Habitat under the *Key Fish Habitat Map for Wollongong* DPI (2007) or the *Fisheries NSW Spatial Data Portal* (DPI, 2025). Approximately 900 m of the lower reaches of Honeysuckle Creek downstream of the full supply level of the Woronora Reservoir (approximately 2 km downstream of the Study Area) are mapped as Key Fish Habitat (DPI, 2007; 2025). Sections of the Waratah Rivulet, Eastern Tributary, Woronora River and Woronora Reservoir are also mapped as Key Fish Habitat (DPI, 2007; 2025).

No threatened aquatic species listed under the FM Act or EPBC Act have been previously recorded within the Study Area or previous surveys within the local area (Appendix E). Aquatic ecology studies and monitoring has been undertaken within and adjacent to the Metropolitan Coal Mine underground mining area since 2002.

Modification Survey Results

A total of six survey sites (Plates 6-4 to 6-9 and Figure 6-11) along Honeysuckle Creek were sampled for aquatic species and habitat. Unnamed tributaries within the Study Area were unable to be safely accessed and could not be sampled.

Aquatic ecology survey sites are shown on Figure 6-11.

Honeysuckle Creek lies to the west of the Waratah Rivulet. The section of Honeysuckle Creek in the Study Area flows through a relatively steep valley with a few small, rocky outcrops with clearly defined bed and banks and semi-permanent to permanent waters in pools (Appendix F).

A range of aquatic habitat for fish and macroinvertebrates was present, including rocks, logs and emergent macrophytes (Appendix F). Emergent macrophyte species including *Empodisma minus*, *Eurychorda complanata*, *Lepidosperma filiforme* and *Juncus prismatocarpus* were commonly recorded during the survey.

Naturally occurring iron staining was observed, but water visibility was clear and free of suspended material. The RCE scores for the sites sampled in Honeysuckle Creek indicate overall condition of aquatic habitats are excellent (Appendix E).

Surface Water Quality

Surface water quality measurements from the sites sampled for the Modification were compared to the appropriate physico-chemical water quality default trigger values (DTVs) recommended by ANZECC & ARMCANZ (2000).

Results indicate that, across the six sites sampled, pH and dissolved oxygen levels were below the lower DTV at all six sites, mean EC levels marginally exceeded the upper DTV at four sites, and turbidity marginally exceeded DTV at one site. Temperature across the sites ranged between 21.6 °C to 25.1 °C and alkalinity measured 0 mg/L at all sites (Appendix E).

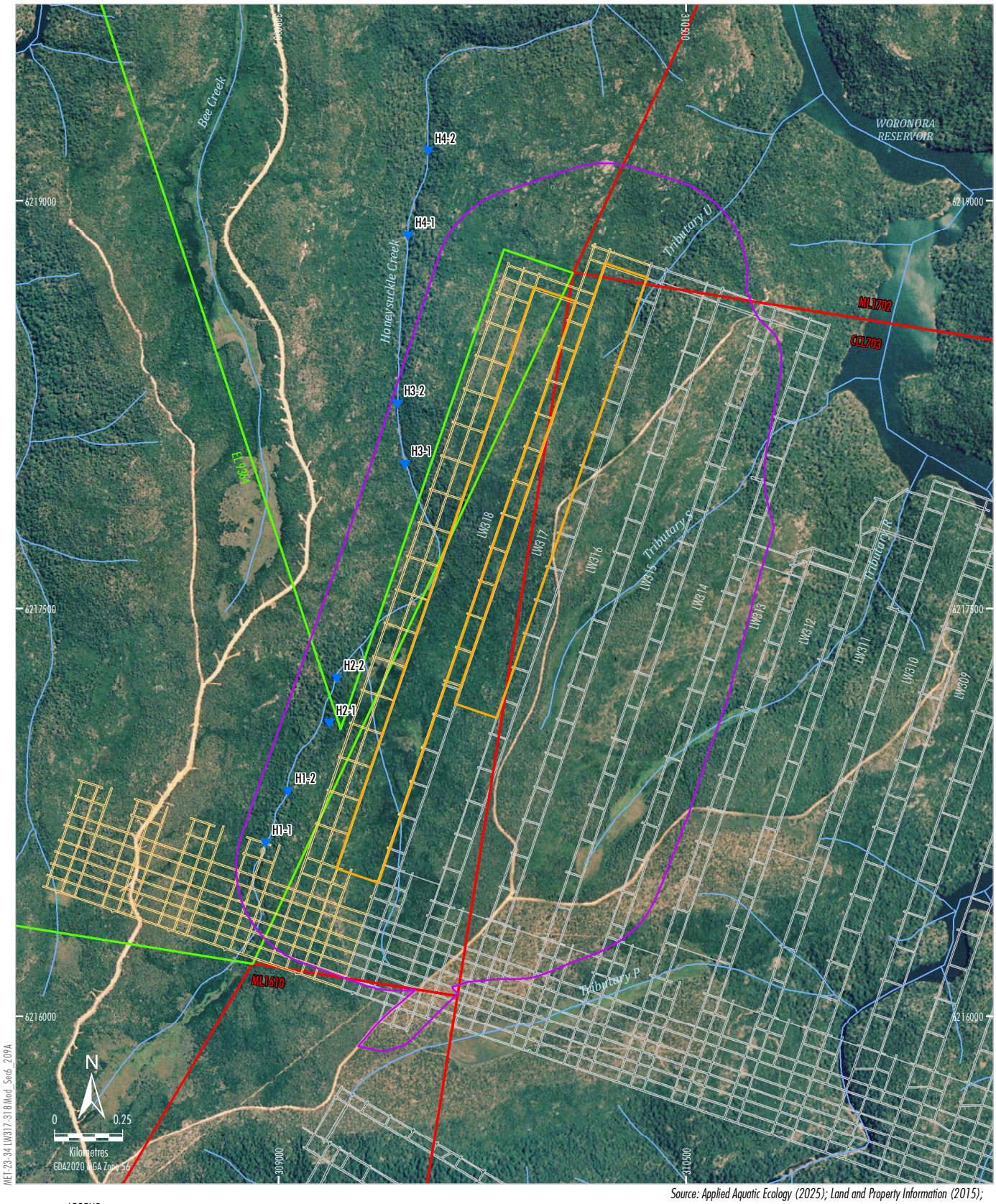
These measurements show little variation along Honeysuckle Creek and are consistent with measurements from historical surveys (Appendix E).

Aquatic Macroinvertebrates

Macroinvertebrates are animals that do not possess a spinal column and are visible to the naked eye.

The number of taxa recorded at each site ranged from six to eight, with a total of 33 taxa observed within pool edge habitats during the surveys for the Modification (Appendix E).

Aquatic macroinvertebrates species including Chironominae, Notonectidae and Leptophlebiidae were commonly recorded during surveys. Fewer families were collected than expected from the sites sampled within Honeysuckle Creek compared to reference sites selected by the AUSRIVAS model (Appendix E).



Source: Applied Aquatic Ecology (2025); Land and Property Information (2015); Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Approved Metropolitan Coal Mine Longwall Layout
- Proposed First Workings
- Indicative Longwalls 317 and 318
- Study Area
- Aquatic Ecology Survey Site*

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.
*Sites H4-1 and H4-2 were unable to be sampled due to access restrictions.

Peabody
METROPOLITAN COAL

Aquatic Ecology Survey Sites

Figure 6-11

Plate 6-4 Aquatic Ecology Survey Site H1-1
Source: Bio-Analysis (2025).

Plate 6-5 Aquatic Ecology Survey Site H1-2
Source: Bio-Analysis (2025).

Plate 6-6 Aquatic Ecology Survey Site H2-1
Source: Bio-Analysis (2025).

Plate 6-7 Aquatic Ecology Survey Site H2-2
Source: Bio-Analysis (2025).

Plate 6-8 Aquatic Ecology Survey Site H3-1
Source: Bio-Analysis (2025).

Plate 6-9 Aquatic Ecology Survey Site H3-2
Source: Bio-Analysis (2025).

The SIGNAL2 values and low diversity of macroinvertebrate assemblages recorded indicates toxic pollution or harsh physical conditions (Appendix E). However, given that the catchment is relatively small and undisturbed, it is likely that the very simple habitat structure (i.e. mostly bedrock with small pockets of mobile sands) has resulted in a low number of macroinvertebrate types being able to colonize and survive the upper reaches of Honeysuckle Creek, despite water quality appearing suitable (Appendix E).

Fish, Reptiles and Crustaceans

No fish, reptiles or crustaceans were collected during surveys of Honeysuckle Creek for the Modification (Appendix E).

Freshwater shrimp (Family Atyidae) were collected in macroinvertebrate net samples at Site H3-1, and a crayfish (*Eustacus cf spinifer*) exoskeleton was observed at Site H2-1 (Appendix E).

No threatened fish listed under the FM Act or the EPBC Act (including those identified in the desktop review as potentially occurring within the Study Area) have been recorded in the waterways sampled within the Woronora Special Area, including the Woronora Reservoir, Waratah Rivulet or Woronora River (Appendix E). The dam wall of the Woronora Reservoir is likely to be a major barrier to migration of fish (Appendix E).

Threatened Aquatic Biota

The Adams Emerald Dragonfly and Sydney Hawk Dragonfly have not been recorded during the numerous aquatic macroinvertebrate surveys carried out in streams in the local area for the Metropolitan Coal Mine and were considered unlikely to occur within the Study Area (Appendix E).

6.8.3 Environmental Review

Potential impacts of the Modification on aquatic ecology were considered in terms of habitat alteration (e.g. potential mine subsidence impacts on hydrology, pool habitat, water quality and aquatic biota), potential mine subsidence impacts on biodiversity (aquatic macrophytes, macroinvertebrates, fish, threatened aquatic biota and riparian vegetation), and other potential direct, indirect and cumulative impacts, as described below.

The Metropolitan Coal Mine Project Approval (08_0149) has an existing performance measure of *'negligible impact to threatened species, populations, or ecological communities'*. The Modification is expected to comply with this performance measure for aquatic habitat (Appendix E).

Subsidence Impacts on Hydrology

The effects of mine subsidence on surface water flows are described in detail in Sections 6.3 and 6.5, Appendix A and Appendix C. In summary, potential subsidence impacts to the tributaries for the Modification are similar to those assessed for the approved Metropolitan Coal Mine. The potential impacts to these watercourses associated with direct subsidence effects include cracking of the creek bed and fracturing/dilation of the underlying strata above and immediately adjacent to the proposed Modification longwalls (Appendix A).

As discussed in Section 6.4.3, the predicted long-term impacts of the Modification on groundwater flux to Honeysuckle Creek, Woronora Reservoir, the Woronora River and Waratah Rivulet are all negligible (i.e. less than 1 ML/year) (Appendix B).

The Groundwater (Appendix B) and Surface Water (Appendix C) Assessments indicate the Woronora Reservoir, Waratah Rivulet and Woronora River are unlikely to experience adverse effects from the Modification as a result of subsidence (Sections 6.3 and 6.5).

As described in Section 6.5.3, the relinquishment of approved underground mining areas would reduce the area that is subject to cracking of sandstone bedrock and potential associated pool water level, streamflow and water quality effects.

Subsidence Impacts on Pools

Fracturing of rock strata in watercourses can also result in a reduction in water level in pools due to the conveyance of a portion of natural surface flows via the fracture network (Appendix C). The effects of mine subsidence on pools are described in detail in Section 6.5 and Appendices A and C.

During high and median flow periods, pool water levels in affected areas are anticipated to remain comparable to pre-impact levels, as flow volumes are sufficient to maintain continuity within the channel. During low flow periods, affected pools may exhibit altered recessionary behaviour, with water levels potentially declining to levels not previously recorded during baseline (pre-impact) conditions (Appendix C).

Any significant diversion of surface flow and changes in the natural drainage behaviour of pools can cause localised reductions in the availability and quality of aquatic habitat through loss of habitat, desiccation, sedimentation, stream discontinuity, and deterioration of water quality (Appendix C).

Based on previous assessments of impacted pools in Waratah Rivulet and Eastern Tributary, where surface and/or sub-surface cracking occurs as a result of the Modification, the following pool water level behaviour is likely to occur (Appendix C):

- During high and median flow periods, pool water levels in affected areas are anticipated to remain comparable to pre-impact levels, as flow volumes are sufficient to maintain continuity within the channel.
- During low flow periods, affected pools may exhibit altered recessionary behaviour, with water levels potentially declining to levels not previously recorded during baseline (pre-impact) conditions.

Subsidence Impacts on Water Quality

Mine subsidence has the potential to impact on stream water quality that can reduce the quality of habitat for aquatic biota. Subsidence effects on water quality are described in detail in Appendix C and are summarised in Section 6.5.

The effect of the Modification on the water quality of Honeysuckle Creek and local tributaries in the Study Area is expected to be similar to that previously recorded (i.e. transient pulses of iron, manganese and aluminium). However, based on historical effects associated with the Metropolitan Coal Mine, it is considered unlikely that the Modification would result in a persistent change in water quality or a material effect to the water quality of the Woronora Reservoir (Appendix C). It is noted that dissolved aluminium and iron concentrations are naturally elevated at times at watercourses within and adjacent to the Study Area (Appendix C).

Subsidence Impacts on Aquatic Biota

Aquatic Macrophytes

Any stream water level changes are unlikely to disturb emergent vegetation to the extent that its role would be adversely impacted, due to the small section of Honeysuckle Creek that is predicted to be impacted, and the relatively low emergent macrophyte species numbers and population densities present (Appendix E).

The Modification is considered unlikely to cause a significant decline in the composition or distribution of aquatic macrophytes within the Study Area or downstream reaches of Honeysuckle Creek and other tributaries (Appendix E).

Aquatic Macroinvertebrates

Subsidence, cracking and redirection or reduction of water may result in localised impacts on aquatic macroinvertebrates, associated with reduced availability of water habitat along the upper to middle reaches of Honeysuckle Creek and within the small drainage lines or tributaries (Appendix E).

Associated changes in the availability of ephemeral aquatic habitat that would occur are not expected to result in any significant impact to overall aquatic macroinvertebrate diversity and abundance due to the limited value of aquatic habitat within ephemeral unnamed tributaries (Appendix E).

The Modification is unlikely to have any significant long-term impacts on assemblages of macroinvertebrates within the Study Area or downstream habitats, including the Woronora Reservoir (Appendix E).

Fish

The Modification has the potential to temporarily affect stream connectivity and fish passage due to reduced availability of habitat and connectivity. Notwithstanding, the Woronora Reservoir dam wall has resulted in very low fish species richness and abundance upstream of the Woronora Reservoir (Appendix E).

Therefore, the Modification is unlikely to have any significant impact to fish assemblage within the Study Area or Woronora Special Area (Appendix E).

Threatened Species

No threatened aquatic biota listed under the FM Act or EPBC Act are known to occur in streams within the Study Area or the Woronora Reservoir. Therefore, direct impacts on threatened aquatic species as a result of the Modification are considered unlikely (Appendix E).

Other Direct or Indirect Impacts

The relocation of Ventilation Shaft 4 would not impact aquatic ecology as the relocated Ventilation Shaft 4 area does not directly interact with any watercourses within or adjacent to the Study Area.

A sediment basin would be constructed to manage sediment laden runoff from the proposed Ventilation Shaft 4 area and minimise erosion (Section 3.4). Construction and operation of the relocated Ventilation Shaft 4 area would have a neutral effect on water quality (Section 6.5.3)

The Modification is unlikely to result in the introduction of new invasive species of aquatic flora or fauna (Appendix E).

Cumulative Impact

Cumulative impacts can be defined as the total impact on the environment that result from the incremental impacts of the Modification added to other past, present, and reasonably foreseeable future actions in a defined area.

An assessment of the cumulative impacts of the Modification on aquatic ecology is provided in Appendix E and summarised below.

The cumulative impact assessment has considered the species present (species diversity, abundance and dynamics), patterns of species distribution (the communities and ecosystem present that encompass all species), broad habitat types (the ecological niches for the range of species present), and ecosystem processes (how species interact through their involvement in key cycles, e.g. carbon, water and nutrient cycles, and the interception and flow of solar energy) (Appendix E).

To date, no threatened aquatic flora and fauna species listed under the FM Act or the EPBC Act have been recorded in streams during current surveys within the Study Area or previous surveys of waterways within the local area (Appendix E).

Honeysuckle Creek, Tributary U, Tributary S, Tributary R and other unnamed tributaries are highly unlikely to provide habitat for aquatic threatened species, populations or communities. Therefore, direct impacts on aquatic threatened species, populations or communities species as a result of the Modification are considered unlikely (Appendix E).

All aquatic flora and fauna species detected in the vicinity of the Study Area during the field survey were common to the region. Subsidence effects on Honeysuckle Creek, Tributary R, Tributary S and Tributary U and other unnamed tributaries are unlikely to have a significant impact on aquatic ecology, including at a regional scale (Appendix E).

6.8.4 Mitigation and Management Measures

As described in Section 6.5, surface water quality monitoring would be conducted to monitor subsidence-related impacts on surface water quality. The surface water quality monitoring program would include parameters of relevance to aquatic ecology including dissolved oxygen, pH, EC, and turbidity.

Aquatic ecology monitoring, including assessment of habitat characteristics, water quality, aquatic macroinvertebrates and aquatic macrophytes, would continue as part of the existing Biodiversity Management Plan, including the aquatic ecology monitoring program for the Metropolitan Coal Mine.

As part of the Modification, Metropolitan Coal would not develop components of the approved Metropolitan Coal Mine, which would reduce the residual impacts to aquatic ecology from the Metropolitan Coal Mine.

The additional monitoring sites recommended by Bio-Analysis (2025) (i.e. H1-1, H1-2, H2-1, H2-2, H3-1, H3-2) for the Modification would be incorporated in the Aquatic Ecology Monitoring Program.

Metropolitan Coal would update the approved Stream Remediation Plan to include Honeysuckle Creek prior to commencing any remediation works, if required (Section 6.5).

6.9 ABORIGINAL CULTURAL HERITAGE

An ACHA has been prepared for the Modification by Niche (2025b) and is presented in Appendix F. An overview of the assessment of the Modification with respect to potential impacts on Aboriginal cultural heritage is provided in this section.

6.9.1 Methodology

The ACHA (Appendix F) was prepared in accordance with relevant State and Commonwealth requirements including the NPW Act and the *National Parks and Wildlife Regulation 2019.*

The ACHA has also been undertaken in accordance with the following guidelines:

- the Consultation Requirements*;*
- *Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b)*;*

- *Guide to investigating, assessing and reporting on Aboriginal cultural heritage in NSW* (OEH, 2011);
- *NSW Minerals Industry Due Diligence Code of Practice for the Protection of Aboriginal Objects* (NSW Minerals Council, 2010);
- *Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999* (Cth DCCEEW, 2023)*;* and
- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia International Council on Monuments and Sites, 2013).

The ACHA (Appendix F) incorporates relevant information from previous assessments, the results of field surveys undertaken for the Modification and consultation with the Aboriginal community, including:

- results from extensive fieldwork and archaeological and cultural investigations previously undertaken by archaeologists and representatives of the Aboriginal community;
- search results from the Aboriginal Heritage Information Management System (AHIMS) database and other heritage registers;
- results from archaeological and cultural surveys conducted by archaeologists and representatives of the Aboriginal community for the Modification between January and February 2024 and September 2024;
- a consultation program undertaken for the Modification; and
- outcomes of extensive consultation with the Aboriginal community regarding archaeological and cultural values as part of both previous investigations and the ACHA.

Aboriginal Community Consultation

Consultation with the RAPs regarding the approved Metropolitan Coal Mine to date has been extensive and involved various methods including meetings, written and verbal correspondence and archaeological survey attendance (Appendix F).

Aboriginal community consultation for the Modification was undertaken with 26 RAPs in accordance with the Consultation Requirements and *National Parks and Wildlife Regulation 2019*.

Table 6-10 summarises the main stages of the Aboriginal cultural heritage consultation process undertaken for the Modification. A detailed account of the consultation process (including consultation records and a detailed consultation log) for the ACHA for the Modification is provided in Appendix F.

A total of 26 organisations and/or individuals were registered as RAPs for the Modification following completion of the registration period.

6.9.2 Existing Environment

Aboriginal History

The Sydney Basin has been occupied by Aboriginal people since at least 30,700 years ago, based on the age of archaeological material found within the region (Jo McDonald Cultural Heritage Pty Ltd, 2005). Nearer to the Modification area, the site of Bass Point at Shellharbour was occupied by Aboriginal people from at least 20,000 years ago, indicating a great antiquity of Aboriginal occupation in the region (Appendix F).

The Modification area is located on land that was the traditional country of the Dharawal people. The Dharawal people distinguished themselves as Fresh Water, Bitter Water or Salt Water depending on where in the wider language boundary their traditional lands were – the inland hills and valleys, the plateaus and swamps or the coastal plain of the region, respectively (Appendix F).

It is understood that at the time of first contact with European observers, the Dharawal people regularly traded, moved around the region and participated in ceremonies between their Country and neighbouring areas (Appendix F).

Despite the changes that were brought to the Aboriginal people of the region, today there are many thousands of Aboriginal people living in the Illawarra region (Appendix F).

Much of the Modification area is undisturbed, due to the reservation of these areas for catchment reserves (i.e. Woronora Special Area located within the Sydney Drinking Water Catchment). This has resulted in relatively little disturbance to many Aboriginal heritage sites in these areas (Appendix F).

Table 6-10
Summary of Aboriginal Cultural Heritage Consultation Undertaken for the Modification

Date	Consultation
Notification of Modification and Registrations	
10 May 2023	Letters requesting the names of Aboriginal parties or groups that may be interested in registering for the consultation process were sent to Illawarra LALC, Heritage NSW, Office of the Registrar (NSW *Aboriginal Land Rights Act 1983*), Native Title Tribunal, Native Title Services Corporation Limited, South East Local Land Service and the Wollongong City Council in order to identify Aboriginal stakeholders.
23 May 2023	Responses to the above request were received.
25 May 2023	Letters seeking registrations of interest were sent to the Aboriginal parties identified by the above step.
25 May 2023	A public notice was placed in the *Illawarra Mercury* inviting interested Aboriginal parties or groups to register for the Modification ACHA.
June to August 2023	Letters were also provided to existing RAPs for the Metropolitan Coal Mine advising them of automatic registration for the Modification consultation process.
	A record of names of RAPs was provided to Heritage NSW, Illawarra LALC and Tharawal LALC in accordance with the Consultation Requirements (apart from the RAPs who requested that their contact information not be provided).
Proposed Methodology Review and Information Session	
25 September 2023	The Proposed Methodology for undertaking the ACHA was distributed to the RAPs for review and comment. An invitation to attend an information session to discuss the Project and Proposed Methodology and an expression of interest for field surveys was also included.
26 October 2023	An information session regarding the Modification and Proposed Methodology was held to give RAPs an opportunity to raise any cultural issues or comments regarding the Proposed Methodology.
October 2023	Feedback from the RAPs in regard to the Proposed Methodology was received, and consideration was given to all comments
Field Surveys	
17 January 2024	RAPs that provided an expression of interest to participate in the field surveys were notified that the field surveys would take place in late-January 2025 and invited to participate*.
30 to 31 January 1 to 2 February 2024	Aboriginal cultural heritage surveys were undertaken by archaeologists from Niche accompanied by RAPs and their representatives. The cultural significance of the Subject Area and the identified Aboriginal heritage sites was discussed with the RAPs and representatives.
19 September 2024	RAPs that provided an expression of interest to participate in the field surveys were notified of the additional field surveys and invited to participate.
25 September 2024	Additional Aboriginal cultural heritage surveys were undertaken by archaeologists from Niche accompanied by RAPs and their representatives. The cultural significance of the Subject Area and the identified Aboriginal heritage sites was discussed with the RAPs and representatives.
Draft ACHA Review and Information Session	
24 April 2025	A copy of the draft ACHA was provided to all RAPs for their review and comment. The draft ACHA included the outcomes of field surveys, archaeological and cultural significance assessment (based on feedback received during consultation and fieldwork), consideration of potential impacts and proposed mitigation and management measures. Feedback was requested by 25 May 2025.
24 April 2025	An invitation was provided to RAPs to attend an information session taking place on 13 May 2025 to discuss the findings, provide any information on cultural knowledge and/or significance and provide an opportunity to comment on the draft ACHA of the Subject Area.
13 May 2025	An information session regarding the Modification and Draft ACHA was held to give RAPs an opportunity to raise any cultural issues or comments regarding the Draft ACHA.
16 June 2025	All comments received on the draft ACHA (both in writing and at the information session) were considered and included in the final ACHA (Appendix F).

Source: Niche (2025b).

Note: LALC = Local Aboriginal Land Council.

* RAPs were initially notified in September 2023 that field surveys would take place in December 2023, however, these field surveys were postponed due to weather.

Previous Archaeological Investigations

A number of Aboriginal cultural heritage surveys, assessments and monitoring programs have been previously undertaken within the Metropolitan Coal Mine area and surrounds, including parts of the Modification area.

Aboriginal cultural heritage surveys and assessments relevant to the Metropolitan Coal Mine area were undertaken for the Metropolitan Coal Project EA in 2008 (Kayandel Archaeological Services, 2008). Various other surveys and assessments, including baseline recordings and ongoing monitoring have also been undertaken at the Metropolitan Coal Mine to support the subsidence monitoring programs developed as part of the Extraction Plan process.

A detailed description of previous archaeological assessments and surveys undertaken at the Metropolitan Coal Mine and surrounds is provided in Appendix F.

Aboriginal Cultural Heritage Management

The management of Aboriginal heritage at the Metropolitan Coal Mine is currently conducted in accordance with the measures outlined in the approved Heritage Management Plan.

Heritage Register Searches

An AHIMS search was undertaken in January 2025 (Appendix F) for the Modification area and surrounds.

Searches of the following heritage registers and planning instruments were undertaken in relation to the Modification for Aboriginal heritage items:

- AHIMS database;
- Australian World Heritage database;
- Commonwealth Heritage List;
- National Heritage List;
- Register of the National Estate (via the Australian Heritage Database);
- State Heritage Register;
- State Heritage Inventory;
- s170 Heritage and Conservation Register;
- Wollongong LEP; and
- *Wollongong Development Control Plan 2009.*

National Heritage Places

There are no listed National Heritage Places within the ACHA Subject Area for the Modification or its immediate vicinity.

The nearest listed National Heritage Places are the Royal National Park and Garawarra State Conservation Area located east of the Princes Motorway, approximately 3 km from the Modification. As such, the Royal National Park and Garawarra State Conservation Area are not anticipated to experience any subsidence effects due to the Modification and there would be no impacts to Aboriginal heritage within the Royal National Park and Garawarra State Conservation Area.

Notwithstanding, further consideration on the potential impacts on the Royal National Park and Garawarra State Conservation Area are provided in Sections 6.6 and 6.8, Attachment 5 and Appendices D and E.

Aboriginal Cultural Heritage Within the ACHA Subject Area

The Proposed Methodology for the Modification ACHA defined a Subject Area (hereafter referred to as the Subject Area), which was determined on the basis of the following:

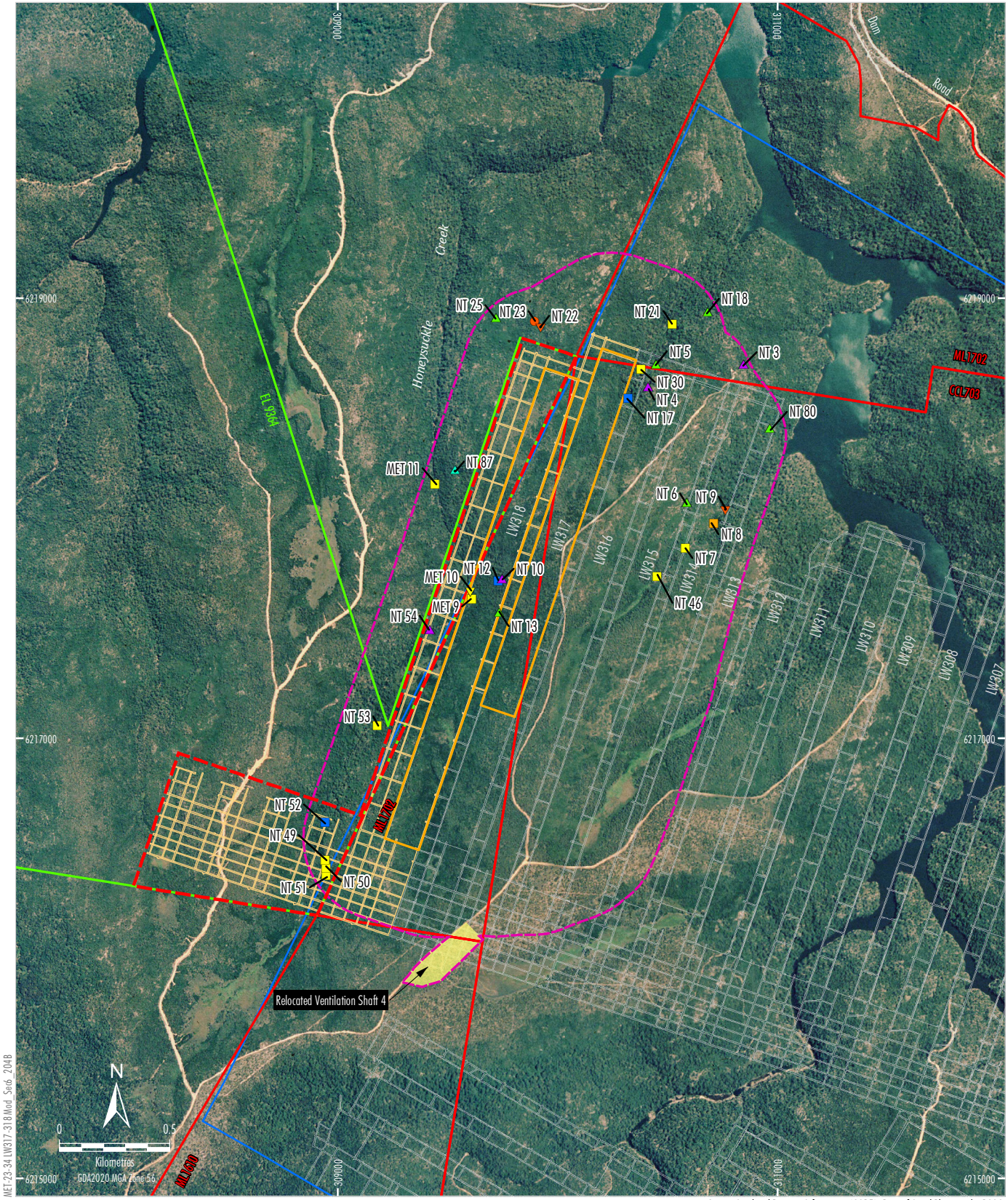
- preliminary 35° angle of draw and/or 20 mm subsidence contour associated with Longwalls 317 and 318; and
- the relocated Ventilation Shaft 4 design.

The Subject Area is approximately 455 ha in size (Figure 6-12).

Refinements to the Modification resulted in a reduction of the extent of potential subsidence effects and associated reduction of potential impacts of some known Aboriginal cultural heritage sites within that area. Notwithstanding, the initial Subject Area was retained for the ACHA.

Archaeological Survey Design and Methodology

Archaeological field surveys for the Subject Area were undertaken by suitably qualified archaeologists, accompanied by representatives of the RAPs, between 30 January and 2 February 2024 and on 25 September 2024.



MET-23-34 LW317-318 Mod. SoEA 204B

Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025)

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- ACHA Subject Area

Aboriginal Cultural Heritage Site

- Grinding Groove(s)
- Grinding Groove(s), Rock Engraving
- Grinding Groove(s), Water Hole/Well
- Overhang with art, artefacts and deposit; Shelter with Art,Shelter with Deposit
- Shelter with Art
- Shelter with Art and PAD
- Shelter with Art, Grinding Groove(s)
- Shelter with Artefact(s)
- Shelter with PAD

- Project Underground Mining Area
- Longwalls 20-27 and 301-317
- Existing/Approved Underground Development
- Proposed First Workings
- Indicative Longwalls 317 and 318 Extraction Area
- Relocated Ventilation Shaft 4

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.

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Aboriginal Cultural Heritage Sites within the ACHA Subject Area

Figure 6-12

Given the level of previous systematic survey and assessment over the approved Metropolitan Coal Mine area, targeted surveys were undertaken of the extent of potential subsidence effects of the extended Longwall 317 and additional Longwall 318 mining area and comprehensive surveys were undertaken of the relocated Ventilation Shaft 4 proposed surface disturbance area and immediate surrounds.

The archaeological field surveys were informed by the archaeological predictive model and were undertaken to ground-truth sites recorded previously, in addition to identifying new sites (Appendix F).

In particular, Niche identified the following target landforms that were considered to have the greatest potential for Aboriginal cultural heritage (Appendix F):

- ridgelines, including cliffs and steep slopes;
- land adjacent to watercourses, including Honeysuckle Creek and other drainage lines;
- open depressions;
- flat planar landforms; and
- lower slopes and gullies.

During the survey and throughout the consultation process, representatives of the RAPs were asked to identify any areas of cultural significance within the Modification area and surrounds or any cultural values relevant to the area.

All cultural comments relating to the Modification area and/or wider region were recorded and are included in Appendix F.

Summary of Archaeological Findings

Following review of the desktop investigation outcomes and the results of the Modification surveys, a total of 29 Aboriginal cultural heritage sites were identified within the Subject Area, consisting of (Appendix F):

- 26 previously recorded sites; and
- three newly identified sites.

The three newly identified Aboriginal cultural heritage sites comprise the following (Appendix F):

- one shelter; and
- two grinding grooves.

All newly identified sites have been assessed as being of low scientific significance (Appendix F). Table 6-11 provides a summary of the Aboriginal heritage sites within the Subject Area and the assessed scientific significance.

Notwithstanding the outcomes of this assessment and classification of some of the identified archaeological sites and objects as having low scientific significance, Metropolitan Coal acknowledges that this assessment in no way diminishes the recognition or significance of Aboriginal peoples past occupation and use of the land and its resources in the vicinity of the Metropolitan Coal Mine.

A detailed discussion of the survey results and descriptions of the newly identified sites and previously identified sites are presented in Appendix F. The location of the Aboriginal heritage sites within the Subject Area is shown on Figure 6-12.

6.9.3 Environmental Review

A total of 29 Aboriginal cultural heritage sites were identified within the Subject Area including 26 previously recorded Aboriginal cultural heritage sites and three newly identified Aboriginal cultural heritage sites.

Four Aboriginal cultural heritage sites within the Subject Area, namely NT 3, NT 18, NT 25 and NT 80 (all assessed as being of low significance), are located outside the extent of predicted subsidence effects and would not experience additional subsidence impacts as a result of the Modification (Appendix F).

Direct Impacts

No Aboriginal cultural heritage sites were identified within the relocated Ventilation Shaft 4 disturbance extent and therefore, no Aboriginal cultural heritage sites would experience direct impacts as a result of the Modification.

Indirect Impacts

Potential indirect impacts associated with subsidence effects from underground mining operations at the Modification are discussed in detail in Section 6.3 and Appendix A. The potential impact of these effects on Aboriginal cultural heritage is summarised below and described further in Appendix F.

Table 6-11
Aboriginal Cultural Heritage Sites within the Subject Area

Site Type	Site Name		Total No. Sites
	Previously Identified	Newly Identified	
Assessed as Low Scientific Significance			
Grinding Grooves	NT 49, NT 50, NT 51, NT 53, NT 7, NT 21, NT 30, NT 12 and NT 46	MET9 and MET11	11
Shelter with Art, Grinding Groove(s)	-	MET 10	1
Shelter with Art	NT 18	-	1
Shelter with Art and Artefact(s)	NT 6	-	1
Shelter with Artefact(s)	NT 87	-	1
Shelter with Art and PAD	NT 54, NT 3, NT 9 and NT 13	-	4
Shelter with Art, Artefact(s) and PAD	NT 10, NT 23, NT 25, NT 22 and NT 80	-	5
Assessed as Moderate Scientific Significance			
Grinding Groove(s), Water Hole/Well	NT 17, NT 52	-	2
Grinding Grooves, Rock Engraving	NT 8	-	1
Shelter with Art	NT 5	-	1
Shelter with Art and PAD	NT 4	-	1
		Total	29

Note: PAD = potential archaeological deposit.

Source: Niche (2025b).

The longwall panel geometry adopted at the Metropolitan Coal Mine (i.e. using narrower panel voids and wider chain pillars), which would also be used for the Modification, significantly reduces subsidence impacts and reduces the potential for harm to the Aboriginal heritage sites. This is the key measure that has been successfully used during historical mining at the Metropolitan Coal Mine to reduce subsidence impacts on Aboriginal cultural heritage sites (Appendix F).

For areas where the landscape is comprised of rock formations (e.g. sandstone and rock outcrops), the risks of harm to Aboriginal heritage sites are greater than those for open sites on soil landscapes. Rock buckling and deformation, block fall, cracking and overhang collapse have the potential to impact Aboriginal heritage sites (e.g. grinding grooves and sandstone shelters) (Appendix F).

The types of changes that may be experienced at rock shelter sites would be similar or identical to those that would be expected due to natural weathering processes, but exacerbated by subsidence. For example, a naturally weathering block which would have detached and fallen at some point in time may detach and fall sooner due to differential movements of the rock strata induced by subsidence (Appendix F).

A portion of the Subject Area for the Modification overlaps the approved Metropolitan Coal Mine underground mining area, and as a result a number of Aboriginal heritage sites are already approved to experience subsidence impacts under Project Approval (08_0419). Of the 25 Aboriginal cultural heritage sites within the extent of predicted subsidence effects for the Modification, 10 are located within the approved Metropolitan Coal Mine underground mining area comprising of (Appendix F):

- six Aboriginal cultural heritage sites assessed as being of low scientific significance; and
- four Aboriginal cultural heritage sites assessed as being of moderate scientific significance.

While there is an increase in the predicted subsidence parameters (vertical subsidence, maximum predicted tilt and curvatures) at some of these Aboriginal heritage sites, the overall impact assessments based on the Approved Layout do not change for the Modified Layout (Appendix A). On this basis, the impact assessments for these 10 Aboriginal cultural heritage sites do not change as a result of the Modification (Appendix F).

The remaining 15 Aboriginal cultural heritage sites are located within the extent of predicted subsidence effects associated with the Modification only, compromising (Appendix F):

- 14 Aboriginal cultural heritage sites assessed as being of low scientific significance; and
- one Aboriginal cultural heritage sites assessed as being of moderate scientific significance.

The predicted subsidence parameters based on the Modified Layout are similar to those predicted for the Approved Layout and therefore the potential impacts to Aboriginal cultural heritage sites would be similar (Section 6.3). It is considered unlikely that Aboriginal cultural heritage sites would experience subsidence impacts as a result of the Modification (Appendix F).

Sites NT 9 and NT 21 (both assessed as being of low scientific significance) have a relatively higher likelihood of potential adverse impact due to valley closure movements (Appendix A). However, the potential for subsidence impacts as a result of the Modification is still considered unlikely (Appendix F).

Niche (2025b) concluded that the incorporation of the Modification is expected to comply with performance measures under the Metropolitan Coal Mine Project Approval (08_0149).

Relinquishment of Approved Mining Areas

The proposed relinquishment of approximately 253 ha of the approved underground mining areas as part of the Modification would reduce the area that is subject to cracking and overhang collapse that have the potential to impact Aboriginal heritage sites. There are 13 previously known Aboriginal cultural heritage sites located within the proposed relinquishment areas which would experience a reduction or complete avoidance of subsidence impacts approved for the Metropolitan Coal Mine (Figure 6-13).

Cumulative Impacts

A consideration of the potential cumulative impacts associated with the Modification, including the existing Metropolitan Coal Mine and other surrounding operations, has been undertaken and is presented in Appendix F. This assessment includes consideration of the known and potential Aboriginal heritage resources that may be impacted by the Metropolitan Coal Mine and surrounding operations.

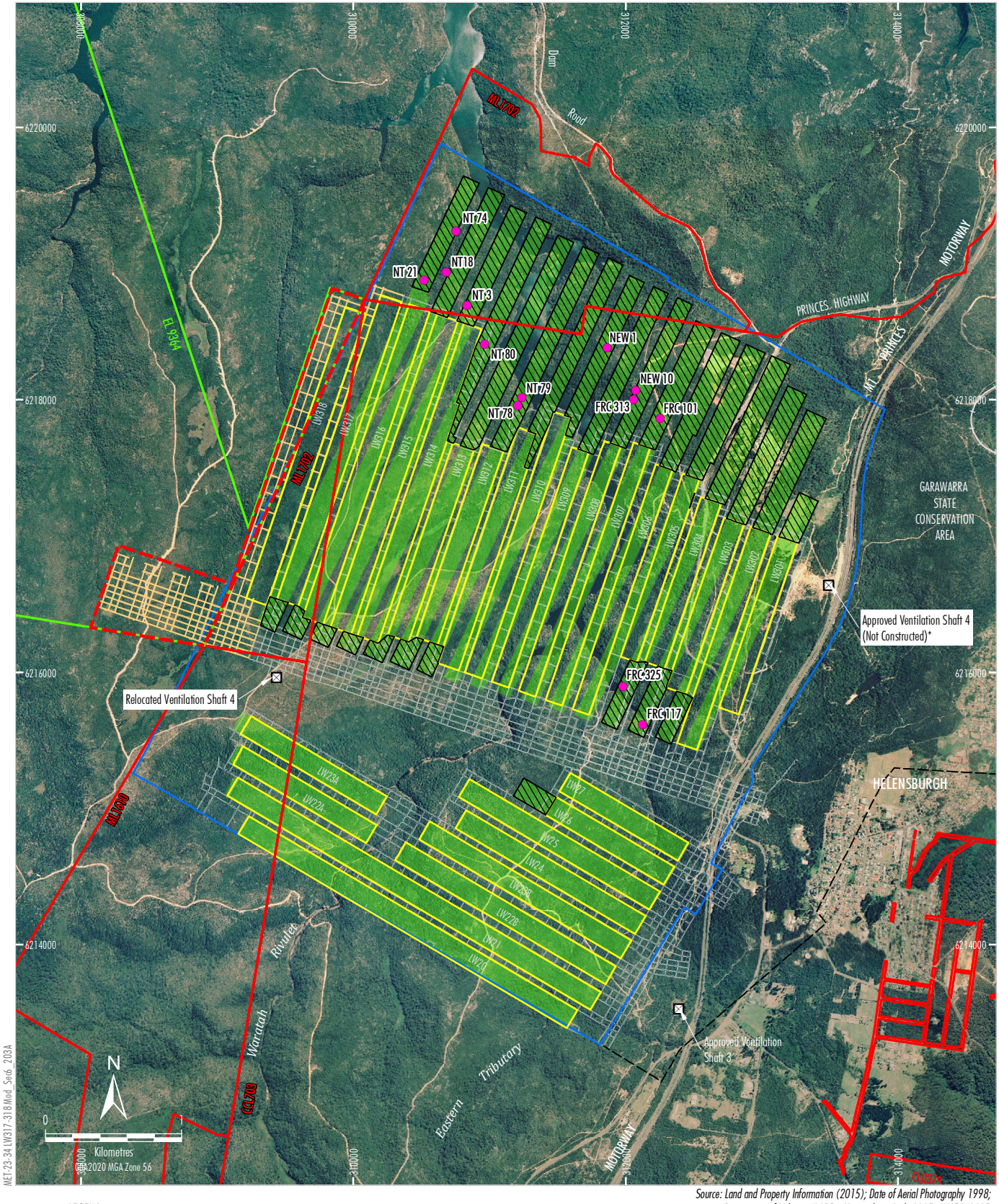
While 25 of the 29 Aboriginal heritage sites identified could be impacted by subsidence due to their location relative to the Modification, impacts are expected to be unlikely (Appendix F). Niche (2025b) concluded that the anticipated risk of impacts to these Aboriginal cultural heritage sites based on the subsidence predictions is low or negligible.

When the predicted impacts associated with the Modification are assessed within the wider context of the known Aboriginal heritage sites across the Metropolitan Coal Mine area and considering the incorporation of appropriate management and mitigation measures, the Modification would not result in a significant increase in cumulative impacts to scientific values of Aboriginal cultural heritage (Appendix F).

Therefore, Niche (2025b) concluded that the Modification would not result in any significant cumulative impact on Aboriginal heritage in the region.

6.9.4 Mitigation and Management Measures

The mitigation, management and monitoring measures detailed below have been developed in consultation with the RAPs, in consideration of the approved management detailed in the approved Metropolitan Coal Heritage Management Plan, cultural and scientific significance of the Aboriginal heritage sites predicted to be impacted, and the cultural significance of the area.



Source: Land and Property Information (2015); Date of Aerial Photography 1998; Department of Industry (2015); Metropolitan Coal (2025); MSEC (2025);

LEGEND

- Mining Lease Boundary
- Exploration Licence (EL 9364)
- Indicative Mining Lease Application Area
- Railway
- Shafts
- Project Underground Mining Area Longwalls 20-27 and 301-317
- Existing Underground Access Drive (Main Drift)
- Approved Metropolitan Coal Mine Longwall Layout
- Proposed First Workings
- Completed and Proposed Secondary Extraction
- Preferred Project Report Longwall Layout
- Approved Longwall Mining Areas to be Relinquished
- Aboriginal Cultural Heritage Site

Note:
The Longwalls 301 to 316 layout shown reflects the layouts in the approved Extraction Plans.
* The approved location of Ventilation Shaft 4 following completion of construction is shown. The construction footprint would be of a similar size to the proposed Relocated Ventilation Shaft 4.

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Aboriginal Cultural Heritage Sites within Approved Longwall Mining Areas to be Relinquished

Figure 6-13

Niche (2025b) has developed recommended management measures for the known Aboriginal cultural heritage sites predicted to be impacted by the Modification.

Metropolitan Coal would implement the management and mitigation measures provided in Appendix F, which were described in the Draft ACHA provided to RAPs for comment and are consistent with the protocols of the approved Metropolitan Coal Mine Heritage Management Plan.

Heritage Management Plan

The Metropolitan Coal Mine Heritage Management Plan would be reviewed and updated to incorporate the Modification (e.g. to include additional sites identified during the survey undertaken for the ACHA) in consultation with the RAPs and any requirements of Project Approval (08_0149), as modified.

Site-specific Management Measures

For Aboriginal cultural heritage sites that are located within the Subject Area, a Subsidence Monitoring Program would be implemented consistent with the approved Metropolitan Coal Mine Heritage Management Plan. The Subsidence Monitoring Program would include the monitoring of subsidence impacts and environmental consequence of Modification related subsidence impacts on Aboriginal cultural heritage sites located within the 35 degree angle of draw and/or 20 mm subsidence contour of Longwalls 317 and 318.

General Measures

In addition, a number of general measures have been formulated in consultation with Aboriginal stakeholders to mitigate impacts, including:

- Ongoing consultation with Aboriginal stakeholders for the life of further operations at the Metropolitan Coal Mine (including the Modification), in accordance with the approved Metropolitan Coal Heritage Management Plan.
- Inclusion of a cultural awareness program as part of inductions aimed at minimising the potential for accidental damage to Aboriginal heritage, consistent with the approved Metropolitan Coal Heritage Management Plan.
- In the event that previously unrecorded sites are discovered at any time during disturbance activities within the Modification area, the protocol for the management of previously unrecorded sites as detailed in Section 10.3 of the approved Metropolitan Coal Heritage Management Plan would be followed.
- In the event that human skeletal remains are discovered at any time during disturbance activities within the Modification area, the protocol for the discovery of human remains (Section 10.4 of the approved Metropolitan Coal Heritage Management Plan) would be followed.

6.10 GREENHOUSE GAS EMISSIONS

A Greenhouse Gas Assessment has been prepared to assess the potential greenhouse gas emissions of the Modification and identify avoidance, mitigation and offset measures and is presented in Appendix G.

The Greenhouse Gas Assessment is supported by a Greenhouse Gas Calculations Report prepared by Todoroski Air Science Pty Ltd (TAS) (2025) (Attachment A of Appendix G).

6.10.1 Key Greenhouse Gas Policies and Guidance

International

The international framework addressing greenhouse gas emissions, and the global response to climate change, commenced with adoption of the United Nations Framework Convention on Climate Change (UNFCCC) in 1992.

Two of the most important progressions of the UNFCCC were at the 3rd Conference of the Parties (in 1997) and the 21st Conference of the Parties (in 2015), with the adoption of the *Kyoto Protocol* and the *Paris Agreement*, respectively.

The *Kyoto Protocol* entered into force in 2005 and imposed limits on the greenhouse gas emissions of developed countries listed in Annex 1 to the UNFCCC, with an initial commitment period of 2008 to 2012 (UNFCCC, 2024).

The UNFCCC requires parties to submit national inventories of greenhouse gas emissions and report on steps taken to implement the *Kyoto Protocol* (UNFCCC, 2024).

Under the *Paris Agreement*, each Party is required to prepare, communicate and maintain Nationally Determined Contributions (NDCs) that would contribute to the long-term goals of the *Paris Agreement* (UNFCCC, 2015). As Australia is a party to the *Paris Agreement*, the potential impacts to greenhouse gas emissions from all Australian sources are collectively managed at a national level, through initiatives implemented by the Commonwealth Government.

Australia's second NDC under the *Paris Agreement* is a greenhouse gas emissions reduction target of 43% below 2005 levels by 2030 (Cth DCCEEW, 2024b).

Australia's third NDC is currently under development and must be announced in 2025.

National

The NGER Act is a national framework for reporting greenhouse gas emissions, energy production and energy consumption by corporations. The greenhouse gas emissions and energy data reported under the NGER Act is used by the Commonwealth Government in compiling Australia's national greenhouse gas emission inventory to meet its reporting obligations under the UNFCCC.

The Safeguard Mechanism (underpinned by the Safeguard Rule) was established through the NGER Act and provides baseline emissions and offset requirements for applicable facilities that emit over 100,000 tonnes of carbon dioxide equivalent (t CO_2-e) per year, such as the Metropolitan Coal Mine.

The Safeguard Mechanism sets a baseline level of emissions for facilities. If a facility exceeds its baseline level, it is generally required to surrender Australian Carbon Credit Units (ACCUs) (or following recent reforms, Safeguard Mechanism Credits) equivalent to the exceedance to the Clean Energy Regulator (CER).

The Safeguard Mechanism Reforms (Cth DCCEEW, 2024a) introduced an amendment to the NGER Act and other legislation to establish the framework to give effect to key elements of the reforms, such as introducing a requirement for facilities to achieve greenhouse abatement via annual downward adjustment of baseline greenhouse gas emission levels.

Safeguard facility standard baselines are determined based on the amount of product each facility produces in a financial year. The reforms apply a decline rate to a facility's baseline so that baselines are reduced predictably and progressively over time (initially 4.9% per annum) on a proportionate trajectory consistent with achieving Australia's emission reduction targets of 43% below 2005 levels by 2030, and net zero by 2050 (Cth DCCEEW, 2024b).

The Safeguard Mechanism decline rates have been determined by the Australian Government with sufficient headroom allowance for higher than expected growth at new and existing Safeguard facilities (Cth DCCEEW, 2024a).

The Metropolitan Coal Mine has triggered the reporting requirements of the NGER Act, and Metropolitan Coal reports on its greenhouse emissions each financial year under its controlling corporation Peabody Australia Holdco Pty Ltd.

New South Wales

The NSW Government released the *NSW Climate Change Policy Framework* (OEH, 2016b), which committed NSW to the long-term objective of achieving net-zero emissions by 2050.

NSW Climate and Energy Action (within NSW DCCEEW) published the Net Zero Plan in March 2020, which describes how, over the next decade, the NSW Government intends to work towards its objective of achieving net-zero emissions by 2050, and an objective to reduce emissions by 70% by 2035, compared to 2005 levels.

The NSW Government has subsequently enshrined in legislation whole-of-government climate action in the Net Zero Future Act. The Net Zero Future Act legislates:

- guiding principles for action to address climate change that consider the impacts, opportunities and need for action in NSW;
- emissions reduction targets for NSW, comprising:
  - 50% reduction on 2005 levels by 2030;
  - 70% reduction on 2005 levels by 2035; and
  - net zero by 2050.
- an objective for NSW to be more resilient to a changing climate; and
- establishing an independent, expert Net Zero Commission (NZC) to monitor, review, report on and advise on progress towards these targets.

Further discussion on greenhouse gas reporting and mitigation measures in NSW are provided in Appendix G.

New South Wales Guide for Large Emitters

In January 2025, EPA released the *NSW Guide for Large Emitters - Guidance on how to prepare a greenhouse gas assessment as part of NSW environmental planning processes* (the Large Emitters Guide), following a period of consultation from May to July 2024 (EPA, 2025).

The Large Emitters Guide requires proponents of major greenhouse gas emitting projects to assess emissions and mitigation opportunities, both in the short-term and long-term. The Large Emitters Guide sets out a description of NSW's emission reduction objectives, types of greenhouse gases, and the EPA's suggested greenhouse gas assessment and mitigation requirements to be addressed in Environmental Impact Statements and Modification Reports. The Large Emitters Guide also includes a description on how measures to avoid or reduce emissions should be identified and evaluated, including setting out the NSW greenhouse gas mitigation hierarchy.

The extraction of an additional 3.2 Mt ROM coal for the Modification would offset a portion of the ROM coal resources within approved Metropolitan Coal Mine underground mining areas that are proposed to be relinquished as a component of the Modification (approximately 14 Mt ROM coal). This would result in a net reduction in ROM coal recovery (i.e. by approximately 10.8 Mt) and associated greenhouse gas emissions when compared to the approved Metropolitan Coal Mine.

As a result, the Modification would not increase greenhouse gas emissions by more than 25,000 t CO_2-e per annum in any year (Section 6.10.3) and is therefore not subject to the assessment requirements of the Large Emitters Guide (Appendix G).

Notwithstanding, the Greenhouse Gas Assessment considers objectives and content provided in the Large Emitters Guide, where relevant (Appendix G).

6.10.2 Greenhouse Gas Emission Scopes

The *Greenhouse Gas Protocol* (GHG Protocol) (World Business Council for Sustainable Development [WBCSD] and World Resources Institute [WRI], 2025) contains methodologies for assessing and calculating greenhouse gas emissions. The GHG Protocol provides standards and guidance for companies and other organisations preparing greenhouse gas emission inventories. It covers the accounting and reporting of the seven greenhouse gases covered by the *Kyoto Protocol*.

Under the GHG Protocol, the establishment of operational boundaries involves identifying emissions associated with an entity's operations, categorising them as direct or indirect emissions, and identifying the scope of accounting and reporting for indirect emissions.

Three "Scopes" of emissions (Scopes 1, 2 and 3) are defined for greenhouse gas accounting and reporting purposes. A summary of the emission scopes is provided below, and further detail is provided in Appendix G.

Key Scope 1, 2 and 3 emissions sources considered for the Modification, and the adopted emissions assessment boundary to the Modification is provided on Figure 6-14.

Scope 1 – Direct Greenhouse Gas Emissions

Direct greenhouse gas emissions are defined as those emissions that occur from sources that are owned or controlled by the entity (WBCSD and WRI, 2025). Direct greenhouse gas emissions are those emissions that are principally the result of the activities undertaken by an entity.

The Modification's key Scope 1 emissions can be categorised into the following sectors using the Intergovernmental Panel on Climate Change Sectors as applied within Australia's national emission projections:

- **Fugitives – Underground Coal Mines** (i.e. fugitive gaseous emissions that are liberated during underground mining – approximately 99.5%).
- **Stationary Energy (Excluding Electricity Generation) – Mining** (i.e. off-road mobile equipment diesel consumption associated with mining operations – approximately 0.5%).

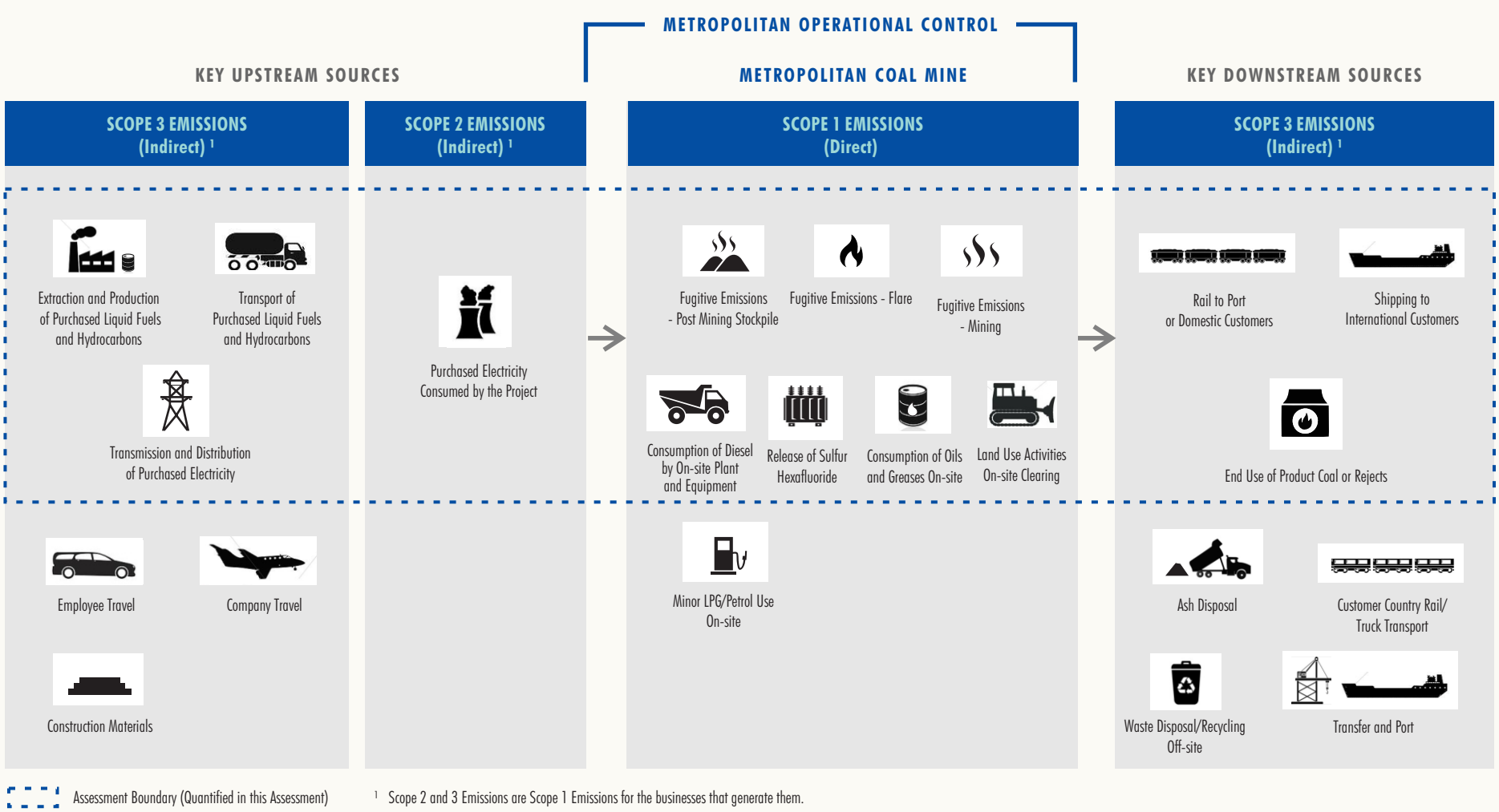
Scope 2 – Electricity Indirect Greenhouse Gas Emissions

Scope 2 emissions are a category of indirect emissions that account for greenhouse gas emissions from the generation of purchased electricity consumed by an entity.

Scope 3 – Other Indirect Greenhouse Gas Emissions

Under the GHG Protocol, Scope 3 is an optional reporting category that allows for the treatment of all other indirect emissions.

Scope 3 emissions are defined as those emissions that are a consequence of the activities of an entity, but which arise from sources not owned or controlled by that entity. Some examples of Scope 3 activities provided in the GHG Protocol are extraction and production of purchased materials, transportation of purchased fuels, and use of sold products and services (WBCSD and WRI, 2025).



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Schematic Diagram
Adopted Greenhouse Gas
Assessment Boundary

Figure 6-14

The Modification's key Scope 3 emissions would be largely categorised as:

- **Category 4 – Upstream Transportation and Distribution**
  (i.e. transport of purchased liquid fuel, hydrocarbons and electricity – approximately 0.04%).
- **Category 9 – Downstream Transportation and Distribution**
  (i.e. transport of coal to third-parties – approximately 2.12%).
- **Category 11 – Use of Sold Products**
  (i.e. end use of product coal – approximately 97.84%).

6.10.3 Quantitative Assessment of Potential Greenhouse Gas Emissions

Greenhouse Gas Estimation Methodology

The Metropolitan Coal Mine's direct and indirect greenhouse gas emissions have been estimated by TAS (2025) for the three primary scenarios described below using published emission factors from the National Greenhouse Accounts (NGA) Factors where possible (Cth DCCEEW, 2024d).

Where NGA Factors were not available (e.g. for rail and ship transport), greenhouse gas emissions have been estimated based on emissions projections for the same activities for similar projects consistent with the Safeguard Rule as well as relevant guidance for land clearing (Transport Authorities Greenhouse Group, 2013).

Emission factors for electricity usage were obtained from *Australia's emissions projections 2024* (Cth DCCEEW, 2024b). These emission factors are based on projections for the decarbonisation of the NSW electricity grid over time.

Greenhouse Gas Scenarios

In order to quantify the incremental greenhouse gas emissions of the Modification, three primary scenarios have been assessed:

- **Current Baseline scenario** – continuation of Metropolitan Coal Mine operations under the current mine plan (financial year 2028 to financial year 2030). Includes indicative abatement achieved by flaring under the current mine plan. This is referred to as the 'business-as-usual' scenario in the Large Emitters Guide.
- **Modification scenario** – continuation of Metropolitan Coal Mine operations under the proposed mine plan, consistent with the Modification proposal (financial year 2028 to financial year 2031). Includes indicative abatement achieved by flaring under the proposed mine plan. This is referred to as the 'modified business' scenario in the Large Emitters Guide.
- **Modification Only scenario** – the incremental increase in emissions due to the Modification when compared against the current mine plan and the proposed mine plan (i.e. the difference in emissions between the Current Baseline scenario and the Modification scenario). This is referred to as the 'Project only' scenario in the Large Emitters Guide.

In addition to the above primary scenarios, emissions for the following two sub-scenarios have been estimated to provide a comparison between the originally approved Metropolitan Coal Mine and proposed Modification for the purposes of addressing the Large Emitters Guide:

- **Approved Baseline scenario** – continuation of the Metropolitan Coal Mine as approved under Project Approval (08_0149).
- **Modification Only Versus Approved Baseline scenario** – the incremental decrease in emissions due to the Modification when compared against the approved mine plan and the proposed mine plan (i.e. the difference in emissions between the Approved Baseline scenario and the Modification scenario).

It should be noted that the Modification Only Versus Approved Baseline scenario shows the Modification is expected to result in a net decrease of approximately 1.1 Million tonnes of carbon dioxide equivalent (Mt CO_2-e) and does not exceed the 25,000 t CO_2-e Guide threshold in any year.

Further discussion on the various greenhouse gas scenarios modelled is provided in Appendix G.

Modification Greenhouse Gas Emissions

Modification Scenario

The Modification scenario greenhouse gas emissions estimated by TAS (2025) are summarised in Table 6-12.

Table 6-12
Summary of Greenhouse Gas Emissions Estimates for the Modification

Component	Estimated Greenhouse Emissions (Mt CO_2-e)		
	Scope 1	Scope 2	Scope 3
Annual Average*	0.81	0.012	5.36
Total*	3.6	0.049	21.5

Source: TAS (2025).

* The annual average values exclude the decommissioning phase, but the total values include the decommissioning phase.

The estimated Scope 1 and 2 greenhouse gas emissions intensities for the Modification are estimated to be approximately 0.428 and 0.006 t CO_2-e per tonne of ROM coal, respectively (Appendix G).

Modification Only Scenario

The greenhouse gas emissions estimated by TAS (2025) for the Modification Only scenario are summarised in Table 6-13.

Table 6-13
Summary of Greenhouse Gas Emissions Estimates for the Modification Only Scenario

Component	Estimated Greenhouse Emissions (Mt CO_2-e)		
	Scope 1	Scope 2	Scope 3
Annual Average*	0.39	0.001	2.22
Total	1.8	0.003	8.9

Source: TAS (2025).

* The annual average values exclude the decommissioning phase, but the total values include the decommissioning phase.

For the purpose of assessing greenhouse gas impacts associated with the Modification, the Modification Only scenario is used for further analysis, and is herein referred to as the Modification.

6.10.4 Environmental Review

The Modification would result in a net reduction in ROM coal recovery of approximately 10.8 Mt and decrease Scope 1 greenhouse gas emissions of approximately 1.1 Mt CO_2-e when compared to the originally approved Metropolitan Coal Mine (Appendix G).

If the Modification is approved and proceeds, the Modification's contribution to global climate change effects would be proportional to its contribution to global greenhouse gas emissions. Greenhouse gases directly generated as a result of the Modification (i.e. Scope 1 emissions) and indirect emissions associated with the on-site use of electricity (i.e. Scope 2 emissions) have together been estimated at approximately 0.39 Mt CO_2-e per year during operations (Table 6-13).

To gain an understanding of the Modification in the context of global greenhouse gas emissions, the Modification's greenhouse gas emissions can be compared to total anthropogenic greenhouse gas emissions.

The Modification's annual average Scope 1 and 2 greenhouse gas emissions would contribute approximately 0.0007% to total global anthropogenic greenhouse gas emissions (excluding land use change), which were approximately 53,100 Mt CO_2-e in 2023 (United Nations Environment Programme, 2023) (Appendix G).

The Modification's contribution to Australian emissions would also be relatively small, as estimated annual average Scope 1 and 2 emissions from the Metropolitan Coal Mine during the life of the Modification represent approximately 0.35% of the estimated total greenhouse gas emissions in NSW from 2022 (111 Mt CO_2-e) and approximately 0.09% of Australia's annual greenhouse gas emissions from 2023 (440.6 Mt CO_2-e) (Appendix G).

Emission Reduction Goals

The Greenhouse Gas Assessment provides an extensive analysis of the Modification's alignment with national and State emission reduction targets (Appendix G).

In summary, the current Safeguard Mechanism emission decline rates (i.e. 4.9% per annum) are more aggressive than the average rate of emissions decline that is required between 2005 and 2030 to achieve the NSW interim 2030 target of 50% below 2005 levels (i.e. 2% per annum).

As the Modification does not seek an extension of the approved mine life and longwall mining would cease prior to 2035, ongoing compliance with the Safeguard Mechanism will result in the Modification making a meaningful contribution to NSW emission reduction targets (Appendix G).

Further details are provided in Appendix G.

6.10.5 Mitigation Measures

Existing Mitigation Measures

Metropolitan Coal currently mitigates greenhouse gas emissions from the Metropolitan Coal Mine in accordance with the Metropolitan Coal Mine Air Quality and Greenhouse Gas Management Plan, which would continue for the Modification.

The current management and mitigation measures include:

- regular maintenance of plant and equipment to minimise fuel consumption and associated emissions; and
- continuing to select plant and equipment that are energy efficient (e.g. electric pumps, fans, compressors or replace all lighting with energy saving light-emitting diodes).

Metropolitan Coal has invested in electric vehicle solutions, such as the DRIFTEX, to replace conventional diesel-powered vehicle emissions with clean alternatives. The DRIFTEX has been developed to reduce carbon emissions, noise and particulate matter, significantly improving worker safety and environmental performance by replacing diesel fuel.

Metropolitan Coal plans to flare pre-drainage gas from the Bulli Coal Seam using a flare system that is scheduled for construction under the existing Project Approval (08_0149) in 2026.

Additional Greenhouse Gas Management and Mitigation Measures

As discussed above, Metropolitan Coal plans to flare pre-drainage gas from the Bulli Coal Seam using a flare system that is scheduled for construction under the existing Project Approval (08_0149) in 2026.

As part of the methane flaring system, gas would be conveyed to the methane flare unit via a surface-to-seam borehole located adjacent to Ventilation Shaft No. 3.

Although this flare system is approved and not part of the Modification, the proposed flare system's construction will support the Modification by reducing greenhouse gas emissions, facilitating the sustainable extraction of additional coal reserves. Further, in the absence of the Modification, Metropolitan Coal would be unlikely to make significant capital investments into greenhouse gas measures given the limited remaining mine life.

As a result of the proposed flaring of the pre-drainage gas, a reduction in Scope 1 greenhouse gas emissions of approximately 17%, or approximately 700,000 t CO_2-e is anticipated for the Modification (Appendix G).

Metropolitan Coal Mine Safeguard Mechanism Baseline

The Modification would be incorporated into the Metropolitan Coal Mine and reported as a single facility under the NGER Act with one baseline under the Safeguard Mechanism.

The Safeguard Mechanism baseline value may change over time in accordance with the provisions of the NGER Act and the applicable rules and regulations. Metropolitan Coal would continue to fulfill its obligations under the NGER Act and the Safeguard Mechanism by retiring ACCUs or Safeguard Mechanism Credits for any exceedances of the baseline.

Adaptive Management

Metropolitan Coal anticipates that the existing Air Quality and Greenhouse Gas Management Plan will either be updated or replaced with a new Climate Change Mitigation and Adaptation Plan in consultation with the EPA.

Should the Modification be approved, Metropolitan Coal anticipates that Project Approval (08_0149) as modified would be updated to reflect contemporary EPA guidance on the content of a Climate Change Mitigation and Adaptation Plan, including:

- Measures to avoid and reduce Modification greenhouse gas emissions applying the EPA's mitigation hierarchy (avoid, reduce, substitute and offset), inclusive of:
  - A description of measures that would be implemented to reduce site Scope 1 and Scope 2 emissions, including:
    - whether the proposed measures represent best-practice;
    - the likely effectiveness of the mitigation measures; and
    - benchmarking of predicted emissions intensity per unit production to other comparable project and the Safeguard Mechanism default intensity.
- Measurable greenhouse gas emission goals.
- Detailed energy efficiency plans.

- Commitment to monitoring, reporting and reviewing performance of greenhouse gas abatement measures and emissions.
- Expected impacts of the Safeguard Mechanism Baseline on year-to-year emissions.
- Comparison of emissions to NSW Government's legislated emissions reduction targets.
- Strategies to offset excess greenhouse gas emissions.
- Description of the monitoring and reporting on greenhouse gas emissions performance, including performance benchmarking and the NGER Act's reporting obligations.
- A timetable for periodic review of the Climate Change Mitigation and Adaption Plan and associated proposed mitigation, reporting and the overarching greenhouse gas management goals of Metropolitan Coal.

6.11 LAND USE AND LAND CONTAMINATION

A Land Contamination Assessment has been prepared by JBS&G Australia Pty Ltd (JBS&G) in the form of a Stage 1 Preliminary Site Investigation Land Contamination Assessment and is presented in Appendix H.

6.11.1 Methodology

The Land Contamination Assessment was prepared in accordance with the *State Environmental Planning Policy (Resilience and Hazards) 2021* and *Consultants reporting on contaminated land – Contaminated Land Guidelines* (EPA, 2020).

The Land Contamination Assessment included a desktop review and site inspection of the Investigation Area which encompasses the Subsidence Extent, relocated Ventilation Shaft 4 surface disturbance extent and indicative MLA area.

6.11.2 Existing Environment

Landforms and Topography

Local topography in the Illawarra region is characterised by very low rolling hills along exposed coastal headlands. The region is influenced by prominent natural features such as the Illawarra Escarpment.

Elevation in the Investigation Area range from approximately 230 m AHD to 295 m AHD with slope gradients less than 20%.

Soils

Geology of the Investigation Area is part of the Hawkesbury Hydrogeological Landscape. Lithologies include Hawkesbury Sandstone, Narrabeen Group, and Wianamatta Group (Appendix H).

Regional soil landscape units mapped in the vicinity of the Investigation Area include Yellow Earths on mid slopes, Gleyed Podzolic Soils on lower slopes, and Acid Peats in areas of poor drainage. Other soils include small portions of Hawkesbury soils in areas of steeper slopes and occasionally Somersby soils on ridge crests (Appendix H)

Land Use

The Metropolitan Coal Mine underground mining area and surrounds occurs within the Woronora Special Area, which is predominantly undeveloped and covered by native vegetation. Public access to the Woronora Special Area is restricted and managed by WaterNSW.

The Woronora Special Area drains to the Woronora Reservoir. The Woronora Reservoir supplies water to residents in the areas south of the Georges River including Sutherland, Helensburgh, Stanwell Park, Lucas Heights and Bundeena.

Strategic Agricultural Land

None of the areas associated with the Modification are currently used for agriculture.

The majority of land within the Modification area is not available for agricultural use as it is located within the Woronora Special Area and is reserved land for the protection of the Sydney Drinking Water Catchment.

A Site Verification Certificate was issued by the Planning Secretary in July 2024 verifying the mining lease application area is not located on Biophysical Strategic Agricultural Land (Attachment 6).

As the Modification would not result in any impact to existing agriculture, an Agricultural Impact Statement was not required for the Modification.

6.11.3 Environmental Review

Soil and Erosion Potential

The Investigation Area is subject to seasonally high water tables, and several of the local soil landscapes are highly permeable and erosion-prone (e.g. Hawkesbury) (Appendix H).

Potential impacts of the Modification on soils would primarily be associated with the construction of the relocated Ventilation Shaft 4. The potential impacts of this would relate primarily to:

- disturbance of *in-situ* soil resources (e.g. during construction);
- alteration of soil structure beneath infrastructure items, hardstand areas and water management structures;
- possible soil contamination resulting from spillage of fuels, lubricants and other chemicals; and
- increased erosion and sediment movement due to exposure of soils during construction, exploration or stream remediation activities.

The potential impacts of Modification-related subsidence on slope stability and surface cracking are assessed in Section 6.3 and Appendix A. The potential impact on streams and swamps (e.g. scour/erosion potential) is described in Sections 6.5 and 6.6.

ATC Williams (2025) concludes that the Modification would result in a neutral effect for water quality (Appendix C).

Water management systems to control sediment runoff are described in Appendix C.

Land Contamination Potential

The Land Contamination Assessment included a desktop review of previous land use to identify past and/or present potentially contaminating activities and areas and a site inspection to identify potentially contaminated areas within the Investigation Area (Appendix H).

Potential sources of land contamination include (Appendix H):

- metals;
- petroleum hydrocarbons (as total recoverable hydrocarbons/benzene, toluene, ethylbenzene and xylenes and polycyclic aromatic hydrocarbons);
- organochlorine pesticides;
- polychlorinated biphenyl; and
- asbestos.

Potential sources of contamination risks for the Modification include (Appendix H):

- fill material used in fire trail roads;
- exploratory and groundwater monitoring bore drilling; and
- unauthorised site access.

The site history review and inspection did not identify any specific land contamination that would preclude the development of the Modification. Any potential contamination is not significant, and not likely to migrate off-site (Appendix H).

JBS&G (2025) concludes there is a low potential for gross or widespread land contamination within the Investigation Area as a result of historical and/or current site uses.

No remediation measures are required to make the Investigation Area suitable for the purposes of the proposed land use change to underground mining (Appendix H).

Land Use

The Modification is located entirely within the Woronora Special Area, immediately adjacent to the approved Metropolitan Coal Mine (Section 2.4).

Potential impacts on soils and land capability for the Modification would be associated with subsidence impacts (i.e. surface cracking, ponding and changes to drainage line gradients) and surface disturbance associated with the relocated Ventilation Shaft 4.

The Modification adopts a precautionary approach by incorporating conservative longwall geometry and a setback from Swamp 106 to minimise subsidence effects on watercourses and upland swamps (Section 3.2).

Using this geometry, there would be no surface to seam cracking at the Metropolitan Coal Mine including the Modification (which could result in loss of surface water to the underground workings) (Section 6.3).

For the Modification underground mining area, the maximum predicted vertical subsidence, tilt and curvatures are similar to those predicted for the approved Metropolitan Coal Mine (Appendix A). Therefore, any impacts to land resources in the Modification underground mining area would be similar to those for the approved Metropolitan Coal Mine.

The relocated Ventilation Shaft 4 area would be constructed immediately south of Longwall 316 and requires a maximum development area during construction of approximately 3.8 ha. Upon completion of construction, the development area during construction for the relocated Ventilation Shaft 4 (excluding the shaft itself) would be rehabilitated using native species consistent with the surrounding vegetation. The area not subject to rehabilitation would occupy less than 0.1 hectares.

At the completion of mining, the ventilation shaft would be removed and decommissioned.

As discussed in Section 6.5, the Woronora Special Area is managed primarily for the supply of drinking water to Helensburgh, Engadine and Lucas Heights. ATC Williams (2025) concludes that the subsidence performance measures "negligible reduction to the quality or quantity of water resources reaching the Woronora Reservoir" would continue to be met (Appendix C). The Modification would therefore not impact the continued use of the land for water supply purposes. Mining activities co-exist with catchment management in this area, and the Modification is not expected to change this existing land use compatibility.

6.11.4 Mitigation and Management Measures

Soil and Erosion Potential

Potential subsidence impacts on land would be managed in accordance with an approved Land Management Plan as part of the Extraction Plan process in accordance with Condition 6, Schedule 3 of Project Approval (08_0149). These management plans will likely be similar to those prepared for Longwalls 311 to 316.

Erosion and sediment control strategies for the Modification would be based on similar practices currently undertaken as part of the existing Erosion and Sediment Control Plan (part of the existing Water Management Plan) for the Metropolitan Coal Mine, which would be reviewed and updated for the Modification.

Specific erosion and sediment control works and additional minor controls would be developed in consultation with WaterNSW as required over the Modification life within the Woronora Special Area.

Land Contamination Potential

Measures to reduce the potential for the contamination of land for the Modification would be based on accepted practices currently undertaken at the Metropolitan Coal Mine and would be further documented in the Construction Management Plan which would be updated to incorporate the Modification.

Additional mitigation and management measures would be implemented during activities such as the construction of Ventilation Shaft 4 to reduce the potential for land contamination in the Woronora Special Areas in consultation with WaterNSW, where appropriate.

Land Use

Surface works in the Woronora Special Area would be undertaken in consultation with WaterNSW and in accordance with existing Metropolitan Coal Mine procedures, to avoid significant adverse impacts on existing land use in the Woronora Special Area. Access to the Woronora Special Area would also continue to be undertaken in accordance with WaterNSW requirements.

Management and adaptive management measures with respect to potential impacts of the Modification on surface water, aquatic ecology, upland swamps and terrestrial flora and terrestrial fauna within the Modification area are provided in Sections 6.5 to 6.8.

6.12 OTHER ENVIRONMENTAL ASPECTS

6.12.1 Non-Aboriginal Heritage

The Modification is located entirely within the Woronora Special Area, immediately adjacent to the approved Metropolitan Coal Mine (Section 2.4).

A Non-Aboriginal Heritage Assessment was prepared for the Metropolitan Coal Project EA (Heritage Management Consultants Pty Ltd, 2008). No non-Aboriginal heritage sites were identified within the Modification area.

In consideration of the outcomes of the Non-Aboriginal Heritage Assessment (Heritage Management Consultants Pty Ltd, 2008), as well as searches of relevant heritage registers, no known non-Aboriginal heritage sites have been identified within the Modification area.

The Metropolitan Coal Mine operates in accordance with an approved Heritage Management Plan. Metropolitan Coal would continue to implement the Heritage Management Plan at the Metropolitan Coal Mine incorporating the Modification.

6.12.2 Visual

Existing Visual Environment

Potential impacts on the visual character of the Modification underground mining area include the construction of the relocated Ventilation Shaft 4 (and associated electrical infrastructure), ongoing minor surface works (e.g. exploration and environmental monitoring) and the aesthetic effects of subsidence related impacts on surface features (e.g. streams and cliff lines) located above the Modification underground mining area.

Access to the Woronora Special Area is restricted and views are restricted to only publicly accessible areas adjacent to Woronora Special Area.

Metropolitan Coal Mine Infrastructure

Given the nature of underground mining and the intervening topography and existing vegetation, the Metropolitan Coal Mine is minimally visible from the surrounding areas.

The Modification would not change the existing Surface Facilities Area or its associated infrastructure. Any potential lighting impacts associated with the Modification would be similar to those previously assessed for the approved Metropolitan Coal Mine.

As described in Section 6.3, the type and magnitude of predicted incremental subsidence impacts for the Modification would be similar to or less than those approved for the Metropolitan Coal Mine and would not be visible to the public due to access restriction on to the Woronora Special Area.

Ventilation Shaft 4

The only change to surface facilities due to the Modification would be the relocation of the already approved Ventilation Shaft 4. Originally located approximately 100 m from the M1 Princes Motorway, Ventilation Shaft 4 would now be positioned approximately 3 km from the highway, south of Longwall 316.

The new location would not be visible from any public vantage points, including nearby roads.

Additionally, as the relocated Ventilation Shaft 4 would operate as a downcast ventilation system, previously approved upcast infrastructure, including fans, power transformers, sheds and cooling towers would no longer be required, further minimising the potential visual footprint.

At the completion of mining, the ventilation shaft would be removed, decommissioned and rehabilitated, resulting in a negligible visual impact.

Conclusion

As the Modification is predicted to have negligible visual amenity impact, there would be no material change to the approved visual landscape impacts compared to the approved Metropolitan Coal Mine and no specific management or mitigation measures are considered to be warranted.

6.12.3 Road Transport

All operational traffic associated with Metropolitan Coal Mine would continue to use the existing access located off Parkes Street in Helensburgh. The Modification would not increase the current operational workforce and therefore would have no impact on any aspect of operational traffic.

The principal potential impact of the Modification on the road transport environment would be the relocation of the approved (but not constructed) Ventilation Shaft 4.

The approved location of Ventilation Shift 4 is to the west of Princes Motorway, and east of Princes Highway.

The Modification proposes the relocation of Ventilation Shaft 4 to the west of Princes Highway, adjacent to Fire Trail 9E on the western side of Waratah Rivulet. The relocation would require construction traffic to use a different entry point into the Woronora Special Area compared with that for the approved location of Ventilation Shaft 4.

Vehicular access to the relocated Ventilation Shaft 4 would be via Princes Highway and Darkes Forest Road.

Construction of the relocated Ventilation Shaft 4 would commence within 12 months of determination of the Modification and occur for a period of up to approximately 18 months.

Consistent with Ventilation Shaft 4 as currently approved, construction activities for the relocated Ventilation Shaft 4 would be conducted up to 24 hours per day, and up to seven days per week, however the majority of activities would occur during daytime hours between Monday to Saturday. Heavy vehicle movements to and from the construction site would be restricted to daytime hours (i.e. 7.00 am to 6.00 pm).

The number of vehicle trips generated during the construction period are expected to be well within the day-to-day traffic volumes on the Princes Highway and Darkes Forest Road. The existing intersection between Darkes Forest Road and Princess Highway incorporates widened sealed shoulder to maintain appropriate traffic safety and operational conditions for these roads.

As a contingency measure, Metropolitan Coal may need to temporarily transport coal rejects by road to urban developments in the Wollongong and Shellharbour LGAs for beneficial reuse in accordance with an approved Traffic Management Plan. It is expected that this contingency trucking would only be required for a period of up to six months (Section 3.7). The temporary trucking would be generally consistent with that previously undertaken at the Metropolitan Coal Mine under Project Approval (08_0149) and in accordance with the Traffic Management Plan.

The proposed contingency trucking is not expected to result in any significant traffic to the performance and safety of the road network given it would occur for temporary periods (up to six months) and trucking volume generally consistent with those previously undertaken.

The Modification would not result in any additional road transport impacts than the existing and approved Metropolitan Coal Mine. On this basis, no specific management or mitigation measures are considered to be warranted.

The existing Traffic Management Plan would be updated to incorporate the Modification.

6.12.4 Socio-Economic

The Modification would allow for the recovery of an additional 3.2 Mt of ROM coal.

This coal would be mined within the approved Metropolitan Coal Mine life and mining and exploration tenements and would predominately use the existing and approved surface infrastructure.

The use of existing/approved Metropolitan Coal Mine infrastructure for the Modification maximises the potential benefits of previous investments into the Metropolitan Coal Mine.

Net Benefits for NSW

The Modification has been proposed as a logical extension of the existing Metropolitan Coal Mine to maximise the recovery of coal resources within the currently approved mine life. The Modification would enable the recovery of an additional 3.2 Mt of ROM coal from Longwall 317 and 318, contributing approximately $49M in additional royalties to the state of NSW over the mine's life in real terms.

The Modification would also continue the benefits for the region and the State in terms of employment opportunities (direct and indirect), income and value added for a further two years.

As far as practicable, Metropolitan Coal Mine employs local contractors, supply companies and services during the course of its operations. This would continue under the Modification for a further two years.

Metropolitan Coal has made a number of significant donations to support the community of Helensburgh and the greater Illawarra region throughout the mine life. Community donations and sponsorship during 2024 amounted to over $190,000. Metropolitan Coal plans to continue support community initiatives throughout the life of the Metropolitan Coal Mine including the Modification (i.e. a two year increase).

Employment and Income

The existing Metropolitan Coal Mine currently employs an average operational workforce of approximately 400 employees and contractors. Approximately 90% if the Metropolitan Coal Mine workforce reside in in the Wollongong, Shellharbour and Sutherland Shire LGAs. If approved, the Modification would extend the employment of this workforce for an additional two years.

6.12.5 Amenity

The existing Metropolitan Coal Mine support facilities, access roads and utilities would continue to be used for the Modification within the existing approved Surface Facilities Area without the need for additional surface infrastructure. Accordingly, there would be no change to the extent of surface disturbance or amenity impacts to private receivers.

The only change to surface facilities due to the Modification would be the relocation of the already approved Ventilation Shaft 4 (Section 3.4). This relocated shaft would operate as a downcast ventilation shaft, resulting in reduced surface infrastructure, no air emissions, and lower noise levels compared to the originally approved shaft.

The Modification would not change the operational hours, equipment and mining fleet, or processing, management of reject material and overall mine life of the approved Metropolitan Coal Mine.

The Modification would not result in any increase to the approved ROM coal production limits or mine life. However, due to the Modification underground mine layout, the total volume of coal recovered is expected to be lower than previously assessed in the PPR, which is anticipated to result in comparatively lower environmental and operational impacts.

No changes to operational road or rail movements are proposed as part of the Modification, and there would be no associated increase in transport-related noise. Minor temporary noise impacts may occur during construction activities, however these would be short-term and managed in accordance with existing controls.

In consideration of the above, there would be no change in noise and air quality impacts due to the Modification compared to the existing and approved Metropolitan Coal Mine.

Noise and air quality management at the Metropolitan Coal Mine surface facilities would continue to be conducted in accordance with the approved Noise Management Plan and Air Quality and Greenhouse Gas Management Plan.

6.12.6 Hazard and Risk

A Preliminary Hazard Analysis was conducted in 2008 to assess the potential hazards and risk associated with the approved Metropolitan Coal Mine (Helensburgh Coal Pty Ltd, 2008b).

It is considered that the Modification would not change the existing potential risk areas identified in the Environmental Risk Analysis conducted for the approved Metropolitan Coal Mine, as the proposed activities associated with the Modification (e.g. underground mining operations and associated surface and support activities) are consistent with the activities assessed in the Environmental Risk Analysis.

Notwithstanding, the Pollution Incident Response Management Plan would be reviewed and, where necessary updated to include the construction and management of Ventilation Shaft 4 and manage any associated environmental risks.

7 JUSTIFICATION OF THE MODIFICATION

This section provides a justification of the Modification and conclusion for the Modification Report.

As part of the justification of the Modification, consideration has been given to:

- strategic planning context relevant to the Modification (Section 7.1);
- the stakeholder engagement undertaken for the Modification (Section 7.2);
- key environmental assessment outcomes including the potential impacts of the Modification (Section 7.3);
- the relevant planning and policy objectives (Section 7.4); and
- the benefits of the Modification and the Metropolitan Coal Mine (Section 7.5).

7.1 STRATEGIC CONTEXT

7.1.1 Regional Context

The Metropolitan Coal Mine has played an important role in the Illawarra region from a social and economic perspective, through its ongoing production of metallurgical coal product for BlueScope's Port Kembla Steelworks and sale of product to international market via Port Kembla.

Approximately 90% of the 400-strong Metropolitan Coal Mine workforce reside in the Wollongong, Shellharbour and Sutherland Shire LGAs. Further, local businesses already provide goods and services to Metropolitan Coal, with the company spending approximately $217M with local suppliers and business in financial year 2024. Metropolitan Coal had a total direct expenditure of approximately $324M in the NSW economy in financial year 2024.

The Modification would continue to contribute to the ongoing viability of existing suppliers and customers of the Metropolitan Coal Mine, including BlueScope's Port Kembla Steelworks and the Port Kembla Coal Terminal.

Economic Significance of the Steelmaking Industry

Steel remains a fundamental material for a variety of construction and manufacturing industries, and domestic steelmaking is a strategically valuable asset for Australia's economic security and prosperity.

The importance of local (i.e. Australian) steelmaking is described in the *Parliamentary Report Australia's Steel Industry: Forging Ahead* (Commonwealth of Australia, 2017), which outlines the safety benefits and economic significance of the steel industry to the Australian economy and regional economies where steelmaking facilities are located.

BlueScope is a major contributor to the Illawarra Region, NSW and Australia, employing approximately 3,000 people and supporting approximately 10,000 jobs in the Illawarra area. As a consequence, BlueScope's proposed Port Kembla Steelworks Blast Furnace Reline Project gained Critical State Significant Infrastructure status.

The BlueScope Steelworks at Port Kembla is the largest steel production facility in Australia, and one of only two primary iron and steelmaking facilities in Australia.

Use of Coal in Steel Production

Metallurgical coal is a raw material that is essential for the manufacture of "virgin iron" and steel (also known as "primary steelmaking" or "integrated steelmaking"). The other key raw material is iron ore.

While BlueScope's Port Kembla Steelworks produces a portion of its steel using recycled scrap steel as a feed stock, there is not sufficient supply of scrap steel to meet demand, and therefore the steelmaking process continues to require the use of metallurgical coal and iron ore.

Metallurgical coal is used as a reducing agent in the steelmaking process. The carbon in the metallurgical coal is used to convert iron ore to molten iron in a blast furnace.

Research into the use of alternative reducing agents in the blast furnace method, such as hydrogen, is being undertaken. However, there is currently no economically viable, commercial-scale alternative to the use of metallurgical coal in making steel using the blast furnace method, which is employed at BlueScope's Port Kembla Steelworks.

Ongoing access to a consistent and local supply of metallurgical coal, which would be produced by the Metropolitan Coal Mine, has been recognised as a key factor in the ongoing economic viability of BlueScope's Port Kembla Steelworks.

Importance of Local Metallurgical Coal Supply

The proximity of the Southern Coalfield metallurgical coal mines is a major factor in BlueScope's ability to make steel economically. The Metropolitan Coal Mine has supplied metallurgical coal to the steelworks for over 25 years.

BlueScope blends coal from its supply base to produce a coke product for use in its operation and for export, with current operations at BlueScope designed to primarily utilise coal produced in the Illawarra Region, supplemented by imported coal and iron ore.

Local supply provides significant benefits to BlueScope. These benefits relate to, but are not limited to, coal quality, delivered cost, supply chain certainty, just-in-time supply with associated working capital benefits, and the maintenance of a competitive supply base, whilst minimising their carbon footprint associated with raw material freight.

For NSW, these benefits include royalties from local production and economic benefits (both generated by Metropolitan Coal but also related businesses such as BlueScope).

The Port Kembla Steelworks Blast Furnace Reline Project, currently under construction, is expected to extend the life of its blast furnace operations by approximately 20 years. BlueScope is continuing with current blast furnace technology given the prevailing view that 'green steel' is still under development.

This creates ongoing metallurgical coal demand for the life of the blast furnace (i.e. well beyond the Modification life).

The continued supply of coal from the Metropolitan Coal Mine to BlueScope's Port Kembla Steelworks, which would be facilitated by approval of the Modification, would contribute to its ongoing economic viability and associated socio-economic benefits.

7.1.2 Project Context

As mining operations have progressed at the Metropolitan Coal Mine, ongoing exploration activities have identified geological and geotechnical constraints which affect the available coal resource. To maintain safe and efficient operations, a reduced underground mine layout has been implemented. In addition, longwalls have been shortened to reduce subsidence effects on watercourses. This has resulted in a reduction in ROM coal extraction compared to the approved underground mine layout.

The reduced underground mine layout incorporates shortened starting (i.e. northern) and finishing (i.e. southern) ends of Longwalls 301-316 and shortened starting position of Longwall 26 compared to the approved underground mine layout. Due to the reduction in the underground mining area, longwall mining would finish in 2029, in absence of the Modification. The Modification proposes to continue mining for a further two years.

The Modification would provide for the continuation of employment of the existing Metropolitan Coal workforce of approximately 400 personnel for a further two years.

The mining of an additional 3.2 Mt of ROM coal would generate approximately $49M in royalties to NSW that would otherwise not be realised. As such, the Modification would continue the benefits for the region and the State in terms of employment opportunities (direct and indirect), income and value added for a further two years.

If the Modification does not proceed:

- the Metropolitan Coal Mine is most likely to close after the completion of Longwall 316 in 2029, leading to significant job losses at the Metropolitan Coal Mine and likely flow on effects to the local region and the Southern Coalfield economic ecosystem including Port Kembla Coal Terminal and BlueScope's Port Kembla Steelworks;
- the approved Longwall 317 cannot be economically mined in its current arrangement (Figure 1-2) and therefore would likely be sterilised; and
- high quality metallurgical coal and thermal coal in the Modification area and EL 9364 would likely be sterilised as there is no other viable opportunity to mine this resource.

7.1.3 Woronora Special Area

The Modification would represent the continuation of mining in the Woronora Special Area. Mining within the Woronora Special Area has occurred for more than 100 years.

As noted by the Independent Expert Panel for Mining in the Catchment (2019), there has been no observed material impacts to drinking water supplies due to mining in these catchments:

- ***Reservoir leakage rates –*** *there is no measured evidence of significant long-term leakage from reservoirs due to mining in the Special Areas.*
- *…*
- ***Watercourse bed leakage (at catchment scale) –*** *from material presented to the Panel, there remains no strong evidence that cracking of watercourse beds leads to significant losses of water at catchment scales relevant for water supplies.*

The Metropolitan Coal Mine Project Approval (08_0149) requires that there is no greater than negligible reduction in the quality or quantity of Woronora Reservoir. The Metropolitan Coal Mine, incorporating the Modification would continue to comply with this requirement.

It is also noted that, given the access restrictions to the Woronora Special Area, underground mining is the only major development that can coexist in the catchment areas given its limited surface impacts.

The coexistence between underground mining and the provision of drinking water supplies in the Woronora Special Area is expected to continue should the Modification be approved.

7.1.4 Suitability of the Site

The Port Kembla Steelworks was originally developed due to its proximity to the coal mines of the Southern Coalfield.

Metropolitan Coal has designed the Metropolitan Coal Mine to target areas that would predominantly yield the highest quality metallurgical coal resource (i.e. rather than thermal or Pulverised Coal Injection product).

The Modification is an extension of the existing Metropolitan Coal Mine, that would develop the Metropolitan Coal Mine adjacent to the existing approved underground mining areas with no increase in the duration of existing impacts of the approved Metropolitan Coal Mine.

The Modification would also include the ongoing use of existing Metropolitan Coal Mine surface facilities located at the site, which maximises the potential benefits of previous Metropolitan Coal infrastructure investment and minimises potential new surface disturbance areas in comparison to a greenfield mine proposal.

Mining operations and nearby land uses, such as state conservation areas and suburban areas, have historically co-existed and this would continue for the Modification (e.g. no evidence of significant loss of water, or changes in water quality from mining, or concern to water supply). The Modification would also be developed in a manner that is responsible and considers the benefits and consequences of the development for other land uses, including coexistence with the Woronora Special Area.

Therefore, the site is considered suitable for the Modification, as the Modification would not adversely impact on, or be inconsistent with, adjoining existing or future land uses.

7.2 STAKEHOLDER ENGAGEMENT OVERVIEW

Metropolitan Coal has consulted with a number of stakeholders during the Modification process, including:

- key State and Commonwealth Government agencies;
- local councils;
- the local community; and
- Aboriginal stakeholders.

Key comments and issues raised during consultation have been considered and addressed in the preparation of this Modification Report where relevant.

Consultation undertaken and feedback received for the Metropolitan Coal Project EA and the Extraction Plans and component management plans prepared for Longwalls 20-22, 23-27, 301-303, 304, 305-307, 308-310 and 311-316, including advice received from the IEAPM, has informed the development of the Modification.

7.3 CONSOLIDATED SUMMARY OF ASSESSMENT OUTCOMES

Metropolitan Coal has undertaken a review of the potential environmental impacts of the Modification.

Key potential environmental impacts are related to (Section 6):

- the reconfiguration of Longwall 317 and the addition of Longwall 318 and the associated subsidence impacts and consequences; and
- the relocation of Ventilation Shaft 4 and the associated surface disturbance.

The key environmental issues identified for the Modification are summarised in Table 7-1.

The existing subsidence performance measures in Table 1, Condition 1, Schedule 3 of Project Approval (08_0149) are considered to be appropriate for the Modification as the subsidence impacts associated with the Modification are similar to or less than the approved Metropolitan Coal Mine.

These reviews indicate that the Metropolitan Coal Mine environmental management and monitoring measures being applied by Metropolitan Coal could continue to be effectively applied to minimise the potential impacts on existing environmental values.

The Modification would not significantly increase potential environmental impacts in comparison to the approved Metropolitan Coal Mine. It is considered that the consent authority can be satisfied that the environmental impacts of the development as proposed to be modified are acceptable, subject to environmental performance conditions of Project Approval (08_0149).

7.4 COMPLIANCE WITH RELEVANT STATUTORY AND POLICY REQUIREMENT

7.4.1 Consideration of the Project Against the Objects of the Environment Protection and Biodiversity Conservation Act 1999

Section 3 of the EPBC Act describes the objects of the EPBC Act as follows:

> *(a) to provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; and*
>
> *(b) to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and*
>
> *(c) to promote the conservation of biodiversity; and*
>
> *(d) to promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples; and*
>
> *(e) to assist in the co-operative implementation of Australia's international environmental responsibilities; and*
>
> *(f) to recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity; and*
>
> *(g) to promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.*

Table 7-1
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Subsidence	• Maximum predicted total vertical subsidence, tilt and sagging curvature for the Modification is the same as predicted for the approved Metropolitan Coal Mine underground mine layout. • No changes to Subsidence Impact Performance Measures outlined in the Project Approval (08_0149) would be required for the Modification.	• The longwall layout proposed for the Modification has been designed by Metropolitan Coal to reflect adoption of a number of longwall mine constraints to minimise potential impacts, including amendment of Longwalls 317 and 318 to reduce subsidence impacts on upland swamps. • Metropolitan Coal would develop a Subsidence Monitoring Program for Longwalls 317 and 318, consistent with that prepared for the Longwalls 311-316 Extraction Plan.
Groundwater	• The majority of the drawdown associated with the Metropolitan Coal Mine is due to the approved mining. • Temporary short-term reductions in groundwater discharge are predicted; however, long-term impacts are expected to be negligible. • It is unlikely that any significant effect on water quality on a receptor would eventuate. • Predicted long-term impacts of the Modification on groundwater flux to Honeysuckle Creek, Woronora Reservoir, the Woronora River and Waratah Rivulet are all negligible (i.e. less than 1 ML/year). • The Modification would not materially change any approved impacts at privately owned bores.	• Metropolitan Coal holds sufficient licences in the Sydney Basin Central Groundwater Source for the Metropolitan Coal Mine incorporating the Modification. • Metropolitan Coal would obtain licences in the Woronora River Water Source – Upper Woronora Management Zone for net take from the source due to the predicted temporary impact on Honeysuckle Creek. • Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan.
Surface Water	• It is unlikely that subsidence effects associated with the Modification would result in significant impacts to overland flow. • Where cracking of a creek bed and/or fracturing underlying strata occurs, this would likely lead to increased leakage from pools and redirection of surface flow. • The proposed relinquished areas (253 ha) would reduce the areas subject to bedrock cracking and associated pool water level, streamflow and water quality effects. • The potential impacts on water quality on Honeysuckle Creek and tributaries within the Study Area are expected to be similar to previously recorded (i.e. transient pulses of iron, manganese and aluminium), however, based on historical effects, it is unlikely to result in a persistent change. • The Modification would have a neutral effect on water quality with respect to underground mining and neutral to beneficial effect on water quality with respect to the construction of the relocated Ventilation Shaft 4.	• Metropolitan Coal would install additional pool water level, surface water quality and gauging stations as recommended by ATC Williams (2025). • Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan. • Metropolitan Coal would undertake remediation works as required, where cracks/fractures do not naturally seal post-cessation of subsidence movements associated with the Modification, consistent with that undertaken to date at impacted locations in Eastern Tributary and Waratah Rivulet.

Table 7-1 (Continued)
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Upland Swamps	• There are six upland swamps that have a low potential risk of greater than negligible environmental consequence. • The remaining 35 swamps have a negligible risk of greater than negligible environmental consequence. • Predicted tilts associated with the Modification are not expected to have a significant effect on the overall gradient of the swamps or the flow of surface water through the swamps • Temporary drawdown to the regional groundwater table would result in some drawdown and some additional induced leakage from parts of a small number of swamps which extend close to larger creeks and longwall panels.	• Swamp monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan and Biodiversity Management Plan. • An Adaptive Management Plan would be prepared to manage potential impacts on swamps. • Trigger action response plans would be established for swamps to inform proactive management. • The existing SEEP/W model would be updated to incorporate the latest monitoring data, and to develop trigger action response plans for the swamps.
Biodiversity	• The BDAR has assessed direct impacts associated with the construction of relocated Ventilation Shaft 4 as well as indirect and prescribed impacts (including subsidence impacts). • Niche prepared an SAII Impact Assessment for 13 entities. The BDAR describes how impacts to SAII entities would be avoided, minimised, mitigated, offset and/or subject to additional appropriate measures. • Niche also assessed 35 MNES in relation to the Modification. The potential impacts to three MNES listed under the EPBC Act (Coastal Upland Swamps, Giant Burrowing Frog, Littlejohn's Tree Frog) are uncertain as they relate to subsidence effects on upland swamps and Honeysuckle Creek. Conservatively, it is assumed the Modification is likely to have a significant impact on these MNES entities in the absence of considering proposed remediation, offset and compensatory measures. • The remaining 32 MNES entities were assessed as unlikely to be significantly impacted by the Modification.	• The BDAR outlines key mitigation measures which would be implemented in carrying out the Modification, such as a Vegetation Clearing Protocol. • In relation to offsetting, biodiversity credit obligation for the Modification would be discharged in accordance with the BAM (DPIE, 2020b). • Key biodiversity management measures at the Metropolitan Coal Mine would continue to be implemented for the Modification, including the Biodiversity Management Plan and Water Management Plan. • An Adaptive Management Plan would be prepared to manage potential impacts on swamps. • Trigger action response plans would be established for swamps and Honeysuckle Creek to inform proactive management, including for the three MNES species (Coastal Upland Swamps, Giant Burrowing Frog, Littlejohn's Tree Frog).

Table 7-1 (Continued)
Summary of Key Environmental Assessment Findings and Mitigation Measures

Aspect	Key Assessment Findings	Key Mitigation Measures
Aquatic Ecology	• The Modification is considered unlikely to cause a significant decline in the composition or distribution of aquatic macrophytes within the Study Area or downstream reaches of Honeysuckle Creek and other tributaries. • The Modification is unlikely to result in significant long-term impacts to aquatic macrophytes, aquatic macroinvertebrates or fish assemblage. • No threatened aquatic biota listed under the FM Act or EPBC Act are known to occur within the Study Area or Woronora Reservoir. • The Modification is unlikely to result in the introduction of new invasive species of aquatic flora or fauna. • During high and median flow periods, pool water levels in affected areas are anticipated to remain comparable to pre-impact levels. During low flow, affected pools may exhibit altered recessionary behaviour.	• Water monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Water Management Plan. • Aquatic ecology monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Biodiversity Management Plan. • Metropolitan Coal would undertake remediation works as required.
Aboriginal Cultural Heritage	• Comprehensive assessment and engagement was conducted with registered Aboriginal stakeholders. • There are no Aboriginal cultural heritage sites within the relocated Ventilation Shaft 4 surface disturbance area. • The Modification has the potential to indirectly impact 15 Aboriginal cultural heritage sites located outside of the approved approved Metropolitan Coal Mine extent, which 14 are assessed as being of low scientific significance and one is assessed as moderate scientific significance. • The Modification would not result in any significant cumulative impact on Aboriginal heritage in the region.	• Avoidance measures adopted for Longwalls 317 and 318 would result in four Aboriginal cultural heritage sites not experiencing additional subsidence impacts as a result of the amended Modification layout. • Thirteen Aboriginal cultural heritage sites located within the proposed relinquishment areas would experience a reduction or complete avoidance of subsidence impacts approved for the Metropolitan Coal Mine. • Aboriginal cultural heritage monitoring and management at the Metropolitan Coal Mine would continue to be undertaken in accordance with an approved Heritage Management Plan.
Greenhouse Gas	• There would be an estimated net reduction in ROM coal recovery of approximately 10.8 Mt and decreased Scope 1 greenhouse gas emissions of 1.1 Mt CO2-e compared to the Metropolitan Coal Mine as approved. • The continued compliance with the Safeguard Mechanism would result in the Modification making a meaningful contribution to the NSW emission reduction targets.	• Metropolitan Coal would prepare a Climate Change Mitigation and Adaptation Plan to document reasonable and feasible Scope 1 and Scope 2 greenhouse gas mitigation measures that could be applied at the Metropolitan Coal Mine. • Metropolitan Coal would continue to comply with its obligations to report greenhouse gas emissions and energy consumption/production under the NGER Act and the associated Safeguard Mechanism.
Land Use and Contamination	• There is low potential for gross or widespread land contamination within the area. • No remediation measures are required to make the area suitable for the purposes of the proposed land use change. • The Modification would not impact the continued use of the land for water supply purposes and is not expected to change this existing land use compatibility.	• Erosion and sediment control strategies for the Modification would be based on similar practices currently undertaken as part of the existing Erosion and Sediment Control program (part of the existing Water Management Plan) for the Metropolitan Coal Mine, which would be reviewed and updated for the Modification.

The Modification is considered to be generally consistent with the objects of the EPBC Act, as:

- The Modification incorporates measures to protect the environment (including aspects of the environment that are of national significance), via the Modification design including relinquishment of approved longwall mining areas (Section 3) and the application of mitigation, offsets and other measures (Section 6).
- The Modification would continue to develop the State's mineral resources (i.e. coal resources) while incorporating relevant ESD considerations (Section 7.4.3).
- An assessment of potential biodiversity and aquatic ecology impacts has been undertaken, and the Modification includes a proposal for offsetting unavoidable impacts on ecology and other compensatory measures (Sections 6.7 and 6.8 and Appendices D and E).
- The Modification is not expected to have a significant impact on water resources, on the basis that:
  - it is expected there is a negligible reduction in net discharge to the Woronora Reservoir (Appendix C);
  - predicted impacts to water quality in the of Honeysuckle Creek and local tributaries are expected to be similar to that previously recorded and are considered unlikely to result in a persistent change in water quality or a material effect to the water quality of the Woronora Reservoir (Appendix C);
  - the predicted long-term impacts of the Modification on groundwater flux to Honeysuckle Creek, Woronora Reservoir, the Woronora River and Waratah Rivulet are all negligible (i.e. less than 1 ML/year) (Appendix B);
  - with respect to Groundwater Dependent Ecosystems, based on monitoring data from previously undermined upland swamps at the Metropolitan Coal Mine (and other mining operations in the Southern Coalfield), changes in upland swamp hydrology as a result of subsidence are not expected to result in significant changes to the extent of upland swamp vegetation and species composition (Section 6.6); and
  - significant impacts on aquatic ecology are predicted to be unlikely (Appendix E).
- The Modification includes an ACHA, which identifies relevant cultural values (including the significance of biodiversity in Aboriginal cultural values) and suitable management and mitigation measures for potential direct and indirect impacts of the Modification (Section 6.9 and Appendix F).
- The Modification would be developed in a manner that incorporates engagement from the community, the landholder and Indigenous peoples through the preparation of the Modification, the public exhibition of the Modification document and the Modification assessment process (Section 5).
- The Modification includes consideration of Metropolitan Coal's contribution to maintaining Australia's international environmental responsibilities and the potential impacts on these.

7.4.2 Evaluation Under Section 4.15(1) of the Environmental Planning and Assessment Act 1979

The Modification is considered to be substantially the same as the approved Metropolitan Coal Mine and generally consistent with the objects of the EP&A Act. In evaluating the Modification, under section 4.15(1) of the EP&A Act, the consent authority is required to take into consideration a range of matters as they are of relevance to the subject of the application. Section 4 provide a summary of how these matters have been considered.

7.4.3 Consideration of Ecologically Sustainable Development for the Modification

The Modification is an extension of the existing Metropolitan Coal Mine, that would provide for the continuation of employment of the existing Metropolitan Coal workforce of approximately 400 personnel for a further two years.

The Modification design, planning and assessment have been carried out applying the principles of ESD, consistent with the approved Metropolitan Coal Mine, through:

- incorporation of a range of mitigation measures adopted as components of the Modification design to minimise the potential for serious and/or irreversible damage to the environment, including the minimisation of tensile strain at the surface to 0.5 mm/m or less for upland swamps, development of environmental management and monitoring programs, compensatory measures and ecological offsets based on conservative assumptions and environmental assessment and within decision-making processes;
- continuation of high standards for environmental and occupational health and safety performance for the Modification;
- consultation with regulatory and community stakeholders; and
- continuation of potential economic benefits to the community arising from the development of the Modification.

The Modification would also include the ongoing use of existing Metropolitan Coal Mine surface facilities located at the site, which maximises the potential benefits of previous Metropolitan Coal infrastructure investment and minimises potential new surface disturbance areas in comparison to a greenfield mine proposal.

Assessment of potential medium-term and long-term impacts of the Modification was carried out during the preparation of this Modification Report on aspects of surface water and groundwater, greenhouse gas emissions, aquatic and terrestrial ecology, heritage and land contamination.

It can be demonstrated that the Modification can be operated in accordance with ESD principles through the application of mitigation measures, compensatory measures and offset measures that have been developed based on conservative impact assumptions for the Modification.

Metropolitan Coal has designed the Modification consistent with the conservative longwall geometry implemented at the existing Metropolitan Coal Mine and in consideration of the feedback received on the Metropolitan Coal Project EA and Extraction Plans and component management plans, including advice received from the IEAPM. Therefore, it is considered the Modification would meet the principles of ESD.

7.5 EVALUATION OF THE MODIFICATION

The Metropolitan Coal Mine is an existing metallurgical coal mine that operates in accordance with Project Approval (08_0149).

The Modification is a continuation of the existing approved Metropolitan Coal Mine that would comply with applicable statutory requirements and relevant strategic planning policy objectives (Section 4 and Attachment 3).

The Modification would facilitate the following key socio-economic benefits:

- contribute to the financial resilience of the Metropolitan Coal Mine, which would be achieved through the efficient development of the existing available resources (e.g. additional production can be achieved with minimal change to the existing infrastructure);
- facilitate ESD, as economic efficiencies can be achieved with minimal change to the currently accepted environmental performance measures, use of existing mining, coal handling, processing and transportation infrastructure and associated support facilities and no increase in the duration of existing impacts of the approved Metropolitan Coal Mine;
- result in the recovery of an additional 3.2 Mt of ROM coal from Longwalls 317 and 318 which would contribute to increased NSW export income and royalties;
- allow the attainment of high-grade coking coal which could be directly supplied to BlueScope's Port Kembla Steelworks;
- extend the duration of employment for the existing 400-strong Metropolitan Coal Mine workforce;
- be developed in a manner that incorporates community engagement, with a wide range of stakeholders consulted through the preparation of this Modification Report; and
- be consistent with the NSW Government's *Strategic Statement on Coal Exploration and Mining* (2020a), which outlines that the NSW Government will act in four areas, including "*supporting responsible coal production in areas deemed suitable for mining*".

The Modification includes the relinquishment of approved surface development and underground mining areas, resulting in a reduction in the total secondary extraction area of approximately 253 ha and a reduction in coal recovery of approximately 14 Mt (which would be partially offset by the Modification ROM coal).

The Modification would include the implementation of environmental mitigation measures (including performance monitoring and adaptive management) to minimise potential impacts on the environment and community (Section 6).

In consideration of the relinquished areas and mine design changes, the Modification has substantially reduced potential environmental impacts compared to the project as originally approved.

As such, the approval of the Modification is considered to be justified.

7.6 CONCLUSION

The Modification is an extension of the existing approved Metropolitan Coal Mine, that would comply with applicable statutory requirements and relevant strategic and statutory planning policy objectives (Sections 2 and 4, and Attachment 3).

The Modification has been designed to avoid or minimise potential impacts to key natural features in the local area.

The Metropolitan Coal Mine, incorporating the Modification, would remain substantially the same as the development that was originally granted for the Metropolitan Coal Mine, as approved under Project Approval (08_0149).

The Metropolitan Coal Mine (as modified) would continue to comply with existing criteria, performance measures and limits described in Project Approval (08_0149).

Metropolitan Coal would continue to operate the Metropolitan Coal Mine (as modified) in accordance with the existing environmental management plans and environmental monitoring programs, which would be updated to incorporate the Modification.

In weighing up the main environmental impacts (costs and benefits) assessed and described in this Modification Report, the Modification, on balance, is considered to have merit.

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9 ABBREVIATIONS

%	Percent
<	Less than
°	Degrees
°C	Degrees Celsius
µS/cm	Microsiemens per Centimetre
ACCU	Australian Carbon Credit Unit
ACHA	Aboriginal Cultural Heritage Assessment
AGE	Australasian Groundwater and Environmental Consultants Pty Ltd
AHIMS	Aboriginal Heritage Management Information System
AIP	*NSW Aquifer Interference Policy*
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZG	Australia and New Zealand Guidelines
ARMCANZ	Agriculture and Resource Management Council of Australia and New Zealand
ATC Williams	ATC Williams Pty Ltd
AUSRIVAS protocol	*NSW Australian River Assessment System (AUSRIVAS) Sampling and Processing Manual*
BAM	*Biodiversity Assessment Method*
BAM-C	Biodiversity Assessment Method Calculator
BC Act	NSW *Biodiversity Conservation Act 2016*
BC S&T Regulation	*Biodiversity Conservation (Savings and Transitional) Regulation 2017*
BDAR	Biodiversity Development Assessment Report
Bio-Analysis	Bio-Analysis Pty Ltd
Bluescope	Bluescope Steel Limited
BoM	Bureau of Meteorology
CCC	Community Consultative Committee
CCL	Consolidated Coal Lease
CER	Clean Energy Regulator
CHPP	Coal Handling and Preparation Plan
CL	Coal Lease
CPHR	NSW DCCEEW Environment and Heritage – Conservation Programs, Heritage and Regulation
Cth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DECC	NSW Department of Environment and Climate Change
DECCW	NSW Department of Environment, Climate Change and Water
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
DotE	Commonwealth Department of the Environment
DPE	NSW Department of Planning and Environment
DPHI	NSW Department of Planning, Housing and Infrastructure
DPI	NSW Department of Primary Industries
DPI – Fisheries	NSW Department of Primary Industries – Fisheries
DPIE	NSW Department of Planning, Industry and Environment
DVG	Default Guideline Value
DTV	Default Trigger Values
EC	Electrical Conductivity
EL	Exploration Licence

EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EP&A Regulation	NSW *Environmental Planning and Assessment Regulation 2021*
EPA	NSW Environment Protection Authority
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
EPT	Ephemeroptera, Plecoptera and Trichoptera
ESD	Ecologically Sustainable Development
FM Act	NSW *Fisheries Management Act 1994*
GHG Protocol	*Greenhouse Gas Protocol*
ha	Hectares
Heritage NSW	NSW DCCEEW Environment and Heritage – Heritage NSW
IEAPM	Independent Expert Advisory Panel for Mining
IESC	Independent Expert Scientific Committee
JBS&G	JBS&G Australia Pty Ltd
IPC	NSW Independent Planning Commission
km	Kilometres
kV	Kilovolt
LALC	Local Aboriginal Land Council
LGA	Local Government Area
m	Metres
M	Million
m AHD	Metres Australian Height Datum
Metropolitan Coal	Metropolitan Collieries Pty Ltd
Metropolitan Coal Mine	Metropolitan Colliery
Metropolitan Coal Project EA	Metropolitan Coal Project Environmental Assessment
mg/L	Milligrams per Litre
Mining Act	NSW *Mining Act 1992*
ML	Mining Lease
MLA	Mining Lease Application
ML/day	Megalitres per Day
ML/year	Megalitres
mm	Millimetres
mm/day	Millimetres per Day
mm/m	Millimetres per Metre
MNES	Matters of National Environmental Significance
MPL	Mining Purpose Lease
MSEC	Mine Subsidence Engineering Consultants Pty Ltd
Mt	Million Tonnes
Mt CO_2-e	Million Tonnes of Carbon Dioxide Equivalent
Mtpa	Million Tonnes per Annum
NDC	Nationally Determined Contribution
Net Zero Future Act	NSW *Climate Change (Net Zero Future) Act 2023*
NGA	National Greenhouse Accounts
NGER Act	Commonwealth *National Greenhouse and Energy Reporting Act 2007*
Niche	Niche Environment and Heritage Pty Ltd
NPW Act	NSW *National Parks and Wildlife Act 1974*
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water

NSW Resources	NSW Department of Primary Industries and Regional Development – NSW Resources
NTU	Nephelometric Turbidity Unit
NZC	Net Zero Commission
OEH	NSW Office of Environment and Heritage
PAD	Potential Archaeological Deposit
PCT	Plant Community Type
Peabody	Peabody Energy Australia Pty Ltd
PoEO Act	NSW *Protection of the Environment Operations Act 1997*
PPR	Preferred Project Report
RAPs	Registered Aboriginal Parties
RCE	Riparian, Channel and Environmental
Resources and Energy SEPP	*State Environmental Planning Policy (Resources and Energy) 2021*
RMP	Rehabilitation Management Plan
ROM	Run-of-Mine
SAII	Serious and Irreversible Impact
SCA	Sydney Catchment Authority
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SIGNAL2	Stream Invertebrate Grade Number-Average Level
SSD	State Significant Development
TAS	Todoroski Air Sciences Pty Ltd
t CO2-e	Tonnes of Carbon Dioxide Equivalent
TEC	Threatened Ecological Community
TfNSW	Transport for NSW
TDS	Total Dissolved Solids
the Consultation Requirements	*Aboriginal cultural heritage consultation requirements for proponents 2010*
the Large Emitters Guide	*NSW Guide for Large Emitters - Guidance on how to prepare a greenhouse gas assessment as part of NSW environmental planning processes*
the Strategic Statement	*Strategic Statement on Coal Exploration and Mining in NSW*
the Swamp Offset Policy	*Addendum to NSW Biodiversity Offsets Policy for Major Projects: Upland swamps impacted by longwall mining subsidence*
UNFCCC	United Nations Framework Convention on Climate Change
WBCSD	World Business Council for Sustainable Development
WM Act	NSW *Water Management Act 2000*
Wollongong LEP	*Wollongong Local Environment Plan 2009*
WRI	World Resources Institute