



Hume Coal Project and Berrima Rail Project

State Significant Development Assessment SSD 7172 and SSD 7171

June 2021



Published by the NSW Department of Planning, Industry and Environment

dpie.nsw.gov.au

Title: State Significant Development Assessment (SSD 7172 and SSD 7171)

Subtitle: Hume Coal and Berrima Rail Project

View from Mereworth House 2020

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Executive Summary

Introduction

Hume Coal Pty Limited (Hume Coal, the Applicant) is proposing to build a new underground coal mine in the Southern Highlands region of NSW (the Hume Coal Project), and develop associated rail infrastructure to support the mining operations (the Berrima Rail Project).

The associated projects are located approximately 100 kilometres (km) southwest of Sydney and 7 km northwest of Moss Vale in the Wingecarribee local government area (LGA).

While Hume Coal submitted two separate development applications, the two projects form an integrated whole and are referred to as ‘the project’ in this report.

This final assessment report for the project has been prepared for consideration by the Independent Planning Commission of NSW (the Commission) in its determination of the project. It should be read in conjunction with the Department of Planning, Industry & Environment’s (the Department’s) Preliminary Assessment Report (PAR) dated December 2018.

Together, these two reports comprise the Department’s environmental assessment of the project (with this final report prevailing to the extent of any inconsistency), and have been prepared in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Strategic Context

The project area and its surrounds are characterised by low, rolling hills with predominantly rural-residential and small-scale agricultural land uses. The project site is located within a broader area that is renowned for its historical and heritage significance.

While there has been long history of coal mining in the Southern Highlands area, it has been generally small scale bord and pillar mining which mostly ceased between 50 and 150 years ago, with the Berrima Colliery going into care and maintenance more recently in 2013. The region is now more widely known for its rural land uses, small-scale agriculture, scenic landscapes and tourism.

The majority of the project area is zoned for environmental purposes (E3 zone - approximately 70%) and forestry purposes (RU3 Zone - approximately 26%), with smaller areas zoned for rural landscape and infrastructure. The objectives of the E3 zone are aimed at protecting existing historic, ecological, cultural and aesthetic values. Similarly, the objectives of the rural landscape zone are focussed on maintaining the “*rural landscape character*” and “*encouraging sustainable primary industry*.”

Mining development is prohibited in all of these land zones. However, the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (the Mining SEPP) allows underground mining on any land, subject to development consent. The Mining SEPP sets out a range of ‘matters for consideration’ that the consent authority must consider in determining whether development consent should be granted for underground mining, including whether the project is compatible with “existing, approved and likely preferred land uses”.

In June 2020, the NSW Government released its *Strategic Statement on Coal Exploration and Mining in NSW*. A key objective of the Statement is to support responsible coal production, with a focus on applications to extend the life of existing coal mines, and to ensure that any new release areas for coal exploration are in areas where “there are minimal conflicting land uses, where social and environmental impacts can be managed, and where there is significant coal production potential.” While, this objective does not directly apply to the project, as it is not a new exploration release area, it is currently the only greenfield site currently under assessment by the NSW Government, and the policy intent is an important consideration.

Statutory Context

Both the Hume Coal Project and the Berrima Rail Project are classified as State Significant Development (SSD) under the EP&A Act. The Commission is the consent authority for the development applications as there were more than 50 unique submissions objecting to each of the projects.

In December 2018, the Minister for Planning asked the Commission to conduct a public hearing into the project. The terms of reference required the Commission to consider, amongst other things:

- the Environmental Impact Statement (EIS) for the project;
- submissions on the project;
- the Department's PAR and relevant expert advice; and
- the merits of the project having regard to relevant NSW Government policies.

In May 2019, the Commission published its report into the public hearing (the Commission's Report). The report made a number of recommendations seeking a range of additional information to enable the Commission to reach a position on the merits of the proposal.

In April 2020, at the request of the Department, Hume Coal provided its detailed response to the Commission's Report (Hume Coal's Response Report). The Department made this report publicly available on its website, and has undertaken additional consultation with key government agencies and independent experts, and finalised its assessment of the project (this report).

In June 2021, the Minister for Planning and Public Spaces requested the Commission to undertake a further public hearing prior to determination of the development applications. The applications are now to be referred back to the Commission for a public hearing and determination within 12 weeks of receiving the Department's assessment report

Engagement

The Department publicly exhibited the EIS from 30 March 2017 to 30 June 2017. In response to the exhibition, the Department received a total of 12,666 submissions on the project, comprising 7,143 on the Hume Coal Project, 5,206 on the Berrima Rail Project, and 317 submissions on both projects.

Over 5,000 submissions were received from the local area with 97% of these submissions objecting to the project. Key issues raised in these submissions related to:

- amenity impacts (noise and air quality);
- groundwater and surface water impacts;
- heritage, cultural landscape and visual impacts;
- economic and social impacts; and
- ecologically sustainable development and greenhouse gas.

During the public hearing, the Commission received a further 699 written submissions and 3,299 form letters, with 71 people addressing the Commission during its hearings. Most of these objected to the project.

The Department's additional consultation since the Commission's Report and Hume Coal's Response Report indicates that a number of government agencies continue to have significant concerns about the project.

Wingecarribee Shire Council maintains its objection to the project, noting its objection to coal mining in its LGA, and the project's potential impacts on groundwater and surface water resources, agricultural land and tourism. Other agencies with significant residual concerns include:

- NSW Resources Regulator, in relation to uncertainty about the mine design, subsidence and safety risks;
- DPIE Water, in relation to groundwater impacts;

- Water NSW, in relation to potential surface water impacts and impacts to Sydney's drinking water catchment; and
- Heritage NSW, in relation to impacts on heritage items and the cultural landscape.

Preliminary Assessment Report

The Department's PAR concluded that, despite some economic benefits for NSW, the benefits of the project could not be achieved without significant adverse impacts on the environment and the local community. Consequently, the Department's preliminary findings were that the project is not in the public interest and should not be approved.

The key reasons for reaching this conclusion included:

- the project would have significant impacts on a highly productive groundwater aquifer, in particular drawdown impacts at up to 118 privately-owned groundwater bores;
- the significant groundwater drawdown impacts are unlikely to be able to be reduced further due to the nature of the geology and hydrogeology of the area;
- the proposed groundwater 'make good' strategy, while feasible from a technical standpoint, is not practicable for such a large number of affected landholders;
- the proposed novel 'pine feather' mine design, and proposed underground storage of mine water in the working mine, carries considerable risk and is potentially unsafe;
- the uncertainty and risks associated with the mine design may lead to the need to discharge mine water into surface waterbodies and Sydney's drinking water catchment, which has not been assessed;
- the project would have relatively low net economic benefits in comparison to many other coal mining projects in the Southern Coalfield and across NSW;
- the proposed mine and its impacts are unlikely to be compatible with other land uses in the area; and
- given the identified uncertainties and risks, proceeding with the project as proposed would not be consistent with the 'precautionary principle' and therefore should not be considered an ecologically sustainable development.

Commission's Report

The Commission's Report assessed the relative merits of the project, however the Commission found that it was not able to adopt a definitive position on the merits of the project as a whole, based on the material before it. The Commission made 30 recommendations seeking a range of additional information to enable it to reach a position on the merits of the proposal.

Hume Coal's Response Report

Hume Coal's Response Report provides a detailed response to each of the recommendations in the Commission's Report. It is based on a number of additional specialist reviews and information, including:

- peer review of the mine design, safety and resource recovery;
- project risk assessment (provided on commercial-in-confidence basis);
- updated assessments for noise, greenhouse gases, visual, economics and social impacts; and
- an updated heritage assessment, including a cultural landscape assessment, Sorensen garden analysis and archaeological assessment, and assessment of groundwater dependence for heritage landscapes and gardens.

The Response Report identifies some relatively minor changes to the project since the PAR, including:

- changes to the temporary coal reject stockpiles;
- removal of the provisional water treatment plant from the project; and
- confirmation of the rail alignment option for the Berrima Rail Project.

Assessment

The Department has completed its assessment of the project, with a focus on addressing and responding to the recommendations in the Commission's Report, particularly in relation to groundwater impacts on bores and make good provisions, the mine design and the economic benefits of the project.

Groundwater and Make Good Arrangements

The Commission made seven recommendations on water resources. These recommendations relate to disputed aspects of the groundwater modelling, management of underground mine water emplacement to protect surface water systems, impacts of drawdown on surrounding properties, vegetation and heritage items, and the practical adequacy of make good provisions for private groundwater bores.

The groundwater impact predictions have not changed since the PAR. In this regard, the project is predicted to have significant impacts on a highly productive groundwater aquifer (as classified under the *NSW Aquifer Interference Policy*), including drawdown impacts on up to 94 registered privately-owned bores based on Hume Coal's 67th percentile predictions, or up to 118 bores based on the 90th percentile predictions.

The significant groundwater drawdown impacts are largely due to a range of project-specific factors, which means there are limited opportunities to further minimise impacts. These factors include:

- the presence of high-quality groundwater aquifers that can produce high yields;
- a comparatively high density of properties with a large number of groundwater bores; and
- the shallow depth of the coal seam (ie. 70 to 180 m below ground level, with the majority 120 m or less) and its proximity to the key groundwater aquifer.

In response to the Commission's Report, Hume Coal has provided additional detail on the process for its proposed make good strategy, but has not provided any substantial new information on the practicality of the make good arrangements.

However, Hume Coal does report that:

- it has secured 'access' arrangements with approximately 20 landholders for monitoring purposes;
- the average drawdown for all affected bores is 6 metres; and
- only 16 bores are predicted to require make good in the first 5 years of mining.

In regard to the access agreements, it is understood that none have been progressed to a formal make good agreement. The Department remains concerned about the number of affected landholders, the greenfield nature of the project area, the shallow nature of the mine and the aquifers, and the practicality of making good these impacts.

In summary, whilst there is no formal NSW policy on make good arrangements for impacted groundwater bores, the Department considers that the proposed make good arrangements are not suitable or practical given:

- the substantial disruption to the local community associated with the negotiation and implementation process, particularly given the rural-residential and small-scale agricultural land use of the area;

- the high likelihood of considerable disagreement between Hume Coal and landowners about the actual impacts and make good arrangements;
- that the process would likely rely heavily on dispute resolution between Hume Coal and a large number of landowners, which would inevitably involve substantial legal costs for both parties and the Department; and
- that the above processes would likely result in extensive time delays, creating ongoing disruption and uncertainty in the community.

Mine Water Management

To address the Commission's concern about whether the project includes a water treatment plant, Hume Coal has amended the project to specifically exclude the plant and to rely only on above ground storages and storage in underground workings to manage surplus water on site.

The proposed mine water management method, particularly the lack of a contingency plan in the event that the underground storage is not available, continues to raise significant concerns for Water NSW and the Department, given the potential need to discharge water to Sydney's drinking water catchment.

This creates an additional uncertainty for the project, noting that Hume Coal would need to demonstrate that the project would have a 'Neutral or Beneficial Effect' (NorBE) on water quality under the State Environmental Planning *Policy (Sydney Drinking Water Catchment) 2011*.

Mine Design

A key issue for the assessment is the proposed use of the unconventional pine feather mining method, which was largely selected to minimise subsidence and associated impacts on surface features. However, the novel mining method has not been used in NSW or in a similar geological environment before, and has potential workplace health and safety risks.

Due to concerns raised by the Department's experts, Emeritus Professor Jim Galvin (mining engineering) and Professor Ismet Canbulat (subsidence/ mining engineering), the Commission made four recommendations relating to the proposed mine design, emphasising the need for further consideration of the mine design features, resolution of safety concerns, consideration of additional risk assessment advice provided to the Commission, and the management of coal rejects.

Hume Coal engaged an independent expert in mining engineering, Mr Russell Howarth to peer review the proposed mining method. The review concluded that the proposed mining technique is technically feasible, and that it should not be inferred as unsafe on the basis that it has not been used before in NSW.

Hume Coal's Response Report, including Russell Howarth's peer review, have been reviewed by the NSW Resources Regulator and both of the Department's independent mining experts. The independent experts also reviewed Hume Coal's risk assessment and additional expert advice (from Professor Bruce Hebblewhite and Dr Russell Firth) provided to the Commission during the public hearing. This additional assessment provided by Hume Coal acknowledges that whilst there is some risk associated with the long term stability of individual 'web pillars', the mine would remain stable when considered as an integrated whole.

However, the NSW Resources Regulator and the Department's experts continue to have concerns about the geotechnical model and the uncertainties associated with the mine design, particularly in relation to the short and/or long term stability of the proposed web pillars. Whilst the likelihood of web pillar failure or yielding may be low and/or localised, any such failure has the potential to result in significant consequences, particularly impacts on workplace health and safety, as well as potential environmental impacts (including groundwater response to mining). The Resources Regulator is also concerned about uncertainty associated with the unorthodox approach to the design of coal protection barriers to critical infrastructure, including the Hume Highway.

The Department's experts note that the uncertainties could potentially be addressed through further risk assessment, and changes to panel and pillar dimensions. The Department (and its experts) have consistently requested that Hume Coal undertakes additional assessment and modelling based on more conservative industry-accepted assumptions. However, Hume Coal has chosen not to undertake this additional work, and continues to assert that these matters should be addressed through post approval requirements as the mine progresses.

The Department considers that it may be possible to draft a complex set of development consent conditions in an attempt to address the uncertainties relating to mine design, which would be at least conceptually similar to the Extraction Plan process required for longwall mining (and other secondary extraction methods). However, given this proposal involves a novel mining method, there are no clear precedents for how the mine design (and any requisite amendments) would be adequately managed through development consent conditions, particularly in relation to preventing potential additional environmental impacts.

Consequently, the Department is therefore not satisfied that the proposed approach of deferring this work to the post approval period is acceptable in this instance given the identified uncertainties and risks. Such an approach lacks finality, is inconsistent with the precautionary principle, and ultimately is unlikely to be capable of being implemented effectively.

Economics

There is now adequate agreement between the economics experts on the net economic benefits of the project, with the Department's expert estimating that the project would have a net benefit of \$194 million in net present value (NPV) terms.

The Department accepts that the project as proposed would have a net economic benefit to NSW and a range of benefits to the Southern Highlands region, and that sensitivity analysis indicates that the NPV of the project (as designed) would remain positive even when considering a range of potential economic variables.

However, any required changes to the mine design (eg. as a result of the identified web pillar stability and mine design issues) has the potential to reduce the coal resources that could be mined and affect the economic benefits of the project.

Other Impacts

The Department has also assessed the full range of other potential impacts, including visual, heritage, social, noise, vibration, air quality, greenhouse gas emissions, traffic, biodiversity, agriculture and rehabilitation.

This assessment indicates that the project would result in some significant, though relatively localised, residual impacts – particularly in relation to noise, visual and cultural landscape impacts in the Medway Road area.

The Department acknowledges that the majority of these potential impacts would be similar to contemporary underground mining projects, and could potentially be managed, mitigated or at least compensated for to achieve an acceptable level of environmental performance if the project was clearly in the public interest.

Evaluation and Conclusion

The Department has assessed the development applications, EIS, submissions and expert advice on the project, Hume Coal's responses to these submissions, the Commission's Report, and Hume Coal's responses to the Commission's Report, in accordance with the requirements of the EP&A Act, including the objects of the Act and the principles of ecologically sustainable development.

Based on this assessment, the Department is not satisfied that the project achieves a reasonable balance between recovering a recognised coal resource of State significance and minimising the potential impacts on the environment and surrounding land users as far as practicable.

In weighing the merits of the project, the Department acknowledges that it would have a number of benefits, including:

- producing a high-quality coal resource (55% of which comprises high quality semi-hard coking coal for the steel-making industry) in proximity to existing rail infrastructure, industrial areas and to Port Kembla;
- generating some 415 jobs during construction and up to 300 jobs during operations, most of which would be filled from the Wingecarribee Shire and surrounding areas;
- significant capital investment value in the project of approximately \$533 million;
- generating around \$200 million in royalties and company taxes for NSW;
- generating significant economic flow-on benefits for the Southern Highlands; and
- providing an estimated net economic benefit to NSW of approximately \$194 million.

However, the Department does not believe that these and other benefits outweigh the project's actual and potential environmental and social impacts. The Department considers that:

- the predicted groundwater drawdown impacts on a large number of groundwater users' bores is unacceptable, as is the practicability of the proposed make good strategy;
- given the very large number of significantly affected groundwater users, the rural-residential and small-scale agricultural land use of the area, and the greenfields nature of the project, the impacts are likely to lead to significant dispute and disruption in the local community, and consequently, the project is not compatible with the rural land uses in the vicinity of the development.
- there remains uncertainty about the potential surface water impacts on Sydney's drinking water catchment, given the mine design risks and the lack of a contingency strategy in the event that surface water discharge is required;
- there remains uncertainty about the mine design, particularly in relation to the stability of the web pillars, with resultant risks to workplace health and safety, and potentially to the environment;
- the project would have amenity impacts on a number of rural-residential land users in the Medway Road area, including noise and visual impacts, as well as impacts on the cultural landscape;
- the residual risks cannot be adequately managed through approval conditions, given the potential impacts and uncertainties;
- proceeding with the project as proposed would not be consistent with the precautionary principle of ecologically sustainable development, given the identified uncertainties and risks;
- there is strong opposition to the project from the local and broader community as well as the local Council, including 97% of the more than 5,000 submissions from the local area objecting to the project, reflecting that the local community does not consider the project has a social licence; and
- the site is not suitable for a greenfield coal mine given the rural-residential and small-scale agricultural land use of the area, along with the growing tourism and heritage landscape focus, and the predicted impacts on these land uses.

For these reasons, and based on its detailed assessment of the merits of the project, the Department considers that the Hume Coal Project as currently proposed, and the associated Berrima Rail Project, are not in the public interest and recommends that the Commission refuses to grant consent for these projects. The Department does not accept that the residual risks can be managed through post-approval conditions of consent, given the potential impacts and uncertainties.

The Department has not provided any recommended conditions of consent, for either the Hume Coal project or the Berrima Rail Project, given the Department's recommendation. If the Commission determines that the project should be approved, then the Department recommends that, having made this determination, the Commission seeks advice from the Department in relation to conditions that may avoid, mitigate or at least compensate the impacts of the project.

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1 Introduction

1.1 Introduction

1. This final assessment report for the Hume Coal Project (SSD 7172) and the related Berrima Rail Project (SSD 7171) (hereafter referred to as 'the project') has been prepared for consideration by the Independent Planning Commission of NSW (the Commission). It should be read in conjunction with the Department of Planning, Industry & Environment's (the Department's) Preliminary Assessment Report (PAR) dated December 2018.
2. Together, these two reports comprise the Department's environmental assessment of the project and has been prepared in accordance with the *Environmental Planning and Assessment Act 1979* (EP&A Act).
3. This report considers the:
 - recommendations made in the Commission's Hume Coal Project and Berrima Rail Project Independent Planning Assessment Report, dated 27 May 2019 (Commission's Report);
 - Hume Coal's response to the Commission's report (Applicant's Response Report) (see **Appendix A**);
 - additional information provided by Hume Coal following the publication of the Commission's report (see **Appendix B**);
 - further advice from key Government agencies received following the Commission's report (see **Appendix C**);
 - further advice from the Department's independent experts received following the Commission's report and Applicant's Response Report (see **Appendix D**); and
 - relevant requirements of the EP&A Act.

1.2 Background

4. Hume Coal Pty Limited (Hume Coal, the Applicant), a subsidiary of the South Korean steelmaking company Pohang Iron and Steel Company (POSCO), is proposing to build a new underground coal mine in the Southern Highlands region of NSW (the Hume Coal Project), and develop associated rail infrastructure to support the mining operations (the Berrima Rail Project). The associated projects are located approximately 100 kilometres (km) southwest of Sydney and 7 km northwest of Moss Vale in the Wingecarribee local government area (LGA) (see **Figure 1**).
5. While Hume Coal submitted two separate development applications, the two projects form an integrated whole and to date have been assessed concurrently in Hume Coal's EIS, the Department's PAR and the Commission's Report. Together the two projects form 'the project' referred to in this report.
6. The key aspects of the project have remained generally unchanged since the original proposal (see Table 1 of the PAR). These include:
 - development of a new (greenfield) underground coal mine, using the 'pine feather' method of extraction;
 - extraction of an estimated 50 million tonnes (Mt) of run-of-mine (ROM) coal at a rate of up to 3.5 Mt of ROM coal a year over 19 years, from the Wongawilli Seam in the Permian Illawarra Coal Measures, at depths of approximately 70 m to 180 m;

- processing of coal at a dedicated on-site coal handling and processing plant (CHPP);
 - development of water management infrastructure, including surface water storages and sub-surface storage of 'produced' mine water and reject material from the processing of the coal at the CHPP in completed sections of the underground mine workings;
 - development of a range of associated infrastructure, including overland conveyors, a rail loader and rail loop, mine ventilation system, workshops, construction workers accommodation facility (for up to 400 workers) and offices;
 - extension of the Berrima branch rail line by 7.6 km and associated upgrades to the line, to connect the Hume Coal Project to the Main Southern Railway;
 - use of the Main Southern Railway to transport coal to Port Kembla for export or to domestic users; and
 - rehabilitation of the site.
7. Hume Coal's Response Report identifies some changes to the project since the PAR, including:
- removal of the secondary temporary coal reject stockpile (western reject) from the project - the footprint of the main temporary stockpile (eastern reject) would remain unchanged, however the maximum stockpile height would increase by 4 m, to a total height of 19 m;
 - removal of the provisional water treatment plant from the project; and
 - confirmation of the rail alignment for the Berrima Rail Project (two options were originally proposed), with the 'alternative alignment' now the chosen alignment.
8. Hume Coal formalised these changes to the project by requesting an amendment to the development application on 2 October 2020. The Director – Resource Assessments under delegation of the consent authority accepted the amendments on 6 October 2020.
9. In June 2021, the Minister for Planning and Public Spaces requested that the Commission conduct a further public hearing into the carrying out of the project prior to determining the development applications for the project, and complete the public hearing and make its determination within 12 weeks of receiving the Department's assessment report, unless the Planning Secretary agrees otherwise.
10. The updated project layout is shown on **Figures 2 to 3**.

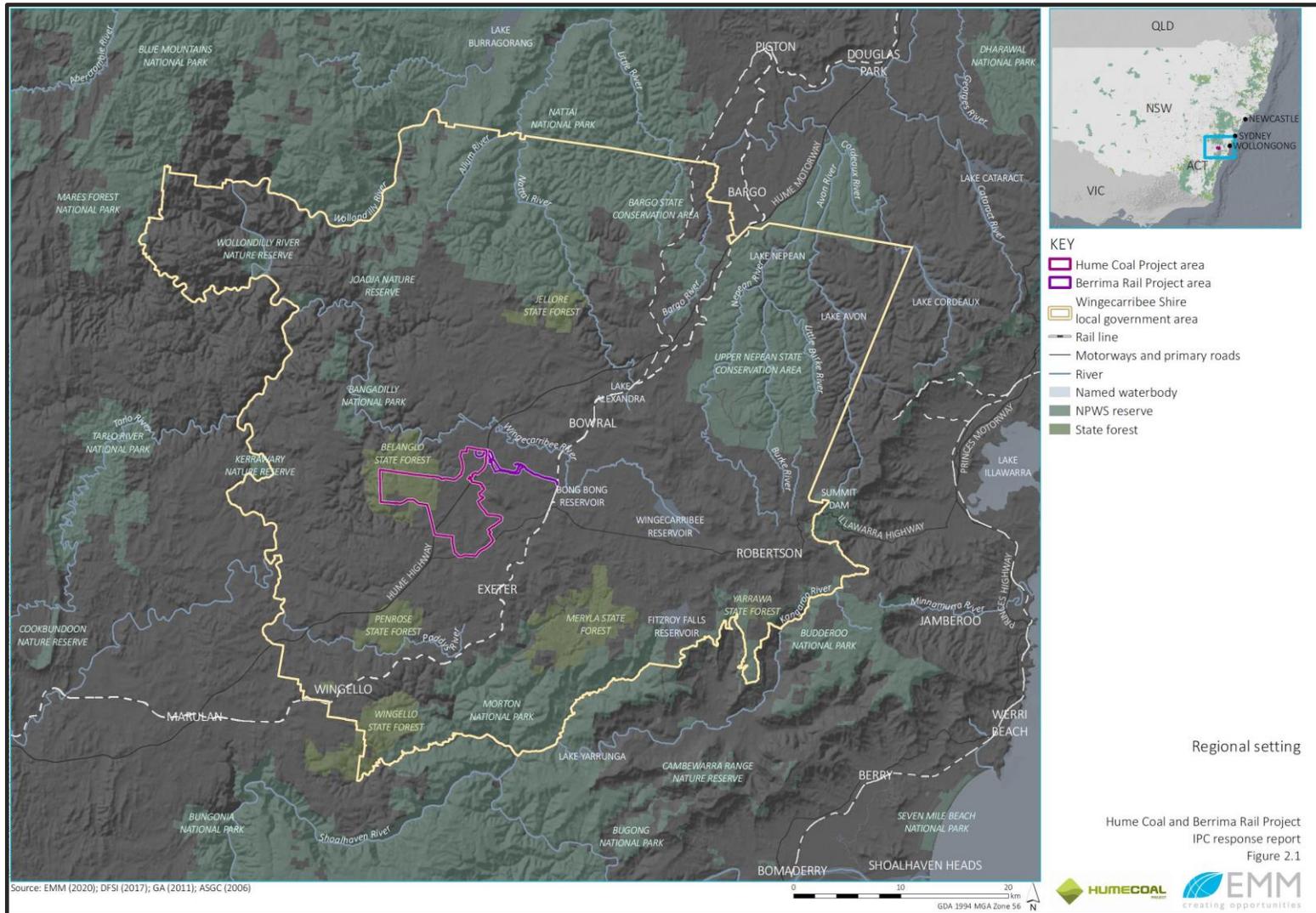


Figure 1 | Local Context

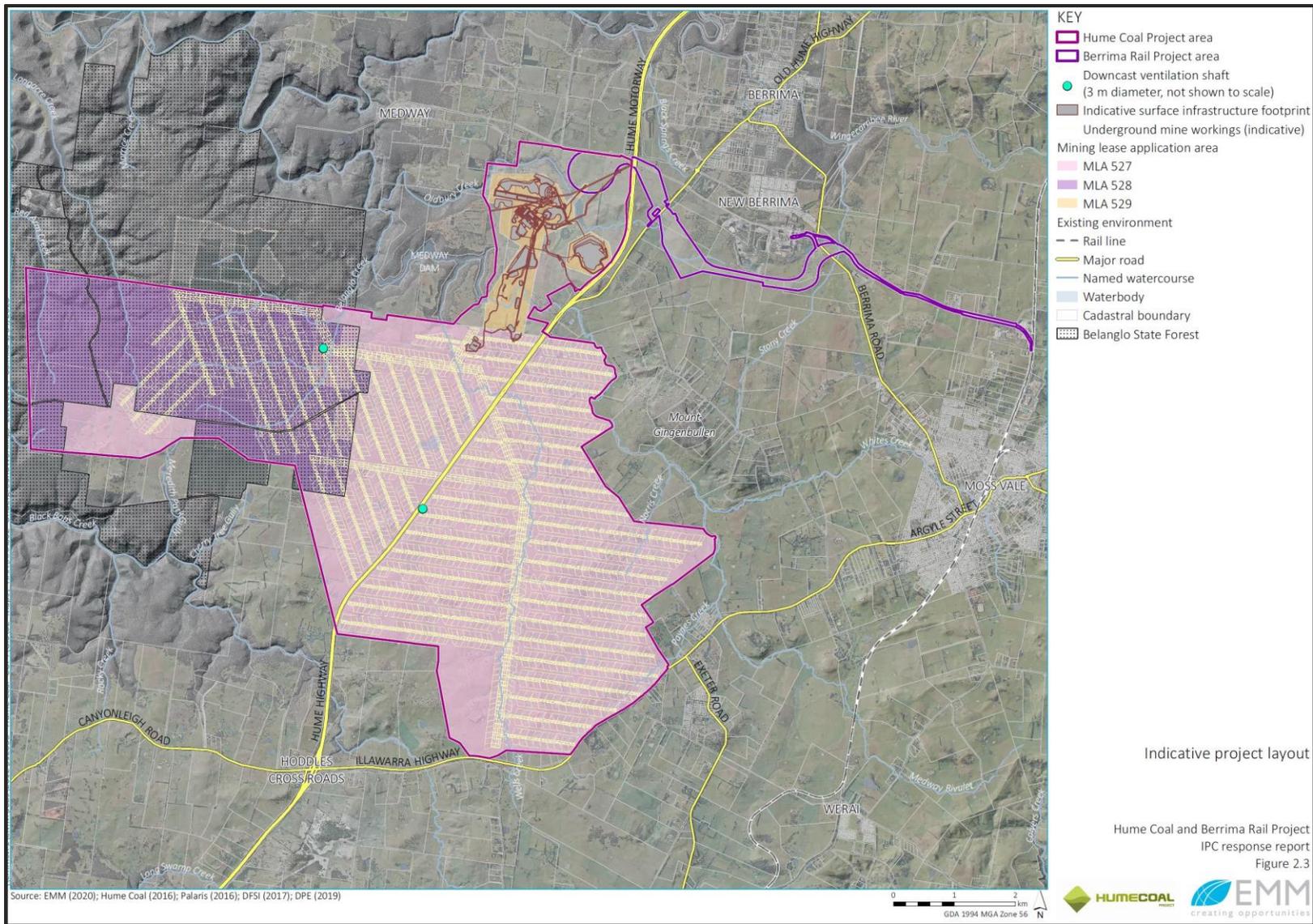


Figure 2 | Project Layout

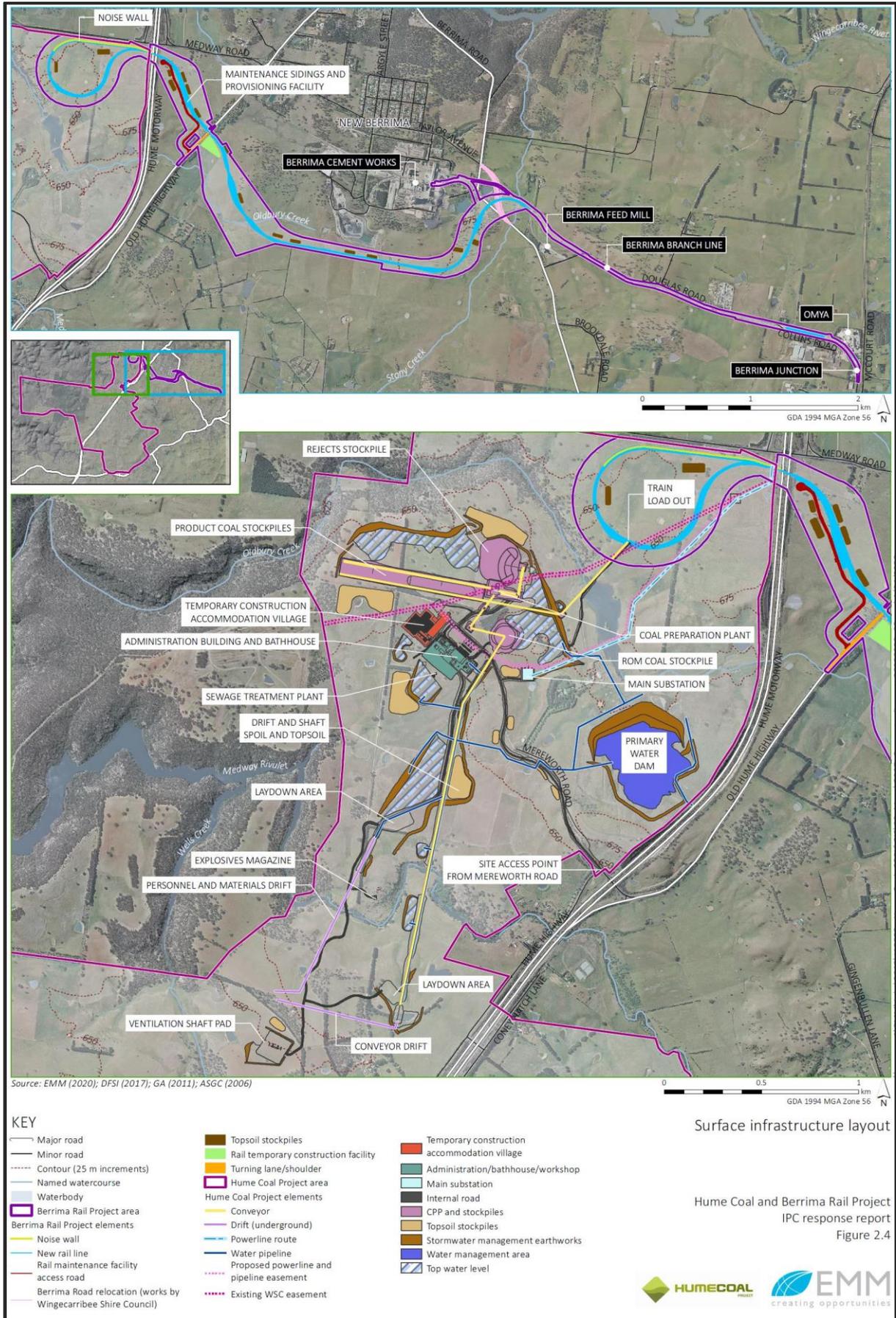


Figure 3 | Surface Infrastructure Layout

1.3 Department's Preliminary Assessment Report

11. In December 2018, the Department completed its preliminary assessment of the environmental, social and economic aspects of the proposed project. The assessment was undertaken with assistance from several independent experts including Emeritus Professor Jim Galvin (mining engineering), Professor Ismet Canbulat (mining engineering), Mr Hugh Middlemis (groundwater), Dr Renzo Tonin (noise) and Mr Andrew Tessler (economics).
12. In summary, the Department's preliminary assessment found that:
 - the project would have significant impacts on a highly productive groundwater aquifer, in particular drawdown impacts at up to 118 privately-owned groundwater bores. Both the Department and DPIE-Water¹ considered that scale of the predicted drawdown impacts on groundwater users would be unacceptable;
 - the significant groundwater drawdown impacts are unlikely to be able to be reduced further due to the nature of the geology and hydrogeology of the area (particularly the shallow coal seams and connections to the highly productive aquifers), and the comparatively high density of privately-owned bores in the area;
 - the proposed groundwater 'make good' strategy, while feasible from a technical standpoint, is not practicable for such a large number of affected landholders, and would inevitably result in a large number of negotiations and likely disputes with local landowners, unavoidable delays to the development of the project, and significant disruption to the community;
 - the proposed novel 'pine feather' mine design, and proposed underground storage of mine water in the working mine, carries considerable risk and is potentially unsafe;
 - the safety risks associated with the mine design (including underground water storage behind bulkheads and surface storage in the primary water dam) may lead to the need to discharge mine water into surface waterbodies and Sydney's drinking water catchment, which has not been assessed;
 - the project would have relatively low net economic benefits in comparison to many other coal mining projects in the Southern Coalfield and across NSW;
 - the proposed mine and its impacts are unlikely to be compatible with other land uses in the area, including small-scale agriculture and tourism, and the scenic landscape of the area. As such, the proposal may not be consistent with applicable land use plans, including the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP); and
 - the project represents a threat of serious harm to groundwater and surface water resources, and there is currently considerable scientific uncertainty about the level of environmental damage to both. As a result, the 'precautionary principle' is triggered and the project as currently proposed should not be considered an ecologically sustainable development.

¹ Formerly Department of Industry Water, or DOI Water

13. Overall, the Department considered that despite the economic benefits for NSW, the benefits of the project could not be achieved without significant adverse impacts on the environment and the local community. Consequently, the Department's preliminary findings were that the project would not be in the public interest and should not be approved.

1.4 Commission's Report

14. On 4 December 2018, the Minister for Planning asked the Commission to conduct a public hearing into the carrying out of the Hume Coal Project and associated Berrima Rail Project, and:
- a) consider the following information:
 - the EIS for the projects;
 - all submissions received on the projects;
 - any relevant expert advice; and
 - any other relevant information;
 - b) assess the merits of the Hume Coal Project and Berrima Rail Project as a whole having regard to all relevant NSW Government policies, and paying particular attention to the:
 - impacts on surface water and groundwater resources, including on private bores;
 - social and economic impacts of the projects on the locality and region; and
 - suitability of the site; and
 - c) prepare a report summarising the actions taken by the Commission in conducting the public hearing and outlining the Commission's findings on the projects, including any recommendations.
15. The Commission held a public hearing in Moss Vale on 26-27 February 2019, with 71 individuals and special interest groups addressing the Commission over the two-day period. The Commission also received a number of written submissions following the public hearing.
16. The Commission gave careful consideration to issues raised by the public at the public hearings, as well as a range of additional material provided by key government agencies and Hume Coal following the hearings. The Commission published its report on 27 May 2019 and made 30 recommendations seeking a range of additional information to enable it to reach a position on the merits of the proposal. The recommendations included:
- **4 recommendations on the proposed mine design** – regarding the need for further consideration of mine design features, resolution of safety concerns, consideration of additional risk assessment advice provided to the Commission and the management of coal rejects;
 - **7 recommendations on water resources** – regarding disputed aspects of the groundwater modelling, management of underground mine water emplacement to protect surface water systems, impacts of drawdown on surrounding properties, vegetation and heritage items, and the practical adequacy of make good provisions for private groundwater bores;
 - **4 recommendations on economics** – regarding the need for further clarification of the net economic benefits of the project and resolution of residual economic uncertainties, and the outlook for the coking coal market;

- **5 recommendations on surrounding landscape and social impacts** – regarding the visual, heritage and cultural landscape impacts of the project, together with the social impacts of the project on the surrounding region and its compatibility with surrounding land uses;
- **5 recommendations on noise and air quality impacts** – including further consideration of predicted noise impacts, noise mitigation measures, meteorological modelling, greenhouse gas emissions and greenhouse mitigation measures; and
- **5 recommendations for the Department’s further evaluation** – regarding the need for additional agency consultation, updated consideration of the Mining SEPP and the objects of the EP&A Act, including but not limited to the principles of ecologically sustainable development, public interest and the suitability of the site.

17. The Department has considered these recommendations, and other aspects of the Commission’s Report, in its final assessment of the project.

1.5 Hume Coal’s Response Report

18. In April 2020, at the request of the Department, Hume Coal provided a response to the Commission’s Report (see **Appendix A**). Hume Coal’s Response Report provides a response to each of the recommendations in the Commission’s Report, based on additional specialist reviews and information, including:

- peer review of mine design, safety and resource recovery, undertaken by Russell Howarth and Associates;
- project risk assessment (provided on commercial-in-confidence basis);
- updated water assessment, undertaken by EMM, including additional peer review by Dr Lloyd Townley;
- updated noise assessment, undertaken by EMM;
- updated greenhouse gas assessment, undertaken by EMM;
- updated visual assessment, undertaken by EMM;
- updated heritage assessment, undertaken by EMM, including a:
 - cultural landscape assessment, undertaken by Catherine Brouwer Landscape Architects;
 - Sorensen garden analysis, undertaken by Catherine Brouwer Landscape Architects; and
 - supplementary historical archaeological assessment, undertaken by EMM;
- assessment of groundwater dependence for heritage landscapes and gardens, undertaken by EMM;
- updated economic assessment, undertaken by BAEconomics, and peer review undertaken by Hon. Prof. Andrew Stoeckel;
- coal market review, undertaken by Wood Mackenzie; and
- updated social assessment, undertaken by EMM.

19. In response to additional consultation with key government agencies and its independent experts on Hume Coal’s Response Report, Hume Coal has also provided a range of additional information that seeks to address residual issues raised by the agencies and experts. This additional information is attached in **Appendix B**.

1.6 Additional Consultation

1.6.1 Government Agencies

20. The Department sought feedback from key government agencies, including Council, on Hume Coal's Response Report. The responses are attached in **Appendix C** and summarised below.
21. The **Department's Water Branch (DPIE Water)** reiterates that while the proposed make good arrangements appear reasonable, uncertainties and risks remain regarding the availability of water due to impacts from the project (including possible cumulative impacts and impacts to heritage gardens) and the ability to negotiate with affected parties, particularly given the number of potentially impacted land users.
22. DPIE Water also continues to raise issues regarding the limitations of the groundwater modelling, including its conceptualisation, model input data and sensitivity analysis. Given these limitations, the agency believes that the predicted impacts should be seen as a minimum, and that any updates to the model are unlikely to decrease the predicted impacts.
23. **Water NSW** continues to raise concerns about the effectiveness of mine water reinjection and the potential need to discharge water to Sydney's drinking water catchment. Water NSW is concerned that any such discharges would not meet the water quality requirements for 'Neutral or Beneficial Effect' (NorBE) under the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.
24. Water NSW also raised concerns about baseflow reductions potentially adversely affecting water quality, and noted that reductions in yield to watercourses must be negligible, and that this has not been demonstrated.
25. The **Environment Protection Authority (EPA)** considers that the revised noise assessment is adequate, although it noted that noise-affected properties should be shown on a map. It also recommended that real-time air and noise monitoring is undertaken for the project if it is approved.
26. The **Resources Regulator** noted that subsidence uncertainty remains given the low depth of cover and the novel mining method. Consequently, significant risk remains, especially to critical infrastructure including the Hume Highway, Moomba-Sydney gas pipeline and the Illawarra Highway. To address this risk, the Resources Regulator recommends that if the project is approved, mining commences in areas with minimal surface constraints, to allow review and validation.
27. **Regional NSW – Mining, Exploration and Geoscience (MEG)**² did not raise any residual issues, noting that the coal recovery and return to the State is satisfactory.
28. **Heritage NSW** considers that Mereworth house and its gardens may be of State heritage significance, and raised concerns that impacts on Mereworth's gardens have not been adequately addressed. It considers that significant impacts on the cultural landscape are likely, including significant visual impacts on the 'Berrima, Sutton Forest and Exeter Cultural Landscape'.

² Formerly Division of Resources and Geoscience, or DRG

29. Heritage NSW believes that the proposed screening/planting mitigation measures are not appropriate, and that Hume Coal should consider relocating some project elements. If approved, the agency believes that plantings should be required to be removed at the end of the project.
30. Heritage NSW also considers that the supplementary historical archaeological assessment is not adequate (including incorrect terminology and inadequate fieldwork, mapping, assessment, comparative analysis and significance assessment), and that its previous recommendations for the assessment have not been addressed.
31. **Wingecarribee Shire Council (Council)** reiterated its objection to the project and noted that its concerns remain unchanged.

1.6.2 *Independent Experts*

32. In addition to seeking feedback from key government agencies, the Department also sought feedback on key residual issues from some of its independent experts, including:
 - Emeritus Professor Jim Galvin – to review the issues relating to mine safety and risk assessment;
 - Professor Ismet Canbulat – to review the issues relating to mine safety and risk assessment; and
 - Mr Andrew Tessler – to review the updated economic assessment.
33. The additional advice from these experts is provided in **Appendix D**.
34. The Department did not seek additional feedback from its other experts (ie. Mr Hugh Middlemis for groundwater, and Dr Renzo Tonin for noise), as it is satisfied that the information available provides an adequate basis for the decision maker to determine the project.
35. Professor Galvin and Professor Canbulat both continue to hold significant concerns about the mine design and safety aspects associated with the proposed pine feather underground mining method. The experts have significant concerns about the geotechnical model on which the mine design is based, particularly in relation to uncertainties with the short and/or long-term stability of the web pillars.
36. Mr Tessler was generally satisfied with Hume Coal's revised economic assessment, subject to some comments and recommendations regarding consideration of economic benefits. Notwithstanding these comments, Mr Tessler acknowledges that the project would result in net positive economic benefits for NSW.
37. The Department has considered the feedback received from agencies and the independent experts in its final assessment of the project.

1.7 **Chronology**

38. A brief chronology of key consultation events that have occurred since the Department completed its PAR is set out in Table 1.

Table 1 | Timeline of key consultation events

Date	Event
06 December 2018	Department's PAR on the Project referred to the Commission
11 February 2019	Commission briefed by officers from the Department
26-27 February 2019	Commission held a public hearing in Moss Vale
27 May 2019	Commission published its Report
2 July 2019	Department requested Hume Coal provide a response to the Commission's Report
30 July 2019	Department chaired a meeting between the Water Group, Hume Coal and the Department's peer reviewer (Hugh Middlemis) to identify potential pathways to clarify residual uncertainties and resolve issues of contention in the groundwater modelling
8 April 2020	Applicant provided its Response Report to address the Commission's Report
14 May 2020	Department sought advice from key agencies and independent experts on Hume Coal's Response Report
June – July 2020	Department received comments from DPIE Water, Water NSW, EPA, Resources Regulator, MEG, Heritage NSW, Council and its independent experts on Hume Coal's Response Report
August – September 2020	Applicant provided additional responses to issues raised by key agencies and independent experts

2 Response to the Commission's Report

2.1 Introduction

39. The Department has completed its consideration and assessment of residual matters related to the project, with a focus on addressing and responding to the recommendations in the Commission's Report.
40. Each of the Commission's recommendations is reproduced in the following sections (in grey-shading), followed by the Department's consideration. The Commission's recommendations have been grouped together where possible (as per Section 1.4), with the Department's responses to these considered collectively to provide a holistic and consolidated response.
41. The following sections should be read in conjunction with the PAR.

2.2 Water Resources

42. As outlined in the PAR, the site is underlain by the Hawkesbury Sandstone groundwater aquifer, which is classified as a 'highly productive aquifer' under the *NSW Aquifer Interference Policy*. It contains generally fresh water with high yields, and is consequently highly valued and extensively used in the region. There are approximately 363 bores within 9 km of the project.

43. The Hawkesbury Sandstone and the coal seam are only separated by a thin layer (between 0.1 to 4m) of shale in the project area. This is an important factor in the predicted levels of groundwater drawdown and impacts for the project.
44. The Commission made seven recommendations on water resources. These recommendations relate to disputed aspects of the groundwater modelling, management of underground mine water emplacement to protect surface water systems, impacts of drawdown on surrounding properties, vegetation and heritage items, and the practical adequacy of make good provisions for private groundwater bores.
45. These recommendations have been considered in detail below.

2.2.1 Groundwater Modelling

Recommendation 4

That the Department review the advice of Department of Industry - Water dated 24 April 2019 and the Applicant's correspondence of the 17 May 2019 and gives consideration to requesting the completion of the revised groundwater flow model, taking into consideration the advice provided.

Recommendation 5

Because the Applicant and Department of Industry - Water remain a considerable distance apart regarding their positions on the groundwater modelling, the Commission suggests that the Department or the Applicant, or both of them jointly³ (and in any case in consultation with Department of Industry - Water), engage a new independent expert (or alternatively a small technical group with Chair) with experience in groundwater modelling with a view to resolving ongoing differences of opinion. The independent expert/Chair should consider:

- *what practical steps, if any, can be taken to make the model a class 2 model or seek agreement on the class of the model;*
- *what additional work is required to establish the extent to which the emplacement of water in mined-out voids will reduce the level of drawdown in the later years of the project;*
- *the range used for the input parameters in the modelling sensitivity/uncertainty analysis and recommend if a wider range is required so that there is no unreasonable truncation of results; and*
- *if additional geological information is required.*

46. Since the Commission's Report, the Department has undertaken additional consultation with DPIE Water and Hume Coal regarding the provision of additional groundwater information and assessment.

³ The Department is required to undertake an independent whole-of-government assessment of the development application, and it is not appropriate or necessary to jointly commission technical experts with applicants for State significant developments.

47. This included a meeting on 30 July 2019 between DPIE Water, the Department, and Hume Coal and its consultants. In response to the meeting Hume Coal agreed to provide a range of additional information, including information/assessment on:
1. Hydrogeological cross sections;
 2. Hydraulic data (including depth and spatially);
 3. Berrima mine comparison;
 4. Calibration statistics;
 5. Uncertainty analysis (further description);
 6. Packer tests data; and
 7. Detailed response to the data and information requests in DPIE Water's earlier submissions.
48. Hume Coal has provided additional information on each of these matters in its Response Report.
49. In addition, Hume Coal engaged Dr Lloyd Townley of GW-SW Pty Ltd to conduct an independent review of the groundwater modelling undertaken for the project.
50. Dr Townley concluded that the modelling undertaken for the project is fit for purpose – that is, for the purpose of predicting groundwater inflows to the proposed mine and drawdown of the water table within and near the project area.
51. This conclusion is consistent with the previous expert reviews by Dr Noel Merrick and Dr Frans Kalf on behalf of Hume Coal, as well as the independent review undertaken by Hugh Middlemis on behalf of the Department, all of which concluded that the groundwater model for the project (as provided in the RTS) is fit for purpose.
52. Given these findings, Hume Coal's Response Report does not include any additional groundwater modelling. However, Hume Coal does note that it has undertaken additional model verification work since the RTS model, based on recent monitoring data. Hume Coal reports that the results of this verification are consistent with the RTS groundwater modelling.
53. In addition to the verification work, Hume Coal notes that it has continued to refine the groundwater model in response to a number of scenarios, including water table response to potential injection of surplus water, refinements to topography, influence of inter-burden units on groundwater flow, and water table response to mining. Given that the RTS model has been determined to be fit for purpose, Hume Coal has not included or relied on this additional modelling work in its response.
54. With regard to the four specific points for consideration raised in Recommendation 5, Hume Coal notes that:
- Dr Noel Merrick, Dr Frans Kalf, Dr Lloyd Townley and the Department's independent expert Mr Hugh Middlemis all accept that the groundwater model is 'Class 2' and fit for purpose;
 - Dr Townley considers that including emplacement of water in the modelling would predict faster recovery after the end of mining and smaller volumes of maximum drawdown in all modelling scenarios;
 - Dr Townley considers that the range of input parameters used in the sensitivity analysis is sufficient and should not be extended; and
 - the geological and hydrogeological data for the project is extensive, and that this has been acknowledged by DPIE Water in recent consultation.

55. Despite the additional groundwater information provided by Hume Coal, DPIE Water continues to have concerns regarding the limitations of the groundwater modelling, including its conceptualisation, model input data and sensitivity analysis. Given these limitations, DPIE Water believes that the predicted impacts should be seen as a minimum, and that any changes to the model to address its concerns are unlikely to decrease the predicted impact.
56. DPIE Water suggests that the Commission may wish to consider requiring Hume Coal to undertake additional modelling, including using higher conductivity values in the Hawkesbury Sandstone and other layers, and getting further independent advice.
57. The Department notes these concerns, but does not consider that there is significant value to be gained by undertaking additional groundwater modelling work at this point. As outlined in the PAR and Hume Coal's response, the groundwater model has now been reviewed by a number of eminent experts. Most of these experts, including the Department's independent expert Hugh Middlemis, accept that the model is fit for purpose.
58. This groundwater modelling work indicates that the project would result in significant groundwater impacts, even at the lower percentile modelling scenarios. As outlined in the PAR and in the following sections, the Department believes that these predicted groundwater impacts are unacceptable.
59. If DPIE Water's recommendations for revised modelling were adopted, then the predicted impacts could be even worse.
60. Given this, the Department sees little utility in requiring additional groundwater modelling work for the project. As outlined in the PAR, and given DPIE Water's latest comments, the Department has considered both the 67th percentile and 90th percentile predictions from the groundwater model in its assessment of the project. Consideration of impacts based on these predictions is presented in the following sections of this report.

2.2.2 Practicality of Make Good Provisions

Recommendation 6

That the Department give close attention to the practical adequacy of make good provisions during the final assessment process, with an independent review if necessary. This should include the practical aspects such as dispute resolution and economics as well as the technical.

61. This issue was one of the key reasons why the Department recommended in its PAR that the project should not be approved.
62. As outlined in the PAR, the NSW government regulates mining-related groundwater issues in two key ways:
 1. any impacts on 'beneficial' groundwater aquifers must be assessed under the *Aquifer Interference Policy*, and
 2. the 'take' of water from groundwater aquifers through groundwater inflows must be licensed under the *Water Management Act 2000* and associated *Water Sharing Plans*.
63. As outlined in the PAR, the *Aquifer Interference Policy* establishes rules for "highly productive groundwater sources", which includes the Hawkesbury Sandstone for this project. It states that any "predicted pressure decline" of more than 2 m is considered to be more than a "minimal impact" and requires "appropriate studies to demonstrate that the decline will not prevent the long-term viability of the water supply works unless make good provisions apply."

64. The Hume Coal Project significantly exceeds the minimal impact threshold at multiple locations, and whether this is an acceptable impact on this highly productive groundwater aquifer is the key issue in the Department's assessment.
65. While there is no specific guidance on how an impact can or should be 'made good' in the legislation or the *Aquifer Interference Policy*, these issues are generally dealt with via agreements between the mining company and the affected landowners, and then supported by development consent conditions.
66. For example, the Department regularly includes a 'compensatory water supply' condition in mining consents, which requires the company to compensate other water users for mining impacts on water supply. However, the inclusion of such conditions is only a contingency measure to manage unexpected impacts that might occur (ie. greater than originally predicted) and the Department has rarely needed to enforce these conditions.
67. Whilst the Department generally accepted that Hume Coal's proposed make good strategy is technically feasible, it did not accept that the provision of make good arrangements was suitable or practical, given that the project is predicted to significantly impact up to 94 bores on 72 properties based on the 67th percentile predictions, or up to 118 bores based on the 90th percentile predictions.
68. The Department's PAR concluded that the proposed make good arrangements were not suitable or practical given:
- the substantial disruption to the local community associated with the negotiation and implementation process, particularly given the rural-residential and small-scale agricultural land use of the area;
 - the high likelihood of considerable disagreement between Hume Coal and landowners about the actual impacts and make good arrangements;
 - that the process would likely rely heavily on dispute resolution between Hume Coal and a large number of landowners, which would inevitably involve substantial legal costs for both parties and the Department; and
 - that the above processes would likely result in extensive time delays, creating ongoing disruption and uncertainty in the community.
69. The Department has not sought an independent review on this matter as suggested by the Commission, as regulation of make good arrangements is generally addressed by government.
70. Hume Coal's Response Report provides additional detail on the process for the proposed make good strategy. However, it does not provide any substantial new information on the practicality of the make good arrangements, with relatively little consideration of the Department's or the Commission's issues as summarised above.
71. Hume Coal reports that:
- it has secured 'access' arrangements with approximately 20 landholders for monitoring purposes;
 - the average drawdown for all affected bores is only 6 metres; and
 - only 16 bores are required to be made good in the first 5 years of mining.

72. Of the 20 access agreements, it is understood that none have been progressed to a formal make good agreement.
73. Hume Coal also notes that although the number of bores predicted to experience drawdown in excess of 2 metres is higher than other approved mining projects, there are other aspects of the groundwater impacts that are similar or less than contemporary approved mining projects in NSW, eg. peak annual inflows, extent of the 2-metre groundwater drawdown contour, and groundwater recovery time.
74. However, the Department maintains that it is the number of affected landholders, the greenfield nature of the project area, the shallow nature of the mine and the aquifers, and the practicality of making good these impacts in a manner that is acceptable to landholders, that is the issue.
75. The Department's experience is that there is a considerable risk of disputes with landowners in relation to the make good arrangements. This is evidenced by the fact that Hume Coal has only secured a relatively small number of access arrangements for the project to date, and has not finalised any make good agreements. This is not surprising given the very large number of objections received on the project from the local area including some 5,131 objections from residents of the Wingecarribee LGA, of which 4,930 were from postcodes surrounding the project area.
76. Hume Coal reports that most of the affected bores provide secondary back-up water supply only, with some used for stock and domestic purposes and a small percentage used for irrigation.
77. However, Hume Coal's make good strategy in the RTS indicates that a large proportion of the affected bores are licenced for stock and domestic and/or irrigation purposes, with about a third of the affected bores licenced for irrigation purposes. A summary of these bores, including Hume Coal's predicted make good option for each, is provided in the following table, and shown on **Figure 4**.

Table 2 | Make Good Summary (based on 67th percentile predictions)

Predicted Make Good Option ¹	No. Affected Bores by Licence Purpose		Total No. Affected Bores	%	Max. Predicted Drawdown (m)		Average Years Drawdown >2m
	Stock and/or Domestic	Irrigation, and stock and/or domestic			Average	Max.	
1 - Increased pumping costs	21	10	31	33%	3	8	28
2 - Deepen pump	23	10	33	35%	11	33	48
3a - Replace stock and domestic bore	15	-	15	16%	11	47	43
3b - Replace irrigation bore	-	15	15	16%	18	30	51
Total	59	35	94	100%	10	47	41

Note 1: Options 2 and 3 also likely to involve increased pumping costs

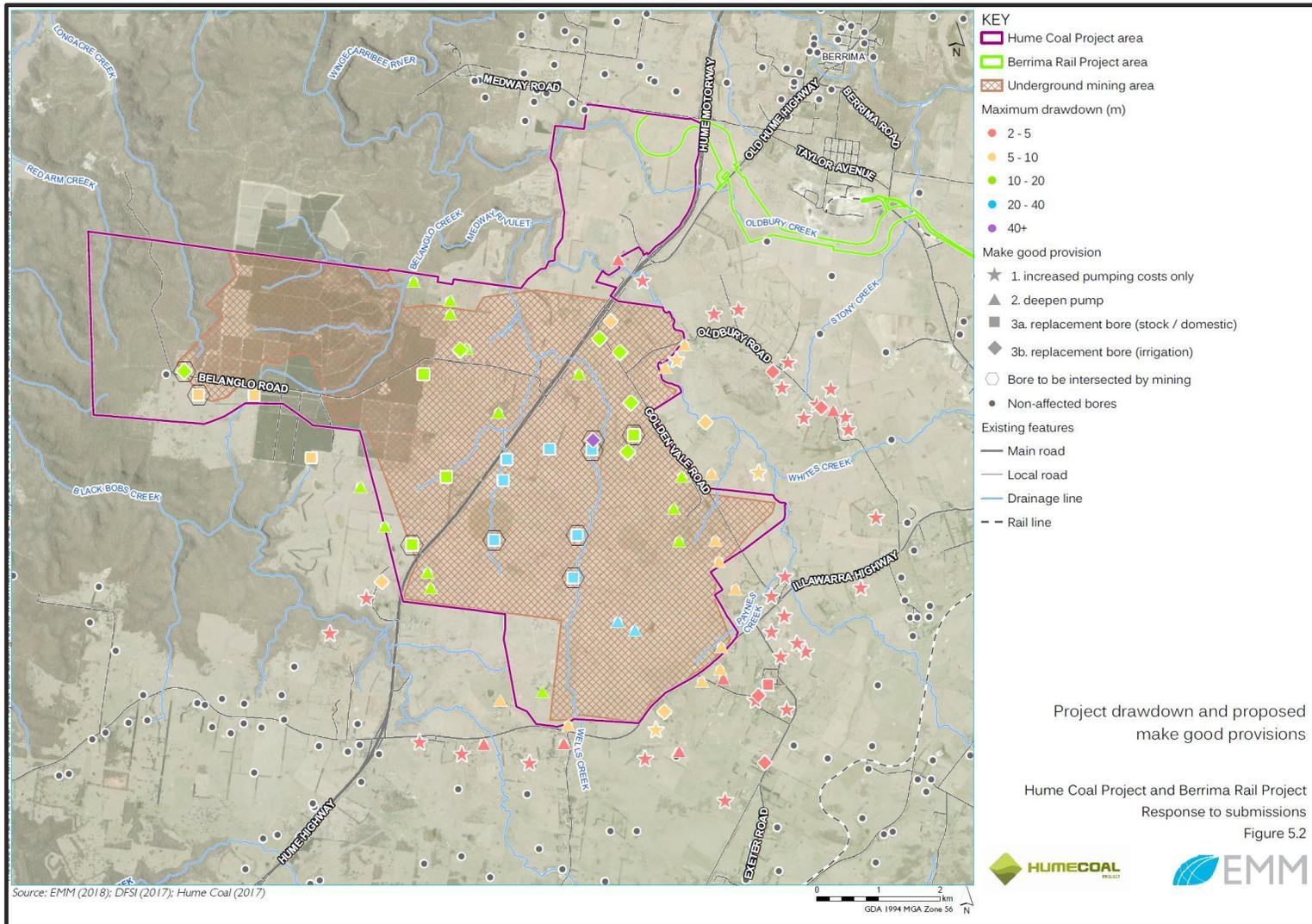


Figure 4 | Groundwater Drawdown and Make Good Strategy

78. Hume Coal's make good strategy notes that a further 19 active (ie. current) water supply works and/or use approvals (which do not have an associated groundwater bore works number) are located in the affectation area, and haven't been included in the above table.
79. The Department also notes that the affected bores in the above table are based on the 67th percentile groundwater drawdown predictions, and DPIE Water maintains that the higher percentile predictions, including the 90th percentile which predicts 118 affected groundwater bores, should not be discounted.
80. On any of the given predictions, the assessment indicates that the number of affected bores would be significant, with the significant drawdown issues continuing for a number of decades.
81. The following summary table illustrates the magnitude of the predicted impacts on privately-owned bores compared to other contemporary NSW mining projects determined in recent years.

Table 3 | Comparison of Predicted Number of Impacted Privately-Owned Bores

Coal Project	Coalfield	Determination Date	Determination ¹	No. Predicted Bores >2m Drawdown	Comments
Dendrobium Extension Project	Southern	5 Feb 21	Refused	0	Up to 5 bores affected in cumulative worst-case scenario, but no significant contribution from project
Maxwell Underground Project	Hunter	22 Dec 20	Approved	1	One bore predicted to be impacted with drawdown up to 2.3m, or 3.7m cumulatively. Two additional bores may be impacted cumulatively up to 3m, though likely to already be dry
Russell Vale Underground Extension Project	Southern	8 Dec 20	Approved	0	
Vickery Extension Project	Gunnedah	12 Aug 20	Approved	0	
Rix's Creek Extension Project	Hunter	12 Dec 19	Approved	0	
Bylong Coal Project	Western	18 Sep 19	Refused	0	
United Wambo Open Cut Project	Hunter	28 Aug 19	Approved	0	
Wallarah 2 Coal Project	Newcastle	16 Jan 18	Approved	0	
Rocky Hill Coal Project	Gloucester	14 Dec 17	Refused	0	
Wilpinjong Extension Project	Western	24 Apr 17	Approved	0	One publicly-owned bore on Wollar Public School predicted to be affected
Drayton Extension Project	Hunter	22 Feb 17	Refused	0	
Tahmoor South Coal Project	Southern	23 Apr 21	Approved	46	Historical database from previous mining indicates that only 20 bores are likely to require make-good

Note 1: None of the refused projects were refused due to impacts on privately-owned bores

82. As shown in the table, the scale of the predicted project-related impacts to privately-owned bores (in terms of the number of affected bores) far exceeds that of contemporary coal mining projects determined in recent years, most of which predict none or only a small number of affected bores.
83. The only other project with a comparable scale of predicted impacts is the Tahmoor South Coal Project, also in the Southern Coalfields, which was recently approved. The Tahmoor South Coal Project is nominally predicted to cause drawdown impacts of greater than 2 metres on up to 46 groundwater bores.
84. However, there are a number of reasons to distinguish the potential drawdown impacts (and associated make good requirements) at Tahmoor South to the Hume Coal Project.
85. Firstly, in relation to the local context, the Tahmoor coal mine is located within the Bargo Mine Subsidence District, which was created in 1975 by the NSW government with an express intention to extract an identified coal resource through longwall mining, while providing adequate protections and compensation for impacts to damage to built infrastructure (including homes, groundwater bores and other infrastructure).
86. Since 1975, the township of Bargo has expanded steadily, such that 83% of houses in the area have been built after the declaration of the Mine Subsidence District, and almost half of the 390 employees at the Tahmoor coal mine reside in the local area. Since the mine was approved, mining has occurred underneath over 1,250 homes.
87. In contrast, while there is a long history of coal mining in the Southern Highlands, the historical coal mining in this region was generally small in scale (eg. bord-and-pillar mining) and mostly ceased between 50 and 150 years ago. There are no areas in this region that have been declared a Mine Subsidence District, and the region is now more widely known for its rural land uses, small-scale agriculture, scenic landscapes and tourism.
88. Secondly, in relation to local geology, the Tahmoor coal mine is much deeper than the proposed Hume Coal Project, with mining depths of 370-430 metres, and its project area comprises additional geological layers in addition to the Hawkesbury Sandstone, including a number of less permeable claystone and thick layers of sedimentary rock, known as the Narrabeen Group.
89. In the project area at Hume, the Hawkesbury Sandstone and the coal seam are only separated by a thin layer (between 0.1 to 4m) of shale. The local geology is different to the rest of the Southern Coalfield, as the Narrabeen Group has been eroded out of the sequence, which creates a unique situation where the Hawkesbury Sandstone is very close, or adjacent, to the coal seam. This is a major factor in the predicted high levels of groundwater drawdown.
90. Thirdly, in relation to the historical policy settings, the Tahmoor coal mine was first approved in the 1970s, which pre-dates the commencement of the *Water Management Act 2000*, the Water Sharing Plans and, importantly, the Aquifer Interference Policy in 2012 (including the requirement for make-good). As there was no policy requirement to consider 'aquifer interference' or 'make good', the potential impacts on groundwater bores was assessed differently when the mine was approved, particularly given the presence of a Mine Subsidence District and associated protections available to landowners.
91. Fourthly, in relation to the predicted versus actual impacts at Tahmoor, for Tahmoor South, the mining company had over 30 years of experience to draw on in assessing the potential drawdown impacts on surrounding groundwater bores and the need to 'make good'. Based on this experience, there is now an extensive historical database demonstrating that actual impacts have

proven to be substantially less than predicted impacts eg. while the current groundwater model predicts that historical operations would have affected 72 bores, only 2 bores have required compensatory water supply.

92. Finally, in relation to the 'make good' predictions at Tahmoor, based on a risk classification system developed from its previous experience, Tahmoor Coal estimates that only 20 of the 46 bores would have a Moderate-Low, Moderate or High risk of requiring make good provisions.
93. Hume Coal notes that this may prove to be the case for the Hume Coal Project as well (ie. that actual impacts will be less than predicted impacts), although it does not provide any evidence to support this claim. The Department is not able to infer any reduced likelihood of predicted impacts at the Hume Coal Project based on the experience at Tahmoor.
94. For the reasons stated above, the Department does not believe that the comparison with the Tahmoor South Coal Project is appropriate. Rather, the predicted impacts on up to 94 bores based on 67th percentile predictions (or 118 bores at 90th percentile) should be considered as the likely impacts from the Hume Coal Project. This is numerically and proportionally a significantly higher number than the likely impacts at Tahmoor South (ie. 20 bores), and is also likely to cause greater impacts in the community given the local context and greenfield nature of the proposal.
95. With regard to the process of make good, Hume Coal's Response Report includes a flowchart outlining the proposed make good strategy and dispute resolution process. The flowchart is reproduced on **Figure 5** below.
96. Hume Coal's make good strategy provides more detail on the proposed dispute resolution process, noting that it would follow the formal dispute resolution pathway outlined for the NSW Land Access Arbitration Framework (DRE, 2018) under the *Mining Act 1992*, including the following key processes:
 - notice of intent;
 - negotiation;
 - mediation, if no agreement reached through negotiation;
 - arbitration, if no agreement reached through mediation; and
 - appeal to the NSW Land and Environment Court, if the final arbitration is appealed.
97. As outlined in the PAR, the Department considers that there are a number of important reasons that mean the provision of make good arrangements for up to 118 bores (and potentially more given the active water supply and works approvals) is not suitable or practical. The Department is not satisfied that Hume Coal's Response Report has adequately addressed these concerns.
98. Firstly, there would be a substantial level of disruption to the community through a difficult, ongoing process of negotiating and implementing make good arrangements. The disruption would be particularly significant on this local community given the nature of the existing land uses and the greenfield nature of the project. The majority of the affected landowners are located in an area with rural-residential and small-scale agricultural land uses, many of which rely on access to the highly productive groundwater aquifer. This includes many for irrigation and stock and domestic purposes.
99. Secondly, there is likely to be considerable disagreement between Hume Coal and the landowners about both the actual drawdown impacts and the proposed make good options. The selection of a particular make good option may be technically preferable, however it may not

align with the landowner's preference, taking into account the potential disturbance required, the physical or visual impacts, or the existing land uses and intended purpose of the bore.

100. Thirdly, the process is likely to rely heavily on dispute resolution to resolve various disagreements between Hume Coal and the landowner. Any dispute resolution process of this nature and on this scale would inevitably involve substantial legal costs for Hume Coal, the Department and, importantly, individual landowners. It is reasonably foreseeable that the Department would find itself in a position of managing a large number of ongoing disputes throughout the life of the proposed mine life and even beyond that.
101. Finally, each of the above issues are likely to result in extensive time delays, which may interfere with the landowners' use of their bores or even disrupt the proposed sequencing of mining. Given that no make good agreements have been executed after several years of negotiation, it is likely that each of the make good arrangements would take a long time to be finalised and many would likely end up in lengthy dispute resolution processes. These unavoidable delays would undermine the effectiveness of the entire make good process and create residual ongoing disruption and uncertainty in the community. The process would also potentially take a considerable social and emotional toll on the affected landholders.
102. For these reasons, and in the absence of Hume Coal obtaining up-front make good agreements with any of the affected groundwater users, the Department maintains that the groundwater drawdown impacts on the local community are not acceptable.

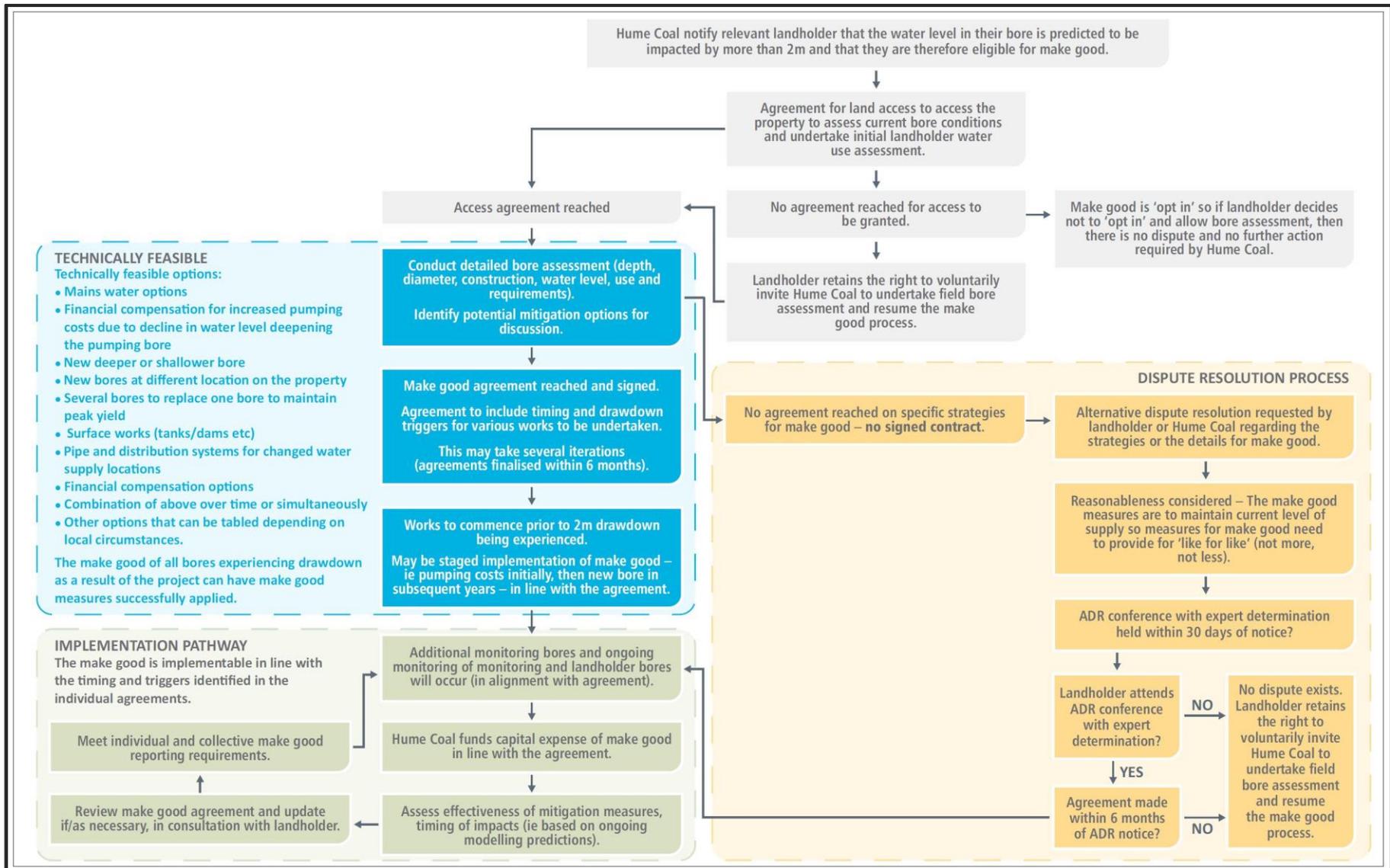


Figure 5 | Make Good Strategy Flowchart (Source – Hume Coal Response Report)

2.2.3 Impacts to Surface Water Systems

Recommendation 7

The Applicant is to confirm whether the provisional Water Treatment Plant does form part of the Project – and if so, provide suitable information to permit an appropriate assessment of its impacts.

Recommendation 8

Should underground emplacement and water impounded have to cease for any reason, the Applicant is to confirm how long under normal mining operations it would take for the reject emplacement stockpile and Primary Water Dam to reach capacity.

103. Hume Coal's Response Report confirms that the provisional water treatment plant (WTP) does not form part of the project. Consequently, Hume Coal has not provided information to assess the impacts of the plant.
104. All excess water would be managed by temporarily storing it in the primary water dam (PWD) on the surface before pumping it underground to the voids behind the sealed bulkheads. The storage of water underground is integral to on-site water management.
105. With regard to the PWD, Hume Coal has used the RTS Goldsim water balance model to estimate the length of time it would take for the dam to reach its capacity if the option of storing excess water in the voids is prevented or unavailable at any time during the 19-year mine life.
106. The assessment, based on 107 different climate scenarios, indicates that the time to reach PWD capacity would gradually reduce over time during the 19-year mine life. The longest duration for the PWD to reach capacity is estimated to be 16.5 years, if storage in the voids were to cease in the first mining year. The shortest duration is estimated to be 0.5 years, if storage in the voids ceases at the start of the last year (Year 19) of mining.
107. Despite the additional water balance work by Hume Coal, Water NSW maintains significant concerns that, without the WTP or other suitable contingency measure, the project could result in untreated water discharges into Sydney's drinking water catchment.
108. Water NSW notes that from Year 11 onwards, the water balance modelling indicates that the duration to reach PWD capacity in the wettest climate scenarios is only 6 to 9 months.
109. Without a suitable contingency (eg. a water treatment plant or re-injection), and given the long lead time likely to be required to get approval for and implement the contingency strategy, Water NSW remains concerned that any untreated discharges into Oldbury Creek would have a detrimental impact on surface water quality in Sydney's drinking water catchment, and would not meet the Neutral or Beneficial Effect (NorBE) on water quality requirement under clause 10(1) of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.
110. As such, Water NSW recommends that either Hume Coal resolves the uncertainty and disagreement about the likely effectiveness of the proposed re-injection of mine water, or otherwise proposes suitable contingencies up front, to ensure that the NorBE water quality test is satisfied.
111. Any contingency measure, if required, is likely to require a significant amount of time to plan, assess, obtain approval for, and implement. It may also entail significant capital expenditure. A

recently implemented desalination plant at the Springvale mine which discharges to Sydney's drinking water catchment has taken a number of years to construct and commission, and had a capital investment cost of approximately \$100 million.

112. In this regard, a period of 6 to 9 months capacity in the PWD would be unlikely to be adequate to address any contingency requirement.
113. Given the novel mining technique, the residual stability issues raised by the Department's independent mine engineering experts, the scale of the proposed underground mine water storage, the potential risks associated with such storage, the finite capacity of the PWD, as well as the sensitivity of the downstream environment, the Department considers that risks remain associated with the removal of the provisional water treatment facility from the project. The Department also agrees with the concerns of Water NSW about potential impacts to Sydney's drinking water.

2.2.4 Impacts of Groundwater Drawdown on Heritage Gardens and Vegetation

Recommendation 16

Further information should be provided to allow the assessment of the potential impact of water table drawdown on heritage items (including gardens, plantings and landscape settings) within or in the vicinity of the Project area. The information should include confirmation of the existing level of the water table and the anticipated drawdown at both the 67th percentile and the 90th percentile.

Recommendation 19

The Applicant is to undertake further technical assessment on the impacts on private gardens, exotic trees and native vegetation from a declining water table.

114. Hume Coal has undertaken a detailed 'Groundwater Dependence Assessment for Cultural Heritage Landscapes' as part of its Response Report. The assessment quantifies impacts on the heritage gardens and cultural heritage landscapes at the 50th, 67th and 90th percentile groundwater predictions. It was undertaken by an interdisciplinary team at EMM including an ecologist, archaeologist, landscape architect, arborist, hydrogeologist and spatial analyst, using the findings from the updated Statement of Heritage Impact and Water Assessment.
115. The cultural heritage items in the project area are shown on **Figure 6**, and heritage gardens within the predicted groundwater drawdown area (90th percentile) are shown on **Figure 7**.
116. The assessment found that all heritage gardens within the curtilage of heritage-listed properties occur where the Wianamatta Group shale overlies the Hawkesbury Sandstone. No impacts to heritage gardens and other vegetation are predicted to occur in these areas, as the shale provides a perched groundwater table above the regional water table, with the perched water table not predicted to be significantly affected by groundwater drawdown from the project.

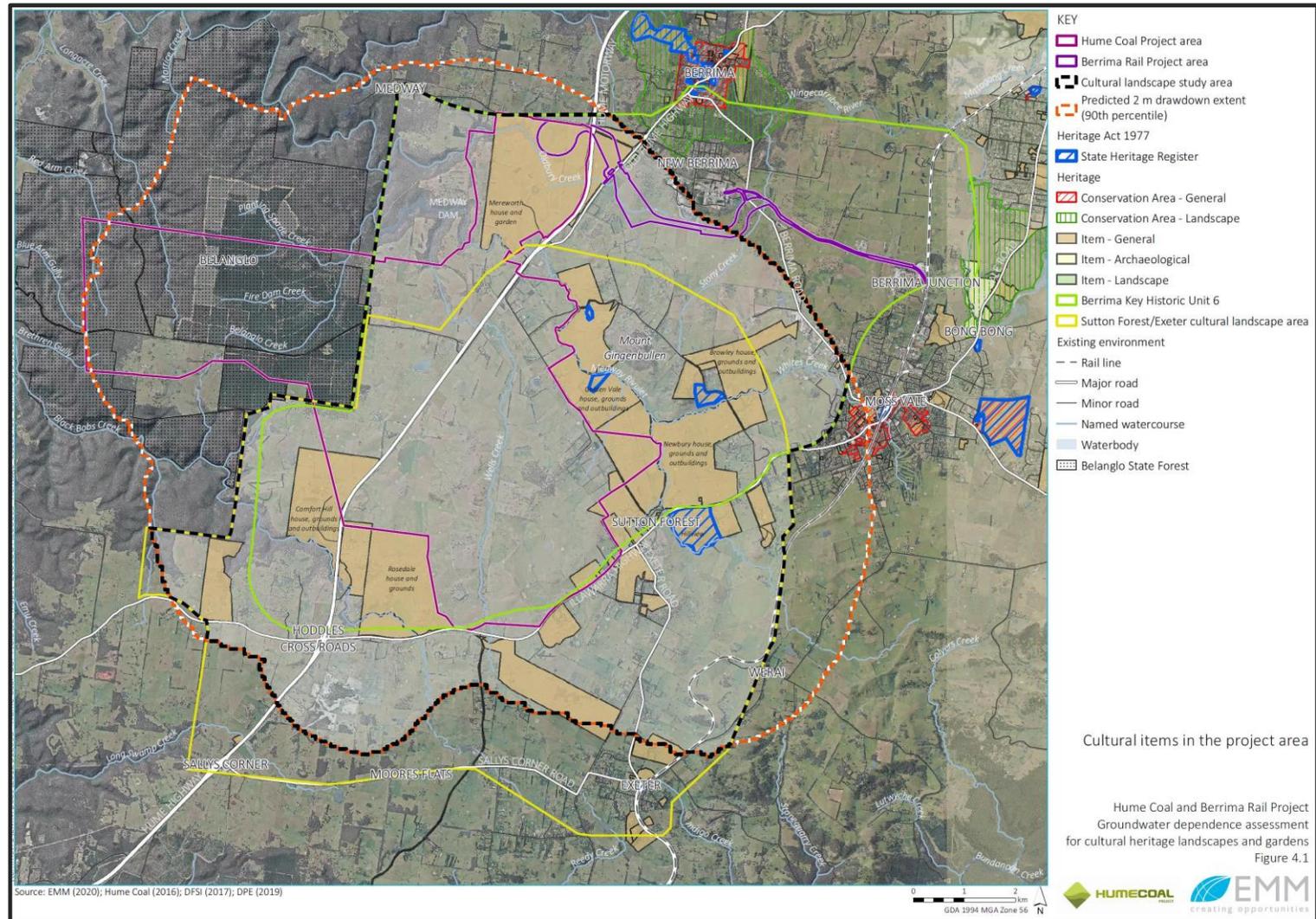


Figure 6 | Cultural Heritage Items

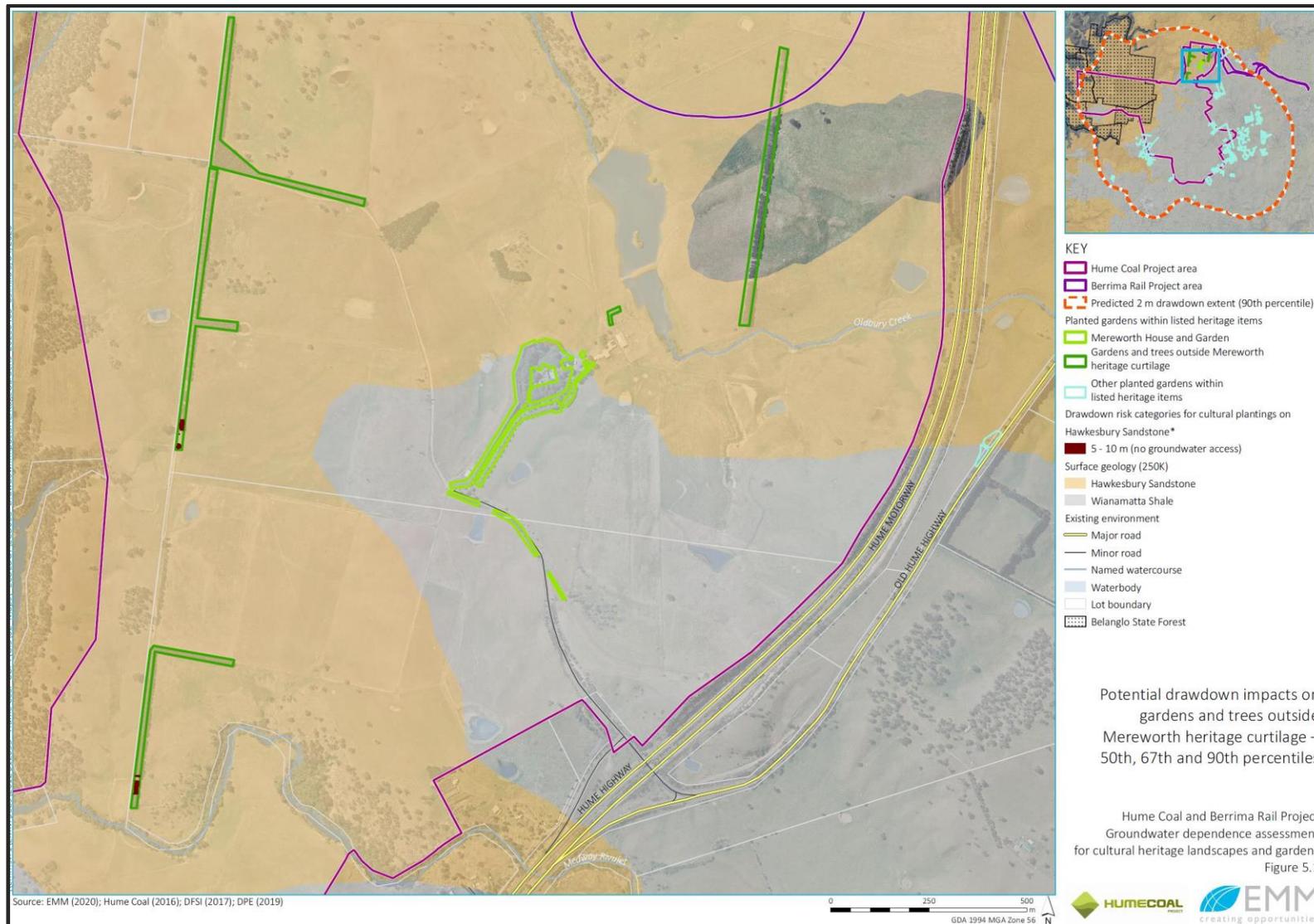


Figure 7 | Groundwater Drawdown Impacts on Gardens (*Nb. Impacted gardens shown in brown shading*)

117. The only exception to this is the planted pine windbreaks on Hume Coal's Mereworth property to the west and south-west of the Mereworth house and garden, which Hume Coal maintains is outside the heritage curtilage⁴. The assessment notes that approximately 0.1 ha of these windbreaks overlie the Hawkesbury Sandstone, and are in locations where they may be affected by groundwater table changes associated with the project during prolonged dry periods (see brown shaded areas on **Figure 7**). Hume Coal proposes to monitor these trees for signs of stress during prolonged drought periods, and supplement with water if required.
118. With regard to the wider cultural landscape⁵, the assessment predicts that some non-native vegetation and grasslands within the cultural landscape areas may be at risk of groundwater stress during prolonged drought periods. As outlined in the following table, up to 13.6 ha of non-native vegetation and 3.1 ha of grassland is predicted to be at some risk of impact during drought conditions, based on the 90th percentile predictions. This area represents only about 0.1% of the overall boundary of the cultural landscapes.

Table 4 | Predicted Impacts on Cultural Landscape Vegetation

Depth to Groundwater		Area of Affected Vegetation (ha)			Risk of Impact During Drought Conditions
Pre-mining	Predicted max.	50th Percentile	67th Percentile	90th Percentile	
Non-Native Vegetation					
0-3m	0-3m	1.6	1.5	1.1	None
3-5m	3-5m	0.5	0.6	1.0	None
5-10m	5-10m	0.8	0.7	0.6	None
0-3m	3-5m	1.1	1.2	1.4	Low
0-3m	5-10m	0.3	0.1	0.0	Moderate
3-5m	5-10m	0.6	1.1	1.4	Moderate
0-3m	>10m	1.8	1.6	1.4	Moderate
3-5m	>10m	3.3	2.2	0.7	Moderate
5-10m	>10m	6.1	7.2	8.7	High
Sub-total – All vegetation		16.3	16.3	16.3	
Sub-total – Vegetation at low-high risk		13.2	13.5	13.6	
Grasslands					
0-1m	0-1m	0.3	0.1	0.1	None
0-1m	>1m	3.0	3.1	3.1	High
Sub-total – All grasslands		3.3	3.2	3.2	
Sub-total – Grasslands at low-high risk		3.0	3.1	3.1	
Total – All vegetation at low-high risk		16.2	16.6	16.7	

4 There remains some disagreement between stakeholders including Council and Heritage NSW about the extent of the curtilage on Mereworth.

5 As defined by the common boundary of the Berrima Key Historic Unit 6 in the former Wingecarribee LEP 1993, and the non-statutory Sutton Forest/Exeter Cultural Landscape Area recognised by the National Trust of Australia (NSW).

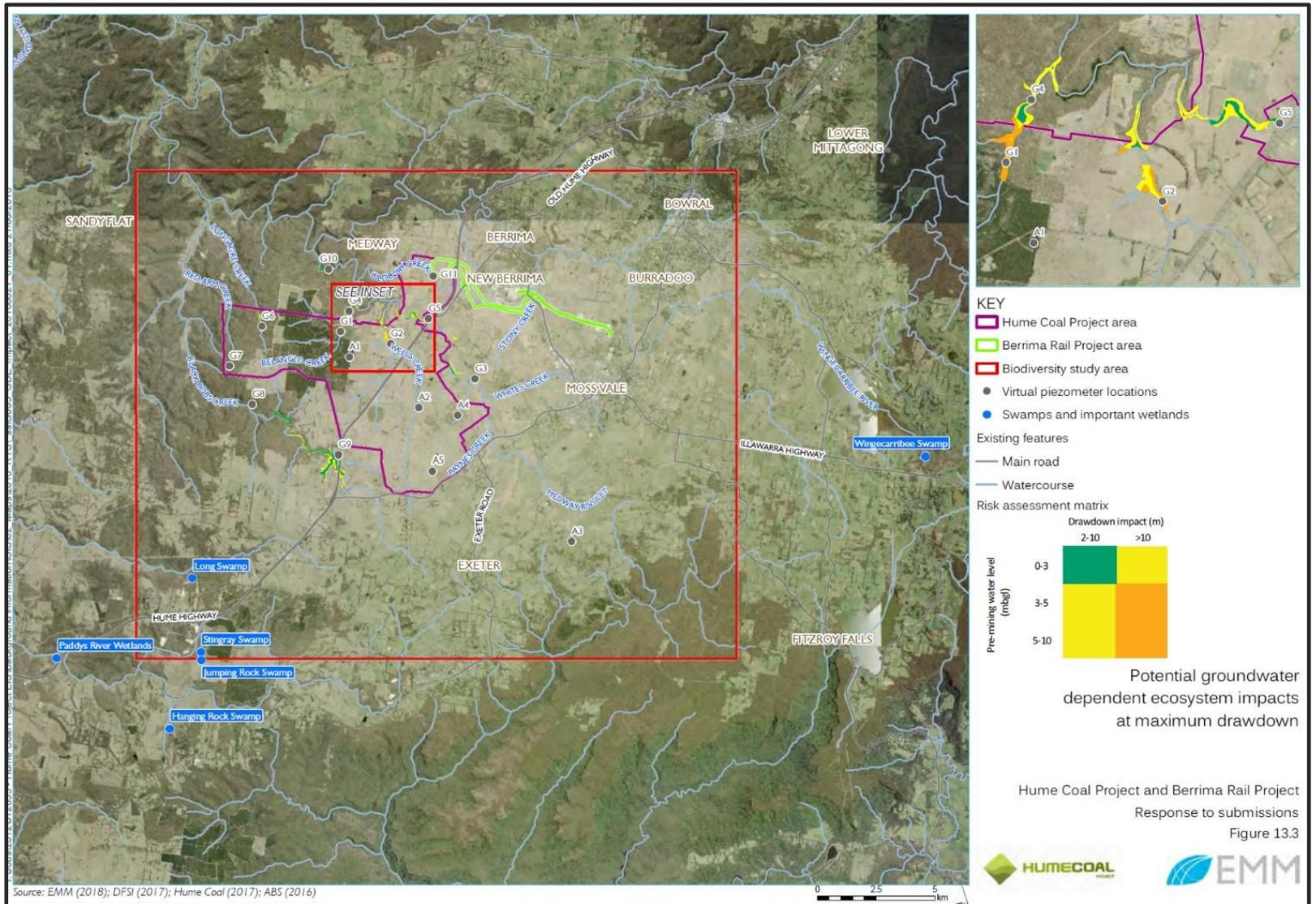


Figure 8 | Groundwater Dependent Ecosystem Impacts

119. The assessment of the cultural landscape did not include consideration of impacts on native vegetation, as this was undertaken as part of the assessment of impacts on groundwater dependent ecosystems (GDEs) in Hume Coal's RTS (see Section 13.3 of the RTS). As outlined in the RTS, terrestrial vegetation in the project study area, as well as Long Swamp and Stingray Swamp, were identified as potential GDEs. A number of other GDEs outside the study area were also considered, including Jumping Rock Swamp, Hanging Rock Swamp, Paddy's River Wetlands and Wingecarribee Swamp.
120. The GDE assessment in the RTS identified some relatively small areas where terrestrial native vegetation would potentially be at risk of stress associated with project-related groundwater drawdown during prolonged drought conditions. These areas are shown on **Figure 8**, and include areas adjacent to local creeks within the project area, including Medway Rivulet, Black Bobs Creek, Belanglo Creek and Wells Creek.
121. The local swamps are not predicted to be affected, given that they rely on local perched watertables which are not predicted to be affected by the project.
122. Hume Coal proposes to monitor the GDEs in the area for signs of stress during prolonged dry periods, and implement mitigation measures (eg. supplementary watering) if necessary.
123. The Department accepts that Hume Coal's assessment demonstrates that the project is unlikely to result in significant drawdown-related impacts to heritage gardens in the project area and its surrounds, and that potential groundwater-related impacts on the wider cultural landscapes and GDEs would be relatively minor, and could be appropriately monitored and managed.
124. However, the Department notes that many of the heritage gardens and private gardens in the area are likely to rely at least in part on watering using irrigation supplies from privately-owned groundwater bores. Many of these bores are predicted to be significantly impacted by groundwater drawdown in the Hawkesbury Sandstone, and the Department has concerns about the scale of these impacts and the practicality of Hume Coal's proposed make good strategy to address these impacts, as outlined in the preceding sections.

2.3 Mine Design

125. The Commission made four recommendations relating to the proposed mine design, emphasising the need for further consideration of the mine design features, resolution of safety concerns, consideration of additional risk assessment advice provided to the Commission, and the management of coal rejects. These recommendations have been considered in detail below.

2.3.1 Safety and Recovery

Recommendation 1

Because the Applicant and Department remain a considerable distance apart regarding their positions on the safety of the pine feather method of mining, the Commission suggests that one of the Applicant or the Department, or both of them jointly⁶, engage a new independent expert with experience in innovative coal mining technology with a view to resolving ongoing differences of opinion. This investigation would involve taking into account new information from the Resources Regulator.

Recommendation 2

As a result of the outcomes of R1, the Applicant needs to advise if there are consequences that would arise in relation to mine design and economics (resource recovery).

Recommendation 3

The Applicant should provide the Project Risk Assessment to the Department, and any other relevant Government agencies, if necessary, on a confidential basis, for consideration in any further Department or other Government assessment or response in the next stage of the assessment process.

126. To address Recommendation 1, Hume Coal engaged Mr Russell Howarth, a mining engineer with over 45 years' experience in the underground coal industry, and experience in innovative coal mining technologies, to review the proposed mining method.
127. Mr Howarth's review concludes that 'the proposed mining technique was found to be technically feasible' and that 'it cannot be inferred that the proposed mining system is unsafe on the basis that it has not been used before in NSW'. The review notes that the proposed technique would employ advanced technology in the form of remote-controlled mining equipment and use of high-precision inertial navigation systems, which would provide a level of surety that the mine is developed as designed and also enable mine workers to operate machinery remote from the coal cutting and coal face hazards.
128. In relation to Recommendation 2, Russell Howarth's review states 'the mine layout maximises recovery of the resource and results in a long-term stable pillar system that keeps mining induced surface subsidence impacts to an imperceptible level, minimises hydrogeological impacts on subsurface strata above the Wongawilli Seam, and provides an ability to store mining wastes and excess water underground'.
129. Consequently, Hume Coal has not proposed any changes to the mine design.
130. With regard to Recommendation 3, Hume Coal provided the project risk assessment to the Department at the same time as Hume Coal's Response Report, although the risk assessment was provided on a commercial-in-confidence basis given the nature of its contents.
131. Hume Coal's Response Report, including Russell Howarth's peer review, have been reviewed by the NSW Resources Regulator and both of the Department's independent mining experts,

⁶The Department is required to undertake an independent whole-of-government assessment of the development application, and it is not appropriate or necessary to jointly commission technical experts with applicants for State significant developments.

Professors Jim Galvin and Ismet Canbulat. The risk assessment has also been reviewed by the independent experts.

132. Following these reviews, Hume Coal provided additional responses from its experts that was provided to the Commission in Hume Coal's submission to the Commission during the public hearing (including Prof. Bruce Hebblewhite and Dr Russell Firth). This additional information was in turn reviewed by the Resources Regulator and the Department's independent experts.
133. The Department is satisfied that further iteration between the parties is unlikely to produce any significant new information or agreement regarding outstanding differences, unless Hume Coal is willing to undertake revised modelling and/or mine design, which it has not offered to undertake at this time, rather to further address this as a post approval requirement if the project were to be approved.
134. In summary, the Resources Regulator and the Department's independent experts continue to have concerns about the geotechnical model and the uncertainties associated with the mine design, particularly in relation to the short and/or long term stability of the web pillars, which may be as narrow as 3.5 m (**Figure 9** shows the mine design concept).

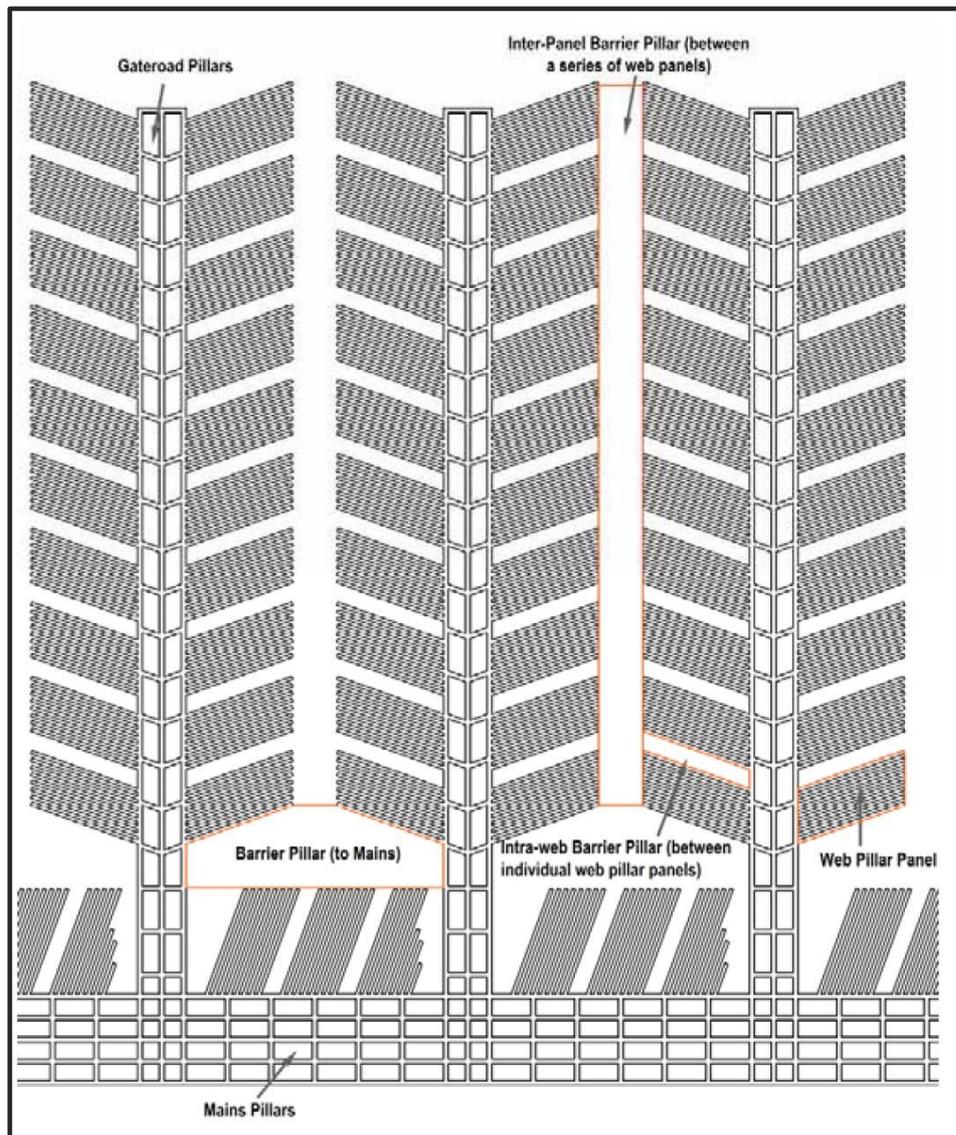


Figure 9 | Conceptual Mine Layout

135. The Resources Regulator noted that secondary coal extraction under critical infrastructure in NSW (including highways, railways or major pipelines) has to date generally only been undertaken in areas of significant depths of cover, ranging from 400 to 500 m. Given the low depths of cover for the Hume Coal Project (ie. 70 to 180 m, with the majority 120 m or less), and the presence of critical infrastructure in the project area (including the Hume Motorway, Illawarra Highway and Moomba to Sydney Gas Pipeline), the Resources Regulator notes that risks and uncertainty in subsidence development requires close attention during the decision-making process.
136. The Resources Regulator noted the difficulty in finding comparable data upon which to base the subsidence assessment due to the novel nature of the proposed mine, and therefore considers that there is uncertainty in the subsidence predicted by Hume Coal. The Resources Regulator notes that any adverse subsidence impacts on the above-mentioned infrastructure has the potential to lead to severe or catastrophic safety and/or serviceability consequences.
137. The Resources Regulator is also concerned about uncertainty associated with the unorthodox approach to the design of coal protection barriers to critical infrastructure, including the Hume Highway.
138. In this regard, Hume Coal has proposed a 150-metre-wide coal barrier beneath the Hume Highway, with a minimum offset distance of 50 metres between any mining area and the trafficable road surface. This approach differs from the industry standard 'angle-of-draw' approach. The Resources Regulator notes that Hume Coal's set-off distance approach is noticeably less than what would be required based on the standard angle-of-draw approach.
139. To address these uncertainties, the Resources Regulator suggests that, if approved, Hume Coal be required to commence mining operations in areas with minimum surface constraints, to allow review and validation of the novel mining method and mine layout.
140. However, the mine plan currently proposes that the initial stages of mining would be in the vicinity of the Hume Highway (see **Figure 10**).
141. Hume Coal notes that the mining would be subject to detailed surface subsidence monitoring together with the underground pillar monitoring, which would allow for adaptive management to ensure that the mine progresses as planned and without incident. If required based on this monitoring, Hume Coal considers that the mine design could be modified if required to minimise impacts.
142. Prof. Jim Galvin considers that Russell Howarth's review addresses the technological and risk management aspects of the mining proposal well, but does not address outstanding geotechnical issues, which is understandable given that Mr Howarth is not a geotechnical expert. Prof. Galvin noted that Hume Coal's response does not adequately address his previously raised issues regarding the geotechnical model, and recommended some additional review and clarification of the risk assessment.
143. Prof. Canbulat also continues to raise concerns regarding the potential sudden or long-term failure of the web pillars, reiterating the expert's advice in the PAR that Hume Coal's geotechnical model uses optimistic formulas for coal pillar strength.

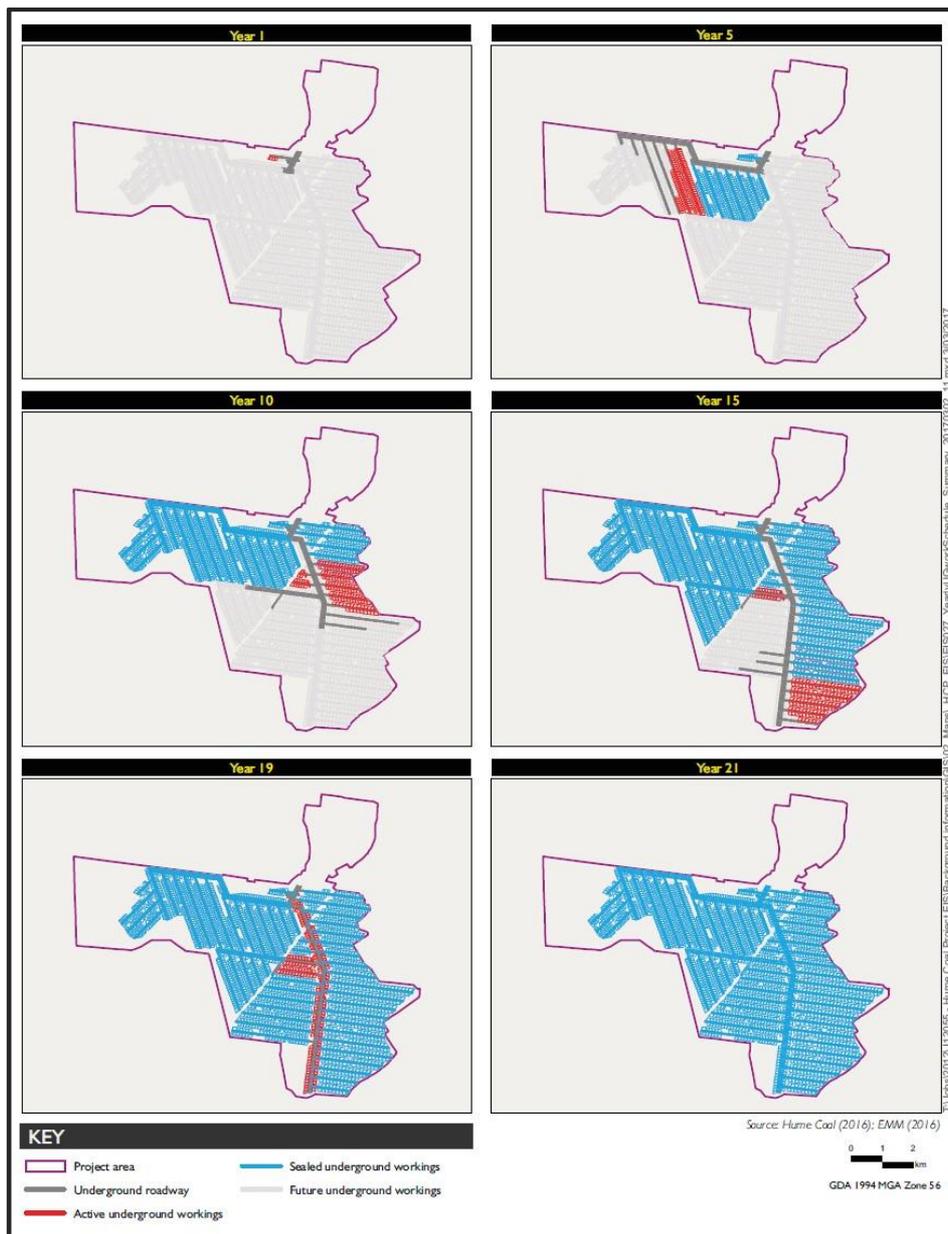


Figure 10 | Indicative Mining Progression

144. Based on the available information, Prof. Galvin concludes that Hume Coal's response does not adequately address the current level of uncertainty associated with the design of the web pillars and their performance and stability, particularly in the long term. However, he acknowledges that this could potentially be addressed through changes to panel and pillar dimensions.
145. Based on the current level of assessment, Prof. Canbulat concludes that he cannot be sure that the web pillars would be 'long term stable'. He notes that they would likely fail at some point, the timing of which cannot be determined with current knowledge. To address this, Prof. Canbulat recommends that failure risk needs to be assessed further using more conservative assumptions.
146. Hume Coal has reviewed and continues to refute the advice of the Department's experts. Its experts (Prof. Bruce Hebblewhite and Dr Russell Firth) continue to attest that the stability of the web pillars should not be viewed in isolation, rather, their stability should be viewed as part of an integrated system, particularly with regard to the stability of the intra-panel barriers and the overburden.

147. Prof. Hebblewhite acknowledges that there is the possibility of localised web pillar yielding or failure, but considers that the mine layout is sufficiently robust to remain stable in the long term, as indicated by modelling scenarios which assumed the complete removal of a panel of web pillars.
148. Prof. Galvin acknowledges that, provided the intra-panel pillars remain stable, web pillar stability is not essential for controlling surface subsidence to manageable levels. However, the relevance of web pillar stability relates primarily to workplace health, safety and welfare, as well as potential groundwater response to mining.
149. Prof. Galvin notes that there is precedent in highwall mining for web pillars to yield, including in a sudden manner. The consequences for this occurring in an underground situation, including for workplace safety and equipment entrapment, are much higher than in highwall mining due to risks associated with working underground (eg. ground falls, contamination of mine atmosphere, impeded egress).
150. This risk is not confined to the immediate vicinity of active mining but could materialise later while persons are undertaking secondary activities, such as waste and water disposal prior to sealing a panel. Prof. Canbulat added that the highest stresses on the web pillars would be around the gate road entries, where workers would be located.
151. For these reasons, Prof. Galvin believes that a higher factor of safety is required for the mine design assessment than for highwall mining (on which the proposed web pillar system is based). Prof. Galvin maintains that the web pillar strengths adopted by Hume Coal (using the Bieniawski and Mark rectangular pillar strength equation) are in the order of 17% to 43% higher than those estimated by four other industry pillar strength formulas. He also understands that while the reliability of these other industry formulas has been quantified, this is not the case for the Bieniawski and Mark formula, therefore casting some uncertainty about Hume Coal's adopted web pillar strengths.
152. Prof. Galvin reiterates that the proposed mining method is amenable to using changes in the panel and pillar dimensions to safely deliver hydrogeological and surface subsidence objectives. However, he notes that these are very likely to have negative implications for resource recovery and economics.
153. Based on the additional advice from the Resources Regulator and the independent experts, the Department is not satisfied that Hume Coal has adequately demonstrated that the proposed mine design, in particular the web pillars, would remain stable either in the short term or the long term, without amending the current mine plan.
154. Whilst the likelihood of web pillar failure or yielding may be low and/or localised, any such failure has the potential to result in significant or even catastrophic consequences, including impacts associated with mine safety, and impacts at the surface on critical infrastructure, public safety and the environment (including groundwater response to mining).
155. The Department acknowledges that Hume Coal has undertaken comprehensive assessment and modelling to develop its mine design, including reviews by a number of respected mine engineering experts. However, the fact that despite years of assessment and review, the Resources Regulator and the Department's equally respected mining engineers are not convinced that the mine design (as currently proposed) would be safe, means that there are considerable residual risk-based concerns for the Department.

156. The Department accepts that these uncertainties and risks may be able to be addressed through further geotechnical modelling and risk assessment by Hume Coal. The Department further acknowledges that the geotechnical and subsidence risks could be mitigated through changes to the mine design based on more conservative assumptions (eg. through increasing the web pillar widths), or commencing mining further away from critical infrastructure.
157. The Department considers that this assessment should be undertaken before any determination on the project. In that regard, the Department (and its experts) have consistently requested that Hume Coal undertake additional assessment and modelling based on more conservative industry-accepted assumptions. However, Hume Coal has chosen not to undertake this additional work, and continues to assert that these matters should be addressed through post approval requirements as further exploration data is gathered, or even as the mine progresses.
158. The Department is not satisfied that deferring this work to the post approval period based on a monitor and adaptive management approach, as proposed by Hume Coal, is acceptable in this instance given the identified risks. The Department considers that such an approach lacks finality, and proceeding with the project as proposed, in the face of the identified uncertainties and risks, is inconsistent with the precautionary principle.
159. The Department would not usually allow the proposed approach by Hume Coal of addressing these types of issues through development consent conditions, ie. in circumstances where the extent of the impacts has not been adequately defined with an appropriate level of confidence. Nevertheless, on this occasion, the Department has carefully considered whether it would be possible to create a set of development consent conditions to manage the residual uncertainties and risks (and the inherent need for flexibility) post-approval.
160. In short, it may be possible to draft an entirely unique (and likely complex) set of development consent conditions, which would necessarily involve a combination of detailed performance measures, stringent post-approval requirements, and a range of oversight measures or checks and balances.
161. This would be at least conceptually similar to the Extraction Plan process required for longwall mining (and other secondary extraction methods), which allows a relatively small degree of flexibility in mine design post-approval. Importantly, the Extraction Plan (and previously the Subsidence Management Plan) process has been well-established and honed over many decades to manage and regulate conventional mining methods based on a strong technical knowledge base and historical data for these methods.
162. However, given this proposal involves a novel mining method on a greenfield site without a similar knowledge base or database, there is no clear precedents for how a highly flexible mine design of this nature (with potential ongoing amendments) would be adequately managed through development consent conditions, particularly in relation to preventing potential additional environmental impacts.
163. Following careful consideration, the Department considers that the closest analogy to the proposed style of post-approval conditions is in the development consent for Airly Coal Mine Extension Project. The Airly consent conditions include a wide range of post-approval requirements, including a set of explicit restrictions on mining to prevent impacts to certain environmental features, detailed performance measures that are linked to different mining methods (eg. first workings vs second workings), a requirement for detailed Extraction Plans,

and the establishment of a project-specific Independent Expert Panel to guide and inform post-approval decision-making.

164. While the Airly Mine Extension Project conditions are long and relatively complex, they are essentially an expanded, comprehensive version of the standard Extraction Plan conditions. These conditions could only be developed, and are only capable of being implemented effectively, because the extension project was a continuation of conventional mining practices that had been in operation for many years. Importantly, the mining company at Airly had developed a strong knowledge base and extensive database about the potential impacts of this specific method of mining in this particular location.
165. At Airly, even with decades of mining experience (involving more conventional mining methods) and a strong knowledge base, the ongoing management of (and compliance with) the post-approval conditions continues to be difficult and time-consuming for both the mining company and the Department.
166. In summary, the Department does not support the development of an entirely unique set of complex conditions for the Hume Coal Project given the residual uncertainties, the level of flexibility that is required, the workplace safety risks, and the sensitivity of the receiving environment, which includes critical infrastructure (such as the Hume Highway in proximity to the initial mining), a large number of semi-rural properties, a large number of groundwater users, and drainage to Sydney's drinking water catchment.
167. The Department also notes that any changes to the mine design are unlikely to result in any significant improvement to the groundwater impacts of the project, which are predicted to be significant (see Section 2.2). Any changes based on more conservative assumptions would also likely affect the economics of the project.

2.3.2 *Underground Rejects Emplacement*

Recommendation 9

The Applicant is to provide greater detail on its surface level reject emplacement process, including the use of the temporary coal reject stockpile (as discussed in paragraph 188) once underground emplacement has been commenced.

168. Hume Coal has undertaken additional mine planning for the surface infrastructure area following the Commission's Report, which has resulted in changes to the temporary coal reject stockpiles. It has also provided additional information regarding the management of the rejects.
169. The changes remove the proposed secondary temporary stockpile (western reject) from the project. The footprint of the main temporary stockpile (eastern reject) remains unchanged as presented in the EIS and RTS, however it does result in a relatively small (4m) increase in maximum height of the eastern reject stockpile, to a total height of 19 m. The updated project layout is shown on **Figure 3**.
170. The revised temporary reject stockpile would have a total of 29 months of capacity should the underground reject emplacement process cease for any reason. The ultimate capacity of the stockpile would be 810,000 tonnes. It would be formed using an automated stacker during the daytime and night-time, combined with a D9 bulldozer working during daylight hours only.

171. Underground emplacement of rejects would commence after approximately 18 months, once sufficient void space is available in the underground workings to allow rejects emplacement.
172. From this time, rejects would be progressively placed underground as void space allows, with the entire temporary rejects stockpile placed back underground at the end of the operational phase of the mine's life.
173. The Department is satisfied that the temporary surface level reject emplacement process is reasonable, and acknowledges Hume Coal's commitment to underground emplacement of all coal rejects by the end of the project.

2.4 Economics

174. The Commission made four recommendations on economics and the coal market. These recommendations relate to disputed aspects of the economic impact modelling and net economic benefit, consistency between the economic assessment and social assessment, economic uncertainties, and the outlook for the coking coal market.
175. These recommendations have been considered in detail below.

2.4.1 Updated Economic Assessment

Recommendation 20

The additional information provided by the Applicant, including the Updated Economic Impact Assessment prepared by BA Economics in October 2018, should be peer reviewed to determine:

- i. whether the concerns and recommendations in the Economic Impact Assessment Review dated December 2017 prepared by BIS Oxford Economics (BISOE 2017) have been adequately justified, including concerns about transparency in relation to project costs, revenues and externalities; and*
- ii. the implications and reasonableness of changes/assumptions in the Updated Economic Impact Assessment including the change to the project description from that in the Hume Coal Environmental Impact Statement and any cost implications.*

Following the peer review, if the net economic benefit of the project remains uncertain and there are outstanding concerns about the assumptions and/or information, a further Economic Impact Assessment should be prepared that is consistent with the recommendations in BISOE 2017 (as set out in pages 1-3 of the Executive summary of BISOE 2017) and any further recommendations of the peer review."

Recommendation 21

The Department should address whether assumptions in the Updated Economic Impact Assessment in regard to employment numbers and percentage of unskilled workers and whether these come from outside the local area are consistent with the assumptions used in the Social Impact Assessment

Recommendation 22

The Applicant is to address the residual economic uncertainties, regardless of the strict interpretation of the 2015 Guidelines and Treasury Guidelines.

176. Hume Coal engaged BAEconomics to prepare a revised Economic Impact Assessment (EIA) to address the recommendations and concerns of the Department's independent expert (BIS Oxford Economics, or BISOE) and the Commission. The revised EIA contains an updated cost benefit analysis (CBA), sensitivity analysis and local effects analysis.
177. Hume Coal has also confirmed that the underlying assumptions used in the revised EIA are consistent with those used in the updated Social Impact Assessment (Recommendation 21), although they use different geographical areas for the consideration of local impacts, as the two assessments serve different purposes.
178. The revised EIA concludes that the project would generate a net economic benefit to NSW of \$192 million according to the strict application of the 2015 guidelines⁷, or \$290 million⁸ if indirect benefits such as employment benefits and taxes are included based on a broader interpretation of the guidelines.
179. For the local Southern Highlands region, the local effects analysis indicates that the project would generate:
- employment:
 - an average operational workforce of 226 full-time equivalents (FTEs), of which between 68 and 93 FTEs are expected to live in the Southern Highlands region; and
 - an additional 37 to 51 FTEs in the region if broader employment flow-on effects are included (ie. 105 to 144 total FTEs for the region);
 - disposable income:
 - approximately \$272 million NPV accruing to the operational workforce, of which between \$31 to \$42 million would accrue to the employees living in the Southern Highlands region; and
 - an additional income of \$28 to \$38 million NPV in the Southern Highlands region if broader employment flow-on effects are included (ie. \$59 to \$80 million total disposable income for the region).
180. Hume Coal's revised EIA has been reviewed by the Department's independent expert, Andrew Tessler of BISOE. The review is attached as **Appendix D**.
181. With regard to the major components of the cost benefits analysis in the revised EIA, BISOE considers that:
- *Royalties* – overall, the analysis is reasonable, but does not consider unforeseen issues such as the COVID-19 pandemic and rising geopolitical and trade tensions which may affect coal prices;
 - *Company Income Tax* – the analysis is reasonable, though subject to the same caveats as above;

⁷ Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (DPE, December 2015)

⁸ This compares to a net economic benefit (including employment benefits) of \$373 million as estimated in Hume Coal's updated EIA (BAE, 2018), and \$127 million estimated in BISOE 2017 (excluding employment benefits).

- *Costs* – no specific issues raised, though BISOE questions whether contingencies or optimism bias has been incorporated into the analysis;
 - *Employment Benefits* – notes that the value has decreased compared to the original EIA, and continues to recommend that employment benefits are disregarded as per strict interpretation of the 2015 Guidelines;
 - *Tax Benefits* – should also be largely disregarded, apart from land tax and local government rates;
 - *Externalities* – notes that ambiguities and uncertainties remain, but acknowledges that these alone are unlikely to cause the project to record a zero or negative net economic benefit;
 - *CGE Modelling* – the additional computable general equilibrium (CGE) modelling of wider flow-on effects to the NSW economy should be disregarded, as its findings of a \$2.2 billion NPV increase in gross state income is significantly (11 times) greater than the CBA analysis; and
 - *Local Effects Analysis* – is considered generally adequate.
182. Based on these issues, BISOE recommends that the narrower measure of project benefits (ie. excluding employment benefits and most taxes), plus an allowance for land and local government taxes, is a better basis for the CBA's assessment of project benefits to NSW. On this basis, the project records a net benefit of \$194 million in NPV terms.
183. BISOE concludes that the project would result in net positive benefits for NSW in NPV terms, even when benefits to workers and accompanying tax benefits are excluded. However, BISOE recommends that the residual issues, regarding matters such as the costing of externalities and risk factors such as COVID-19 and geopolitical tensions, are considered.
184. The Department accepts that the economic analysis indicates that the project would have a net economic benefit to NSW and a range of benefits to the Southern Highlands region.
185. The Department does not believe that additional assessment would likely change this conclusion, and acknowledges that in cost benefit analysis, experts often differ on the value that should be placed on various costs and benefits, particularly the externalities.
186. To this end, the Department acknowledges that Hume Coal's sensitivity analysis indicates that the project is likely to remain positive even when considering a range of potential economic variables. In relation to coal price, the sensitivity analysis indicates that coal prices would need to reduce by 65% over the life of the project before the net benefit of the project to NSW reduces to zero. BISOE and the Department agree that this is unlikely to occur based on available economic forecasts (including the Commonwealth Government's Resources and Energy forecasts), although BISOE notes that some broader issues (including COVID-19, geopolitical tensions and environmental issues) present some uncertainties regarding the future coal price.
187. Notwithstanding the above, as outlined in the PAR the Department maintains that the estimated net economic benefits of the project are relatively low in comparison to many other coal mining projects in the Southern Coalfields and across NSW. For example, comparing total estimated (indirect and direct) net benefits the Tahmoor South Coal Project in the Southern Coalfields is predicted to have an overall NPV of some \$665 million, and the recently refused Dendrobium Extension Project was predicted to have an overall NPV of \$1,073 million, compared to Hume Coal's overall NPV of \$290 million.

188. The scale of the relatively lower benefits associated with the project needs to be carefully weighed up against the potential impacts of the project on the environment and the community.

2.4.2 Coking Coal Market

Recommendation 23

The Applicant or the Department, or both of them, should review the market for coking coal, including the most recent forecasts by the Australian Government.

189. Hume Coal engaged Wood Mackenzie to provide additional information on the coking coal market, noting that the market for metallurgical coal is driven by the demand for steel. Globally, the demand for steel is forecast to increase, driven in particular by increased urbanisation in South and South-east Asian countries (in particular, India).

190. The market study indicates that:

- global export demand for coking coal is forecast to continue to steadily increase for the foreseeable future (from 318 Mt in 2019 to 421 Mt in 2040, or an increase of 103 Mt and a compound annual growth rate of 1.3%);
- global export supply of coking coal is forecast to increase by 108 Mt by 2040, with Australia continuing to be the largest exporter (about 60% of supply, with exports increasing from 184 Mt currently to 246 Mt by 2040);
- domestic demand for coking coal is forecast to remain relatively flat (from 3.0 Mt in 2019 to 3.3 Mt in 2040);
- contracted domestic supply is likely to fall below demand by around 2023, with this supply gap to be filled by redirecting export coal, or through new production. The review notes that Hume Coal is well placed to service the Port Kembla steel works when it looks to source new coal; and
- coking coal prices are forecast to remain relatively flat over the long term.

191. The market study outlook is generally consistent with the Commonwealth Government's forecasts for the next 5 years⁹, albeit the government's most recent export demand figures are slightly higher than Hume's forecasts. The Department cautions that projections beyond this time frame are likely to contain considerable uncertainty.

192. The project can also be compared to the total Australian and NSW coking coal market to give an idea of the scale of the project and significance of the resource. In this regard, Australia exported approximately 184 million tonnes of metallurgical coal in 2019¹⁰, with NSW producing approximately 25 million tonnes (for export and domestic use)¹¹.

⁹ Resources and Energy Quarterly – June 2020

¹⁰ Resources and Energy Quarterly – June 2020

¹¹ Based on data provided by MEG.

193. The project would produce up to 3.5 Mt of ROM coal a year, or up to about 2.73 Mt of saleable coal each year. With the stated coal composition of 55% metallurgical and 45% thermal this equates to up to approximately 1.5 Mt of saleable metallurgical coal each year. This in turn equates to about 0.8% of Australia's annual production of export metallurgical coal, or about 6% of NSW's annual production of metallurgical coal. The project's thermal coal production would represent less than 1% of NSW's annual production (ie. approximately 170 million tonnes).

2.5 Surrounding landscape impacts

194. The Commission made five recommendations on the visual, heritage and cultural landscape impacts of the project, together with the social impacts of the project on the surrounding region and its compatibility with surrounding land uses. These recommendations have been considered in detail below.

2.5.1 Visual impacts

Recommendation 15

Further visual impact assessment should be completed for assessment and should include at a minimum:

- *dimensioned plans of the project area and the railway extension. The plans should include a survey with contours and the location and size of all works as well as the relative heights above ground level of significant structures, including the coal stockpiles, the coal loader and primary water dam walls;*
- *views of the project area and railway extension from sensitive properties within and in the vicinity of the Project area (including heritage items), from the Hume Highway and Medway Road or any likely affected property. The distance and heights of the viewing points should be provided;*
- *views should be without mitigation measures (screen planting) and with mitigation measures in place after 5 years and 15 years;*
- *any findings in relation to groundwater impacts on gardens, plantings and landscape settings, and*
- *further assessment of the impacts of night-time lighting.*

Any photomontages of the view impacts should be certified in accordance with the Land and Environment Court's Direction on use of photomontages:

http://www.lec.justice.nsw.gov.au/Pages/practice_procedure/directions.aspx.

195. Hume Coal has undertaken an updated Visual Impact Assessment (UVIA) to address the matters raised by the Commission. Consideration of groundwater impacts on gardens and vegetation is provided separately in Section 2.2.4 above, which indicates that groundwater drawdown from the project is unlikely to result in significant vegetation dieback and resultant landscape/visual impacts. The updated UVIA includes detail of all major elements in the Surface Infrastructure Area (SIA), and their context within the surrounding landscape (see **Figure 11**).

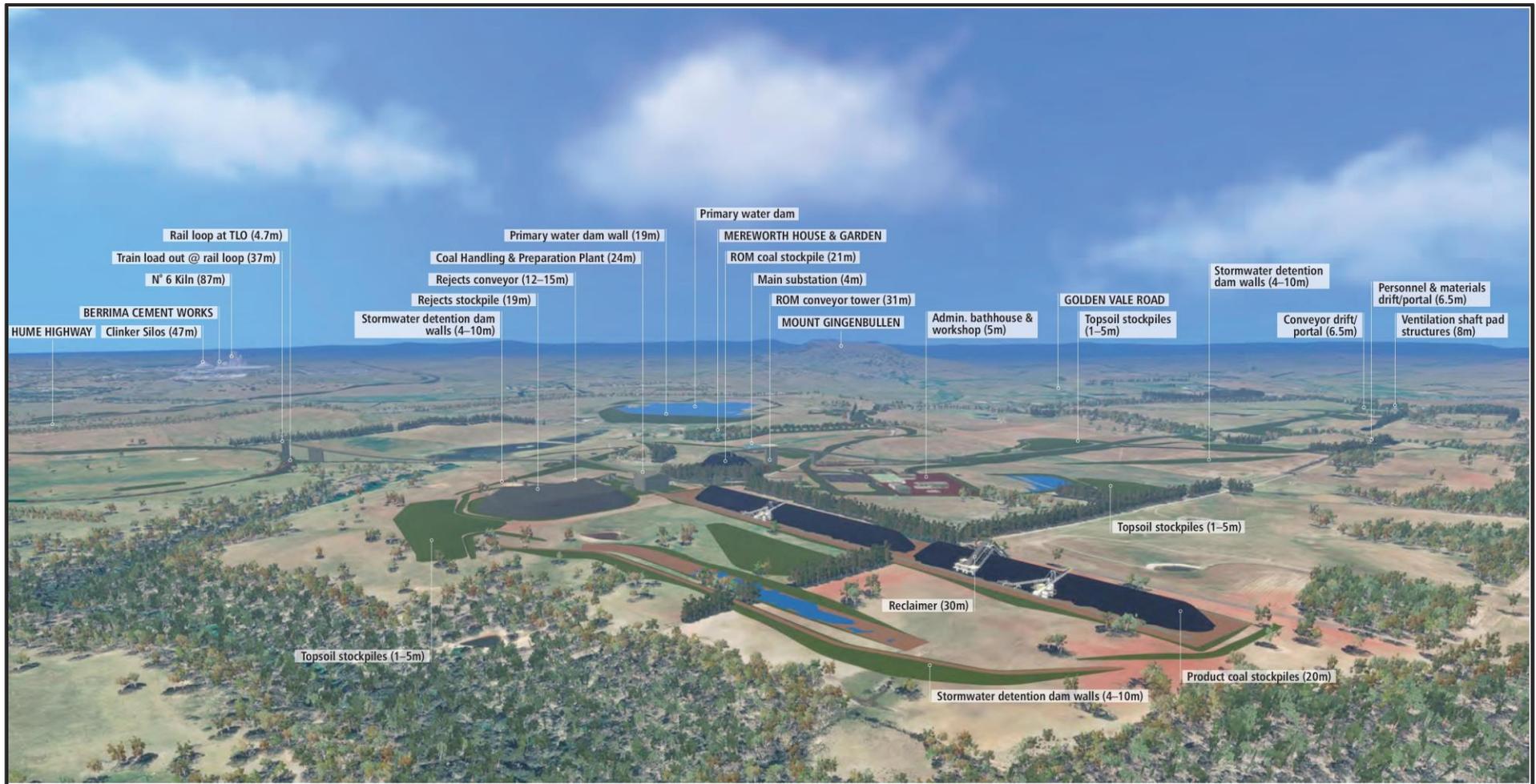


Figure 11 | Oblique Perspective Showing Project Elements

196. The updated assessment also includes a number of additional viewpoint analyses and photomontages, including:
- photography from 21 viewpoints representative of the landscape character within the project view zone, including views from sensitive receivers and public areas such as Medway Road and the Hume Motorway;
 - a further 13 viewpoints within the Mereworth Garden area to represent significant views from the heritage item; and
197. Photomontages from 10 representative viewpoints within the visual affectation area (including visual representations for existing, Year 5 and Year 15)The assessment included development of a visual catchment for the project, which identifies the ‘significant potential visibility’ (SPV) zone for the project. The visual catchment is shown on **Figure 12**. The catchment analysis used a number of methods to assess the areas with potential visibility to the project elements, including a digital elevation model (DEM), digital surface model (DSM) and surface elements 3D model.
198. The DEM (shown in light brown on **Figure 12**) shows land from which the project is theoretically visible based on terrain only, excluding consideration of above-ground features such as vegetation, buildings and surface infrastructure. The DSM (shown in dark brown on **Figure 12**) takes into account above-ground features, and is therefore more representative of the actual visibility of the project elements.
199. A summary of the visual impacts of the project based on the findings of the updated UVIA is provided in **Table 5** below.

Table 5 | Visual Impacts¹²

Receptors	Views to SIA Elements	Impact Before Mitigation	Mitigation Measures	Impact After Mitigation
<i>National Parks, State Forests and Reserves</i>	Receptors include Belanglo State Forest, Medway Dam and Council reserves (including Makin Reserve, Berrima Reserve and Berrima Camping Ground). No views available from any receptors due to blocking from vegetation and topography ¹ (see Figure 13).	None	N/A	None
<i>Urban and Semi-Urban Areas</i>	Receptors include residences in Medway, New Berrima and Berrima in the SPV. No views available from any receptors due to blocking from vegetation and topography ¹ (see Figure 14).	None	N/A	None
<i>Road Corridors</i>	<i>Hume Motorway</i> – Transient views available from some sections (see Figure 15).	Mod-High	Integration planting. Painting of structures to blend with landscape.	Mod
	<i>Old Hume Highway</i> – Uninterrupted views of rail bridge and rail maintenance shed. Some views from sections of the road, which is a designated heritage route.	Mod-High	Maturation of existing plantings.	Low-Mod
	<i>Golden Vale Road</i> – No views.	None	N/A	None
	<i>Oldbury Road</i> – Minor partial/filtered views at distance (2.5km to 7.5km).	Low	N/A	Low

¹² Adapted for simplicity from Hume Coal’s assessment, which considered impacts on a number of ‘landscape character units’

Receptors	Views to SIA Elements	Impact Before Mitigation	Mitigation Measures	Impact After Mitigation
	<i>Medway Road</i> – Some views above intervening vegetation.	Low-Mod	Painting of structures to blend with landscape. Maturation of existing plantings.	Low
	<i>Mereworth Road</i> – Views to SIA, and would be primary access route for project. Road only provides access to Mereworth and one other property to the south.	Low-Mod	Integration planting. Painting of structures to blend with landscape. Maturation of existing plantings.	Low
	<i>Belanglo Road</i> – Minor possible glimpses only.	Low-Mod		Low
<i>Heritage Sites</i>	Two State Heritage Register (SHR) listed sites visited by the public are within the SPV – Oldbury and Golden Vale – located 2.2km and 3.5km respectively from the nearest SIA element. No views would be available from the houses due to vegetation and topography, but some views from Golden Vale’s gardens would be available (at a distance of 2.5km to 7.5km) (see Figure 16). Local heritage items were considered as part of the impact on rural residences (see below).	Low-Mod	Integration planting. Painting of structures to blend with landscape.	Low-Mod
<i>Rural Residences</i>	Ten residences on rural land would be potentially affected, with views or partial views to SIA elements (see Figure 17).	Low-Mod	Integration planting. Painting of structures to blend with landscape.	Low-Mod
<i>Rural Lands</i>	Some views available, particularly from flat pastoral lands. Views from much of the undulating lands blocked by vegetation and topography (see Figure 18).	Low-Mod	Integration planting. Painting of structures to blend with landscape.	Low-Mod
<i>Industrial Lands</i>	Some views, but low sensitivity.	Low-Mod	Integration planting. Painting of structures to blend with landscape.	Low
<i>Southern Tablelands Food and Wine Cluster</i>	Some farm-to-gate producers in the SPV, with the nearest (Cherry Tree Hill Wines) located 3.5 km to the south of the nearest SIA element. The pre-existing Zen Oasis Restaurant (Residence 15) to the north of the project site was assessed as having not having visibility of the mine in the UVIA, however a new 2-level function centre at Zen Oasis is currently under construction, which the Department could clearly see from the SIA during its site visit in June 2020. Hume Coal has provided additional information on the function centre, noting that it is oriented to the north-east, and that the second storey elements of the function centre facing the project site are intended to be utility rooms and not publicly accessible.	Mod	Integration planting. Painting of structures to blend with landscape.	Low-Mod

1. Although DSM analysis does show some theoretical visibility in parts, field inspection and analysis indicates that these are representative of views from the tops of canopy trees and/or would be otherwise shielded.

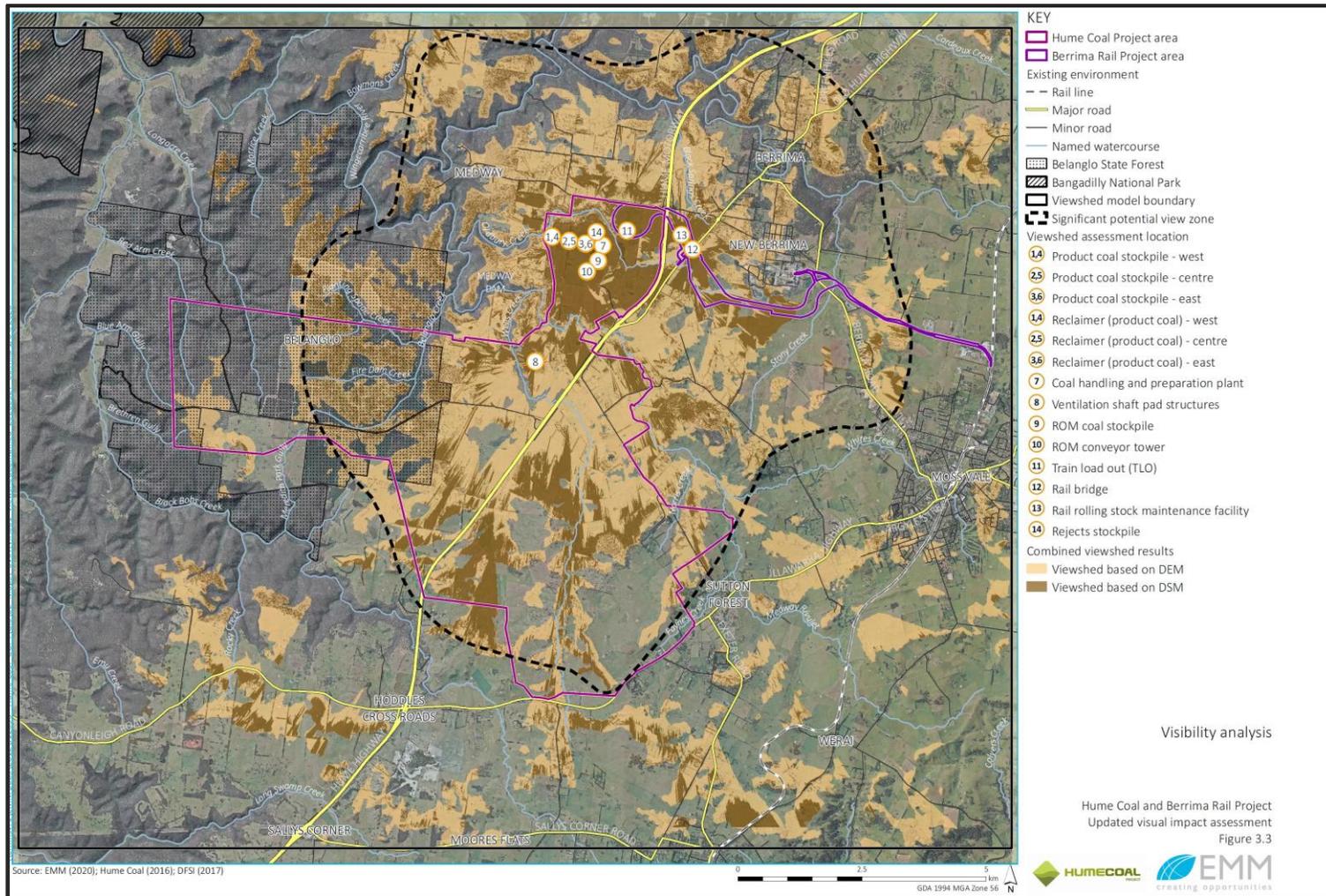


Figure 12 | Visual Catchment

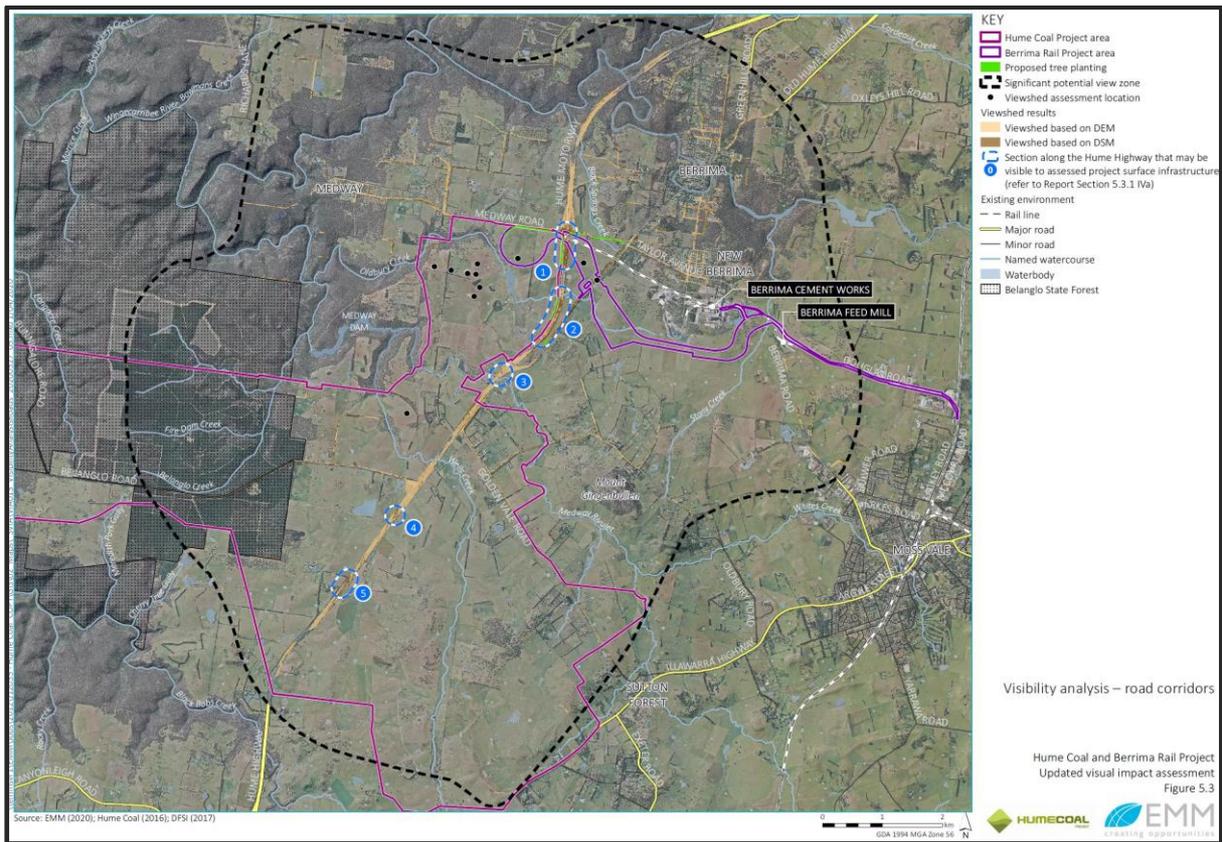


Figure 15 | Visibility Analysis –Road Corridors

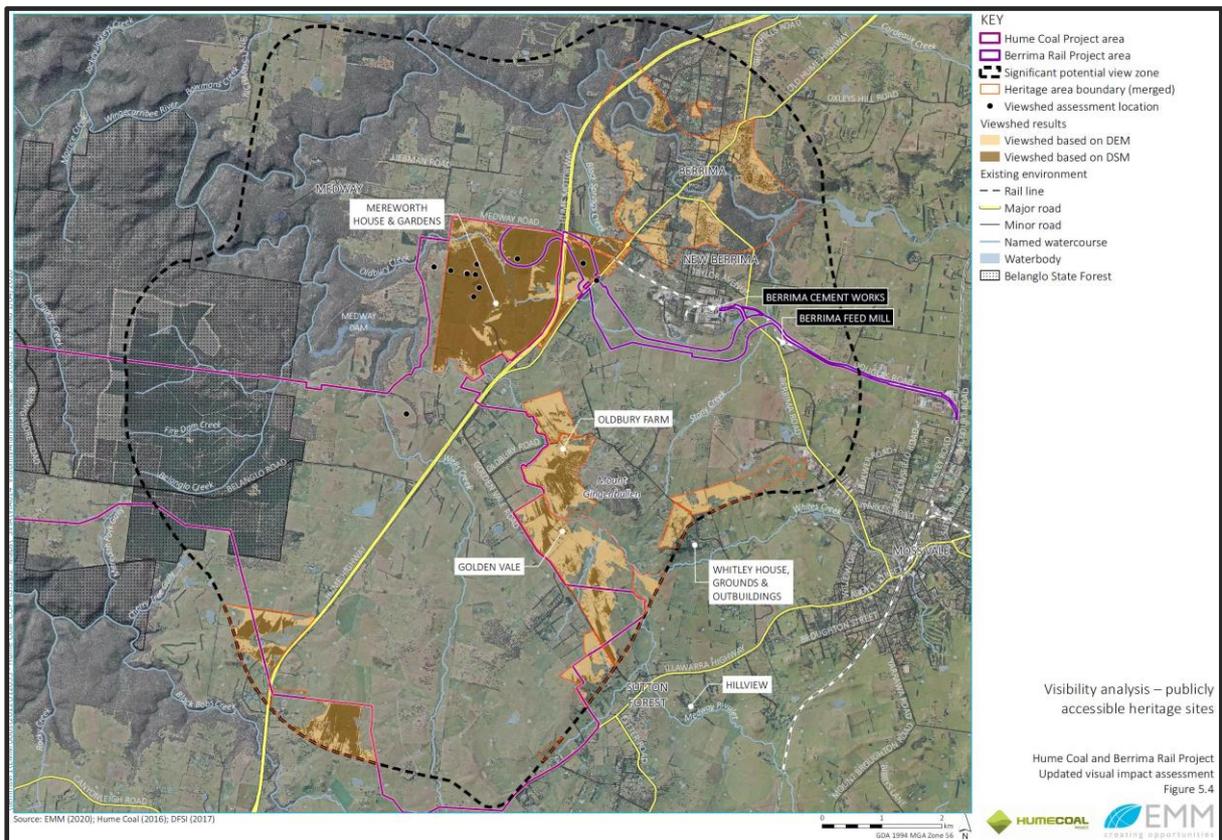


Figure 16 | Visibility Analysis – Key Heritage Sites

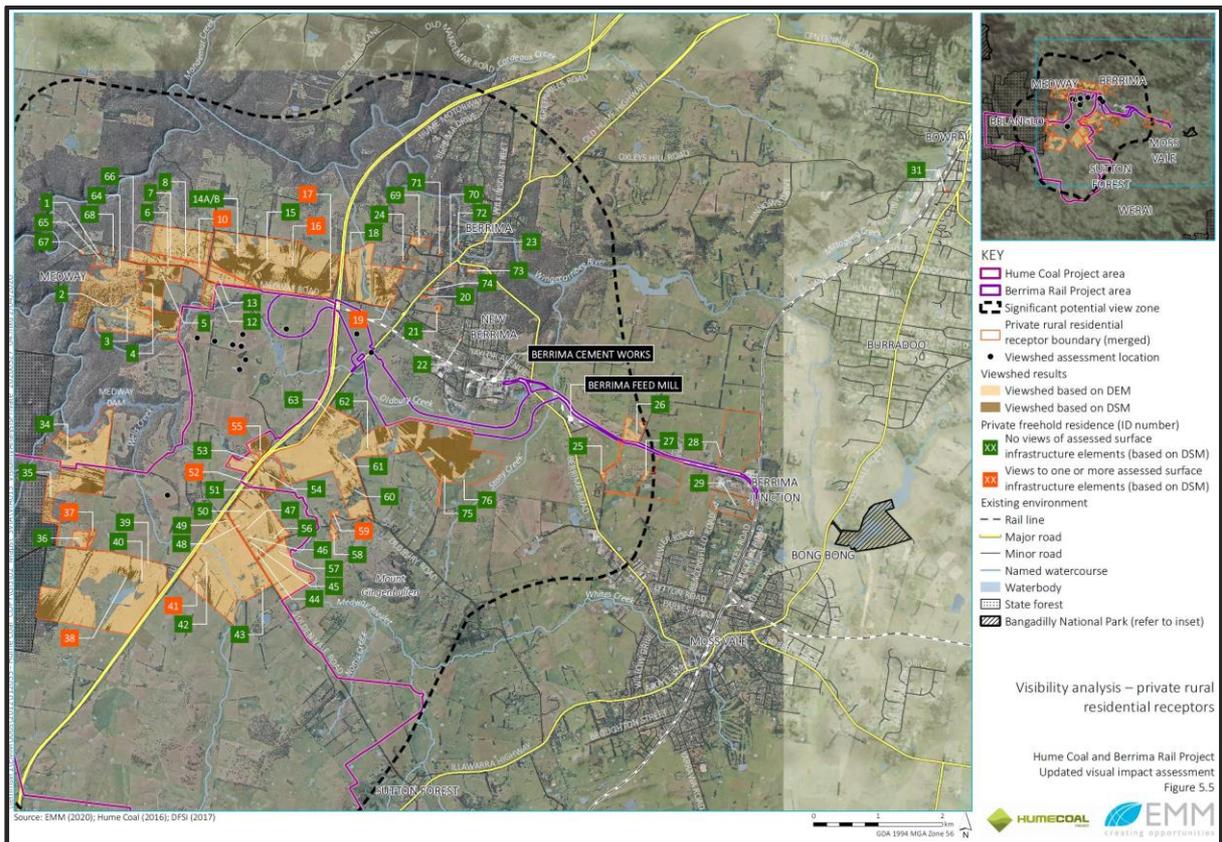


Figure 17 | Visibility Analysis –Residences

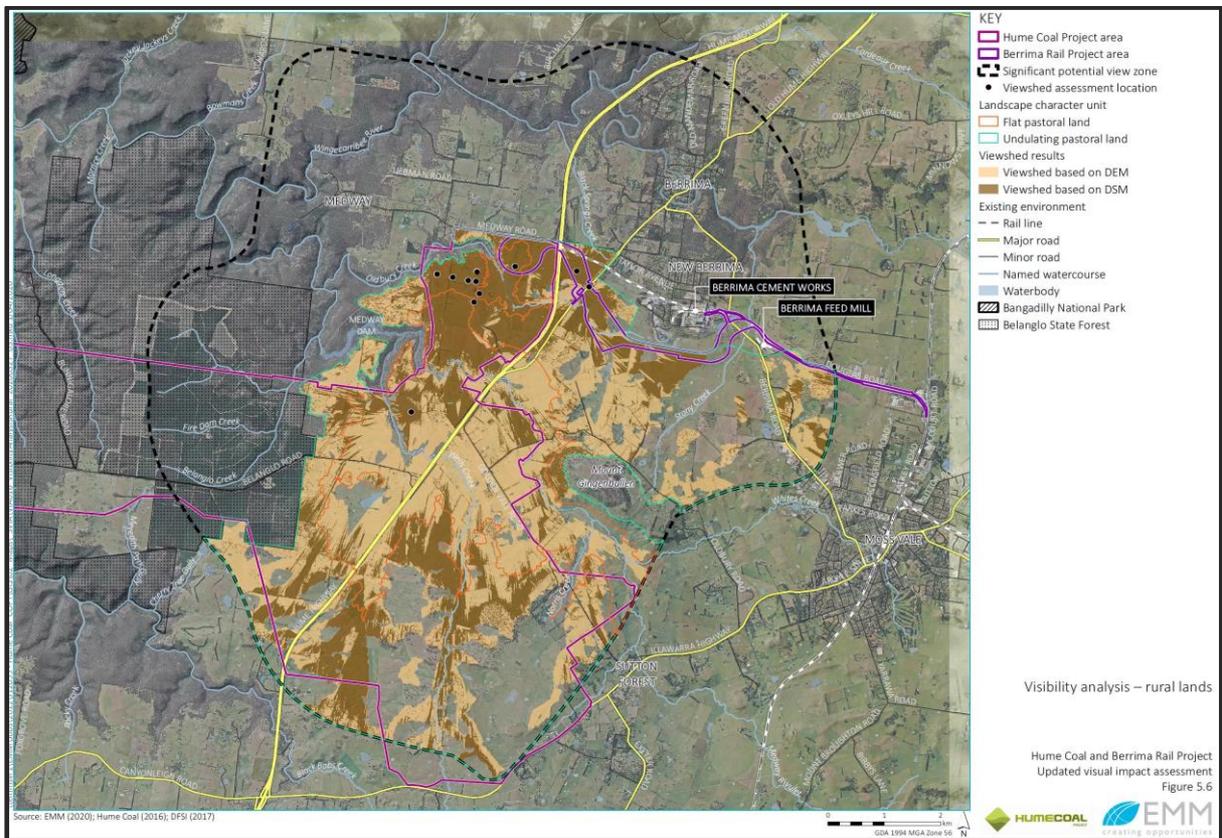


Figure 18 | Visibility Analysis –Rural Lands

200. The photomontages (in the UVIA) of the above receptors generally show the project-related infrastructure blending in with the middle-ground and background of the landscape, with the impacts reducing over time as the existing and proposed screening plantings mature.
201. Visual impacts on the locally heritage listed Mereworth house and gardens would be more significant, with foreground views of the various mine elements, due to the cleared pastoral nature of the property and the flat terrain. A representative photomontage showing the view from near the 'ha-ha wall' in the Mereworth gardens overlooking the SIA to the north is shown on **Figure 19** (ie. Viewpoint 3). It is noted that some key parts of the SIA (including much of the CHPP and stockpiles) are located further to the west of this viewpoint. This view is represented by Viewpoint 5 in the UVIA, however no photomontage has been prepared for this viewpoint.
202. Nonetheless, Mereworth and its gardens is owned by Hume Coal, and would not be publicly accessible during the project life.

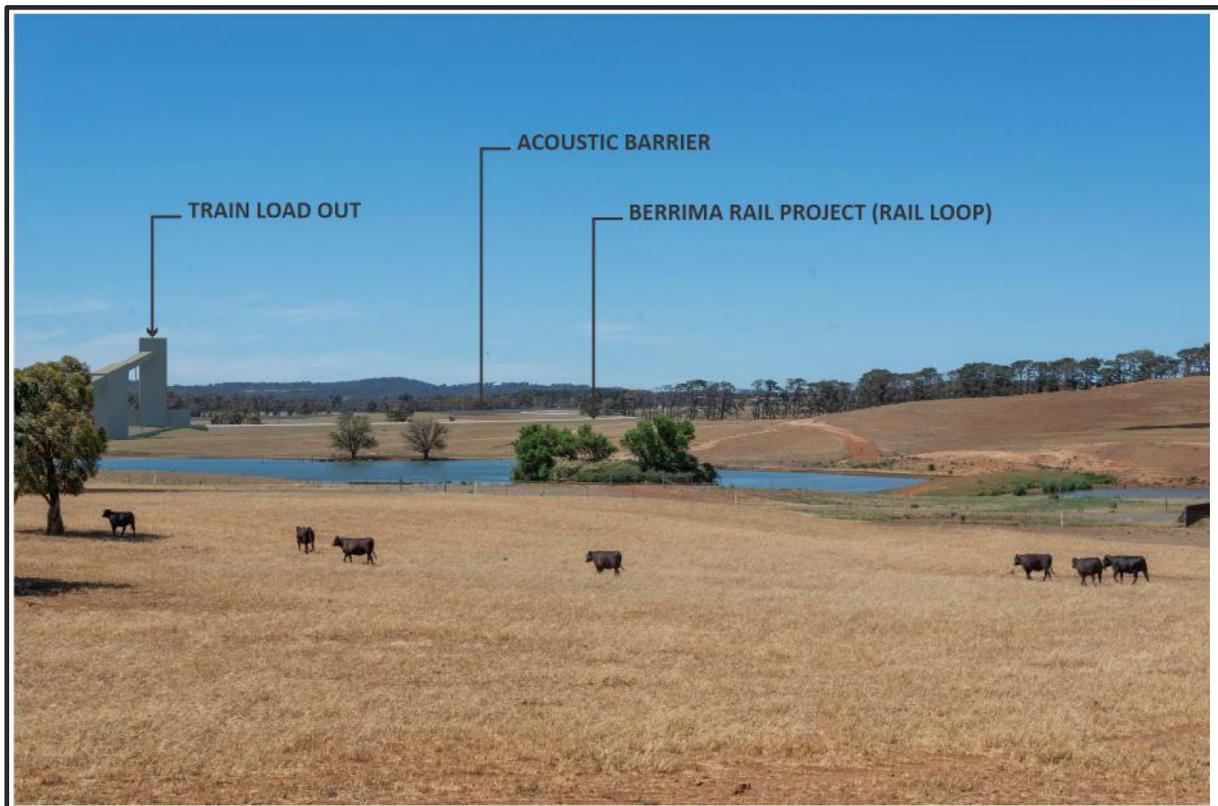


Figure 19 | Mereworth Photomontage – Year 1

203. As outlined above, the impact assessment is based on the implementation of a number of mitigation measures, in particular additional visual integration plantings around key infrastructure areas and adjacent to roads and fence lines. The proposed plantings, which supplement the existing plantings undertaken by Hume Coal in 2015/2016, are shown on **Figure 20**.

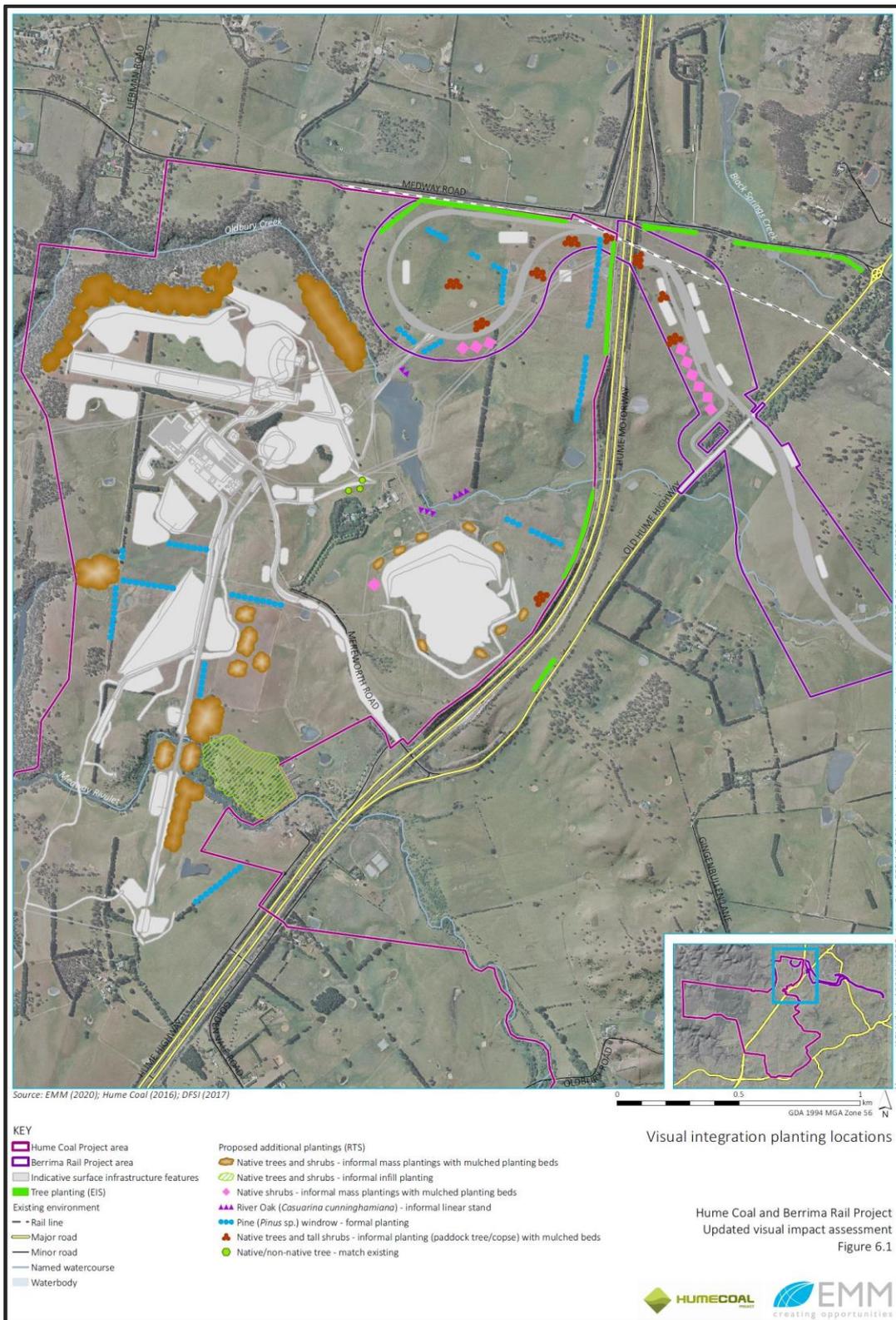


Figure 20| Proposed Visual Integration Plantings

204. Other mitigation measures would include:
- painting key SIA infrastructure and structures to blend in with the landscape;
 - preparation of a Landscape Plan to address heritage and /or cultural landscape key viewpoints;
 - forming the primary water dam as an attractive farm waterbody;
 - designing lighting to minimise obtrusiveness in accordance with Australian Standards, and additional assessment of potential light spill during detailed design, including consideration of onsite planting treatments to further mitigate night-time lighting effects;
 - implementation of additional visual impact mitigation on affected privately-owned land where deemed necessary, in consultation with landowners;
 - development of a Visual Management Plan (VMP) in consultation with relevant stakeholders; and
 - timely rehabilitation of disturbed areas, with full removal of SIA infrastructure and structures at the end of the project
205. The Department is satisfied that Hume Coal’s updated UVIA is generally adequate to enable the assessment of visual impacts on receptors in the locality. This assessment indicates that the project would have some visual impacts on receptors, including 10 rural residences, views from some surrounding rural lands and tourism-related agribusiness, and for commuters on roads including the Hume Motorway, Old Hume Highway and Medway Road.
206. At a broader level, the project elements are unlikely to result in any significant visual impacts on key urban areas, conservation areas, and State listed heritage items.
207. The scale of the visual impacts on receptors, putting aside the significance of the cultural landscape, is not dissimilar to other mines and large industrial facilities in the region and the State, and the Department is satisfied that these visual impacts could be appropriately minimised and managed through Hume Coal’s mitigation measures and appropriate conditions of consent. Notwithstanding, the visual impacts would contribute to the project’s amenity impacts on some surrounding receivers, particularly those in the Medway Road area.
208. It is noted that the UVIA does not provide detailed analysis of impacts on the cultural landscape, which is addressed separately as part of the updated Statement of Heritage Impact. This issue is discussed separately below.

2.5.2 Heritage impacts

Recommendation 17

The Applicant should address the recommendations of the Heritage Council of NSW’s correspondence to the Department dated 17 August 2018 as referenced in paragraph 283.

Recommendation 18

The Statement of Heritage Impact Assessment should be updated in response to recommendations R16 and R17, and the visual impact of the project on the significance of the above items and the cultural landscape in accordance with an updated visual impact assessment. (see R15 in Visual Impact recommendations).

209. Hume Coal has sought to address the Commission's recommendations by updating the Statement of Heritage Impact (SHI) for the project (prepared by EMM), as well as preparing the following supplementary information:
- updated visual impact assessment, prepared by EMM (see Section 2.5.1 above);
 - groundwater dependence assessment for cultural heritage landscapes, prepared by EMM using a multi-disciplinary team (see Section 2.3.4 above);
 - cultural landscape assessment, prepared by Catherine Brouwer Landscape Architects;
 - Sorensen and Mereworth gardens analysis, also prepared by Catherine Brouwer Landscape Architects; and
 - supplementary historical archaeological assessment, prepared by EMM.
210. Despite this updated and supplementary information, Heritage NSW continues to raise significant concerns about the adequacy of the assessment and the heritage-related impacts of the project.

Historical Archaeological Assessment

211. With regard to Recommendation 17, Heritage NSW's correspondence of 17 August 2018 included a number of recommendations for appropriate historical archaeological assessment of the project area.
212. Heritage NSW has reviewed the supplementary historical archaeological assessment, and considers that it is not adequate for a number of reasons, including that it:
- uses incorrect terminology, including use of the term 'relic' too broadly, which leads to confusion and inconsistency;
 - is based on inadequate fieldwork, with large parts of the project area above the underground mining area not surveyed, including areas likely to contain relics;
 - includes inadequate mapping, including mapping of potential archaeological resources and archaeological sensitivity;
 - contains inadequate assessment of archaeological potential given the above, with detailed archaeological survey of known sites not undertaken (such as the Three Legs of Man property);
 - contains inadequate comparative analysis and significance assessment, with significance assessment focused on built heritage values rather than archaeological potential;
 - assumes that archaeological impacts are unlikely due to negligible subsidence, though no subsidence predictions are provided (in the archaeological assessment); and
 - contains insufficient detail on mitigation and management measures.
213. Hume Coal has concentrated the field surveys for the archaeological assessment on the surface infrastructure area and other surface disturbance areas, including the drift entry and exit points and the ventilation shafts. The assessment does include consideration of other archaeological resources in the project area and locality, but the main focus was on the areas of surface disturbance.
214. The Department accepts that this would be a reasonable response to the archaeological assessment, if Hume Coal's predictions of negligible subsidence prove to be correct. The Department also accepts that the assessment indicates that the project is unlikely to have any

significant direct and long-lasting impacts on archaeological resources within the surface infrastructure area, subject to rehabilitation of the site following the cessation of mining.

215. However, as discussed in Section 2.2, the Resources Regulator considers that subsidence uncertainty remains given the low depth of cover and the novel mining method. If uncontrolled subsidence was to occur, this in turn could impact archaeological resources in the wider project area beyond the surface infrastructure areas. Given these potential risks the Department agrees with Heritage NSW that the assessment is not adequate.

Mereworth House and Sorensen Garden

216. While much of the proposed surface infrastructure is located within the Hume Coal-owned, locally heritage listed Mereworth property, the infrastructure would not directly impact the Mereworth house (or the former house), known archaeological items on the property, or the Paul Sorensen-designed gardens on the property.
217. Hume Coal's Sorensen and Mereworth gardens analysis, prepared by Catherine Brouwer, concludes that the gardens include typical Sorensen garden design features, however the garden is not uncommon in a state context, and is unlikely to be amongst his highest calibre rural homestead garden designs. As such, the report concludes that the garden is of local significance.
218. Heritage NSW does not agree with this assessment, and considers that the site is arguably of state significance. While no formal assessment of state significance has been undertaken by Heritage NSW, it has provided the Department with research from a number of sources that point to the significance of the garden. This includes a reference in Landscape Architect Richard Ratcliffe's book on Sorensen titled '*Australia's Master Gardener: Paul Sorensen and his Gardens*', which states that Mereworth '*must rank among [Sorensen's] best and could be considered to be among the great cultural landscapes of Australia*'. The Department notes that this same quotation was referenced and considered as part of Hume Coal's heritage assessment.
219. Although the project would not directly impact Mereworth House or its Sorensen Garden, Heritage NSW considers that the construction and operational phases of the project would have significant detrimental visual impact on the heritage item, given:
- the proposed surface infrastructure within the heritage curtilage, and the significance of the views and vistas from the garden, including the use of the ha-ha walls to ensure retention of uninterrupted views (noting that the view from Mereworth House over the ha-ha walls would be directly towards the mine infrastructure); and
 - the potential groundwater drawdown impacts on the gardens, although Heritage NSW acknowledges the groundwater dependence assessment predicts that no impacts are likely.
220. Heritage NSW notes that alternative locations for surface infrastructure do not appear to have been considered, and that the proposed screening plants are not an appropriate response, and at the very least should be removed at the end of the project's life.
221. Consideration of alternative locations for the surface infrastructure is provided in the EIS, and the Department accepts that Hume Coal has considered the location carefully, locating the infrastructure mainly on cleared land where topography would shield the infrastructure from public view as far as reasonable and feasible.
222. To this end, the Department acknowledges that Mereworth and its gardens are privately owned by Hume Coal, and are not publicly accessible. The Department also accepts that the visual

impacts on the house and gardens would be remedied at the end of the project life, and therefore would be temporary (albeit only over the long term).

223. Further, as outlined in Section 2.3.4 the Department is satisfied that the groundwater drawdown impacts are unlikely to result in significant impacts on heritage gardens.
224. As such, the Department believes that the project could be managed such that it would not result in a significant long-term impact on Mereworth House and its Sorensen Garden after the cessation and rehabilitation of the project, subject to appropriate conditions. However, the Department agrees with Heritage NSW that for at least¹³ the 20 year life of the mine, the project would have a significant visual impact on the heritage items.

Berrima, Sutton Forest and Exeter Cultural Landscape

225. With regard to Recommendation 17, Heritage NSW's correspondence of 17 August 2018 also included a recommendation that Hume Coal undertake a detailed assessment of impacts on the Berrima, Sutton Forest and Exeter Cultural Landscape.
226. As outlined above, a specific cultural landscape assessment has been undertaken by Catherine Brouwer Landscape Architects, a specialist landscape heritage architect and planner. The assessment forms part of the updated SHI. It includes consideration of past, present and proposed cultural landscapes in the locality, which include the (see **Figure 21**):
- *Key Historic Unit 6*¹⁴ – *Sutton Forest Landscape Area*, listed as Zone 7(b) in the Wingecarribee LEP until 2010 (no longer current);
 - *Exeter Sutton Forest Landscape Conservation Area*, as listed by the National Trust (NSW) in 1998 (current); and
 - *Berrima, Sutton Forest and Exeter Cultural Landscape Area*, proposed by the Berrima Residents Association in 2017 (proposed).
227. None of these identified cultural landscapes have any current statutory status.
228. The assessment acknowledges that the cultural landscapes have historical, aesthetic and research value, but that based on the statements of significance for the identified cultural landscapes, they do not meet the criteria for state listing.
229. The assessment concludes that the project would have some localised 'low to moderate' impacts on the cultural landscape, particularly around Mereworth. However, impacts on the cultural landscape as a whole are assessed as being 'low', given the limited visibility of the proposed surface infrastructure from many of the key heritage items in the landscape, and the presence of other industrial facilities in the landscape (such as the Berrima Cement Works and Berrima Feed Mill), which form part of the landscape.

¹³ Or longer if the mine was extended in the future (subject to separate approval)

¹⁴ Unit 6 was one of 9 units within the wider Southern Tablelands region.

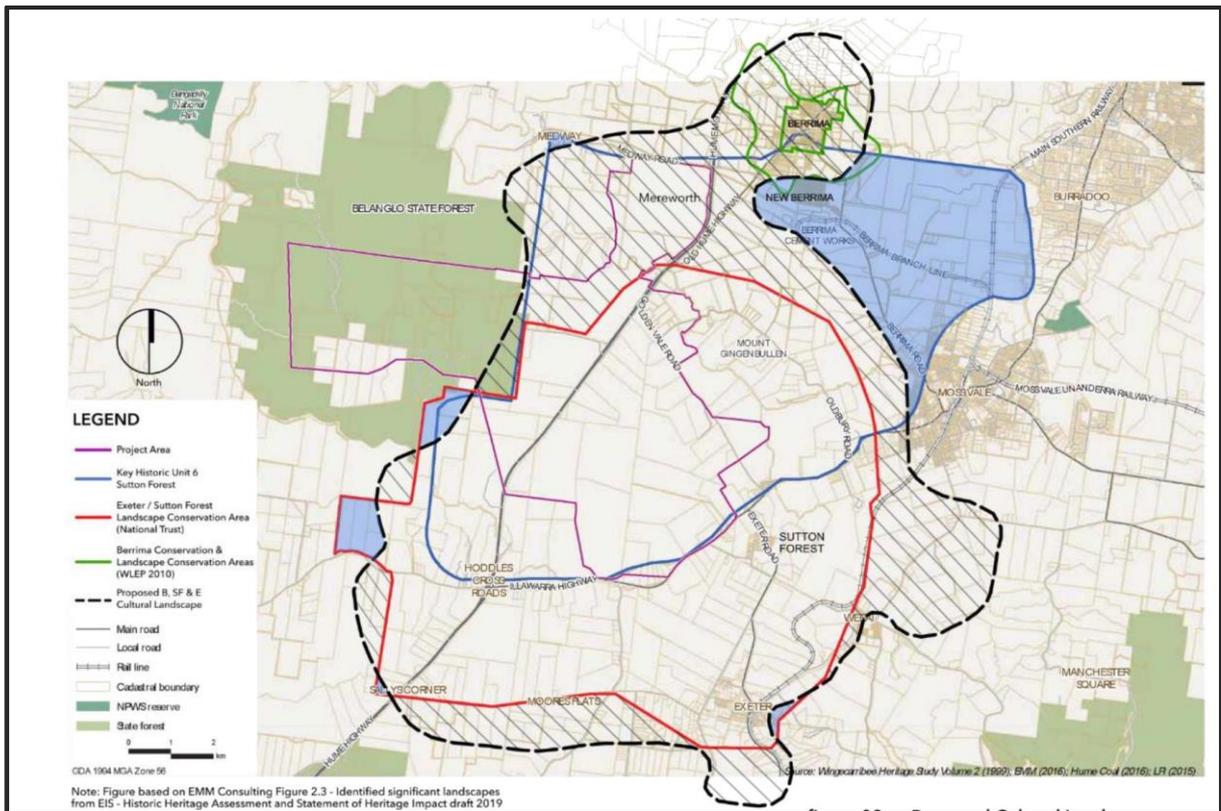


Figure 21 | Cultural Landscapes

230. Heritage NSW has advised that it considers that the construction and operational phases of the project would have a significant detrimental visual impact upon the significance of the Berrima, Sutton Forest and Exeter Cultural Landscape. The agency considers that the cultural landscape itself, with wide open meadow landscape and relatively open views, is of significance, and blocking views of it, as well as considerable physical change to its content, would adversely impact the landscape. Also, the landscape includes a large number of local and state listed heritage items. In this regard, there are some 61 listed heritage items within the 90th percentile groundwater drawdown area, including 4 items listed on the State Heritage Register, 15 state significance items listed on the Wingecarribee LEP 2010, and 42 local significance items listed on the LEP.
231. NSW Heritage considers that the proposed mitigative planting measures are not an appropriate response given that they would block views of the landscape, and that at the very least, these plantings should be required to be removed at the end of the project.
232. The Department agrees that the project would have a detrimental impact on the cultural landscape. The placement of large industrial infrastructure within the landscape is not consistent with many of the values for which the cultural landscape was formulated.
233. The Department notes that these impacts would be relatively localised, and are unlikely to seriously affect the cultural landscape as a whole. The project infrastructure would not be visible or significantly obtrusive when viewed from most of the heritage items, urban areas, public spaces and tourist areas within the locality. The infrastructure would be similar to other industrial infrastructure in the cultural landscape, some of which has been part of the landscape since the early 20th century.

234. Notwithstanding, the visual and cultural landscape impacts of the project would contribute to the amenity impacts of the project, which are not insignificant.

2.5.3 Social Impacts

Recommendation 24

The Applicant should consider updating its Social Impact Assessment in accordance with the Department's 'Social Impact Assessment Guidelines – September 2017' and ensure consistency with the assumptions of the revised Economic Impact Assessment.

Recommendation 25

The Department, regardless of any further assessment provided by the Applicant, should assess the Project in accordance with its 'Social Impact Assessment Guidelines – September 2017' and report on the findings of this assessment in its Final Assessment Report.

235. Hume Coal has updated the SIA in accordance with the Commission's recommendation.
236. It has also confirmed that the underlying assumptions used in both the updated SIA and the revised Economic Impact Assessment (EIA) are the same. However, the assessments use different geographic/demographic boundaries as they serve different purposes. The SIA uses the local government area (LGA) as its primary data source, as this dataset best represents those most likely to be impacted (directly and indirectly) from the project. Conversely, the revised EIA necessitates a broader geographic area due to the requirements of relevant guidelines and to more accurately gauge the economic activity as a result of the project.
237. The Department accepts that Hume Coal's updated SIA has been undertaken in a manner that is generally consistent with the Department's guidelines and the revised EIA, and that it provides a suitable basis for the decision maker to consider the social impacts of the project.
238. In this regard, the SIA acknowledges that the project would have a range of actual or perceived social impacts, including both positive and negative impacts. The key positive impacts include those related to:
- increased employment and training opportunities, particularly local employment;
 - increased investment in community infrastructure and services through direct contributions; and
 - economic flow-on benefits.
239. The key negative impacts include those related to:
- potential antisocial behaviour from workers, especially during construction;
 - population growth changing the character of the area;
 - perceived increase in demand on emergency services and infrastructure;
 - potential impacts on mental health and wellbeing;
 - perceived and actual amenity, traffic, cultural heritage, and other environmental impacts; and
 - impacts on local businesses, particularly agriculture and tourism.
240. The SIA includes consideration of these and other issues, and Hume Coal has proposed a range of mitigation measures to address residual impacts.

241. The assessment notes that the project would generate a peak of just over 450 workers during the construction phase. Ninety percent of these workers are expected to come from outside the area, however the imported workforce would represent less than 1% of the Wingecarribee LGA population.
242. Hume Coal proposes to construct a temporary on-site construction accommodation facility to house these workers, and the Department is satisfied that the facility would adequately accommodate the peak fly-in fly-out (FIFO), and drive-in drive-out (DIDO), accommodation demands associated with the project. The Department is also satisfied that other social impacts associated with the accommodation facility (such as anti-social behaviour) would be similar to other contemporary mining projects, and could be appropriately managed.
243. During the operational phase, the project would generate a peak workforce of about 315 workers over the 19 year project life. Hume Coal proposes to implement a policy requiring the operational workforce to reside within a 45 minute drive of the site, and it expects that 70% of the workforce would reside in the Wingecarribee LGA.
244. Around 160 workers are expected to relocate to the area permanently (or at least during the project), which equates to approximately 0.35% of the LGA population.
245. In total, up to about 1,440 people are predicted to migrate into the area during the project life including workers, their families, and workers and families associated with other approved and proposed major projects in the region.
246. This expected cumulative population growth represents about 4.6% of the Wingecarribee LGA population, which is similar growth to that predicted in government forecasts over the period to 2041.
247. The Department is satisfied that this growth is unlikely to cause significant adverse social impacts at the LGA level, including in terms of accommodation and housing, community infrastructure and services, education and health care, emergency services, transport, and impacts on other businesses and tourism. The Department acknowledges that the project would create some actual and perceived impacts in the broader community, including impacts on mental health (through stress and tension).
248. Hume Coal has proposed a range of measures to mitigate social impacts during operations, including:
- employing local people, including requiring all workers to live within a 45 minute drive of the site;
 - using local contractors where possible;
 - providing training and professional development opportunities;
 - preparing and implementing a social impact management plan, which would make proposed mitigation measures enforceable and implemented to the satisfaction of the Planning Secretary; and
 - entering into a voluntary planning agreement (VPA) with council to provide contributions towards community infrastructure and services.

249. With regard to the VPA, Hume Coal has offered to enter into a VPA with Council¹⁵, comprising monetary contributions into a community trust of:
- \$750,000 initial contribution upon commencement of construction; and
 - 5 cents per saleable tonne of coal transported from the site each year, which equates to about \$2.1 million over the project life.
250. Council has declined to enter into negotiations with Hume Coal on the VPA offer.
251. Whilst the Department accepts that the project is unlikely to result in significant social impacts for the community at an LGA level, or even in the surrounding urban centres including Berrima and Moss Vale, the Department does consider that the project would result in significant localised impacts. In particular, the project would result in significant disruption, stress and tension and likely dispute for the 72 landholders whose groundwater supplies are predicted to be significantly impacted. The project would also have some amenity impacts on the small-scale agricultural land users along Medway Road, particularly by way of noise and or visual impacts.
252. As discussed in this assessment report, the Department is not satisfied that these impacts are acceptable, particularly with regard to the predicted groundwater impacts on such a large number of groundwater users, and the dispute and disruption that these impacts and their mitigation (or make good) requirements would likely cause in the community.
253. The Department also acknowledges that there is widespread opposition to the project in the wider community. In this regard, there were some 5,131 objections received from residents of the Wingecarribee LGA, which constituted 97% of the total submissions received from people in the LGA.
254. While there is some support, there remains strong local opposition to the project and social impacts were a key concern raised throughout the assessment process in submissions to the Department and the Commission during the public hearing. Many of these submissions raised questions about whether the project would have a 'social licence' within the local community. In addition to concerns about impacts on broader environmental and social impacts, submitters raised concerns about changes to the fabric or sense of place, which also goes to the issue of site suitability and land use compatibility.

2.6 Noise and Air Quality Impacts

255. The Commission made five recommendations relating to noise, air quality and greenhouse gas issues. These recommendations requested further consideration of predicted noise impacts, noise mitigation measures, meteorological modelling, greenhouse gas emissions and greenhouse gas mitigation measures.
256. The recommendations have been considered in detail below.

¹⁵ Via letter to the Minister dated 22 May 2017.

2.6.1 Policy Setting

Recommendation 10

The Department is to consider and advise if Assessment Location No 7 should be afforded mitigation rights under the application of the Noise Policy for Industry.

257. The proposed changes to temporary coal reject stockpiling (see response to Recommendation 9 in Section 2.3.2 above) would change the noise emissions associated with the project. As such, Hume Coal has prepared an updated noise assessment as part of its IPC response.
258. The updated noise assessment has been undertaken in accordance with contemporary NSW noise policy (which has been updated since the EIS), including the:
- EPA's Noise Policy for Industry (NPfI), which replaced the former Industrial Noise Policy; and
 - Department's *Voluntary Land Acquisition and Mitigation Policy (VLAMP)*, which was updated in 2018.
259. The changes to rejects stockpiling would result in an increase in operational noise levels by up to 3 dBA at Locations 11 and 14, and by up to 2 dBA at Location 7.
260. In terms of residual impacts and consideration of the updated VLAMP, the assessment found that:
- 9 properties would be marginally impacted (ie. 3 to 5 dBA above criteria), and would be entitled to additional mitigation measures under the policy (Locations 4, 5, 6, 7, 8, 10 14¹⁶, 15 and 16); and
 - 2 properties would be significantly impacted, and would be entitled to voluntary acquisition under the policy (Locations 11 and 12).
261. All of these properties are located on Medway Road to the north and north-west of the project area (see **Figure 22**).

¹⁶ Two dwellings

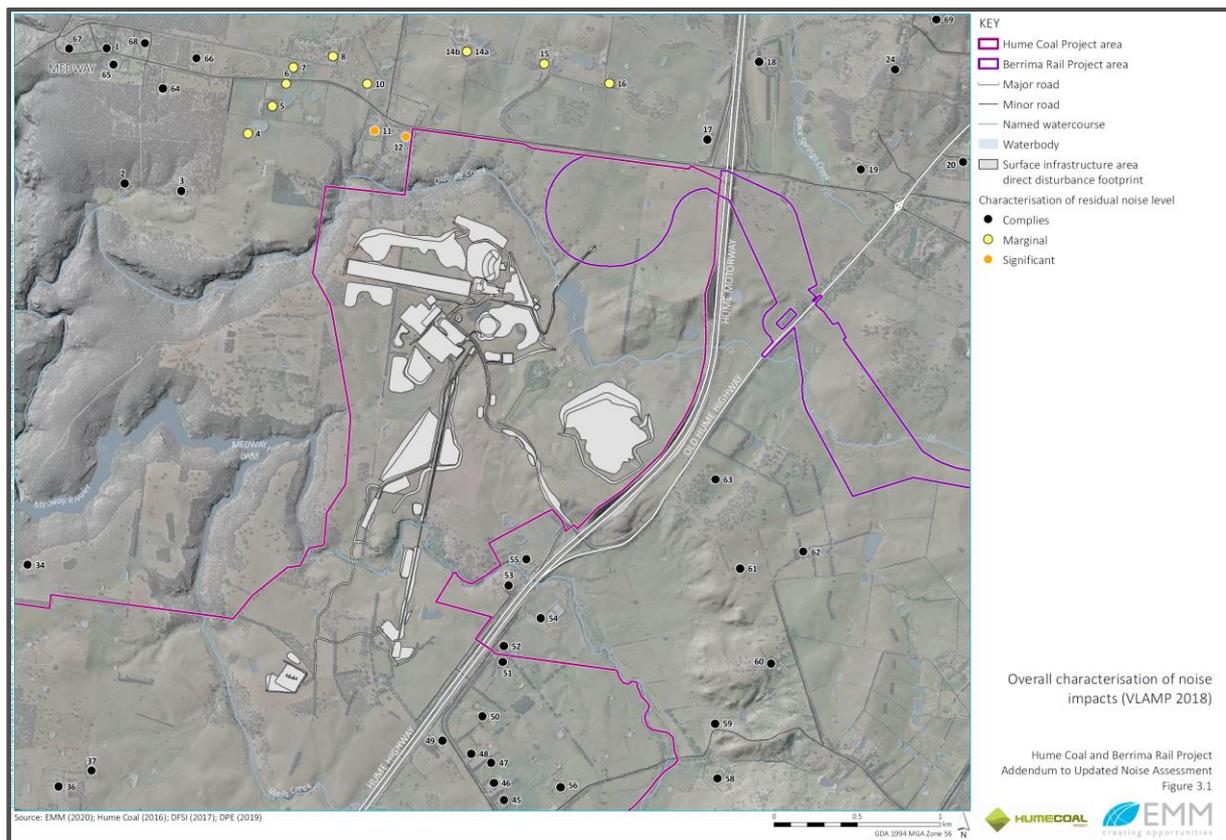


Figure 22| Operational Noise Impacts

262. The updated noise assessment also found that:

- operational noise associated with the Berrima Rail Project (associated with the rail maintenance operations) would meet applicable criteria at all receivers, with the exception of a negligible 1 dB exceedance at Location 19 if the former INP criteria is applied (noting that compliance at this receiver is predicted under the updated Npfl criteria);
- the project would exceed applicable sleep disturbance screening criteria at 3 properties (Locations 11, 2 and 17), but internal noise levels would remain below those levels likely to cause awakening reactions; and
- construction noise levels would remain unchanged from the original EIS assessment, with several properties predicted to exceed the noise management level criteria, but none predicted to exceed the highly affected noise limit under the EPA's *Interim Construction Noise Guideline*.

263. The EPA did not raise any significant issues regarding the updated noise assessment, noting that there is little change to the project noise levels apart from the identified changes at Locations 7, 11 and 14.

264. The EPA did recommend that the location of all affected properties be clarified on a map (which Hume Coal has since provided).

265. The Department notes that the number of properties predicted to be affected by operational noise associated with the project is similar to those of other large coal mining projects in NSW. In the PAR, the Department accepted that the noise impacts could be adequately managed (or at least compensated for) through the following measures:

- include noise criteria in the conditions;
- restrict construction hours to 7 am to 6 pm Monday to Friday, 8 am to 1 pm on Saturday, and no work on Sundays or public holidays;
- prepare and implement a Noise Management Plan;
- minimise the construction noise in accordance with the EPA's *Interim Construction Noise Guideline*;
- provide mitigation and acquisition in accordance with the VLAMP; and
- use approved class of locomotives for operation on the NSW rail network.

266. Notwithstanding, the noise modelling indicates that the project would have some residual amenity impacts for residents along Medway Road. This includes significant impacts on two properties justifying acquisition of the properties, and further impacts on another 9 properties justifying provision of additional noise mitigation measures. These impacts would contribute to the wider amenity impacts on these receivers in this quiet rural-residential area.

267. The VLAMP provides that the application of voluntary acquisition rights through a development consent should be seen as a mitigation measure of last resort, and that voluntary acquisition and mitigation rights should only be applied where the proposal is assessed as having a net benefit and in the public interest.

268. For the reasons outlined in this report, the Department does not believe that the project is in the public interest. As such, the Department does not believe that the residual noise impacts on the Medway Road residents, and the provision of voluntary acquisition and mitigation rights, are acceptable.

2.6.2 Noise Modelling and Mitigation

Recommendation 11

The Applicant and the Department should explore opportunities to further mitigate noise impacts. Such opportunities may include more extensive noise monitoring, closer attention to atmospheric conditions, incorporation of any recently developed rail and rolling stock modifications, construction of noise bunds and physical barriers and stop-work when exceedances are observed.

269. Hume Coal's updated noise assessment concluded that no further reasonable and feasible mitigation measures could be applied, but includes little investigation or consideration of additional mitigation measures apart from a commitment to investigating further noise mitigation post-approval in consultation with landholders.

270. Nonetheless, the EPA is satisfied that Hume Coal has proposed a range of contemporary noise mitigation measures as part of the project. These include"

- location of infrastructure based on noise considerations;
- automated coal handling equipment and noise-attenuated components;
- enclosures on conveyors and plant;
- limiting dozer operation to day time only;
- use of latest generation locomotives; and

- a noise barrier to the north of the rail loop.
271. The EPA recommended that any approval include requirements for real time noise monitoring, and ongoing consideration of reasonable and feasible noise controls as part of a noise management plan.
272. As outlined above, despite these mitigation measures the project is predicted to have residual noise impacts on a number of properties along Medway Road, including significant impacts on 2 properties and marginal impacts on a further 9 properties. These impacts would contribute to the project's amenity impacts on the Medway Road area.

2.6.3 Air Quality Modelling

Recommendation 12

The Department's Final Assessment Report should confirm the suitability of the assumptions in the Applicant's modelling in relation to the prevailing wind data utilised as this was questioned by members of the public in submissions.

273. Hume Coal's response includes additional analysis of annual wind roses for the four applicable monitoring stations, to demonstrate the consistency and similarity in recorded wind speed and direction profiles over a four-year basis.
274. The analysed data supports the use of the 2013 meteorological monitoring datasets used for the air quality impact assessment (AQIA) undertaken for the EIS.
275. Wind speeds recorded at the BoM Moss Vale dataset used in the modelling are the highest of the four reviewed monitoring resources. The use of these elevated wind speeds (average and gust conditions) in the assessment provides for a conservative (highest) prediction of dust emission generation.
276. Hume Coal notes that the AQIA dispersion modelling is based on two representative meteorological datasets, and therefore it considers that the likely impacts from the project at surrounding residences and community centres have been robustly quantified.
277. Hume Coal also quotes the EPA's submission (dated 30 June 2017), in which the EPA states that it "did not identify any issues that have the potential to alter the overall conclusions and outcomes of this assessment".
278. The EPA has reviewed the additional information and has not raised any issues in relation to the wind data or modelling.
279. The Department is satisfied that Hume Coal's air quality assessment is reasonable and conservative, and that the assessment indicates that air quality emissions associated with the project would comply with applicable criteria.
280. As outlined in the PAR, the Department considers that air quality could be adequately managed through standard best practice conditions, including requiring Hume Coal to:
- comply with air quality criteria in accordance with EPA's relevant guidelines; and
 - prepare and implement an Air Quality Management Plan, in consultation with EPA.

2.6.4 Managing Greenhouse Gas and Diesel Emissions

Recommendation 13

The Applicant should undertake a more rigorous and detailed assessment of Project Greenhouse Gas Emissions, including Scope 3 end use of product coal, and this should be assessed prior to the Department's Final Assessment.

Recommendation 14

The Applicant is to clearly define how it intends to mitigate/offset its greenhouse gas emissions through measures such as ensuring that all Project coal is only used within countries that are parties to the Paris Agreement.

281. Hume Coal has undertaken further investigations using in-situ gas values from its exploration boreholes to determine a more appropriate site-specific emission factor than was used for the EIS.
282. These investigations identified the site as being a 'low gas' resource, and therefore the Scope 1 greenhouse gas (GHG) emissions would be less than those presented in the EIS and RTS.
283. The project's Scope 1 GHG emissions intensity is low relative to the Australian coal mining industry facility average, and lower than the *National Greenhouse and Energy Reporting Act 2007* (NGER Act) threshold level, therefore the mine would not be classed as a large GHG emitting facility.
284. Scope 3 emission calculations were revised based on the latest national GHG emission factors and a more conservative 45/55 thermal/coking coal split.
285. A summary of the GHG emissions associated with the project is provided in the following table.

Table 6 | Project GHG Emissions

Scope	GHG Source(s)	Total GHG Emissions (tonnes CO ₂ -equivalent)		
		Annual Average	Project Total	% of Total
Scope 1	On-site fuel use, ventilation gas	7,750	178,244	0.17%
Scope 2	Upstream electricity	67,479	1,552,006	1.5%
Scope 3	Downstream fuel and electricity	7,868	180,957	0.17%
	Downstream thermal coal use	1,908,329	43,891,559	41%
	Downstream coking coal use	2,645,838	60,854,284	57%
	Total (exc. Coal use)	83,096	1,911,207	1.8%
	Total (inc. coal use)	4,637,263	106,657,050	-

286. As outlined in the PAR, the Department remains of the view that Scope 1 GHG emissions associated with the project would be relatively low, and could be managed through the implementation of reasonable and feasible measures to minimise the release of GHG emissions.
287. The total direct and indirect GHG emissions (ie. Scopes 1 to 3) from the project, if accounted wholly within Australia, would equate to about 1% of Australia's Nationally Determined Contribution (NDC) 2030 emissions target. In reality, much of the coal from the project would

likely be exported, and would therefore contribute to other countries NDCs. As indicated in the table, downstream coal use is by far the biggest source of GHG emissions from the project.

288. Mitigation measures proposed to be implemented by Hume Coal for the reduction of Scope 1, 2 and 3 GHG emissions include the following (where practicable):

- Scope 1 measures:
 - use of battery-electric powered vehicles for surface activities and underground personnel transport;
 - use of fuel-efficient locomotive engines and systems;
 - reduction of engine idling times; and
 - routine servicing and maintenance;
- Scope 2 measures:
 - procure power supply from renewable energy sources where possible; and
 - establish solar power cells and storage batteries to power administration buildings on site;
- Scope 3 measures:
 - only sell coal products to countries (states or organisations) that are signatories of the Paris Agreement.

289. Hume Coal has also committed to offsetting all fugitive (Scope 1) GHG emissions through tree planting on Hume Coal owned land. Hume Coal anticipates that this would equate to some 1ha to 2ha of tree plantings per year, with the plantings targeting revegetation along watercourses.

290. The Department is satisfied that Hume Coal's mitigation and offsetting measures are consistent with best or leading practice for coal mining projects in NSW.

2.7 Matters for Further Consideration

291. The Commission made five recommendations in relation to matters for further assessment and statutory evaluation, including the need for additional agency consultation, updated consideration of the Mining SEPP and the objects of the EP&A Act, including but not limited to the principles of ecologically sustainable development, public interest and the suitability of the site.

292. These recommendations have been considered in detail below.

2.7.1 Further Agency Consultation

Recommendation 30

The Department should invite relevant Government agencies to review and provide comment on any new information provided by the Applicant since the Department's Preliminary Assessment Report was published, including the content of this report. In its Final Assessment Report to the Commission, the Department should consider any further Agency feedback as well as the content of this report, the Materials, and any additional information produced in response to this Report and its recommendations.

293. The Department referred Hume Coal's Response Report to the relevant government authorities, as well as to the Department's relevant independent experts. The additional consultation is discussed in Section 1.6 above, and the Department has considered this feedback in its final assessment of the project.

2.7.2 Mining SEPP Consideration

Recommendation 26

The Department should provide an updated and detailed assessment of all relevant components under Part 3 of the State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 with its Final Assessment Report, based on any additional information made available since the issue of the Department's Preliminary Assessment Report.

Recommendation 29

The Department should include in its Final Assessment Report to the Commission an assessment of the public benefits of the Project which give consideration of whether:

- i. the economic benefits of the Project outweigh its costs to the local community (section 4.15(1)(b) of the Environmental Planning and Assessment Act 1979); and*
- ii. the public benefits of the Project outweigh the public benefits of other land uses (clause 12 (b) of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007).*

294. The Department has considered the relevant provisions of the Mining SEPP and other environmental planning instruments (EPIs) in its assessment of the project. Hume Coal has also provided a detailed consideration of the Mining SEPP, and the matters for consideration in section 4.15 of the EP&A Act, in its Response Report.
295. The Department notes that it generally seeks to avoid providing a formulaic or checklist approach to consideration of EPIs in its assessment reports. Rather, the consideration of the relevant provisions of the instruments its undertaken as part of the broader merit assessment of the project. This approach avoids repetition and duplication in reports, and focuses the assessment on the complex interaction of environmental, social and economic matters on major projects.
296. Notwithstanding, in accordance with the Commission's recommendation, the Department has undertaken an assessment of the relevant components of Part 3 of the Mining SEPP, which is provided in **Appendix E**.
297. The assessment indicates that the project would not comply with one of the non-discretionary development standards for mining in clause 12AB of the SEPP, namely exceedances of the minimal impact considerations in the *Aquifer Interference Policy* (ie. 2 metre groundwater bore drawdown) at 94 bores on 72 landholdings based on the 67th percentile predictions, or 118 bores based on the 90th percentile predictions.
298. The issues associated with groundwater drawdown at privately-owned bores are significant for the Department's overall consideration of the merits of the project.
299. Clause 12 of the Mining SEPP requires a consent authority to consider the compatibility of the proposed mine with other land uses, including "*existing, approved or likely preferred uses*".
300. As outlined in the PAR, the zoning provisions of the Wingecarribee LEP 2010 are relevant to the extent that they influence the existing, approved and likely preferred land uses in the project area and its surrounds.

301. The majority of the project area is zoned E3 Environmental Management (approximately 70%), and there is also a smaller area in the southwestern portion that is zoned RU2 Rural Landscape (approximately 3%). Other parts of the project area are zoned RU3 Forestry (approximately 26%), SP2 Infrastructure (approximately 1%) and E2 Environmental Conservation (less than 1%).
302. Based on the limited list of permitted land uses and the non-mandatory objectives in the E2, E3 and RU2 zones, the Department remains concerned that a new coal mine may not be compatible with the “*existing, approved and likely preferred land uses*” of these zones.
303. In this regard, the objectives of the E2 and E3 zones are aimed at protecting existing historic, ecological, cultural and aesthetic values. Similarly, the objectives of the RU2 zone are focussed on maintaining the “*rural landscape character*” and “*encouraging sustainable primary industry*”.
304. However, the Department also acknowledges that the proposal is permissible on the land under the Mining SEPP, and that mining proposals are routinely approved on land that is not wholly compatible with the land use zones on which they are located (noting that there is no such thing as a ‘mining’ zone).
305. As outlined in Section 2.2.2, the Department notes that given the very large number of significantly affected groundwater users, the rural-residential and small-scale agricultural land use of the area, and the greenfields nature of the project, the impacts are likely to lead to significant dispute and disruption in the local community.
306. Consequently, the Department maintains its concerns that the project is not compatible with the rural land uses in the vicinity of the development.
307. The Department also notes that the project would have amenity impacts on rural-residential land users along Medway Road, in particular significant noise impacts on two residences, as well as some visual impacts.
308. Clause 12 of the Mining SEPP also requires a consent authority to evaluate and compare the respective public benefits of the development and the land uses in the vicinity of the development.
309. In this regard, the Department recognises that the project would have public benefits, including generation of a considerable number of jobs, as well as economic benefits for the Southern Highlands and NSW.
310. The Department acknowledges that the distribution of these wider public benefits is likely to be greater than the public benefits derived from the current land uses in the vicinity of the development, the benefits of which are more localised.
311. The Department has considered these public benefits associated with the project in its overall assessment and evaluation of the project.
312. The Department notes that the Commission’s Recommendation 29 asks the Department to give consideration of whether “the economic benefits of the Project outweigh its costs to the local community (section 4.15(1)(b) of the *Environmental Planning and Assessment Act 1979*)”.
313. Hume Coal notes that section 4.15(1)(b) of the Act does not require such a consideration. The Department accepts this literal interpretation of section 4.15(1)(b), but also recognises that consideration of public benefits forms part of the ‘weighing up’ of the development under section 4.15. This evaluation is summarised in Section 3 below.

2.7.3 Ecologically Sustainable Development

Recommendation 27

The Applicant should update its consideration of the objects of the Environmental Planning and Assessment Act 1979 and utilise the definition of 'Ecologically Sustainable Development' from the Protection of the Environment Administration Act 1991.

Recommendation 28

The Department should provide an updated and detailed assessment of the public interest, the objects of the Environmental Planning and Assessment Act 1979 and 'Ecologically Sustainable Development' with its Final Assessment Report, based on any additional information made available since the issue of the Department's Preliminary Assessment Report, including the further information recommended in this report by the Commission.

314. The Department's final assessment of the project has given updated detailed consideration of relevant statutory requirements, including the objects of the EP&A Act and the principles of ecologically sustainable development (see **Appendix E**). The Department's final evaluation of the project has considered the relevant matters under section 4.15 of the Act, including the public interest.
315. Hume Coal has also updated its consideration of these matters in its Response Report.
316. As outlined in Appendix E, the Department maintains its conclusion that there is a predicted threat of serious harm to groundwater resources. There is also a threat of serious harm to surface water resources, including Sydney's drinking water catchment, in the absence of a contingency strategy for managing the potential need to discharge water from the project.
317. There are also threats of serious harm to the health and safety of the mine workers themselves associated with the proposed mine design, particularly in the event of failure or yielding of the web pillars.
318. There is still a lack of scientific certainty around most of these issues, and the Department does not believe that it would be acceptable to defer or postpone full assessment of these matters, or to postpone measures to prevent environmental degradation.
319. Consequently, the Department maintains that proceeding with the project as proposed would not be consistent with the precautionary principle.

3 Evaluation

320. Under the EP&A Act the Department is required to undertake a triple-bottom line assessment that balances the likely environmental, social and economic impacts of the project. In undertaking this assessment, the Department must also consider public submissions, the provisions of environmental planning instruments (EPIs), the suitability of the site and the public interest.
321. The following table provides an updated summary of the Department's overall evaluation of the project, based on the information in the Commission's Report and Hume Coal's Response Report, as well as other relevant project-related information. The table includes a summary of

the evaluation as provided in the PAR, as well as an updated evaluation based on the additional information.

Table 7 | Project Evaluation Summary

Matter	Evaluation in PAR	Updated Evaluation
Project Design		
Key Mine Design Mitigation Measures	<p>The Department acknowledges that Hume Coal has taken a number of important steps in designing the project to avoid and/or mitigate potential impacts of the project on the environment and the community, including:</p> <ul style="list-style-type: none"> • locating the proposed mine’s surface infrastructure away from most sensitive receivers, adjacent to a major highway and on largely cleared land with limited native vegetation; • locating the proposed rail works close to an existing industrial area (the Moss Vale Enterprise Corridor); • utilising a range of existing infrastructure in the vicinity that would allow the transportation of coal for use and/or export at Port Kembla; • selecting an unconventional mining method in an attempt to limit subsidence-related impacts on sensitive features at the surface, particularly in comparison to the longwall mining that is used in other parts of the Southern Coalfield; and • selecting an unconventional method of mine water management that would use the storage capacity of the mine workings to reduce groundwater inflows and prevent surface water discharges. 	<p>These measures have not changed since the PAR.</p> <p>The unconventional pine feather mine design continues to raise concerns for the NSW Resources Regulator and the Department’s independent mining engineering experts, particularly with regard to the stability of the web pillars, with resultant risks to workplace health and safety and the environment.</p> <p>The mine water management method, particularly the lack of a contingency plan in the event that the underground storage is required to cease, also continues to raise significant concerns for Water NSW and the Department, given the potential requirement to discharge water to Sydney’s drinking water catchment.</p> <p>The Department is not satisfied that the risks and impacts associated with these aspects of the mine design have been adequately addressed. The Department (and its experts) have consistently requested that Hume Coal undertakes additional assessment and modelling based on more conservative industry-accepted assumptions.</p> <p>However, Hume Coal has chosen not to undertake this additional work, and considers that these matters could be addressed through post approval requirements as the mine progresses.</p> <p>The Department is therefore not satisfied that the proposed approach of deferring this work to the post approval period is acceptable in this instance given the identified uncertainties and risks, particularly in relation to preventing potential additional environmental impacts.</p> <p>The Department considers that such an approach lacks finality, and proceeding with the project as proposed, in the face of the identified uncertainties and risks, is inconsistent with the precautionary principle.</p>
Planning Context		
Strategic Context and Site Suitability	<p>The Department acknowledges that there are some advantages to the site as a coal mine, most notably the existence of a valuable coal resource</p>	<p>The uncertainties and risks associated with the unconventional pine feather mining method remain, as do the uncertainties and risks associated with the underground mine water</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>and the presence of existing transportation infrastructure.</p> <p>However, the targeted coal resource is located in a shallow seam that is inherently difficult to extract without causing adverse environmental impacts and disturbing existing land uses. The project is also located within the upper reaches of Sydney's drinking water catchment.</p> <p>In addition, while coal mining plays a part in the Southern Highlands region's history and heritage, the region is now more widely known for its rural land uses, small-scale agriculture, scenic landscapes and tourism. The area surrounding the proposed coal mine features relatively dense, small-scale agricultural lots with most properties holding registered bores in order to gain access to productive groundwater aquifers.</p> <p>These unique characteristics have led to an unconventional mine design that presents a range of uncertainties and safety risks, as well as the likelihood of significant impacts on water resources.</p> <p>Consequently, the Department considers that the project site is not suitable for the development of a new coal mine.</p>	<p>disposal (given the risks associated with the mining method, and the lack of a suitable contingency measure in the event that underground storage is required to cease).</p> <p>These issues arise largely because of the shallow nature of the coal resource, the proposed novel mining method, the hydrogeology of the site, the highly productive nature of the aquifer and its widespread use in the area, the rural-residential nature of much of the locality, and the site's location in the Sydney drinking water catchment.</p> <p>The Department accepts that there are positive suitability aspects of the site, including the site's proximity to existing industrial areas and to Port Kembla, and the ability to largely screen the surface infrastructure from key surrounding urban areas.</p> <p>However, the Department remains concerned about the suitability of the site for the development of a greenfield coal mine given the transition of the area to a tourism and small agriculture/ rural residential focus, which is reflected in the land use zoning.</p> <p>Consequently, the Department remains of the view that the site is not suitable for a greenfield coal mine.</p>
Policy Context	<p>The Mining SEPP is the key planning policy that regulates mining in NSW, including underground coal mines.</p> <p>While the Mining SEPP is intended to make underground coal mining permissible on almost any land, it only allows underground mining "with development consent".</p> <p>In particular, clause 12 of the Mining SEPP requires the consent authority to consider whether the project is compatible with other land uses, including "existing, approved and likely preferred land uses". In that regard, the zoning provisions of the LEP are relevant to the extent that they influence the existing, approved and likely preferred land uses in the project area and its surrounds.</p> <p>The majority of the project is zoned as E3 Environmental Management (approximately 70%) and there is also a smaller area in the southwestern portion that is zoned RU2 Rural Landscape (approximately 3%).</p> <p>Based on the limited list of permitted land uses and the non-mandatory objectives in both the E3 and RU2 zones, the Department is concerned that a new coal mine may not be compatible with</p>	<p>The proposed project would not comply with one of the non-discretionary development standards in clause 12AB of the Mining SEPP, namely the exceedance of the minimal impact considerations of the <i>Aquifer Interference Policy</i> (ie. 2 metre groundwater bore drawdown) at 94 bores on 72 landholdings based on the 67th percentile predictions, or 118 bores based on the 90th percentile predictions.</p> <p>The Department also remains concerned that the project is not compatible with the "existing, approved and likely preferred land uses" of the area (which are focused on protection of historic, ecological cultural and aesthetic values), particularly given the mine design risks, the predicted groundwater impacts, the impracticality of the make good arrangements given the large number of affected land users and the likelihood for dispute, and the localised amenity impacts on rural-residential land users along Medway Road.</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>the “existing, approved and likely preferred land uses” of these zones.</p> <p>Further, under clause 10 of the Drinking Water Catchment SEPP, the consent authority must not “grant consent to the carrying out of development” in the drinking water catchment unless it would have a ‘neutral or beneficial effect’ on water quality (the ‘NorBe test’).</p> <p>Hume Coal has not undertaken an assessment of the potential surface water impacts associated with the potential need to store additional mine water above ground. Consequently, the Department considers that the project may not conform with the Drinking Water Catchment SEPP.</p>	
<h3>Submissions</h3>		
<p>Submissions Summary</p>	<p>The vast majority of the community has expressed its opposition to the project, particularly those in close proximity to the proposed mine site.</p> <p>The Department received a total of 12,666 submissions on the project, of which 96% were objections, 3% supported the project and less than 1% provided comments. The key issues raised in objections were groundwater, and social and economic impacts.</p> <p>The Department has reviewed the geographical locations of the submissions and notes that 5,099 were received from addresses within postcodes that are within or adjacent to the project area. The vast majority of these submissions were objections to the project, i.e. 4,930 objections or approximately 97%.</p> <p>The Department acknowledges that Hume Coal has made considerable efforts to respond to the concerns raised by government agencies and the community throughout the development assessment process, including:</p> <ul style="list-style-type: none"> • revising its entire groundwater model and undertaking comprehensive uncertainty and sensitivity analyses; • updating its groundwater impact assessment, including the preparation of a detailed ‘make good strategy’; • commissioning an international mining engineering expert to prepare a three-dimensional geotechnical model; and • undertaking additional consultation with the community to address amenity 	<p>Wingecarribee Shire Council maintains its objection to the project, and a number of other government authorities continue to raise considerable concerns, despite ongoing review and assessment over a number of years, including:</p> <ul style="list-style-type: none"> • NSW Resources Regulator, in relation to mine design, subsidence and safety risks; • DPIE Water, in relation to groundwater impacts; • NSW Water, in relation to potential surface water impacts and impacts to the Sydney drinking water catchment; and • Heritage NSW, in relation to historical heritage impacts. <p>The continued public interest in the project is also evidenced in the submissions to the Commission during its public hearing, which included 699 written submissions and 3,299 form submissions, with 71 people addressing the Commission during its hearings. Most of these objected to the project.</p> <p>Key issues raised in these submissions related to:</p> <ul style="list-style-type: none"> • amenity impacts (noise and air quality); • groundwater and surface water impacts; • heritage, cultural landscape and visual impacts; • economic and social impacts; and • ecologically sustainable development and greenhouse gas.

Matter	Evaluation in PAR	Updated Evaluation
	<p>impacts and progress potential make good arrangements.</p> <p>Notwithstanding, Wingecarribee Shire Council maintains its objection to the project and has a policy against any coal mining in its local government area. It has also not participated in VPA negotiations with Hume Coal.</p> <p>None of the other government agencies objected to the project, however several agencies have significant residual concerns about the potential impacts of the project.</p> <p>While there are supporters of the project, the community engagement undertaken by the Department indicates strong and widespread opposition to the project from the local community.</p>	

Key Likely Impacts

Groundwater	<p>The project is predicted to have significant impacts on a highly productive groundwater aquifer, including drawdown impacts on up to 118 privately held bores.</p> <p>Regardless of any uncertainty about the modelling, the predicted drawdown impacts on this aquifer would be the most significant for any mining project that has ever been assessed in NSW.</p> <p>The significant groundwater drawdown impacts are largely due to a range of project-specific factors, which means there are limited opportunities to further minimise impacts.</p> <p>Hume Coal has proposed a strategy to ‘make good’ on the predicted drawdown impacts. While the proposed make good measures (e.g. deepening pumps or replacing bores) may be feasible from a strictly technical standpoint, the Department considers that make good arrangements are not suitable or practical in this case.</p> <p>Given the significant opposition to the project in the local area, the proposed make good process would inevitably result in a large number of negotiations and disputes with local landowners, unavoidable delays to the development of the project, and significant disruption to the community.</p>	<p>The predicted impacts have not changed since the PAR. That is, the project is predicted to exceed the minimal impact considerations of the <i>Aquifer Interference Policy</i> (ie. 2 metre groundwater bore drawdown) at 94 privately-owned bores on 72 landholdings based on the 67th percentile predictions, or 118 bores based on the 90th percentile predictions.</p> <p>This level of impact far exceeds those of contemporary mining projects in NSW. Drawdown in these bores is significant, exceeding 10 metres for many of the affected bores, and up to more than 40 metres for some bores. This impact is significant given the relatively shallow nature of the proposed mine and the groundwater aquifer.</p> <p>Hume Coal has provided additional detail on the process for the proposed make good strategy, but has not provided any substantial new information on the practicality of the make good arrangements.</p> <p>The Department maintains that the proposed make good arrangements are not suitable or practical given:</p> <ul style="list-style-type: none"> • the substantial disruption to the local community associated with the negotiation and implementation process, particularly given the rural-residential and small-scale agricultural land use of the area; • the high likelihood of considerable disagreement between Hume Coal and landowners about the actual impacts and make good arrangements;
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Matter	Evaluation in PAR	Updated Evaluation
		<ul style="list-style-type: none"> • that the process would likely rely heavily on dispute resolution between Hume Coal and a large number of landowners, which would inevitably involve substantial legal costs for both parties and the Department; and • that the above processes would likely result in extensive time delays, creating ongoing disruption and uncertainty in the community.
Mine Design	<p>The unconventional pine feather mining method was largely selected to minimise subsidence and associated impacts to surface features. However, the combination of an untested mining method and an unconventional method of storing large quantities of mine water underground is likely to result in serious operational safety risks.</p> <p>The Department considers that the various safety risks may lead to the transfer of additional mine water to the surface and a need to discharge into local watercourses. Hume Coal has not assessed this issue or proposed a water treatment plant.</p> <p>Any discharge of mine water may result in significant impacts on surface water within Sydney's drinking water catchment.</p> <p>Further, there is a risk that the operational safety issues associated with the unconventional mine design may result in an unexpected sterilisation of coal, which may significantly reduce the economic benefits of the project.</p>	<p>The NSW Resources Regulator and the Department's two independent mine engineering experts continue to have concerns about the geotechnical model and the uncertainties associated with the mine design, particularly in relation to the short and/or long term stability of the web pillars.</p> <p>Whilst the likelihood of web pillar failure or yielding may be low and/or localised, any such failure has the potential to result in significant or even catastrophic consequences, particularly impacts on workplace health and safety, as well as environmental impacts (including groundwater response to mining).</p> <p>Hume Coal argues that these risks could be addressed, if required, through further assessment and/or changes to the mine design during the operational of the project.</p> <p>While the mine design could be further developed as a post approval requirement, similar to the preparation of Extraction Plans required for longwall mining and High Risk Activity (HRA) notifications and approvals under mine safety regulations, given this is a novel mining method, there are no clear precedents for how mine design would progress.</p> <p>The Department is therefore not satisfied that the proposed approach by Hume Coal to deferring this work to the post approval period based on a monitor and adaptive management approach is acceptable in this instance given the identified risks.</p>
Economics	<p>While there are differences in opinion and various residual uncertainties about the scale of the project's economic benefits, the Department considers that the project is likely to have some level of economic benefits for the state of NSW.</p> <p>However, the Department notes that there are fundamental difficulties in efficiently recovering the coal resource for this project, particularly due</p>	<p>There is now adequate agreement between the economics experts on the net economic benefits of the project, with the Department's expert estimating that the project would have a net benefit of \$194 million in net present value terms which is less than Hume Coals estimates in the EIS.</p> <p>The Department accepts that the project as proposed would have a net economic benefit to NSW and a range of benefits to the Southern</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>to the shallow depth of the coal and the risk of environmental impacts.</p> <p>Importantly, even Hume Coal's estimated net economic benefits of \$373 million is relatively low in comparison to many other coal mining projects in the Southern Coalfield and across NSW.</p>	<p>Highlands region, and that sensitivity analysis indicates that the project (as designed) would remain of positive net benefit even when considering a range of potential economic variables.</p> <p>However, any required changes to the mine design (eg. as a result of the identified web pillar stability issues) has the potential to affect the economic benefits of the project. As such, there remains some uncertainty about the extent of economic benefits of the project.</p>

Other Likely Impacts¹

Noise	<p>During operations, there are predicted exceedances of project specific noise levels (PSNLs) at numerous privately-owned properties surrounding the project.</p> <p>For the Hume Coal Project, there are 9 properties with predicted noise levels of 3 to 5 dB above the PSNLs, and 2 properties with predicted noise levels greater than 5 dB above PSNLs.</p> <p>For the Berrima Rail Project, there is 1 property with predicted noise levels of 3 to 5 dB above the PSNL.</p> <p>Under the <i>Voluntary Land Acquisition and Mitigation Policy (VLAMP)</i>, exceedances of 3 to 5 dB would require mitigation and exceedances greater than 5db would require acquisition.</p> <p>Sleep disturbance is predicted for maximum noise events due to train pass-by-arrival on the rail loop at 3 privately-owned properties.</p> <p>While there are a number of exceedances of the relevant PSNLs, the Department, the Department's independent expert and EPA consider that noise could be adequately managed through best practice mitigation and/or compensatory measures.</p>	<p>Updated noise assessment indicates that operational noise levels would increase marginally at a small number of properties compared to the assessment in the PAR, but that the classification of impacts under the VLAMP would remain similar to that in the PAR.</p> <p>That is, 9 properties (10 residences) are predicted to be marginally impacted (ie. 3 to 5 dB above the criteria), and would nominally be entitled to additional mitigation measures under the VLAMP. Two (2) properties would be significantly impacted (ie. >5 dB above the criteria) and would nominally be entitled to voluntary acquisition. All of the affected properties are located along Medway Road to the north and north-west of the project area.</p> <p>The Department notes that the voluntary mitigation and acquisition provisions in the VLAMP are a mitigation measure of last resort, and should only be applied where the proposal has a clear net benefit and is in the public interest.</p> <p>For the reasons outlined in this report, the Department does not believe that the project has a clear net benefit that would justify the provision of such voluntary mitigation and acquisition rights.</p> <p>The Department considers that the noise impacts would contribute to the wider amenity impacts in the quiet rural-residential area of Medway Road.</p>
Vibration	<p>The nearest sensitive receptor is located 300 m from the construction blast activity for the Hume Coal Project. Predicted construction blasts would comply with the relevant ANZECC air-blast and ground vibration criteria.</p> <p>Vibration levels under Hume Highway would not cause structural damage. The predicted peak particle velocity is less than 0.1 mm/s, which is</p>	<p>The Department's consideration remains the same as in the PAR. No further comments were received from the EPA in relation to vibration issues.</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>well below structural vibration screening criteria is 7.5 mm/s.</p> <p>Vibration impacts from construction and operation of the Berrima Rail Project would be negligible.</p> <p>The Department considers that blasting could be adequately managed through best practice mitigation measures.</p>	
Air Quality	<p>The air quality impact assessment considered any location within 165 km² of the project and included 76 selected receptors out of the identified 172.</p> <p>Loaded and empty trains associated with the project would be covered to minimise fugitive dust emissions.</p> <p>Predicted concentrations of particulate matter (TSP, PM₁₀ and PM_{2.5}), gaseous emissions (NO₂ and VOCs) and dust deposition levels would be negligible at the sensitive receptors.</p> <p>The Department and EPA consider that air quality could be adequately managed through best practice mitigation measures.</p>	<p>The Department's consideration remains the same as in the PAR. No further comments were received from the EPA in relation to air quality issues, although it recommended that real time monitoring is required as part of any project approval.</p>
Greenhouse Gas (GHG) Emissions	<p>Total annual average scopes 1, 2 and 3 GHG emissions (excluding the end use of coal) for Hume Coal project are estimated as approximately 345.01 kt CO₂-e. Total maximum annual scopes 1 and 3 emissions for the Berrima Rail Project are estimated as approximately 4.3 kt CO₂-e.</p> <p>The predicted emission from Hume Coal Project for scopes 1, 2 and 3 GHG emissions represent approximately 0.27% of NSW annual GHG emissions and 0.066% of Australia's annual GHG emissions.</p> <p>The predicted emission from the Berrima Rail Project for scopes 1 and 3 represent 0.0033% of NSW and 0.0008% of Australia's annual emissions.</p> <p>The Department considers GHG emissions would be minimal and could be managed through the implementation of all reasonable and feasible measures to minimise the release of GHG emissions</p>	<p>Hume Coal has updated its GHG assessment using more accurate site-specific emission factors.</p> <p>The updated assessment indicates that total average annual Scope 1 to 3 GHG emissions from the project (including the end use of coal) would be approximately 4.6 Mt CO₂-e, of which 98% would be associated with the downstream burning of the coal resource.</p> <p>If accounted wholly within Australia, the GHG emissions would equate to about 1% of Australia's Nationally Determined Contribution (NDC) 2030 emissions target. Whilst it is likely that some of the coal would be burnt in Australia and would need to be accounted for locally, the Department accepts that much of the coal from the project would likely be exported, and therefore contribute to other countries NDCs.</p> <p>The Department is satisfied that Hume Coal's mitigation and offsetting measures, particularly the commitment to offsetting fugitive GHG emissions through tree planting, and selling coal products only to countries that are signatories to the Paris Agreement, are consistent with best or leading practice for coal mining projects in NSW.</p>
Traffic	<p>During the construction and operation of the Hume Coal Project, there would be up to 378</p>	<p>The Department's consideration remains the same as in the PAR. No further comments were received</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>additional daily light and heavy vehicle movements using the local road network (between 0.2% to 29% traffic increases on various roads).</p> <p>During construction of the Berrima Rail Project, the peak daily movements would be 80 vehicles for the construction stage of Berrima Rail Project from Old Hume Highway (approximately 3% traffic increase).</p> <p>During the operations of the Berrima Rail Project, there would be 10 heavy and 10 light vehicle movements per day, accessing the rail maintenance facility access road (approximately 1% traffic increase).</p> <p>There would be additional delays of up to a 24 minutes per day at the major road level crossings between Robertson and Moss Vale, and associated safety risks within the local road network.</p> <p>The Department and RMS consider that the traffic impacts would not be significant and could be managed subject to identified road and intersection upgrades and best practice traffic management.</p>	<p>from Transport for NSW (TfNSW) or Council in relation to traffic issues.</p>
Rail	<p>The maximum daily movements on the Berrima Branch Line would be 34 trains (17 in each direction). This would be equivalent to 77% of the practical line operating capacity.</p> <p>ARTC noted the performance improvements in its rail network resulting from the project.</p> <p>The Department considers that any residual rail issues could be adequately managed by including the design and use of the proposed level crossings and railway bridges in the conditions.</p>	<p>The Department's consideration remains the same as in the PAR. No further comments were received from ARTC in relation to rail transport issues.</p>
Biodiversity	<p>The Department including the Biodiversity Conservation Division (BCD formerly the Office of Environment and Heritage) consider the project has largely been designed to avoid and minimise direct impacts of the project on biodiversity.</p> <p>The Hume Coal Project would involve clearing of up to 8.3 ha of native vegetation and threatened species habitat and requires 101 ecosystem credits and 582 species (Koala, Squirrel Glider and Southern Myotis) credits.</p> <p>The Berrima Rail Project would involve clearing of up to 2 ha of native vegetation and threatened species habitat and requires 6 ecosystem credits and 44 species (Squirrel Glider) credit.</p>	<p>The Department's consideration remains the same as in the PAR. No further comments were received from BCD in relation to biodiversity issues.</p>

Matter	Evaluation in PAR	Updated Evaluation
	<p>The Department and BCD consider that the biodiversity impacts would not be significant and could be managed through offsetting impacts in accordance with <i>NSW Biodiversity Offsets Scheme</i>, and preparing and implementing a Biodiversity Management Plan in consultation with BCD.</p>	
Heritage	<p>206 Aboriginal sites were identified within the Hume Coal Project area, 20 of which would be affected by direct disturbance footprint (3 totally disturbed, 10 partially lost and 7 totally lost).</p> <p>11 Aboriginal sites were identified within the Berrima Rail Project area, 8 of which would be affected by direct disturbance footprint (6 partially lost and 2 totally lost).</p> <p>8 historic items were identified within the project area. A portion of one of the identified items that would be affected is in the Wingecarribee LEP.</p> <p>The Department considers that the Aboriginal and historic heritage impacts would not be significant and could be managed through best practice mitigation measures.</p>	<p>Heritage NSW continues to raise significant concerns about the adequacy of the historical archaeological assessment and the heritage-related impacts of the project, including the impacts on the Hume Coal-owned Mereworth House and its Sorensen-designed garden, as well as impacts on the wider cultural landscape.</p> <p>The Department acknowledges Heritage NSW's concerns, but notes that:</p> <ul style="list-style-type: none"> the focus of Hume Coal's archaeological assessment was on the surface infrastructure disturbance area, given the predictions of negligible subsidence in the wider project area. However, as noted above there is still some uncertainty about the potential for subsidence; Mereworth House and its Garden would not be directly impacted by the project, are not publicly accessible, and the visual impacts on the house and gardens would be of a temporary nature (ie. During the project life); and the project-related impacts on the cultural heritage landscape are unlikely to seriously affect the landscape values as a whole. <p>Notwithstanding, the Department agrees that the project would have a detrimental impact on the cultural landscape, and that the visual and cultural landscape impacts of the project would contribute to the amenity impacts of the project, which are not insignificant.</p>
Agriculture and Rehabilitation	<p>279 ha of land would be disturbed for the project, including:</p> <ul style="list-style-type: none"> 117 ha of land (or 2% of the project area) for the mine infrastructure area; 25 ha of land for the rail line; 73 ha of land would be temporarily disturbed for the construction workers camp and site administration; and 64 ha would be temporarily disturbed during the construction of the Berrima Rail Project. 	<p>The Department's consideration remains similar to the PAR in relation to direct impacts on agricultural land.</p> <p>However, the Department notes that the project's impacts on groundwater resources is likely to have impacts on agricultural land use in the groundwater affectation area. In this regard, approximately one third of the affected bores are licensed for irrigation purposes. It is also predicted to have some impact on pastures during prolonged drought conditions.</p> <p>The Department acknowledges that Hume Coal has committed to make good the groundwater</p>

Matter	Evaluation in PAR	Updated Evaluation
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The Department considers that the agricultural impacts would not be significant and could be managed through best practice mitigation measures.

impacts, but as outlined above the Department considers that the make good arrangements are not suitable or practical.

Public Interest

Ecologically Sustainable Development and the Public Interest

The courts in NSW have held that the concept of 'ecologically sustainable development' should be taken into account in considering the public interest. The Department considers that there is a threat of serious harm to both groundwater and surface water resources, and there is currently considerable scientific uncertainty about the level of environmental damage to both.

Consequently, the 'precautionary principle' is triggered and the project as currently proposed should not be considered an 'ecologically sustainable development'.

Further, while the project is likely to have some level of economic benefits for the state of NSW, the scale of these benefits needs to carefully weighed against the potential impacts of the project on the environment and the community.

The Department considers that the economic benefits cannot be realised without significant adverse impacts on the environment and the local community, particularly in relation to groundwater impacts. At this stage, the Department does not consider that the economic benefits outweigh the likely adverse impacts on the environment and community.

Consequently, based on the information currently available, the Department considers that the project should not be approved.

The predicted groundwater impacts of the project have not changed since the PAR, nor has Hume Coal progressed any make good agreements with the affected groundwater users.

Therefore, the Department maintains its conclusion that there is a predicted threat of serious harm to groundwater resources.

While Hume Coal has made it clear that a Water Treatment Plant is not part of the project as a contingency for management of surplus water, there remains some uncertainty about the need to discharge during a wetter cycle from Year 11 onwards. While it may be possible to submit a planning application to include a treatment facility, it is not clear whether discharges would meet the NorBE requirements. This remains a risk to the project viability.

There are also threats of serious harm to the health and safety of the mine workers themselves associated with the proposed mine design, particularly in the event of failure or yielding of the web pillars.

There is still a lack of scientific certainty around most of these issues, and the Department does not believe that it would be acceptable to defer or postpone full assessment of these matters, or to postpone measures to prevent environmental degradation.

Consequently, the Department maintains that proceeding with the project as proposed would not be consistent with the precautionary principle.

The Department acknowledges that the site contains a valuable coal resource, a proportion of which comprises a high quality semi-hard coking coal for the steel-making industry. The Department accepts that this resource, and the wider project, would have economic benefits.

However, the Department is not satisfied that these economic benefits outweigh the actual and potential impacts of the project. Therefore, the project is not in the public interest.

1 Adapted from Section 6.5 of the PAR

4 Conclusion

322. The Department has assessed the development applications, EIS, submissions and expert advice on the project, Hume Coal's responses to these submissions, the Commission's Report, and Hume Coal's responses to the Commission's Report, in accordance with the objects of the EP&A Act and the principles of ecologically sustainable development.
323. Based on this assessment, the Department is not satisfied that the project achieves a reasonable balance between recovering a recognised coal resource of State significance and minimising the potential impacts on the environment and surrounding land users as far as practicable.
324. The Department acknowledges that the project would have benefits, including:
- producing a high quality coal resource in proximity to existing rail infrastructure, industrial areas and to Port Kembla;
 - generating some 415 jobs during construction and up to 300 jobs during operations, most of which would be filled from the Wingecarribee Shire and surrounding areas;
 - significant capital investment value in the project of approximately \$533 million;
 - generating around \$200 million in royalties and company taxes for NSW;
 - generating significant economic flow-on benefits for the Southern Highlands; and
 - potentially providing a net economic benefit to NSW of approximately \$194 million.
325. However, the Department does not consider that these economic benefits outweigh the project's actual and potential environmental and social impacts. The Department considers that:
- the predicted groundwater drawdown impacts on a large number of groundwater users' bores is unacceptable, as is the practicability of the proposed make good strategy;
 - given the very large number of significantly affected groundwater users, the rural-residential and small-scale agricultural land use of the area, and the greenfields nature of the project, the impacts are likely to lead to significant dispute and disruption in the local community, and consequently, the project is not compatible with the rural land uses in the vicinity of the development.
 - there remains unacceptable uncertainty about the potential surface water impacts on Sydney's drinking water catchment, given the mine design risks and the lack of a contingency strategy in the event that surface water discharge is required;
 - there remains considerable uncertainty about the mine design, particularly in relation to the stability of the web pillars, with resultant unacceptable risks to workplace health and safety, and potentially to the environment;
 - the project would have significant amenity impacts on a number of rural-residential land users in the Medway Road area, including noise and visual impacts;
 - the residual risks cannot be adequately managed through approval conditions, given the potential impacts and uncertainties;
 - proceeding with the project as proposed would not be consistent with the precautionary principle of ecologically sustainable development, given the identified uncertainties and risks;
 - there remains strong and long-standing opposition to the project from the local and broader community and Council;
 - the site is not suitable for a greenfield coal mine given the rural-residential and small-scale agricultural land use of the area, along with the growing tourism and heritage landscape focus, and the predicted impacts on these land uses; and consequently
 - on balance, the site is not suitable for the mine, and the project is not in the public interest.

326. For these reasons, and based on its detailed assessment of the merits of the project, the Department recommends that the Hume Coal Project, and the associated Berrima Rail Project, should be refused consent by the Commission.
327. The Department has prepared recommended instruments of refusal, which are attached in **Appendix F**.
328. The Department has not provided any recommended conditions of consent, for either the Hume Coal project or the Berrima Rail Project, given the Department's recommendation. If the Commission determines that the project is able to be approved, then the Department recommends that, having made this determination, the Commission seeks advice from the Department in relation to conditions that may avoid, mitigate or at least compensate the impacts of the project.



8/6/2021

Stephen O'Donoghue
Director
Resource Assessments



8/6/2021

David Gainsford
Deputy Secretary
Assessment and Systems Performance

Appendices

Appendix A – Hume Coal’s Response to the Commission’s Review

Appendix B – Additional Information Provided by Hume Coal

Appendix C – Agency Advice on Hume Coal’s Response Report

Appendix D – Independent Expert Advice

For appendices, refer to the Department’s website:

<https://www.planningportal.nsw.gov.au/major-projects/project/10881>

<https://www.planningportal.nsw.gov.au/major-projects/project/10876>

Appendix E – Updated Statutory Consideration

The Department’s assessment of the project has given detailed consideration to applicable statutory requirements, including:

- the objects in Section 1.3 of the EP&A Act; and
- the matters for consideration in Section 4.15(1) of the EP&A Act, including applicable environmental planning instruments and regulations.

The Department has considered all of these matters in its assessment of the project, including the PAR and this final assessment report. A summary of the Department’s consideration is provided below. Reference should also be made to the EIS and Hume Coal’s Response Report, where Hume Coal has also considered applicable legislation and environmental planning instruments in detail.

E.1 Objects of the EP&A Act

A summary of the Department’s consideration of the relevant objects (found in section 1.3 of the EP&A Act) are provided in **Table E1** (below).

Table E1 | Consideration of the relevant objects of the EP&A Act

Objects of the EP&A Act	Summary of Consideration
<p>(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;</p> <p>(c) to promote the orderly and economic use and development of land,</p>	<ul style="list-style-type: none"> • The project would have economic benefits, including producing approximately 50Mt of ROM coal, 55% of which comprises high quality semi-hard coking coal for the steel making industry. • The project is located in proximity to existing rail infrastructure, industrial areas and to Port Kembla. • The project would generate significant employment and economic benefits. • Economic assessment indicates that the project would have a net benefit to NSW. • Social impacts (outside the local area affected by environmental impacts) would be similar to contemporary mining projects, and could be appropriately managed.
<p>(b) to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment;</p>	<ul style="list-style-type: none"> • There is a predicted threat of serious harm to groundwater resources. There is also a potential threat of serious harm to surface water resources given the risks associated with the mine design and underground mine water disposal, and the absence of a contingency strategy (eg. water treatment plant) in the event that the primary water dam reaches capacity. • There are also threats of serious harm to the health and safety of the mine workers themselves associated with the proposed mine design, particularly in the event of failure or yielding of the web pillars. • There is still a lack of scientific certainty around most of these issues, and the Department does not believe that it would be acceptable to defer or postpone full assessment of these matters, or to postpone measures to prevent environmental degradation. • Consequently, the Department believes that proceeding with the project as proposed would not be consistent with the precautionary principle of ecologically sustainable development.
<p>(e) to protect the environment, including the conservation of threatened and other species of native animals and</p>	<ul style="list-style-type: none"> • The Department considers that the project’s biodiversity impacts would not be significant and could be managed

Objects of the EP&A Act	Summary of Consideration
<p>plants, ecological communities and their habitats;</p> <p>(f) to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),</p>	<p>through standard avoidance, mitigation and offsetting measures.</p> <ul style="list-style-type: none"> The Department's assessment indicates that the project would have some historical heritage impacts, including detrimental impacts on the cultural landscape. Whilst these impacts would be relatively localised and/or temporary in nature, they would persist over the life of the mine and are not insignificant. Moreover, there remains some uncertainty about the potential for subsidence, and resultant potential impacts on archaeological resources of the area. The project would result in significant impacts on groundwater resources, and potentially on surface water resources including Sydney's drinking water catchment
<p>(i) to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,</p>	<ul style="list-style-type: none"> The Department notified and consulted with the applicable Council and NSW government authorities about the project, and carefully considered all responses in its assessment.
<p>(j) to provide increased opportunity for community participation in environmental planning and assessment.</p>	<ul style="list-style-type: none"> The Department publicly exhibited the EIS for the project, and the Commission has held a public hearing to maximise community involvement.

E.2 Ecologically Sustainable Development

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*, which can be summarised as follows:

“Ecologically sustainable development requires the effective integration of economic and environmental considerations in decision-making processes. Ecologically sustainable development can be achieved through the implementation of the following principles and programs:

- (a) the precautionary principle;
- (b) inter-generational equity;
- (c) conservation of biological diversity and ecological integrity; and
- (d) improved valuation, pricing and incentive mechanisms.”

The Department has considered the principles and programs of ESD, as follows:

Precautionary Principle

The precautionary principle provides that *“if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation”*.

The Chief Judge of the NSW Land and Environment Court, The Hon. Justice Brian Preston SC, has established guidance for the application of the precautionary principle as it relates to planning law¹⁷.

¹⁷ In *Telstra Corporation Limited v Hornsby Shire Council* [2006] NSWLEC 133.

Justice Preston stated that the application of the precautionary principle and the need to take precautionary measures is triggered when two precedent conditions are satisfied:

1. there is a threat of serious or irreversible environmental damage; and
2. there is scientific uncertainty as to the nature and scope of the threat of environmental damage.

If both of these conditions are satisfied, then precautionary measures should be taken that are proportionate to the level of the threat.

In the PAR, the Department considered that the Hume Coal Project as proposed at that time should not be considered ecologically sustainable development, as it believed that proceeding with the project as proposed was not consistent with the precautionary principle. This was because the Department considered that there was a threat of serious harm to both groundwater and surface water resources, and there was considerable scientific uncertainty about the level of environmental damage to both.

The predicted groundwater impacts of the project have not changed since the PAR, nor has Hume Coal progressed any make good agreements with affected groundwater users. Therefore, the Department maintains its conclusion that there is a predicted threat of serious harm to groundwater resources.

With regard to surface water, while Hume Coal has made it clear that a Water Treatment Plant is not part of the project as a contingency for management of surplus water, there remains some uncertainty about the need to discharge during a wetter cycle from Year 11 onwards. The potential for uncontrolled discharges from the mine presents a threat of serious harm to downstream surface water resources.

There are also threats of serious harm to the health and safety of the mine workers themselves associated with the proposed mine design, particularly in the event of failure or yielding of the web pillars. There also remain threats of serious impacts to land users on the surface associated with uncontrolled subsidence as highlighted in concerns raised by the Resources Regulator related to major infrastructure such as the Hume Highway, Moomba-Sydney gas pipeline and the Illawarra Highway.

The Department accepts that there is sufficient scientific certainty around the predicted groundwater impacts, with the evidence demonstrating that the project would have significant impacts on a large number of groundwater users in the vicinity of the development.

However, the Department remains concerned that there is not full scientific certainty about the short or long term stability of the mine design. The Department also remains concerned that there is not full scientific certainty about the potential surface water impacts, given that Hume Coal has removed the water treatment plant from the project, that there still remains some risk that surface water discharges of mine water may be required, and that Hume Coal has not undertaken any assessment of potential downstream surface water impacts in the event that discharge of mine water is required.

With regard to measures to prevent environmental degradation, the Department acknowledges that make good measures to at least compensate (not prevent) environmental degradation to groundwater user's bores is technically feasible, but as outlined in Section 2.2.2 of this report the Department is not satisfied that these measures are practicable for such a large number of affected landholders in a greenfields mining environment where there is likely to be significant dispute and/or disruption for affected groundwater users.

In relation to surface water, while it may be possible to submit a planning application to include a treatment facility at a future point in time if it is found to be required, it is not clear whether discharges from the treatment plant would meet the NorBE requirements, and whether the treatment plant would be economically viable. In this regard, the Department is concerned that that measures to prevent environmental degradation have been postponed.

In relation to mine safety and subsidence, the Department also remains concerned that measures to prevent environmental degradation have been postponed (ie. through deferring further analysis until after the commencement of mining), despite the lack of full scientific certainty on this matter.

For these reasons, the Department remains concerned that to proceed with the project as proposed, given the scientific uncertainties set out above and the related risks of environmental damage, would not be consistent with the precautionary principle of ecologically sustainable development.

Intergenerational Equity

The Department acknowledges that coal and other fossil fuel combustion is a contributor to climate change, which has the potential to impact future generations. The proposal includes measures to mitigate potential GHG emissions from the operation of the project.

The Department's assessment of direct energy use and associated GHG emissions (ie. Scope 1 and Scope 2 emissions) has found that these emissions would be relatively low and comprise a relatively small contribution towards climate change at both the national and global scale.

Conservation of Biological Diversity and Ecological Integrity

The Department considers that the conservation of biological diversity and ecological integrity has been addressed through avoiding and minimising biodiversity impacts. The Department considers that the project's potential impacts could be reasonably mitigated and/or offset to enable the long-term biodiversity outcomes to be achieved for the region.

Improved Valuation, Pricing and Incentive Mechanisms

Valuation and pricing of the resource project has been considered through economic, social and cost-benefit analyses. The cost benefit analyses sought to weigh up the project's costs and benefits based on its full range of environmental, social and economic impacts. While the Departments independent expert indicated that there may have been an inadequate consideration of externality costs and it was noted that a revised mine design in response to safety concerns would reduce outputs,, the Department accepts that the analysis indicates that the project would have a net economic benefit to NSW.

E.3 Environmental Planning Instruments

The key EPIs relevant to the project include:

- *Wingecarribee Local Environmental Plan 2010;*
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007;*
- *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011;*
- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy No.33 – Hazardous and Offensive Development;*
- *State Environmental Planning Policy (Koala Habitat Protection) 2020 and 2021; and*
- *State Environmental Planning Policy No.55 – Remediation of Land.*

A summary of the Department's consideration of these instruments is provided below.

Wingecarribee Local Environmental Plan 2010

The majority of the project area is zoned E3 Environmental Management (approximately 70%) under the Wingecarribee LEP, and there is also a smaller area in the southwestern portion that is zoned RU2 Rural Landscape (approximately 3%). Other parts of the project area are zoned RU3 Forestry (approximately 26%), SP2 Infrastructure (approximately 1%) and E2 Environmental Conservation (less than 1%).

Underground mining is prohibited in all of these zones.

Notwithstanding that the project is permissible under the Mining SEPP (see below), the Department considers that the project is not wholly consistent with the objectives of the E3, RU2 and E2 zones.

In this regard, the objectives of the E2 and E3 zones are aimed at protecting existing historic, ecological, cultural and aesthetic values. Similarly, the objectives of the RU2 zone are focussed on maintaining the “*rural landscape character*” and “*encouraging sustainable primary industry*”.

The objectives of the E3 Environmental Management zone, which covers approximately 70% of the project area, are reproduced below:

- *“To protect, manage and restore areas with special ecological, scientific, cultural or aesthetic values.*
- *To provide for a limited range of development that does not have an adverse effect on those values.*
- *To encourage the retention of the remaining evidence of significant historic and social values expressed in existing landscape and land use patterns.*
- *To minimise the proliferation of buildings and other structures in these sensitive landscape areas.*
- *To provide for a restricted range of development and land use activities that provide for rural settlement, sustainable agriculture, other types of economic and employment development, recreation and community amenity in identified drinking water catchment areas.*
- *To protect significant agricultural resources (soil, water and vegetation) in recognition of their value to Wingecarribee’s longer term economic sustainability.”*

Whilst Hume Coal has proposed measures to avoid, mitigate or at least compensate for the project’s impacts on the values in these objectives, the Department remains concerned that these measures and the project’s benefits do not outweigh the impacts on these values.

A number of heritage items listed in the LEP are located in the vicinity of the project area. Hume Coal has assessed impacts on these items in its EIS and associated assessments, and the Department has considered the impacts in its assessment of the project.

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007

Permissibility

Clause 7(1)(a) of the Mining SEPP provides that underground mining is permissible with consent on any land. Clause 7(1)(d) further provides that ‘facilities for the processing or transportation of minerals or mineral bearing ores’ are permissible with consent 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’.

Consequently, the project is permissible with consent under the Mining SEPP, and the Commission may determine the application.

Matters for Consideration

Part 3 of the Mining SEPP lists a number of matters that a consent authority must consider before determining an application for consent for development for the purposes of mining. These matters were considered in Hume Coal’s EIS and Response Report.

The Department has considered these matters in its assessment of the project and includes a brief outline of the key considerations below.

Non-discretionary development standards (clause 12AB)

Clause 12AB identifies non-discretionary development standards for the purposes of section 4.15 of the EP&A Act in relation to the carrying out of development for the purposes of mining.

The assessment indicates that the project would not comply with one of the non-discretionary development standards for mining in clause 12AB, namely exceedances of the minimal impact

considerations in the *Aquifer Interference Policy* (ie. 2 metre groundwater bore drawdown) at 94 bores on 72 landholdings based on the 67th percentile predictions, or 118 bores based on the 90th percentile predictions.

The Department notes that non-compliance with this non-discretionary development standard does not preclude the consent authority from approving the project. Rather, clause 12AB of the Mining SEPP seeks to identify development standards for mining that, if complied with, prevents the consent authority from requiring more onerous standards for those matters.

Notwithstanding, the issues associated with groundwater drawdown at privately-owned bores are significant for the Department's overall consideration of the merits of the project.

Compatibility with other land uses (clause 12)

Clause 12 of the Mining SEPP requires a consent authority to consider the compatibility of the proposed mine with other land uses, including *'existing, approved or likely preferred uses'*.

As outlined in the PAR, the zoning provisions of the Wingecarribee LEP 2010 are relevant to the extent that they influence the existing, approved and likely preferred land uses in the project area and its surrounds.

The majority of the project area is zoned E3 Environmental Management (approximately 70%), and there is also a smaller area in the southwestern portion that is zoned RU2 Rural Landscape (approximately 3%). Other parts of the project area are zoned RU3 Forestry (approximately 26%), SP2 Infrastructure (approximately 1%) and E2 Environmental Conservation (less than 1%).

Based on the limited list of permitted land uses and the non-mandatory objectives in both the E3 and RU2 zones, the Department remains concerned that a new coal mine may not be compatible with the *'existing, approved and likely preferred land uses'* of these zones.

However, the Department also acknowledges that the proposal is permissible on the land under the Mining SEPP, and that mining proposals are routinely approved on land that is not wholly compatible with the land use zones on which they are located (noting that there is no such thing as a 'mining' zone).

Notwithstanding, the Hume Coal Project is predicted to have significant groundwater impacts for a large number of landholders in the vicinity of the development, including drawdown impacts on up to 94 bores on 72 properties based on Hume Coal's 67th percentile predictions, or up to 118 bores based on the 90th percentile predictions. Many of these bores are licenced for irrigation purposes.

As outlined in Section 2.2.2 of this report, while the Department is satisfied that these impacts could feasibly be mitigated through Hume Coal's make good strategy, it is not satisfied that this strategy is practicable given the very large number of affected groundwater users, the rural-residential and small-scale agricultural land use of the area, and the greenfields nature of the project. The impacts are likely to lead to significant dispute and disruption in the local community.

Consequently, the Department maintains its concerns that the project may not be compatible with the *'existing, approved or likely preferred uses'* of the rural and environmentally zoned land in the vicinity of the development.

The Department also notes that the project would have amenity impacts on rural-residential land users along Medway Road, in particular significant noise impacts on two residences, as well as some visual impacts.

Clause 12 of the Mining SEPP also requires a consent authority to evaluate and compare the respective public benefits of the development and the land uses in the vicinity of the development.

In this regard, the Department recognises that the project would have economic benefits, including the generation of a considerable number of jobs, as well as economic benefits for the Southern Highlands and NSW.

The Department acknowledges that there would likely be increased economic benefits to the wider public from the project, however there is also likely to be reduced localised benefits derived from the existing, approved and likely preferred land uses in the immediate vicinity of the development

The Department has considered these public benefits associated with the project in its overall assessment and evaluation of the project.

Voluntary Land Acquisition and Mitigation Policy (clause 12A)

The Department's assessment has considered the NSW Government's *Voluntary Land Acquisition and Mitigation Policy* (see Section 2.6.1). This assessment indicates that 9 properties would be marginally impacted by noise from the project (ie. 3 to 5 dBA above criteria), and would nominally be entitled to additional mitigation measures under the VLAMP. Two properties would be significantly impacted by noise (ie. more than 5 dBA above criteria), and would nominally be entitled to voluntary acquisition under the VLAMP.

The Department notes that the voluntary mitigation and acquisition provisions in the VLAMP are a mitigation measure of last resort, and should only be applied where the proposal has a clear net benefit and is in the public interest.

For the reasons outlined in this report, the Department does not believe that the project has a clear net benefit that would justify the provision of such voluntary mitigation and acquisition rights.

Clauses 14 to 17

Clauses 14 to 17 of the Mining SEPP require a consent authority to consider a number of other matters before granting consent to development for the purposes of mining, including whether to issue consent subject to conditions relating to:

- Natural Resource Management and Environmental Management (clause 14);
- Resource Recovery (clause 15);
- Transport (clause 16); and
- Rehabilitation (clause 17)

As the Department is recommending that the project should be refused consent, the Department has not considered whether any conditions relating to these matters should be imposed. If the Commission determines that the project should be approved, then these matters would require further consideration.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011

The project area is within the Sydney drinking water catchment. Clause 10(1) of the Sydney Drinking Water Catchment SEPP provides that a consent authority must not grant consent to the carrying out of development on land in the catchment unless it is satisfied that the carrying out of the proposed development would have a neutral or beneficial effect (NorBE) on water quality.

As outlined in Section 2.3.3 of this report, Hume Coal has confirmed that the provisional water treatment plant does not form part of the project, and therefore it has not proposed any contingency measure in the event that the underground emplacement of water is not possible, and the capacity of the primary water dam (PWD) is exceeded.

Without a suitable contingency (eg. a water treatment plant or re-injection), and given the long lead time likely to be required to get approval for and implement the contingency strategy, Water NSW remains concerned that any untreated discharges into Oldbury Creek would have a detrimental impact on surface water quality in Sydney's drinking water catchment, and consequently the project would not have a NorBE on water quality as required under clause 10(1).

The Department agrees with Water NSW that the absence of the water treatment plant, or other suitable contingency measure to address the potential need to manage excess water, leaves considerable uncertainty. Any contingency measure, if required, is likely to require a significant amount of time to

plan, assess, obtain approval for, and implement. It may also entail significant capital expenditure. A recently implemented desalination plant at the Springvale mine to Sydney's drinking water catchment has taken a number of years and cost \$100 million to plan and develop.

State Environmental Planning Policy (State and Regional Development) 2011

Coal mining is identified as State Significant Development in Schedule 1 of the State and Regional Development SEPP.

In accordance with section 4.5 of the EP&A Act and clause 8A(1) of the State and Regional Development SEPP, the Commission is the consent authority and must determine the applications, as more than 50 public submissions in the nature of objection were received on both the Hume Coal Project and Berrima Rail Project.

State Environmental Planning Policy (Infrastructure) 2007

In accordance with the provisions of the Infrastructure SEPP, the Department notified relevant public authorities about the project as it is development that may affect public infrastructure or land. The Department has considered the matters raised in its assessment of the project.

State Environmental Planning Policy No.33 – Hazardous and Offensive Development

The Department is satisfied that the project is not potentially hazardous or offensive, and could be undertaken in a manner that is generally consistent with the aims, objectives and requirements of SEPP 33.

State Environmental Planning Policy (Koala Habitat Protection) 2020 and 2021

A new *SEPP (Koala Habitat Protection) 2021* commenced in March 2021 along with an amendment to *SEPP (Koala Habitat Protection) 2020*, replacing former Koala Habitat Protection SEPP 44 and SEPP 2019.

SEPP 2020 and SEPP 2021 apply to the determination of development applications by Councils in the local government areas listed in Schedule 1, including Wingecarribee Shire Council, and do not apply to State significant developments. Nevertheless, the Department has considered impacts on Koalas in its assessment and notes that a detailed assessment against the provisions of the former SEPP 44 was undertaken by Hume Coal and considered by the Department and BCD in its review of the project.

There is some native vegetation in the north-west and central parts of the project area that provides koala habitat. The project would remove some isolated koala feed trees on the edge of this habitat area, however the biodiversity assessment indicates that the project is unlikely to result in any significant impacts on koalas.

State Environmental Planning Policy No.55 – Remediation of Land

The Department is satisfied that the project area does not have a significant risk of contamination given its historical land use, and that the project could be undertaken in a manner that is generally consistent with the aims, objectives and provisions of SEPP 55.

Appendix F – Recommended Instruments of Refusal

F1 – Recommended Instrument of Refusal – Hume Coal Project

F2 – Recommended Instrument of Refusal – Berrima Rail Project

For appendix, refer to the Department’s website:

<https://www.planningportal.nsw.gov.au/major-projects/project/10881>

<https://www.planningportal.nsw.gov.au/major-projects/project/10876>