

## **Appendix C**

### **Agency Advice on Applicant's Response Report**

## Appendix C1 – DPIE Water advice



OUT20/5769

Mandana Mazaheri  
Team Leader  
Planning and Assessment Group  
NSW Department of Planning, Industry and Environment

[mandana.mazaheri@planning.nsw.gov.au](mailto:mandana.mazaheri@planning.nsw.gov.au)

Dear Ms Mazaheri

**Hume Coal and Berrima Rail Project  
Response to the Independent Planning Commission (IPC) report dated 27 May 2019**

I refer to your email of 14<sup>th</sup> May 2020 to the Department of Planning, Industry and Environment (DPIE) –Water about the above matter.

In relation to our concerns regarding Hume Coal's groundwater model, DPIE Water reviewed Annexure A of the updated water assessment in Hume Coal's response to the IPC which discusses the topics highlighted at the 2 July 2019 meeting with Hume Coal for resolution. Please note Attachment A for our detailed response.

Whilst the proposed make good arrangements described in Hume Coal's response appear reasonable, uncertainties in the availability of water due to impacts (including possible cumulative impacts) from the project and the ability to negotiate with affected parties remain a risk, particularly given the number of potentially impacted properties. There also remain gaps in the assessment and response procedures that are of concern. For example:

- Confirmation of the acceptability of the proposed make good arrangements to those landholders that have opted in to the monitoring and mitigation program has not been provided.
- Where there is the requirement from a make good provision to source water from a new location, from a deeper aquifer or at a higher extraction rate, the proponent may need to complete further impact assessment and obtain approvals if not addressed within this project. The need to acquire additional entitlement may also need to be considered.
- The possibility that importing water from other sources (either through piping or trucking in tanker loads) would be complicated and likely to have adverse effects on the local area. Whilst this appears to have been replaced as an option by financial incentives in the form of compensation, it does not appear to have been formally excluded.
- The proponent has undertaken separate analysis of affected water bores and potentially groundwater dependent heritage gardens that may be affected. It is not clear to the department that properties that have both will have their bore water supply appropriately reinstated under make good arrangements. We are also concerned that those properties with heritage gardens which have not been historically irrigated may not receive equitable treatment.

Whilst we recognise that individual make good agreements are appropriate to adequately tailor mitigation or remediation actions to the best outcome for each property, clarification of the details are required.



DPIE Water notes limitations in the model which mean that the current presented impact predictions should be considered the minimum likely impact. In other words, any changes to the model are unlikely to decrease the predicted impact. DPIE Water also notes that, apart changing parameters in the model, the model is as advanced as it can get at this stage and unlikely to be able to provide further support to decision making.

Any further referrals to DPIE – Water & NRAR can be sent by email to:  
[landuse.enquiries@dpi.nsw.gov.au](mailto:landuse.enquiries@dpi.nsw.gov.au).

Yours sincerely

A handwritten signature in blue ink, appearing to read 'M Isaacs'.

Mitchell Isaacs  
Director, Office of the Deputy and Strategic Relations  
**Department of Planning, Industry and Environment - Water**  
22 July 2020

## Attachment A

### Review of Annexure A from:

Appendix B - EMM, 2020. Hume Coal and Berrima Rail Project, Updated water assessment in response to recommendations R4, R5, R6, R7 and part of R8 within the Independent Planning Commission Assessment Report dated 27 May 2019. Report J12055 IPC-Water 01 v3 Final prepared by EMM Consulting Pty Ltd for Hume Coal Pty Ltd, April.

**Plus** additional comments about impacts to groundwater dependent ecosystems

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## 1 Cross Sections

*Context:* Hume Coal to provide additional north–south and east–west sections to assist DPIE with making their assessment on impacts.

*Conclusion:*

Five geological sections across the mining domain in the form of several parallel slices oriented approximately perpendicular to each other. Three of the sections are oriented east-west and two are oriented northeast-southwest. The figures include comparative depictions of the groundwater model layering along each section line.

The comparison between the geological sections and groundwater model sections are broadly instructive. The scale of the illustrations does not allow a detailed review of the information provided between the two diagrams on each figure. DPIE Water acknowledges the difficulty of representing the information on meaningful illustrations given the extended length and limited depth of each section. However, more (and more detailed) parts of sections could have been included in the document to more clearly demonstrate the relationship between the geological units and the groundwater model layers. Such supplementary information would prove considerably more useful in assessing the model construct.

## 2 Hydraulic data

*Context:* Hume Coal is to re-evaluate original data from the EIS and Response to Submission (RTS) graphs showing hydraulic conductivity with depth (Coffey's EIS graphs and refined HydroSimulations graphs in the RTS). The data is to be reproduced and charted spatially on a map or series of maps.

*Conclusion:*

Additional questions and uncertainty remain with the figures provided. The data displayed can be visually ascribed to three main groups, which it is believed are broadly influenced by the scale at which the testing has occurred. It is apparent from various diagrams in Annexure A of the EMM Updated Water Assessment (Figures 3.2, 3.3, 3.4 and 3.5 on pages 13 to 16) that the following groupings exist:

- Bore data (specific capacity analysis values) generally between 0.1 and 10 m/d representing average characteristics for the ground around a tested work under in situ conditions (most reliable)
- Packer test data generally between 0.001 and 1 m/d representing character of the ground immediately around a borehole over a specific depth range
- Laboratory core testing data generally between 0.0000001 and 10 m/d representing values from very short lengths of core sample referencing small scale intervals without the in situ context (least reliable).

The broad range from the least reliable method may well have reduced the values for hydraulic conductivity used in the modelling well below what the site-specific testing data from across the mine lease would have otherwise indicated.

Relating the data presented to the model layers and their parameters is a difficult exercise. Prior DPIE recommendations are yet to be presented. The presentation of information as grouped depth layers (50 m depth 'bins') within the Hydrosimulations Revised Groundwater Modelling Report has not included comparison with the model layers and geological units, therefore DPIE Water consider it difficult to correlate any relationship between the three datasets. This has compounded the problems around the understanding of the thickness of layers and their hydraulic characteristics.

### **3 Comparison with Berrima Coal Mine**

*Context:* Hume Coal to provide an enhanced discussion of the similarities and differences between the existing Berrima Colliery and the proposed Hume Coal Project.

*Conclusion:*

The comparison provided between the Hume Coal Project and the Berrima Coal Mine is comprehensive and well presented. However, questions remain around the use of the Berrima Coal Mine data for calibration targets when the predictions from the model remain uncertain.

### **4 Calibration statistics**

*Context:* Hume Coal was asked to provide more information on model calibration statistics. DPIE Water wanted to know if the model predicts 70% of the monitoring bores hydrograph history match is in excess of 2 metres, then what are the impacts of the 2 metre drawdown on landowner bores.

*Conclusion:*

The report provided has reiterated the discussion from the RtS and does not provide any new data on the model calibration. DPIE Water finds that the data is the same as has been used before, and that the requested re-runs of the model with higher hydraulic conductivity values for the Hawkesbury Sandstone has not been done. Nor has detailed hydraulic property information, about all the layers above the mine voids been provided as per prior DPIE recommendations. This is a major shortcoming of the modelling and reporting and does not allow DPIE Water to have confidence in the model predictions. The calibration to multiple data sets, in particular the data for the Berrima Coal Mine, remains a concern for DPIE Water that has not been alleviated by the current reporting.

### **5 Uncertainty analysis**

*Context:* Hume Coal to describe the range of parameters explored and map them.

*Conclusion:*

The uncertainty maps provided in Section 6 of Annexure A to the EMM Updated Water Assessment showing the 95th percentile distributions for hydraulic conductivity (Figures 6.1 to 6.3, pages 32 to 34) are helpful in understanding the spread of modelling attributes. However, it would have been beneficial for the corresponding 5th percentile maps to be prepared and reported to enable DPIE Water to better understand the range of values that were considered. There is also a need for the depths and thicknesses of the layers to be more clearly described, including for those model layers that were not included in the report.

The subdivision of zones across the mining domain is an interesting approach, but it remains to be seen whether it is beneficial or if it is adding more complexity unnecessarily. The maximum horizontal hydraulic conductivity data used in the different zones appears generally reasonable. However considerably more justification is needed for the adoption of values of horizontal and vertical hydraulic conductivity for each layer in zones 1 and 2 which are the most likely to be affected by mining.

The new documents have not addressed the requirements made by DPIE Water to run a sensitivity analysis for higher conductivities – as per field data - than those chosen in the onset of the uncertainty analysis.

## **6 Packer test data**

*Context:* Hume Coal to provide raw data from the packer tests conducted for the project.

*Conclusion:*

Packer test data has been provided in both summary form (Table 7.1, pages 35 and 36, Annexure A), and complete reports in Attachment B. The information provided relates to tests on four separate boreholes only (HU0040CH, HU0077CH, HU0146CH and HU0147PZB) at a range of depths (HU0146CH being the most comprehensive across the geological profile).

Provided this is the extent of the packer testing conducted for the project, the department advises that this information meets their request.

## **7 Impact on groundwater dependent ecosystems**

The predicted impacts on groundwater dependent ecosystems in the area of the project appear generally reasonable in relation to hydrogeological theory. However, the evidence in support of the conceptualisation of groundwater behaviour and therefore the proposed effects is not obviously provided. Whilst the proposed mining method has been selected to minimise the possibility of vertical fracturing and connectivity to the surface, that does not mean that natural connections do not exist. It is not possible to fully assess the circumstances of specific features and the likely impacts on them from the information that has been provided.

Of particular concern are the make good arrangements for those properties that include heritage gardens that have not previously required irrigation for maintenance. It is not apparent that those properties once affected will have a bore water volume for purposes other than garden watering (identified under existing make good arrangements) and an amount for the watering of impacted heritage gardens (not apparently identified under existing make good arrangements).

## **General comments**

DPIE Water still consider that there are issues with the groundwater modelling and input data for the Hume Coal project.

In the absence of comprehensive supporting data, DPIE Water is still not in a position to support the appropriateness of the numerical model predictions and everything that flows from that (i.e. the number and extent of bores impacted, the magnitude of impacts, the potential for make good arrangements to meet the desired outcome, and the possibility that other mitigation measures will be successful) in assessing the effects of the project. The current presented impact predictions are seen as a minimum impact. In other words, any changes to the model are unlikely to decrease the predicted impact. DPIE Water also note that, apart from changing parameters used by the model, the model is as advanced as it can get for now and unlikely to be able to provide further support to decision making.

Caution is used in the reading of the results presented and subjectivity of the documentation. When compared to the number of affected bores identified in the Hydrosimulations Revised Groundwater Modelling Report, DPIE Water questions that the increase in numbers between the 67th and 90th percentiles is 'small' ( $118 - 93 = 25$ ) when the decrease in numbers between the 67th and 50th percentiles is claimed in Annexure A of the EMM Updated Water Assessment to be 'significant' ( $93 - 84 = 9$ ).

The IPC may wish to consider:

- The suitability of using higher conductivity Kx and higher Kv across the whole Hawkesbury Sandstone and including layers above the Hawkesbury Sandstone (i.e. all layers and entire lateral extent), and in particular in the sensitivity analysis.
- The appropriateness to run a model run with higher K values than  $10^{-2}$  m/d.

- Addressing the prior recommendations made by DPIE Water in the review of the EIS and RTS, and
  - Getting further technical advice on the modelling (conceptualisation, model build and sensitivity analysis) from groundwater modellers remote from the current project. Recommendations for suitable modellers can be provided if required.
-

## Appendix C2 – Water NSW advice

21 September 2020

Mandana Mazaheri  
Resource Assessments  
Department of Planning, Industry and Environment  
Locked Bag 5022  
PARRAMATTA NSW 2124

Dear Ms Mazaheri

### **Comments on Hume Coal Mine and Berrima Rail Line Projects (SSD 7172 and SSD 7171)**

WaterNSW appreciates the opportunity to provide comments on the Applicant's response to its comments contained within the Applicant's response to the IPC Report for the Hume Coal Mine and Berrima Rail Line Projects (SSD 7172 and SSD 7171).

In response to WaterNSW's concerns about surface water quality and quantity, the Applicant maintains that no further assessment is required. As such, all issues previously raised by WaterNSW regarding this project remain current and have not been addressed to WaterNSW's satisfaction. In particular, WaterNSW's key residual concern is that there is uncertainty about whether the proposed mine would meet the neutral or beneficial effect (NorBE) test for water quality.

WaterNSW would like to take this opportunity to clarify any confusion regarding the application of the NorBE tool and the NorBE test for this project. Hume Coal is correct that the NorBE tool does not apply to this project as it is not a type of development to which the tool applies. However, the Minister (as consent authority) must be satisfied that the development would likely achieve a NorBE on water quality prior to determination as per Clause 10(1) of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.

WaterNSW notes that there is no other mine in the Sydney Drinking Water Catchment that utilises the proposed unconventional mining method or extensive reinjection of mine water and coal rejects into the mine voids. This is a highly specialised technical area and there appears to be residual disagreement between the relevant experts about the likely safety and effectiveness of the unconventional mining method and reinjection of mine water.

In this context of uncertainty, WaterNSW remains concerned that if the mining method or reinjection fails (for any reason), this may lead to discharges of untreated mine water in Oldbury Creek, resulting in significant adverse impacts on water quality. For example, WaterNSW is concerned that should the reinjection process stop during the mining phase of the project, there is no contingency to store the mine water other than the Primary Water Dam, which has only 6 to 9 months capacity in the wettest climate scenario (from Year 11 of mining onwards) to capture the mine water.

Based on a risk management approach, WaterNSW considers that while there may only be a low likelihood of a failure in the mining method or reinjection technique and resulting discharges, the consequences would be very high or severe for the sensitive Sydney Drinking Water Catchment.

Consequently, WaterNSW maintains its recommendation that contingency measures for the management of any discharges of untreated mine water from the primary water dam should be specified and designed upfront, in order to ensure the NorBE on water quality is satisfied.

WaterNSW requests that it be listed as a stakeholder in any further consultation and assessment on this project.

If you wish to discuss this letter or the project more generally please do not hesitate to contact Girja Sharma on 9865 2501 or e-mail [environmental.assessments@waterNSW.com.au](mailto:environmental.assessments@waterNSW.com.au)

Yours sincerely

A handwritten signature in black ink that reads "C. Preshaw". The signature is written in a cursive, flowing style.

**CLAY PRESHAW**  
**Manager Catchment Protection**

17 June 2020

Mandana Mazaheri  
Department of Planning Industry and Environment  
Locked Bag 5022  
PARRAMATTA NSW 2124

Dear Ms Mazaheri,

**SSD-7171 and SSD-7172: Hume Coal Mine and Berrima Rail Projects  
Hume Coal's Response to the Independent Planning Commission**

I refer to Hume Coal's response to the Independent Planning Commission's request for more information on the Hume Coal Mine and Berrima Rail Projects (SSD-7171 and SSD-7172).

Water NSW has considered Hume Coal's response and, in particular, the Updated Water Assessment (Appendix B) prepared by EMM Consulting (dated April 2020).

It is noted that the residual concerns of Water NSW outlined in our previous response to the Response to Submissions (RTS) report were not specifically addressed in this latest response, however some of WaterNSW's concerns were similar to those concerns raised by the IPC.

**Key Concern**

WaterNSW's key concern is that Hume Coal (the applicant) has not adequately demonstrated that the Hume Coal Mine project (SSD-7172) will have a Neutral or Beneficial Effect (NorBE) on water quality. The consent authority must be satisfied that the applicant has demonstrated that the project will achieve a NorBE on water quality throughout the project, including the pre-mining, mining and post-mining phases, in accordance with Clause 10(1) of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011*.

WaterNSW's concern relates to the uncertainty associated with the unconventional mining method and proposal for re-injecting mine water and coal rejects into the mine voids and sealing those voids with bulkheads. This is a highly specialised technical area and there appears to be residual disagreement between the relevant experts about the likely effectiveness of the proposed re-injection and storage of mine water underground.

Given this context of uncertainty, WaterNSW considers a risk-based approach should be adopted. While there may only be a low likelihood that the proposed method of re-injecting mine water is ineffective, the consequences of this would be significant on water quality in the catchment. If the re-injection of mine water is ineffective and must be abandoned, the applicant's own calculations (in Table 5.1 of Appendix B) show that the Primary Water Dam has only 6 to 9 months capacity in the wettest climate scenario (from Year 11 of mining onwards) to capture the mine water.

As the applicant has now confirmed that the project does not include a water treatment plant, WaterNSW is therefore concerned that this could result in untreated mine water discharges into Oldbury Creek, which forms part of the Warragamba Dam catchment. Any discharges of untreated mine water into Oldbury Creek would have a detrimental effect on surface water quality in Sydney's drinking water catchment and would not achieve a NorBE on water quality.

Unless the uncertainty and disagreement about the likely effectiveness of re-injection of mine water can be resolved, WaterNSW considers that contingency measures for the management of any discharges of untreated mine water from the primary water dam should be specified and designed upfront, in order to ensure the NorBE test on water quality is satisfied.

### **Other Concerns**

#### **Ground Water and Surface Water Quality**

WaterNSW's residual issues about water quality from its response to the RTS report still exist, including potential impacts on groundwater quality, and potential pollution of surface water due to reductions in dilution of baseflow to Medway Rivulet and Wingecarribee River. These issues have not been adequately addressed the applicant's latest response as it continues to rely on the information provided in the RTS Report (Revised Water Assessment – EMM, 2018b).

#### **Loss of Yield**

WaterNSW reiterates that it considers that any reduction in yield to watercourses within the area potentially affected by mining must be negligible and notes that the applicant has not provided any new information relying on the yield calculations presented in the RTS report.

If you wish to discuss the matters raised in the response, please feel free to contact Girja Sharma via email at [environmental.assessments@waternsw.com.au](mailto:environmental.assessments@waternsw.com.au).

Yours sincerely

A handwritten signature in black ink that reads "Clay Preshaw". The signature is written in a cursive, slightly slanted style.

**CLAY PRESHAW**  
**Manager Catchment Protection**

## **Appendix C3 – NSW Environment Protection Authority advice**



DOC20/394072-1

Ms Mandana Mazaheri  
Department of Planning, Industry and Environment  
Locked Bag 5022  
PARRAMATTA NSW 2124

Email: [Mandana.Mazaheri@planning.nsw.gov.au](mailto:Mandana.Mazaheri@planning.nsw.gov.au)

Dear Ms Mazaheri

### **Hume Coal Project – Comments on Hume Coal’s Response to IPC Noise Recommendations**

The Environment Protection Authority (EPA) refers to your request dated 21 May 2020 for comments on the noise assessment study undertaken for the Hume Coal Project and Berrima Rail Project (called Hume Coal Project below).

Hume Coal Pty Ltd (Hume) is seeking a project approval under the *Environmental Planning and Assessment Act 1979* (EP&A Act) to construct an underground coal mine near Berrima NSW.

The Independent Planning Commission NSW (IPC) released an assessment report in relation to the Hume Coal Project on 27 May 2019. The report contained recommendations for additional information and clarification of issues to be used by the Department of Planning, Industry and Environment (DPIE) in determining the Development Application.

Hume Coal submitted the “Response to the Independent Planning Commission Assessment Report dated 27 May 2019, April 2020” to DPIE for consideration.

The EPA has reviewed the revised noise assessment in the report and has provided comments in the attachment. The EPA has not provided draft conditions of approval under a prior agreement with DPIE where the EPA would review the draft Development Approval if developed for the project.

In summary, the EPA considers that the revised noise impact assessment meets the EPA’s guidelines for consideration of environmental impacts from the proposal and can be used in determination of the project.

It is recommended that the location of marginally and significantly affected properties be clarified in an updated map prior to consideration of any Approval.

The EPA also recommends that real time air and noise monitors be required by any approval and located to enable assessment of compliance with air quality at the most sensitive receptors. These monitors should be included in the Management Plans for the project.

**Phone** 131 555  
**Phone** 02 9995 5555  
(from outside NSW)

**TTY** 131 677, then  
ask for 131 155

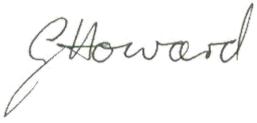
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**[www.epa.nsw.gov.au](http://www.epa.nsw.gov.au)**  
**ABN 43 692 285 758**

If you have questions regarding the above, please phone Andrew Couldridge on (02) 4224 4100.

Yours sincerely

A handwritten signature in cursive script that reads "G. Howard".

10/6/2020

**GISELLE HOWARD**  
**Director Metropolitan South Operations**  
**Regulatory Operations Metropolitan Branch**  
**Environment Protection Authority**

Attachment

## Attachment – Specific Comments on Noise Impact Assessment

The Planning and Assessments section of DPIE has requested that the EPA review the noise assessment that has been updated for the project using the EPA's Noise Policy for Industry noise guidelines (NPfI 2017) and updated Voluntary Land Acquisition and Mitigation Policy (VAMP 2018).

The assessment is titled "Updated Noise Assessment for the Hume Coal and Berrima Rail Project in response to recommendations R10 and R11 within the Independent Planning Commission Assessment Report, dated 27 May 2019".

It was also noted that the IPC report made two recommendations in relation to noise:

- R10 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.
- R11 The Applicant and Department should explore opportunities to further mitigate noise impacts.

The EPA has not remodelled the proposal but notes that the assessment provides a logical and clear evaluation of noise impacts in accordance the NPfI guideline.

As would be expected, there is little change to project noise levels from the re-modelling.

The only significant change is from a proposed increase in the maximum height of the main (eastern) temporary coal reject stockpile of 4 m to a total height of 19 m. This results in a "2 dB increase at assessment location 7 and has resulted in a change in the significance of residual impact from negligible to marginal, and hence this means that assessment location 7 is entitled to voluntary mitigation in the form of mechanical ventilation/comfort condition systems".

This answers the IPC's consideration under point R10.

The updated noise assessment also states that under the updated VLAMP, assessment locations (11 and 12) are predicted to experience significant residual noise levels and are therefore entitled to voluntary acquisition. However no description or diagram has been provided showing the location of the affected properties.

The EPA's review of the original EIS contains a map of affected receivers (attached below from EIS, Volume 7, Appendix I, Noise and Vibration Assessment Report). The map shows that receivers numbered 12 and 13 may be significantly affected by noise and are entitled to voluntary acquisition. There is no receiver location 11. However, Figure 14.4 of the Response to Submissions document shows receiver locations 10 and 11 but no receiver 13.

*The EPA recommends that the location of marginally and significantly noise affected properties be clarified in the report and that a revised map be drawn showing the final locations and updated status of noise impacts and VLAMP mitigation.*

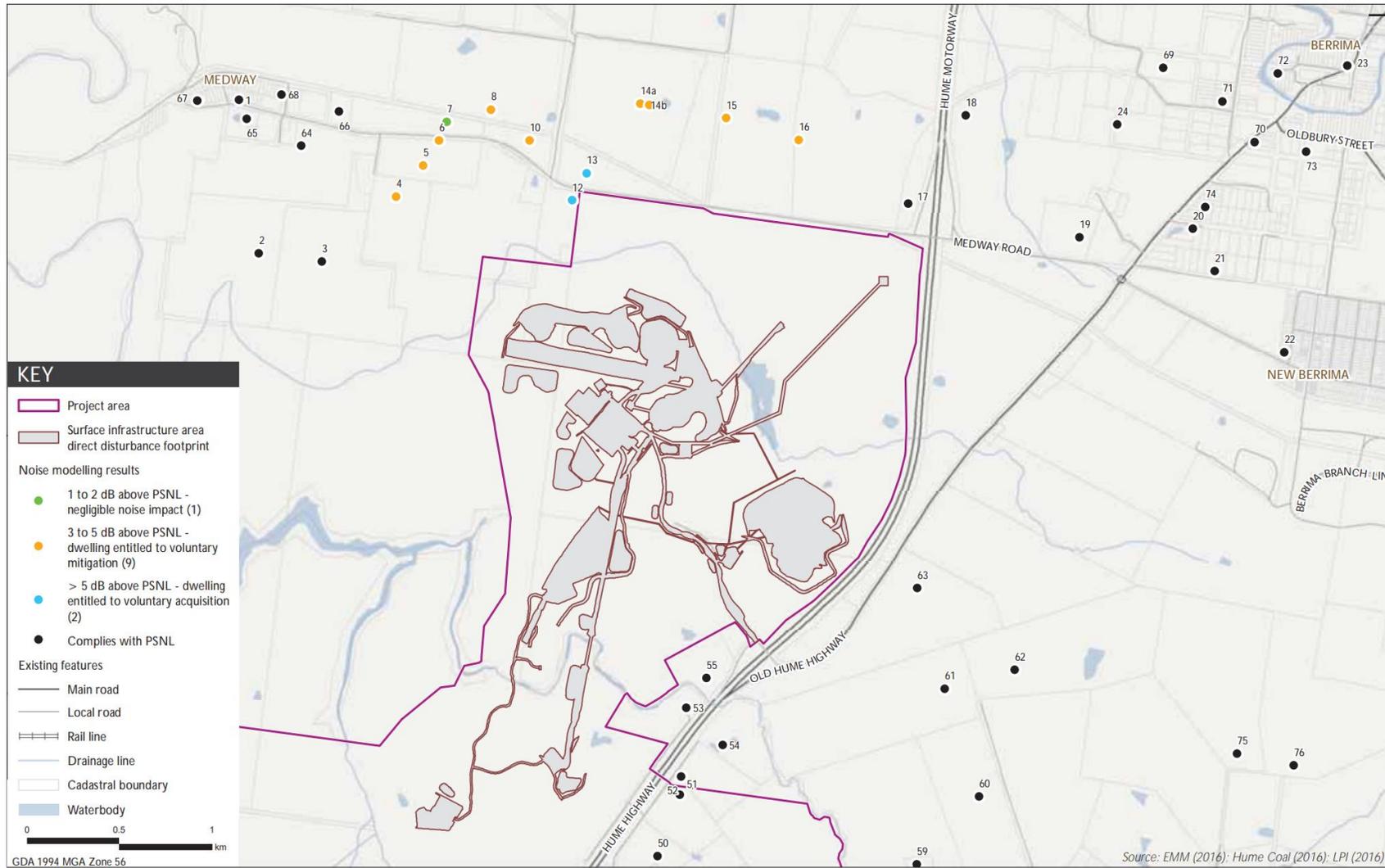
- R11 The Applicant and Department should explore opportunities to further mitigate noise impacts.

The EPA notes that in response, the report does not specifically respond to R11 but states that all feasible and reasonable measures have been considered previously in the EIS and RTS report.

A review of the EIS shows that a range of contemporary noise mitigation measures have been proposed and that the modelling purports to use actual or realistic sound power levels. The proponent states that selection of optimal noise controls to meet noise performance criteria will be undertaken in consultation with equipment suppliers during detailed design.

*In response, the EPA recommends that consideration of contingency noise controls be part of any approval condition for a Construction and/or Operational Environmental Management Plan.*

*The EPA also recommends that any approval require real time noise monitoring close to the nearest affected resident(s).*



Summary of worst case operational noise impacts, night, adverse weather

Hume Coal Project  
Noise Impact Assessment

Figure E.1

DOC20/394072-02

Ms Mandana Mazaheri  
Department of Planning, Industry and Environment  
Locked Bag 5022  
PARRAMATTA NSW 2124

Email: Mandana.Mazaheri@planning.nsw.gov.au

Dear Ms Mazaheri

**Hume Coal Project – Additional Comments on Hume Coal’s Response to IPC Recommendations**

The Environment Protection Authority (EPA) refers to your email request dated 11 June 2020 for additional comments on Hume Coal Pty Ltd’s report titled “Response to the Independent Planning Commission Assessment Report, April 2020” (the IPC response report) for the Hume Coal and Berrima Rail Project.

The EPA provided comments on the revised noise assessment in the IPC response report in its letter dated 10 June 2020.

The EPA has now reviewed the full IPC response report in relation to the last comments the EPA made on the project for the Response to the Submissions (RTS) report. The comments were sent to DPIE in a letter dated 18 August 2018.

The RTS report provided supplementary information as requested by the EPA to allow the air, noise and water quality impacts for the development to be sufficiently assessed. The EPA recommended that if approval for the project was granted, several specific matters be addressed via conditions of approval and /or management plans for water, air and noise emissions. The EPA recommended some conditions of approval for the project including that any management plans be developed in consultation with the relevant agencies.

The EPA has reviewed the IPC response report and notes that the majority of issues are unrelated to the EPA’s regulatory jurisdiction, or have been previously addressed by the EPA through its RTS comments. The EPA has no additional comments to make on the report.

If you have questions regarding the above, please phone Andrew Couldridge on (02) 4224 4100.

Yours sincerely

*William Dove* 18.06.2020

**WILLIAM DOVE**  
Unit Head Regulation Illawarra  
Environment Protection Authority

## Appendix C4 – Resources Regulator advice

## Jack Turner

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**From:** Jack Turner  
**Sent:** Thursday, 8 October 2020 1:54 PM  
**To:** Jack Turner  
**Subject:** FW: DPIE's Request for Updated Advice by the Resources Regulator regarding Hume Coal Project

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**From:** Gang Li <[gang.li@planning.nsw.gov.au](mailto:gang.li@planning.nsw.gov.au)>  
**Sent:** Thursday, 8 October 2020 12:24 PM  
**To:** Mandana Mazaheri <[Mandana.Mazaheri@planning.nsw.gov.au](mailto:Mandana.Mazaheri@planning.nsw.gov.au)>  
**Cc:** Garvin Burns <[garvin.burns@planning.nsw.gov.au](mailto:garvin.burns@planning.nsw.gov.au)>; Steve Orr <[steve.orr@planning.nsw.gov.au](mailto:steve.orr@planning.nsw.gov.au)>; Matthew Newton <[matthew.newton@planning.nsw.gov.au](mailto:matthew.newton@planning.nsw.gov.au)>; Bill Barraclough <[bill.barraclough@planning.nsw.gov.au](mailto:bill.barraclough@planning.nsw.gov.au)>; John Stacpoole <[John.Stacpoole@planning.nsw.gov.au](mailto:John.Stacpoole@planning.nsw.gov.au)>  
**Subject:** DPIE's Request for Updated Advice by the Resources Regulator regarding Hume Coal Project

Hi, Mandana,

As requested, please find below Resources Regulator's updated advice on the proposed Hume Coal Project.

### 1. INTRODUCTION

On 20 August 2020 and 26 August 2020, Ms. Mandana Mazaheri of the Department of Planning, Industry and Environment (i.e. DPIE) requested, via two emails both titled "RE: Resources Regulator's Comments on Hume Coal Projects", the Principal Subsidence Engineer (i.e. PSE) of the Resources Regulator to provide an updated advice by considering the following two documents.

- Report by Dr. Russell Frith dated 23 February 2019 and titled "Response to DP and E Assessment Report, Hume Project" (Report No. HUME22/2).
- Hume Coal's Submission to the DPIE dated 21 August 2020 and titled "Re: SSD-7171 & SSD-7172 The Hume Coal Mine and Berrima Rail Projects Response to Agency Comments – Subsidence – Principal Subsidence Engineer".

Please note that this updated advice has been prepared by considering the following three additional documents. PSE's assessments of the three additional documents were requested by the Proponent in their Submission to the DPIE dated 21 August 2020, as mentioned above.

- *Mine Advice (2016a) Mine Design Justification Report, Hume Project. Commercial consulting report to Hume Coal Report HUME 13/2.*
- *Mine Advice (2016b) Environmental Impact Statement, Subsidence Assessment. Commercial consulting report to EMM Consulting, Report EMM 01/2.*
- *Mine Advice (April 2017) Formal Responses to the Issues Raised by NSW Roads and Maritime Services (RMS) Relating to the Hume Project EIS, Report Hume19/1.*

**Note** - Mine Advice (2016a) and Mine Advice (2016b), listed above, are part of the Environment Impact Statement for the Hume Coal Project dated March 2017, which were previously assessed by the PSE.

The advice provided herein replaces Resources Regulator's previous advice provided to the DPIE in an e-mail by the PSE dated 3 June 2020 and titled "Resources Regulator's Comments on Hume Coal Projects".

### 2. FINDINGS

Note that the findings below are presented within the context of the Work Health and Safety (i.e. WHS) matters related to the critical infrastructure items located within the Hume Coal's Project Area.

## 2.1 Attention Required Regarding the Shallow Depths of Cover at the Hume Coal Project Site

In NSW, secondary extraction of coal under critical infrastructure, such as national highways / railways or major gas / liquid fuel pipelines, has taken place to-date only in areas with significant depths of cover ranging in general from 400m to 550m. In other areas with shallower depths of cover, such infrastructure has been fully protected by adequate coal protection barriers.

**Note** – There are limited exceptions to the above statements, which occurred more than 20 years ago (approximately) before the common practices of risk management principles in NSW in relation to subsidence.

In contrast, the depths of cover at the Hume Coal Project Site range from 80m to 170m only, with the majority of the proposed mine workings having depths of cover less than or equal to 120m.

Within the context of mine subsidence, the above-mentioned shallow depths of cover at the Hume Coal Project Site requires close attention, as hazards related to the mode of mining-induced ground deformation (i.e. subsidence) and speed of such deformation in such shallow areas may not be controllable by the risk management systems established in NSW for the protection of critical infrastructure affected by subsidence.

### Note

1. Under clause 3 of *Work Health and Safety (Mines and Petroleum Sites) Regulation 2014*, “subsidence” is defined as the deformation or displacement of any part of the ground surface or subsurface strata caused by the extraction of minerals.
2. The term “shallow depth of cover” is used within the context of risk management for critical infrastructure items affected by subsidence.

## 2.2 Critical Infrastructure at the Hume Coal Project Site

According to the Environmental Impact Statement by the Hume Coal Pty Ltd dated March 2017 and the additional documents provided by the Proponent (as listed in Section 1 above), the critical infrastructure items located within the Hume Coal’s Project Area include:

- A. M31 Hume Motorway (previously called Hume Highway);
- B. Moomba to Sydney Natural Gas Pipeline, which supplies most of Sydney’s and Newcastle’s natural gas requirements;
- C. Illawarra Highway, and
- D. Telecommunication fibre optic lines. According to Drawing No HUME5178 – 23 presented in Hume Coal’s Submission to the DPIE dated 21 August 2020, the optical cables and the Moomba to Sydney Natural Gas Pipeline are located within the same infrastructure corridor.

**Note** - “Fibre optical cable” is mentioned in the Proponent’s EIS dated March 2017 and the Submission to the DPIE dated 21 August 2020 without relevant details. It is not clear if the fibre optical lines located with the Hume Coal’s Project Area is a local or a national telecommunication infrastructure item.

Any adverse impacts of subsidence on the critical infrastructure items, as listed above, have a potential to lead to severe or catastrophic safety and/or serviceability consequences.

## 2.3 Risk Management Systems Established in NSW for Critical Infrastructure Affected by Subsidence

To prevent any adverse subsidence impacts on critical infrastructure in NSW, the risk management systems for critical infrastructure, as mentioned in Section 2.1 above, have been carefully established, reviewed, amended and implemented during the past 20 years in various NSW mining districts with appropriate site conditions, in particular, high depths of cover (>400m) as discussed in Section 2.1 above.

Without site-specific appraisals in consultation with the relevant infrastructure operators, the applicability of the above-mentioned risk management systems for critical infrastructure is questionable for the proposed Hume Coal Project Site, if significant subsidence occurs at the subject site (see discussions below).

## 2.4 Uncertainty with the Proponent’s Subsidence Predictions

In an earlier submission to the Department of Planning, Industry and Environment dated 2 October 2018 (Our Ref: DOC18/591440), the Resources Regulator provided the following comment.

*At this point in time subsidence levels can only be theoretical as the method of mining has not been undertaken to draw comparisons.*

Within the context of subsidence, the proposed mining by Hume Coal Pty Ltd is novel in terms of the stability of the proposed mine layout as well as the proposed method of mining to achieve the designed mine layout. This creates difficulties in finding adequate and reliable empirical data from comparable mining sites to calibrate and/or to verify any theoretical or numerical models used for predicting subsidence due to the proposed Hume Coal Project. In other words, there is uncertainty in the subsidence predicted by the Hume Coal Pty Ltd.

## **2.5 Uncertainty with the Proponent's Design Methodology for the Coal Protection Barriers under Critical Infrastructure**

The methodology used by the Proponent to design the proposed 150m-wide coal barrier under the M31 Hume Motorway differs fundamentally from the established Industry Practices (i.e. the Angle-of-Draw Approach).

The dimension of the above-mentioned 150m-wide coal barrier is determined by the Proponent based on a geotechnical approach related to coal pillar stability, rather than the established Industry Practices that are based on a set-off distance for achieving zero vertical subsidence of the surface features requiring protection, that is, the empirical Angle-of-Draw Approach.

Drawing No HUME5178 – 21, which is part of the Proponent's Submission to the DPIE dated 21 August 2020, shows a set-off distance of 50m as part of the above-mentioned 150m-wide coal barrier. This proposed set-off distance is noticeably less than what would be required if the above-mentioned Industry Practices, i.e. the Angle-of-Draw Approach, are applied.

We are unaware of any cases in NSW where critical infrastructure items have been protected from impacts of vertical subsidence via coal barriers designed based on the methodology as proposed by the Proponent. While it may be worthwhile to undertake trials by the Proponent of the proposed new methodology in areas away from the critical infrastructure items located with the Hume Coal's Project Area, the uncertainty with the Proponent's methodology, as described above, must be treated critically.

## **3. SUMMARY**

Any adverse impacts of subsidence on the critical infrastructure items located within the Hume Coal's Project Area, as listed in Section 2.2 above, have a potential to lead to severe or catastrophic safety and/or serviceability consequences.

In view of the shallow depths of cover (refer to Section 2.1 above) and existence of the critical infrastructure items (refer to Section 2.2 above) at the subject site, the uncertainties, as discussed in Sections 2.4 and 2.5 above, warrant priority risk treatment during the decision-making processes in relation to the proposed Hume Coal Project.

Consequently, we recommend a Staged Process whereby the Proponent is required, during an initial stage of the proposed mining operations:

- To undertake secondary extraction that is sufficiently away from the critical infrastructure items, and
- To gather and review relevant and adequate site-specific information collected during the aforementioned secondary extraction to enable further appraisals or verification of the subsidence models / design methodologies used in the Proponent's EIS. This is a critical step in view of the uncertainties as discussed in Sections 2.4 and 2.5 above.

If the Proponent subsequently seek amendments to the coal protection barriers to be required for the critical infrastructure items, such proposed amendments must be justified based on the results of the above-mentioned reviews. For details, refer to Section 4 below.

## **4. RECOMMENDATIONS**

- 4.1 Without meeting the requirements set out by Point 4.3 below, the Proponent must not undertake any secondary extraction within a minimum 35 degrees of angle of draw in relation to the boundaries or limits of any major infrastructure corridors located within the Hume Coal's Project Area. The said boundaries or limits of the infrastructure corridors must be defined based on either any relevant legal instrument or the results of consultation with the relevant infrastructure operators.

Note - In accordance with the Environmental Impact Statement by the Hume Coal Pty Ltd, the aforementioned major infrastructure corridors refer to those containing:

- i) the M31 Hume Motorway;
- ii) the Illawarra Highway, and
- iii) the Moomba to Sydney Natural Gas Pipeline and telecommunication fibre optic lines.

- 4.2 To protect the bridges as part of the M31 Hume Motorway located within the Hume Coal's Project Area, the Proponent must determine in consultation with the Roads and Maritime Services if any additional set-off distance in relation to the coal protection barrier required under Point 4.1 above, is to be implemented for the said bridges.
  - 4.3 Any proposed amendments by the Proponent to the coal protection barriers required under Points 4.1 and 4.2 above must be subject to:
    - 4.3.1 Justification based on the results of the Proponent's review(s) that provide further appraisals or verification of the subsidence models / design methodologies used in the Proponent's EIS. The said reviews must be undertaken by competent persons based on relevant and adequate site-specific information collected by the Proponent during secondary extraction away from the major coal protection barriers required under Points 4.1 and 4.2 above, and
    - 4.3.2 The Proponent's ability to gain access to any land for the purposes of undertaking subsidence monitoring and risk management activities such as unearthing buried critical infrastructure items wherever and whenever it is required.
- Note -** Effective risk management for major gas pipelines and fibre optical cables affected by subsidence relies critically on the Proponent's ability to gain access to land to unearth the buried infrastructure items, wherever and whenever required considering the potentially severe or catastrophic consequences of any adverse subsidence impacts on such infrastructure items.
- 4.4 The coal protection barriers required under the sections of M31 Hume Motorway and Illawarra Highway located within the Hume Coal's Hume Coal Project Area must be maintained during the life of Hume Coal Project, although the Proponent may seek to amend the dimensions of such coal protection barriers pursuant to the requirements set out by Point 4.3 above.

Kind Regards

**Dr. Gang Li**  
**Principal Subsidence Engineer**

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*The Department of Regional New South Wales acknowledges that it stands on Country which always was and always will be Aboriginal land. We acknowledge the Traditional Custodians of the land and waters, and we show our respect for Elders past, present and emerging. We are committed to providing places in which Aboriginal people are included socially, culturally and economically through thoughtful and collaborative approaches to our work.*



## **Appendix C5 – Regional NSW – Mining, Exploration and Geoscience advice**

## MINING, EXPLORATION & GEOSCIENCE ADVICE RESPONSE

Dr Mandana Mazaheri  
Energy & Resource Assessments - Planning & Assessment Division  
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SYDNEY NSW 2001

[Mandana.mazaheri@planning.nsw.gov.au](mailto:Mandana.mazaheri@planning.nsw.gov.au)

Dear Mandana

**Project: Hume Coal Project**  
**Stage: Review response to IPC Review Report**  
**Development Application: SSD-7172**

I refer to your correspondence dated 14 May 2020 inviting Regional NSW – Mining, Exploration and Geoscience (MEG) to provide comments on the Hume Coal Project Response to IPC Review Report submitted by EMM Consulting Pty Limited on behalf of Hume Coal Pty Limited.

MEG advises that the information provided in the proponent's response adequately addressed issues regarding coal resources raised by the IPC Review. Further, MEG notes the findings of the *Independent review of residual issues of disagreement between the applicant and the Department of Planning associated with the Hume Coal Project* report by Russell Howarth and Associates Pty Limited (January 2020):

*"The proposed mining technique was found to be technically feasible. 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, minimizes hydrogeological impacts on subsurface strata above the Wongawilli Seam, and provides an ability to store mining wastes and excess water underground"*

MEG confirms that its previous submissions reviewing the project's Environmental Impact Statement, which included a Resource and Economic Assessment (reference OUT17/25104/DOI and INT17/75333/DOI), and the proponent's Response to Submissions Report (reference DOC18/665401) are still considered appropriate to the proposal and reflect MEG's position as the mine design has not been revised.

The proponent has planned a method of coal recovery that is designed to minimise surface subsidence which over a 20-year mine life is planned to recover 50 million tonnes of Run-of-Mine coal which would otherwise not be mined. MEG considers the return to the state is satisfactory given the constraints surrounding the project location.

For further advice concerning this matter, please contact Adam W. Banister, Senior Advisor, Resource Assessments on 02 4063 6534 or [assessment.coordination@planning.nsw.gov.au](mailto:assessment.coordination@planning.nsw.gov.au).

Yours sincerely



Dr David Blackmore  
**Director Resource Assessments**  
**Regional NSW – Mining, Exploration & Geoscience**  
4 June 2020

## Appendix C5 – Heritage NSW advice

Ms. Mandana Mazaheri  
Acting Team Leader, Resource Assessments  
Department of Planning & Environment  
GPO Box 39  
SYDNEY NSW 2000

By email: [mandana.mazaheri@planning.nsw.gov.au](mailto:mandana.mazaheri@planning.nsw.gov.au) / uploaded to Major Projects website

Dear Ms Mazaheri,

**Hume Coal Project (SSD 7172) and related Berrima Rail Project (SSD 7171): HNSW Review of Hume Coal Response to IPC Review Report**

I refer to your correspondence received on 19 May 2020 requesting review on the Hume Coal Response to the IPC Review Report for the Hume Coal Project (SSD 7172) and the related Berrima Rail Project (SSD 7171) ('the proposal').

The Heritage Council of NSW commented on the proposal in letters dated 17 July 2017 (EIS) and 17 August 2018 (RTS). The project was assessed by the NSW Government's Independent Planning Commission, with the IPC Assessment Report issued on 27 May 2019. The IPC Assessment Report included several recommendations relating to Historic Heritage, including R15, R16, R17 and R18.

The proponent has submitted their response to the IPC Review, which includes the *Hume Coal and Berrima Rail Project, Response to the IPC Assessment Report*, the *Updated Visual Impact Assessment (UVIA)* and *Updated Statement of Heritage Impact (USHI)*, all prepared by EMM, dated April 2020. Heritage NSW has reviewed these reports and provides the following comments in relation to the heritage issues.

Figure 4.1 of the USHI illustrates the location of the proposed site in relation to both state and local heritage listed items. The figure clarifies that the subject site is not within the curtilage of any State Heritage Register (SHR) listed item, but that it is in the vicinity of the following SHR listed items:

- Oldbury Farm (SHR no. 488);
- Golden Vale (SHR no. 489); and
- Hillview (SHR no. 442).

Figure 4.1 and Table 3.1 of the USHI also illustrate that the proposed site is located entirely or partially within several locally listed heritage items:

- Mereworth House and Garden (WLEP 2010, I351);
- Newbury Farm Group (WLEP 2010, I202 & I036);
- Sutton Farm House, Grounds and Outbuildings (WLEP 2010, I035);
- The Pines Slab Cottage (WLEP 2010, I029);
- The Harp (WLEP 2010, I027);
- Bunya Hill House, Grounds and Outbuildings (WLEP 2010, I018);
- Eling Forest Winery House, Grounds and Outbuildings, (WLEP 2019, I004);
- Eling Forest Original Homesite (WLEP 2010, I010);
- Eling Forest Winery Homestead (WLEP 2010, I009);
- Comfort Hill Group (WLEP 2010, I021);
- Comfort Hill Garden (WLEP 2010, I356); and
- Comfort Hill Garden (WLEP 2010, I357).

## **Mereworth House and Garden**

### *Significance*

Heritage NSW previously requested a comparative analysis of Paul Sorensen's body of work and assessment of the Mereworth garden within his oeuvre, to enable a conclusion as to the significance of this garden. The USHI contains Catherine Brouwer's report, which concludes that the Mereworth garden includes the typical Sorensen garden design features however that the garden is not uncommon in a state context, and that it is unlikely to be amongst his highest caliber rural homestead garden designs. The report therefore concludes that the Mereworth garden is a place of local significance. Heritage NSW does not agree with this assessment, instead an assessment by Heritage NSW has indicates that the site may be of state significance.

### *Impacts*

The USHI Groundwater Dependence Assessment includes an assessment of shallow groundwater access making a distinction between firstly Mereworth's house and garden and secondly the gardens and trees located within the heritage listed item described as '*outside Mereworth heritage curtilage*'. Consultation with Wingecarribee Council has clarified that no curtilage studies have been undertaken for the locally listed Mereworth House and Garden, and that the entire allotment was listed. It was also clarified that the significance of the views and vistas, including the use of the ha-ha walls to ensure retention of uninterrupted views, could be considered in a curtilage assessment; therefore, the surrounding landscape could be considered part of the heritage item's curtilage. Figure 5.1 of the groundwater assessment clarifies that potential drawdown impacts on gardens and trees do exist in some of these other areas on the property.

The Groundwater Dependence Assessment concludes that all listed heritage gardens accessing shallow groundwater and part of the vegetation in the landscape conservation areas are situated above the Wianamatta Group Shale, which is described as a perched groundwater system. It concludes that private gardens, non-native vegetation or exotic grasslands occurring in areas where the Wianamatta Group Shale outcrops at the surface, will not be impacted by groundwater drawdown due to the perched groundwater system. Heritage NSW does not include experts in this scientific field, and refers these assessments to the relevant department, to advise DPIE.

Figure 5.8 and 5.9 of the UVIA illustrate the proposed site in relation to Mereworth House and Garden, demonstrating that the majority of the coal infrastructure is proposed within the boundaries of this locally heritage listed item. This includes several coal stockpiles (up to 21m high), the coal stacker (23m high), the coal reclaimer (30m high), the ROM conveyor tower (31m high), ventilation shaft (8m high) and water dams (the primary dam wall being 19m high). Figure 5.8 and 5.9 of the UVIA also show viewpoints from Mereworth's Sorensen garden and other locations (including views from Mereworth's driveway and from the Hume Highway) to the rural landscape.

Table 6.1 of the UVIA appears to be missing from the report, and no conclusion was provided as to how the visual impacts upon Mereworth House and Garden were assessed (i.e. low, moderate or high). However, the report notes that visual mitigation measures are supported, via design elements, onsite and offsite treatments and post mining landform.

The UVIA concludes that the visual impacts will be temporary during the life of the project (25 years), and that upon decommissioning, the landscape will be returned to its pre-disturbance agricultural landform and land use for grazing livestock.

This project will have major adverse impacts on this arguably state-significant designed cultural landscape. The project proposal's treatment of and project impacts on this landscape requires further consideration. Alternative locations for project elements do not appear to have been adequately considered.

Proposed mitigative measures of planting screen vegetation to block views of this (and other) landscapes impacted by the project, is not considered to be an appropriate response. At the very least, any such 'buffer' plantings should be conditioned to be removed on completion of the project's time frame, to restore the landscape masked for the project's life. Proposed 'Plant Succession Plan' and 'activating it when necessary' is also considered to be an inadequate response.

Heritage NSW is of the opinion that the construction and operational phases of the proposal would have a significant detrimental visual impact upon the significance of Mereworth House and Garden. However, as the Heritage Council is not a consent authority for local heritage items, it is recommended that DPIE consults with the local council in terms of the acceptability of likely impacts on Mereworth House and Garden as a local heritage item.

### ***Berrima, Sutton Forest and Exeter Cultural Landscape***

#### ***Significance***

Heritage NSW had previously requested a detailed assessment of the proposal's impacts on the Berrima, Sutton Forest and Exeter Cultural Landscape. The USHI includes a Cultural Landscape Assessment report by Catherine Brouwer. This report reviews the National Trust (NSW) non-statutory 1998 listed *Exeter/Sutton Forest Landscape Conservation Area* cultural landscape and the *Proposed Berrima, Sutton Forest and Exeter Cultural Landscape*, presented in the 2017 Morris study. The report assesses the statements of significance of these cultural landscapes and concludes that these do not demonstrate eligibility for state listing.

#### ***Impacts***

The USHI Cultural Landscape Assessment report concludes that impacts of views of part of the proposed surface infrastructure are likely to have a low impact on the heritage values of the cultural landscape as a whole, while impacts on views of the landscape at and immediately around the proposed surface infrastructure are assessed as foreground views and as having a low to moderate impact on the heritage values of the whole landscape.

Mitigation measures by a range of forms and species of planting, are assessed as likely to be moderately effective within approximately five years of plant growth and moderate to highly effective after fifteen years of plant growth. The report claims these measures will substantially reduce the potential impacts on the appreciation of the cultural landscape from the public realm viewpoints and routes, and from the tourism, recreation and social destinations.

The views and the impact of the proposal have been investigated by photomontages in the UVIA. The UVIA concludes that overall visual impacts of the mine surface infrastructure, taking into account proposed mitigation measures, for motorists travelling along the Hume Motorway and for residences along Medway Road, will be of a moderate level.

The UVIA also concludes these visual impacts will be temporary and the mine surface infrastructure will be removed, excess stockpiled material will be returned underground, the landform returned as close as practical to the pre-disturbance landform, stockpiled topsoil spread and topsoiled areas reseeded with pasture grasses and returned to agricultural production.

Heritage NSW is of the opinion that the construction and operational phases of the proposal would have a significant detrimental visual impact upon the significance of the Berrima, Sutton Forest and Exeter Cultural Landscape. This cultural landscape itself, with wide open meadow landscape and relatively open views, is of significance. Blocking views of it, as well as considerable physical change to its content, will adversely impact this landscape. Also, this landscape includes a large number of local and state listed heritage items. Therefore, it is recommended that the cultural landscape treatment and project layout be more carefully considered and conditioned by the consent authority.

Proposed mitigative measures of planting screen vegetation to block views of this (and other) landscapes impacted by the project, is not considered to be an appropriate response. Relocation of parts of the project away from highly-sensitive views and other landscape fabric should be considered. At the very least, any such 'buffer' plantings should be conditioned to be removed on completion of the project's time frame, to restore the landscape masked for the project's life.

### ***Historical Archaeology***

The following recommendations for appropriate historical archaeological assessment were originally provided in our correspondence from 17 July 2017, reiterated in correspondence from 18 August 2018 and confirmed by the Independent Planning Commission Review (**R17**):

- The EIS should be supplemented with a detailed historical archaeological assessment prepared by a suitability qualified and experienced historical archaeologist. The assessment should be prepared in accordance with Heritage Council of NSW guidelines including *Archaeological Assessments 1996* and *Assessing Significance for Historical Archaeological Sites and Relics 2009*.
- This Assessment should address, in sufficient detail through historical investigation of primary records, the potential for other historical archaeological sites within the subject area and reassess the significance of the sites it identifies.
- The Assessment should clarify how archaeological sites of the 1820s associated with the Atkinson Family and other early settlers in NSW, would not be of potential state significance, rather than local.
- The Assessment should also clearly outline what the impact would be to these sites, both within the study area subject to the coal mining works below and above ground and how mitigation of relics may or may not be required. This impact should be clearly explained so that conditions of consent can be reasonably imposed to manage such impacts to these significant archaeological deposits.
- The detailed historical archaeological assessment should be provided to the Heritage Council for review prior to any determination of the application. Based on this supplementary assessment to address these elements in sufficient detail, the Heritage Council would be able to provide more specific advice for recommended conditions of approval to manage this resource.

In response to these recommendations a *Supplementary historical archaeological assessment* was supplied by the Applicant as Appendix F of the *Updated Statement of Heritage Impact* (USHI) as referred to above. This assessment was further supplemented by a *Summary table of archaeological sites*, supplied as Appendix G of the USHI. A review of these documents reveals inadequacies and inconsistencies which raise concerns as to the level and quality of assessment undertaken, as follows:

#### *Terminology*

The terminology applied throughout the report contradicts the relevant definitions as set out in the NSW *Heritage Act 1977* and by the Heritage Council of NSW. Various built heritage items are discussed as archaeological sites (Appendix G); the term '*relic*' is broadly and indiscriminately applied to a variety of movable objects (e.g. p. 46-49; p. 123), works (e.g. p. 52-53; Fig. 6.2 etc.); buildings (e.g. Table 6.11) and archaeological sites (e.g. p. 11; 101). None of these items fit the definition of '*relic*' as specified in S4(1) of the *Heritage Act 1977* (as amended 2009) and the guidelines *Assessing Significance for Historical Archaeological Sites and Relics 2009* (Heritage Council 2009, 6). The confusion resulting from the misinterpretation of terminology and particularly the term '*relic*', predetermines a number of inconsistencies throughout the report and has an overall negative influence on the outcomes of the significance assessment.

#### *Fieldwork*

The fieldwork undertaken for the assessment as detailed in the report is insufficient. Large portions of the project area above the underground mining area, were not accessed by the

consultant and a number of locally listed items deemed 'likely' and 'highly likely' to contain relics, including relics of potential State significance have not been inspected, but viewed from the public domain (e.g. p. 37; p. 52; p. 66-71; Appendix G). This suggests that an appropriate level of understanding of the archaeological potential and sensitivity of numerous locations within the project area was not achieved.

### *Mapping*

The relevant mapping does not clearly demonstrate the assessed locations of potential archaeological resources which may contain relics within the project area. No survey coverage mapping has been provided and no archaeological sensitivity mapping has been prepared. The recurring argument that structures and potential archaeological resources identified by the consultant within locally listed heritage items, portions of which fall within the project area, are in fact outside of the project area is not demonstrated (p. 66-71; Appendix G).

### *Assessment of archaeological potential*

Based on the outcomes of the above, a detailed assessment of archaeological potential has not been appropriately undertaken. This is acknowledged by the consultant: *Nevertheless, the archaeological potential of the Three Legs of Man property will only be determined through thorough archaeological survey within the property boundaries* (p. 57). This statement is valid for all areas of archaeological potential as identified by the consultant that were not inspected, but viewed from the public domain, or not viewed at all (e.g. Eling Forest Winery, Comfort Hill, p. 71 and Appendix G). As a result, while archaeological potential is mentioned on various occasions throughout the report, it is usually defined by overarching statements: *'Given the history of the area it is possible that unrecorded relics exist, particularly where they may be associated with the larger estates or where early industry may have left the ruins of ephemeral structures'* (p. 79), or *'the potential for unrecorded relics exists as in any area that has the history of the project area'* (Appendix G; Table 6.4.; E.23). This level of assessment is inadequate for the purposes of this report as it impedes an accurate impact assessment.

### *Comparative analysis*

Chapter 5, entitled *'Site evaluation'* contains a section devoted to comparative analysis (5.2, p. 72-79). The purpose of comparative analysis is to assess the known parameters of potential archaeological resources against comparable sites from the available sources and thus inform significance assessment. In the report under consideration, comparative analysis is limited to three items: *Mereworth House and Garden*, the *Kentish Arms/Three Legs of Man Inn* and the *Three Legs of Man Bridge*. None of the other areas identified as likely to contain archaeological resources and relics are included. The analysis consists of a list of the above-mentioned items followed by a list of broadly similar items (mostly built heritage items) with short notes on their chronology and main features, as detailed in the relevant listings. No discussion is included in this section. The following section, entitled *Discussion of archaeological sensitivity* (5.3), which contains the actual comparative analysis, is also limited to the above three items and concluded with broad statements, e.g. *'The existence of archaeological sites across the landscape should not be discounted and should be recorded when encountered. Conservation or protection of such features is only possible if their location is known, and in many cases, small or vernacular structures were not recorded.'* (p. 92). This statement indicates that the aims of the comparative analysis are not achieved.

### *Significance assessment*

The significance assessment provided in Section 5.4. While some items are assessed against the criteria by the consultant (Tables 5.2; 5.3; 5.4; 5.5), others are detailed with their statements of significance, cited from the relevant statutory listings (5.5.9; 5.5.24). The latter is inappropriate as it unconditionally reiterates statements potentially out of date with regard to the current state of art and does not re-evaluate the relevant items' significance against the new information that would have been gained via this assessment. Items that were not inspected by the consultant are assessed against the criteria (Tables 5.6; 5.7; 5.8; 5.9; 5.10; 5.11; 5.12). Archaeological resources identified by the consultant are not assessed against the criteria (5.5.8). One item that has not previously been discussed in the report (Former Berrima

Coal Rail Corridor) appears in this section and is assessed against the criteria in Table 5.13 (p. 109). In general, items are assessed mainly for built heritage values and archaeological potential is discussed only under criteria *e) Research* and *f) Rarity* which is insufficient. The significance assessment as presented in the report is to a large extent a function of the confused terminology and the level of understanding of archaeological potential. It is inadequate for the purposes of the report, and does little to facilitate an adequate assessment of potential impacts.

#### *Identification of impacts to historical archaeological resources and relics*

An impact assessment is provided in Chapter 6 *Potential Impacts to Relics*. While on numerous occasions throughout the report, it is stated that potential unrecorded relics are assumed to exist throughout the project area, potential impacts by surface infrastructure are assessed as unlikely (p. 118). Impacts to potential archaeological resources above the underground mining area are assessed based on an overarching assumption that due to the mining method adopted, subsidence will be negligible and therefore impacts to potential archaeological resources will be very unlikely (p. 119-121; Appendix G). Two potential versions of a subsidence prediction report by Mine Advice Pty Ltd (2015 and 2016) are referred to within the report (p.111, 114, 120), however the relevant entries are missing from the reference list. The relevant report has not been appended to this report. No subsidence prediction mapping has been supplied. It is therefore difficult to ascertain the validity of this assessment. Potential impacts of the 'mine pipe-line' as detailed in Figure 6.1 and discussed on p. 118, 122 and 123 are not sufficiently discussed. Due to the above and with regard to the already mentioned concerns about the level of understanding of archaeological potential and significance throughout the project area, the impact assessment as presented in this report is considered inappropriate.

#### *Mitigation and management measures*

Determined by the level of assessment, the mitigation and management measures proposed in section 7 are correspondingly vague, proposing a blanket approach rather than a focused method to mitigation and management of impacts. The overarching strategy detailed on p. 122 consists of five points which are repetitive (p. 3 and 4) and in the case of point 1 suggest two contradicting outcomes. The *Specific management* measures proposed in section 7.1 consist of a historic heritage management plan (HHMP), which would be a requirement under the relevant approval, and *Site-specific management* (7.1.2) containing recommendations for the all heritage items as identified by the consultant within the project area. Apart from the few measures outlined for Mereworth House and Garden, The Three Legs of Man bridge piers and Evandale, monitoring on a yearly or half-yearly basis is recommended for all sites without any specification as to the methods, techniques or technologies to be utilised. This is insufficient for the purposes of this report. An appropriate historical archaeological assessment identifying historical archaeological potential, significance and impacts to significance by the proposal throughout the project area is still outstanding and will be required in order to propose adequate mitigation and management strategies and guide the HHMP. Heritage NSW does not recommend deferring the project's management of archaeological sites and impacts to a post approval suite of conditions at this stage as outlined above. These matters should be clarified and resolved ahead of a decision on this SSD.

#### **Conclusion**

Heritage NSW is of the opinion that the construction and operational phases of the proposal would have a significant detrimental visual impact upon local heritage item Mereworth House and Garden, but also upon the greater cultural landscape which includes many locally and state listed heritage items.

**Therefore, the landscape and visual impact issues mentioned above should be resolved prior to a decision on this SSD.**

Heritage NSW is also of the opinion that appropriate historical archaeological assessment has not been undertaken and therefore recommendation **R17** of the IPC Review has not

been fulfilled. HNSW recommends to DPIE that the archaeological management of the project should NOT be deferred to a post approval approach without the adequate resolution of the historical archaeological sites, their potential, significance, impact and clear mitigation proposed by the project.

**Therefore, an appropriate historical archaeological assessment that addresses the requirements under R17 of the IPC review should be prepared and provided to the Heritage Council for review, prior to a decision on this SSD.**

Subject to the resolution of the archaeology and landscape issues mentioned above, following conditions of consent are recommended to be attached to any approval:

- A conservation management plan (CMP) for Mereworth estate, including the house, garden, estate drive, former drive and rural landscape, is to be prepared within 12 months of the approval. The CMP shall identify appropriate uses for the house, include a schedule of conservation works, as well as a maintenance schedule for house, garden and surrounding farm estate. The CMP shall specifically re-look at the proposed curtilage for Mereworth, noting deliberate view manipulation in the design and location of its access drives, outlooks from key parts of both house and garden surrounds. Conservation policies to conserve and maintain these views, including pruning reinstatement of horizontal elm trees on the 'ha-ha' terraces west of the house, tree removal and replacement plantings, and staging of these, must be included. Prioritised staged works and implementation of those works must be tied to specific development consent conditions to ensure adequate implementation and oversight occurs;
- Detailed project treatment of areas of Mereworth's (as presently defined) curtilage for the life of the project shall be reviewed and adjusted based on the outcomes of the CMP. This may include planting treatment, propagation and replacement plantings, monitoring of condition and damage, conservation and reparatory works.
- The project proposal's treatment of and project impacts on Mereworth's cultural landscape is not considered acceptable. This project will have major adverse impacts on this arguably state-significant designed landscape. Alternative locations for project elements do not appear to have been adequately considered. Specific approval conditions requiring such reassessment and relocation, so as to avoid or minimise adverse impacts on Mereworth's cultural landscape are recommended.
- A dilapidation report is to be undertaken prior to the commencement of both the Hume Coal Project (SSD 7172) and the Berrima Rail Project (SSD 7171) of each of the State Heritage Register items adjacent to the Hume Coal Project, being Oldbury Farm (SHR no. 488), Golden Vale (SHR no. 489), Hillview (SHR no. 442) and each of the locally significant heritage items listed on Schedule 5 of the Wingecarribee Local Environmental Plan (LEP) 2010 adjacent to the Hume Coal Project. This study is to report on the condition of the properties prior to any construction or excavation. It is to record any existing damage, and the state of any particular aspects of the property that are likely to be affected by construction work, excavation or demolition.
- An inspection and monitoring program should be established for all such properties to ensure that any structural changes are identified. This program is to inspect and monitor the condition of the buildings, structures as well as the level and extent of ground water for the full duration of the mine, from inception to final decommissioning and for two years following decommissioning and site remediation.
- Any damage to State Heritage Register items adjacent to the Hume Coal Project, being Oldbury Farm (SHR no. 488), Golden Vale (SHR no. 489), Hillview (SHR no. 442) and each of the locally significant heritage items listed on Schedule 5 of the Wingecarribee Local Environmental Plan (LEP) 2010 adjacent to the Hume Coal Project, due to mine construction and operation and for two years following decommissioning should be firstly prevented. Any damage must be carefully rectified immediately in accordance with conservation standards such as the Australia ICOMOS Burra Charter, best industry practice and Heritage Council of NSW guidelines. This includes damage to buildings' structure, external and internal claddings, finishes, built in fittings, external

paths, retaining or other walls, sheds, fences and other significant landscape elements including trees due to any movement, contamination, leaching, accelerated corrosion and deterioration, or discolouration. This program should be included in the proposed Historic Heritage Management Plan for both the Hume Coal Project (SSD 7172) and the Berrima Rail Project (SSD 7171).

- The proposed 'Plant Succession Plan' should:
  - a) Be specific about which plants need propagating and replacing first; and when;
  - b) Be staged in its implementation over short, medium and long-term (life of the project);
  - c) Include post-project restoration and reinstatement plantings;
  - d) Include regular 3-monthly monitoring and follow-up care by an experienced and qualified horticulturist or landscape consultant, with their reports on condition and progress sent to Heritage NSW, for its satisfaction;
  - e) Be tied to a large project bond, to ensure staged progressive implementation, sign-off of satisfactory meeting of those milestones, before any partial, progressive return of said project bond.
- The proposed Historic Heritage Management Plan should:
  - a) Include map-based specificity about sensitive views, which screening plants are proposed for screening which views;
  - b) Be specific about staging, monitoring and progressive sign-off of any succession plan;
  - c) Specify where monitoring reports (on structural stability of items inside and outside the project area, again, first specifying which items, where) shall be sent, and for whose approval or sign-off in each stage of the project;
  - d) Specify where excavation reports within the Mereworth curtilage (as now defined) shall be sent, and for whose approval or signoff in each stage of the project.

If you have any questions regarding the above advice, please contact Veerle Norbury, Senior Heritage Assessment Officer at Heritage NSW, on 9873 8616 or [veerle.norbury@environment.nsw.gov.au](mailto:veerle.norbury@environment.nsw.gov.au).

Yours sincerely



**Rajeev Maini**  
Acting Regional Manager  
Southern Region  
Heritage NSW, Community Engagement  
Department of Premier and Cabinet

**As Delegate of the Heritage Council of NSW**

19 June 2020

## Appendix C7 – Wingecarribee Shire Council advice

## Jack Turner

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**From:** Jack Turner  
**Sent:** Wednesday, 10 June 2020 8:30 AM  
**To:** Jack Turner  
**Subject:** FW: Hume Coal and Berrima Rail projects

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**From:** Barry Arthur <[Barry.Arthur@wsc.nsw.gov.au](mailto:Barry.Arthur@wsc.nsw.gov.au)>  
**Sent:** Tuesday, 9 June 2020 4:10 PM  
**To:** Mandana Mazaheri <[Mandana.Mazaheri@planning.nsw.gov.au](mailto:Mandana.Mazaheri@planning.nsw.gov.au)>  
**Subject:** RE: Hume Coal and Berrima Rail projects

Good afternoon Mandana

Thank you for advising of Hume Coal's response to Independent Planning Commission Assessment Report and allowing the opportunity for Council to provide advice on this matter.

Despite the very tight timeframe to go over the numerous documents, Council has reviewed Hume Coals response. Council's adopted position and concerns about the Hume Coal projects remains unchanged.

If you wish to discuss this matter further I am happy to be contacted by either phone or email.

Regards,

**Barry Arthur** Manager Environment and Sustainability

**Wingecarribee Shire Council**

e. [Barry.Arthur@wsc.nsw.gov.au](mailto:Barry.Arthur@wsc.nsw.gov.au)

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