APPENDIX 5 KEY CORRESPONDENCES

Office of Environment & Heritage

Date:	7 December 2015
Your reference:	MP09_0013
Our reference:	DOC15/xxx
Contact:	Gabrielle Pietrini 4224 4159

Catherine Van Laeren
Planning Assessment Commission
GPO Box 3415
SYDNEY NSW 2001
E-mail: catherine.vanlaeren@planning.nsw.gov.au

Dear Ms Van Laeren

RE: Russell Vale Colliery Underground Expansion Project
Public Hearing, Addendum Report & Draft Project Approval

Thank you for notifying the Office of Environment and Heritage (OEH) of the public hearing for the abovementioned major project on 8 December 2015. OEH has reviewed the DPE addendum and draft project approval conditions and provide the following comments on the draft project approval, supplementary to our submission dated 21 October 2015.

Impacts upon Swamps CRUS1, CCUS1, CRUS6 and CCUS 24

OEH supports the inclusion in Schedule 3, Condition 1 - Table 1 of a detailed and specific definition of *'negligible environmental consequences'* for upland swamps CRUS1, CCUS1, CRUS6 and CCUS24, particularly the inclusion of *"negligible change to the shallow groundwater regime when compared with control swamps"*. OEH considers the shallow groundwater regime to be a key component of the ecological function of the swamp ecosystem and suggests that the definition could be further strengthened by reference to measurable triggers, such as groundwater levels below the lowest recorded baseline period and exceedance of the water level recession rate compared to before mining or un-impacted reference swamps.

Impacts upon Swamps CUS2, CCUS4, CCUS5, CCUS10, CCUS11, CCUS12, BCUS4 and BCUS11

All other upland swamps in the project area are addressed by Schedule 3, Conditions 4 and 5. These conditions address the proposed timing for any required offsets and the payment of a Swamp Offset Bond for the first upland swamp proposed to be undermined (CCUS4).

Conditions 4 and 5 identify no greater than 'negligible environmental consequences' as the threshold under which the bond can be released and for which offsets are not required. OEH considers that it should be explicit that 'negligible environmental consequences' in this context is defined as in Table 1, including *"negligible change to the shallow groundwater regime when compared with control swamps"*. Swamps CCUS2, CCUS4, CCUS5, CCUS10, CCUS11, CCUS12, BCUS4 and BCUS11 have a higher likelihood of significant and irreversible impacts as a result of mining. It is important that the trigger for the provision of offsets is clear and measurable in order to support effective regulation of the mining activity.

OEH considers that all upland swamps affected by the proposed activity should have a specific performance measure defined in Table 1 of the approval. If the definition of 'negligible environmental

consequences' as defined in Table 1 is not predicted to be achieved for the upland swamps identified in Conditions 4 and 5, an alternate performance measure that reflects an approved level of impact should be specified to enable effective monitoring and regulation.

Impacts upon Biodiversity

OEH considers that the performance measure for biodiversity specified in Table 1 (ie *'negligible environmental consequences'*) is not adequately defined to support effective regulation of the proposed activity. This performance measure should refer to changes in population levels or regional persistence of specific species such as the Giant Dragonfly, and should refer to all swamps.

Please contact Gabrielle Pietrini, Regional Manager Illawarra, on 4224 4159 or gabrielle.pietrini@environment.nsw.gov.au should you have any further queries.

Yours sincerely

8/12/15

DEREK RUTHERFORD
Director, South Branch
Regional Operations

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Our Ref: D2015/128239

11 December 2015

Catherine Vanlaeren
Planning Assessment Commission
GPO Box 3415
SYDNEY, NSW 2001

Dear Ms Vanlaeren

WOLLONGONG COAL RUSSELL VALE COLLIERY
PREFERRED UNDERGROUND EXPANSION PROJECT NO. MP 09_0013

I refer to the discussion between the Planning Assessment Commission (PAC) and WaterNSW on 7 December 2015 regarding the above proposal. I thank the PAC for providing WaterNSW with an opportunity to provide further comments on the proposal.

WaterNSW notes PAC's first review of the Preferred Underground Expansion Project (UEP) and that the Commission made 15 recommendations requiring additional work and assessment to be carried out prior to a determination. The additional work included the establishment of an Independent Risk Assessment Panel (IRAP) to oversee an Integrated Risk Assessment (IRA), focusing between the subsidence and associated impacts of the mining proposal including on groundwater, surface water and swamps.

As part of IRA process, WaterNSW reviewed the draft and final IRA reports and Wollongong Coal's (WCL) Contingency and Closure Plans of the mine's application to extract Longwalls 6, 7, 9, 10 and 11 in the Cataract Dams Safety Committee (DSC) Notification Area and provided comments to the Department of Planning and Environment (DPE). WaterNSW considers that IRA process for the proposal was thorough and it identified all risks, associated likelihood and consequences.

WaterNSW has reviewed the DPE's Addendum Report and draft Conditions of Approval (dated 2015). WaterNSW has also considered the WCL final reports (Part 1 and Part 2) that addressed recommendations of the PAC Review including a final IRA in preparing this response to the PAC.

WaterNSW's remaining issues of concern related to the Preferred UEP application and the Department's response in the Addendum Report are discussed below. WaterNSW considers that these matters can be addressed via conditions of approval and a minor change to the mine layout.

WaterNSW Concern 1 – Setback of mining from Cataract Reservoir for protecting the stored waters of Cataract Reservoir

WaterNSW is concerned about the extent of intrusion of longwalls, particularly longwall 7, into the Cataract Reservoir Notification Area. WaterNSW notes that the preferred UEP longwall layout is designed to avoid any coal extraction inside the 35° angle of draw, however the calculations by WaterNSW identified that the western end of longwall 7 is within 35° angle of draw. WaterNSW requests clarification regarding this matter. If the clarification identifies that longwall 7 is within Notification Area, WaterNSW recommends the mine layout be amended to exclude the western part of longwall 7 from the marginal zone i.e. outside 35° angle of draw to ensure the protection of Cataract Reservoir which is an essential part of Sydney's drinking water supply system.

In its response to the DPE on the Contingency and Closure Plans (dated 2 November 2015), WaterNSW requested DPE include adequate financial provisions in approvals to compensate WaterNSW for any water losses from Cataract Reservoir that are greater than 1ML/day should the Contingency Plan measures fail.

If the Commission decides to recommend the mining proposal for approval, Water NSW recommends:

- to amend the mine layout to exclude the western part of longwall 7 outside the marginal zone i.e. 35° angle of draw, if longwall 7 is identified to be located within 35° angle of draw
- to amend Condition 2 to include (2d) to adequately compensate WaterNSW for any water losses from Cataract Reservoir that are greater than 1ML/day should the Contingency Plan measures fail.

WaterNSW Concern 2 – Conflicting Estimates of Baseflow Losses in the Groundwater Assessment and Surface Water Modelling

WaterNSW has been concerned regarding the difference in predictions between the baseflow loss of 0.041ML/day in the groundwater assessment and the stream flow loss of 7.3ML/day in the surface water assessment.

WaterNSW has previously requested that the consent should only permit mining up to a point where the valley closure is predicted to be 200mm, consistent with the TARP for LWs 5 and 6.

The Addendum Report states that WaterNSW continues to express its dissatisfaction with the surface and groundwater modelling, particularly in respect of predicted baseflow losses; requesting further modelling and limiting baseflow loss of 0.05ML/day in conditions of approval in its final submissions in response to the IRA dated 2 and 6 November 2015.

The Addendum Report also states that:

- it is the Department's view that the additional long-term modelling as proposed by WaterNSW would serve no useful purpose. All surface water impacts of the project are required to be accounted for though water licensing. The Department considers that good baseline monitoring and impact monitoring would be more accurate than any predictive modelling. The Department also considers that there is no policy basis for restricting baseflow losses to an arbitrary (and exceedingly low) limit. Instead, the policy framework for dealing with baseflow losses across the State (including all mining operations and all water catchment areas) is one of licensing water take under the Water Management Act 2000

- the existing conditions of approval require a program to validate the surface water and groundwater models for the project, and compare monitoring results with baseline data and modelled predictions (Condition 10(h) of Schedule 3).

WaterNSW notes no timeframe for validating the models has been specified in the condition as was required for the recently approved Springvale mine extension project. Given the short longwalls and rapid mining progress likely to be undertaken at Russell Vale, WaterNSW requests that this condition be amended to include a timeframe for updating these models to every two years.

WaterNSW disagrees with the DPE's assertion that the predicted extreme water loss is negligible. Water loss of 7.3 ML/day is unacceptable to WaterNSW, particularly during dry periods.

WaterNSW notes the DPE's statement that the baseflow loss estimates provided by groundwater modelling represent a "likely" estimate, i.e. of 0.04 ML/day (15 ML/year). WaterNSW does not support this conclusion for a number of reasons.

As pointed out in the Addendum report, the estimated baseflow losses are related to the regional aquifer only. WaterNSW considers a significant proportion of baseflow in this area is likely to be from perched and transient hill-slope aquifers following wet periods, and these are likely to be significantly reduced by near-surface subsidence cracking. Whilst WaterNSW understands that it may not be strictly appropriate that it be used in this way, the surface-water modeller's base-flow index of 0.317 (Table 4.1, WRM 14 August 2015) gives an approximate value of base-flow (though not considering that provided by swamps and other local storages). This value of approximately 30% is consistent with assessments made by WaterNSW (refer our submission D2013/29381, dated 12 April 2013) in other stream base-flow component estimates in the Special Areas, and could be reasonably used as a non-conservative, approximate guide to the volume of baseflow which might be lost from the stream reaches predicted to be subsidence-impacted reaches of Cataract Creek, Cataract River and Bellambi Creek. This estimate would suggest a "likely" baseflow loss significantly higher than 0.04ML/day.

WaterNSW accepts that there is little value in undertaking significant additional modelling for the purposes of deciding whether or not to approve the application. If the Commission decides to recommend the mining proposal for approval, Water NSW recommends that the conditions of approval include requirements for:

- limits on total baseflow loss from all streams of no more than 10% of pre-mining (i.e. pre-UEP) flows, with suitable performance triggers and assessment system to be identified within a Water Management Plan, developed in consultation with WaterNSW.
- amend Condition 10(h), dot point 5 to require baseline data on surface flows include an assessment of baseflow components using an agreed methodology, that trigger levels for baseflow losses do not exceed 10% of pre-mining baseflow components, that include predictions of baseflow losses from streams and water storages at 1, 10, 50, 100 and 200 year timeslices be set out in the Water Management Plan, and these estimates be updated and validated at least every two years.

WaterNSW Concern 3 – Upland Swamps

WaterNSW reiterated its concern in its most recent response to the DPE about predicted impacts on upland swamps causing environmental consequences greater than negligible and considered this is an unacceptable level of environmental consequence.

The Addendum Report states that the Department accepts that:

- the current mine plan for the Preferred UEP would result in impacts to some upland swamps, particularly CCUS4 and the Department accepts that WCL has employed all feasible and reasonable measures to avoid swamp impacts during the development of the mine plan, and has avoided mining under several large swamps near the proposed longwalls
- some impacts on swamps are an unavoidable consequence of longwall mining, and that these impacts should be carefully weighed against the social and economic benefits of the project, and offset if they are greater than negligible. The Department's proposed approach to offsetting impacts to upland swamps (including CCUS4) is consistent with the Government's current draft Swamp Offsets Policy
- there is uncertainty in predicting subsidence and environmental outcomes for upland swamps. However, the Department considers it unlikely that this issue can be resolved through further technical work or analysis and that there is a need to accept there could be some variability in predicting impacts on swamps. Therefore, the Department considers that it would be unreasonable to hold WCL strictly liable for precise impacts on swamps. However, it is vital that there is strict monitoring of the impacts on swamps and an obligation to offset all such impacts. If offsets cannot be obtained, then WCL would have to adapt the mine plan to avoid greater than negligible impacts on swamps. To ensure there is a consistent approach to managing both uncertainty and impacts, the Department proposes that the project approval be revised to:
    - strengthen monitoring conditions, requiring expansion of the existing network of piezometers in and around the upland swamps; and
    - reflect the draft Policy Framework for Biodiversity Offsets for Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence.
- WCL has committed to ensuring land- based offsets are located within the local catchment, where possible. The Department accepts that this may not be possible, and notes that the draft Swamp Offset Policy does not place any such restriction on the provision of offsets. Instead, it takes a broader perspective and requires the impact to be offset within the range or distribution of the relevant endangered ecological community or swamp community.
- while the Department agrees with WaterNSW that the additional piezometers should be installed as soon as practicable, it does not think this can be achieved within 3 months, particularly if the installation of these piezometers is to be informed by the advice of the proposed Independent Monitoring Panel. The Department has therefore recommended a condition requiring piezometers to be installed as soon as practicable after approval, to the satisfaction of the Secretary. The Department notes that all future installation of piezometers would be subject to further consultation with key agencies and would be described in future Extraction Plans. The Department has also recommended a condition requiring all raw piezometer and other monitoring data to be made available to the Department, OEH and an independent monitoring panel, on request.

WaterNSW supports the DPE's assessment that if offsets cannot be obtained, then WCL would have to adapt the mine plans to avoid greater than negligible impacts on swamps.

If the Commission decides to recommend the mining proposal for approval, Water NSW recommends that:

- Define the determination of the 'negligible environmental consequences' as per the OEH draft Swamp Offset Policy.

- The impacted swamps are within the Metropolitan Special Areas and any offset proposal should therefore be applied within the Special Areas. If a like-for-like offset cannot be secured within the Special Areas, other options under the various 'rules' or supplementary measures that may be considered should be applied within the Special Areas.
- Swamps within the Metropolitan and Woronora Special Areas are managed and substantially owned by WaterNSW. The conditions should therefore explicitly include a requirement for consultation with WaterNSW in the development and implementation of an offset strategy including a variation to a strategy.
- Amend Condition 10(j, dot point 7) to include WaterNSW for the provision of swamp monitoring data.

WaterNSW Concern 4 - Subsidence Impact Performance Measures and Corresponding Monitoring Triggers

WaterNSW is concerned that the some of our recommended performance measures have not been included in the draft Conditions of Approval (see amended Table 1).

The Addendum Report states that the Department confirms that the recommended approval includes subsidence impact performance measures which are considered to be adequate to protect water resources, swamps, biodiversity, cliffs and steep slopes. The conceptual monitoring triggers proposed by WaterNSW are generally seen as useful. However, such triggers would normally be developed and included in future Extraction Plans. The Department supports careful review of these proposed triggers, in consultation with WaterNSW and other key agencies, during the preparation of future Extraction Plans.

WaterNSW has further refined performance measures for the mine proposal (see amended Table 1). If the Commission decides to recommend the mining proposal for approval, Water NSW recommends that DPE adopt all of the performance measures in Table 1.

WaterNSW Concern 5 - Socio Economic

WaterNSW notes the cost benefit analysis (CBA) in the Economic Assessment Report has been updated to reflect a loss of stream base flow of 15 ML/year, based on updated groundwater modelling by GeoTerra, to a high-end estimate of $430,000 in net present value terms.

As noted above (Concern 2) however, WaterNSW remains of the view that the groundwater-modelled value for stream base flow of 15 ML/year is not conservative and that real surface water reductions are likely to lie within the range of 15 ML/year and 2.6 GL/year (the worst case scenario value derived by assuming that all surface flows above the subsidence impacted areas will be lost from stream flow).

WaterNSW notes the use of a value of $2,000 per ML in the economic analyses, which is suggested to be based on the current (2010) Metropolitan Water Plan. The current IPART approved value of Long Run Marginal Cost is in a range that includes the current Sydney Water retail price of $2.276 per kL or $2,276 per ML ($2015/16). IPART has set retail water prices to signal opportunity cost, and any resource decisions, either made by water consumers or by other parties such as miners, should be consistent with this value. WaterNSW is aware that both IPART and Sydney Water have revised this calculation, and that a different usage price on this basis may be set by IPART for Sydney Water by June 2016. In any case, the opportunity cost should be set at the retail price so that all resource decisions are on a level playing field.

The base-flow index of 0.317 (Table 4.1, WRM 14 August 2015) could be used as a guide to the volume of baseflow which might be lost from the stream reaches predicted to be subsidence-impacted (max 2.6 GL/year), i.e. a value of 824 ML/year (or 10% of baseflow loss from groundwater contribution). If the current replacement value of water of $2,276/ML is used, a potential cost to WaterNSW (who does not own the water and does not therefore benefit from any compensation or licence fees paid to the NSW Government) of approximately $22.1M could ensue, which is not significantly different from the threshold value of the project given by Gillespie of $23M.

WaterNSW Concern 6 – Ongoing Role of the Independent Risk Assessment Panel

The Addendum Report states that WaterNSW indicated its strong support for an ongoing role of the IRAP during the operational stages of the UEP, and considered that this should be a conditional requirement.

The Addendum Report states that

- the Department agrees that an independent panel should continue to provide expert advice to WCL, the Department and relevant agencies on the environmental consequences of mining associated with the UEP.
- the Department has recommended a condition requiring the establishment of an Independent Monitoring Panel for the project (see condition 12 of Schedule 3). The panel is to be appointed by the Department, funded by Wollongong Coal and comprise suitably qualified experts in the fields of mining subsidence, groundwater and upland swamps."

WaterNSW notes that the role of IRAP in Condition 12 has a focus on upland swamps. WaterNSW believes that the role of the panel must extend to water resources such as surface water and groundwater. In light of this, WaterNSW recommends amendments to Condition 12 to include water resources (see below).

Comments related to Draft Conditions of Approval:

Definitions

WaterNSW be included in definitions.

Schedule 3

- Condition 1, Table 1 – WaterNSW recommended performance measures have not been adopted. WaterNSW should recommend that its performance measures in table 1 be adopted.

- Condition 2b – there should be a time limit on when a report is required for an impact exceeding a performance measure. Reports should be required no later than 3 months after the performance measure has been exceeded or otherwise as directed by the Secretary.

- Condition 2 – there should be a requirement to compensate WaterNSW for any losses of water from Cataract Reservoir caused by mining where these losses exceed 1ML/d and where the contingency plan has failed to address these losses. This should be reflected in new point (d).

- Condition 3 – as any offsets are required as a result of an impact within the Special Area and as it is likely the impact relates to land or an asset owned by WaterNSW there should be a requirement for the proponent to consult with WaterNSW when they develop offsets.

- Condition 10 – (h) dot point 5 – requires a program to validate the surface and groundwater models for the project. This validation should be required every two years and if required the models should be updated.

- Condition 10 – (j) dot point 7 – WaterNSW requests that it also receive the raw piezometer and other monitoring data related to swamps.

- Condition 10(p) - Contingency planning shall result in a plan which can be implemented effectively over the short, medium and long term to maintain impacts within acceptable limits.

- Condition 12 – The Independent Monitoring Panel has a focus on swamps. The role of the panel must extend to water resources. The panel therefore needs to include suitably qualified experts in the field of water resources.
  Condition 12b - also include water resources
  Condition 12c - also include Surface and Groundwater Monitoring Program
  Condition12d – also include surface water

Schedule 4

- Condition 27(a) – WaterNSW should be included for consultation for the preparation of the Rehabilitation Plan.

Schedule 6

- Condition 6 – If there is a need to do more than a minor update to a strategy, plan or program required then there should be a requirement to consult with WaterNSW where WaterNSW has an interest.

Conclusion

If the Commission decides to recommend the mining proposal for approval, WaterNSW requests that its concerns be addressed by modifying the mine layout and via appropriate Conditions of Approval including:

1. Modify the proposed mining layout to exclude western part of longwall 7 from marginal zone i.e. 35 degree angle of draw, if longwall 7 is identified to be located within 35 degree angle of draw.
2. The consent should only permit mining up to a point where the valley closure is predicted to be 200mm, consistent with the TARP for LWs 5 and 6.
3. WaterNSW's performance criteria developed for the proposed mining area (Table 1) be adopted including for Cataract Reservoir, biodiversity and cliffs.
4. Adequate financial provisions are included in any approval granted to mine within the Cataract Dam Notification Area to compensate WaterNSW for any water losses from Cataract Reservoir should the measures in the Contingency Plan fail.
5. WaterNSW's other concerns related to DPE's draft Conditions of Approval specifically Schedule 3, Conditions 1, 2, 2b, 3, 10(h)-dot point 5; 10(j)–dot point 7, 10(p), 12, 12b, 12c, 12d; Schedule 4 Condition 27(a) and Schedule 6 Condition 6 be addressed. WaterNSW requests that, if the project is approved the amended conditions laid out in the attached submission be adopted.

Further queries about our submission can be directed to Malcolm Hughes, Manager Environment & Planning, who can be contacted on 4724 2452 or via e-mail malcolm.hughes@waternsw.com.au.

Yours sincerely

FIONA SMITH
Executive Manager,
Water Quality, Catchment Protection and People and Culture

Table 1: WaterNSW Recommended subsidence impact performance measures and corresponding triggers – Russell Vale Preferred Underground Expansion Project – December 2015

Environment	Performance Measures	Indicative/Conceptual Monitoring Triggers
Cataract Reservoir	Negligible environmental consequences including: • negligible reduction in the quantity or quality of inflows to the reservoir, • negligible leakage from the reservoir, and • negligible mine inflows sourced from the reservoir.	Performance triggers may be set using the following approaches: • Quantity of stream flows entering the reservoir (gauged at Cataract Creek, Cataract River and Bellambi Creek) is not significantly different post-mining compared to pre-mining • Baseflow losses (assess by baseflow analysis using hydrograph separation approach) from Cataract Creek, Cataract River and Bellambi Creek reaching the reservoir be restricted to no more than 10% of pre-mining baseflows • Quality of water entering the reservoir is not significantly different post-mining compared to pre-mining • Groundwater levels and hydraulic gradients between existing and proposed mine workings and reservoir remain within limits derived from assessment of natural baseline variability • Monitored mine inflows, calculated mine water balance and mine inflow sources (by fingerprinting including tritium dating) not exceeding groundwater model predictions

Environment	Performance Measures	Indicative/Conceptual Monitoring Triggers
Streams: Cataract Creek, Cataract River and tributaries	Negligible environmental consequences including: • negligible diversion of flows or changes in the natural drainage behaviour of pools, • negligible gas releases and iron staining, • negligible increase in water cloudiness, • negligible increase in bank erosion, and • negligible increase in sediment load.	Performance triggers may be set using the following approaches: • Stream flow continuity (e.g. by visual observation/mapping of surface cracking, stream sections with no flow, and differential stream flow gauging) is not significantly different post-mining compared to pre-mining • Water quality is not significantly different post mining compared to pre-mining (e.g. turbidity, suspended solids, total iron) • The extent iron staining in streams (by visual observation/mapping of stream sections with iron precipitates) is not significantly different post-mining compared to pre-mining • Natural pools drainage behaviour (e.g. by visual observation/mapping of rock bar cracking, monitoring of pool water levels) is not significantly different post-mining compared to pre-mining
Ecologically Significant Swamps: CCUS2 CCUS4 CCUS5 CCUS10 CCUS11 CCUS12 BCUS4 and BCUS11	Negligible environmental consequences including: • negligible change in the size of swamps • negligible erosion of the surface of swamps • negligible change in the ecological functioning of swamps • negligible change to the composition or distribution of species within swamps, • negligible change to the structural integrity of any controlling rockbar; and negligible drainage of water from	Performance triggers may be set using the following approaches: • Groundwater levels in the peat substrate and sandstone bedrock (based on nested piezometers in combination with monitoring of subsidence effects) are not significantly different post-mining compared to pre-mining • Groundwater recession rates in the peat substrate are not significantly different post-mining compared to pre-mining, • Swamp water balance and outflow rates are not significantly different post-mining compared to pre-

Environment	Performance Measures	Indicative/Conceptual Monitoring Triggers
	swamps, or redistribution of water within swamps.	mining • Swamp conditions based on survey/mapping of the extent, peat thickness and/or cracking, vegetation conditions and proportion of bare land, integrity of controlling rockbars) are not significantly different post-mining compared to pre-mining • The extent, distribution, diversity of key ecological groups/species are not significantly different post-mining compared to pre-mining • Abundance of flora and fauna species (e.g. by surveys of threatened or vulnerable species, invasive species) is not significantly different post-mining compared to pre-mining
All other swamps: mapped in the PPR	No significant environmental consequences beyond predictions in the EA	Performance triggers may be set using the same approaches as listed for the ecologically significant swamps above
Biodiversity: Threatened species, threatened populations, or endangered ecological communities	Negligible environmental consequences, including negligible reduction in biodiversity	Performance triggers may be set using the following approaches: • Diversity and abundance of swamp fauna (e.g. by periodic surveys of threatened species) is not significantly different post-mining compared to pre-mining
Cliffs and Steep Slopes	Minor environmental consequences (that is occasional rockfalls, displacement or dislodgement of boulders or slabs, or fracturing, that in total do not impact more than 3% of the total face of such cliffs within any longwall mining	Performance triggers may be set using the following approaches: • Survey and visual observation/mapping of rock falls and surface cracks

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RECEIVED
4 JAN 2016
BY:

15/18281

Mr Joe Woodward PSM
Member
Planning Assessment Commission
GPO Box 3415
Sydney NSW 2001

Dear Mr Woodward

I refer to your letter to the Secretary, dated 11 December 2015, about the Russell Vale Colliery Underground Expansion Project. The Secretary has asked me to reply to your letter on her behalf.

Thank you for your advice on the outcomes of the public hearing held in Wollongong on 8 December 2015.

I note the Commission has now engaged subsidence and groundwater experts to provide additional independent advice on Wollongong Coal's Integrated Risk Assessment. Further, that the Commission is seeking additional clarification on certain issues from the Department and other government agencies, and that, for these reasons, the Commission will be unable to provide its review report to the Department by 16 December 2015.

In light of the matters raised by the Commission, the end of year period and the Commission's comprehensive review of the proposal to date, the Secretary has requested that the Commission complete its review by no later than 15 January 2016.

Should you have questions about this timeframe, please contact Howard Reed, Director Resource Assessments, on 9228-6308.

Yours sincerely

Marcus Ray
Deputy Secretary
Planning Services
18/12/2015

From: Howard Reed
Sent: Friday, 22 January 2016 5:16 PM
To: Megan Webb
Cc: David Kitto; Sara Wilson; Derek Rutherford
Subject: Russell Vale - amended draft conditions

Hi Megan,

As indicated earlier, herewith is an amended set of recommended conditions for the Russell Vale UEP. The amendments made since the Department's Addendum Report was referred to the PAC are shown in yellow highlight. As you would expect, most of these relate to the discussions held with the Commission members and OEH representatives on Wed 13 January. These amendments proved simpler to draft than I initially anticipated.

Kind regards,

Howard Reed
Director Resource Assessments
NSW Department of Planning & Environment
GPO Box 39 Sydney NSW 2001
(02)9228 6308

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

As delegate for the Minister for Planning, the Planning Assessment Commission approves the project application referred to in Schedule 1, subject to the conditions in Schedules 2 to 6.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Member of the Commission	**Member of the Commission**	**Member of the Commission**

Sydney 2015

SCHEDULE 1

Project Application:	09_0013
Proponent:	Wollongong Coal Limited
Approval Authority:	Minister for Planning
Land:	See Appendix 1
Project:	Russell Vale Colliery Underground Expansion Project

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DEFINITIONS

Adaptive management	Adaptive management includes monitoring subsidence effects and impacts and, based on the results, modifying the mine plan as mining proceeds to ensure that the effects, impacts and/or associated environmental consequences remain within the predicted and/or designated ranges and in compliance with the conditions of this approval
Annual Review	The review required by condition 11 of Schedule 6
Approval	This Project Approval
Approved Mine Plan	The mine plan depicted in the figure in Appendix 2
BCA	Building Code of Australia
Built features	Includes any building or work erected or constructed on land, and includes dwellings and infrastructure such as any formed road, street, path, walk, or driveway; and any pipeline, water, sewer, telephone, gas or other service main
CCC	Community Consultative Committee
Conditions of this approval	Conditions contained in Schedules 2 to 6 inclusive
Construction	The demolition of buildings or works, carrying out of works and erection of buildings covered by this approval
Council	Wollongong City Council
Day	The period from 7 am to 6 pm on Monday to Saturday, and 8 am to 6 pm on Sundays and Public Holidays
Department	Department of Planning and Environment
DPI	Department of Primary Industries
DPI-Water	Department of Primary Industries – Water
DRE	Division of Resources and Energy within the Department of Industry
DSC	Dams Safety Committee
EA	Environmental Assessment prepared for NRE No. 1 Colliery Underground Expansion Project entitled *NRE No. 1 Colliery Project Application (09_0013) Environmental Assessment* (dated February 2013) including the Preferred Project Report and associated Response to Submissions (dated September 2013), the Residual Matters Report (dated June 2014) and the following additional information: - *Bellambi Gully Flood Study* (25 November 2014) undertaken by Cardno Pty Ltd; - letter report from Wollongong Coal Ltd (26 September 2014) to the Department providing additional information in relation to total groundwater inflow; and - *Noise Impact Assessment* (September 2014) undertaken by Wilkinson Murray Pty Ltd.
Environmental consequences	The environmental consequences of subsidence impacts, including: damage to built features; loss of surface water flows to the subsurface; loss of standing pools; adverse water quality impacts; cliff falls; rock falls; damage to Aboriginal heritage sites; impacts on aquatic ecology; and ponding.
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPL	Environment Protection Licence issued under the *Protection of the Environment Operations Act 1997*
Evening	The period from 6 pm to 10 pm
Feasible	Feasible relates to engineering considerations and what is practical to build or to implement
First workings	Extraction of coal from bord and pillar workings and development of main headings, longwall gate roads, related cut throughs and the like
Incident	A set of circumstances that causes or threatens to cause material harm to the environment, and/or breaches or exceeds the limits or performance measures/criteria in this approval
INP	*NSW Industrial Noise Policy* (NSW EPA, 2000)
Land	As defined in the EP&A Act, except where the term is used in the noise and air quality conditions in Schedule 4 of this project approval where it is defined to mean the whole of a lot, or contiguous lots owned by the same landowner, in a current plan registered at the Land Titles Office at the date of this approval
Material harm to the environment	Harm to the environment is material if it involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial
Mining operations	Extraction, processing, handling and storage of coal on the site
Minister	Minister for Planning, or delegate
Mitigation	Activities associated with reducing the impacts of the project prior to or during those impacts occurring

MSB	Mine Subsidence Board
Negligible	Small and unimportant, such as to be not worth considering
Night	The period from 10 pm to 7 am, Monday to Saturday, 10 pm to 8 am on Sundays and Public Holidays
OEH	Office of Environment and Heritage
PKCT	Port Kembla Coal Terminal
POEO Act	*Protection of the Environment Operations Act 1997*
Privately-owned land	Land that is not owned by a public agency, or a mining company (or its subsidiary)
Project	Russell Vale Colliery Underground Expansion Project as described in the EA
Proponent	Wollongong Coal or any other person or persons who rely on this approval to carry out the project that is subject to this approval
Reasonable	Reasonable relates to the application of judgement in arriving at a decision, taking into account: mitigation benefits, cost of mitigation versus benefits provided, community views and the nature and extent of potential improvements
Reasonable costs	The costs agreed between the Department and the Proponent for obtaining independent experts to review the adequacy of any aspects of the extraction plan, or where such costs cannot be agreed, the costs determined by a dispute resolution process
ROM coal	Run-of-mine coal
RMS	Roads and Maritime Services
Safe, serviceable & repairable	Safe means no danger to users who are present, serviceable means available for its intended use, and repairable means damaged components can be repaired economically
Second workings	Extraction of coal from longwall panels, mini-wall panels or pillar extraction
Secretary	Secretary of the Department, or nominee
Site	Land to which the project approval applies (see Appendix 1)
Statement of Commitments	The commitments by Wollongong Coal set out in Appendix 3
Subsidence	The totality of subsidence effects and impacts and their associated environmental consequences
Subsidence effects	Deformation of the ground mass due to mining, including all mining-induced ground movements, including both vertical and horizontal displacement, tilt, strain and curvature
Subsidence impacts	Physical changes to the ground and its surface caused by subsidence effects, including tensile and shear cracking of the rock mass, localised buckling of strata caused by valley closure and upsidence and surface depressions or troughs
Surface facilities site	The Russell Vale site; all ventilation shaft sites; sites used for gas drainage or for other mining purposes infrastructure; and any other site subject to existing or proposed surface disturbance associated with the project
Wollongong Coal	Wollongong Coal Limited

SCHEDULE 2
ADMINISTRATIVE CONDITIONS

OBLIGATION TO MINIMISE HARM TO THE ENVIRONMENT

1. In addition to meeting the specific performance criteria established under this approval, the Proponent shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the project.

TERMS OF APPROVAL

2. The Proponent shall carry out the project:
   (a) generally in accordance with the EA;
   (b) in accordance with the project layout plans and the Statement of Commitments; and
   (c) in accordance with the conditions of this approval.

   Notes:
   - *The project layout plans are shown in Appendix 2.*
   - *The Proponent's Statement of Commitments is shown in Appendix 3.*

3. If there is any inconsistency between the above documents, the more recent document shall prevail to the extent of the inconsistency. However, the conditions of this approval shall prevail to the extent of any inconsistency.

4. The Proponent shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of:
   (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this approval;
   (b) any reviews, reports or audits undertaken or commissioned by the Department regarding compliance with this approval; and
   (c) the implementation of any actions or measures contained in these documents.

LIMITS ON APPROVAL

Mining Operations

5. The Proponent may carry out mining operations on the site until 31 December 2021.

   Note: Under this Approval, the Proponent is required to rehabilitate the site to the satisfaction of DRE. Consequently this approval will continue to apply in all other respects other than the right to conduct mining operations until the site has been rehabilitated to a satisfactory standard.

Coal Extraction

6. The Proponent shall not extract more than 3 million tonnes of ROM coal from the site per calendar year.

Hours of Operation

7. The Proponent may undertake mining operations 24 hours a day, 7 days a week.

COMMENCEMENT OF DEVELOPMENT UNDER THIS APPROVAL

8. The Proponent:
   (a) shall notify the Secretary in writing of the proposed date of commencement of development under this approval; and
   (b) may only commence development under this approval once the Secretary has agreed in writing that all prerequisites to the commencement of that development have been met.

SURRENDER OF EXISTING PROJECT APPROVAL

9. By 31 December 2016, or as otherwise agreed by the Secretary, the Proponent shall surrender the existing project approval for the site in accordance with Section 104A of the EP&A Act.

   Prior to the surrender of the existing project approval, the conditions of this approval shall prevail to the extent of any inconsistency with the conditions of the existing project approval.

STRUCTURAL ADEQUACY

10. The Proponent shall ensure that all new buildings and structures, and any alterations or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.

Notes:
- *Under Part 4A of the EP&A Act, the Proponent is required to obtain construction and occupation certificates for the proposed building works; and*
- *Part 8 of the EP&A Regulation sets out the requirements for the certification of the project.*

DEMOLITION

11. The Proponent shall ensure that all demolition work is carried out in accordance with *Australian Standard AS 2601-2001: The Demolition of Structures*, or its latest version.

PROTECTION OF PUBLIC INFRASTRUCTURE

12. Unless the Proponent and the applicable authority agree otherwise, the Proponent shall:
    (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the project; and
    (b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the project.

Note: This condition does not apply to any damage to public infrastructure subject to compensation payable under the Mine Subsidence Compensation Act 1961, or to damage to roads caused as a result of general road usage.

OPERATION OF PLANT AND EQUIPMENT

13. The Proponent shall ensure that all plant and equipment used on site is:
    (a) maintained in a proper and efficient condition; and
    (b) operated in a proper and efficient manner.

CONTRIBUTIONS TO COUNCIL

14. Within 6 months of the date of this approval, the Proponent shall reach agreement with Council on the annual contribution to be paid to Council for the maintenance of Bellambi Lane. Should agreement not be reached within that timeframe, the matter may be referred to the Secretary by either party for resolution. The Secretary's decision in regard to contributions shall be final.

SCHEDULE 3
ENVIRONMENTAL CONDITIONS – UNDERGROUND MINING

SUBSIDENCE

Performance Measures – Natural and Heritage Features

1. The Proponent shall ensure that the project does not cause any exceedance of the performance measures in Table 1, to the satisfaction of the Secretary.

Table 1: Subsidence Impact Performance Measures

Water resources	
Cataract Creek Cataract River	Negligible environmental consequences including: • *negligible* diversion of flows or changes in the natural drainage behaviour of pools; • *negligible* gas releases and iron staining; • *negligible* increase in water cloudiness; • *negligible* increase in bank erosion; • *negligible* increase in sediment load; and • *negligible* reduction in the volume of water reporting to the reservoir.
Cataract Reservoir	Negligible leakage from the reservoir and negligible reduction in the water quality of the reservoir.
Other watercourses	No greater subsidence impact or environmental consequences than predicted in the EA.
Swamps	
Upland Swamps CRUS1, CCUS1, CRUS6 and CCUS24	Negligible environmental consequences including: • *negligible* change to the shallow groundwater regime when compared with control swamps; • *negligible* erosion of the surface of the swamp; • *negligible* change in the size of the swamp; • *negligible* change in the ecosystem functionality of the swamp; • *negligible* change to the composition or distribution of species within the swamp; and • *negligible* change to the structural integrity of the bedrock base or any controlling rockbar/s of the swamp.
Land	
Cliffs	No greater subsidence impacts or environmental consequences than predicted in the EA.
Biodiversity	
Threatened species or populations	Negligible environmental consequences.
Heritage Features	
Aboriginal heritage sites 52-2-0083, 52-2-0233, 52-2-0310, 52-2-0311, 52-2-0312, 52-2-0313, 52-2-0314, 52-2-0317, 52-2-0319, 52-2-0322, 52-2-0323, Wonga East 4 and Wonga East 5	Negligible impact or environmental consequences.
Aboriginal heritage sites 52-2-0099, 52-2-0229, 52-2-0603, 52-2-3939, 52-2-3940, 52-2-3941, 52-2-0320 and 52-3-0325.	No greater subsidence impact or environmental consequences than predicted in the EA.
Historic heritage sites	Negligible impact or environmental consequences.

Notes:

1) *The Proponent will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in the various management plans that are required under this approval (see eg condition 10 below).*
2) *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.*
3) *The requirements of this condition only apply to the impacts and consequences of mining operations, construction or demolition undertaken following the date of this approval.*
4) *The definition of 'negligible environmental consequences' applicable to the four upland swamps listed in Table 1 is also to be used in applying conditions 4, 5 and 6 of Schedule 3 to the eight upland swamps subject to those conditions.*

2. The Proponent must assess and manage project-related risks to ensure that there are no exceedances of the performance measures in Table 1. Any exceedance of these performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation, notwithstanding actions taken pursuant to paragraphs (a)-(c) or condition 3 below. Where any exceedance of these performance measures has occurred, the Proponent must, at the earliest opportunity:
   (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
   (b) consider all reasonable and feasible options for remediation and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
   (c) implement remediation measures as directed by the Secretary,

   to the satisfaction of the Secretary.

Offsets

3. If the Proponent exceeds the performance measures in Table 1, or causes greater than 'negligible environmental consequences' to any upland swamp subject to condition 4 or condition 5 below, and the Secretary determines that:
   (a) it is not reasonable or feasible to remediate the impact or environmental consequence; or
   (b) remediation measures implemented by the Proponent have failed to satisfactorily remediate the impact or environmental consequence;

   then the Proponent shall provide a suitable offset to compensate for the impact or environmental consequence, to the satisfaction of the Secretary.

   The offset must give priority to like-for-like physical environmental offsets, but may also consider payment into any NSW Offset Fund established by OEH, or funding or implementation of supplementary measures such as:
   - actions outlines in threatened species recovery programs;
   - actions that contribute to threat abatement programs;
   - biodiversity research and survey programs; and/or
   - rehabilitating degraded habitat.

   Note: Any offset required under this condition must be proportionate with the significance of the impact or environmental consequence.

Swamp Offset Bond for First Swamp Undermined

4. Prior to the re-commencement of second workings in Longwall 6, unless otherwise agreed by the Secretary, the Proponent shall lodge a Swamp Offset Bond of $500,000 with the Department.

   If, after 12 months of completion of all mining under this approval within 400 metres of swamp CCUS4, monitoring demonstrates that no greater than 'negligible environmental consequences' have resulted to the swamp from mining under this approval, to the satisfaction of the Secretary, then the Secretary will release the Bond.

   If monitoring demonstrates that greater than 'negligible environmental consequences' have resulted to swamp CCUS4 from mining under this approval, and that these consequences have stabilised for a period of at least 12 months, then the Proponent must offset the environmental consequences to that swamp to the satisfaction of the Secretary within any period specified by the Secretary.

   The offset liability will be set by the Secretary in consultation with OEH, following consideration of:
   (a) the estimated liability using the Framework for Biodiversity Assessment in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*; and
   (b) advice from the Independent Expert Panel that will be established by the Secretary for the project.

   Once the Proponent has offset the environmental consequences to the satisfaction of the Secretary, the Bond will be returned to the Proponent.

   Note: Alternative funding arrangements, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate, can be used as part of the Swamp Offset Bond. A bank guarantee can be lodged in place of a cash bond.

Swamp Offsets for all Other Upland Swamps

5. Prior to the commencement of mining operations under an approved Extraction Plan which are predicted to cause greater than 'negligible environmental consequences' to any of Upland Swamps CCUS2, CCUS5, CCUS10, CCUS11, CCUS12, BCUS4 or BCUS11, the Proponent shall demonstrate that it can satisfy the maximum predicted offset liability for the total area of swamp(s) predicted to be impacted under that Extraction Plan.

   If, after 12 months of completion of all mining under this approval within 400 metres of any of these swamps, monitoring demonstrates that no greater than 'negligible environmental consequences' have resulted to the swamp

from mining under this approval, to the satisfaction of the Secretary, then the Proponent will not be required to secure the offset or retire the credits relating to that swamp.

If monitoring demonstrates that greater than 'negligible environmental consequences' have resulted to any of these swamps from mining under this approval, and that these consequences have stabilised for a period of at least 12 months, then the Proponent must offset the environmental consequences to that swamp (other than 'negligible environmental consequences') to the satisfaction of the Secretary within any period specified by the Secretary.

The offset liability will be set by the Secretary in consultation with OEH, following consideration of:

(a) the estimated liability using the Framework for Biodiversity Assessment in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*; and

(b) advice from the Independent Expert Panel that will be established by the Secretary for the development.

Note: Alternative funding arrangements, such as provision of capital and management funding as agreed by OEH as part of a Biobanking Agreement or transfer to conservation reserve estate, can be used as part of the Swamp Offset.

6. As part of each Extraction Plan for mining within 400 metres of the swamps subject to condition 5 above, the Proponent must:

(a) calculate the maximum predicted offset liability for any environmental consequences (other than 'negligible environmental consequences') on these swamps that may result from the proposed mining using the Framework for Biodiversity Assessment in accordance with the *NSW Biodiversity Offsets Policy for Major Projects*; and

(b) demonstrate that it has suitable arrangements in place to deal with these liabilities quickly in the event that offsets are required.

Performance Measures – Built Features

7. The Proponent shall ensure that the project does not cause any exceedances of the performance measures in Table 2, to the satisfaction of the Secretary.

Table 2: Subsidence Impact Performance Measures

Built Features	
Key public infrastructure: Mount Ousley Road; Picton Road Interchange; 330 and 132 kV power transmission lines and associated towers; and telecommunication infrastructure on Brokers Nose.	Always safe and serviceable. Damage that does not affect safety or serviceability must be fully repairable, and must be fully repaired.
Access road to Vent Shaft No. 4, fire trails, other public infrastructure, other built features	Always safe. Serviceability should be maintained wherever practicable. Loss of serviceability must be fully compensated. Damage must be fully repairable, and must be fully repaired or else replaced or fully compensated.
Public safety	
Public Safety	No additional risk

Notes:

1) *The Proponent will be required to define more detailed performance indicators (including impact assessment criteria) for each of these performance measures in Built Features Management Plans or Public Safety Management Plan (see condition 10 below).*
2) *Measurement and/or monitoring of compliance with performance measures and performance indicators is to be undertaken using generally accepted methods that are appropriate to the environment and circumstances in which the feature or characteristic is located. These methods are to be fully described in the relevant management plans. In the event of a dispute over the appropriateness of proposed methods, the Secretary will be the final arbiter.*
3) *The requirements of this condition only apply to the impacts and consequences of mining operations undertaken following the date of this approval.*
4) *Any breach of this condition is taken to be a breach of this approval, and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.*
5) *Requirements regarding safety or serviceability do not prevent preventative or mitigatory actions being taken prior to or during mining in order to achieve or maintain these outcomes.*

8. Any dispute between the Proponent and the owner of any built feature over the interpretation, application or implementation of the performance measures in Table 2 is to be settled by the Secretary, following consultation with the MSB and DRE. Any decision by the Secretary shall be final and not subject to further dispute resolution under this approval.

First Workings

9. The Proponent may carry out first workings within the underground mining area, other than in accordance with an approved Extraction Plan, provided that DRE is satisfied that the first workings are designed to remain stable and non-subsiding in the long-term, except insofar as they may be impacted by approved second workings.

Note: The intent of this condition is not to require an additional approval for first workings, but to ensure that first workings are built to geotechnical and engineering standards sufficient to ensure long term stability, with negligible resulting direct subsidence impacts.

Extraction Plan

10. The Proponent shall prepare and implement an Extraction Plan for all second workings on site to the satisfaction of the Secretary. Each extraction plan must:
    (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
    (b) be approved by the Secretary before the Proponent carries out any of the second workings covered by the plan;
    (c) include detailed plans of existing and proposed first and second workings and any associated surface development;
    (d) include detailed performance indicators for each of the performance measures in Tables 1 and 2;
    (e) provide revised predictions of the potential subsidence effects, subsidence impacts and environmental consequences of the proposed second workings, incorporating any relevant information obtained since this approval;
    (f) describe the measures that would be implemented to ensure compliance with the performance measures in Tables 1 and 2, and manage or remediate any impacts and/or environmental consequences;
    (g) include a Built Features Management Plan, which has been prepared in consultation with DRE and the owners of affected infrastructure, to manage the potential subsidence impacts and/or environmental consequences of the proposed second workings, and which:
        - addresses in appropriate detail all items of key public infrastructure, other public infrastructure and all classes of other built features;
        - has been prepared following appropriate consultation with the owner/s of potentially affected feature/s;
        - recommends appropriate remedial measures and includes commitments to mitigate, repair, replace or compensate all predicted impacts on potentially affected built features in a timely manner; and
        - in the case of all key public infrastructure, and other public infrastructure except roads, trails and associated structures, reports external auditing for compliance with ISO 31000 (or alternative standard agreed with the infrastructure owner) and provides for annual auditing of compliance and effectiveness during extraction of longwalls which may impact the infrastructure;
    (h) include a Water Management Plan, which has been prepared in consultation with WaterNSW and DPI-Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on watercourses and aquifers, including:
        - detailed baseline data on:
            - surface water flows and quality in water bodies that could be affected by subsidence, including Cataract Creek, Cataract River and all major associated tributaries ;
            - groundwater levels, yield and quality in the region;
        - surface and groundwater impact assessment criteria, including trigger levels for investigating any potentially adverse impacts on water resources or water quality;
        - a surface water monitoring program to monitor and report on:
            - stream flows and water quality (including both dissolved iron and filterable iron oxides/hydroxides);
            - stream and riparian vegetation health;
            - channel and bank stability;
        - a groundwater monitoring program to monitor and report on:
            - groundwater inflows to the underground mining operations;
            - leakage from Cataract Reservoir;
            - the height of groundwater depressurisation in the area between Longwalls 6 and 7 and the Cataract Reservoir;
            - background changes in groundwater yield/quality against mine-induced changes;
            - permeability, hydraulic gradient, flow direction and connectivity of the deep and shallow groundwater aquifers;
            - impacts of the project on upland swamps and other groundwater dependent ecosystems;
        - a program to validate the surface water and groundwater models for the project, and compare monitoring results with modelled predictions; and
        - a plan to respond to any exceedances of the surface water and groundwater assessment criteria;

(i) include a Biodiversity Management Plan, which has been prepared in consultation with OEH, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on aquatic and terrestrial flora and fauna, with a specific focus on threatened species, populations and their habitats; endangered ecological communities; upland swamps and other groundwater dependent ecosystems;

(j) *Swamp Monitoring Program* which has been prepared in consultation with OEH, DPI-Water and WaterNSW, and which includes:

- measures to record the nature and condition of terrestrial and aquatic flora and fauna within all upland swamps;
- measures to characterise soils or peat layers within the upland swamps to determine:
  - porosity;
  - a basis for relating water levels to rainfall and evapotranspiration; and
  - the presence, or absence, of clay materials at the interface with the underlying bedrock;
- a program for monthly review of the water balance of all monitored swamps based on recorded rainfall, estimated evapotranspiration and recorded surface and shallow groundwater levels and outflow measurements;
- detailed performance indicators for the relevant performance measures in Table 1, including performance indicators relating to surface and shallow groundwater levels and outflow measurements;
- consideration of a minimum of 2 years of baseline data for swamp hydrology and swamp vegetation;
- hydrological and vegetative monitoring which fully satisfies Before After Control Impact (BACI) design principles;
- provision of raw piezometer and other monitoring data to the Department, OEH and the Independent Monitoring Panel, if requested; and
- incorporation of any relevant findings from swamp research projects into the swamp monitoring program;

(k) include a Land Management Plan, which has been prepared in consultation with any affected public authorities, to manage the potential impacts and/or environmental consequences of the proposed second workings on land in general;

(l) include a Heritage Management Plan, which has been prepared in consultation with OEH and relevant stakeholders for both Aboriginal and historic heritage, to manage the potential environmental consequences of the proposed second workings on both Aboriginal and non-Aboriginal heritage items. This plan must reflect all requirements under condition 19 of Schedule 4;

(m) include a Public Safety Management Plan, which has been prepared in consultation with DRE, to ensure public safety in the mining area;

(n) include a Subsidence Monitoring Program, which has been prepared in consultation with DRE, to:

- describe the on-going subsidence monitoring program;
- provide data to assist with the management of the risks associated with subsidence;
- validate the subsidence predictions;
- analyse the relationship between the predicted and resulting subsidence effects and predicted and resulting impacts under the plan and any ensuing environmental consequences; and
- inform the contingency plan and adaptive management process;

(o) include Trigger Action Response Plans, or equivalent, to address potential subsidence impacts and environmental consequences that may result from mining subsidence;

(p) include a Contingency Plan that expressly provides for adaptive management where monitoring indicates that there has been an exceedance of any performance measure in Tables 1 and 2, or where any such exceedance appears likely;

(q) include a Mine Workings Closure Plan, prepared in consultation with WaterNSW and the DSC, that effectively provides for the sealing and isolation of affected mine workings if there are unacceptable inflows to the mine from the Cataract Reservoir;

(r) proposes appropriate revisions to the Rehabilitation Management Plan required under condition 27 of Schedule 3; and

(s) include a program to collect sufficient baseline data for future Extraction Plans.

Notes:

- *To identify the longwall mining domains referred to in this condition, see Appendix 2;*
- *Extraction of Longwall 6 may be undertaken under a Subsidence Management Plan or Extraction Plan which satisfies the conditions of MP 10_0046 and was prepared prior to the date of this approval.*

Geological Structures

11. The Proponent shall:

(a) implement the following prior to the extraction of Longwall 7, to the satisfaction of the DSC:

- undertake inspections of the Bulli Seam workings overlying Longwall 7 to confirm the accuracy of the record tracings (subject to ability to safely access these workings); and

- drill exploration boreholes to confirm the accuracy of the record tracings for the Bulli Seam workings overlying Longwall 7.

(b) if required by the DSC, truncate the panel length of Longwall 7 if the Corrimal Fault is intersected during development of the gateroads for Longwall 7;

Independent Monitoring Panel

12. An Independent Monitoring Panel for the project will be established by the Secretary, and be comprised of suitably qualified experts in the fields of mining subsidence and upland swamps. The role of the Panel is to provide timely, accurate and focussed advice to the Proponent and the Secretary regarding the:
    (a) collection of relevant data to predict and monitor the potential subsidence impacts and environmental consequences of second workings;
    (b) achievement of performance measures in Table 1 in respect of Swamps, Land and Biodiversity, having regard to relevant performance indicators, including avoidance of impacts where reasonable and feasible, rather than relying on remediation and offsets;
    (c) preparation, revision and implementation of Extraction Plans, particularly their Swamp Monitoring Program, Biodiversity Management Plan and Land Management Plan components;
    (d) implementation of the swamp and groundwater monitoring programs (including the installation of piezometers) and adaptive management regime throughout the life of the project; and
    (e) calculation of swamp offset liabilities and verification of calculated swamp offset liabilities under conditions 4 and 5 of Schedule 3.

Installation of Piezometers

13. As soon as practicable following the date of this approval, the Proponent shall complete the installation of its network of piezometers to monitor shallow groundwater and upland swamps, to the satisfaction of the Secretary. This network must include:
    (a) installation of upslope and downslope piezometers in all upland swamps, in order to better understand the down-slope movement of shallow groundwater; and
    (b) installation of flow monitoring points in all upland swamps.

PAYMENT OF REASONABLE COSTS

14. The Proponent shall pay all reasonable costs incurred by the Department to:
    (a) engage suitably qualified, experienced and independent persons to review the adequacy of any aspect of an Extraction Plan; and
    (b) establish and operate the Independent Monitoring Panel for the development.

SCHEDULE 4
ENVIRONMENTAL CONDITIONS – GENERAL

NOISE

Noise Criteria

1. The Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 3 at any residence on privately-owned land.

Table 3: Noise Criteria dB(A)

Location		***Day***	***Evening***	***Night***	
Area	***Receiver Number***	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{Aeq\ (15\ min)}$	$L_{A1\ (1\ min)}$
16 West Street, Russell Vale	R1	53	53	43	50
30 West Street, Russell Vale	R2	54	53	44	51
13 West Street, Russell Vale	R3	53	53	44	50
13 Broker Street, Russell Vale	R4	53	53	43	50
4 Broker Street, Russell Vale	R5	53	53	41	52
659 Princes Highway, Russell Vale	R6	53	53	41	52
34 Princes Highway, Corrimal	R7	53	53	44	52
95 Midgley Street, Corrimal	R8	53	53	46	52
109 Midgley Street, Corrimal	R9	46	46	43	48
6 Lyndon Street, Corrimal	R10	44	44	43	48
22 Lyndon Street, Corrimal	R11	43	43	40	48
46 Lyndon Street, Corrimal	R12	42	42	39	48
6 Taylor Place, Corrimal	R13	46	46	42	48
15 Taylor Place, Corrimal	R14	46	46	40	48
All other privately-owned land		63	53	48	52

Note: To interpret the land referred to in Table 3 see the applicable figures in Appendix 4.

Noise generated by the project is to be measured in accordance with the relevant requirements of the NSW Industrial Noise Policy (as may be updated from time-to-time). Appendix 5 details the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.

However, these criteria do not apply if the Proponent has an agreement with the owner/s of the relevant residence or land to generate higher noise levels, and the Proponent has advised the Department in writing of the terms of this agreement.

Operating Conditions

2. The Proponent shall:
   (a) implement best management practice to minimise the operational and coal transport noise generated by the project, including any restrictions on the loading and transport of coal described in conditions 14 to 16 below;
   (b) implement the following measures to the satisfaction of the EPA:
      - fit polymer rollers to conveyors RC1 and RC3 prior to the commencement of coal extraction under this approval;
      - conduct trials to minimise the height of falling on the stockpile with tripper automation within 6 months of the commencement of operations at the pit top site under this approval; and
      - undertake further investigations in relation to an on-site noise barrier within 6 months of the commencement of operations at the pit top site, including:

- o conduct real time *in-situ* noise monitoring to verify the results of the modelling and assess the need for a noise barrier;
- o discuss the results with the affected residents to determine their views on the construction of a noise barrier; and
- o present the findings to the EPA for its final position on whether the noise barrier should be constructed;

(c) not operate dozers or front end loaders between the hours of 10 pm and 7 am Monday to Friday, or between the hours of 10 pm and 8 am on Saturdays, Sundays and Public Holidays. Start-up checks may be undertaken up to 30 minutes prior to operations, where this is undertaken in a designated area selected to minimise noise impacts;

(d) ensure that delivery of known igneous dyke or sill material to surface stockpiles only occurs between the hours of 7 am and 6 pm;

(e) ensure that seam floor and roof material and any unmapped igneous dyke or sill material delivered to surface stockpiles between the hours of 10 pm and 7 am comprises less than 10% of the ROM product by volume;

(f) not operate Trippers 2 or 3 between the hours of 10 pm and 7 am, unless the Trippers are re-engineered to demonstrably achieve the criteria in Table 3;

(g) ensure the existing Bulli Conveyor is only operated between 7 am and 6 pm and is decommissioned after completion of the driveage of the Wonga Mains;

(h) only use noise-attenuated mobile fleet on the surface stockpile site;

(i) operate a comprehensive noise management system that uses real-time noise monitoring data to guide day to day planning of mining operations and the implementation of both proactive and reactive noise mitigation measures to ensure compliance with the relevant conditions of this approval;

(j) minimise the noise impacts of the project during meteorological conditions when the noise limits in this approval do not apply (see Appendix 5); and

(k) carry out regular monitoring to determine whether the project is complying with the relevant conditions of this approval and, if necessary, adjust the scale of operations on site to meet the criteria in this approval.

to the satisfaction of the Secretary.

Note: During emergencies (see condition 15 below), the Proponent may exceed the restrictions in condition 2 above with the written approval of the Secretary.

Noise Management Plan

3. The Proponent shall prepare and implement a Noise Management Plan for the project to the satisfaction of the Secretary. This plan must:

(a) be prepared in consultation with EPA, and submitted to the Secretary for approval prior to the delivery of igneous dyke material to surface stockpiles;

(b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this approval;

(c) outline procedures to manage responses to any complaints or issues raised by the owners of affected residences;

(d) describe the proposed noise management system in detail; and

(e) include a noise monitoring program that:

- evaluates and reports on:
  - the effectiveness of the noise management system;
  - compliance against the noise criteria in this approval; and
  - compliance against the operating conditions in condition 2 above;
- includes a program to calibrate and validate the real-time noise monitoring results with the attended monitoring results over time (so the real-time noise monitoring program can be used as a better indicator of compliance with the noise criteria in this approval and trigger for further attended monitoring); and
- defines what constitutes a noise incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any noise incidents.

AIR QUALITY

Air Quality Criteria

4. The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed, or contribute to exceedances of, the criteria listed in Tables 4, 5 or 6 at any residence on privately-owned land.

Table 4: Long term impact assessment criteria for particulate matter

Pollutant	Averaging period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 5: Short term impact assessment criterion for particulate matter

Pollutant	Averaging period	[d] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 6: Long term impact assessment criteria for deposited dust

Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Notes to Tables 4-6:

[a] *Total impact (i.e. incremental increase in concentrations due to the complex plus background concentrations due to all other sources);*

[b] *Incremental impact (i.e. incremental increase in concentrations due to the complex on its own);*

[c] *Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method; and*

[d] *Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents, illegal activities or any other activity agreed by the Secretary.*

Operating Conditions

5. The Proponent shall:
   (a) implement all reasonable and feasible measures to minimise the:
      - odour, fume and dust emissions of the project; and
      - release of greenhouse gas emissions from the project;
   (b) implement the following mitigation measures by 31 December 2016:
      - new truck loading facility;
      - secondary sizer building;
   (c) upgrade of the fleet of coal transport trucks from 34 to 44 tonne capacity progressively over 24 months from the date of this approval;
   (d) implement the following mitigation measures prior to quarterly production rates reaching the equivalent of 2.7 million tonnes per annum:
      - two new conveyors with enclosures;
      - underground reclaim;
   (e) implement the following mitigation measures within 12 months of the commencement of mining operations:
      - trial the use of chemical wetting agents on haul roads and stockpiles;
      - seal the haul roads through the stockpile area;
      - install water sprays on the moving tipper(s);
   (f) minimise any visible off-site air pollution generated by the project;
   (g) minimise the surface disturbance of the site;
   (h) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting and real-time air quality monitoring data to guide the day to day planning of mining operations and the implementation of both proactive and reactive air quality mitigation measures to ensure compliance with the relevant conditions of this approval; and
   (i) minimise the air quality impacts of the project during adverse meteorological conditions and extraordinary events (see Note d above under Table 6),

   to the satisfaction of the Secretary.

Air Quality & Greenhouse Gas Management Plan

6. The Proponent shall prepare and implement an Air Quality Management Plan for the project to the satisfaction of the Secretary. This plan must:
   (a) be prepared in consultation with the EPA, and submitted to the Secretary within 6 months of the date of this approval, unless the Secretary agrees otherwise;
   (b) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval;
   (c) describe the measures that would be implemented to minimise the release of greenhouse gas emissions from the site;
   (d) describe the air quality management system;

(e) include an air quality monitoring program that:
- uses a combination of real-time and supplementary monitors to evaluate the performance of the project against the air quality criteria in this approval;
- adequately supports the air quality management system;
- evaluates and reports on the:
  - the effectiveness of the air quality management system;
  - compliance with the air quality criteria;
  - compliance with the operating conditions in condition 5 above; and
- defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.

Meteorological Monitoring

7. For the life of the project, the Proponent shall ensure that there is a meteorological station operating in the vicinity of the site that:
   (a) complies with the requirements in the *Approved Methods for Sampling of Air Pollutants in New South Wales* guideline; and
   (b) is capable of continuous real-time measurement of temperature lapse rate in accordance with the NSW Industrial Noise Policy, unless a suitable alternative is approved by the Secretary following consultation with the EPA.

WATER

Water Supply

8. The Proponent shall ensure that it has sufficient water for all stages of the project, and if necessary, adjust the scale of operations on site to match its available water supply.

   Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Proponent is required to obtain the necessary water licences for the project.

Water Pollution

9. Unless an EPL authorises otherwise, the Proponent shall comply with section 120 of the POEO Act.

Water Management Performance Measures

10. The Proponent shall comply with the performance measures in Table 7 to the satisfaction of the Secretary.

Table 7: Water Management Performance Measures

Feature	***Performance Measure***
Water Management – General	• Minimise the use of clean water on site • Minimise the use of make-up water from external sources
Construction and operation of infrastructure	• Design, install and maintain erosion and sediment controls generally in accordance with the series Managing Urban Stormwater: Soils and Construction including Volume 1, Volume 2A – Installation of Services and Volume 2C – Unsealed Roads • Design, install and maintain the infrastructure within 40 m of watercourses generally in accordance with the *Guidelines for Controlled Activities on Waterfront Land (DPI 2007)*, or its latest version • Design, install and maintain creek crossings generally in accordance with the Policy and Guidelines for *Fish Friendly Waterway Crossings* (NSW Fisheries, 2003) and *Why Do Fish Need To Cross The Road? Fish Passage Requirements for Waterway Crossings* (NSW Fisheries 2003), or their latest versions
Clean water diversion & storage infrastructure	• Maximise as far as reasonable and feasible the diversion of clean water around disturbed areas on site
Sediment Dams	• Design, install and maintain the dams generally in accordance with the series Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries
Mine water storages	• Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water off-site • New on-site storages (including tailings dams, mine infrastructure dams, groundwater storage and treatment dams) are suitably lined to comply with a permeability standard of $< 1 \times 10^{-9}$ m/s
Chemical and hydrocarbon storage	• Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standards

Aquatic and riparian ecosystems	• Maintain or improve baseline channel stability • Develop site-specific water quality objectives in accordance with ANZECC 2000 and *Using the ANZECC Guidelines and Water Quality Objectives in NSW* procedures (DECC 2006), or its latest version
Bellambi Gully Channel and Diversion	• Design, install and maintain the main channel and culvert to convey the 100 year ARI flood or greater using Council's 'policy based' conduit blockage criteria • Design, install and maintain the swale alongside the stockpile access road to convey the 100 year ARI flood or greater

Bellambi Gully Creek Works

11. The Proponent shall implement each of the recommended mitigation measures detailed in Section 6 of the *Bellambi Gully Flood Study* (Cardno Pty Ltd, January 2012) within 12 months of the date of this approval, to the satisfaction of the Secretary.

Water Management Plan

12. The Proponent shall prepare and implement a Water Management Plan for the project to the satisfaction of the Secretary. This plan must:
    - (a) be prepared in consultation with DPI-Water and the EPA, by suitably qualified and experienced persons whose appointment has been approved by the Secretary;
    - (b) be submitted to the Secretary for approval within 6 months of the date of this approval, unless the Secretary agrees otherwise;
    - (c) include reference to the National Water Quality Management Strategy;
    - (d) include detailed performance criteria and describes measure to ensure that the Proponent complies with the Water Management Performance Measures (see Table 7);
    - (e) in addition to the standard requirements for management plans (see condition 2 of Schedule 6), this plan must include a:
        - (i) Site Water Balance that:
            - includes details of:
                - sources and security of water supply, including contingency planning for future reporting periods;
                - water use and management on site;
                - reporting procedures, including the preparation of a site water balance for each calendar year;
            - describes the measures that would be implemented to minimise clean water use on site;
        - (ii) <u>Surface Water Management Plan</u>, that includes:
            - detailed baseline data on water flows and quality in the waterbodies that could be affected by the surface facilities associated with the project, including Bellambi Creek and Lizard Creek;
            - a detailed description of the water management systems on site, including the pit top and all shaft sites and associated facilities;
            - detailed plans, including design objectives and performance criteria;
            - detailed performance criteria for the following, including trigger levels for investigating any potentially adverse impacts associated with the project:
                - the water management system;
                - downstream surface water quality;
                - downstream flooding impacts; and
                - stream and riparian vegetation health for Bellambi Creek and Lizard Creek;
            - a program to monitor and report on:
                - the effectiveness of the water management system;
                - surface water flows and quality, stream and riparian vegetation health in the watercourses that could be affected by the surface facilities associated with the project;
                - the seepage/leachate from on-site water storages; and
                - downstream flooding impacts;
            - reporting procedures for the results of the monitoring program; and
            - a plan to respond to any exceedances of the performance criteria, and mitigate any adverse surface water impacts of the project.

TRANSPORT

Monitoring of Coal Transport

13. The Proponent shall:
    - (a) keep accurate records of the amount of coal transported from the site (on a daily basis);

(b) make these records publicly available on its website at the end of each calendar quarter.

Road Transport Restrictions

14. The Proponent shall only load coal or coal reject onto trucks, or transport it off site by road between 7 am to 10 pm, Monday to Friday and between and 8 am to 6 pm on Saturdays, Sundays and public holidays.

15. During emergencies, the Proponent may exceed the restrictions in condition 14 above with the written approval of the Secretary.

Note: The kind of circumstances which may constitute an emergency include major traffic disruptions on the transport route and major loading equipment failure or critical port need at PKCT.

16. The Proponent shall ensure that any truck leaving the site:
    (a) does not carry dirt or mud onto public roads; and
    (b) is free of material that may fall on the road and create a road safety hazard or public nuisance,
    to the satisfaction of the Secretary.

Traffic Management Plan

17. The Proponent shall prepare and implement a Traffic Management Plan for the project to the satisfaction of the Secretary. This Plan must:
    (a) be prepared in consultation with RMS, EPA, Council and PKCT;
    (b) be submitted for approval to the Secretary within 6 months of the date of this approval, unless the Secretary agrees otherwise;
    (c) aim to minimise the traffic impacts of the project on the residential areas surrounding the surface facilities site, and in particular the residences located along Bellambi Lane;
    (d) include a traffic management protocol, which must consider:
        - appropriate speed limits;
        - truck separation distances;
        - minimisation of compression braking and other noisy practices, especially on the approach to Port Kembla Road/Springhill Road traffic lights when entering or exiting PKCT;
        - reporting of vehicle faults; and
        - reporting of all traffic incidents; and
    (e) include a Traffic Noise Management Strategy, which must consider, but is not limited to:
        - the selection and maintenance of vehicle fleets;
        - movement scheduling to reduce noise impacts during sensitive times of the day; and
        - procedures to minimise impacts at identified sensitive areas along the haulage routes; and
    (f) include a drivers' code of conduct to minimise the impacts of project-related trucks on local residences and road users; and
    (g) describe the measures that would be put in place to ensure compliance with the drivers' code of conduct.

HERITAGE

Protection of Aboriginal Heritage Items

18. Unless otherwise authorised under the *National Parks and Wildlife Act 1974*, the Proponent shall ensure that the project does not cause any direct or indirect impact on the identified Aboriginal heritage items located outside the approved disturbance area of the project.

Note: Identified Aboriginal heritage items are listed in Appendix 6.

Heritage Management Plan

19. The Proponent shall prepare and implement a Heritage Management Plan for the project to the satisfaction of the Secretary. This Plan must:
    (a) be prepared by suitably qualified and experienced persons whose appointment has been endorsed by the Secretary;
    (b) be prepared in consultation with OEH, Council, any relevant local historical organisations and Aboriginal stakeholders;
    (c) be submitted to the Secretary for approval within 6 months of the date of this approval, unless the Secretary agrees otherwise;
    (d) include a description of the measures that would be implemented for:
        - managing the discovery of human remains or previously unidentified heritage items on site; and
        - ensuring any workers on site receive suitable heritage inductions prior to carrying out any development on site, and that suitable records are kept of these inductions;
    (e) include the following for the management of Aboriginal Heritage:

- a description of the measures that would be implemented for:
  - protecting, monitoring and/or managing (including any proposed archaeological investigations and/or salvage measures) the heritage items identified in Table 1;
  - managing the discovery of previously unidentified Aboriginal items on site;
  - conserving the sites outside the surface disturbance area (see Appendix 6), including measures that would be implemented to secure, analyse and record the sites at risk of subsidence;
  - maintaining and managing reasonable access for Aboriginal stakeholders to heritage items on site;
  - ongoing consultation with the Aboriginal stakeholders in the conservation and management of Aboriginal cultural heritage on site; and
- a strategy for the storage of any heritage items salvaged on site, both during the project and in the long term;

(f) include the following for the management of cultural heritage items:
- a description of the measures that would be implemented for:
  - protecting, monitoring and managing the heritage items identified in Appendix 7;
  - managing the discovery of previously unidentified cultural heritage items on site;
  - undertaking archival and photographic recording of the site, including the 1887 portal and all moveable heritage items; and
  - ensuring for the long-term storage of moveable heritage items.

VISUAL

Visual and Lighting

20. The Proponent shall:
    (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the project;
    (b) ensure no fixed outdoor lights shine above the horizontal or above the building line or any illuminated structure;
    (c) ensure that all external lighting associated with the project complies with *Australian Standard AS4282 (INT) 1997 – Control of Obtrusive Effects of Outdoor Lighting*, or its latest version;
    (d) take all practical measures to shield views of mining operations from users of public roads and privately-owned residences,

    to the satisfaction of the Secretary.

WASTE

21. The Proponent shall:
    (a) implement all reasonable and feasible measures to minimise the waste generated by the project;
    (b) ensure that the waste generated by the project is appropriately stored, handled and disposed of; and
    (c) monitor and report on effectiveness of the waste minimisation and management measures each calendar year,

    to the satisfaction of the Secretary.

Underground Tailings Storage Trials

22. The Proponent may conduct trials of underground emplacement and storage of coal tailings, subject to the prior approval of the Secretary.

BUSHFIRE MANAGEMENT

23. The Proponent shall:
    (a) ensure that the project is suitably equipped to respond to any fires on site; and
    (b) assist the Rural Fire Service and emergency services as much as possible if there is a fire in the surrounding area.

PROJECT SURFACE INFRASTRUCTURE MANAGEMENT

Service Boreholes Management Plan

24. The Proponent shall prepare and implement a Service Boreholes Management Plan in respect of construction and use of future service boreholes (ie any service boreholes not subject to approval at the date of this instrument) to the satisfaction of the Secretary. This plan must be submitted to the Secretary for approval prior to the construction of any future service borehole and must include commitments regarding:
    (a) community consultation;
    (b) landholder agreements;

(c) assessment of noise, air quality, traffic, biodiversity, heritage, public safety and other impacts in accordance with approved methods;
(d) avoidance of significant impacts and minimisation of impacts generally;
(e) achievement of applicable standards and goals;
(f) mitigation and/or compensation for significant noise, air quality and visual impacts; and
(g) rehabilitation of disturbed sites.

REHABILITATION

Rehabilitation Objectives

25. The Proponent shall rehabilitate the site to the satisfaction of DRE. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA, and comply with the objectives in Table 8.

Table 8: Rehabilitation Objectives

Feature	***Objective***
Mine site (as a whole)	• Safe, stable & non-polluting. • Final landforms to: - use compatible with surrounding land uses; - be designed to minimise the visual impacts of the project; - be in keeping with the natural terrain features of the area; and - avoid straight run drainage drop structures.
Project surface infrastructure	• To be decommissioned, and subject to the Heritage Management Plan, removed (unless DRE agrees otherwise).
Portals and vent shafts	• To be decommissioned and made safe and stable. • Retain habitat for threatened species (eg bats), where practicable
Watercourses of 2nd order or higher subject to subsidence impacts	• Hydraulically and geomorphologically stable.
Cliffs	• No additional risk to public safety compared to prior to mining
Other land affected by the project	• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native plant species (unless the Secretary, NSW Trade & Investment agrees otherwise).
Built features damaged by mining operations	• Repair to pre-mining condition or equivalent unless the: - owner agrees otherwise; or - damage is fully restored, repaired or compensated for under the *Mine Subsidence Compensation Act 1961*.
Community	• Ensure public safety. • Minimise the adverse socio-economic effects associated with mine closure.

Notes:
- *These rehabilitation objectives apply to all subsidence impacts and environmental consequences caused by mining taking place after the date of this approval; and to all project surface infrastructure part of the project, whether constructed prior to or following the date of this approval.*
- *Rehabilitation of subsidence impacts and environmental consequences caused by mining which took place prior to the date of this approval may be subject to the requirements of other approvals (eg an existing project approval, mining lease, or Subsidence Management Plan approval) or the Proponent's commitments.*

Progressive Rehabilitation

26. The Proponent shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. All reasonable and feasible measures must be taken to minimise the total area exposed for dust generation at any time. Interim rehabilitation strategies shall be employed when areas prone to dust generation cannot yet be permanently rehabilitated.

Rehabilitation Management Plan

27. The Proponent shall prepare and implement a Rehabilitation Management Plan for the project to the satisfaction of DRE. This plan must:
(a) be prepared in consultation with the Department, DPI-Water, OEH, Council and the CCC;
(b) be submitted to DRE for approval within 6 months of the commencement of development under this approval;
(c) be prepared in accordance with any relevant DRE guidelines;
(d) include detailed performance and completion criteria for evaluating the performance of the rehabilitation of the site, and triggering remedial action (if necessary);

(e) describe the measures that would be implemented to ensure compliance with the relevant conditions of this approval, and address all aspects of rehabilitation including mine closure, final landform, and final land use;
(f) provide for detailed mine closure planning, including measures to minimise socio-economic effects due to mine closure, to be conducted prior to the site being placed on care and maintenance;
(g) include interim rehabilitation where necessary to minimise the area exposed for dust generation;
(h) include a program to monitor and report on the effectiveness of the measures, and progress against the detailed performance and completion criteria; and
(i) build to the maximum extent practicable on the other management plans required under this approval.

SCHEDULE 5
ADDITIONAL PROCEDURES

NOTIFICATION OF LANDOWNERS

1. As soon as practicable after obtaining monitoring results showing:
   (a) an exceedance of any relevant criteria in Schedule 4, the Proponent shall notify the affected landowners in writing of the exceedance, and provide regular monitoring results to these landowners until the project is again complying with the relevant criteria; and
   (b) an exceedance of any relevant air quality criteria in Schedule 4, the Proponent shall send a copy of the NSW Health fact sheet entitled "Mine Dust and You" (as may be updated from time to time) to the affected landowners and/or existing tenants of the land (including the tenants of any mine-owned land).

INDEPENDENT REVIEW

2. If an owner of privately-owned land considers the project to be exceeding the relevant criteria in Schedule 4, then he/she may ask the Secretary in writing for an independent review of the impacts of the project on his/her land.

   If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Proponent shall:
   (a) commission a suitably qualified, experienced and independent person, whose appointment has been approved by the Secretary, to:
      - consult with the landowner to determine his/her concerns;
      - conduct monitoring to determine whether the project is complying with the relevant criteria in Schedule 4;
      - if the project is not complying with these criteria then identify the measures that could be implemented to ensure compliance with the relevant criteria; and
   (b) give the Secretary and landowner a copy of the independent review.

SCHEDULE 6
ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING

ENVIRONMENTAL MANAGEMENT

Environmental Management Strategy

1. The Proponent shall prepare and implement an Environmental Management Strategy for the project to the satisfaction of the Secretary. This strategy must:
   (a) be submitted to the Secretary for approval within 6 months of the date of this approval, unless the Secretary agrees otherwise;
   (b) provide the strategic framework for the environmental management of the project;
   (c) identify the statutory approvals that apply to the project;
   (d) describe the role, responsibility, authority and accountability of all key personnel involved in the environmental management of the project;
   (e) describe the procedures that would be implemented to:
      - keep the local community and relevant agencies informed about the operation and environmental performance of the project;
      - receive, handle, respond to, and record complaints;
      - resolve any disputes that may arise during the course of the project;
      - respond to any non-compliance;
      - respond to emergencies; and
   (f) include:
      - copies of any strategies, plans and programs approved under the conditions of this approval; and
      - a clear plan depicting all the monitoring required to be carried out under the conditions of this approval.

Management Plan Requirements

2. The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include:
   (a) detailed baseline data;
   (b) a description of:
      - the relevant statutory requirements (including any relevant approval, licence or lease conditions);
      - any relevant limits or performance measures/criteria;
      - the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;
   (c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;
   (d) a program to monitor and report on the:
      - impacts and environmental performance of the project;
      - effectiveness of any management measures (see c above);
   (e) a contingency plan to manage any unpredicted impacts and their consequences;
   (f) a program to investigate and implement ways to improve the environmental performance of the project over time;
   (g) a protocol for managing and reporting any:
      - incidents;
      - complaints;
      - non-compliances with statutory requirements; and
      - exceedances of the impact assessment criteria and/or performance measures; and
   (h) a protocol for periodic review of the plan.

   Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.

Application of Existing Management Plans

3. Prior to the approval of management plans under this project approval, the Proponent shall manage development undertaken pursuant to this project approval in accordance with any equivalent or similar management plan/s required under approval MP10_0046.

Relationships between Management Plans

4. The Water and Heritage Management Plans required by conditions 12 and 19 of Schedule 4, respectively, are to be prepared in respect of all parts of the project that are not covered by an Extraction Plan approved under condition 10 of Schedule 3. In particular, those management plans should address all areas subject to existing or proposed surface disturbance associated with the project.

Revision of Strategies, Plans and Programs

5. Within 3 months of:
   (a) the submission of an incident report under condition 9 below;
   (b) the submission of an annual review under condition 11 below;
   (c) the submission of an audit under condition 12 below; or
   (d) any modification to the conditions of this project approval (unless the conditions require otherwise),

   the Proponent shall review the strategies, plans, and programs required under this approval, to the satisfaction of the Secretary. Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted for the approval of the Secretary.

   Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

Updating & Staging Strategies, Plans or Programs

6. The Proponent must regularly review the strategies, plans and programs required under this consent and ensure that these documents are updated to incorporate measures to improve the environmental performance of the development and reflect current best practice in the mining industry. To facilitate these updates, the Proponent may at any time submit revised strategies, plans or programs for the approval of the Secretary. With the agreement of the Secretary, the Proponent may also submit any strategy, plan or program required by this approval on a staged basis.

   With the agreement of the Secretary, the Proponent may prepare a revision of or a stage of a strategy, plan or program without undertaking consultation with all parties nominated under the applicable condition in this approval.

   Notes:
   - *While any strategy, plan or program may be submitted on a staged basis, the Proponent will need to ensure that the existing operations on site are covered by suitable strategies, plans or programs at all times.*
   - *If the submission of any strategy, plan or program is to be staged; then the relevant strategy, plan or program must clearly describe the specific stage/s of the project to which the strategy, plan or program applies; the relationship of this stage/s to any future stages; and the trigger for updating the strategy, plan or program.*

Adaptive Management

7. The Proponent shall assess and manage project-related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4. Any exceedance of these criteria and/or performance measures constitutes a breach of this approval and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.

   Where any exceedance of these criteria and/or performance measures has occurred, the Proponent must, at the earliest opportunity:
   (a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
   (b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
   (c) implement remediation measures as directed by the Secretary,

   to the satisfaction of the Secretary.

Community Consultative Committee

8. The Proponent shall operate a Community Consultative Committee (CCC) for the project to the satisfaction of the Secretary. This CCC must be operated in accordance with the *Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments* (Department of Planning, 2007), or its latest version or replacement.

   Notes:
   - *The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Proponent complies with this approval;*
   - *In accordance with the guideline, the Committee should be comprised of an independent chair and appropriate representation from the Proponent, Council, recognised environmental groups and the local community;*
   - *The Department will accept the continued representation from existing CCC members.*

REPORTING

Incident Reporting

9. The Proponent shall immediately notify the Secretary and any other relevant agencies of any incident. Within 7 days of the date of the incident, the Proponent shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.

Regular Reporting

10. The Proponent shall provide regular reporting on the environmental performance of the project on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this approval, and to the satisfaction of the Secretary.

ANNUAL REVIEW

11. By the end of March each year, unless the Secretary agrees otherwise, the Proponent shall review the environmental performance of the development to the satisfaction of the Secretary. This review must:
    (a) describe the project (including any rehabilitation) that was carried out in the past calendar year, and the project that is proposed to be carried out over the current calendar year;
    (b) include a comprehensive review of the monitoring results and complaints records of the project over the past calendar year, which includes a comparison of these results against the:
        - the relevant statutory requirements, limits or performance measures/criteria;
        - the monitoring results of previous years; and
        - the relevant predictions in the EIS;
    (c) identify any non-compliance over the past year, and describe what actions were (or are being) taken to ensure compliance;
    (d) identify any trends in the monitoring data over the life of the project;
    (e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and
    (f) describe what measures will be implemented over the next year to improve the environmental performance of the project.

INDEPENDENT ENVIRONMENTAL AUDIT

12. Within 1 year of the commencement of development under this approval, and every 3 years thereafter, unless the Secretary directs otherwise, the Proponent shall commission and pay the full cost of an Independent Environmental Audit of the project. This audit must:
    (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
    (b) include consultation with the relevant agencies;
    (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval and any relevant EPL or Mining Lease (including any assessment, plan or program required under these approvals);
    (d) review the adequacy of strategies, plans or programs required under the abovementioned approvals; and
    (e) recommend appropriate measures or actions to improve the environmental performance of the project, and/or any assessment, plan or program required under the abovementioned approvals.

    Note: This audit team must be led by a suitably qualified auditor and include experts in any fields specified by the Secretary.

13. Within 6 weeks of the completion of this audit, or as otherwise agreed by the Secretary, the Proponent shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report.

ACCESS TO INFORMATION

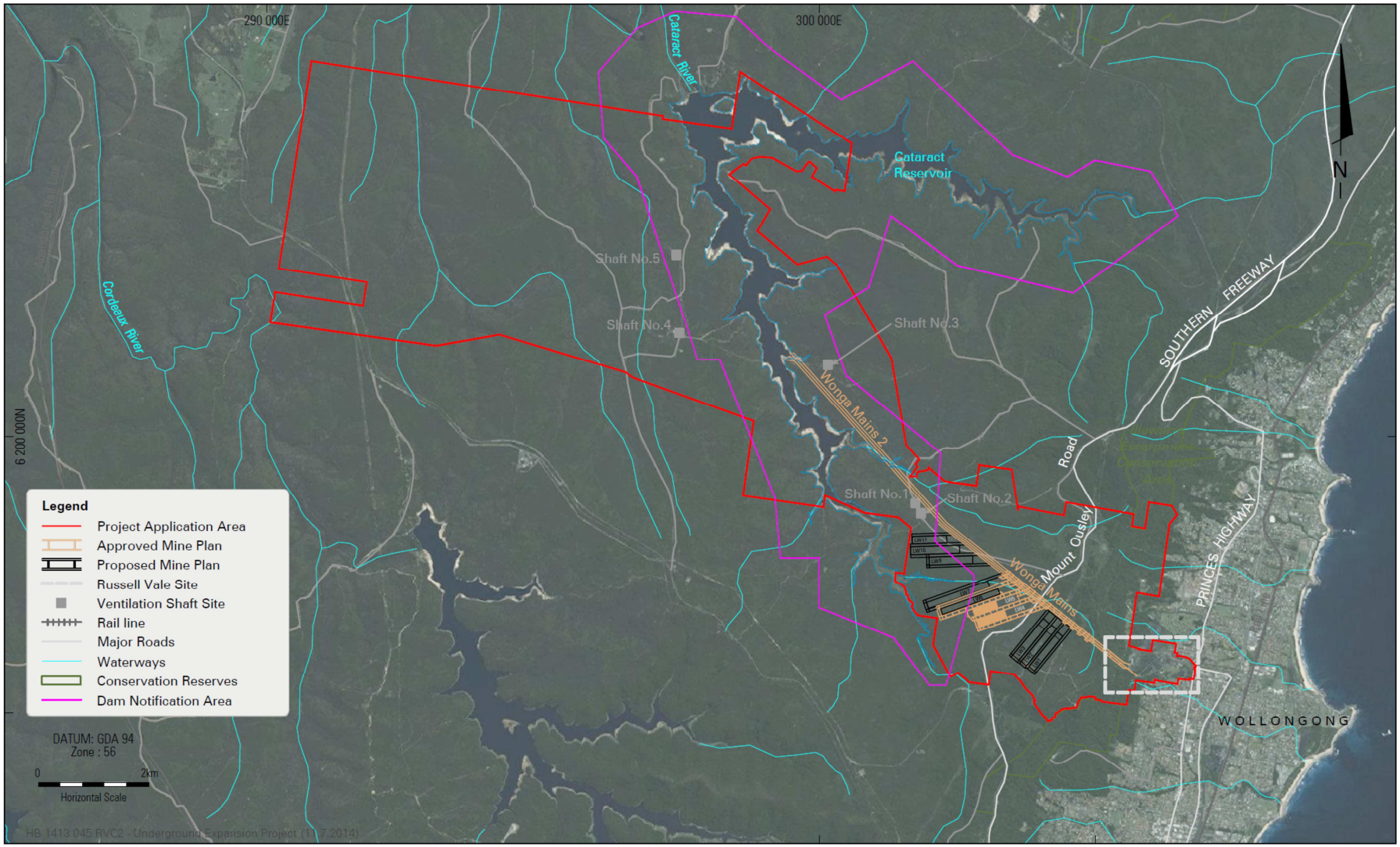
14. From the commencement of development under this approval, the Proponent shall:
    (a) make copies of the following publicly available on its website:
        - the EA;
        - current statutory approvals for the project;
        - approved strategies, plans and programs required under the conditions of this approval;
        - a comprehensive summary of the monitoring results of the project, reported in accordance with the specifications in any conditions of this approval, or any approved plans and programs;
        - a complaints register, which is to be updated monthly;
        - minutes of CCC meetings;
        - the annual reviews of the project (for the last 5 years, if applicable);
        - any independent environmental audit of the project, and the Proponent's response to the recommendations in any audit;
        - any other matter required by the Secretary; and
    (b) keep this information up-to-date,

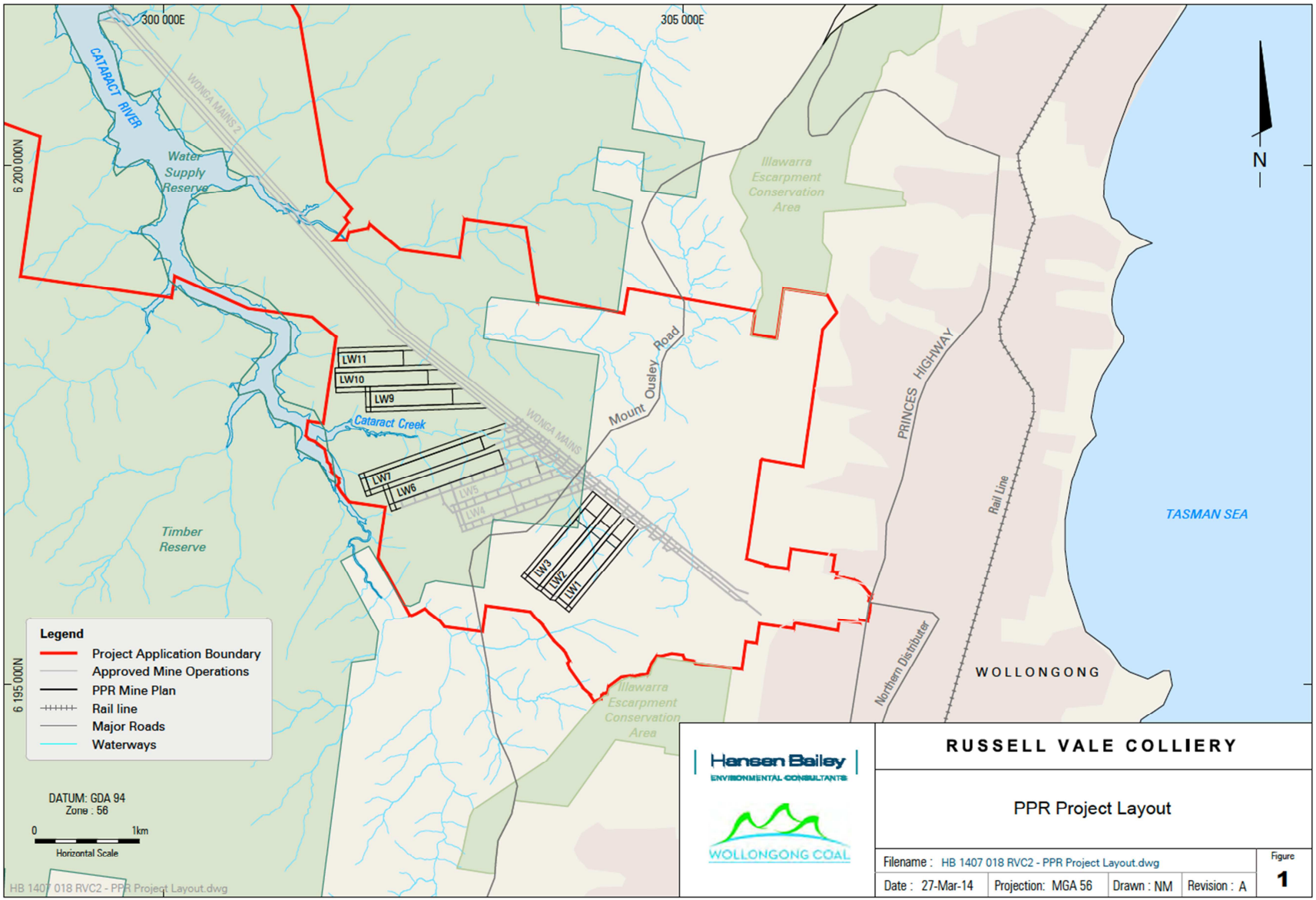
    to the satisfaction of the Secretary.

APPENDIX 1: SCHEDULE OF LAND

Property ID / Lot Number	DP Plan Number	Owner
Auto Consol 1833-110		Wollongong Coal Ltd
Auto Consol 1644-66		Wollongong Coal Ltd
Auto consol 5333-243 includes:		Wollongong Coal Ltd
Lot 3	DP 60975	Wollongong Coal Ltd
Lot 30 to 32	DP 751301	Wollongong Coal Ltd
Lot 63&68 -71	DP 751301	Wollongong Coal Ltd
Lot 1-2	DP 1046069	Wollongong Coal Ltd
Lot 1	DP 1046070	Wollongong Coal Ltd
Lot 130	DP 751301	Wollongong Coal Ltd
Lot 31	DP 1006012	Wollongong Coal Ltd
Lot 1	DP 630761	Wollongong Coal Ltd
Lot 1	DP 986675	Wollongong Coal Ltd
Lot 1	DP 986676	Wollongong Coal Ltd
Lot 1	DP 534522	Wollongong Coal Ltd
Lot 95 to 96	DP 4414	Wollongong Coal Ltd
Lot 97	DP 4414	The Council of the City of Wollongong
Lots 1 to 4	DP 225021	Wollongong Coal Ltd
Lot 34	DP 751301	Wollongong Coal Ltd
Lot 6	DP 793358	Wollongong Coal Ltd
Lot 66	DP 751301	Wollongong Coal Ltd
Lot 67	DP 751301	Wollongong Coal Ltd
Lot 1	DP 652833	Wollongong Coal Ltd
Lot 6001	DP 1077301	Wollongong Coal Ltd
Lot 1	DP 77407	Wollongong Coal Ltd
Lot 1	DP 1052074	Wollongong Coal Ltd
Lot 2	DP 1052074	Wollongong Coal Ltd
Lot 151	DP 667029	Wollongong Coal Ltd
Part Lot 6000	DP 1077301	Illawarra Land Pty Ltd
Lot 6500	DP 1083715	Illawarra Land Pty Ltd
Lot 6502	DP 1083715	Ronald Edward Devitt & Jane Wilson
Part Lot 6501	DP 1083715	Barbara Jean Williams
Lot 12	DP 736121	Integral Energy Australia
Lot 32	DP 1138149	Sydney Catchment Authority

APPENDIX 2: PROJECT LAYOUT PLANS




300 000E
305 000E
6 200 000N
6 195 000N
CATARACT RIVER
Water Supply Reserve
WONGA MAINS 2
Illawarra Escarpment Conservation Area
Mount Ousley Road
PRINCES HIGHWAY
Rail Line
TASMAN SEA
N
LW11
LW10
LW9
Cataract Creek
WONGA MAINS
LW7
LW6
LW5
LW4
LW3
LW2
LW1
Timber Reserve
Northern Distributer
WOLLONGONG
Illawarra Escarpment Conservation Area
Legend
Project Application Boundary
Approved Mine Operations
PPR Mine Plan
Rail line
Major Roads
Waterways
DATUM: GDA 94
Zone : 56
0
1km
Horizontal Scale
HB 1407 018 RVC2 - PPR Project Layout.dwg
Hansen Bailey
ENVIRONMENTAL CONSULTANTS
WOLLONGONG COAL
RUSSELL VALE COLLIERY
PPR Project Layout
Filename : HB 1407 018 RVC2 - PPR Project Layout.dwg
Date : 27-Mar-14
Projection: MGA 56
Drawn : NM
Revision : A
Figure
1

Pit Top Surface Facility

APPENDIX 3: STATEMENT OF COMMITMENTS

Additional SoC's from the Response to PAC Report Parts 1 and 2 are shown in **bold**.

Ref	Commitment
General	
1.	WCL will conduct regular community consultation and provide updates to the community during operation of the UEP.
2.	WCL will regularly review and revise (if necessary) the existing Environmental Management System and its supporting management plans and procedures. This will be undertaken in consultation with relevant regulators.
3.	The existing Environmental Monitoring Program shall be revised and updated in consultation with relevant regulators in consideration of operations and impacts. The monitoring program will be included in Extraction Plans.
4.	WCL will provide regular and relevant training to all employees and contractors to ensure that environmental outcomes are achieved.
5.	WCL will continue to coordinate the Community Consultative Committee for the Russell Vale Colliery.
6.	All environmental management and monitoring outcomes will be reported in an Annual Review.
7.	**Consult with the IRAP (or equivalent expert panel) during the development of management plans (following approval of the Project).**
Subsidence	
8.	Establish a technical committee comprising representatives from Wollongong Coal, the power utility company and government regulators to monitor and manage potential impacts of mining on the power transmission towers.
9.	All secondary workings will be undertaken in accordance with approved Extraction Plans developed in consultation with relevant regulatory authorities and infrastructure owners.
10.	The Extraction Plan will include Trigger Action Response Plans (TARPs) to allow WCL to respond to impacts as they arise and to facilitate adaptive management over the life of the Project. TARPs will be developed for built features and natural features.
11.	The Extraction Plan will include a protocol for monitoring of subsidence effects. Monitoring will be conducted before, during and after secondary extraction.
12.	If necessary, adaptive management measures will be undertaken to reduce impacts on Cataract Creek and swamps of special significance. Adaptive management measures will determined in consultation with relevant regulators.
13.	**If required by the DSC, the panel length of LW 7 will be truncated if the Corrimal Fault is intersected during the development of the gateroads for LW 7.**
14.	**Undertake inspections of the Bulli Seam workings overlying LW 7 to confirm the accuracy of the record tracings (subject to the ability to safely access these workings).**
15.	**Conduct drilling of underground exploration boreholes where necessary to confirm the accuracy of the record tracings for the Bulli Seam workings overlying LW 7.**
Water	
16.	WCL will revise the Water Management Plan (including a TARP and water monitoring program) in consultation with the relevant regulators.
17.	WCL will revise the existing water monitoring program in consultation with the relevant authorities. This will include monitoring of streams, swamps and groundwater systems.
18.	Monitoring of stream flows will be conducted to determine the potential for connectivity of surface water and groundwater systems.

Ref	Commitment
19.	To assess mine water make, WCL will continue to monitor volumes of water pumped into and out of the underground mine workings.
20.	WCL will continue to treat stormwater and mine water prior to discharge via LDP2. Treated water will continue to be discharged to Bellambi Creek in accordance with WCL's EPL.
21.	An Erosion and Sediment Control Plan will be implemented during construction activities at the Russell Vale Site.
22.	WCL will obtain and hold water licences as required.
23.	**Undertake detailed design of the dry sediment dam to ensure that there is sufficient treatment capacity.**
Air Quality and Greenhouse Gas	
24.	WCL will review and revise the existing Air Quality Management Plan in consultation with the relevant authorities. The Plan will include feasible and reasonable air quality controls.
25.	The existing air quality monitoring network will be reviewed.
26.	**Implement the following dust mitigation measures:** • **Trial the use of chemical wetting agents on unsealed roads and stockpiles, and report the results of the trial in the Annual Review;** • **Sealing of the proposed haul road circuit to and from the truck loading bins; and** • **Install water sprays on the tripper gantries.**
27.	**Regularly report on the:** • **Annual average and 24 hour average PM_{10} criteria;** • **Annual average and 24 hour average $PM_{2.5}$ criteria; and** • **Adaptive management and ongoing improvements implemented to reduce dust emissions throughout the reporting period.**
Acoustics	
28.	WCL will review and revise the existing Noise Management Plan in consultation with the relevant authorities. The Plan will include feasible and reasonable noise controls.
29.	The environmental monitoring program will include continuous monitoring of operational noise, including attended monitoring of road traffic noise.
30.	Construction activities will be limited to between 7 am to 6 pm on weekdays and 8 am to 1 pm on Saturdays.
31.	The site noise model will be revised (in consultation with relevant regulators) once site specific sound power levels have been measured after construction and commissioning.
32.	**Implement the following noise mitigation measures:** • **Fitting surface conveyors with poly rollers (with the exception of high wear sections) prior to the commencement of coal extraction;** • **Maintain a volume of coal in bins at all times to minimise noise;** • **Undertake a trial to determine the efficiency of tripper automation to reduce noise produced by falling material; and** • **Undertake real time noise monitoring to confirm if any noise barriers (as shown on Figure 7-7 of the 'Response to Noise Issues Raised by the PAC' (Wilkinson Murray, July 2015) provide a net benefit to neighbours.**
33.	**Any large scale construction activity will include a noise management plan prepared in accordance with DECCW's Interim Construction Noise Guidelines.**
34.	**Any new machinery bought onto site will have non-tonal reverse alarms fitted.**
35.	**Any new loaders and dozers used on site will be fitted with noise attenuation prior to use on site.**
Biodiversity	

Ref	Commitment
36.	The existing Biodiversity Management Plan (BMP) will be reviewed and revised in consultation with the relevant authorities.
37.	Monitoring of the swamps will be undertaken in consultation with relevant regulators in accordance with the BMP.
38.	**WCL will install a number of additional shallow groundwater piezometers in all upland swamps within 400 m of the longwalls (secondary extraction). This will include the installation of approximately 30 additional shallow groundwater piezometers. Where feasible, this will include the installation of open standpipes or shallow groundwater piezometers around upland swamps CCUS1 and CRUS3 to assess the inflow to these upland swamps from surrounding surficial and shallow groundwater aquifers. Installation will be subject to further consultation and approval by relevant regulators.**
39.	**WCL will implement offsets for impacts to swamps in accordance with the final Swamp Offset Policy (with precedent given to conditions of Project Approval).**
40.	**Where offsets for impacts to swamps are required, WCL will endeavour to preferentially locate offsets within the local catchment the swamps were located.**
Heritage	
41.	A Heritage Management Plan (HMP) will be developed in consultation with the relevant authorities and Aboriginal stakeholders. The Plan will include management strategies for identified Aboriginal items.
42.	Photographic recordings of the existing site will be conducted prior to the proposed infrastructure upgrades. Moveable items of heritage significance will be documented, collated and catalogued. All recording work will be conducted to Heritage Archival Recording standards.
Visual and Lighting	
43.	Colour treatments for surface facilities will minimise visual contrast with the surrounding environment.
44.	Lighting will be directed away from nearby residences through the use of directional lightning and shielding.
Waste	
45.	The existing Waste Management System will be reviewed and revised (if necessary) to promote waste avoidance and resource recovery.
Hazards & Roads	
46.	To protect public safety, WCL will continue to manage public access to the site using boundary fences, warning signs, surveillance and security personnel.
47.	A driver code of conduct will be enforced to avoid risks to public safety arising from coal transportation including complying with the 60 km/hr speed limit along Bellambi Lane.
48.	**Consult with Wollongong City Council regarding WCL's contribution to the maintenance of Bellambi Lane.**
Rehabilitation and Mine Closure	
49.	A Mine Closure Plan will be developed in consultation with the relevant authorities. The mine closure strategy will consider previous land uses, land zonings and potential uses for the existing infrastructure at the site.
50.	Areas that are no longer required for operations will be progressively rehabilitated.

APPENDIX 4: RECEIVER LOCATION PLAN

APPENDIX 5
NOISE COMPLIANCE ASSESSMENT

Applicable Meteorological Conditions

1. The noise criteria in Table 3 of Schedule 4 are to apply under all meteorological conditions except the following:
   (a) wind speeds greater than 3 m/s at 10 metres above ground level; or
   (b) stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
   (c) stability category G temperature inversion conditions.

Determination of Meteorological Conditions

2. Except for wind speed at microphone height, the data to be used for determining meteorological conditions shall be that recorded by the meteorological station located on the site.

Compliance Monitoring

3. Attended monitoring is to be used to evaluate compliance with the relevant conditions of this approval.

4. This monitoring must be carried out at least 4 times a year, unless the Secretary directs otherwise.

5. Unless otherwise agreed with the Secretary, this monitoring is to be carried out in accordance with the relevant requirements for reviewing performance set out in the *NSW Industrial Noise Policy* (as amended from time to time), in particular the requirements relating to:
   (a) monitoring locations for the collection of representative noise data;
   (b) meteorological conditions during which collection of noise data is not appropriate;
   (c) equipment used to collect noise data, and conformance with Australian Standards relevant to such equipment; and
   (d) modifications to noise data collected, including for the exclusion of extraneous noise and/or penalties for modifying factors apart from adjustments for duration.

APPENDIX 6: ABORIGINAL HERITAGE SITES

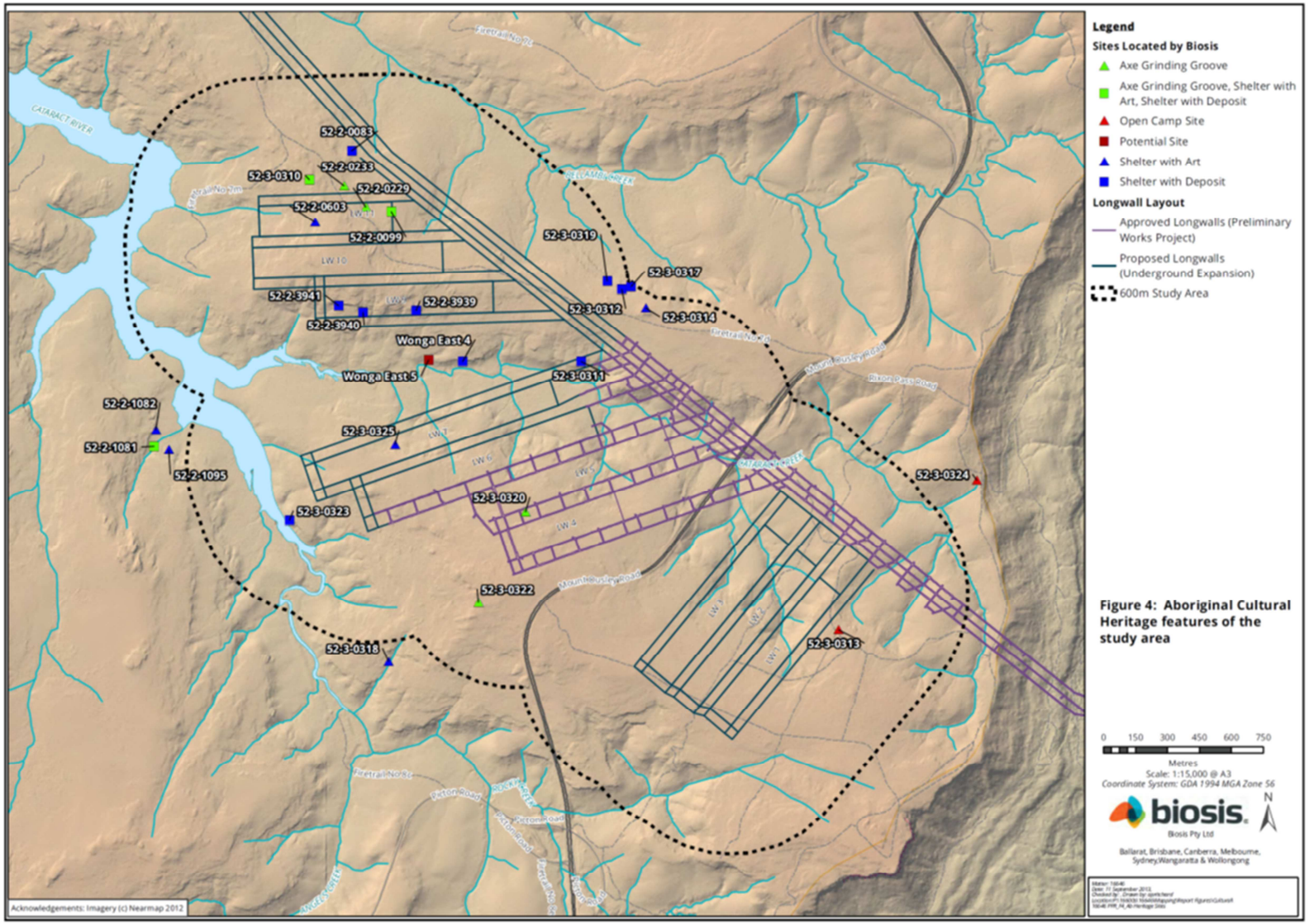
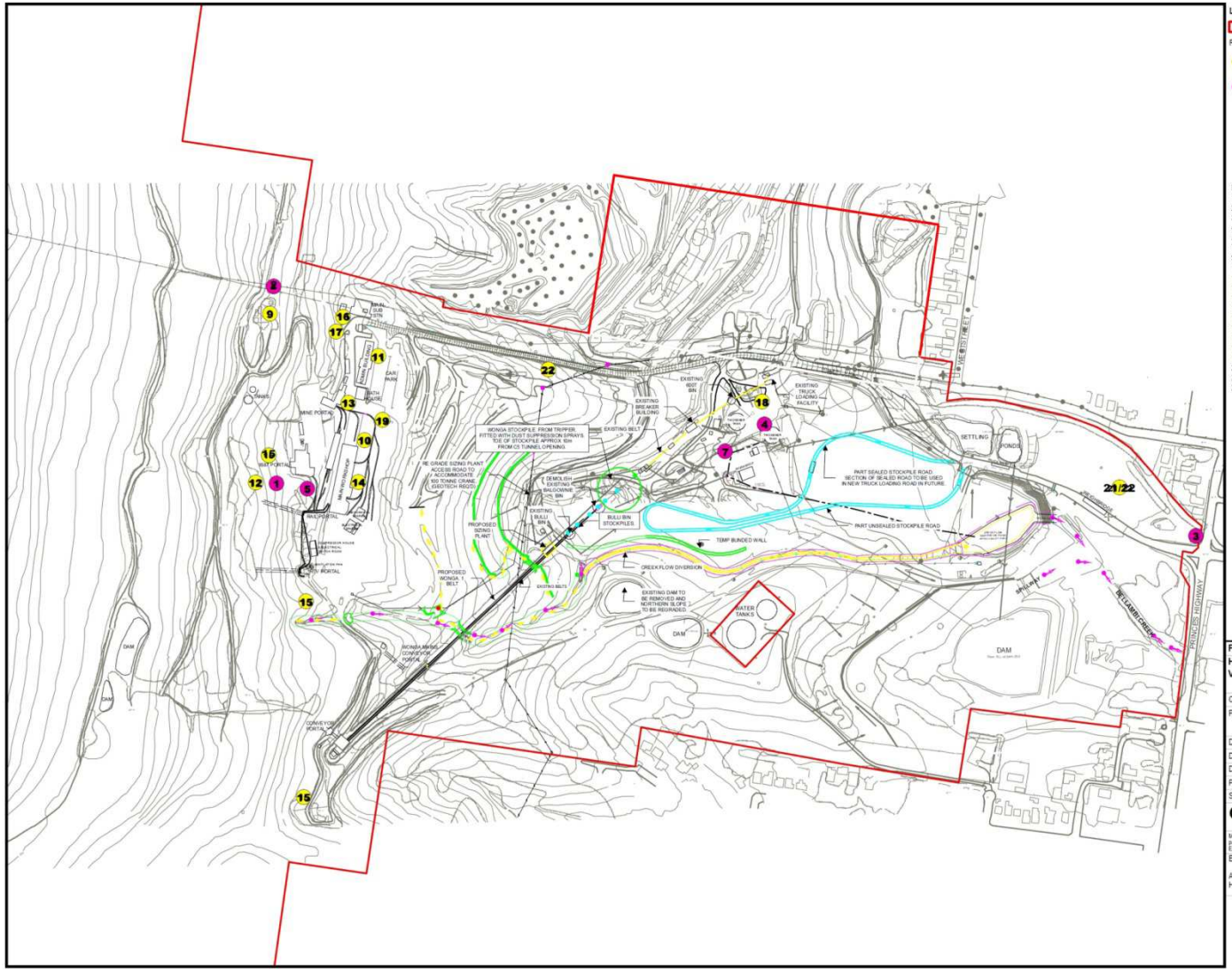


Figure 4: Aboriginal Cultural Heritage features of the study area

APPENDIX 7: CULTURAL HERITAGE SITES



Planning Assessment Commission

NSW GOVERNMENT

Ms Carolyn McNally
Secretary
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

15 January 2016

Dear Ms McNally

Subject: Timeframe for PAC Second Review of the Russell Vale Colliery Underground Expansion Project, Wollongong and Wollondilly LGAs

I refer to the Minister's request to the Planning Assessment Commission, to review the above project, my previous letter of 11 December 2016 regarding the need for some additional time to complete the review and your Department's response granting an extension until Friday 15 January 2016.

The Commission is progressing with its review as quickly as possible, although this has been hampered by the availability of people over the holiday period. This week the Commission met with the NSW Office of Environment and Heritage and separately with the subsidence and groundwater experts it has engaged, Emeritus Professor Jim Galvin and Dr Colin Mackie.

The Commission, together with the subsidence and groundwater experts, is working to resolve the outstanding questions that remain. Doing this now as part of the review, with the expertise available to the Commission, seems a logical and efficient way to progress the assessment of the matter.

The Commission is intending to provide some further questions to the Proponent and will be seeking a written response as well as a further meeting with the Proponent, in late January, to work through any outstanding issues of contention. Expert reports from E/Prof Galvin and Dr Mackie are then expected to be provided in the first weeks of February 2016. The Commission will then finalise its review and provide its report. The Commission expects the review will be completed before the end of February 2016, and as always, it will be working as quickly and efficiently as possible and will deliver its report sooner, if possible.

I trust this arrangement is acceptable to you. Should your Department have any questions, I have arranged for Ms Megan Webb or Ms Catherine Van Laeren of the Commission Secretariat to assist, on 9383 2113 or 9383 2102.

Yours sincerely

Joe Woodward

Mr Joe Woodward PSM
Member,
Planning Assessment Commission

COMMISSION SECRETARIAT
Level 13, 301 George Street SYDNEY, NSW 2000
GPO BOX 3415, SYDNEY, NSW 2001
TELEPHONE (02) 9383 2100 FAX (02) 9299 9835
pac@pac.nsw.gov.au

Planning Assessment Commission

Contact: Megan Webb
Phone: 02 9383 2113
Fax: 02 9299 9835
Email: megan.webb@planning.nsw.gov.au

David Clarkson
Group Environment Manager
Wollongong Coal Ltd
PO Box 281
FAIRY MEADOW NSW 2519

15 January 2016

Dear Mr Clarkson

Subject: Russell Vale Underground Expansion Project, request for clarification and site inspection

Thank you for the latest documents, dated 18 December 2015, provided in response to the Public Hearing. As you are aware, the Commission has engaged E/Prof Jim Galvin and Dr Colin Mackie to review the latest subsidence and groundwater predictions. As part of this review, the two experts have identified a number of questions and are seeking some clarification on these. Questions on subsidence and regarding options to avoid or minimise impacts to Swamp CCUS4 are attached. Questions about groundwater are currently being drafted and will be provided to you on Monday morning.

The Commission would appreciate a written response on these issues. It would also like to arrange a site inspection (of relevant areas of the catchment) and a meeting to further discuss any outstanding questions with the relevant subsidence and groundwater consultants. The Commission proposes that E/Prof Galvin and Dr Mackie will accompany it, attending both the inspection and meeting. This is proposed to occur on Thursday 28 January 2016.

To arrange the site inspection and meeting, or should you have any questions, please contact Megan Webb or Catherine Van Laeren of the Commission Secretariat on (02) 9383 2113 or (02) 9383 2102.

Yours sincerely

Joe Woodward

Joe Woodward PSM
Member
NSW Planning Assessment Commission

POINTS OF CLARIFICATION

Russell Vale Colliery Underground Expansion Project

1. Height of depressurisation

Please clarify the approach being adopted to predicting the height of depressurisation. Please include a consideration of the following matters and questions in the clarification.

i. Galvin & Associates review of 3/3/15 undertaken for the PAC questioned the reliance placed in the EA on the Tammetta prediction methodology and expressed and, based on the information reviewed, questioned the confidence that can be placed in the height of depressurisation not reaching the surface.

ii. SCT Report No. WCRV 4440 (12/8/15) states that:

'based on SCT's experience of monitoring groundwater depressurisation directly above extracted longwall panels at multiple sites, the [Tammetta] approach appears to give a very reasonable estimate of the height of depressurisation. The outcome is not surprising given the Tammetta approach is derived from a broad database of hydrogeological experience in single seam mining situations...

.....A key point, however, is that the Tammetta approach is likely to provide a lower limit on the height of depressurisation given that the presence of multi-seam mining is expected to increase the height of depressurisation compared to an equivalent single seam situation.'

Q. What is the upper limit and how is this determined?

iii. GeoTerra/GES 2014 utilised a modified Tammetta equation based on single seam extraction to estimate the height of depressurisation.

iv. GeoTerra/GES Report No. NRE12 – RIB (September 2015) reports that:

'Two empirical based methods for the height of fracturing (Tammetta, 2012) as well as Ditton and Merrick (2014), and by association, the height of groundwater depressurisation, have been proposed using the height of single seam longwall extraction, width of extraction and the depth of cover(as well as a geological factor in Ditton and Merrick (2014) over the centre of single seam longwall panels.

No reliable comparison between the theoretically predicted and observed Russell Vale East in-situ height of depressurisation was able to be established from VWP data over the Russell Vale East multiple seam workings...

Neither of the two theoretical approaches are applicable to the Russell Vale East triple seam extraction environment...'

The modellers appear to have addressed this situation by developing a conceptual model of caving and fracturing and by developing a new function for calibrating their model to piezometer data.

Q. What is the level of confidence, or risk, associated with the reliability of this alternative approach?

Q. Why was the height of the caved zone increased in areas of multi-seam mining when subsidence behaviour suggests that minimal additional voids result from the extraction of second and subsequent seams that are in close proximity (that is, incremental subsidence approximates the extracted height of second and subsequent seams)?

v. OEH Preliminary Comments on Russell Vale UEP Risk Assessment – email of 2 September 2015.

Q. Please address matters raised in the following extract.

- SCT (2015; Ken Mills) has stated *"based on SCT's experience of monitoring groundwater depressurisation directly above extracted longwall panels at multiple sites, the* [Tammetta] *approach appears to give a very reasonable estimate of the height of depressurisation. This outcome is not surprising given the Tammetta approach is derived from a broad database of hydrogeological experience in single seam mining situations. At Russell Vale East, the Tammetta approach is not so applicable because of the multi-seam interactions that may be occurring. A key point however, is that the Tammetta approach is likely to provide a lower limit on the height of depressurisation given that the presence of multi-seam mining is expected to increase the height of depressurisation compared to an equivalent single seam situation"*

Tammetta (Coffey 2013 GEOTLCOV24840AA-AB) has already assessed the potential for depressurisation (surface to seam connective fracturing) above the earlier Russell Vale East proposal (the mine layout hasn't really changed all that much compared to what is currently proposed and predicted subsidence is still very similar) indicating that the height of depressurisation was predicted to extend to the surface over many areas of the proposed mine plan. Tammetta (Coffey 2013 GEOTLCOV24840AA-AB) concluded that *"Figure 9 shows the protrusion of the interpreted potential drainage thickness above ground surface for Wonga East. Outlines of significant swamps are also shown. Complete drainage is calculated to occur over parts of LW3 to LW8."*

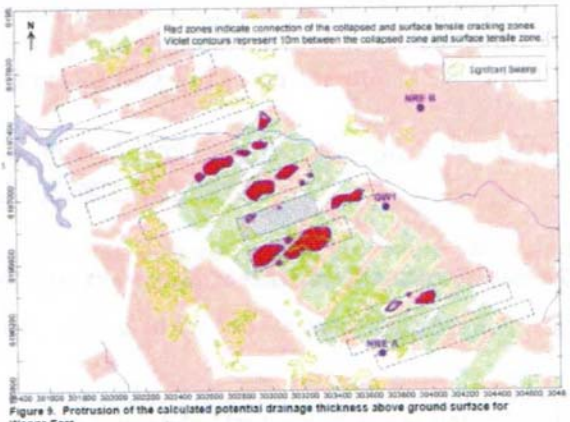


Figure 9. Protrusion of the calculated potential drainage thickness above ground surface for Wonga East.

"A serious risk to Cataract Creek is present in the area where Cataract Creek, Balgownie LW11, a Bulli pillar extraction block, and Wongawilli panels LW7 and LW8 coincide (see Figures 9 and 1a). The interpretation indicates that the collapsed zone and surface tensile fracturing zones will connect in this area, and lead to creek drainage into the mined void. The calculated baseflow of Cataract Creek is 11.7 ML/day (see above), which is 6% of the average water volume generated by Lake Cataract between 2006 and 2012 (from the SCA water balance reports web page)."

Continues over page

- If Tammetta's assessment of depressurisation is likely to underestimate the degree of depressurisation due to the presence of **multi-seam mining which is expected to increase the height of depressurisation compared to an equivalent single seam situation** (SCT 2015), then the UEP risk assessment is clearly out of step with statements and predictions from their own subsidence engineer, Coffey 2013 and the IESC.

2. Cracking of Cataract Creek

i. Response to Planning Assessment Commission Review report – Part 2, page 26 re:

'The main channel of Cataract Creek is hosted sequentially downstream within the Hawkesbury Sandstone, Newport and Garie Formation, Bald Hill Claystone and Bulgo Sandstone. The Newport and Garie Formations, Bald Hill Claystone and Bulgo Sandstone are more ductile than the Hawkesbury Sandstone.

Q. How was ductility determined?

Q. What are the respective ductility values?

3. Pillar Stability Inbye of Longwall 7

i. The Independent Risk Assessment Panel has raised the reliability of mine plans in the Bulli Seam workings at the start of Longwall 7. SCT letter report of 12 September 2015 (Appendix G of part 2 of Response to Planning Assessment Review Report) presents a number of factors that might give confidence in the accuracy of the mine plans.

Comment: It is a fundamental principle in mine management, unfortunately borne out by incidents, to never, ever, trust a mine plan, even of areas only recently mined. There are numerous examples of inaccurate recording of mine workings driven in NSW in the last two decades. Unless entry can be safely obtained to the old workings, it can be very difficult from a technical perspective and expensive and time consuming to remotely verify the degree of reliability of old mine plans.

Q. What contingency is proposed in the event that the reliability of the record tracing cannot be determined?

ii. SCT Report No. WCRV 4440 (12/8/15) addresses pillar stability on the basis of an *averaged size pillars with a nominal geometry of 22 m by 33 m, a roadway width of 6 m and a pillar height of 2.2 m*. As the Independent Risk Assessment Panel has identified, some pillars are a narrow as 12 m. The irregular pillar size and the presence of abutment stress associated with adjacent pillar extraction workings is likely to result in irregular pillar load throughout the workings. Furthermore, it is noted that many of the smaller pillars in the panel abut against a goaf edge.

Q. What are the implications of this situation on the likelihood of pillar failure?

Q. What are the implications if, as in the extreme case of Crandall Canyon pillar failure, failed coal has a much lower void content than 50% assumed in the SCT analysis?

4. Options to avoid or minimise impacts to Swamp CCUS4

The Risk Assessment has identified a high risk of impacts to Swamp CCUS4. Avoidance of longwall mining beneath this swamp does not appear to have been considered.

Q. What are the implications for Swamp CCUS4, both positive and negative, of not mining the (approximately 300m) section of longwall 6 below the swamp?

Q. The Commission understands that the first 365 m of Longwall 6 were mined in 2015, what impact has this had on Swamp CCUS4 to date?

QUESTIONS RELATING TO GROUNDWATER – January 2016

RUSSELL VALE PROJECT

Model related questions arising from the review to-date are as follows:

Comment 1 – Model layers 1 to 15 have been treated as variably unconfined (laycon=43) while model layers 16 through 19 have been installed as strictly confined (laycon=40). Layer 17 is the Wongawilli seam which is the target seam for extraction while layer 16 is overburden which will freely drain to layer 17. Conversion to confined/unconfined will affect the depressurisation of layers 16 through 19 and the volume of water reporting to the proposed mine.

Question 1: Why are the Wongawilli seam and the overlying layer treated as strictly confined layers where drainable porosity is not taken into account when it is expected that the mined seam and the overlying strata will be completely dewatered during mining? What are the implications for model calibration?

Comment 2 – The Wongawilli seam is designed to dewater in the model through the use of drain cells. The seam is 10 m thick and it is stated in the report that the bottom 3m section of the seam is the intended working section but the top section has been simulated in the model by assigning the drainage elevation to 5 m above the floor (contrary to 0.1 m stated in the report). Changing the drain cell elevations to represent the working section at the lower elevation will affect the depressurisation of layers 16 through 19 and the volume of water reporting to the proposed mine plan.

Question 2: Why has the upper section of the Wongawilli seam been represented as the working section? What are the implications for model calibration?

Comment 3 – Hydraulic conductivities within the subsidence zone have been enhanced during the model simulation period to account for bed separation (Kh) and vertical fracturing (Kv). Post subsidence horizontal conductivities (Kh) have been changed by applying a scaling factor of 2 to all layers while vertical conductivities have widely varying scaling factors. Considering Kh, a normal approach would establish the likely apertures of horizontal fractures and then determine the enhanced conductivity for specific layers as a porous media equivalent. A scaling factor would then be calculated from the pre and post subsidence values. Adopting a scaling factor of 2 for all layers seems to be largely conjectural.

Question 3: How was the scaling factor for Kh determined? Given the significant influence of the enhanced material properties on the groundwater systems, what are the likely implications for model calibration and model outcomes if an equivalent porous media approach was adopted?

Comment 4 – The subsidence zone (including the cave zone) have been represented using the TMP package available within Modflow Surfact. This package facilitates a temporal change in material properties at nominated times during a simulation. Inspection of the relevant data file reveals the hydraulic conductivities (Kh, Kv) and specific yield (Sy) are changed at the commencement of certain stress periods that align with panel extraction. However changes appear to be applied without consideration of the manner in which the model code treats these changes. Specifically, if increases are applied at the start of a stress period, then a linear interpolation is applied from the start of the stress period to the next nominated time which by inspection of the data files is commonly the start of the next stress period. This means that for Kh and Kv, full upscaling is achieved only by the end of the stress period. It also means that upscaling of Sy is occurring before the targeted model cells are dewatered thus artificially introducing water into the model.

Question 4: Can the proponent provide an explanation as to why the scaling was applied over a stress period and to what extent the modified porosity has affected the estimated mine water influx ? What are the implications for model calibration and the volumetric balance?

Comment 5 – General head boundary conditions have been employed along the active model perimeter. These conditions support a head/flux relationship that can control depressurisation by introducing or removing groundwater from the model.

Question 5: How were the heads and conductance terms determined for individual cells?

Comment 6 – Model layers 1 to 10 appear to have the same or very similar values of drainable porosity (1%) even though the lithologies vary from sandstone to claystone and the hydraulic conductivities vary over several orders of magnitude.

Question 6: Can the proponent provide an explanation for the adoption of similar values for widely differing lithologies?

Comment 7 – It has not been possible to replicate the mine water inflows provided in Figure 84 of Appendix H[1] from the cell by cell flow data file provided by the proponent.

Question 7 – How were the mine water influx estimates derived ?

Comment 8 – The reported mine water influx estimates have been generated at the end of each stress period with stress periods varying from 30 to 184 days duration. Capturing the influx at the end of stress periods overlooks higher rates associated with higher pressure heads that will occur at the start of stress periods. Consequently there is a high probability that the reported (and calibrated) mine water influx rates are incorrect. Model output needs to also capture influx at early times in a stress period (say 1, 3, 9, 27 and 81 days) in order to derive reasonably accurate influx rates[2].

Question 8 – Were influx estimates only captured at the end of stress periods? If so, what are the implications for model calibration?

Comment 9 – There are extensive areas surrounding the proposed longwall extractions that are depressurised from surface to seam before the commencement of mining. This is particularly evident from the verrtical sections provided as Figures 33 and 34 where complete dewatering (zero or negative pore pressures) in all layers from surface down to layer 15, extends from the coastal escarpment inland for distances of more than 1 kilometre. Figure 76 also suggests dewatering of the Wongawilli seam over large areas of the model before the commencement of mining.

Question 9 – What is the cause of this regionally extensive complete loss of pore pressure and what field observations support this?

General questions associated with studies supporting the modelling effort:

Comment 10 – Section 8.3 provides a summary of observed piezometric elevations in boreholes equipped with vibrating wire pore pressure transducers. These transducer arrays facilitate determination of hydraulic gradients that are associated with strata depressurisation. The following Table provides a summary of statements regarding depressurisation:

Report	Piezometer	Report statement (Proponent)	Review comment
Section 8.3.1	GW1	The height of depressurisation lies between 140 and 165 mbgl.	Fig. 15 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer, suggesting measurable depressurisation extends upwards to 18 mbgl

[1] see GeoTerra, GES Appendix H, Russell Vale East Revised Groundwater Assessment, September 2015, page 112

[2] See Mackie, 2014. Post processing of zone budgets to generate improved groundwater influx estimates associated with longwall mining. Ground Water Journal Vol.52 Issue 4

Section 8.3.2	RV20	The height of depressurisation … lies between 105 and 134 mbgl.	Fig. 16 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer suggesting measurable depressurisation extends upwards to 35 mbgl
Section 8.3.3	RV17	The height of depressurisation … has not been identified as the drill hole was not deep enough ..	Fig. 17 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer suggesting measurable depressurisation extends upwards to 20 mbgl
Section 8.3.5	RV16	The height of depressurisation … lies between 197 and 242 mbgl.	Fig. 19 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer suggesting measurable depressurisation extends upwards to 21.8 mbgl
Section 8.3.6	NRE B	The bore does not extend deep enough to assess the height of depressurisation…..	Fig. 20 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer suggesting measurable depressurisation extends upwards to 27.5 mbgl
Section 8.3.6	RV23	The height of depressurisation … lies between 197 and 242 mbgl.	Fig. 22 supports a vertical hydraulic gradient from the shallowest to the deepest piezometer suggesting measurable depressurisation extends upwards to 90 mbgl

Vertical hydraulic gradients are present in all of the above noted piezometers. These gradients support a downwards flow regime.

Question 10 – Are there any factors other than mining that would generate the observed hydraulic gradients?

Comment 11 – Piezometer RV20 is situated above longwall 5 where triple seam extraction has occurred. It is stated that 'The pressure profile indicates that the vertical flow rate is likely to be enhanced at this location'.

Question 11 - How does the pressure profile indicate enhancement and what is the enhanced vertical flow rate?

Comment 12 – The mean annual pan evaporation rate is stated to be 1420 mm/annum.. Normally the pan rate is multiplied by a (crop) factor to establish field estimates of actual evaporation. The factor is typically 0.7 to 0.8, yielding field evaporation rates of 994 to 1136 mm/annum. The model adopts a value of 1825 mm/annum to control groundwater levels[3] and groundwater recharge to the model.

Question 12 – Why has the rate of 1825 mm/annum been adopted rather than the much lower rates? What are the implications in respect of model calibration and model outcomes?

[3] see GeoTerra, GES Appendix H, Russell Vale East Revised Groundwater Assessment, September 2015, page 12

27 January 2016

GeoTerra

Wollongong Coal Ltd
PO Box 281
Fairy Meadow NSW 2519

Attention: Dave Clarkson

Dave,

RE: Russell Vale Colliery – Underground Expansion Project Planning Assessment Commission – January 2016 – Response to Questions

Please find enclosed our ***DRAFT*** response to selected questions that were provided by the January 2016 PAC review.

Q10 - Are there any factors other than mining that would generate the observed hydraulic gradients?
A10 – There are no other factors that would generate the hydraulic gradients observed within the Study Area. The overburden has been significantly depressurised as a result of coal extraction in up to 3 seams and the associated overburden subsidence fracturing and delamination above past workings in the Balgownie, Bulli and Wongawilli Seams at Russell Vale Colliery.

The phreatic surface within the overburden strata above the mining area is significantly below the level of the Cataract River and Cataract Creek. The only credible gradient is downward toward the mining horizons.

The depressurisation also extends over a significant regional extent associated with extraction in adjoining mines within the Bulli Seam to the east, south and north of Russell Vale Colliery.

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Q11 - How does the pressure profile indicate enhancement and what is the enhanced vertical flow?

A11 – RV20 is a borehole located over Longwall 4 in an area where triple seam mining has caused significant strata fracturing, delamination and associated groundwater depressurisation. The head vs depth pressure profile of the piezometric array shown below indicates that all the strata from 35 – 65m below surface in the Hawkesbury Sandstone and then from 65- 85 m in the Bald Hill Claystone is highly depressurised. There is evidence of a head pressure rise at 105 mbgl in the top of the Bulgo Sandstone. However, the piezometer at 134 mbgl in the Bulgo Sandstone is depressurised as shown in **Figure 1**.

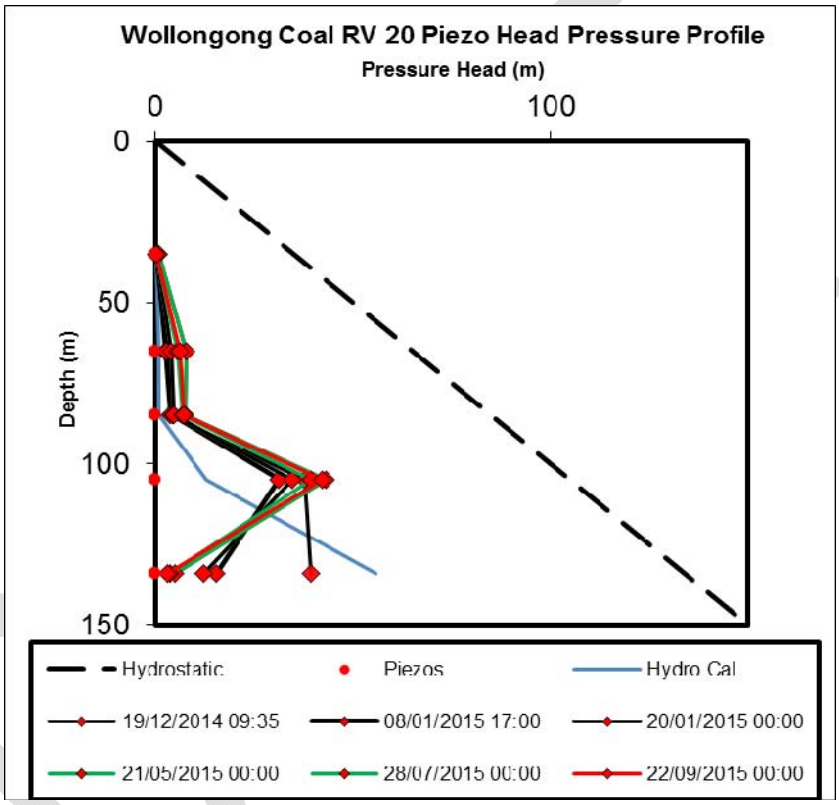

Figure 1 RV20 Pressure Head vs Depth Profile

The enhanced vertical flow rate, in terms of hydraulic conductivity, has not been directly measured, however the quantum of inflow into the underground workings is separated into inflows into Longwalls 4 and 5 and these inflows are consistent with downward flow through the overburden strata via a tortuous fracture network. The non-hydrostatic nature of the piezometric profile indicates the tortuous / discontinuous nature of the fracture network.

Q13 – What is the upper limit (of the height of depressurisation) and how is this determined?
A13 – The maximum height of depressurisation was derived based on vibrating wire piezometer (VWP) data over the various workings at Russell Vale Colliery. The maximum height of depressurisation varies depending on whether there has been 1, 2 or 3 phases of seam extraction, and on the interaction of the various adjoining mines, overlying fracture networks and strata delamination that has occurred as a result of mine subsidence.

The greatest height of strata depressurisation measured within the Russell Vale Colliery VWP network is within RV20, which is within a triple seam mined area overlying Longwall 4 in the Wongawilli Seam. At this location, the height of depressurisation extends to between 105mbgl and 134mbgl (approximately 220-240 m above the mining horizon), with a perched horizon that maintains up to about 40 m of head as represented by the 105mbgl VWP intake. The low piezometric heads measured above the 105mbgl VWP at the 35, 65 and 85mbgl VWPs indicate this zone is highly fractured and hydraulically connected and does not support a positive piezometric profile.

The height of depressurisation calculated using Tammetta (2012) is 148m for the Wongawilli Seam alone, assuming a 3.2 m mining height and 150 m wide panel at 350 m depth. The calculated height of depressurisation for all three seams is 290 - 340 m, assuming an equivalent seam thickness of 5.4 - 5.8 m.

The measured height of depressurisation (220 - 240 m) used in the model is significantly greater than the calculated values for mining the Wongawilli Seam alone, but less than the calculated value for the combined height of mining all three seams. The Tammetta equation is intended for single seam mining only, but the measured values are consistent with the range that would be expected.

Q14 – What is the level of confidence, or risk, associated with the reliability of this alternative approach?
A14 – The conceptual model of caving, fracturing and associated strata depressurisation used in the groundwater model was principally based on the observed VWP head versus pressure data within the Russell Vale Colliery overburden.

The relevant site data was initially incorporated into the Tammetta (2012) strata fracturing / strata depressurisation theory that was developed for single seam mining over an extracted longwall panel. However, the derived theoretical values did not correlate with the observed in-situ VWP depressurisation profile/s.

Where multiple seam extraction was conducted, the Tammetta (2012) theory was then modified by adding the cumulative thickness of all workings. This approach overestimated the height of depressurisation measured by the piezometers.

Subsequently, the Ditton and Merrick (2014) theory of strata fracturing / strata depressurisation (which was also developed for single seam mining over a longwall panel) was compared to the observed VWP data, and this theory also did not reliably predict the observed height of depressurisation using a RAMP function with a linear decline of enhanced vertical conductivity (weighted layer thickness) that did not match the observed groundwater pressures in the site VWPs, primarily in the Bulgo Sandstone.

As a result, the model utilised a modified version of a vertical conductivity RAMP function enhancement whereby a greater degree of enhancement was made within the Lower and Mid Bulgo Sandstone as shown in **Figure 2**.

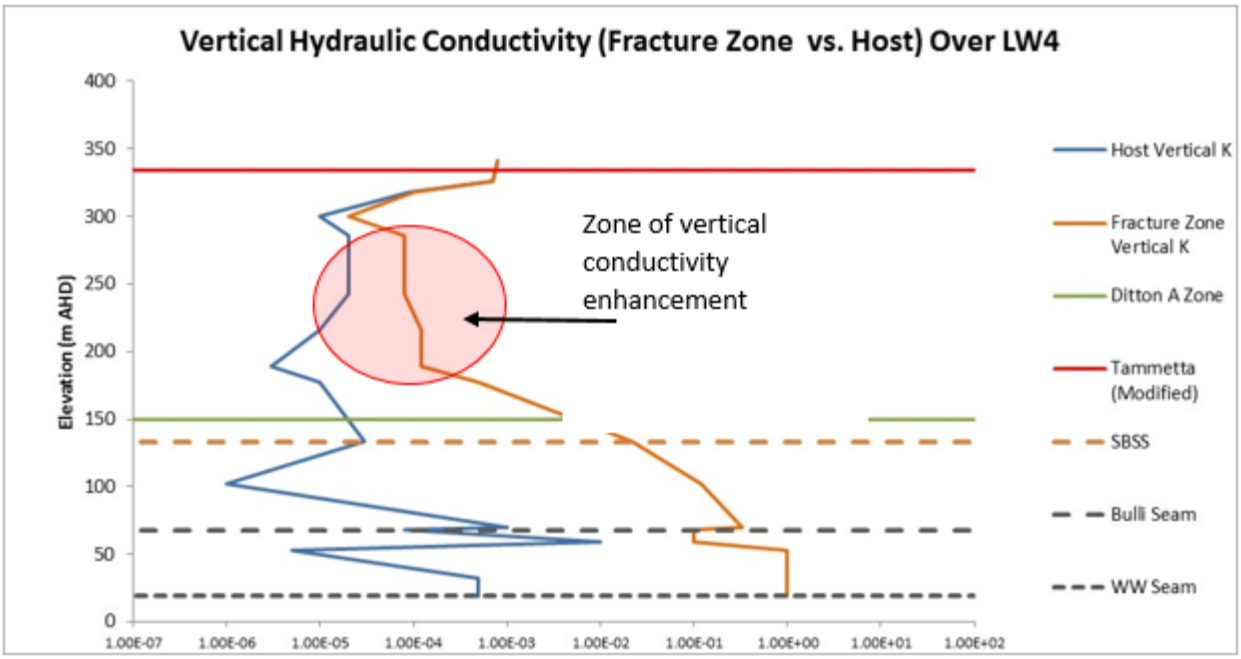

Figure 2 **Vertical Hydraulic Conductivity (Fracture Zone vs Host) Over LW4**

Q15 – Why was the height of the caved zone increased in areas of multi-seam mining when subsidence behaviour suggest that minimal additional voids result from extraction of second and subsequent seams that are in close proximity (that is, incremental subsidence approximates the extracted height of second and subsequent seams)

A15 – See response for A14.
In essence, the measured depressurisation from the suite of VWPs was used in the groundwater model set up and calibration, however they did not correlate well to the modified Tammetta (2012) (using cumulative seam thickness) theory, whilst the Ditton Merrick (2014) approach was less conservative and also was not used for this reason.

Q16
Paragraph 1 – (OEH comment – Tammetta equation provides a lower limit to prediction of the height of depressurisation)

Answer - see Q15 answer

Paragraph 2 – (OEH comment – height of depressurisation was predicted to extend to the surface over many areas)

Answer - surface to seam depressurisation was initially predicted over parts of LW3 – LW7 within the June 2014 Preferred Project groundwater modelling assessment (GeoTerra/ GES, 2014).

Following installation of the latest VWPs in July to December 2014 (RV16, 17, 22, 23, and particularly RV20) and subsequent detailed interpretation of the VWP steady state data, which was not available during the previous assessment, adherence to the previously modified (i.e., cumulative) Tammetta (2012) theory was assessed to be inappropriate.

The revised (GeoTerra / GES, 2015) groundwater report for the Preferred Project Report subsequently assessed that surface to seam depressurisation was not predicted to potentially occur at the end of the proposed mining of the Wongawilli Seam at Russell Vale East.

Depressurisation from surface to seam was predicted to occur in the southern tributary of Cataract Creek 100 years after mining Longwalls 1-3. The larger, northern tributary of Cataract Creek is not predicted by the groundwater model to experience surface to seam depressurisation.

The 2015 Integrated Risk Assessment concluded that due to the 700mm of closure predicted in the southern tributary of Cataract Creek over LW1-3 (SCT 2014) that the tributary would be potentially cracked, with potentially no connective overland flow over Longwalls 1-3. Therefore the underlying surface to seam strata depressurisation predicted by the groundwater model 100 years after completion of LWs 1 - 3 will have no additional detrimental effect on overland stream flow in the subsided and fractured tributary reach.

Although surface to seam depressurisation is predicted 100 years after cessation of mining over LWs 1-3, the actual annual flow loss from the stream in the latest version due to strata depressurisation, which incorporates the comments and model revisions provided in the January 2016 PAC suite of questions, is very low and is essentially indistinguishable from the previous (GeoTerra / GES, 2015) June 2015 assessment.

Depressurisation to surface is not predicted at the end of mining. However it is predicted to occur 100 years after mining to the east of Cataract Creek, adjacent

to, but not over, LW5. This is because the Hawkesbury Sandstone has been eroded through to the Bulgo Sandstone along this reach of the creek.
The predicted groundwater model stream baseflow losses associated with the potential surface to seam depressurisation adjacent to LW5 from Cataract Creek are XX ML/year and therefore not a significant proportion of total flows.

Paragraph 3 – (OEH comment) there is a serious risk to Cataract Creek from surface to seam hydraulic connection where Balgownie LW11, a Bulli Pillar extraction block and Wongawilli LW7 and LW8 coincide)

Answer – the assessment of potential areas of surface to seam depressurisation was based on a previous version of the groundwater modelling / reporting (GeoTerra / GES 2014) which utilised an analytical calculation of the revised (cumulative seam thickness) version of Tammetta (2012).

Subsequent to receipt, interpretation and incorporation in the study of additional VWP data after late 2014, and utilising a ramping depressurisation function in the (GeoTerra / GES, 2015) model, which was based on in-situ VWP pressure head distributions, the “risk” of the LW7 region in or near Cataract Creek depressurising to surface was no longer predicted. The potential risk of surface to seam depressurisation was present in GeoTerra / GES (2015), however, in a small area to the west of Cataract Creek and east of LW5, and over LWs1 -3 as explained in the previous (paragraph 2) answer.

Paragraph 4 – (OEH comment) Tammetta’s assessment of depressurisation underestimates the potential depressurisation due to multi seam mining, therefore the UEP risk assessment is out of step with statements and predictions by SCT / Coffey / IESC.

Answer – As outlined above, the latest version (GeoTerra / GES 2015) moved away from using the modified (multi-seam cumulative extraction thickness) Tammetta (2012) approach as the current suite of VWP data does not support the Tammetta (2012) theory in the multi-seam extraction environment at Russell Vale Colliery.

The latest assessment (GeoTerra / GES, 2015), which has been collaboratively derived between GeoTerra, GES and SCT Operations, is in joint agreement.

References

Ditton, S Merrick, N., 2014 A New Subsurface Fracture Height Prediction Model for Longwall Mines in the NSW Coalfields. Geological Society of Australia, 2014 Australian Earth Sciences Convention (AESC), Sustainable Australia. Abstract No.03EGE-03 (p.136) of the 22nd Australian Geological Convention, Newcastle, NSW

GeoTerra / GES, 2014 Russell Vale Colliery Underground Expansion Project Preferred Project Report Wonga East Groundwater Assessment, June 2014

GeoTerra / GES, 2015 Russell Vale Colliery Underground Expansion Project Russell Vale East Revised Groundwater Assessment, September 2015

Hansen Bailey, 2015 Russell Vale Colliery Underground Expansion Project Independent Risk Assessment Panel – Risk Assessment Supporting Technical Information, September 2015

SCT 2014 Update of Subsidence Assessment for Wollongong Coal Preferred Project Report Russell Vale No 1 Colliery, June 2014

SCT 2015 Assessment of Corrimal Fault and Dyke D8 at Russell Vale East as Risks to the Stored Waters of Cataract Reservoir, August 2015

Tammetta. P, 2012 Estimation of the Height of Complete Groundwater Drainage Above Mined Longwall Panels. Groundwater - Vol. 51, No. 5. (pp/723–734)

WRM Water & Environment, 2014 Russell Vale Colliery Wonga East Underground Expansion Project Surface Water Modelling, May 2014

WRM Water & Environment, 2015 Russell Vale Colliery Underground Expansion Project Surface Water Modelling: Response to Planning Assessment Commission, August 2015

regards

GeoTerra Pty Ltd

Andrew Dawkins
Director (AuSIMM CP-Env)

Question 22

What are the implications for Swamp CCUS4, both positive and negative, of not mining (the approximately 300m) section of Longwall 6 below the swamp?

The risks to swamp CCUS4 were assessed in the Integrated Risk Assessment. Mining of Longwall 6 will generate strains that have the potential to result in fracturing of the underlying bedrock or the controlling rockbar. Such fracturing may result in impacts to the perched water table. The Tea-tree Thicket and Cyperoid Heath sub-communities, which are present within the central area of CCUS4, are reliant on near surface expression of the perched water table. Fracturing of the bedrock or controlling rockbar may result in transitioning from wetter sub-communities to drier sub-communities. At present, the majority of swamp CCUS4 consists of the Banksia Thicket sub-community, which is not reliant on the perched water table.

Avoidance of mining the section of Longwall 6 beneath swamp CCUS4 will reduce the magnitude of the strains that the swamp will experience. Although the swamp will experience some subsidence from mining of the adjacent longwall panels, the avoidance of mining directly beneath the swamp will reduce the risk of impacts to its ecological values. The cost of avoiding mining directly beneath swamp CCUS4 is the value of the coal foregone and the cost of relocating the longwall miner. The cost of this avoidance measure is estimated at $10M.

Question 23

The commission understands that the first 365m of Longwall 6 were mined in 2015, what impact has this had on swamp CCUS4 to date?

To date, WCL has mined the first 340 m of Longwall 6. WCL has installed four piezometers in swamp CCUS4 to monitor water levels, moisture profiles and water quality. The data collected from these piezometers has indicated that mining of Longwall 6 (to date) has not observably affected swamp water levels, water storage or water quality. A detailed report (GeoTerra, 2015) is provided in Appendix O of the *Russell Vale Colliery Underground Expansion Project (EPBC2014/7268) Environmental Impact Statement* (Hansen Bailey, 2015).

NSW GOVERNMENT | Planning & Environment

Mr Joe Woodward
Member
Planning Assessment Commission
GPO Box 3415
Sydney NSW 2001

Dear Mr Woodward

I refer to the email from the Planning Assessment Commission dated 27 January 2016 in relation to the proposed Russell Vale Underground Expansion Project (MP 09_0013).

As requested, the Department has provided a response to the Commission's request for additional information regarding the benchmarking of noise levels for the proposed pit top operations.

Should you have any enquiries regarding this response, I have arranged for Mr Howard Reed, Director Resource Assessments, to assist you. Mr Reed can be contacted on telephone number 9228 6308.

Yours sincerely,

Howard Reed

for David Kitto 4.2.16
Executive Director
Resource Assessments & Business Systems

RUSSELL VALE COLLIERY
UNDERGROUND EXPANSION PROJECT (MP 09_0013)
RESPONSE TO PLANNING ASSESSMENT COMMISSION'S
INFORMATION REQUEST DATED 27 JANUARY 2015

Applicability of the Voluntary Land Acquisition and Mitigation Policy

PAC's Comments:
As a result of concerns about intrusive noise in public submissions and also at the Public Hearing, the PAC is seeking clarification regarding the benchmarking of noise levels in the Department's addendum report and the subsequent inability to apply the provisions of the Voluntary Land Acquisition and Mitigation Policy (VLAMP).

I understand the existing noise levels as described on page 19 in the Department's addendum report are actually a modelled noise level based on the existing practices. These noise levels are adopted as the benchmark and when compared to the noise levels produced by modelling the existing practice with mitigation (ie the existing mitigated), there is understandably a negligible or beneficial outcome. Hence, the Department's report states the mitigation or acquisition provisions of the VLAMP do not apply.

The NSW Government's new *Voluntary Land Acquisition and Mitigation Policy* (VLAMP, November 2014) specifically states that a consent authority cannot grant voluntary mitigation and acquisition rights to reduce operational noise impacts for:

> *"existing developments with legacy noise issues, where the modification would have beneficial or negligible noise impacts. In such cases, these legacy noise issues should be addressed through site-specific pollution reduction programs under the Protection of the Environment Operations Act 1997".*

The Russell Vale Colliery's pit-top operations fit into this category. The pit top site is an existing development that has been operated as a colliery pit top since 1887. As a result of long occupation of the site, until recently much of the plant and equipment as well as work practices were dated and did not represent best practice. From the 1960s until 2003 a coal washery and coal preparation plant operated on site. Washeries are traditionally a significant source of noise annoyance and often the source of complaints regarding low frequency noise and tones.

Whilst the old washery has been demolished, the Department identified a number of noise sources that it believed could be mitigated. Consequently, a number of noise surveys were undertaken to identify areas for improvement and noise mitigation works have been implemented at the site to reduce noise to residents living in the vicinity of the site.

Table 1 below presents a summary of historical night-time noise levels in the vicinity of the pit top operations and compares these to the current and proposed operational scenarios. This information was presented in Table 6 of Section 6.7.1 of the *Secretary's Environmental Assessment Report* (December 2014) and expanded in Table 2 of Section 3.6.1 of the *Secretary's Addendum Report* (November 2015).

Table 1: *Historical Noise Levels Compared to Current and Proposed Nights*

Receiver Id	Location	Noise Level dB(A) Historical	Existing Night	Proposed Night
R1	16 West St, Russell Vale	56	45	43
R2	30 West St, Russell Vale	52 - 59	47	44
R4	13 Broker St, Russell Vale	48	45	43
R9	109 Midgley St, Corrimal	NA	42	43
R12	46 Lyndon St, Corrimal	Low 40's - 47	40	39

The actual and predicted noise levels presented in **Table 1** show that the noise levels in the vicinity of the pit top operations have been reducing from historic levels, and are predicted to continue to reduce under the proposed Underground Extraction Project (UEP). The Department considers it clear that the:

- pit top site is an existing operation with legacy noise issues; and
- proposed UEP would have beneficial or negligible noise impacts.

The Department therefore maintains that, under existing Government policy (ie the VLAMP), the consent authority should not grant voluntary mitigation and acquisition rights in response to the operational noise impacts of the UEP.

Noise Audit 2012

PAC's Comments:
The result of the noise audit from 2012 show lower noise levels than the modelled existing noise levels. If the 2012 noise levels are used as the benchmark rather than the modelled noise levels, then at night, there is a deterioration of noise amenity for a number of receivers. This deterioration may then allow the provisions of the VLAMP to apply. Having regard to the short term of the 5 year approval, the existing status of the mine and the intrusion of the residences into the mining area, it may be argued that the application of mitigation works at the receivers rather than acquisition would be appropriate.

In accordance with the existing Preliminary Works Project Approval (MP10_0046), the previous owner of Russell Vale Colliery (Gujarat NRE Coking Coal Ltd) engaged Pacific Environmental Limited (PEL) to undertake a noise audit, which was conducted on-site in late 2012.

As identified by the PAC, the night-time noise levels measured at a number of receivers (refer to Appendix B of the *Noise Audit*) were lower than the modelled existing noise levels presented in the *Noise Assessment* undertaken by Wilkinson Murray in 2014.

However, the Department does not consider this to be an unexpected or unusual result. Noise measured during the audit presents a single snapshot of the mining operations and weather conditions that were in place at the particular time during which attended monitoring was undertaken (ie on 28 November 2012). The audit did not coincide with nor represent the colliery operating at full production (even under the existing approval), nor did it necessarily represent adverse noise enhancing meteorological conditions for all receivers. That is, it is very likely that the audit sampled noise emissions which were substantially less than worst-case current emissions and impacts.

Current noise policy requires noise level objectives to apply under "worst-case operational and meteorological conditions". The Department therefore does not consider that it is realistic or applicable to use noise levels measured during the short timeframe of the noise audit as 'benchmark' noise levels.

Modelled Vs Actual Noise Levels

PAC's Comments:
The EPA in its letter dated the 20 August 2015 suggests that there is an avenue for the PAC to consider the imposition of mitigation at the receivers where the noise exceeds the PSNL.

It is acknowledged that the mine operations have fluctuated over the history of the mine and that the noise levels during the time of the washery were higher, however the washery ceased operation in 2003. The PAC is questioning the use of a modelled benchmark adopted in the report rather than using the actual noise levels. Does the VLAMP or the Industrial Noise Policy provide guidance for the establishment of the benchmark to determine if the project has beneficial noise outcomes? Could the Department please review this and provide any additional justification for the proposed approach.

Due to operational constraints, the Russell Vale Colliery has not operated at its approved production level of 1 million tonnes per annum (Mtpa) for a long time. At no point in time has the Colliery operated at the level of production proposed under the UEP (ie 3 Mtpa), in conjunction with the existing and/or proposed noise mitigation measures in place.

This means that the collection of robust empirical data that are directly relevant to the proposed production is not possible. However, the modelling techniques typically used by acoustic consults to compare noise impacts over time are generally considered to be well-advanced and scientifically sound. In most cases the modeling technique is preferable to empirical monitoring, particularly where the differences are likely to be small and/or difficult to measure.

It is important to note the during June 2015, Wilkinson Murray undertook additional noise measurements at the pit-top site to verify noise levels of activities and equipment following implementation of recently installed mitigation measures (see Appendix B of the *Response to Planning Assessment Commission Review Report – Part 1*, Hansen Bailey, 23 July 2015). The results were consistent with those set out in Wilkinson Murray's 2014 *Noise Assessment*.

In situations where the VLAMP is not applicable, the *NSW Industrial Noise Policy* (INP) states that "*decisions of this nature will be determined on a case-by-case basis, taking into account various factors, for example, feasible and reasonable mitigation works, the absolute level of noise and existing measures of community impact including complaints.*"

The EPA and the Department both accept that all reasonable and feasible noise mitigation measures have been adopted by Wollongong Coal for the project. In addition, as discussed in Section 3.6.4 of the *Addendum Report*, Wollongong Coal would be required to investigate any additional improvements associated with the operation of the tripper and noise barriers and, if considered beneficial, they would also be implemented.

As stated in the *Environmental Assessment Report*, the Russell Vale pit top site is the only industrial noise source in the catchment and as a consequence of current land use zoning no further industrial noise sources can be established nearby. Therefore, in the knowledge that there can be no further increase in industrial noise, the Department believes it is reasonable to limit noise from the Russell Vale pit top site to levels that do not exceed the Acceptable Amenity Criteria for the area. This approach is in line with the draft *Industrial Noise Guideline*, which states that '*the recommended amenity noise levels represent the objective for total industrial noise at a receiver location*'.

It should also be noted that both the INP and the draft ING allow the Amenity Noise Criteria to increase by a further 5 dB where there is an existing interface with an industrial facility. Whilst the nearest receivers to the Russell Vale Colliery would be classified as being in an industrial interface zone (thereby bringing this additional 5 dB into play), it was not necessary for the Department to pursue this line of assessment given that the more stringent threshold was not expected to be exceeded under the project.

Predicted noise levels represent worst-case scenarios that would only occur less than 10% of the time. Although the predicted noise levels mostly exceed the PSNLs, in no case would the predicted levels exceed the Acceptable Amenity Criteria. Furthermore, stringent operational restrictions recommended in the draft project approval would mean that the operations would be quieter during the most sensitive time-periods.

Finally, it should be noted that under the proposed draft *Industrial Noise Guideline*, the PSNLs for industries that have operated for a long period of time in one location, such as the Russell Vale Colliery, will no longer be treated the same as for greenfield sites. In these cases, the PSNLs will increase substantially.

In summary, the Department believes that the methodology undertaken is the most reasonable and applicable option, considering:

- the pit top site is an existing operation that predates all of the surrounding receivers;
- the proposed noise limits represent significant reductions on historical levels;
- the proposed noise limits are realistic and consistent with best practice for the site;
- the proposed noise limits are below the acceptable INP's industrial noise amenity levels for a suburban land use adjoining an industrial site; and
- intrusive noise criteria for the site, if generated in accordance with the draft *Industrial Noise Guideline*, would increase substantially.

---

5 February 2016

Dave Clarkson
Group Environment and Approvals Manager
Wollongong Coal
PO Box 281
FAIRY MEADOW NSW 2519

Dear Dave,

Response to PAC Questions

Our Ref: Matter 19508

In January 2016 correspondence was received from the NSW Planning Assessment Commission (PAC) requesting clarification on some items and further information for the assessment of Wollongong Coal's Underground Expansion Project (UEP). These questions were forwarded to Biosis from Hansen Bailey on 18 January 2016. Two of these questions related to upland swamps.

This letter provides a response to these questions, integrating information from SCT Operations, Wollongong Coal and Biosis.

Question 22

What are the implications for Swamp CCUS4, both positive and negative, of not mining (the approximately 300m) section of Longwall 6 below the swamp?

The risks to swamp CCUS4 were assessed in the Integrated Risk Assessment. Mining of Longwall 6 will generate strains that have the potential to result in fracturing of the underlying bedrock or the controlling rockbar. Such fracturing may result in impacts to the perched water table. The Tea-tree Thicket and Cyperoid Heath sub-communities, which are present within the central area of CCUS4, are reliant on near surface expression of the perched water table. Fracturing of the bedrock or controlling rockbar may result in transitioning from wetter sub-communities to drier sub-communities. At present, the majority of swamp CCUS4 consists of the Banksia Thicket sub-community, which is not reliant on the perched water table.

To assess the implications for CCUS4 if the swamp was not mined beneath subsidence modelling was undertaken by SCT Operations assuming a maingate cut through (C/T) would be required for longwall face installation and lining up the start of 6B with the nearest outbye C/T. This resulted in an approximately 230 metre section of CCUS4 not being mined beneath.

Avoidance of mining the section of Longwall 6 beneath swamp CCUS4 will reduce the magnitude of the strains that the swamp will experience. Although the swamp will experience some subsidence from mining of the adjacent longwall panels, the avoidance of mining directly beneath the swamp will reduce the risk of fracturing of bedrock and changes in flow pathways into and through the swamp, and subsequent impacts to its ecological values.

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Wollongong Resource Group

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It should be recognised that Wollongong Coal has undertaken a substantial body of work to avoid and minimise impact to upland swamps, including best-practice LiDAR mapping of upland swamp, and changes in the mine plan, resulting in the avoidance and minimisation of impacts to swamps CCUS1, CRUS3, CCUS5 and CCUS10. Wollongong Coal advises that this has resulted in it foregoing 1.8 million tonnes of coal and $80 M of revenue.

The cost of further avoiding mining directly beneath swamp CCUS4 is the value of the coal foregone and the cost of relocating the longwall miner. The cost of this avoidance measure is estimated at $10M and is considered by Wollongong Coal to outweigh its benefits. Wollongong Coal advises that if longwall mining has to avoid the remainder of LW6 , this would require an additional $10 M capital expense and increased working capital requirements.

Question 23

The commission understands that the first 365m of Longwall 6 were mined in 2015, what impact has this had on swamp CCUS4 to date?

To date, Wollongong Coal has mined the first 340 metres of Longwall 6. Wollongong Coal has installed four piezometers in swamp CCUS4 to monitor water levels, moisture profiles and water quality. The data collected from these piezometers has indicated that mining of Longwall 6 (to date) has not observably affected swamp water levels, water storage or water quality. A detailed report (GeoTerra, 2015) is provided in Appendix O of the Russell Vale Colliery Underground Expansion Project (EPBC2014/7268) Environmental Impact Statement (Hansen Bailey, 2015).

Please contact me if you have any enquiries.

Yours sincerely

Nathan Garvey
Senior Consultant Ecologist