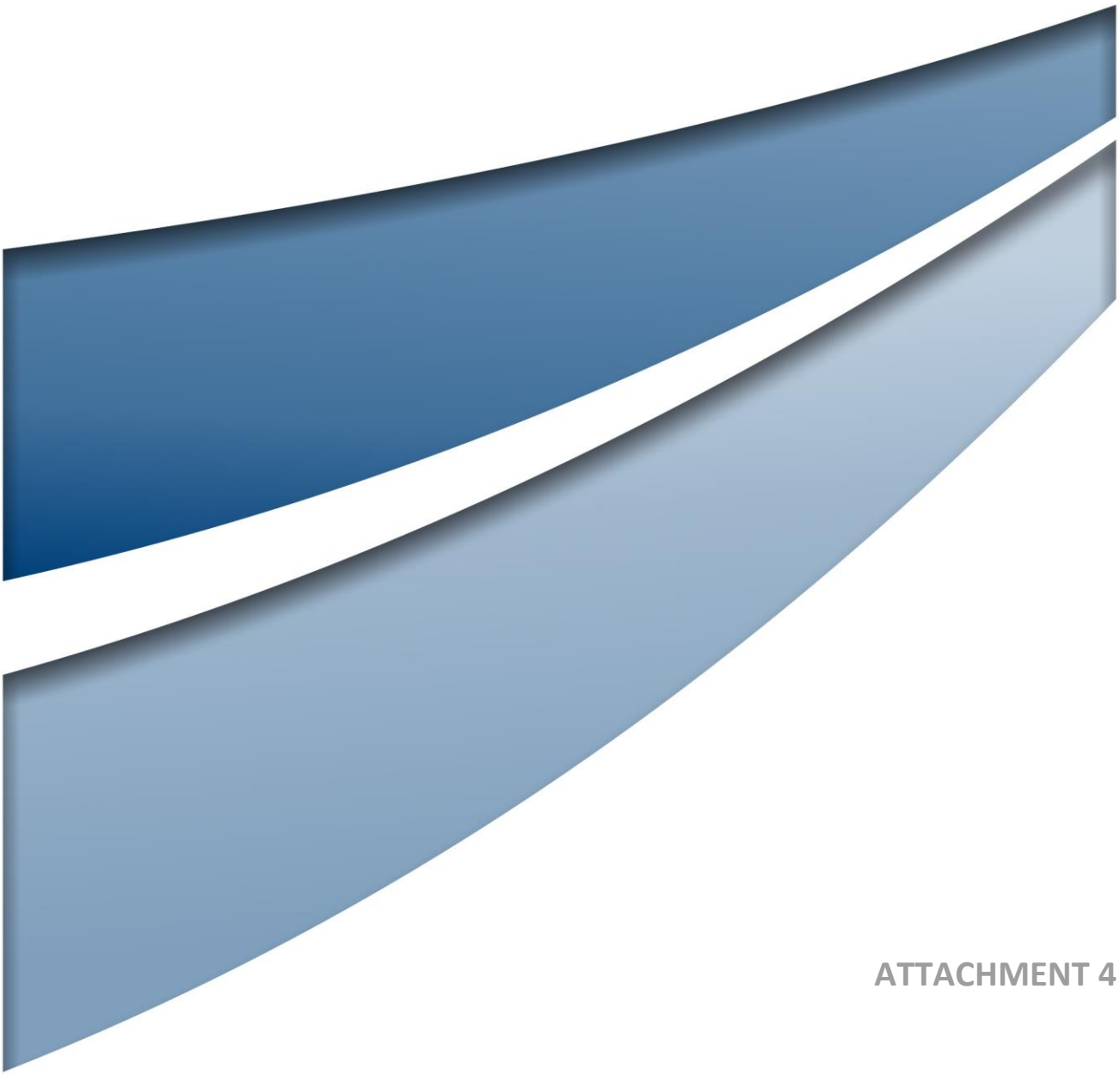

ATTACHMENT 4

NSW GOVERNMENT | Planning & Environment

ADDENDUM REPORT:

MAJOR PROJECT ASSESSMENT Russell Vale Colliery Underground Expansion Project (MP 09_0013)

Section 75I of the
Environmental Planning and Assessment Act 1979
November 2015

Main photo sourced from:
http://www.miningaustralia.com.au/news/wollongong-coal-cuts-more-jobs-at-russell-vale-min

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NSW Department of Planning and Environment

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EXECUTIVE SUMMARY

This Addendum Report (AR) for the Russell Vale Colliery Underground Expansion Project (the UEP) has been produced by the Department of Planning and Environment (the Department) for consideration by the Planning Assessment Commission (the Commission).

This AR focuses on the residual matters identified in the Commission's *Russell Vale Colliery – Underground Expansion Project - Review Report* dated 2 April 2015, responses to that report by the proponent Wollongong Coal Pty Ltd (Wollongong Coal) and additional information received from technical specialists and key Government agencies since the Commission's review.

The Commission's report made 15 recommendations regarding additional work and assessment that it considered should be carried out prior to a determination being made. These were in relation to:

- establishment of an Independent Risk Assessment Panel to oversee an Integrated Risk Assessment, particularly focusing on links between subsidence and impacts of the proposal;
- re-running the existing groundwater model;
- establishment of a network of piezometers within and around the upland swamps;
- consideration of any additional Government policy developed regarding swamp-related triggers for offsets and mitigation measures under the *"Policy Framework for Biodiversity Offsets for Threatened Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence"*;
- revision of the existing economic assessment to reflect the current economic climate and an independent analysis of the revised assessment;
- further consideration of the noise impacts of the project, including justification for any deviations from the existing noise limits and clarification on the outcomes and applicability of the noise audit;
- assessment of $PM_{2.5}$ dust emissions from the project and strengthening of the monitoring and reporting systems for air quality;
- further justification for the proposed flood mitigation measures for Bellambi Creek;
- negotiations with Wollongong City Council (Council) and Road & Maritime Services in relation to road maintenance contributions;
- consideration of further limiting the hours of truck movements and options to reduce the noise impacts to residents along Bellambi Lane; and
- demonstration that the pit-top infrastructure and facilities can handle the additional volume of coal without unacceptable impacts for local residents.

The Department considered the Commission's recommendations and then required Wollongong Coal to undertake additional work and assessment to satisfy these recommendations, including the:

- establishing the Independent Risk Assessment Panel and completion of an Integrated Risk Assessment;
- implementing extensive additional technical studies, including re-running the groundwater model;
- expanding the existing network of piezometers in and around the upland swamps;
- preparing a revised *Economic Assessment*, including an updated Cost Benefit Analysis which calculates the benefits of the project using the latest projected coal prices and foreign exchange rates;
- completing an independent analysis of the economic costs and benefits of the UEP as presented in the revised *Economic Assessment;*
- assessing the potential noise reductions associated with noise mitigation measures recommended by the Environment Protection Authority and analysing the costs of implementing the noise controls;
- assessing the predicted $PM_{2.5}$ dust emissions associated with the UEP;
- revising the *Bellambi Creek Flood Study* to incorporate a range of measures to reduce clean runoff entering the stockpile area, whilst ensuring that all site runoff is released in a controlled way to Bellambi Gully Creek;
- preparing an additional noise assessment to analyse the noise control efficacy of constructing a noise barrier around the site; and
- preparing a *Materials Handling Assessment* to assess the ability of the proposed infrastructure to handle an increase in production from 1 million tonnes per annum (Mtpa) to 3 Mtpa.

In addition, the Department has amended and strengthened its recommended conditions to require:

- the approach to offsetting for upland swamps to fully reflect the *Policy Framework for Biodiversity Offsets for Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence*, which is expected to be finalised shortly;
- continuing investigation and implementation of any additional reasonable and feasible noise and air quality mitigation measures; and
- implementing on-site flood mitigation measures for Bellambi Creek within 12 months.

The Department is satisfied that the project would provide economic and social benefits for the Illawarra region and for NSW as a whole. These benefits include:

- direct employment of 300 people during mining operations;
- direct employment of an additional 100 people during construction of surface facilities;
- estimated indirect employment of up to 800 people in the local and regional area;
- a total of $85 million in capital investment ($18 million during construction and $67 million during operations); and
- $23 million to the State of NSW in royalties.

The Department is satisfied that its recommended conditions, which incorporate a number of changes as recommended by the Commission, are based on contemporary policy and reflect current best-practice for the management of underground coal mines in NSW, and are equitable and enforceable.

Following its consideration of the Commission's Report and Wollongong Coal's response, and the changes made to the recommended conditions, the Department is satisfied that the project is, on balance, in the public interest, and recommends that it be approved, subject to the recommended conditions of approval.

1.0 INTRODUCTION

1.1 Background

This Addendum Report (AR) has been produced for the consideration of the Planning Assessment Commission (the Commission).

The AR supplements the Secretary's *Preliminary Assessment Report* (PAR, December 2014) for the Russell Vale Colliery Underground Expansion Project (MP 09_0013) (the UEP), which provides a detailed assessment of the key issues in accordance with the requirements of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and remains part of the Secretary's environmental assessment report for the project.

This AR considers the:

- recommendations made in the Commission's *Russell Vale Colliery – Underground Expansion Project - Review Report* (2 April 2015);
- additional information since received from Wollongong Coal Pty Limited (Wollongong Coal) and its technical specialists; and
- further advice received from key Government agencies.

1.2 Project Overview

Wollongong Coal is seeking approval to extend its existing approved underground mining operations, to allow it to extract coal for an additional 5 years. The UEP would involve:

- continued mining operations to extract 4.7 million tonnes (Mt) of run-of-mine (ROM) coal from the Wongawilli Seam in the Wonga East domain from a total of eight longwalls (Longwalls 1, 2, 3, the remaining length of Longwall 6[1], and Longwalls 7, 9, 10 and 11);
- upgrade of and continued operation of the pit-top area, support facilities and utilities;
- continued minimal processing (sizing and screening) of up to 3 Mt per annum (Mtpa) of ROM coal at the pit-top area;
- continued exploration activities, environmental monitoring and maintenance of access to the existing underground workings and surface infrastructure within exploration and mining tenements in the Wonga West domain;
- continued transport of ROM coal from the mine by road to the Port Kembla Coal Terminal (PKCT) for export; and
- disposal of coal rejects adjacent to the mine site and rehabilitation of the site.

The proposal would also consolidate the mining operations associated with the mine's existing Preliminary Works Project (PWP) approval, into one integrated project approval.

The major components of the UEP are depicted in **Figures 1** and **2**.

1.3 Overview of Commission's Review Findings

The Commission's Review Report concluded that:

> *"At this stage, the Commission does not have sufficient information or confidence to determine the merits of the proposal sufficient for a determination for approval. It may be possible for the proposal, or a modified proposal to be approved if all the additional information identified in this Review report provides a greater level of confidence for the protection of the water quality and quantity in the Sydney Catchment Area and satisfies all the other issues identified in this review."*

The Commission made 15 recommendations regarding additional work and assessment that it considered should be carried out prior to a determination being made. These were in relation to:

- establishment of an Independent Risk Assessment Panel (IRAP) to oversee an Integrated Risk Assessment (IRA), particularly focusing on links between subsidence and impacts of the proposal;
- re-running the existing groundwater model;
- establishment of a network of piezometers within and around the upland swamps;

[1] Total length of LW6 is 1,120 metres (m), but only 340 m has been extracted to date.

- consideration of any additional Government policy developed regarding swamp-related triggers for offsets and mitigation measures under the *"Policy Framework for Biodiversity Offsets for Threatened Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence"*;
- revision of the existing economic assessment to reflect the current economic climate and an independent analysis of the revised assessment;
- further consideration of the noise impacts of the project, including justification for any deviations from the existing noise limits and clarification on the outcomes and applicability of the noise audit;
- assessment of $PM_{2.5}$ dust emissions from the project and strengthening of the monitoring and reporting systems for air quality;
- further justification for the proposed flood mitigation measures for Bellambi Creek;
- negotiations with Wollongong City Council (Council) and Road & Maritime Services in relation to road maintenance contributions;
- consideration of further limiting the hours of truck movements and options to reduce the noise impacts to residents along Bellambi Lane; and
- demonstration that the pit-top infrastructure and facilities can handle the additional volume of coal without unacceptable impacts for local residents.

***Figure 1**: Russell Vale Colliery Pit-top Surface Facilities*

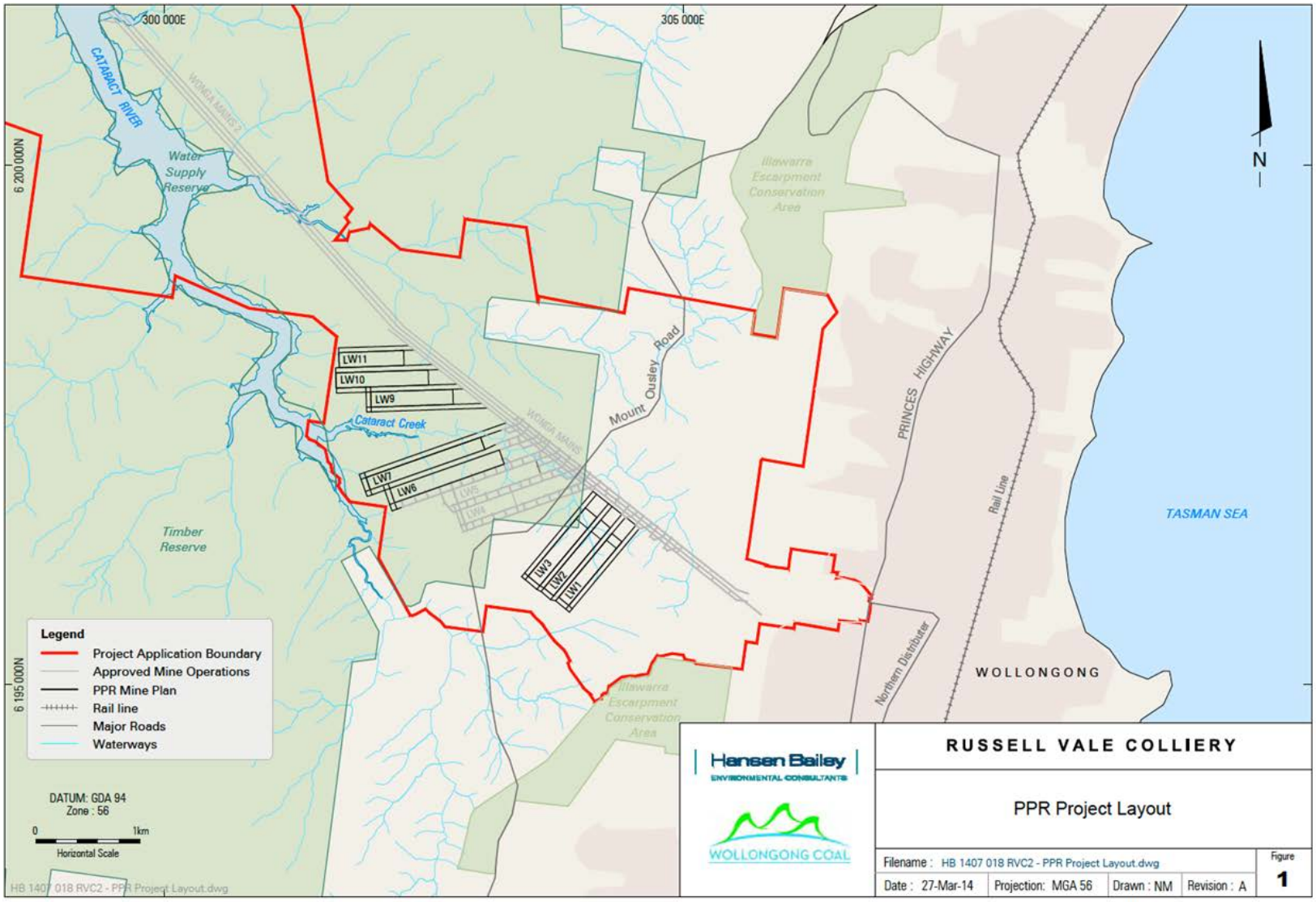

Figure 2: *Preferred Project Longwall Layout*

1.4 Chronology of Events

A chronology of the key events relevant to this AR in the time since the Department's referral of its PAR to the Commission to consider as part of its merit review of the UEP is presented in **Table 1**.

Table 1: *Chronology of Events*

Date	***Event***
9 December 2014	Secretary's Preliminary Assessment Report referred to Commission
9 January 2015	Wollongong Coal submits a revised *Bellambi Creek Flood Study*, prepared by Cardno (NSW/ACT) Pty Ltd (Cardno) to the Department and Commission (**Appendix A**)
3 February 2015	Commission holds public hearings
19 February 2015	Wollongong Coal submits document titled *Response to Public Hearing*, prepared by Hansen Bailey, to the Commission
2 April 2015	Commission finalises its review and refers its *Review Report* to the Department (**Appendix B**)
5 June 2015	Department approves the members of Wollongong Coal's Independent Risk Assessment Panel (IRAP)
19 June 2015	Wollongong Coal, in consultation with key agencies, finalises the IRAP's Terms of Reference (**Appendix C**)
23 July 2015	Wollongong Coal submits *Response to Planning Assessment Commission Review Report – Part 1 (Part 1 Response),* prepared by Hansen Bailey, including a response to the economic, noise, air quality and flooding issues raised by the Commission (**Appendix D**)
14 August 2015	Wollongong Coal submits draft *Risk Assessment Report* and a draft *Risk Register* which were prepared by Broadleaf Capital International Pty Ltd (Broadleaf)
19 August 2015	Wollongong Coal submits draft *Independent Risk Assessment Panel – Risk Assessment Supporting Technical Information,* prepared by Hansen Bailey, including updated surface and groundwater modelling and assessments, and specialist studies regarding the suitability of the protective barrier between the proposed mining and Cataract Reservoir
20 August 2015	Department distributes the above information to agencies for comment
20 August 2015	Environment Protection Authority (EPA) submits a letter to the Department commenting on Wollongong Coal's response to the Commission's Recommendations 7-10 related to noise and particulate emissions (**Appendix E**)
2 September 2015	Department engaged the Centre for International Economics (CIE) to undertake an independent analysis of the project's economic costs and benefits
7 September 2015	Department provides Wollongong Coal with review comments on the draft Integrated Risk Assessment (IRA) process and draft documentation, including comments received from other agencies (**Appendix F**)
10 September 2015	Dams Safety Committee (DSC) confirms to Wollongong Coal and the Department that it is satisfied with the company's approach to developing effective closure and contingency plans (**Appendix G**)
28 September 2015	Wollongong Coal submits *Response to Planning Assessment Commission Review Report – Part 2,* prepared by Hansen Bailey, including the final IRA and a response to the Commission's upland swamp recommendations (**Appendix H**)
7 October 2015	Department distributes the above information to agencies for final comment
14 October 2015	CIE submits its independent economic analysis of the project titled *Review of CBA for Russell Vale Extension* (**Appendix I**)
8-22 October 2015	Department receives final comments from agencies on the IRA and supporting information (**Appendix J**)
23 October	Minister asked the Commission to carry out a second review of the project (with public hearings) and to report back within 5 weeks of receiving this report (**Appendix K**)

2.0 INTEGRATED RISK ASSESSMENT AND PANEL

Commission Recommendation 1

The establishment of a risk assessment panel, constituted by an independent Chair, WaterNSW, the Dams Safety Committee, the Division of Resources and Energy and the proponent to oversee an integrated risk assessment, particularly focusing on links between subsidence and water (both groundwater and surface water) impacts of the proposal. This risk assessment, including associated work rerunning the groundwater modelling as recommended by Dr Mackie; and addressing the issues raised by the relevant agencies and experts (as highlighted by this report), needs to be completed before the application can be determined.

2.1 Risk Assessment Methodology

In addressing this recommendation, the Department and other affected agencies initially met and agreed that it was inappropriate for government agency representatives to constitute an independent panel which could be considered to be advocating for or otherwise endorsing proposals by a mining company. Instead, it was agreed that the IRAP should consist of an independent Chair and independent specialists in groundwater, surface water, upland swamps and subsidence. The Department engaged in extensive discussions with Wollongong Coal over a suitable membership, including a proposal to include additional subsidence expertise on the panel. On 15 June 2015, the Department approved the structure and membership for the IRAP. As a result, the approved IRAP comprised:

- *Chairperson* - Ismet Canbulat, Professor of Rock Mechanics at UNSW;
- *Subsidence* - Arthur Waddington, Managing Director (Mine Subsidence Engineering Consultants);
- *Groundwater* - Andrea Madden, Principal Hydrogeologist (WSP – Parsons Brinkerhoff);
- *Surface Water* - Steve Perrens, Principal (Advisian, formerly Evans & Peck); and
- *Upland Swamps* - David Robertson, Director (Cumberland Ecology).

The scope of the risk assessment proposed to be considered by the IRAP and thereby satisfy the Commission's request was first drafted by Wollongong Coal, and then discussed with the Department and other key agencies. Following extensive review by the Department and other agencies, the scope was then stipulated in an approved Terms of Reference (ToR) for the IRAP on 19 June 2015 (see **Appendix C**). In summary, the ToR require Wollongong Coal to:

- constitute an IRAP to conduct an ongoing assessment of the risks to Cataract Reservoir, groundwater, surface water and upland swamps during the extraction of longwalls associated with the project;
- develop a risk assessment methodology;
- utilise the latest available data to identify and assess the risks related to the extraction of the project longwalls;
- engage experts to assist and/or review the Risk Assessment Report and any other specialist studies;
- consult with regulatory authorities and WaterNSW during the process; and
- implement advice from the IRAP during the Extraction Plan and post-approval stages of the project.

Wollongong Coal then engaged a risk assessment specialist, Dr Dale Cooper from Broadleaf Capital International Pty Ltd (Broadleaf), to facilitate risk assessment workshops, which were held during July and August 2015. During this process, a risk assessment methodology was agreed and an Integrated Risk Assessment (IRA) was conducted. The IRAP made a number of recommendations for the provision of additional technical information.

A draft *Integrated Risk Assessment* (IRA), including a *Risk Register*, was subsequently prepared by Broadleaf and distributed to the IRAP and affected agencies on 14 August 2015. The technical information requested by the IRAP was included in a draft document titled *Independent Risk Assessment Panel – Risk Assessment Supporting Technical Information* (the *Technical Information report*), which was prepared by Hansen Bailey and submitted to the Department on 19 August 2015 and then to agencies. This document included the following additional specialist studies:

- *Review of Barrier to Protect Stored Waters of Cataract Reservoir,* SCT Operations Pty Ltd (SCT), 12 August 2015 (Appendix B of the *Technical Information report*);
- *Assessment of Corrimal Fault and Dyke 8 at Russell Vale East as Risks to the Stored Waters of Cataract Reservoir,* SCT, 19 August 2015 (Appendix D of the *Technical Information report*);
- *Russell Vale Colliery Underground Expansion Project, Russell Vale East, Revised Groundwater Assessment,* Geoterra Pty Ltd and GES Pty Ltd, 18 August 2015 (Appendix E of the *Technical Information report*); and
- *Russell Vale Colliery Underground Expansion Project – Surface Water Modelling: Response to Planning Assessment Commission,* WRM Water & Environment Pty Ltd (WRM), 19 August 2015 (Appendix F of the *Technical Information report*).

On 7 September 2015, the Department provided formal review comments to Wollongong Coal on the IRA process and the draft IRA and the *Technical Information report*, including comments received from the Dams Safety Committee (DSC), Office of Environment & Heritage (OEH), WaterNSW and subsequently the Division of Resources & Energy (DRE) of the Department of Industry. A copy of these comments is provided at **Appendix F**.

2.2 Final Integrated Risk Assessment (IRA)

On 28 September 2015, Wollongong Coal submitted a document titled *Response to Planning Assessment Commission Review Report – Part 2* (Hansen Bailey). This document includes the final IRA, which reports the outcomes of the risk assessment, provides the final versions of the technical information requested by the IRAP and responds to the issues raised by agencies. Copies of the final IRA and associated *Risk Register* are provided in Appendix A and B of Appendix A of the Part 2 response, respectively. A copy of the Part 2 response is provided at **Appendix H** of this AR.

The final IRA includes the same four technical studies as the *Technical Information report*, but now numbered as Appendices D, F, H and I, respectively. The *Groundwater Assessment* and the *Surface Water Modelling* were also revised to specifically address residual issues raised by agencies.

In addition, in response to a further request from the IRAP, the Part 2 document also includes the following reports:

- *Response to Residual Matters from the Independent Risk Assessment Panel Comments*, 12 September 2015, SCT (Appendix G of the Part 2 response). This letter report addresses issues in relation to the:
  - reliability of the mine plan in the Bulli Seam at the start of LW7;
  - clarification of closure movements on Cataract Creek;
  - uncertainty of subsidence predictions;
  - effectiveness of underground seals at the Colliery; and
  - potential for horizontal shears to influence mine flow; and
- *Underground Expansion Project, Independent Risk Assessment – Addendum Report*, 23 September 2015, Biosis Pty Ltd (Appendix J of the Part 2 response). This addendum report responds to IRAP questions relating to upland swamps and provides an impact assessment for two additional swamps (CCUS24 and CRUS6) identified during recent aerial surveys.

2.3 Outcomes of the IRA

As requested by the IRAP, the final IRA provides a summary and discussion of the predicted risks of impact of the UEP on water resources and upland swamps, which was informed by the technical studies prepared by the relevant specialists. In summary, the IRA:

- identifies 110 individual risks across the three groups of longwall panels (ie LWs 1-3, 6-7 and 9-11), the great majority of which (107 of 110) were assessed as having either 'low' or 'very low' consequences;
- did not identify any 'extreme risks' that may result from the UEP;
- identifies two 'high' risks, both of which relate to potential impacts to swamps;
- identifies a total of 29 'medium' risks, the majority of which (28) were assessed as having 'low' or 'very low' consequences (and all of which relate to water quantity and quality) and one which relates to impacts to a swamp.

A more detailed analysis of the findings of the IRA is provided throughout Section 3 of this report.

2.4 Agency Comments on the IRA

On 7 October 2015, the Department distributed the final IRA and supporting information to agencies for final comment. The Department and the IRAP also completed comprehensive reviews of the final documentation.

Importantly, the IRAP has indicated that it is satisfied with the IRA process and additional information provided and concluded that:

> *"the risk assessment has been conducted by appropriately qualified experts in the fields of mine subsidence engineering, groundwater, surface water and ecology. It is understood that the WCL experts worked on the project together for a considerable period of time, which provided them the experience and the knowledge required to conduct the 'integrated' risk assessment, which aims to ensure that the risks associated with underground mining on the quantity and quality of groundwater and surface water as well as upland swamps have been assessed and appropriate controls are identified.*
>
> *Following an extensive review of the risk assessment and the relevant documentation, it is the opinion of the IRAP that the risk assessment is 'integrated' and has been based upon an approach that is sufficiently detailed and at an appropriate level to evaluate the risks to the swamps, streams, groundwater and the waters of Cataract Reservoir."* (see Appendix B to the IRA).

Similarly, the Department, the Division of Resource & Energy (DRE), the Environment Protection Authority (EPA) and the Dams Safety Committee (DSC) are satisfied with the risk assessment process and findings.

A summary and discussion of the review comments from the Department, the IRAP and the residual issues from relevant agencies is provided in Section 3 of this report. Copies of all comments are provided at **Appendix J**.

2.5 Ongoing Role of the IRAP

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. Wollongong Coal also contemplated an ongoing role for the panel (see Figure 1 of the Part 2 Response at **Appendix H**).

The Department agrees that an independent panel should continue to provide expert advice to Wollongong Coal, the Department and relevant agencies on the environmental consequences of mining associated with the UEP. Specifically, the Department believes that the role of the panel should be to provide timely, accurate and focussed advice regarding the:

- collection of relevant data to predict and monitor the potential subsidence impacts and environmental consequences of longwall mining;
- achievement of performance measures in respect of swamps, land and biodiversity, including avoidance of impacts where reasonable and feasible, rather than relying on remediation and offsets;
- preparation, revision and implementation of Extraction Plans, particularly their Swamp Monitoring Program, Biodiversity Management Plan and Land Management Plan components;
- implementation of the swamp and groundwater monitoring programs and adaptive management regime throughout the life of the project; and
- calculation of swamp offset liabilities and verification of calculated swamp offset liabilities.

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.

The Department notes that a requirement for a similar panel was included in the recent approval for the Springvale Mine Extension Project.

3.0 SUPPLEMENTARY ASSESSMENT

3.1 Subsidence Impacts on Stored Waters

3.1.1 Findings of the IRA

The final IRA provides a summary and discussion of the predicted risks of impact of the UEP on water resources, which was informed by the technical studies prepared by the relevant specialists. In relation to subsidence and water resources, the IRA identified a total of 29 'medium' risks, the majority of which (28) were assessed as having 'low' or 'very low' consequences. These include risks to water quantity and quality, such as:

- groundwater depressurisation leading to seepage from Cataract Reservoir;
- reduced baseflow to streams due to depressurisation of the regional aquifer;
- fracturing of deeper strata leading to increased groundwater flowing into the mine; and
- surface cracking leading to redirection of surface flow to groundwater system.

Most of these risks are considered to be unavoidable consequences of underground mining (and likely to occur), but are not considered to be significant in magnitude of impact (ie volumes of water involved). The 'medium' level of risk is therefore attributed to a high likelihood of occurrence but is not a reflection of the severity of impact.

3.1.2 Connectivity with Cataract Reservoir

In response to a request from the IRAP, Wollongong Coal engaged SCT to produce a report titled *Review of Barrier to Protect Stored Waters of Cataract Reservoir* (12 August 2015, Appendix D of the

IRA), which provides a comprehensive discussion of the background to the selection of the proposed width of the protective barrier between proposed mining and Cataract Reservoir and its suitability.

As discussed in the Department's PAR (p. 22-23), the mining layout proposed for the UEP incorporates a protective barrier to the full supply level (FSL) of Cataract Reservoir which was based on 0.7 times depth (35° angle of draw) or a 203 m horizontal distance. There is also a vertical barrier of about 300 m between the stored waters and the mining horizon along most of this barrier.

SCT indicates that the 0.7 times depth barrier was used because it is consistent with historical norms that have existed since prior to the formation of the DSC and is about 50 m more than the offset recommended by Reynolds (1977) based on the findings of a Commission of Inquiry into coal mining under or in the vicinity of stored waters in the Nepean, Avon, Cordeaux, Cataract, and Woronora Reservoirs in NSW. SCT concludes that *"a review of the historical prescriptive guidelines indicates that this barrier is likely to be conservative and ensure that the stored waters of Cataract Reservoir are fully protected".*

The Department and DSC accept the justification for the selection of the proposed width of the protective barrier between the mining and Cataract Reservoir. However, as discussed below, both agencies recognise that geological structures have the potential to compromise the effectiveness of the barrier.

3.1.3 Corrimal Fault and Dyke 8

In response to a request from the IRAP, Wollongong Coal also engaged SCT to prepare a report titled *Assessment of Corrimal Fault and Dyke 8 at Russell Vale East as Risks to the Stored Waters of Cataract Reservoir* (19 August, 2015, Appendix F of the IRA). The report presents all the available information, including mining records in three seams dating back to the 1880s, to assess the potential for the Corrimal Fault and/or Dyke 8 to provide flow pathways between the stored waters of Cataract Reservoir and the mining horizons.

SCT's additional research in relation to the Corrimal Fault indicates that:

- the fault tapers to become insignificant with less than 1 m throw at seam level which is 540 m from the edge of the Reservoir at an overburden depth of greater than 300 m;
- the fault has not been found to be hydraulically conductive or water-bearing at any of the numerous intersections in all three seams, including the most recent intersection where the fault was mined through in Longwall 6; and
- proposed mining does not have potential to enhance connection between the seam and the Reservoir along the projected alignment of the fault.

SCT's additional research in relation to Dyke 8 indicates that:

- it passes below the Reservoir and is intersected by the mine workings;
- there has been no history of inflow through this dyke at numerous intersections in all three seams; and
- the lateral offset of the proposed longwall goafs from the Reservoir along the alignment of the dyke is sufficiently large (1.7 km) for there to be no credible risk to the stored waters of Cataract Reservoir.

SCT concludes that:

> *"The additional research undertaken as part of this assessment has increased the understanding of the characteristics of the Corrimal Fault and Dyke 8 but this understanding has not changed the original interpretation that proposed mining does not present a credible pathway for inflow from Cataract Reservoir through either the Corrimal Fault or Dyke 8" (p. ii).*

It is noted that the IRA determined that the risks of these geological structures providing flow pathways between the stored waters of Cataract Reservoir and the mine workings are 'low'. The Department and DRE are satisfied with this finding.

The DSC has reviewed the additional information produced by SCT and indicates that it would:

> "*have no difficulty in approving extraction of longwall 7 if the Corrimal Fault is absent, or can be demonstrated to be terminating at longwall 7. Even if the Corrimal Fault is demonstrably present in LW7, DSC has no concerns with extraction of the Eastern 2/3 of LW7, but may insist on a leaving a hydraulic barrier of solid coal against the fault for protection against ingress."* (see Appendix G).

In its submission on the final IRA, WaterNSW requested the following commitments made by Wollongong Coal in relation to geological structures be included in the recommended conditions:

- if required by the DSC, the panel length of Longwall 7 would be truncated if the Corrimal Fault is intersected during the development of the gateroads for Longwall 7;
- 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.

The Department accepts this adaptive management approach, particularly the role of the DSC, and believes that additional inspections and exploration would further inform this process. The Department has recommended a condition to give it effect (see condition 11 of Schedule 3).

3.1.4 Subsidence Impact Performance Measures

In its submission in the final IRA, WaterNSW included recommended subsidence impact performance measures and monitoring triggers for water resources, swamps, biodiversity, cliffs and steep slopes (see **Appendix J**).

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.

3.1.5 Extraction Plan

In its submission in the final IRA, WaterNSW also requested that the Department require a Trigger Action Response Plan (TARP) as part of the Extraction Plan. The Department confirms that the existing conditions of approval require the Extraction Plan to include a Trigger Action Response Plan (condition 10(o) of Schedule 3).

3.1.6 Contingency and Closure Planning

The DSC requires the preparation of a Mine Closure and Contingency Plan prior to any mining within a Notification Area. Wollongong Coal submitted a copy of its *Mine Closure and Contingency Plan for the Underground Expansion Project* to DSC's Mining Subcommittee on 26 August 2015. The plan contains closure and contingency measures that would be implemented in the unlikely event that a hydraulic connection is made between the Cataract Reservoir and the mine workings.

WaterNSW requested that the Department not recommend approval of the project unless it is satisfied that the project's Mine Closure and Contingency Plan contains feasible closure and contingency measures. Correspondence received by the Department from the DSC indicates that it is:

> "*satisfied with the approaches WCL have taken to address issues with respect to the development of effective contingency and closure plans.*
>
> *DSC staff are confident that WCL have demonstrated that in the unlikely event of a connection to the Mine developing, that water from the outflow could be contained for an extended period (up to 10 years) in the workings that currently exist underground and would therefore have ample time to install effective seals where required."* (see **Appendix G**).

The Department notes that WaterNSW has recently provided additional comments on Wollongong Coal's *Mine Closure and Contingency Plan.* The Department is satisfied that these can be addressed in conjunction with the Extraction Plan process (ie post-approval). WaterNSW has accepted that these matters can be adequately addressed after determination, and has requested that the *Mine Closure and Contingency Plan* is updated, in consultation with WaterNSW and to the satisfaction of the DSC.

3.2 Subsidence Impacts on Watercourses

3.2.1 Surface Water Modelling

Wollongong Coal engaged WRM to revise the *Surface Water Model* undertaken for the project (Appendix I of the IRA). The revised model uses recent flow monitoring data from an expanded surface water monitoring network to refine its previous estimates of streamflow losses associated with the UEP.

The Department notes that the WRM modelling presents 'worst case' scenarios of streamflow loss by removing all subsidence-affected tributary streamflow within, and upstream of, the aerial extent of the proposed underground workings. The model was prepared to specifically investigate the impact that worst case losses would have on Cataract Reservoir yield. The model therefore assumes both *total* diversion of all surface rainfall and flow and *no* downstream re-emergence of diverted flow. WRM concludes that, even with these very conservative assumptions, losses would average approximately 7.3 ML/d, which is within the range previously assumed and a negligible impact on the overall water storage of Cataract Reservoir.

WRM acknowledges that the surface water model is highly conservative and that the "*likelihood of losing all streamflow to the underground workings via subsidence cracking is very improbable*". The Department agrees, and maintains its previous position that this type of modelling provides coarse estimates for comparative purposes, rather than firm predictions. The Department accepts that the model presents useful comparative data to demonstrate that even total loss of baseflow and streamflow would have negligible impacts on the water stored within Cataract Reservoir, but presents results that are highly unlikely to eventuate in reality. WRM's predictions should therefore be used with caution in relation to both streamflow losses and baseflow losses.

3.2.2 Baseflow Predictions

The GeoTerra/GES *Groundwater Assessment* presents predictions of the UEP's likely baseflow impacts. This assessment predicts a maximum of 0.041 ML/day (14.9 ML/year) transfer of stream flow from the stream beds in the vicinity of the UEP to the underlying strata in the Cataract Creek, Cataract River and Bellambi Creek catchments at the end of the proposed mining. The great majority of this very low level of loss would occur in Cataract Creek. The great majority of the loss in Cataract Creek is predicted to take place during extraction of Longwalls 9 to 11, because:

- only the Bulli Seam has been extracted adjacent to this stream reach, so there is greater potential for additional incremental strata depressurisation leading to baseflow losses following extraction of the underlying Wongawilli Seam; and
- Longwalls 9 to 11 are located in the downstream reach of the creek, which has a much greater catchment area to generate baseflow volumes.

Predicted baseflow losses associated with extraction of Longwalls 1 to 3 and also Longwalls 6 to 7 are very low because a significant degree of strata depressurisation has already occurred in these areas due to the extraction of both the Bulli and Balgownie Seams. Furthermore, the Longwall 1 to 3 area is in the headwaters of Cataract Creek's catchment, meaning that there is significantly less catchment area from which baseflow volume can be derived.

It should also be noted that not all of the 14.9 ML/year water volume is 'lost' as flow into the reservoir, as a portion of it would migrate to the reservoir via lower elevation, down-gradient, groundwater seeps into the lower catchments and reservoir. It is beyond the capacity of the groundwater or surface water models to specify how much of the 14.9 ML/year would enter the reservoir via groundwater seepage following their initial transfer from the stream bed into underlying strata.

The IRA determined that the risks associated with depressurisation of the regional groundwater system are 'medium', because mining is certain to result in groundwater depressurisation (high likelihood rating), but the effect of depressurisation on stream flows is predicted to be negligible (low consequence rating).

3.2.3 Conflicting Estimates of Baseflow Loss

The Department of Primary Industries (DPI Water) and WaterNSW questioned the significant differences in predictions in baseflow and stream flow losses presented in the *Groundwater Assessment* undertaken by GeoTerra/GES (Appendix H of the IRA) and the *Surface Water Modelling* undertaken by WRM (Appendix I of the IRA).

As indicated above, the GeoTerra/GES model predicts a baseflow loss of approximately 0.041 ML/day, while the WRM model predicts a loss of approximately 7.3 ML/day. It should be recognised that the two models have been prepared for very different purposes. The WRM model relates to the very highly unlikely, potential worst case impact where all surface runoff catchments upstream of and overlying the proposed secondary extraction areas are cracked and *all* affected catchment runoff is diverted into these cracks and no infiltrated runoff later emerges as groundwater seeps. This model was prepared to illustrate that, even under unrealistically conservative assumptions, the worst case baseflow losses would have negligible impact on the water storage of Cataract Reservoir.

The mechanism assessed by the GeoTerra/GES groundwater model is the regional depressurisation of aquifers following mine subsidence, with associated groundwater level reductions, and as a result, reduction in groundwater baseflow from surficial aquifers to the streams and the reservoir. The Department considers that the *Groundwater Assessment's* predictions of baseflow and stream flow losses are a much more accurate reflection of potential actual impacts than those in the *Surface Water Modelling*, and that they should be adopted for assessment purposes. The *Groundwater Assessment* uses the latest available data from the mine's piezometer network, has been peer reviewed and been endorsed as 'fit for purpose'.

DPI Water indicated that, if the surface water take proves to be a significant volume in comparison with groundwater make, it may not be possible to authorise this take under the relevant licensing provisions of the *Water Management Act 2000*. GeoTerra/GES predicts that the maximum loss of stream baseflow that would require licensing is 14.9 ML/year, which is a small fraction of the predicted maximum groundwater inflow of 1,066 ML/year. It is therefore considered that this surface water take is licensable under the *Water Management Act 2000* within the Upper Nepean and Upstream Warragamba Water Source. Wollongong Coal has confirmed that it has commenced negotiations to source a licensed allocation.

WaterNSW continues to express its dissatisfaction with the surface and groundwater modelling, particularly in respect of predicted baseflow losses (see **Section 3.2.6** below).

3.2.4 Conceptual Water Balance

WaterNSW sought further explanation of the conceptual water balance figure shown in the IRA (see Figure 10 of the IRA). The Department has confirmed that this figure was sourced from Wollongong Coal's presentation to the Commission during the public hearings for the project's first merit review. SCT has confirmed that this figure estimates rainfall (derived from local average annual rainfall data), drinking water usage and environmental flows (obtained from recent WaterNSW annual reports) and predictions of mine inflow capture (obtained from the *Groundwater Assessment*).

3.2.5 Iron Oxide Staining

In its submission in the final IRA, DPI Water recommended that, in recognition of the 'medium' risk classification in the IRA in respect of iron oxide staining, a review of the proposed water quality performance measures and the monitoring program be undertaken. As stated in the Department's PAR, GeoTerra/GES predicts that the UEP may result in some localised iron hydroxide precipitation if the groundwater is exposed to freshly-fractured rock surfaces. However, it is important to note that stored water quality in the region has not been adversely affected by previous mining and that many aquifers in the Southern Coalfields contain dissolved iron and that consequently many groundwater seeps display iron staining. Wollongong Coal confirmed that recent water quality monitoring data indicates that extraction of Longwalls 4 & 5 did not affect the water quality of Cataract Creek.

The Department accepts the results of the IRA and that the project may result in some iron oxide staining of the beds of watercourses. However, this iron staining is likely to be localised and would have negligible effect on the overall water quality of Cataract Creek and more particularly Cataract Reservoir. A subsidence performance measure requiring not-greater-than-negligible iron staining in Cataract Creek is already included in the project approval. To further satisfy DPI Water's recommendation, the Department has included a specific requirement for the proposed surface water monitoring program to address both dissolved iron and filterable iron oxides/hydroxides.

3.2.6 Surface Water Monitoring

In its final submissions in response to the IRA dated 2 November 2015 and 6 November 2015, WaterNSW requested that the conditions of approval include requirements for:

- limits on total baseflow loss from all streams of 0.05 ML/day;
- revised surface and groundwater modelling to specify detailed predictions for surface water losses for 3 years after commencement of mining, when mining is completed (ie 5 – 6 years), and 50, 100 and 200 years following completion of mining; and
- a surface and groundwater monitoring program to confirm that losses of surface water and baseflow adequately align with predictions;

The Department confirms that the existing conditions of approval require the Extraction Plan to include a Water Management Plan which is required to include 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). All surface water impacts of the project are required to be accounted for though water licensing.

However, it is Department's view is that the additional long-term modelling as proposed by WaterNSW would serve no useful purpose. Firstly, the Geoterra/GES modelling already includes the Upper Hawkesbury Sandstone and the overlying regolith. From this modelling it has derived clear estimates for predicted baseflow losses to surface streams both during and after mining. These losses are predicted to be very low. Secondly, WRM's model considered surface flow losses as an extreme worst-case scenario, and demonstrated that even extreme losses would be low. Thirdly, the Department considers that good baseline monitoring and impact monitoring would be more accurate than any predictive modelling. The Department also questions whether accurate, longterm predictive modelling can accomplished unless it is well-informed by accurate data from impact monitoring.

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*. In alignment with the advice of DPI-Water, the Department considers that Wollongong Coal should obtain all necessary water licences for water take by the project, including baseflow losses as monitored.

3.3 Subsidence Impacts on Groundwater

3.3.1 Groundwater Assessment and Modelling

In response to the Commission's Recommendation 1, Wollongong Coal engaged GeoTerra Pty Ltd (GeoTerra) and Groundwater Exploration Services (GES) to prepare a revised *Groundwater Assessment* (Appendix H of the IRA). The revised assessment uses the latest available data, including data collected from an expanded piezometer network and recent monitoring following the extraction of the first 340 m of Longwall 6, to provide an updated understanding of the local groundwater system and predicted mine-water inflow dynamics.

The Department considers that the revised assessment addresses the groundwater-related issues raised in the Commission's *Review Report* (see Appendix A of the *Groundwater Assessment*). It is noted that a peer review of the *Groundwater Assessment*, undertaken by Dr Noel Merrick of HydroSimulations (see Appendix F of the *Groundwater Assessment*), concludes that:

> *"the Russell Vale Groundwater Model has been developed competently and is "fit for purpose" for addressing the potential environmental impacts from the proposed underground mining operations and for estimating indicative dewatering rates.*
>
> *The uncertainty in modeling predictions was assessed thoroughly in the PPR groundwater assessment by analyzing the outputs of 31 models with parameterisations based on the statistical distribution of packer test permeabilities. Additional investigation of mine inflow uncertainty has been made in the current report for changes in effective recharge due to land surface disturbance.*
>
> *Due to the substantial depressurization that has been caused by earlier mining at the subject mine, and at neighbouring historical mines, the additional effects of mining the Wongawilli Seam with eight more longwall panels are considered marginal".*

3.3.2 Groundwater Management Plan

WaterNSW requested that the recommended conditions of approval include a requirement for the preparation of a Groundwater Management Plan. The Department agrees, and notes that its standard conditions of approval for underground coal mines require the preparation of such a plan. Accordingly, the recommended conditions of approval for the UEP require the Extraction Plan to include a Water Management Plan, which involves preparation of a groundwater monitoring program (condition 10(h) of Schedule 3). As requested by WaterNSW, this requirement aligns with that for the recently approved Springvale Coal Mine Extension Project.

3.4 Subsidence Impacts on Upland Swamps

Commission Recommendation 2

> *The establishment of a network of piezometers within and surrounding the upland swamps, the establishment of this network should be guided by the relevant authorities (ie Office of Environment & Heritage, WaterNSW, the Dams Safety Committee and the Department of Planning & Environment). This network will collect additional baseline data and monitor the impacts to the swamps, through changes to the groundwater supporting the swamps, from the mining. This monitoring data should be made available to the independent risk assessment panel.*

Commission Recommendation 3

Any more definitive policy developed regarding triggers for offsets and mitigation measures under the "Policy Framework for Biodiversity Offsets for Threatened Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence" should be made available for consideration by the independent risk assessment panel (see Recommendation 1).

Commission Recommendation 4

Any potential offset policy should address key elements including:

a. the potential delayed onset of subsidence and associated hydrogeological and ecological impacts to swamps;
b. potential ecological and structural tipping points; and
c. mechanisms to adequately secure offset sites (with consideration of the current land tenure and exploration licence and mining lease tenements of the proposed offset site; and the need for site specific offset management plans).

3.4.1 Findings of the IRA in Relation to Swamps

The final IRA provides a summary and discussion of the predicted risks of impact of the UEP on upland swamps, which was informed by the technical studies prepared by the relevant specialists. In relation to swamps, the IRA:

- identified two 'high' risks (BS1113 and BS1213), both of which relate to potential impacts to swamp CCUS4. This swamp is assessed as being at high risk of environmental impacts due to fracturing of the bedrock beneath the swamp and/or fracturing of the controlling rockbar at the base of the swamp; and
- identified that the only 'medium' risk that is assessed as having 'moderate' consequences relates to swamp BCUS4, which is assessed as being at a 'medium' risk of environmental impacts due to subsidence-induced tilting.

3.4.2 Consequence Categories for Swamps

In its submission on the final IRA, OEH considered that the risk assessment for upland swamps uses assumptions that lead to an under-estimation of the project's consequences. OEH questioned several of the consequence categories for swamps used in the risk matrix, as well as the area of assumed impact within swamps. OEH considers that predicted swamp impacts need to be supported by evidence and that a more precautionary approach to the risk assessment should have been taken.

The Department acknowledges OEH's concerns and accepts that 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. Indeed, the draft Swamp Offsets Policy provides for such variations as a matter of course. Therefore, the Department considers that it would be unreasonable to hold Wollongong Coal 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 Wollongong Coal 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 (see Section 3.4.4); and
- reflect the draft *Policy Framework for Biodiversity Offsets for Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence* (see Section 3.4.5)

3.4.3 Swamp Avoidance

In its submission on the final IRA, Wollongong City Council (Council) reiterated its previous requests that the proposed extension of Longwall 6 should be deleted in order to minimise impacts on upland swamp CCUS4. The Department accepts that the current mine plan for the UEP would result in impacts to some upland swamps, particularly CCUS4. The Department believes that the impacts of the UEP need to be carefully weighed against its social and economic benefits and that residual impacts should be addressed in a clear and consistent manner.

The Department accepts that Wollongong Coal 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. It also accepts that 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 (see Section 3.4.5).

3.4.4 Upland Swamp Monitoring

Wollongong Coal has confirmed that it has already installed a total of 23 shallow groundwater piezometers within and around upland swamps in the vicinity of the UEP. A location figure and a full list of the swamps within which piezometers have been installed, including the installation date, intake depth and closest proximate longwall is provided in Section 2.2 of Wollongong Coal's Part 2 response (see **Appendix H**). Wollongong Coal has also confirmed that extensive consultation has been undertaken with key agencies, including OEH, DRE, WaterNSW and the Commonwealth Department of Environment, in relation to the design and installation of the existing swamp piezometer monitoring network (see Table 3 of **Appendix H**).

In addition, Wollongong Coal has committed to installing an additional 30 shallow groundwater piezometers in all upland swamps located within 400 m of the longwalls. If feasible, this would include 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. Wollongong Coal has confirmed that installation would be subject to further consultation with key agencies and would be described in future Extraction Plans. This commitment is included in Wollongong Coal's revised Statement of Commitments (SoC) at Appendix 3 of **Appendix K** (Commitment No. 38).

The Department considers that the existing and proposed network of piezometers within and around upland swamps would be more than sufficient to determine if the performance measures and other conditions of approval are being met and would provide valuable information on the magnitude of any mining-related impacts to swamps.

WaterNSW requested that the Department include a condition of approval requiring all new piezometers to be installed within 3 months of the date of an approval. 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.

3.4.5 Draft Swamp Offset Policy

In May 2015, OEH released for public consultation the draft *Policy Framework for Biodiversity Offsets for Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence* (draft Swamp Offset Policy). Since that time, extensive consultation between the Department and OEH over the development of the draft Swamp Offset Policy has taken place, and the policy is expected to be finalised in the next few months.

The current draft policy framework outlines a clear and consistent approach to identifying subsidence-related impacts to upland swamps and calculating and securing offsets for swamps impacted by longwall mining subsidence, and would operate as an addendum to OEH's 2014 *NSW Biodiversity Offsets Policy for Major Projects* (Offsets Policy).

The Department has recommended that the draft project approval is revised to reflect the current draft Swamp Offset Policy and the recent conditions applied to the Springvale Extension Project. Consequently, the Department recommends that the subsidence impact performance measure of 'negligible environmental consequences' continue to apply to 2 of the swamps (CRUS1 and CCUS1),

as well as to the additional 2 nearby swamps recently identified in aerial surveys (CRUS6 and CCUS24) (see condition 1 of Schedule 3).

Wollongong Coal should be held strictly liable for causing not greater than negligible environmental consequences to these swamps, and should be subject to compliance action if there are any exceedances of this performance measure. In the unlikely event of any such exceedances occurring, Wollongong Coal should also be required to offset any resulting impacts in accordance with the draft Swamp Offsets Policy (or the final policy once it is made).

The Department has recommended a condition which requires a Swamp Offset Bond of $500,000[2] for the first swamp to be undermined (ie CCUS4) (see condition 4 of Schedule 3). This is in recognition of the fact that Wollongong Coal may not be able to purchase relevant offset sites or biodiversity credits, or arrange for supplementary measures to be carried out, before it commences mining of Longwall 6, which may impact this swamp. The bond therefore provides a safeguard in the event that swamp CCUS4 is impacted by mining operations, and gives Wollongong Coal time to demonstrate that it can satisfy the maximum predicted offset liability for all other potentially-affected swamps.

There are 7 other upland swamps which may be impacted by mining operations at Russell Vale (CCUS2, CCUS5, CCUS10, CCUS11, CCUS12, BCUS4 and BCUS11). Recommended conditions have been revised to require Wollongong Coal to have suitable offsets in place prior to carrying out any longwall extraction under these swamps and to offset any impacts on these swamps that cause greater than 'negligible environmental consequences' (see condition 5 of Schedule 3).

Due to the uncertainties in predicting impacts on swamps, and OEH's concerns that the IRAP may have underestimated these impacts, the Department considers it would be unreasonable to hold Wollongong Coal strictly liable if greater than negligible environmental consequences result in any of these swamps. Instead, the requirements of the draft Swamp Offset Policy should apply.

As discussed in Section 2.5, recommended conditions include a requirement to establish an Independent Monitoring Panel (see condition 12 of Schedule 3). The panel would be required to consider monitoring data for at least 12 months after mining ceases within 400 m of a swamp (or within the 20 millimetre (mm) subsidence contour, whichever is greater), to determine whether a greater than negligible environmental consequence has occurred, and whether an offset should therefore be realised.

If monitoring demonstrates that greater than negligible change to the shallow groundwater regime occurs and that impact has stabilised for a period of 12 months, then the Wollongong Coal must meet the full calculated value of the offset for that swamp equivalent to that impact within six months of the completion of the review by the independent monitoring panel.

If the independent panel assesses that the monitoring data demonstrates that a predicted groundwater impact has not occurred within 12 months of completion of all mining within 400 m of a swamp, or has occurred in only part of that swamp, then the full offset associated with the swamp, or part of that offset, may be deducted from the UEP's overall 'maximum predicted offset liability'.

Conversely, where the independent panel concludes that monitoring demonstrates that mining has impacted the shallow groundwater regime to a greater degree than was predicted and that impact has stabilised for a period of 12 months, then an offset equivalent to that impact must be identified and secured within six months of the completion of the 12 month monitoring review.

The recommended conditions have been revised to require the preparation of the Swamp Monitoring Program as part of the Extraction Plan (see condition 10(j) of Schedule 3). This program requires both primary (groundwater) and secondary (terrestrial and aquatic flora and fauna, soil and peat, stability, erosion) monitoring of swamps to inform the adaptive management process, as recommended by the Commission. The Swamp Monitoring Program requires consideration of a minimum of 2 years of baseline data for swamp hydrology and swamp vegetation. Swamp monitoring must fully satisfy Before After Control Impact (BACI) design principles.

WaterNSW requested that any offsets required for impacts to upland swamps are located within the local catchment where the swamps are located. Wollongong Coal has committed to ensuring land-

[2] This figure has been determined based on a comparative analysis of the proportional area and vegetation complexity of the first swamp to be undermined at Russell Vale compared with the first two swamps to be undermined at Springvale Mine (Sunnyside and Carne West).

based offsets are located within the local catchment, where possible (see Commitment No. 40 at Appendix 3 of **Appendix K**). 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.

3.5 Socio Economic

Commission Recommendation 5

The proponent's economic assessment, in particular the estimated costs and benefits, should be updated to reflect the current economic climate.

Commission Recommendation 6

The final assessment and determination of the project should be informed by an independent analysis of the economic costs and benefits of the project, including any additional information/updated economic assessment provided by the Applicant. The independent analysis should be managed by the Department of Planning & Environment.

In response to the Commission's recommendation, Wollongong Coal engaged Gillespie Economics to undertake a revised *Economic Assessment*, which was included as Appendix A of the company's *Part 1 Response* to the Commission's review (see **Appendix D**). The revised assessment included an updated Cost Benefit Analysis (CBA), which calculated the benefits of the project using the latest projected coal prices and foreign exchange rates.

The Department commissioned the Centre for International Economics (CIE) to undertake an independent analysis of the economic costs and benefits of the UEP as presented by Gillespie (see **Appendix I**).

Specifically, Gillespie adopted export prices of US$84 per tonne for coking coal and US$61 per tonne for thermal coal, and an AUD/USD exchange rate forecast of 0.73. In line with its earlier CBA for the UEP, Gillespie assumed an average annual production rate of 934,000 tonnes and that the coal produced would be sold into the export market on a 52.6% coking coal and 28.6% thermal coal basis.

In the revised CBA, Gillespie took a 'minimum threshold value' approach and focused on quantifying the royalty payments to the State, excluding other known but difficult-to-quantify benefits, such as company tax payments to the Commonwealth. CIE supported this approach. Using this approach, Gillespie calculated that the project would, under the current economic climate, generate $323 million in revenue for Wollongong Coal and $23 million in royalties to the State. These figures are lower than the original figures presented in the social and economic assessment provided in the Preferred Project Report (PPR), which estimated $400 million in revenue to Wollongong Coal and $34 million in royalties to the State.

Gillespie also undertook a sensitivity analysis of the revised figures at discount rates of 4%, 7% and 10% for a number of variables. This analysis indicated that the value of royalties is most sensitive to either a change in production levels or a change in the USD price for coal. A 20% decrease in production or USD price would reduce royalties to $18.6 million. A 20% increase in coal prices would increase the royalties to $27.9 million.

Gillespie states that, for the project to be questionable from an economic efficiency perspective, the incremental residential environmental, social and cultural impacts of the project (after mitigation, offsetting and compensation) would need to exceed $23 million.

The revised CBA noted that no 'material' impacts are considered likely in relation to air quality, traffic and transport, Aboriginal cultural heritage and historic heritage. The revised CBA also noted that noise impacts, surface water impacts, groundwater impacts, visual amenity impacts, upland swamp impacts and infrastructure impacts associated with the project would be mitigated, compensated for or offset, and therefore the costs associated with this would form part of the capital or operating costs of the project. Subsequently, the only impacts that would remain unmitigated and uncompensated for would be greenhouse gas emissions. Gillespie estimated the cost of the greenhouse gas emissions would be in the order of $0.15 M (present value).

In summary, the revised CBA estimates the project would have net social benefits to Australia of a minimum of $23 M minus the cost of greenhouse emissions ($0.15 M) and hence is considered desirable and justified from an economic efficiency perspective. CIE indicated that these estimates are reasonable.

In terms of the costing of environment impacts, CIE notes that the Gillespie analysis assumes that the majority of the environmental impacts would be mitigated or offsets would be purchased to compensate for any impact. CIE notes that implementing mitigation or purchasing offsets would reduce the financial profitability of the UEP and not impact on royalty payments accruing to the State government.

In its merit review, the Commission noted that Wollongong Coal had used available information reported by WaterNSW to calculate the value of the catchment areas proposed to be impacted. The Commission considered that WaterNSW's view on these figures should be sought and considered in any subsequent updating of the analysis of this issue. In response to this, CIE consulted with WaterNSW and reviewed Gillespie's estimate of $235,000 in net present value terms for the loss of stream baseflow as a result of the project. CIE considered the maximum predicted loss of stream baseflow of 15 ML/year (as included in the *Groundwater Assessment*) and suggested a high-end estimate of $430,000 in net present value terms could be assumed for the purposes of the CBA. As recommended conditions would ensure that the costs associated with purchasing licences for this loss of stream baseflow would be borne by Wollongong Coal, the Department is satisfied that the difference in these values would not impact on the outcome of the CBA.

CIE also estimated that additional monitoring costs of around $62,000 in present value terms could be incurred by WaterNSW and should be reflected in the CBA. The Department notes this cost of the project but considers it also would have little bearing on the overall socio-economic outcome, given the magnitude of other variables, such as the export coal price.

In summary, the Department considers that the project would result in an unequivocal socio-economic benefit to the region and the State through:

- the employment it would provide (both directly and indirectly);
- its significant capital investment (and resultant flow-on effects within the region); and
- an estimated $23 million to the State of NSW in royalties.

3.6 Noise

Commission Recommendation 7

The Commission recommends that further consideration of the noise impacts of the project needs to be provided including consideration of further noise mitigation measures as recommended by the EPA. Detailed justification should be provided for any deviations from the existing noise limits in current planning approval. Also clarification should be provided on the outcomes and applicability of the noise audit required in the 2011 approval.

3.6.1 Existing and Predicted Noise Levels

As discussed in the Department's PAR (Section 6.7.1), Wollongong Coal engaged Wilkinson Murray to prepare a revised *Noise Assessment* for the UEP in accordance with applicable guidelines (see Appendix F of the PAR). The *Noise Assessment* provides a comparison of the existing noise levels against the predicted noise levels associated with the UEP. These have been summarised in **Table 2** below.

Table 2: *Predicted Noise Levels and Recommended Noise Criteria*

Receiver Id	***Time Period***	***Noise Level Leq(15 minute) dB(A)***	
		Existing	***Predicted Level***
R1	Day	51	51
	Evening	54	53
	Night	45	43
R2	Day	54	54
	Evening	56	53
	Night	47	44
R3	Day	53	53
	Evening	55	53
	Night	46	44

R4	Day	51	51
	Evening	55	53
	Night	45	43
R5	Day	52	52
	Evening	55	53
	Night	43	41
R6	Day	51	51
	Evening	56	53
	Night	43	41
R7	Day	52	52
	Evening	56	53
	Night	44	44
R8	Day	51	51
	Evening	56	53
	Night	46	46
R9	Day	44	43
	Evening	47	46
	Night	42	**43**
R10	Day	42	42
	Evening	45	44
	Night	42	43
R11	Day	40	40
	Evening	43	43
	Night	40	40
R12	Day	42	42
	Evening	43	42
	Night	40	39
R13	Day	45	45
	Evening	46	46
	Night	42	42
R14	Day	44	44
	Evening	46	46
	Night	42	40

Table 2 shows that the predicted noise levels under the UEP are either the same as, or less than, those currently being experienced in the vicinity of the pit top operations. The only exception to this is at one receiver location (Receiver 9), which is predicted to experience a 1 dB(A) increase in existing noise levels under the UEP. The Department notes that this increase would not be noticeable and, given conditions the Department has developed that restrict surface activities during the sensitive night-time period, it is considered that Receiver 9 would actually experience a decrease on existing noise levels.

The Department notes that maintaining the existing restrictions on the Wollongong Coal's operations effectively means that the only surface activity that can occur during the sensitive night-time period is the running of coal onto the stockpile. Details regarding the noise mitigation measures already implemented and restrictions on equipment and transfer of material to the surface during night-time operations are provided in Section 3.6.2 below.

3.6.2 Best Practice Noise Mitigation Measures

A number of noise surveys of the previous and existing operations at the Russell Vale pit top site have been undertaken in order to identify noise mitigation measures that could be implemented to reduce noise to residents living in the vicinity of the site.

In accordance with the existing PWP project approval, 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 between 1 October and 21 December 2012.

In addition, in response to the EPA's recommendations to the Commission (letter dated 13 March 2015), Wollongong Coal engaged Wilkinson Murray to assess the potential noise reductions associated with a range of additional noise mitigation measures and engaged Hatch to provide an analysis of the costs of implementing these noise controls. Copies of the noise assessment and costing report are included at Appendices B and C, respectively, of Wollongong Coal's *Part 1 Response* (see **Appendix D**).

The EPA has reviewed the additional noise and costing reports and has indicated that Wollongong Coal has undertaken a 'reasonable and feasible' assessment of the noise control recommendations and costs (see **Appendix E**).

A summary of both the recommendations of the 2012 noise audit and the mitigation measures suggested by the EPA in 2015 is provided in the first column of **Table 3** below. The continuing applicability, outcome and status of these are provided in the second column of the table.

Table 3: *Noise Audit and EPA Mitigation Measures – Applicability, Outcome and Status*

Conclusion / Recommendation	***Applicability / Outcome / Status***
Noise Audit (2012)	
Restrict heavy truck activities on the project site outside day and evening periods to achieve the project approval's noise limits.	Wollongong Coal has confirmed that this is undertaken where possible; however infrequent night deliveries do take place for oversized loads. These movements require RMS/police approval. The Department notes that the recommended UEP project approval includes a condition which specifically prohibits the operation of dozers or front end loaders during the night-time period (see condition 2(b) of Schedule 4).
Schedule 3, condition 14(a) of the project approval to be modified to state *'the existing Bulli Conveyor is decommissioned when the Wonga Mains drivage is complete'.*	This requirement was included in the PWP project approval via Mod 1 in December 2012. Wollongong Coal has confirmed that the Bulli Conveyor is currently decommissioned, but may be required to the re-commissioned at a later date. The Wonga Mains driveage would not be complete for several years. The Department has recommended that this condition be included in the UEP approval (see condition 2(f) of Schedule 4).
Any large scale construction activity include a noise management plan in accordance with the EPA's *Interim Construction Noise Guidelines*	Wollongong Coal has agreed to implement this recommendation (see Commitment 33 at Appendix 3 of **Appendix K**).
Retrofit existing mobile plant with non-tonal reversing alarms (quacking alarms).	Wollongong Coal has confirmed that all heavy equipment that remains on-site in the stockpile area has had non-tonal reversing alarms fitted. Wollongong Coal has committed to ensuring that any new machinery brought onto site would have non-tonal reversing alarms fitted (see Commitment 34 at Appendix 3 of **Appendix K**).
Implement real time monitoring program	Complete and being implemented.
When possible, coordinate quarterly attended noise surveys with high levels of site activity. Quarterly attended noise survey should include 1/3 octave band measurement	Wollongong Coal has confirmed that short-term attended noise monitoring is being undertaken at 8 locations in the vicinity of the pit-top site on a quarterly basis. The Department confirms that the details of this monitoring are included in the approved Noise Management Plan required under the PWP approval (condition 3 of Schedule 4), and would be updated as part of the UEP.
Retrofit CAT988 loader and the D11 dozer with noise mitigation	Wollongong Coal has confirmed that the CAT988 loader and D11 dozer are no longer on-site and has committed to ensure that any new loaders and dozers would be fitted with noise attenuation prior to use (see Commitment 35 at Appendix 3 of **Appendix K**).
Based on noise source levels of mitigated dozer and front end loaders, quarterly compliance measurements and operational modelling predictions; determine additional administrative controls required to achieve medium term intrusive noise limits of the project approval.	No longer applicable. See above.
EPA (2015)	
Conveyor runner bearing design	Wilkinson Murray has confirmed that RV1 has poly rollers installed; RC1 and RC3 conveyors are not yet installed; and RC4 has steel rollers. Wollongong Coal has committed to fit all surface conveyors with poly rollers prior to the commencement of coal extraction (see Commitment 32 at Appendix 3 of **Appendix K**).

	In accordance with the EPA's request, the Department has also recommended a condition requiring conveyors RC1 and RC3 to be fitted with polymer rollers prior to coal extraction.
Replacement of metal clips used to join conveyors with vulcanised joints	Wilkinson Murray has confirmed that all surface belts are vulcanised.
Use of noise barriers on site boundaries and around identified noisy equipment	Discussed in detail below.
Maintaining a volume of coal in bins so that coal is not dumped into an empty bin	Wollongong Coal has committed to ensuring that a volume of coal remains in the bins at all times (see Commitment 32 at Appendix 3 of **Appendix K**).
Minimising dump height from mobile plant	Wilkinson Murray considered that an automotive tripper system may provide some noise reduction benefit and recommended that this be further evaluated. Wollongong Coal has agreed to undertake trials into the potential noise reductions associated with tripper heights and locations (see Commitment No. 32 at Appendix 3 of **Appendix K**). In accordance with the EPA's request, the Department has also include a condition requiring the trials to be completed to the satisfaction of the EPA within 6 months of the commencement of operations at the pit top site.
Noise dampening material in coal bins/deflection plates	Wilkinson Murray considered that this measure is not practicable because coal typically wears the dampening material away. Wilkinson Murray believes that alternative measures, such as maintaining a volume of coal in the bins, are more effective. Wilkinson Murray also notes that the bins contribute a low level of noise to the closest residences, therefore mitigating these items would not result in a noticeable reduction in noise levels at the receivers.
Noise cladding on conveyor winder houses and conveyor rope rollers	Belt drivers have cladding on the walls.
Enclosed motor rooms, etc	Wilkinson Murray confirmed that the RC1 drive is within the sizer building; however the RC3 and RC4 drives are not enclosed. Wilkinson Murray considered that the RC3 and RC4 drives contribute low levels of noise to the closest residential receivers and enclosing these items would not result in a reduction of noise at the receivers.
Different load-out operations	Wilkinson Murray confirmed that, with the proposed UEP upgrades in place, the majority of coal would be loaded from the truck loading bins. This would ensure the use of a front-end loader is limited to times when the conveyor/bin is unserviceable or during longwall change-outs.

Wilkinson Murray confirms that the majority of the EPA's recommended noise mitigation measures have already been implemented on-site. The measures that have not been implemented have been assessed as having limited acoustic benefit (ie enclosing motor rooms and attenuating the D11 dozer, which does not operate at night) or else are considered impractical when compared with more beneficial alternative measures (ie noise dampening material in coal bins).

3.6.3 Potential Noise Barrier

Wilkinson Murray undertook more detailed modelling to assess the noise control efficacy of constructing noise barriers around the site boundaries. Modelling indicates that some acoustic benefit may be achieved by constructing a 280 m barrier of 6 m height along part of the site's northeastern boundary. Hatch has estimated that the cost of constructing such a barrier would be $1.08 million for a concrete structure or $445 K for a steel panel system.

Wilkinson Murray indicates that the barrier may provide benefit to some single-storey receivers adjacent to the barrier during day and evening operations, but that its effectiveness would reduce as distance from the barrier increases, and the barrier would provide a negligible reduction in noise impacts at night.

Council believes the noise barrier should be constructed (see **Appendix F**). However, the Department maintains its long-held position that the topography in the vicinity of the pit-top site is not conducive to a noise barrier being an effective noise management technique. Furthermore, such a barrier would result in significant visual impacts on nearby receivers, which have generally not raised noise as an issue in the past.

Wollongong Coal also considers that the limited benefits of the barrier do not outweigh the costs of its construction. Nonetheless, the company has committed to undertake further real time *in-situ* noise monitoring to verify the results of Wilkinson Murray's modelling, as requested by the EPA. Wollongong Coal also committed to discussing the results with the affected residents, who may not wish to have a 6 m noise wall directly behind their houses, presenting the findings to the EPA for its final position on whether the noise barrier should be constructed. The Department supports this proposal and has recommended a condition requiring this work to be submitted to the EPA within 6 months of the commencement of operations at the pit top site. If it is decided that there would be some benefit in constructing the barrier, then Wollongong Coal would be required to seek planning approval for its construction and the community in the surrounding area would be given an opportunity to comment on the merits of the proposal before any final decision is made.

3.6.4 Proposed Noise Limits

The noise limits in the current planning approval (ie the PWP approval) were based on information contained in the *Acoustic Assessment* prepared by Environmental Resource Management (ERM) (October, 2010) for the *NRE No. 1 Colliery Preliminary Works Project Environmental Assessment* (see Annex J of that EA).

As identified by the Department in its PAR (p. 47) and re-confirmed by Wilkinson Murray (see **Appendix D**), the assumptions and methodology used in ERM's noise assessment were seriously flawed and failed to deliver realistic or practical outcomes for a number of reasons, including the:

- incorrect assumption that adverse meteorological conditions were not a feature of the area;
- predictions based on data from an inappropriate weather station;
- use of sound power levels lower than that actually produced by key equipment; and
- omission of items of noise plant and equipment in the noise model.

The combined result of the assumptions and methodology used in the ERM noise assessment was to:

- significantly underestimate the noise being generated by the Russell Vale pit-top site during periods when it operated to capacity; and
- derive noise criteria which are unrealistically low.

Wilkinson Murray subsequently undertook a revised *Noise Assessment* (2014), which incorporated long-term data logging to provide a more accurate estimate of background noise levels. The revised assessment developed a noise prediction model based on more appropriate weather data, including that collected on-site, and examined the historical context of the mine in terms of noise levels generated over the last 35 years. This *Noise Assessment* was included in Appendix F of the UEP EA and was considered by the Department's noise specialist to be "*representative of the existing and future operational activities under the UEP*" (p. 47 of the PAR).

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 **Appendix D**). The results were consistent with those set out in the *Noise Assessment* (2014).

The EPA has accepted that the noise criteria for the UEP proposed by the Department approximately correspond to the worst case levels modelled by Wilkinson Murray and that "*the modelled levels include all reasonable and feasible noise treatments and are conservatively generated under full scale production of 3 Mt/y*" (p. 2 of **Appendix E**). As discussed in the Department's PAR (p. 49), the predicted noise levels would exceed the PSNLs at certain locations, even following the implementation of all reasonable and feasible noise mitigation measures.

However, the NSW Government's *Voluntary Land Acquisition and Mitigation Policy* (November 2014) specifically states that a consent authority cannot grant voluntary mitigation and acquisition rights to reduce operational noise impacts of a development 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".

Russell Vale's pit-top operations clearly fit into this category. In such cases, 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 accept that all reasonable and feasible noise mitigation measures have been adopted, and that any additional improvements associated with the operation of the tripper and noise barriers would be investigated and, if considered beneficial, implemented.

For the reasons detailed in the PAR (Section 6.7.1), the Department believes that 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. In line with current EPA practice, where the predicted level is below the nominal amenity criterion, the Department has set criteria to the predicted level.

As discussed in detail in the Department PAR (p.49), the 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.

The Department maintains that the previously recommended noise criteria for the UEP are appropriate and that the recommended conditions would require Wollongong Coal to continue to investigate and implement any additional reasonable and feasible noise reduction measures.

3.6.5 Recommended Noise Conditions

The Department maintains that the existing proposed noise criteria and operating conditions remain applicable to the UEP. In accordance with a request from the EPA, the Department has recommended additional conditions, which require Wollongong Coal to:

- fit polymer rollers to conveyors RC1 and RC3 prior to the commencement of coal extraction;
- conduct trials to minimise the height of falling on the stockpile with tripper automation within 12 months of the commencement of operations; and
- undertake further investigations in relation to a noise barrier within 6 months of the commencement of operations at the pit top site, including:
  - conducting real time *in-situ* noise monitoring to verify the results of the modelling and assess the need for a noise barrier;
  - discuss the results with the affected residents to determine their views on the construction of a noise barrier; and
  - present the findings to the EPA for its final position on whether the noise barrier should be constructed.

The Department has recommended that these measures be implemented within the specific timeframes to the satisfaction of the EPA.

3.7 Air Quality

Commission Recommendation 8

The $PM_{2.5}$ emissions from the proposal need to be assessed prior to any determination of the application.

Commission Recommendation 9

Consideration of best practice standards needs to be provided to demonstrate that air emissions would be minimised and to justify the proposed increase in coal handling capacity.

Commission Recommendation 10

The mine's existing monitoring and reporting systems should be strengthened to clearly demonstrate compliance with current conditions, environmental standards and reporting goals (ie for $PM_{2.5}$ emissions).

3.7.1 Existing and Predicted Air Quality

As discussed in the Department's PAR (Section 6.7.3), Wollongong Coal engaged ERM to prepare an *Air Quality Assessment* for the UEP in accordance with applicable guidelines (see Annex I of the UEP EA). The air quality assessment predicted that dust emissions generated by the UEP would comply with all relevant dust criteria at privately owned residences in the vicinity of the pit top site. Similarly, the cumulative impact assessment predicts that the cumulative dust levels would remain in compliance with all relevant criteria.

The only exception to this is in relation to short-term (24-hour) *cumulative* impacts. The modelling predicts that the PM_{10} 24-hour criterion is exceeded on one occasion over the year when emissions are considered in conjunction with existing background concentrations. This exceedance is considered to be infrequent and would only occur rarely under worst case meteorological conditions.

3.7.2 Best Practice Air Mitigation Measures

As indicated in the Department's PAR (p. 53), Wollongong Coal has implemented a range of air quality mitigation measures associated with the existing mining operations. These measures include:

- decommissioning the Balgownie belt and bins and the Bulli decline belt;
- constructing a new stackout conveyer and tripper system;
- covering coal conveyors to the stockpile area;
- installing an automatically controlled stockpile spray system;
- using mobile water trucks;
- installing new truck washing facilities used by all trucks prior to departure from site;
- covering all loads prior to leaving the site;
- sealing pit-top truck haulage roads and parking areas;
- using a bobcat mounted road sweeper on all sealed areas;
- using fixed water sprays on surface and underground coal conveyors; and
- operating a comprehensive air quality management system, including 9 dust deposition gauges and two real-time high volumes air samplers.

In response to a Pollution Reduction Program imposed by the EPA on the site's Environment Protection Licence, Wollongong Coal engaged PAE Holmes in October 2012 to undertaken a site-specific best management practice review and report aimed at further reducing emissions of particulate matter at the site. This report recommended that the following additional measures be implemented to reduce dust emissions:

- a new truck loading facility;
- secondary sizer building;
- upgrade of the fleet of trucks from 34 to 44 tonne;
- two new conveyors with enclosures; and
- underground reclaim.

In addition, the PAE Holmes report identified the following measures to potentially achieve further reductions in dust levels:

- vegetation windbreaks protecting stockpiles;
- use of chemical wetting agents on haul roads and stockpiles;
- sealing of haul roads; and
- water sprays on the moving tipper.

Wollongong Coal has confirmed that the:

- new truck loader facility and the secondary sizer building would be constructed during the first stages of the UEP and would be completed by the end of 2016.
- truck fleet upgrade would be phased in progressively over a 24 month period following approval of the UEP; and
- two new conveyors and underground reclaim operations would only be needed once production rates reach around 2.7 Mtpa (ie approximately 2 to 3 years after commencement of operations under the UEP).

In its response to the Commission's *Review Report*, Wollongong Coal committed to trialling chemical wetting agents on haul roads and stockpiles, sealing the haul roads through the stockpile area and installing water sprays on the tipper (see Commitment 26 at Appendix 3 of **Appendix K**).

To ensure these additional air quality mitigation measures are implemented, and in accordance with the EPA's recent recommendations (see **Appendix E**), the Department has included operating conditions requiring these measures to be implemented within these timeframes (see condition 5(b) of Schedule 4).

PEL conducted a further evaluation of these measures and their applicability at the Russell Vale site (see Appendix D of **Appendix D**). PEL states that:

> "*vegetative windbreaks can reduce dust during high wind conditions (by intercepting dust with leaves and branches, and reducing wind speed as it passes through the vegetation). However, as with other dust management measures, it is more effective to control the source (ie avoid the dust emissions) rather than control the emissions after release.*"

The Department agrees with this evaluation and considers that 'source-based' mitigation measures are more effective. The Department considers that the implementation of these measures, in conjunction with best practice particulate matter control, would allow the pit-top facilities to operate within relevant dust criteria, despite the proposed increase in coal handling capacity.

3.7.3 $PM_{2.5}$ Emissions

In response to the Commission's recommendation, Wollongong Coal engaged Pacific Environmental Limited (PEL) to undertake an air quality assessment for the UEP for $PM_{2.5}$ emissions. A copy of the assessment is included at Appendix D of Wollongong Coal's *Part 1 Response* (see **Appendix D**).

PEL's atmospheric dispersion modelling was based on the approach taken by ERM in its original air quality assessment undertaken for the UEP for total suspended particulate (TSP) and PM_{10} emissions, which was in accordance with the EPA's *Approved Methods for Modelling and Assessment of Air Pollutants in NSW.* The EPA has reviewed PEL's air quality assessment and modelling for $PM_{2.5}$ emissions and is satisfied that it has been undertaken in accordance with the approved methods (see **Appendix E**).

Wollongong Coal currently measures $PM_{2.5}$ concentrations using two Tapered Electronic Oscillating Microbalances (TEOMs) located at the Russell Vale site. Measured $PM_{2.5}$ concentrations were adopted as the background $PM_{2.5}$ concentrations for purposes of the cumulative assessment.

Since the EPA does not have criteria for $PM_{2.5}$, the predicted $PM_{2.5}$ emissions were assessed against the *National Environment Protection Measure for Ambient Air Quality* (NEPM, May 2003 version). The assessment predicts that $PM_{2.5}$ dust emissions generated under the UEP would comply with the NEPM criteria at all privately-owned residences in the vicinity of the pit-top site. Similarly, the cumulative impact assessment predicts that the cumulative $PM_{2.5}$ levels would remain in compliance with the criteria.

3.7.4 Air Quality Monitoring and Reporting

Wollongong Coal currently maintains two TEOM monitors at the northern and southern boundaries of the Russell Vale site to continuously monitor PM_{10} and $PM_{2.5}$. Wollongong Coal has confirmed that data is transferred to a cloud-based environmental management software (EnviroSuite) that provides real-time alerts to mine operators when short-term PM concentrations exceed trigger levels. The trigger levels are short-term (typically 1-hour) values that are set to alert the mine of the potential for exceedance of 24-hour criteria before the event, in order that pre-emptive mitigation measures can be applied.

Wollongong Coal currently produces quarterly reports that reference the EPA's air quality criteria for PM_{10}, however does not report the $PM_{2.5}$ data. In accordance with the Commission's recommendations, Wollongong Coal has provided a commitment to report:

- 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.

This commitment is specified in Wollongong Coal's revised SoC at Appendix 3 of the Project Approval at **Appendix K** (Commitment No. 27).

3.7.5 Recommended Air Quality Conditions

The Department maintains that the existing proposed air quality criteria and operating conditions remain applicable to the UEP. In accordance with a request from the EPA, the Department has recommended additional conditions, which require Wollongong Coal to:

- implement the following mitigation measures by 31 December 2016:
  - new truck loading facility; and
  - secondary sizer building;
- upgrade the fleet of trucks from 34 to 44 tonne progressively over 24 months from the date of the approval;
- 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;
- implement the following mitigation measures within one year 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; and
  - install water sprays on the moving tipper(s).

3.8 Flooding/Bellambi Creek

Commission Recommendation 11

Any new approval should retain the existing requirement to realign Bellambi Creek or a full justification why this is no longer necessary to provide protection to the creek downstream from the pit-top surface area.

The existing SoC for the PWP project approval requires Wollongong Coal to complete the Bellambi Gully realignment works by December 2014. These works were originally committed to by the then owner of the mine (Gujarat NRE Coking Coal Ltd) in order to protect against any repetition of a major pollution incident during the 1998 floods. The incident involved the Bellambi Gully Creek overtopping the constructed underground culvert beneath the Russell Vale pit-top site, and consequently scouring a significant quantity of coal from the mine's ROM stockpile, which in turn was transported off the site, affecting a number of residences and the downstream creekline.

However, Wollongong Coal did not proceed with the construction of the realignment. In response to a draft Order from the Department requiring implementation of the works, Wollongong Coal indicated that the original undertaking as presented in the EA for the PWP was made on the basis of incomplete and incorrect information regarding the cause of the overtopping incident. Wollongong Coal subsequently committed to preparing a detailed flood mitigation study to assess the flood risks and determine the most appropriate flood mitigation option for the surface infrastructure and stockpile areas at the pit-top site.

As described in detail in the Department's PAR (p. 51-52), the *Bellambi Creek Flood Study,* was subsequently undertaken by Cardno (NSW/ACT) Pty Ltd (Cardno) in August 2014. However, the study was not considered by the Department to contain sufficient information to support the alternative flood mitigation measures proposed. In particular, the Department raised concerns that the study did not:

- assess any residual risk of the coal stockpile being eroded or scoured;
- address what size of flood is likely to lead to overland flows (ie the point at which the capacity of the pipe network is exceeded); and
- provide a comparative analysis between its recommended approach and the re-establishment of the original creek alignment previously proposed (and still required under existing conditions of the PWP approval).

Council also completed a review of the flood study and requested that it be revised to use a standard modelling approach which assesses the 100 year ARI, adopts appropriate tailwater levels and applies a 100% blockage criterion for all stormwater pipes less than 6 m in diameter.

Consequently, Cardno prepared a revised *Bellambi Creek Flood Study* that was submitted to the Department and Council in January 2015 (**Appendix A**). In addition, Cardno prepared a report titled *Bellambi Gully Flooding Approach* (23 July 2015), which provides a comparison of the originally proposed creek realignment approach with the alternative mitigation measures presented by Carndo

(see Appendix F of **Appendix D**). The revised flood study includes a review of all past flood studies, a topographic survey and a digital terrain model, identification of peak flows (5, 10 and 100 year ARI), a flood model based on three scenarios and recommended flood mitigation measures.

The study indicates that runoff originating from the Illawarra Escarpment flows down the Escarpment's heavily vegetated, steep slopes to the Russell Vale site in the foothills, where it enters the Bellambi Gully Creek. Some reaches of the watercourse are conveyed by pipes and constructed channels within the site. The total catchment area is 427 ha and the total creek length is 4.3 km.

Cardno modelled three blockage scenarios to assess flooding throughout the site. The models represented 100 year ARI events where the current stormwater pipes are completely blocked, 20% blocked and fully operational. Results indicated that flooding within the site is significant under all three scenarios. In all scenarios, while overland flows are mainly contained within the stockpile area, they also overtop the access road and continue as sheet flow towards and onto Bellambi Lane.

The study recommends a range of mitigation measures to reduce clean runoff entering the stockpile area, while conveying all site runoff in a controlled way to Bellambi Gully Creek (ie preventing flooding of Bellambi Lane). In summary, these measures include:

- upgrading the stockpile area access road and installing a 6m span culvert to convey the site runoff across the access road, into a proposed grass-lined swale before discharging into Bellambi Creek;
- implementing a debris control structure at the 1800 mm diameter pipe and M3 culvert opening to reduce probability of blockage within the system due to debris from the upstream catchment;
- formalising the swale in the vicinity of the existing 600 mm clean water inlet;.
- upgrading the existing 600 mm diameter clean water pipe to an 825 mm diameter pipe;
- maintenance works immediately upstream and downstream of the existing debris control structures within Bellambi Gully Creek to minimise the potential for blockage of the system and
- installing culverts across the access road along the northern boundary of the site to direct flows from catchment M8 directly towards Bellambi Gully Creek, in order to reduce clean water runoff conveyed into the stockpile area.

Cardno states that the proposed culvert and swale structure would be adequate to convey the 100 year ARI flows and eliminate the flooding on Bellambi Lane, even if the existing pipes are 20% blocked. Cardno notes that the proposed flood mitigation approach assumes sufficient treatment of runoff water within the stockpile area prior to discharge through the licenced discharge point and into the upgraded system. As part of the UEP, Wollongong Coal proposed to construct a dry sedimentation basin with a 6 ML capacity to treat runoff water from the pit-top area prior to discharge into Bellambi Creek. Cardno recommended that the proposed sedimentation design be reviewed after adoption of the proposed flood mitigation measures to ensure adequate treatment capacity for dirty runoff water. DPI Water also requested that the water quality impacts downstream of the proposed Bellambi Creek flood mitigation works be further considered during the detailed design of the works.

The Department has reviewed the two Cardno reports and is satisfied that they adequately address previous concerns, and that the proposed flood mitigation works would reduce clean runoff entering the stockpile area, while conveying all site runoff in a controlled way to Bellambi Creek. Council has also confirmed that it is satisfied with the proposed flood mitigation measures.

The Department has recommended a condition requiring the flood mitigation measures proposed by Cardno to be implemented on-site within 12 months of the date of any approval (see condition 11 of Schedule 4). The Department also notes that dirty water discharges from the site are regulated by the EPA under the site's EPL. The Department is satisfied that the existing water performance measure requiring dams to be designed, installed and maintained in accordance with the series *"Managing Urban Stormwater: Soils and Construction – Volume 1 and Volume 2E Mines and Quarries"* is otherwise sufficient to ensure the treatment of runoff water within the stockpile area prior to discharge.

3.9 Traffic

Commission Recommendation 12

The proponent should negotiate with Council and Roads & Maritime Services regarding maintenance contributions to mitigate impacts from the increase in truck movements along the haulage route.

Commission Recommendation 13

Consideration should be given to further limiting the hours of truck movements.

Commission Recommendation 14

Proponent should investigate and cost a number of options to reduce the noise impacts to the most effected residents along Bellambi Lane, particularly those near the intersections with the Princes Highway and the Northern Distributor. Options to be considered by the proponent, should include, but not be limited to:

a. construction of a coal truck parking area (for trucks to wait prior to the commencement of haulage hours)within the mine boundary;
b. construction of a noise barrier near the intersections of Bellambi Lane/Princes Highway and Bellambi Lane/Northern Distributor; and
c. use of pavement modifications along Bellambi Lane, to reduce truck/trailer banging.

Commission Recommendation 15

No increase in the currently approved maximum rate of extraction should be approved without clear demonstration that facilities can handle the additional volume without unacceptable impacts for local residents.

3.9.1 Road Maintenance Contributions

The existing and proposed haulage route from the pit-top site to PKCT runs along Bellambi Lane to Memorial Drive / M1 Princes Motorway, Masters Road, Springhill Road and Port Kembla Road.

Although Bellambi Lane is a former arterial road (formerly part of the Princes Highway), it was transferred to Council following the construction of the Northern Distributor. Bellambi Lane is now a local road which is managed and maintained by Council.

While the Department concluded in the PAR that a maintenance contribution was not necessary, given the existing high standard of the road surface, which reflects its prior use as an arterial road, and the UEP's relatively short (5 year) project life, it accepts that Wollongong Coal would cause some wear and tear to the road and should therefore contribute towards any future road maintenance costs. Wollongong Coal has advised that it is negotiating with Council in relation to providing an annual maintenance contribution for Bellambi Lane (see Commitment No. 48 at Appendix 3 of **Appendix K**). The Department has included a condition requiring agreement with Council to be reached within 6 months of approval, and referral to the Secretary if agreement cannot be reached.

With regard to the remainder of the fixed haul route to PKCT which follows roads under RMS (rather than Council) control, the Department considers the maintenance of these roads should continue to be funded by State and Commonwealth governments under the usual arrangements. The Department notes that the RMS, in its submission on the PPR dated 28 May 2015, stated that it did not consider that the proposed increase in traffic would have a significant impact on the operation and performance of the main road network and raised no objections in principle to the application.

3.9.2 Restrictions on Truck Movements

Under the PWP approval, Wollongong Coal is currently approved to transport coal from the colliery during the following time periods:

- 7 am to 10 pm on weekdays; and
- 8 am to 6 pm on weekends and public holidays.

The Department has recommended a condition requiring these coal transport restrictions to continue to apply to the UEP (see condition 14 of Schedule 4).

Under the UEP, coal trucks from the pit-top site would continue to initially travel along Bellambi Lane before joining Memorial Drive. As discussed in the Department's PAR (p. 50), Bellambi Lane is a four-lane road that has a long history as a coal transport corridor to the Northern Distributor (now Memorial Drive). The nearest residences to the north are in Keerong Avenue as the northern side of the road is a disused rail corridor (which previously serviced the mine). The south side of Bellambi Lane is zoned light industrial land and as such the isolated residences located in this zone do not have noise criteria assigned to them under the Road Noise Policy.

From 1992 until 2009, Bellambi Lane formed part of State Highway 1 (the Princes Highway) with correspondingly high levels of road traffic noise experienced on both the southern side of Bellambi Lane and the rear of residences on Keerong Avenue to the north. Following the extension of the Northern Distributor, there was a considerable reduction in traffic volumes on Bellambi Lane.

The proposal to increase transport of coal from a current level of 1 Mtpa to 3 Mtpa would require an increase in the number of truck movements from 22 to 34 per hour. The Road Noise Policy sets noise criteria for two periods – 7 am to 10 pm and 10 pm to 7 am. Trucking from Russell Vale on Bellambi Lane would only take place during the first of these periods. The proposed increase in trucks during these hours has been estimated to increase the current road traffic noise levels by up to 1.7 dB(A). This is considered negligible, particularly within the historical context of noise levels generated on Bellambi Lane until 2009, which were much higher than future predictions. The Department notes there would be no night-time trucking (apart from the odd over-sized vehicle) and that the project would remain fully in compliance with criteria in the Road Noise Policy.

Once trucks leave Bellambi Lane they travel on high traffic volume roads to PKCT. The impact of increased truck volumes on these roads is insignificant and does not trigger the need for any further consideration of noise.

Given these considerations, the Department does not believe that additional restrictions on truck movements from the colliery are warranted.

3.9.3 Additional Noise Mitigation along Bellambi Lane

The Department confirms that the existing UEP proposes the construction of a coal truck parking area in the northeastern portion of the pit-top area. The precise location of the parking area is shown in Figure 3 of Wollongong Coal's *Part 1 Response* (see **Appendix D**). Wollongong Coal has confirmed that this area is intended to be used for truck parking outside of haulage hours.

Wollongong Coal engaged Wilkinson Murray to undertake an additional noise assessment of the noise control efficacy of constructing a barrier around the site (see Appendix B of **Appendix D**). The assessment concludes that, for the majority of the site, including near the intersection of Bellambi Lane and Princes Highway, a 6 m high acoustic boundary would provide limited and barely discernible reductions in noise.

As discussed above, the increase in traffic noise levels along Bellambi Lane without any noise barriers is predicted to be 1.7 dB(A). The Department agrees with Wollongong Coal's noise consultant that this increase is minor and likely to be barely perceptible. Therefore, the Department does not believe that the construction of a noise barrier at the intersections along Bellambi Lane would provide noise benefits to residents, and may well introduce a visually unattractive element in the streetscape.

Wollongong Coal has confirmed that the majority of the pavement along Bellambi Road has previously been upgraded. As discussed above, Wollongong Coal has committed to negotiating with Council in relation to providing an annual maintenance contribution for Bellambi Lane, which could be used to upgrade the short length of the road which has not been upgraded.

3.9.4 Infrastructure Capacity

In response to the Commission's recommendation, Wollongong Coal engaged Hatch to undertake a *Materials Handling Assessment* for the UEP (see Appendix F of **Appendix D**). The assessment considers the ability of the proposed infrastructure to handle an increase in production from 1 Mtpa to 3 Mtpa. Hatch used an event simulation model which was run on an annual basis over the proposed production period, and considered the capacity of the primary and secondary sizers, stockpiles, conveyors and surge and weight bins. Hatch concludes that:

> *"The proposed material handling equipment system capacity has been assessed and we confirm that proposed materials handling infrastructure has the system capacity to handle 3 Mtpa".*

The Department confirms that the air quality, noise and traffic assessments undertaken for the UEP have all modelled an operational scenario with an annual coal production rate of 3 Mtpa. The Department is satisfied that the additional mitigation measures required under the recommended project approval would ensure that the UEP would comply with applicable criteria and standards, despite the proposed increase in coal handling capacity.

4.0 RESIDUAL MATTERS

4.1 Statutory Considerations

While the provisions of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) do not strictly apply to the UEP (because it is a transitional Part 3A project), consistent with previous practice, the Department has considered the provisions of

the Mining SEPP in its assessment of the merits of the proposal, as summarised under the headings below.

4.1.1 Compatibility with Other Land Uses (Clause 12)

The Department's assessment has considered the potential impacts of the project on other land uses in the locality, particularly on the catchment of the Cataract Reservoir and on upland swamps. This assessment has been undertaken in consideration of the public benefits of the project and the surrounding land uses, and measures to avoid or minimise any land use incompatibility.

The Department's assessment indicates there would be some minimal residual impacts on a small number of privately-owned residences, but that it is not likely to result in unacceptable impacts to surrounding land uses in general. The Department is satisfied that the residual impacts are able to be minimised, mitigated or compensated for to achieve acceptable environmental and amenity outcomes.

4.1.2 Voluntary Land Acquisition and Mitigation Policy (Clause 12A)

The Department's assessment has considered the NSW Government's *Voluntary Land Acquisition and Mitigation Policy* (December 2014), and notes that a consent authority cannot grant voluntary mitigation and acquisition rights to reduce operational noise impacts for existing developments with legacy noise issues, such as Russell Vale. Therefore, as discussed in response to Recommendation 7, decisions in relation to acquisition and mitigation have been reached by careful consideration of the feasible and reasonable mitigation measures, the absolute level of noise and existing measures of community impact including complaints.

The EPA and the Department accept that all reasonable and feasible noise mitigation measures have been adopted, and that any additional improvements associated with the operation of the tripper would be investigated and, if considered beneficial, implemented.

4.1.3 Compatibility with Mining, Petroleum and Extractive Industries (Clause 13)

The Department is satisfied that the project has been designed in a manner that is compatible with, and would not adversely affect, adjacent current or future mining-related activities.

3.1.4 Natural Resource Management and Environmental Management (Clause 14)

The Department has recommended a number of conditions aimed at ensuring that the project is undertaken in an environmentally responsible manner, including but not limited to conditions in relation to water resources, threatened species and biodiversity, and greenhouse gas emissions. All offsets in relation to swamps have been designed to reflect the draft Swamp Offsets Policy.

4.1.5 Resource Recovery (Clause 15)

The Department has considered resource recovery in its assessment of the project, and is satisfied that the project can be carried out in an efficient manner. The Department has recommended conditions requiring Wollongong Coal to implement reasonable and feasible measures to minimise waste and maximise the salvage and re-use of resources within the disturbance area (including vegetative and soil resources).

4.1.6 Transport (Clause 16)

The Department notes that the maximum number of truck movements per hour as a result of the project would increase from 22 (for a production rate of 1 Mtpa) to 34 (for a production rate of 3 Mtpa). The Department has consulted with the applicable roads authorities in relation to the project, and taken these submissions into consideration in its assessment of the project.

The Department notes that the colliery has used the proposed haul route for many years, and that there is no alternative road route to PKCT that would reduce the impact of the road transport of coal on residences. Conditions have been recommended to require Wollongong Coal to implement a traffic management plan to minimise traffic impacts on residential areas along Bellambi Land and implement a code of conduct for its drivers.

4.1.7 Rehabilitation (Clause 17)

The Department has recommended a number of conditions aimed at ensuring the rehabilitation of land affected by the existing or proposed development at Russell Vale. These include requirements on Wollongong Coal to prepare and implement a Rehabilitation Management Plan, to effectively manage waste, and to meet a number of rehabilitation objectives including ensuring that the mine site as a whole is safe, stable and non-polluting, and to ensure public

4.1.8 Significance of the Resource (Clause 12AA)(Repealed)

Clause 12AA of the Mining SEPP previously required the significance of the resource to be the consent authority's (ie the Commission's) 'principal consideration' under Part 3 of the Mining SEPP. However, this provision was repealed on 2 September 2015.

The Department has considered the draft *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Significance of Resource) 2015*, which effected this repeal, and its explanation of intended effect. The Department is satisfied that the repeal of clause 12AA has no material bearing on the outcomes of the Department's assessment of the project or the conclusions reached regarding its net overall social and economic benefits.

The Department is satisfied that the project is able to be managed in a manner that is generally consistent with the aims, objectives, and provisions of the Mining SEPP, following the repeal of clause 12AA, and that the project is in the public interest.

5.0 RECOMMENDED CONDITIONS

Appropriate revisions have been made to the draft conditions of consent to reflect the Commission's recommendations and the Department's further assessment (see **Appendix L**).

6.0 CONCLUSION

In April 2015, the Commission completed its merit review of the Russell Vale Colliery UEP and concluded that it did not have sufficient information or confidence to determine the merits of the proposal in order to determine it. Consequently, the Commission made 15 recommendations regarding additional work and assessment to be carried out prior to a determination being considered.

The Department has carefully considered the Commission's recommendations. The Department has largely accepted the Commission's recommendations and has accordingly required Wollongong Coal to undertake additional assessment, including the:

- establishment of an IRAP and completion of an IRA;
- implementation of extensive additional technical studies, including re-running the groundwater model;
- proposed expansion of the existing network of piezometers within and around the upland swamps;
- preparation of a revised *Economic Assessment*, including an updated CBA which calculates the benefits of the project using the latest projected coal prices and foreign exchange rates;
- completion of an independent analysis of the economic costs and benefits of the UEP as presented in the revised *Economic Assessment;*
- assessment of the potential noise reductions associated with noise mitigation measures recommended by the EPA and an analysis of the costs of implementing potential noise controls;
- assessment of the predicted $PM_{2.5}$ dust emissions associated with the UEP;
- revision of the *Bellambi Creek Flood Study to recommend* a range of mitigation measures to reduce clean runoff entering the stockpile area, while conveying all site runoff in a controlled way to Bellambi Gully Creek;
- preparation of an additional noise assessment to analyse the noise control efficacy of constructing a barrier around the site; and
- preparation of a *Materials Handling Assessment* to assess the ability of the proposed infrastructure to handle an increase in production from 1 Mtpa to 3 Mtpa.

In addition, the Department has amended and strengthened its recommended conditions to require:

- the approach to offsetting for upland swamps to fully reflect the agreed *Policy Framework for Biodiversity Offsets for Upland Swamps and Associated Threatened Species Impacted by Longwall Mining Subsidence,* which is expected to be finalised shortly;
- continued investigation and implementation of any additional reasonable and feasible noise and air quality mitigation measures; and
- flood mitigation measures for Bellambi Creek to be implemented on-site within 12 months.

The Department considers the additional assessment addresses the Commission's recommendations and provides greater confidence in the previous predictions made in relation to the impacts of the UEP on swamps, underground and surface waters, and the risks to stored waters in Cataract Reservoir.

With the proposed amendments, the Department considers that its recommended conditions provide a comprehensive, strict, and precautionary approach to ensuring that the project can comply with relevant criteria and standards, and ensure that the predicted residual impacts can be effectively minimised, mitigated and/or compensated for. The Department considers that these conditions reflect current best practice for the regulation of underground mining projects in NSW, and would therefore protect the local environment and the amenity of the local community and promote the orderly development of the region's important natural resources.

The Department also recognises that the project would provide significant economic and social benefits for the Illawarra region and for NSW as a whole. These benefits include the:

- direct employment of 300 people during mining operations;
- direct employment of an additional 100 people during construction;
- indirect employment, estimated to be up to 800 people in the local and regional area;
- $85 million in capital investment during construction ($18 million) and operation ($67 million); and
- $23 million to the State of NSW in royalties.

The Department has carefully weighed the impacts of the project against its social and economic benefits. On balance, the Department is satisfied that the project's benefits substantially outweigh its residual costs, that it is in the public interest and should be approved, subject to strict conditions of consent.

7.0 RECOMMENDATION

On 23 October 2015, the Minister for Planning requested the Commission to carry out a second review of the project (with public hearings) and to report back within 5 weeks of receiving this report. The Minister's Terms of Reference for the review are attached (see **Appendix K**).

It is therefore RECOMMENDED that the Commission, as requested by the Minister for Planning:

- **consider** the findings of this report;
- **consider** the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment (Significance of Resource) 2015* (Mining SEPP Amendment);
- **hold a public hearing** on matters relating to the Mining SEPP Amendment;
- **consider any submissions** made on matters relating to the Mining SEPP Amendment; and
- **provide a review report** on matters relating to the Mining SEPP Amendment and any residual matters within 5 weeks of receiving this report.

Howard Reed 10.11.15

Howard Reed
Director
Resource Assessments

10/11/15

David Kitto
Executive Director
Resource Assessments & Business Systems

APPENDIX A: BELLAMBI CREEK FLOOD STUDY

APPENDIX B: COMMISSION'S MERIT REVIEW REPORT

APPENDIX C: TERMS OF REFERENCE FOR THE INDEPENDENT RISK ASSESSMENT PANEL

APPENDIX D: WOLLONONG COAL'S RESPONSE TO THE COMMISSION'S REVIEW REPORT (PART 1)

APPENDIX E: EPA'S RESPONSE TO WOLLONGONG COAL'S RESPONSE (PART 1)

APPENDIX F: AGENCY RESPONSES TO WOLLONGONG COAL'S DRAFT IRA AND SUPPORTING TECHNICAL INFORMATION

APPENDIX G: DSC RESPONSE TO WOLLONGONG COAL

APPENDIX H: WOLLONGONG COAL'S RESPONSE TO THE COMMISSION'S REVIEW REPORT (PART 2)

APPENDIX I: CIE'S INDEPENDENT ECONOMIC ANALYSIS

APPENDIX J: FINAL AGENCY COMMENTS ON THE IRA

APPENDIX K: TERMS OF REFERENCE FOR THE SECOND REVIEW BY THE COMMISSION

APPENDIX L: DRAFT INSTRUMENT OF APPROVAL