Centennial Coal

RESPONSE TO SUBMISSIONS

Springvale Mine Extension Project

State Significant Development 5594

Modification 1

October 2016

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Centennial Coal
Springvale

Springvale Mine

SSD 5594 – Modification 1

RESPONSE TO SUBMISSIONS

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1.0 INTRODUCTION

This Response to Submissions (RTS) report has been prepared by Centennial Coal Company Pty Limited (Centennial Coal) in response to submissions lodged with the NSW Department of Planning and Environment (DPE) during the public exhibition of the *Statement of Environmental Effects* (SEE) for the proposed modification to Springvale Mine Extension Project (MOD 1), State Significant Development (SSD) 5594. The SEE supporting the proposed modification to SSD 5594 was exhibited from 02 to 23 August 2016.

The RTS report addresses issues raised in submissions received on the SEE. The report builds on information presented in the SEE and is to be read in conjunction with that document.

1.1. Background

1.1.1. Springvale Mine

Springvale Mine is an established underground longwall coal mine located in the Western Coalfield of New South Wales (NSW), approximately 15 kilometres (km) northwest of Lithgow and 120 km west-northwest of Sydney. Springvale pit top is accessed via the Castlereagh Highway and is located 3 km east of the township of Wallerawang.

Springvale Mine is owned by Centennial Springvale Pty Limited (as to 50%) and Springvale SK Kores Pty Limited (as to 50%) as participants in the Springvale unincorporated joint venture. Springvale Coal Pty Limited (Springvale Coal) is the operator of Springvale Mine on behalf of the joint venture.

Underground coal commenced in 1995 following the granting of the development consent DA 11/92 on 27 July 1992 pursuant to Section 101 under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The consent DA 11/92 lapsed on 30 September 2015. Springvale Mine currently operates under State Significant Development consent SSD 5594. This consent was granted to the mine, for the Springvale Mine Extension Project (SVMEP), on 21 September 2015 by the Planning Assessment Commission of NSW under Section 89E of the EP&A Act. The consent SSD 5594 allows Springvale Mine to carry out mining operations until 31 December 2028. The Springvale Mine Extension Project is a controlled action (EPBC 2013/6881) under the *Environment Protection and Biodiversity Act 1999* (EPBC Act). The approval under the EPBC Act was granted on 13 October 2015 and has effect until 8 October 2035.

Springvale Mine's State consent and the Federal approval allow extraction of coal from 20 longwalls (LW416 – LW432, LW501 – LW503), at the extraction rate of 4.5 million tonnes per annum (Mtpa), and the continued operation of the mine's surface infrastructure sites at the pit top and on Newnes Plateau. Springvale Mine is also approved to employ up to 310 full time personnel and carry out operations 24 hours per day, seven days per week.

1.1.2. Overview of the Proposed Modification

Springvale Coal is proposing to modify SSD 5594 under Section 96(2) of the EP&A Act to permit:

- An increase in the workforce from the approved 310 full time equivalent (fte) personnel, including contractors, to 450 fte personnel
- An increase in run-of-mine (ROM) coal production from the approved 4.5 million tonnes per annum (Mtpa) to 5.5 Mtpa
- An increase in the existing ROM coal stockpile at the pit top from the approved 85,000 tonnes capacity to 200,000 tonnes capacity and an increase in the coal stockpile footprint by 0.3 ha northeast of the existing stockpile area.

There is no proposal to change the approved longwall mining technique or the approved mine plan to achieve the proposed increase in production. The proposed modification does not include any physical

works or significant changes to the existing underground mining operations. Minimal changes to the surface infrastructure at the pit top will be required to extend the coal stockpile to the northeast of the existing footprint to achieve the proposed capacity of 200,000 tonnes. There is no proposal to change the life of the consent or the hours of operation.

The proposed increase in ROM coal production will be achieved through:

i. The increased workforce

ii. The installation and operation of additional underground mining equipment

iii. Improved equipment utilisation and availability.

1.2. Document Preparation

The RTS has been prepared by Nagindar Singh and Peter Corbett of Centennial Coal Company Limited. The following specialist consultants have provided additional technical advice included in **Appendix C** and **Appendix D** of the RTS:

- Dr Justin Bell, Associate Environmental Engineer, Jacobs Australia Pty Limited
- Mr Greg Sheppard, Senior Associate Hydrogeologist, Jacobs Australia Pty Limited
- Dr Deepak Adhikary, Senior Principal Research Scientist, Commonwealth Scientific and Industrial Organisation.
- Dr Mark Sargent, Director, AIGIS GROUP.

1.3. Centennial Coal's Adaptive Management Framework

1.3.1. Adaptive Management and Development Consent SSD 5594

This section of the RTS sets out the adaptive management framework developed by Centennial Coal based on Williams (2011). In recognising the important role of adaptive management in natural resource management, Centennial Coal began developing an adaptive management framework in 2012. This framework was documented in the Response to Submissions on the SVMEP *Environmental Impact Statement* EIS), and has been further refined within the LW419 Extraction Plan.

Springvale Mine operates under State Significant Development consent SSD 5594 granted to the SVMEP on 21 September 2015. Schedule 6 Condition 8 and Schedule 3 Condition 2 of SSD 5594 require adaptive management of the development as follows.

1. Assess and manage development related risks to ensure that there are no exceedances of the criteria and/or performance measures in Schedules 3 and 4.
2. Where an exceedance occurs, all reasonable and feasible steps must be taken to ensure the exceedance ceases and does not reoccur and a remediation plan must be developed and implemented.
3. In circumstances where it is not reasonable or feasible to remediate, or remediation measures have failed, an offset must be provided to compensate for the impact that has occurred. The offset must be proportionate to the significance of the impact and follow the general principles of the NSW Biodiversity Offset Policy for Major Projects.

The development consent SSD 5594 defines Adaptive Management as follows.

Monitoring subsidence effects and impacts and, based on results, modify the mine plan (including potentially modifying the mining height, longwall width or any other element of the mine plan) as mining proceeds to ensure effects, impacts and/or associated environmental consequences remain within the predicted and/or designated ranges and in compliance with the conditions of this consent.

The conditions of consent also set the process for management response within the broader adaptive management framework. This includes, within Schedule 3:

Condition 1: sets the performance measures (or limits) for sensitive surface features, as identified within the SVMEP EIS.

Condition 2: sets the process for adaptive management, consistent with Schedule 6 Condition 8.

Condition 3: sets the process to follow in the event remediation is not feasible or effective.

Condition 4: sets the bond for Sunnyside East and Carne West Swamps and establishes the process to follow in the event monitoring demonstrates greater than negligible environmental consequences have occurred to either of these swamps.

Condition 5: sets the offset requirement for the swamps defined in the condition and establishes the process to follow in the event monitoring demonstrates greater than negligible environmental consequences have occurred to any of these swamps.

Condition 6: sets the mechanism whereby the swamp offset liability is calculated.

The section below explains how the adaptive management framework has been used in the past and will be used in the future for the ongoing development of the Springvale Mine and Angus Place Colliery's hydrogeological model as new monitoring data and hydrogeological information become available. Centennial Coal applies this framework collectively, however, because of the complexity around groundwater modelling, the application of the adaptive management framework in practice is described below using groundwater as a case study.

The hydrogeological model being referred to is the COSFLOW Hydrogeological Model developed in 2013 by Commonwealth Scientific and Industrial Research Organisation (CSIRO) in 2013. The COSFLOW (2013) Numerical Groundwater Model has been used to provide mine inflow predictions (CSIRO, 2015) used in the Groundwater Impact Assessment (Jacobs, 2016) in the SEE for the proposed modification. The COSFLOW (2013) model was re-run as part of the RTS (refer **Section 1.3.2.3**, **Section 3.1.2**) and the revised mine inflows have been reported as CSIRO (2016) predictions.

1.3.2. Adaptive Management Framework and the Hydrogeological Model for Springvale Mine and Angus Place Colliery

1.3.2.1. Development of the Adaptive Management Framework at Springvale Mine and Angus Place Colliery

Uncertainty in natural systems needs to be accounted for in any adaptive management framework, and can include, amongst other things, the inherent environmental variation found in natural systems and the uncertainty around resource definition.

To account for this uncertainty, adaptive management is the structured process of learning through doing, and adapting based on what is learned (Williams, 2011). Williams (2011) suggests that the National Research Council (2004) definition of adaptive management provided a clear understanding of the intent behind an adaptive management framework, notably, one of flexible decision making, adjusted to consider uncertainties, as management outcomes are understood. Monitoring of these outcomes is essential to both scientific understanding as well as iterative management decision making.

New information and the use of new, improved technology have informed Centennial Coal's groundwater modelling process at Springvale Mine and Angus Place Colliery. The outcomes of the information collected from groundwater monitoring and modelling, as described above, have been applied to groundwater modelling for future longwalls at Springvale Mine and Angus Place Colliery.

The process of establishing an Adaptive Management Framework, commenced by Centennial Coal in 2012, consisted of the traditional adaptive management model, complemented by management outcomes, as depicted in **Figure 1** (after Williams, 2011):

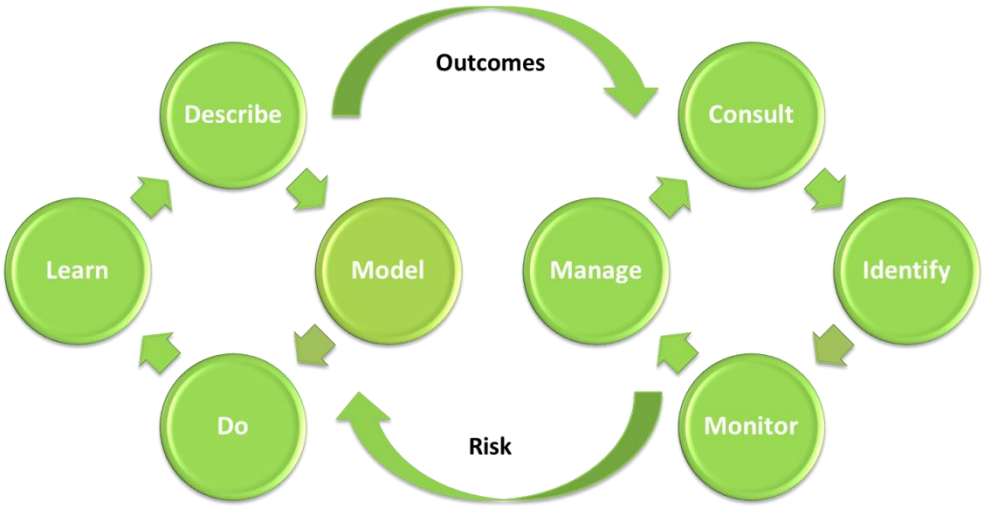

Figure 1 – Adapative Management Framework (After Williams (2011))

Understanding the Environment within which Centennial Coal Operates (Describe)

Understanding the environment within which a mine operates requires the collection of significant volumes of baseline data, against which actual monitoring results during mining can be compared.

Multiple lines of data, from multiple sources, are collected and analysed in accordance with the relevant monitoring program or plan of management. All management plans are available on Centennial Coal's website and results of monitoring are reported as per the consent requirements, or annually in the Annual Review. The results of this analysis includes:

1. A description of the development that was carried out and the development that is proposed to be carried out
2. A description of the environmental values impacted or potentially impacted as a result of existing and proposed development
3. A comprehensive review of the monitoring data and results which includes a comparison of these results against:
    - The relevant statutory requirements, limits or performance measures/criteria identified in any environmental approval
    - The monitoring results
    - The relevant predictions in the environmental impact assessment
4. An analysis of trends in the monitoring data over the life of the operation or project
5. Identification of discrepancies between predicted and actual impacts of the operation or project, and an analysis of the potential cause of these discrepancies.

Prior to seeking development consents for the SVMEP (SSD 5594) and Angus Place Mine Extension Project (APMEP, not approved yet), Springvale Mine and Angus Place Colliery completed a comprehensive baseline data collection process that, for the purposes of groundwater modelling included, surface and groundwater monitoring data comprising:

- Water volumes discharged through licensed discharge points
- Surface water flows
- Surface and groundwater quality
- Groundwater levels
- Hydrogeology
- Consumption of potable water
- Volume of water reused or recycled.

The data was reviewed and analysed in accordance with the CSIRO groundwater modelling process.

Model the Environment and its Response to Management Action (Model)

Centennial Coal has developed a number of conceptual and numerical models, validated with actual data, to model the environmental response to certain management actions/decisions, supported by the description of the environment, with clearly articulated assumptions. In the context of groundwater modelling, Centennial Coal has developed models for:

- Geology
- Hydrogeology
- Height of fracturing
- Groundwater.

The output from the above models is compared with actual monitoring results to improve the triggers used within each management plan/monitoring program and inform management responses. Similar to the monitoring data collected, these models are considered in the framework collectively, not in isolation of each other, thereby reducing the uncertainty of a particular modelled response and its subsequent environmental consequences. Not only this, the multiple lines of evidence as well as any single parameter response are analysed in the context of this historical understanding.

Undertake Management Action (Do)

Mine design is the key management control to reducing the environmental consequences to sensitive surface features (anthropogenic or natural). Selection of appropriate mine design takes into consideration risk, costs, benefits, consequences to resource development and the resilience of sensitive surface features to change.

Mine design, and the associated surface related environmental impacts and consequences through subsidence, is supported by a long history of research, both in Australia and internationally. For example, a significant body of work undertaken over the last 40 years on the issue of hydraulic connection and underground mining has been used as evidentiary input into the height of fracturing model undertaken by DgS (2014) for the Response to Submissions on the SVMEP and APMEP EISs. Reference to work undertaken by Holla (1987, 1989, 1991), Mills and O'Grady (1998), Gale (2008) and Mills (2011), amongst others, was included in the peer review of the DgS model undertaken by MSEC (2014). Research published by the Australian Coal Association Research Program (ACARP) and undertaken by CSIRO (2007) (ACARP Report C14033) and Gale (2008) (ACARP Report C13013) highlights that the impact of mining induced fractures depends on a complex combination of the mining geometry and the lithology and geology of the overburden strata.

Galvin (2016) provides a summary of the history of mine subsidence behaviour and modelling and its impact on groundwater systems, including specific reference to Springvale Mine.

The conclusion in DgS (2014) contrasts significantly with that of Tammetta (2014) and the Independent Expert Scientific Committee Reports (Commonwealth of Australia, 2014a, 2014b, 2014c).

Notably, these reports ignore the work in DgS (2014), which is considered by several peer reviewers as a superior model due to its basis in geotechnical theory, alignment with Australian conditions and inclusion of geological stratigraphy as a key variable in determination of height of continuous and discontinuous fracturing.

Monitor and Evaluate Environmental Responses (Learn)

Significant investment in the monitoring and evaluation of environmental responses of groundwater systems has been undertaken for over a decade at the Springvale Mine, (as described above and below and in detail in the SMEP EIS and LW419 Extraction Plan). Integral to this monitoring is a detailed monitoring program, based on a Before – After – Control – Impact (BACI) monitoring design that is statistically robust. Models have been developed to understand groundwater response to mining and mine subsidence. Mechanisms to test these models, including the use of sensitivity analyses, where appropriate, are included in the monitoring program, and validation of the model with actual data collected is undertaken in accordance with the monitoring program/management plan commitments. In Centennial Coal's case, this might be site specific data or regional data used where this type of data would add to model interpretation and understanding. All such data, and their sources, are incorporated into the relevant monitoring programs and plans of management.

The Swamp Monitoring Program, Water Management Plan and Biodiversity Management Plan required under Springvale Mine's consent conditions provide for specific monitoring methods, measures, triggers and responses.

Seek Input from Relevant Stakeholders on Outcomes (Consult)

Effective management requires ongoing engagement with relevant stakeholders in understanding the environment and the development of models, model outcomes and management actions/decisions in response to validation of the modelled system.

Springvale Mine's management plans and monitoring programs have been developed in consultation with relevant government agencies and, for the purposes of plans required under the Longwall 419 Extraction Plan, the Independent Monitoring Panel.

Setting Clear Objectives (Identify)

Adaptive management relies on the identification of clear management objectives. In the context of groundwater modelling, the model produces outputs in terms of mine water make, drawdown of water levels, changes to baseflow in watercourses. These output parameters can be compared to monitoring data to determine the level of consistency of the model with measured outcomes.

For groundwater, the clear objective for the Springvale Mine is to ensure that:

1. The necessary licenses for groundwater take are secured
2. The drawdown of shallow groundwater is not from the aquitards of the Burralow Formation (the critical aquitards that support swamp communities).

By setting these objectives, the inputs and outputs for the groundwater model and the associated environmental consequences can be defined, monitored and analysed.

Monitoring and Management Responses (Monitor and Manage)

Monitoring the system using best available technologies and multiple lines of evidence to evaluate progress against objectives determine the status of the system, and increase our understanding of the environment and the potential impacts of mining on it. Monitoring of the system also allows the further validation of the groundwater modelling used to underpin the impact assessment. These monitoring programs are documented within the Subsidence Monitoring Program, Swamp Monitoring Program, Water Management Plan, Biodiversity Management Plan and the Extraction Plans.

The objective of monitoring with associated management responses is to reduce uncertainty. Monitoring enables greater understanding of the environment and its responses to variation and management actions.

The SSD 5594 conditions of consent as described above, clearly set the process for management response, in the event an exceedance occurs. This process is consistent with government policy and allows for the development of appropriate response actions that can then be monitored for effectiveness.

Adaptive Management at Springvale Mine

The principal approach undertaken at the Springvale Mine to adaptively manage impacts has been the modification of the mine design criteria. Further to this, consideration of a number of alternatives has been made throughout the assessment of the SVMEP EIS and the development of the Extraction Plan. The mine design modifications have been specifically assessed through the groundwater modelling process, and are described below.

The Social and Economic Consequences of Adaptive Management

Alternative mine designs were considered within the SVMEP EIS and the economic consequences have been communicated in a commercial in confidence discussion with the Planning Assessment Commission (PAC) and the DPE.

There are a number of social and economic consequences that should be considered when investigating these, and other adaptive management options. These include, but should not be limited to:

- The approved business case presented in the SVMEP EIS
- The need for capital investment
- The potential loss of employment for over 300 personnel
- The loss of revenue to the State, through lost royalties and taxes
- A loss of reserves in one part of the mine may result in a need to increase available reserves in other parts of the mine.

Information on the economic consequences of these options can be provided to DPE under a commercial in confidence arrangement.

Risk and Uncertainty

The Adaptive Management Framework is risk based in a triple bottom line framework in that, as well as the environmental consequences of the project, it includes consideration of socio-economic impacts and benefits, the costs of these on local and regional communities and the residual consequences of net impacts/benefits on local and regional economies. These assessments include the costs and benefits of the management commitments made, and allow for monitoring of the social response to these management actions in the implementation and operational stages of Springvale Mine.

1.3.2.2. Application of Adaptive Management to Groundwater Modelling

Adaptive management has been applied in the context of the groundwater model which was prepared for the SVMEP and APMEP, which is described below.

History of Groundwater Modelling at Springvale Mine and Angus Place Colliery

Longwall mining commenced at the Angus Place Colliery in 1979 and at the Springvale Mine in 1995. Prior to this, underground bord and pillar mining had been undertaken in the region since the early 1950s. In 2002, Centennial Coal acquired these assets from State owned corporations. Centennial Coal recognised the need to develop robust groundwater modelling to understand the nature and extent of the potential impacts of longwall mining on groundwater resources.

Historical Groundwater Modelling (2003-2008) at Springvale Mine for LW 408 – LW412

The hydrogeology in the Springvale Mine and Angus Place Colliery region was investigated by CSIRO between 2003 and 2008 and is described in Guo et al (2007) (ACARP report C14033) and Adhikary and Wilkins (2012) (ACARP Report C18016). In these two studies, the distribution of porewater pressures within the Springvale region was investigated using more than 100 vibrating wire piezometers installed at Springvale Mine.

Connell Wagner (later Aurecon) monitored water level monitoring bores and swamp piezometers on the Newnes Plateau from 2005 to 2013 and prepared groundwater monitoring reports with purposes Subsidence Management Status Reports (SMSR) compliance. Since October 2013, RPS has monitored water level monitoring bores and swamp piezometers on the Newnes Plateau and prepared groundwater monitoring reports for SMSR compliance.

Angus Place and Springvale Mine Extension Projects (2013-14)

Between 2004 and 2015 CSIRO has undertaken a number of studies comprising numerical modelling simulations using COSFLOW to estimate surface subsidence and predict mine inflows from longwall mining (see for example, Guo, Adhikary and Gabeva (2007), Adhikary and Wilkins (2012), Adhikary and Wilkins (2013), Adhikary and Wilkins (2015)). These studies have culminated in a detailed COSFLOW numerical hydrogeological model, which provides a continuous simulation of both unsaturated and saturated conditions. It is therefore capable of simulating the formation of multiple phreatic surfaces (water tables). This is an important attribute in the context of the hydrogeology of Newnes Plateau, which overlie the Angus Place and Springvale mining operations. The model allows Springvale Mine (and in the future Angus Place Colliery) to quantify the mining induced groundwater impacts, their magnitude and extent, including impacts on swamps and watercourses.

Groundwater assessments for SVMEP and APMEP EISs were prepared by CSIRO (D Adhikary and A Wilkins (authors)) in 2013, based on the extensive history of groundwater modelling at the site. RPS used the CSIRO (2013) groundwater predictions to prepare the Groundwater Impact Assessments for the SVMEP and APMEP EISs.

It is noted the COSFLOW (2013) Numerical Groundwater Model used for the CSIRO (2013) mine inflows predictions used the full mine plan approved in SSD 5594 at a coal production rate of 4.5 Mtpa for Springvale Mine, and the full mine plan proposed in the APMEP EIS at a production rate of 4 Mtpa at Angus Place Colliery. It is also noted that the CSIRO (2013) predictions is for the concurrent operations of Springvale Mine and Angus Place Colliery, however, Angus Place Colliery has been under care and maintenance since March 2015.

Peer Review of Groundwater and Height of Continuous Fracturing Models

There has been extensive consideration of modelling of the groundwater effects of subsidence, calibration of models to measured groundwater response and peer review of methodologies and models prepared. Peer reviews have been conducted for all groundwater and height of continuous fracturing models developed for Angus Place Colliery and Springvale Mine.

The COSFLOW groundwater model was peer reviewed by Dr Noel Merrick of HydroSimulations Pty Ltd. This third party review was required under the *Australian Groundwater Modelling Guidelines* (Commonwealth of Australia, 2012). The following is an excerpt from Dr Merrick's final review:

> "A brief peer review is provided here to finalise a long process that dates back to April 2012 when the reviewer was first called upon to review the geotechnical-groundwater COSFLOW model under development by CSIRO. A review report written in June 2012 recommended substantial expansion of the model's groundwater capabilities and a shift in focus from near-field mine inflow to far-field environmental effects. It also alerted the authors to best practice expectations articulated within Australian groundwater modelling guidelines. Model expansion and focused reporting was duly undertaken by CSIRO in February 2013, resulting in a successful incorporation of groundwater and near-surface processes into what had primarily been a geotechnical model.

> Another review report was written in April 2013. This review listed 81 technical and editorial matters that required attention. CSIRO has attended to these matters in the May 2013 version of the report."

In order to supplement the COSFLOW numerical model, the Pi-Term model (DgS, 2014) developed by Ditton Geotechnical Services and HydroSimulations in 2014 was utilised to predict the height of continuous and discontinuous fracturing which would result from the proposed longwall mining activities at Angus Place and Springvale mines beneath the Newnes Plateau. The decision to use the Pi-Term Model was made after due consideration of alternative models, including the Tammetta (2012) model.

A review of the Tammetta (2012) model as presented in Commonwealth of Australia (2014a) was conducted by HydroSimulations (2014), available from the DPE website, as Appendix 17 to SVMEP EIS Response to Submissions at:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594

In part, the review by HydroSimulations concluded as follows.

1. The treatment of fractured zone algorithms in the literature reviews is inadequate as the work of Ditton, documented in Ditton and Merrick (2014), is ignored.
2. The Ditton model for fractured zone height is considered superior to the Tammetta algorithm due to a basis in geotechnical theory, a correct trend for sensitivity to mining height, calibration to Australian conditions, and inclusion of a host geology term.
3. The association of the Collapsed Zone in the Tammetta model with complete desaturation is disputed, given the retention of significant volumes of water in the matrix of the rock material in this zone, and statistical correlation of the height of this zone with the B-Zone altitude in the Ditton model, which marks the top of a zone that has disconnected fractures.
4. The treatment of fracture permeabilities in the literature review is inadequate as the substantial body of work on discrete fracture networks is ignored.
5. The estimates for fracture permeability are simplistic and grossly overstated, due to lack of consideration of fracture connectivity influenced by closure or truncation.
6. The conclusion that "a few small cracks through the swamp substrate can lead to substantial vertical drainage" is invalid, due to over-reliance on the cubic law for relating water flow to aperture size, and lack of consideration of the relative sizing of water-holding cracks and the water stored within intact swamp sediments.

Due to the fact that the Pi-Term Model is based on a geomechanical model which specifically models subsidence "zones" (based on subsidence induced strain), and then relates historical measured groundwater response for different subsidence "zones" to modelled areas, it was considered appropriate for a peer reviewer with expertise in the field of subsidence to review the Height of Continuous Fracturing Model prepared by DgS. The peer review of the Height of Continuous Fracturing Model was conducted by MSEC (attached as Appendix 7 of SVMEP EIA Response to Submissions available at the DPE website). MSEC (2014) concluded in part:

> “MSEC has reviewed the above referenced CSIRO and DgS Reports and found that they provide detailed information on the existing environment, the groundwater systems, the overburden and the presence of layers of low permeability for this Western Coalfields area. The selection and use of both numerical and empirical models which have been calibrated to site data over many years and used for the Angus Place and Springvale Mine Extension Projects, are believed to represent the current “industry best practice”. MSEC has reviewed these reports and, in our opinion, we consider the assessments of the HoCF for the proposed longwalls at Angus Place and Springvale Collieries that are included in these reports are reasonable for this particular geological region.”

1.3.2.3. Adaptive Management in the Context of the COSFLOW Groundwater Model

Following is a case study of the adaptive management approach adopted by Springvale Coal in the context of groundwater modelling presented in CSIRO (2015) predictions utilised in the Groundwater Impact Assessment (Jacobs, 2016) for the SSD 5594 Modification 1 application. The attributes of the CSIRO (2015) predictions, compared to the CSIRO (2013) predictions, are presented in **Appendix A**.

Reasons for Adaptive Management

As mining progresses spatially and through time, it is necessary to update the groundwater model, which was a Statement of Commitment in the SVMEP EIS. The reasons for the need for this adaptive management process are outlined below.

Coal Resource Definition

Springvale Mine and Angus Place Colliery utilise a variety of methods to characterise the coal resource available in areas where it holds mining titles. It also conducts detailed exploration in order to understand the geotechnical conditions likely to be encountered when mining these coal resources. Information obtained are used to improve future operations at the mine. These include the following.

- Surface to seam drilling and coring is undertaken in order to ascertain the thickness and quality of the coal in the area surrounding the borehole.
- Geophysical methods of analysis of drilled boreholes are used to characterise the coal seam and overlying and underlying strata. These methods include the use of optical scanners, acoustic scanners, gamma, density, sonic and neutron probes and borehole calipers.
- Mapping geological features and mining conditions in the underground workings is undertaken.
- Inseam drilling and coring to detect geological faults and investigate changes in roof and floor lithology which may affect mining conditions and coal quality are undertaken.
- “Strip sampling” of exposed coal in the underground workings and sampled coal quality analysis in order to increase the sampling density and improve the coal quality model for the mine is undertaken.
- Measurement of Coal Mine Roof Rating (CMRR) (a measure of roof ‘quality’ or structural competency for bedded roof types typical of underground coal mines) is undertaken.
- In-situ stress measurement (magnitude and orientation) is made.

There is a life of mine exploration program which has been developed in the context of obtaining information when necessary in order to make decisions about proposed mining areas in a timely manner for operational continuity. This program has been developed with a focus on distributing costs over the mine life and delaying the incurring of costs as far as possible, balanced with the competing need to have exploration data available to optimise the mine design and resulting financial model.

Business Planning

Business plans are developed at Springvale Mine and Angus Place Colliery considering the following one year, five years and life of mine plans. A wide range of inherently variable business plan input factors are considered in developing business plans, including:

- Coal production
- Product coal quality
- Coal price (domestic and export)
- Coal demand (domestic and export)
- Production costs (capital and operating).

During the period since the SVMEP and APMEP were developed, export coal demand (and thereby pricing) has fallen dramatically. In order to keep the mines economically viable, significant changes to coal production and costs had to be achieved. In the case of Springvale and Angus Place mines, this involved a temporary cessation of production at Angus Place Colliery, which was placed on care and maintenance in March 2015. It also included a significant planned future increase in production from Springvale Mine to up to 5.5 Mtpa (although the total production from the two mines will fall as a result of Angus Place Colliery being on care and maintenance), which is the subject of the application for Modification 1 to SSD 5594.

Further, four longwalls at Springvale Mine (LW423 and LW501-503) approved in SSD 5594, and three longwalls proposed at Angus Place (LW1017-1019) in the APMEP EIS were not assessed as financially viable at the time of preparation of the 2015 business plans (and were thus not included in the 2015 business plan). It is noted that an improvement in business plan input factors may lead to the inclusion of these longwalls in future business plans. Importantly, the base case assessed in the SVMEP EIS remains the same, even though there have been operational adjustments due to business need and changes.

Variations in mine productivity and favourable economic conditions over time may mean that efficiencies are gained and markets are available to accommodate those efficiency gains, and the longwalls not included in the CSIRO (2015) predictions could, as noted above, in future be mined. Springvale Mine wants to retain the flexibility of managing its mining operations in response to market needs, and did not propose in the modification application that longwalls LW423 and LW501 – LW503 be removed from the approved mine plan. Similarly, whilst the mine life will be reduced through the increased production rate, Springvale Coal did not propose that the mine life be reduced, again for the reason that it wants to retain operational flexibility. The SEE assessed the maximum production limit of 5.5 Mtpa although this limit may not be reached consistently every year.

SSD5594 Statement of Commitments – Groundwater Model Review

The Statement of Commitments in SVMEP EIS committed to updating the existing groundwater models every six months, and a review will be included in the Annual Review. Inherent in this commitment is the update of the groundwater predictions in the context of input parameters including the mine plan and mine production schedule, and validation of the model in the context of environmental monitoring data.

This review is done in the context of comparison with the approved base case to confirm whether the objectives above are within the base case predictions contained in the SVMEP EIS, that is:

- Does Springvale Coal hold the necessary licenses for predicted groundwater take?
- Is the drawdown of shallow groundwater from the aquifers of the upper Burralow Formation (interbedded with the critical YS1-YS4 aquitards that support swamp communities)?

Review in the Context of Groundwater Model Outputs

Where critical groundwater model outputs (e.g. mine water make) may be affected by changes to model input parameters (e.g. mine production schedule), model updates will be completed to ensure compliance with SSD 5594 consent conditions.

This review is done in the context of comparison with the approved base case to confirm whether the objectives above are within the base case predictions contained in the EIS, that is:

- Does Springvale Coal hold the necessary licenses for predicted groundwater take?
- Is the drawdown of shallow groundwater from the aquifers of the upper Burralow Formation (interbedded with the critical YS1-YS4 aquitards that support swamp communities)?

Review in the Context of Feedback from Stakeholders

The groundwater model may be updated to reflect valid feedback from expert stakeholders, (e.g. DPI Water and WaterNSW). An example of this is the future inclusion of the Coxs River in the COSFLOW groundwater model updates, not included in the COSFLOW (2013) Model. .

Review in the Context of Environmental Monitoring Triggers

Where environmental monitoring data is not within the expected range, triggers for reporting, investigation and action have been developed within management plans including the:

- Swamp Monitoring Program
- Water Management Plan.

In the case of the observed groundwater level triggers at two piezometers (CW1 and CW2) installed in the Carne West Swamp, investigations have been conducted into the cause of the triggers. The Independent Monitoring Panel (IMP) established as per Condition 11, Schedule 3 of SSD 5594 have been involved in the investigations and made specific recommendations regarding additional monitoring requirements in order to establish the causes of the triggers. The additional monitoring recommended by the IMP was included in the Swamp Monitoring Program for LW419 Extraction Plan, which was subsequently approved under SSD 5594 and EPBC 2013/6881.

Future updates to the COSFLOW (2013) Groundwater Model may include modification to the permeability ramp function.

This review is done in the context of comparison with the approved base case to confirm whether the objectives above are within the base case predictions contained in the EIS, that is:

- Is the drawdown of shallow groundwater from the aquifers of the upper Burralow Formation (interbedded with the critical YS1-YS4 aquitards that support swamp communities)?

Review in the Context of Input to Water Sharing Plan Reviews

Under the *Water Management Act 2000*, Water Sharing Plans (WSPs) were introduced in the area of Angus Place Colliery and Springvale Mine in 2011. These plans have scheduled major reviews every 10 years and minor review every 5 years.

Springvale Coal and Centennial Angus Place Pty Limited hold groundwater Water Access Licences in the Sydney Basin Richmond Groundwater Source and the Sydney Basin Coxs River Groundwater Source, which are specifically related to Angus Place Colliery and Springvale Mine.

Centennial Coal has committed to provide data to DPI Water to assist with updates as part of the WSP review process. In order to provide data which if compatible with DPI Water models, the COSFLOW Groundwater Model may require review.

This review is done in the context of comparison with the approved base case to confirm whether the objectives above are within the base case predictions contained in the EIS, that is:

- Does Springvale Coal hold the necessary licenses for predicted groundwater take, and
- Is the drawdown of shallow groundwater from the aquifers of the upper Burralow Formation (interbedded with the critical YS1-YS4 aquitards that support swamp communities).

Review in the Context of Updates to the Springvale Mine Plan and Mine Production Schedule

Since the development of the numerical COSFLOW (2013) groundwater model, prepared in 2013 by CSIRO and with the predictions from the model utilised for the SVMEP and APMEP EISs (CSIRO, 2013), a review was conducted based on the 2015 business plan, which was based on the Angus Place Care and Maintenance business plan (per “Business Planning” section above). The numerical groundwater model was itself not changed, however, two input parameters (mine plan and production

limit (5.5 Mtpa) for Springvale Mine) were changed. In addition the predictions reported in the CSIRO (2015) groundwater assessment is for the sequential operational scenario with Angus Place commencing extraction when Springvale Mine completes extraction. The groundwater impact assessment for the proposed Springvale Modification 1 was based on CSIRO (2015) predictions as this was the latest version of the model at the time of preparation of the SEE.

Given that Springvale Modification 1 is not proposing to remove LW423 and LW501-503 from the approved mine plan, in order to retain operational flexibility to be able to mine these longwalls under favourable market conditions, the COSFLOW (2013) groundwater model has been re-run, based on a mine production model which reflects a potential future business plan intentions for Springvale Mine. The updated production model used included production rates of up to 5.5 Mtpa at Springvale Mine (as was the case for the CSIRO (2015) predictions), and also included the four longwalls at Springvale (LW423 and LW501-503), which had been removed from the CSIRO (2015) simulations. The predictions from the re-run of the groundwater model referred, to as the CSIRO (2016) predictions, and the expected impacts are provided in Section 2.5 of Appendix C of this RTS. Briefly, the CSIRO (2016) mine inflow predictions are consistent with CSIRO (2015) and CSIRO (2013) predictions, and all are consistent with the 19 ML/day maximum assessed in the SVMEP EIS and approved in SSD5594. Given this outcome, the baseflow predictions with respect to modelled surface water reaches, and modelled mine inflows in the CSIRO (2016) simulation, are consistent with CSIRO (2015) simulation and as presented in CSIRO (2015), are consistent with the CSIRO (2013) simulation. However, given that the CSIRO (2016) simulation is at a higher production limit then mining will be completed by October 2023, compared to the CSIRO (2013) simulation where the mining was expected to be completed by February 2025. The impacts and environmental consequences for the proposed Springvale Mine modification are therefore expected to be consistent, as discussed in the SEE, with the impacts presented in the SVMEP EIS and approved in SSD 5594, however the impacts will not be sustained till February 2025 but will terminate before that date.

Consistency between Mine Water Make Predictions from CSIRO (2013), CSIRO (2015) and CSIRO (2016) Groundwater Simulations

To date the COSFLOW (2013) groundwater model has been run three times to generate the CSIRO (2013), CSIRO (2015) and CSIRO (2016) water make predictions. **Appendix A** provides a comparison of the three simulations and the mine inflow outputs. The results presented in CSIRO (2013), CSIRO (2015) and CSIRO (2016), discussed above and in **Section 3.1.2**, suggest the correlations between groundwater simulations are dependent on the underpinning production models. The CSIRO groundwater model simulations do not recognise production tonnage, other than its impact on longwall block completion dates.

The start dates for the CSIRO (2013) and CSIRO (2016) simulations are separated by four years, and with the passage of time there has been significant slippage in actual mine production (average 3.05 Mtpa for past four years) relative to the production model used for the CSIRO (2013) groundwater simulation (based on 4.5 Mtpa production limit), for reasons including:

- Production model conservatism
- Springvale Mine did not operate for eight weeks (21/08/15 – 16/10/15) while the SVMEP was being assessed.

The finish dates for the CSIRO (2013) and CSIRO (2016) simulations are both in January 2025. The dates when the CSIRO (2015) and CSIRO (2016) simulations reach LW432 (finish of the CSIRO (2015) predictions) are both in October 2023.

For these reasons, the production models used for the purposes of the CSIRO (2013), CSIRO (2015) and CSIRO (2016) simulations are effectively very similar in terms of when each future longwall is extracted. The minor variations between them can be seen in the slight differences between mine water make projections from the different simulations (refer **Section 3.1.2** of the RTS and Section 2.5 of **Appendix C**).

The differences between the CSIRO (2013) (SVMEP EIS) and CSIRO (2016) simulation, which both cover all of the approved longwalls under SSD 5594, and the CSIRO (2015) simulations are expressed, not in terms of significant differences to rates of mine water make, but instead in terms of the end date of mining.

For these reasons, there is a high level of consistency in rates of mine water make predictions between the CSIRO (2013), CSIRO (2015) and CSIRO (2016) simulations.

2.0 SUBMISSIONS ON THE PROPOSED MODIFICATION

This section provides an overview of the submissions received on the proposed modification during the exhibition period, and summaries of these submissions.

2.1. Overview of Submissions

Of the 97 total submissions received on the SEE:

- 9 were from government agencies
- 5 were from special interest groups and organisations
- 83 were from community individuals.

Government agency submissions were received from:

- Forestry Corporation of NSW (FCNSW)
- Lithgow City Council (LCC)
- NSW Department of Planning and Environment (DPE)
- NSW Department of Primary Industries (DPI)
- NSW Department of Industry - Division of Resources and Energy (DRE)
- NSW Environment Protection Authority (EPA)
- NSW Office of Environment and Heritage (OEH)
- Roads and Maritime Services (RMS)
- WaterNSW.

LCC provided two submissions. One submission was in the form of comments on the SEE while the second submission was in support of the proposed modification.

Submissions from specialist group and organisations were received from:

- CFMEU – supports the proposed modification and contained a petition with 221 signatures
- The United Mineworkers South Western District – supports the proposed modification
- 4nature – objects to the proposed modification
- Blue Mountains Conservation Society (BMCS)– objects
- The Colong Foundation for Wilderness Ltd (Colong Foundation) – objects.

Of the 83 community submissions received:

- 4 submissions were in support of the modification
- 79 submissions were in objection to the modification comprising:
    - 7 individual contributions
    - 72 form letter contributions.

2.2. Summaries of Submissions

2.2.1. Government Agency Submissions

Table 1 provides summaries of issues raised by government agencies listed in Section 2.1. **Table 1** also notes sections in the RTS where the issues raised are addressed.

Table 1 – Summary of Comments and Issues in Submissions from Government Agencies

Government Agency	Comment / Issue	Section Reference
FCNSW	FCNSW commented the Stakeholder Engagement section of the SEE did not include FCNSW as a stakeholder, and requested that all proposed developments of Springvale Mine note FCNSW as a key stakeholder.	Noted.
DPE	The Adhikary and Wilkins (2015) report included as Appendix G of the Jacobs Groundwater Assessment (Appendix I) is based on a model for sequential mining of Springvale Mine and Angus Place Colliery. This report does not purport to take into account the proposed increase in the rate of production. Page 90 of the Statement of Environmental Effects Main Report states that the COSFLOW groundwater model was updated by CSIRO "to account for the change in operational status at Angus Place Colliery… and the proposed change in coal mining rate at Springvale Mine, with an increase from the approved 4.5 Mtpa to up to 5.5 Mtpa". The groundwater assessment report goes on to makes extensive reference to the Adhikary and Wilkins (2015) model, and draws conclusions based on that model. While there is a clear link between the alternate mining schedule and changes to mine inflows, the nexus between the proposed increased production rate and groundwater impacts is less clear. Can you please confirm that the Adhikary and Wilkins (2015) model does assume a 5.5 Mtpa production rate, and clarify which changes to groundwater are due to sequential mining, and which are predicted to result from the proposed increased production rate.	**Section 3.1.1**
	Also, the production schedule used in the CSIRO model is based on a forecast production of rate of 5.32 Mtpa. The modification application is for a production increase to 5.5 Mtpa, and the Department's assessment of the inflow rates and relative change in impacts should consider this rate.	
	Figures 4.2 and 4.3 of the Jacobs report compare the concurrent and sequential Springvale and Angus Place mining. It would assist the Department's assessment if you could provide a comparison between the modelled mine inflows for Springvale at the approved production rate of 4.5 Mtpa and predicted mine inflows at a production rate of 5.5 Mtpa, assuming operation of the Springvale only for both cases.	
DPI	There are issues concerning comparisons of outcomes between the 2013 and 2015 versions of the numerical groundwater model (NGM) .The proponent should present a NGM reflective of the one used in 2013 and thus representing all of the approved mine footprint, together with an amended application document for the Modification.	**Section 3.1.2**
	There is a data mis-match in the interpretation based on hydrographs derived from the NGM. This should be addressed or otherwise clarified in an updated NGM.	
	The proponent should ensure that in all future documentation they acknowledge that the swampland of the Newnes Plateau is specifically listed in Schedule 4 of the *Greater Metropolitan Water Sharing Plan for Groundwater Sources 2011.*	
	The Proponent should correctly identify, when discussing the influence of the proposed works on nearby groundwater users' bores, that drawdown and other aquifer impacts, these occur against groundwater works and not Water Allocation Licences.	

Government Agency	Comment / Issue	Section Reference
DRE	The following requirements are to be included in the consent conditions: The Springvale Colliery Mining Operations Plan will need to be modified for consistency with the revised activity approval (if granted). The company should be required to review, and modify where appropriate, their "Water Management Plan" and any other Management Plans/Procedures to take into account changes to the drainage system around the coals stockpile. An appropriate condition should be placed on the approval to ensure the coal stockpile area is clearly delineated and designed so as to ensure containment of coal material within the delineated area.	**Section 3.1.3**
EPA	The Springvale Mine (Springvale) is currently licensed by the Environment Protection Authority (EPA) by Environment Protection Licence (EPL) 3607, the EPL permits Coal Works >2000000-5000000 T handled, and Mining for Coal >3500000-5000000 T produced. In the event the modification is approved Springvale will be required to submit a Licence Variation Application to the EPA for the increased activities.	**Section 3.1.4**
	The Statement of Environmental Effects (SEE) states that the proposed modification to consent does not result in an increase of inflow to underground operations and therefore there is no change to mine water discharge predicted to Sawyers Swamp Creek via LDP009. The EPA notes however that within Table 15 - Broad Brush Risk Assessment Results, increased mine water discharges at LDP009 to the Coxs River Catchment is identified as a potential impact. The EPA therefore requests that any ground and surface water impact assessments that identify an increase in mine water make and subsequent discharge from LDP009 (as noted in the discussion within Table 15), be provided to the EPA.	
	With regard to the expansion of the ROM coal stockpile; in September 2014 Springvale had an incident involving a discharge of coal fine sediment from the premises due to inadequate management of the existing ROM coal stockpile. Stockpiled coal had slumped and blocked drainage from the ROM pad causing coal fines to discharge into the clean water diversion and discharge off site. The EPA therefore requests that as part of the expansion to the ROM coal stockpile area, that appropriate measures are taken to ensure coal is not stockpiled in close proximity to the drainage system.	
LCC	Council considers the Environmental Assessment adequately highlights the relevant issues, and has no objection to the project subject to Council's original conditions remaining on the consent.	Noted
	Lithgow is acknowledged as the oldest mining community in the Central West Region of NSW. The economic and social fabric of the community has developed around the coal industry. The mining industry has historically been a very important component of the Lithgow economy, and still remains so today. According to the ABS 2011 Census, the mining sector employed about 12.4% of the total Lithgow resident workforce in 2011. Any fluctuations in the coal mining sector have the potential to have a major impact upon the Lithgow community. According to the Economic Impact Assessment 2014/15 Report prepared for the NSW Minerals Council (dated January 2016) the following results were presented for the Lithgow LGA: (a) $183.7 million in direct spending through: (i) $126.1 million in wages and salaries to 891 direct, full-time residing employees (including contractors); and (ii) $57.6 million in purchases of goods and services from 171 local businesses (including contractors) and community contributions. (b) the total economic contribution in the Lithgow LGA (direct, indirect and induced) during 2014/15 amounted to $371.9 million in value added, 22% of total gross regional product in the Lithgow LGA.	Noted

Government Agency	Comment / Issue	Section Reference
	With coal mining so important to the Lithgow Community the Springvale Mine is a very important development for the region. Not only is this mine a very important source of employment for many within the Lithgow Local Government Area it is also now the only practical supplier of coal to the Mount Piper Power Station, another significant employer in the Lithgow LGA. The Mount Piper Power Station currently provides up to 15% of the State's power supply. Last year we were very pleased that the NSW Planning Assessment Commission (PAC) found, on two separate occasions, that it was satisfied that the Springvale Mine Extension Project's benefits were considered to outweigh the potential impacts and that the development is therefore 'approvable'. As a result the development was given development consent. The Lithgow community has, in recent years, endured a difficult period. This has come about with the economy tightening, world coal prices dropping and the loss of local jobs, including those from the recently closed Angus Place Mine. Given the importance of this industry to Lithgow I would urge you to favourably consider the modification before you.	
OEH	OEH considers that, prior to making a decision on the proposed modification, the Department of Planning and Environment (DP&E) needs to be fully satisfied that the current operations of Springvale Mine have been conducted in full accordance with the current Project Approval for SSD 5594. In particular, DP&E should ensure that all requisite management plans are finalised to an adequate standard, and all required monitoring has commenced.	**Section 3.1.5**
	OEH has concerns regarding a statement in section 1.6 of the Statement of Environmental Effects (SOEE) *Additional equipment to be installed will comprise longwall equipment (increased from one to two longwalls) and continuous miners (increased from three to five). While there will be two longwalls underground some of the time, only one longwall equipment will be operated at a time. Similarly, while five continuous miners will be located underground, only four will be operated at a time. Installation of an additional longwall equipment underground means the changeover period between longwalls, approximately six weeks, will be eliminated. The next longwall to be extracted can be preinstalled with the additional longwall equipment prior to the completion of the current longwall being extracted.* It is understood from the above that, while two sets of longwall equipment may be located in two adjacent longwalls at one time, only one will be operational (so that only one longwall will be extracted at a time). However, there is no indication in the SOEE regarding whether there are additional impacts or planning requirements associated with the elimination of changeover periods. This may have implications for monitoring and management of sensitive features such as Newnes Plateau Shrub Swamps. OEH recommends DP&E ensures that adequate management plans, baseline monitoring and adaptive management procedures are in place prior to installation of longwall equipment.	
RMS	Prior to the commencement of construction work, a Channelised Right (CHR) turn lane in accordance with Figure 7.7 Part 4A of Austroads Guide to Road Design (copy enclosed) and relevant Roads and Maritime supplements, is to be provided in the Castlereagh Highway at its intersection with the Mine Access Road. The intersection works are to be designed and constructed for a 100km/h speed zone and be able to accommodate the largest vehicle accessing the intersection.	**Section 3.1.6**
	As road work is required on a state road, prior to the commencement of road work the developer is to enter into a Works Authorisation Deed (WAD) with Roads and Maritime Services.	
WaterNSW	**1. Potential additional mine inflows and changes to discharge water quality from the increased annual coal production**	**Section 3.1.7**

Government Agency	Comment / Issue	Section Reference
	The updated modelling results with the increased mining rate at Springvale Mine indicate a minor increase in mine water (10 L/s or 0.86 ML/day) to underground workings. This increase is predicted not to lead to changes in quality of mine water discharges to Sawyers Swamp Creek. However, no data on water quality has been provided with the SEE or Appendices to substantiate this prediction. The SEE and Appendices specifies the requirement to reduce salinity of mine water discharges to the Coxs River to 500 ms/cm (90th percentile) by 30 June 2019 (as per Schedule 4, Conditions 12 and 13) however, there is no reference to the requirement to meet limits for salinity of 700 (50th percentile), 900 (90th percentile) and 1000 (100th percentile) ms/cm by 30 June 2017 (as per Schedule 4, Condition 12). WaterNSW assumes Centennial Coal still intends to achieve the 30 June 2017 targets. WaterNSW notes an error in Table 41. The total salt outputs for existing conditions is listed as 3,624 ML/year however, the actual total figure should be 3,924.	
	2. Potential impacts from the increased coal stockpile area (additional 0.3 ha) The coal stockpile footprint will increase by approximately 23% as a result of the proposed extension area, which falls within the existing clean water catchment. The SEE proposes a new diversion drain (designed for 100 year ARI) to be constructed around the stockpile extension area to divert run-off to the existing dirty water surface water management system. WaterNSW expects that the Surface Water Management Plan will be updated to reflect these changes.	
	3. Wastewater management to cater for proposed additional staff The SEE does not specify how the increased wastewater from the increased staff numbers will be managed at the site. However, WaterNSW notes that a development application was assessed and approved in 2015 for the Springvale Wastewater Transfer Scheme (DA 023/15) which has a design capacity for 450 staff, indicating the system can cater for the proposed additional staff and associated wastewater loads from the Modification (SSD 5594 MOD1). It is not clear from the SEE whether the new sewage pump station required as part of DA 023/15 has been installed as yet, or whether it will be installed prior to the proposed modifications taking effect. WaterNSW would require the works approved under DA 023/15 to be completed prior to the modification taking effect, to ensure increased wastewater loads at the site can be appropriately managed.	
	4. Life of consent WaterNSW notes there is no proposal to amend the life of the consent notwithstanding that the production rate and size of the workforce is proposed to increase. WaterNSW requests the Department consider reducing the life of the consent.	
	It is considered that Schedule 4, Condition 14 (d)(i), (ii) and (iii) related to Site Water Balance, Surface Water Management and Groundwater Management, should incorporate proposed changes as a result of the modification.	

2.2.2. Submissions from Special Interest Groups and Organisations

Two organisations, CFMEU and The United Mineworkers South Western District, provided submissions supporting the proposed modification. The CFMEU submission included a petition with 221 signatures.

Three Special Interest Groups (4nature, Blue Mountains Conservation Society, The Colong Foundation for Wilderness Ltd) object to the proposed modification. **Table 2** provides a summary of issues raised by these three Special Interest Groups. **Table 2** also notes sections in the RTS where the issues raised are addressed.

Table 2 – Summary of Comments and Issues in Submissions from Special Interest Groups

Special Interest Group	Issue	Section Reference
4nature	**Scope 2 & Scope 3 Greenhouse Gas Emissions** The Centennial Coal *Summary of Environmental, Economic and Social Impact* (page 1 iv & page 1 v, Vol 1) includes Scope 1 Greenhouse Gas Emissions but does not include the additional contribution of the mine extension to Scope 2 and Scope 3 Greenhouse Gas Emissions. Ignoring Scope 2 and Scope 3 emissions significantly understates the adverse environmental effects of the proposed extension.	**Section 3.2.1**
	Pollution of Coxs River The Centennial Coal proposal contends that the environmental effects on water quality are minimal or negligible because mine water discharges would not significantly increase contaminants above current levels. However current levels of discharge are causing pollution of the Coxs River. There is published scientific evidence that current levels of discharge have contaminant levels which are known to adversely affect stream dwelling biota. Current discharges do not adhere to the requirement of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 to maintain or improve water quality. Additional discharges arising from the mine extension would create additional pollution of the Coxs River.	
	Pipeline for waste water The current levels of contaminant discharge are also in contention because 4nature has initiated a legal challenge to the process by which previous the development application was approved. There is currently a development application to pipe mine waste water to the nearby Mt Piper power station. At the power station the contaminants would be treated and not discharged into the Coxs River. It is essential that this pipeline project be completed before any additional levels of discharge occur from the mine extension and either use by the power station or treatment of the water be a mandatory condition of consent. Such a pipeline should be designed to handle the mine discharge water from all the Newnes Plateau underground coal mines. Measures to deal with discharge water must be able to operate for as long as the water is discharged. This means that a solution must be found for times when the Mt Piper Power Station is temporarily or permanently out of action or decommissioned and outlast the life of the mine.	
	Impacts on swamps The Centennial Coal *Summary of Environmental, Economic and Social Impact* ignores the recent evidence from the Springvale Mine Independent Monitoring Panel that current mine operations have had significant impacts on the upland swamps listed as federally listed endangered ecological communities. Furthermore, the current monitoring regime for water flows through the swamps was found to be inadequate by the Springvale Mine Independent Monitoring Panel. Underground mining is demonstrably damaging groundwater that the upland swamps depend on, resulting in the permanent loss of the swamps and the loss of flows to creeks and waterfalls. Underground longwall panels for any mine extension must be reconfigured to avoid undermining the catchments of the upland swamps and creeks.	
BMCS	**1. Adequacy of the Statement of Environmental Effects** The society believes that the proposed modification has not adequately assessed the likely environmental impacts on the natural environment. The consent authority for a modification is required to consider all the factors in *Environmental Planning and Assessment Act 1979* under s.79C (1) which includes at S.70C (1) (b) particular "the likely impacts of the development, including environmental impacts on the natural and built environments…" s.79C	**Section 3.2.2**

Special Interest Group	Issue	Section Reference
	(1) (b). Although the consultants preparing the *Statement of Environmental Effects* (July 2016) (SEE) did a "desktop level assessment" (SEE, p.136) they failed to include the report of the Independent Monitoring Panel for Springvale Coal Mine on the *Springvale Mine Extension Project - Extraction Plan for Longwall 19* (June 2016) (IMP Report). [A copy of the IMP Report is attached as part of this submission]. This report is an important addition to the understanding of impacts of subsidence specifically from the Springvale Mine on swamps lying above or near the Springvale Mine area. This report's existence was known to the proponent and if it wasn't in existence when the consultants were engaged, it was known it would exist and be relevant given the IMP's role as defined in the Springvale Mine Expansion Project Conditions of Consent (2015) (Springvale Consent Conditions). The consultants could have identified its existence through their desktop level research or by merely reading the Springvale Consent Conditions. Those conditions state that the Independent Monitoring Panel (IMP)'s role included giving advice "…to the applicant and the Secretary of the Department of Planning and Environment (DPE) regarding the collection of relevant data to predict and monitor the potential subsidence impacts and environmental consequences of second workings" [Schedule 4, condition 11(a)]. The IMP Report concentrated on what was causing the damage to Carne West swamp in the Springvale mining area which it reported was " …the very significant drop in the water level of Carne West Swamp and the cessation of flow in the watercourse through this swamp, with consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp" [IMP Report, p.2]. "These changes began to be detected when mining was up to 700 m away, well outside the impact zone predicted in the EIS for mining in this region of Springvale Mine." [IMP Report p.2] "It appears to the Panel on the basis of the information provided to it that this swamp (Carne West) may have started to be impacted by mining at around July 2013." (IMP Report p.7) The IMP concluded that the likely cause was mining causing far field movement. They comment that while the EIS "…acknowledged the occurrence of far field movements, apparently these have not been measured in any detail to date at Springvale Mine. Based on behaviour in the Southern Coalfield, reported in the EIS, these movements can be quite substantial (up to 100 mm at a distance of 700 m from the edge of a longwall panel.)" [IMP Report p.5]	
	Impact identified by IMP Report but not assessed in EIS DPE has included much of the IMP's advice in its approval of the extraction plan for Longwall 149 (LW419) under the Springvale Consent Conditions. The IMP's Report concluded that impacts occurred which were not assessed in the EIS process for the determination of the Springvale Mine Expansion Project. The proposed modification (increasing coal production) will affect the whole of Springvale Mine Expansion Project (MEP) area. It is not, for instance, a modification to increase the area of the consent. The swamps within the MEP are listed as endangered ecological communities under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* and at the state level the Newnes Plateau Shrub Swamps are declared as endangered ecological communities under the *Threatened Species Conservation Act 1995*. These should be taken into account in considering the environmental impacts of the modification under s.79C and conditions imposed to ensure this damage does not recur or continue. ***Referral to the Commonwealth*** The swamps in Springvale MEP area include nationally listed swamps, therefore harm to these swamps is a matter of national environmental significance under the EPBC Act. In the light of the IMP Report, the modification and the IMP Report should be referred to the Department of Environment for consideration of the impacts under Part 9 of the EPBC Act.	
	2. Impacts of increased annual coal production	

Special Interest Group	Issue	Section Reference
	The Springvale Modification 1 will increase the amount and rate of annual coal extraction by up to 22 per cent. This is likely to accelerate damage occurring to the endangered swamps. The impact of accelerated extraction needs to be assessed as to its environmental impacts on the natural environment. ***Impacts of removing the turn around/ set up times for machinery*** The IMP's advice is required per extraction plan for a longwall (SV Consent, schedule4 condition 11). The IMP has referred to the time pressures on their work which come from the timetable for approvals [IMP Report, pp.1 and 11]. These pressures are likely to increase as Modification 1 proposes to increase mining time in part by removing the six week changeover time to get new longwall machine installed in a new panel. [SEE at p.4] This could reduce both the time and monitoring data available to the IMP as it carries out its role including reviewing extraction plans. The consent says that the IMP has to provide "**timely,** accurate and focussed advice" [Springvale Consent Conditions, schedule 6 condition 11]. DPE needs to consider how the IMP can still meet its role as defined in the consent and, for instance, whether they need more support. Comprehensive and targeted data is going to be important to the IMP's future reports. The IMP has been critical of the existing monitoring in place and has recommended additional monitoring equipment be put in place as soon as possible in relation to Carne West swamp damage, particularly to identify far field movement. [IMP Report pp7-8] The IMP Report suggests that the current monitoring data is not the "robust monitoring" claimed by the SEE eg at p.137. For instance, the IMP has stated as follows: • there appears to be no baseline data for Carne West before it was impacted by mining [IMP Report p.7]; • "the existing monitoring program has been restricted and limited across lineament zones ' p.5 • There is a lack of groundwater monitoring in swamps. The current monitoring regime is inadequate (p.6) • Lack of knowledge and sufficient monitoring p.5 • There is no measurement of far field movements [p.5] • Lack of soil moisture monitoring is unacceptable [p.7]; • No information available to the panel on the status of soil moisture monitoring since July 2013 at sites of relevance to assessing the impacts of mining at Springvale Mine" [p.7]; • "there is currently a knowledge gap in the status and dynamics of moisture content in the top 1 – 1.5m of the substrate of the swamps, with the most critical gap being in the 0.0 to 0.5m zone, which is the zone of greatest biological activity" [p.7]; • Flow monitoring maybe be too late for Carne West (p.8) This situation needs to be rectified for future swamps and accelerating the extraction rate may undermine the ability of getting appropriate monitoring in place and providing the data in time for the next extraction plan's approval. ***Impacts of installing longwall machines earlier*** "The next longwall to be extracted can be preinstalled with the additional longwall equipment prior to the completion of the current longwall being extracted. The elimination of production downtime will result in additional weeks available for ROM coal extraction." [SEE, P.4] It is understood that removing a longwall machine would not possible without actually mining, as Springvale will use "the retreat mining configuration whereby the longwall face equipment is established at the end of the panel that is remote from the main headings…" SEE p.25]. Thus, putting the mining equipment in place before the extraction plan has been prepared and approved puts pressure on the consent authority	

Special Interest Group	Issue	Section Reference
	not to change the mining plan even when it might be a necessary action depending on the outcomes and monitoring of previous longwalls. For instance, it might remove the possibility of avoiding or shortening a longwall to prevent further damage based on conclusions drawn from previous mining and monitoring. The conditions of consent already allow for the proponent to object to recommendations on the basis that it is "unreasonable or not feasible" [Springvale Consent Conditions, Schedule 6, condition 11 (b)] or that it is not "possible" even if recommended by the IMP. [Schedule 6 condition 11 (d)] This fait accompli could be avoided if the longwall machinery s not put in place in the next longwall to be mined until the extraction plan for that longwall has been reviewed by the IMP and approved by DPE. There appears to be a lot of leeway in the additional time that would result from removing the down time between longwalls. There is no equivalence between the time lost before the approval of Springvale MEP (eight weeks), as is suggested [SEE at p. vi]), and the ability to make up time by the earlier insertion of the longwall in place earlier (estimated to be up to six week downtime per longwall.) With 19 longwalls still to be mined and have extraction plans approved, this is a saving of up to 18 longwalls times six weeks equals 108 weeks or just over two years. Referring to the downtime before MEP was approved is really a red herring.	
	3. Impact of Mine Discharges to Coxs River The consent authority also needs to take into account the Sydney Drinking Water State Environmental Planning Policy. The mine discharge to the Coxs River will not have a neutral or beneficial impact on Sydney's drinking water supply. A river flowing through world heritage area and into a major drinking water supply should not be used as a place to dump toxic mining waste. Sydney has cleaned up the discharging of industrial waste into its rivers such as Parramatta, Georges and Cooks Rivers. The same principle should apply to a significant asset to the functioning of the greater Sydney area, its drinking water supply.	
	4. Significant increase in size of coal reject piles The proposed change to the size of the coal stockpile is in fact a large increase of 120,000 (235%) on the existing stockpile of 80,000 allowed. (SEE, p.iii) Given the massive and very damaging coal waste collapse in July 2015 at Centennial's Clarence Colliery, it is not clear from the SEE whether Springvale has learnt from this disaster at its associated mine and applied any learnings from Clarence Colliery to its operations at Springvale.	
Colong Foundation	The Colong Foundation considers there are two grounds that support modification of the SSD 5594 consent in the public interest so as to take into account new data, make improvements and correct errors: 1. Section 96 of the Environmental Planning and Assessment Act, 1979 applies to Part 4 development consent modifications involving *minor error*, *misdescription* or *miscalculation* and modifications involving minimal environmental impacts and other modifications. Under Item 1, upland swamp impacts have been subject to new information revealing a significant miscalculation of environmental impacts. It is no longer appropriate to assume there will be negligible impacts to the swamps arising from longwall mining under SSD5594. The 2014 Environmental Impact Statement (EIS) incorrectly advised that the Springvale mine extension would produce negligible impacts on swamps. The determining authority concluded the swamps did not require protection that would constrain longwall mining operations in the project area. This matter must be revised by the Department and the Commission in the light of independent expert advice and swamps protected from being undermined by longwall coal extraction machines. Further, the 2014 EIS omits advice or consideration of the mine's impacts as a	**Section 3.2.3**

Special Interest Group	Issue	Section Reference
	consequence of longwall mining on the waterfall below Carne West Swamp and a 25 metre tall waterfall below Gang Gang Swamps that lie in the project area. As the Department is aware, the Carne West waterfall no longer flows due to longwall impacts on groundwater and that undermining the Gang Gang Swamps will terminate flows over a waterfall downstream. The September 2015 approval does not address these waterfalls omitted from the EIS. If nothing is done to prevent the loss of flows to a large waterfall downstream of the Gang Gang Swamps, the Department would be condoning such serious omissions. The consent should also vary its reference in the consent conditions in relation to the water transfer pipeline proposed jointly by EnergyAustralia and Centennial Springvale. As the Department is aware, a previous arrangement for mine water directed this discharge to the now decommissioned Wallerawang Power Plant. A re-consideration of neutrality or beneficial purpose of mine water under the drinking water catchment SEPP for this modification should lead to consent conditions that require construction of an appropriate mine water transfer scheme. 2. The statement of environmental effects for Modification 1 considers the following relevant matters: a) the impacts on nationally endangered upland swamps; and b) the impacts of mine water discharges on the Coxs River. The modification considers swamps, ground and surface water impacts in detail, but incorrectly restates negligible impacts arguments on affected swamps that are no longer relevant and also omits consideration of or reference to the 2016 water treatment project (SSD 16_7592). In relation to mine water transfer - Appendix I on ground water and J on surface water, including a water and salt balance, bring the consideration of the neutrality and beneficial effect matters into the frame of this modification proposal. The water volumes and salt balance are relevant to the protection of the Coxs River. The SEPP (Sydney Drinking Water Catchment) 2011 is considered in the main volume of the statement of environmental effects on page 50. The Modification proposal also seeks an inappropriate amendment of the September 2015 consent to allow duplication of the Springvale Delta Water Transfer Scheme (condition 9), which is opposed in relation to its location on Newnes Plateau. The groundwater modelling presented in Appendix I is relevant to the protection of upland swamps, bringing in these considerations for review by the Department and the determining authority. In relation to swamps - Section 9 of Volume 1 of the statement of environmental effects considers the swamps, that are described as ground water dependent ecosystems. Table 34 of the statement wrongly concludes negligible impacts on Newnes Plateau swamps and also on streams. Regardless of the conclusions made in the statement of environmental effects, these matters become relevant for Department and the Commission to consider and address with varied consent conditions because the proponent has introduced them as a relevant part of the considerations for this modification. Reading items 1 and 2 together, the Colong Foundation for Wilderness considers it reasonable for the Department of Planning and Environment and the Planning Assessment Commission to correct errors in the September 2015 development consent and generally act improve environmental outcomes regarding the Springvale mine extension, as well as the proposed modifications. Further Protection for Nationally Endangered Swamps The basis for issuing the September 2015 development consent for longwall mining under nationally endangered upland swamps on sandstone was that there would be negligible impacts to these swamps, and if there were unusual circumstances causing more than negligible swamp impacts, then these impacts	

Special Interest Group	Issue	Section Reference
	would be offset by the protection of swamps elsewhere. This premise was proven to be incorrect. There was wrong information in the 2014 Environmental Impact Statement that may have mislead the Department and the Commission regarding swamps. Centennial Coal states in the 2014 environmental impact statement for mine extension that there will be negligible impact on swamps from longwall mining and there had been no past impacts on swamps attributed to longwall mining. The negligible impact on swamps claim in the 2014 EIS is wrong and dramatically so. Connell Wagner, Centennial consultant observed that Junction Swamp was damaged by longwall mining in 2005. The swamp has lost groundwater and surface flows, but nine years later, other Centennial consultants claimed in the 2014 EIS that no damage had occurred to the same swamp. The swamp, Junction Swamp, is now effectively non-existent. The V-notch weir that used to measure flows from Junction Swamp was removed when flows ceased. Yet the Centennial Coal 2014 EIS states, "no water level changes that can be attributed to longwall mining have been observed" (2014 EIS, Appendix E, on page 75). Centennial describes all previously undermined swamps at Springvale by a euphemism - 'rainfall-dependent swamps', alias 'Type A' swamps, and these swamps are claimed to not have experienced groundwater impacts (see Pells, 2015, page 27, Figure 22). The Colong Foundation believes this is incorrect. The Colong Foundation considers that near-surface groundwater below swamps falls five to ten metres when longwall mining passes under Newnes Plateau swamps, the groundwater available to the swamps is then irreversibly reduced. The swamps cease being groundwater dependent swamps and become 'rainfall dependent'. The nationally endangered ecological community is destroyed. The groundwater dependent vegetation slowly dies, and is ultimately replaced by dry land vegetation. The 'rainfall dependent' swamps are then prone to destruction by bushfires that will consume the peat soil. The Department and the Commission should also appreciate that the drop in groundwater levels occurs throughout an area subject to longwall mining, but the contingent environmental impacts are most marked on swamps and streams. The Planning Assessment Commission reported on confusion and uncertainty regarding swamp impacts. A Commission report further states 'However, the Commission believes that there also needs to be a focus on the avoidance or mitigation of damage to swamps, as well as adaptive management measures, in order to deal with the various uncertainties around subsidence-related impacts on swamps' (page 6, 2015). The Commission's belief should be now translated into amended consent conditions that protect swamps from being undermined. This would correct the misleading statements in and wilful omissions of waterfalls from the 2014 EIS, as well as new information by experts that point to other errors in the 2014 EIS in relation to swamp impacts. Two expert reports now question the negligible impact claims made by Centennial Coal in the 2014 EIS (repeated in the Statement of Environmental Effects) that have led to the Commission's uncertainties referred to above. The Independent Monitoring Panel established to advise on swamp health in relation to SSD 5594 operations reported in June 2016 on 'the very significant drop in the water level of Carne West Swamp and the cessation of flow in the stream through this swamp, with the consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp. These changes begun to be detected when the mining was up to 700 metres away, well outside the impact zone predicted in the environmental impact statement (EIS) for mining in this region of the Springvale mine' (page 2 of the report, June 9, 2016). Furthermore, according to the Independent Expert Panel, 'it is now concluded by Centennial Coal that mine subsidence interactions with lineament fault zones at Springvale mine do appear to impact standing water levels well outside the designed buffer zone (defined by a 26.5 degree angle of draw or a 20mm vertical	

Special Interest Group	Issue	Section Reference
	subsidence contour, whichever produces the widest buffer) and, furthermore, these water levels do not fully recover. In some cases, the impacts extended for more than three times the width of the designed buffer zone' (page 2). The problem arises now that the mine is having and has had impacts outside the mine project area since it began operations and that these impacts have not been subjected to environmental assessment. Review consent conditions to protect these significant environmental values is justified by the fact that swamp impacts haven't been and will never be 'negligible', further unassessed impacts are occurring and have occurred outside the project area, and the waterfalls mentioned above were not considered in the 2014 EIS despite being in the project area. The expert identified far field impacts outside the project area are not permitted by the development consent. Technically the consent has been and will remain invalid, and required immediate correction to protect the environment. The abovementioned views of the Independent Monitoring Panel are confirmed by Pells Consulting (2015) in its report to the Colong Foundation and the Blue Mountains Conservation Society regarding the *Impacts from coal mining at the Springvale Colliery on the temperate highland peat swamps of Newnes Plateau* report. The Pells report confirms that dramatic swamp impacts from future mining are irreparable. Pells Consulting believes mining will slowly change swamps, drying them out and this will be reflected in changes to swamp ecology. Mine dewatering will also ultimately affect swamps, but it is not known by when, and by how much. These findings are consistent with longwall mining being a key threatening process to these nationally endangered swamps, but directly contradict Centennial Coal's negligible impacts claim. The Pells report states that the theory used by Centennial to justify the claim of minor swamp impacts is based on an assumption that is not supported by measurement. Swamp monitoring and offsets are all very well, but they do not fix errors in the consent that will cause unexpected damage national heritage listed swamps or ensure flows over waterfalls. Centennial's proposed offsets for Newnes swamps are on private land in the Blue Mountains across many parcels of land and are not like-for-like offsets. Such offsets are already protected in Environmental Protection zones 2 and 3. Protection of protected swamps can in no way compensate for the damage to the public interest from loss of swamps on public forests within the Gardens of Stone Sage 2 reserve proposal. These deficiencies were foreseen by the Planning Assessment Commission who stated that in its determination report that 'the role of the Independent Monitoring Panel should be more clearly defined, *as well as broadened to enable greater focus on avoidance and minimisation of swamp impacts, and adaptive management measurers*' (my emphasis). These broader powers for the Independent Panel were not included into the consent, but while that may be the case, there remains a need to adapt the consent to protect Newnes Plateau swamps from longwall mining. It is immaterial to a swamp or waterfall whether the responsibility falls to the Planning Assessment Commission, Department of Planning and Environment or the Independent Monitoring Panel to adapt the consent. Given the modification for determination, it would be appropriate for the Planning Assessment Commission to amend the development consent to protect swamps and the waterfall by placing protection zones over and around them. It is unacceptable for September 2015 SSD 5594 development consent to remain defective as it is be based on wrong information in relation to swamps or no information in the case of a key value (waterfalls) that were not considered in the 2014 EIS. Further provisions to effectively clean-up the Coxs River The September 2015 consent conditions must be amended to require a water transfer scheme from Springvale Mine to Mt Piper Power Plant to be built. Construction of this scheme is by no means certain, despite a preliminary	

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	environmental analysis prepared for Centennial Coal and EnvironmentAustralia by GHD. A Land and Environment Court ruling against 4Nature and for Centennial Springvale regarding its water discharges to the Coxs River would probably result in cancellation of this proposal. The transfer pipeline is the only proposal on the table that would remove mine water from the Coxs River and it would achieve a neutral impact of drinking water supplies provided there is no discharge to the environment from the power plant. The Colong Foundation prefers transfer and reuse of mine water to its alternative of treatment and discharge to the Coxs River. On face value the reuse of mine waste water by the power industry is superior to that industry using water from the Coxs River that would be better consumed by Sydney residents and by also providing environmental flows to the Coxs River that flows through the World Heritage Area. On Monday, May 9th, 2016 the Land and Environment Court considered whether discharges of mine water from the Springvale Mine have a neutral or beneficial effect on water quality of the Coxs River. In the 2014 determination process it appears that the application of the neutral or beneficial test for 19ML/day of mine water discharge into the Coxs River may be have been not undertaken in an appropriate manner, although the SEPP guidelines apparently were applied. The Colong Foundation believes that the appropriate test should have been whether the mine water discharge was equal to a previous virtual 0ML/day discharge of mine water into the Coxs River from Licence Discharge Point 9 due to its transfer to Wallerawang Power Plant. To be more accurate, the 2014 EIS for the Springvale extension estimated that the mine water transferred from LDP 9 to the Wallerawang power plant represented 86% of all water leaving the mine in 2013 and this was predicted to increase to 89% with the now approved mine expansion. Surely the application of the SEPP to a mine extension must require an environmental outcome for the Coxs River that was previously achieved by the mine at the time the 2014 EIS was written and as described in it, rather than a worse outcome as is currently the case under the consent? Surely this is an error? The Wallerawang power plant closed down before the Springvale mine extension was approved but the EPA, WaterNSW and Department of Planning and Environment did not then require Centennial Coal to relocate its mine water transfer arrangement to the Mt Piper power plant, as should have been done as part of the approval deliberations and consent conditioning. Instead, the SEPP Guidelines were apparently misapplied in a manner that considered guidelines and contaminant concentrations, but did not appropriately consider past volumes and practical outcomes. The absurdly simple mathematic question is whether the mine water discharge of 19ML/day that now goes to the Coxs River should go to the Mt Piper Power Plant so that is can equal a discharge of 0 ML/day as before when the discharge went to the Wallerawang power plant. Is this not correct? These government agencies and Planning Assessment Commission appear have made an error in unreasonably considering that this very large new mine water discharge to the Coxs River had a neutral or beneficial effect on water quality, with partial water treatment that was required by the consent to increase through time. It does matter that 19ML/day is not less than or equal to 0ML/day, and the government agencies should correct this error and require the transfer of mine water to the power plant as an amendment to the September 2015 consent. The merit of the water transfer proposal, as well as maths, should be part of any reasonable assessment of the Department and the Commission in reaching a “state of satisfaction” after “active intellectual engagement” on whether a discharge complies with the drinking water SEPP. Both must conclude that	

Special Interest Group	Issue	Section Reference
	19ML/day of mine water is not less than or equal to 0ML/day of mine water discharge when it is diverted, as before, to a power plant. The duplication of the mine water transfer pipeline on Newnes Plateau proposed in the modification documentation must be required keep to the existing pipeline alignment. The proposal for an additional road and pipeline easement descending off Newnes Plateau will cause totally unacceptable scarring to a scenic part of the Gardens of Stone region. The proposed new alignment does not follow the existing corridor through the sensitive western edge of Newnes Plateau. The road and 10 metre wide easement proposal descends into Sawyers Swamp Creek. The existing pipeline alignment further to the south must be followed. This will avoid the destruction of a Sheltered Peppermint – Brown Barrel Shrubby Forest between two significant and well featured Pagoda spurs above the creek. It would avoid unnecessary bisection and damage to a Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest, an endangered ecological community. This diversion of the pipeline alignment was originally rejected by the Department and the Commission and this unnecessary impact must be avoided. Further, a consent condition for a water transfer pipeline must require all Springvale discharges to be incorporated into the transfer system, including the LPT006 discharge that is part of the existing consent. Springvale Coal Services April 2016 Environmental Monitoring Data reveals salinity values for discharges from LDP006 of 4,550 uS/cm. In addition, the transfer pipeline should be required to have sufficient capacity to serve all licenced discharges from coal mines in the Coxs River catchment as well as those from the Clarence Colliery that discharges 15ML/day of mine water to the Wollangambe River catchment. The consent should require a much more specific Upper Coxs River Action Plan. A revised Action Plan must consider and provide for future capacity to collect, transfer and treat polluted water from licenced discharge points of mining operations, including those of Angus Place, Clarence Colliery and Lidsdale Siding and Western Coal Services (amend Schedule 4, condition 13 of the September 2015 consent to require an integrated water treatment plan).	

2.2.3. Submissions from Members of the Community

Submissions from the members of the community are provided in **Table 3** (Letters of Support), **Table 4** (Form Letter Submissions) and **Table 5** (Individual Contributions). These tables also provide section references where the responses to submissions have been provided. As noted above, of the 83 community submissions received, 4 submissions were in support of the proposed modification while 79 were against.

Table 3 – Summary of Comments in Submissions from Members of the Community – Letters of Support

ID (refer Appendix B)	Comment	Section Reference
158851	My name is Robert Cluff, I am a local businessman from Black Gold Motel in Wallerawang and a member of the Wallerawang/Lidsdale Progress Association. Over the years the business has grown from one employee to 25. The Wallerawang Power Station closed, then the Angus Place Colliery, both a major hit like never before in our community. As a small country town which has a lot of small businesses operated by local families & employing local people that are suffering due to these closures. I believe there should be a balance in tourism & industry to make our local area expand and grow. We have to consider that tourists generally travel on the	Noted

ID (refer Appendix B)	Comment	Section Reference
	weekend. This means that the predicted growth in tourism will not replace the local coal mine and power station workers we all relied on during the week. In addition to this, Tourism does not help the 40 other businesses in Wallerawang that employ the many flow on employees at other business that are not involved in Tourism e.g. the plant hire, engineering businesses, mechanics and even our local schools and pre-schools. This is just Wallerawang alone - look further afield the whole of the Lithgow & Portland areas need more than the tourism industry to survive. I would like to plead with those that feel this is the answer to our area to be realistic and take off the rose coloured glasses; we need industry in our area to survive. Regulations of today in all forms have come a long way from the way we built buildings, workplace rules, and mostly the way we mine. I have only the utmost support for the increase of production at the Springvale mine, this will help our local community grow and give employment for young families. Once again our community need this modification proposal to go ahead, and we urge the planning commission to consider all the positives that come from more employment. In closing Lithgow, Wallerawang & Portland areas need this modification to be approved for our survival as a community. I am sure that we would all agree that the expectations of a modern organisation today, are that they will operate in a socially and environmentally responsible manner. We would expect nothing less of Centennial Coal for example. It is socially unacceptable that our politicians, our government, our agencies and this very process have let this town, this state and this country down. All involved in this process have a social responsibility to ensure this process is managed professionally, on time with minimal impact to the community, the company and again our country. The NSW and Australian Government along with the various agencies that regulate should be encouraging business in NSW and helping them to comply. Their job should not be to just throw road blocks, red tape and more steps in a process.	
158143	The economic benefits for this project in the local community are extremely significant and the environmental obligations imposed on the mine will be met by a responsible operator therefore this project should continue to go ahead.	Noted
157659	I wish to offer my support for the modification to this project. The Springvale Mine operation has provided employment and economic benefits for the Lithgow area for many years, and in conjunction with the remaining mines and industry in the region is maintaining a meaningful economic base for the community. Being the major supplier of coal to the local Mount Piper power station, Springvale secures energy supply for a large percentage of the eastern seaboard of Australia which cannot be understated. As evident in the Statement of Environmental Effects documents the benefits of this project modification greatly outweigh any perceived negative impacts expressed by individuals or groups, who may oppose such projects based on a single agenda of opposition to mining or development in general. A production increase for this operation can only improve its viability and thus improve economic security for the local community over the remainder of this operations life. The local community overwhelmingly support this industry in their area, and look forward to seeing the NSW state government assist their region by supporting projects and operations such as this.	Noted
157966	I support Springvale operations.	Noted

Table 4 – Summary of Issues Raised in Submissions from Members of the Community – Form Letter Submissions

ID (refer Appendix B)	Issue	Section Reference
159288, 158024, 159103, 159130, 159054, 159095, 159016, 159126, 159099, 157995, 159120, 159286, 159105, 159058, 157974, 159010, 159093, 159014, 159945, 159044, 159097, 158043, 158001, 157997, 159052, 159030, 158020, 159012, 157976, 157978, 157985, 157993, 158022, 158016, 157987, 159026, 157989, 157991, 157983, 159028, 158053, 159062, 159089, 157968, 157803, 158018, 157981, 159111, 159000, 158045, 158805, 159068, 159022, 158049, 158012, 159002, 157972, 159107, 159060, 158730, 159008, 159122, 158996, 159024, 158998, 159004, 159018, 158014, 159939, 158047, 159042, 159048	I request that assessment report by the Department of Planning and Environment (the DPE) recommend variation of the development consent for Springvale mine modification 1 so that the mine will adequately protect World Heritage, National Heritage, the Coxs River, as well as Sydney's drinking water resources. The serious errors, misdescriptions and miscalculations in the September 2015 mine extension approval must be corrected under the modification consent process, particularly as the following matters of concern are considered in the July 2016 statement of environmental effects for the modification 1 proposal.	**Section 3.3.1**
	In June 2016 independent experts have reported to DPE significant impacts to upland swamps due to the mine extension. The expectation in the consent of negligible impacts due to mining extension is a significant miscalculation and underestimation of mining impacts on our national heritage listed swamps. Further, the far field impacts to upland swamps beyond the project area is a serious miscalculation not foreseen in the September 2015 consent that must be corrected.	
	These independent experts also advised DPE that the waterfall below Carnes West Swamp has stopped flowing due to mining. If longwall mining continues east under the Gang Gang Swamps, that waterfall will also stop flowing. The EIS and the September 2015 consent do not mention waterfalls. This is another important error that must be corrected by the modified consent. The consent must be amended to place streams, waterfalls and nationally endangered swamps on Newnes Plateau in protection zones. The modified consent must also prevent unauthorised far-field swamp impacts by protection zones.	
	The modified consent must require reuse of polluting mine water, eliminating the mine's environmentally-impacting discharges to the Coxs River. A proposal to divert mine water to Mt Piper Power Plant is now under consideration. This proposal must be made a condition of consent of this modification to ensure the transfer is constructed and not shelved as is likely unless the applicant is required to build it. The Coxs River can be restored to health by piping Springvale's salt laden mine water to the Mt Piper Power Plant, then treating it for use in the plant, with a further requirement of a zero discharge to the environment. Such reuse will benefit Sydney's Drinking Water Supply and correct this error in the September 2015 consent. I also request that any further pipeline construction for mine water transfer follow the existing pipe, and avoid any damage to endangered ecological communities and pagoda landscapes.	
159004	*Centennial Comment: This submitted used the form letter for submission but included two additional issues provided below.* GHG emissions current 10.98 proposed in MOD 1 to 13.42 represents +22%. Max. production (Mtpa) currently is 4.5 with the proposed MOD 1 being 5.5 +22% and yet its proposed to go from existing employment of 310 to 450 which represent +45% inc. contractors - wow I find this hard to swallow. Claimed Estimated Economic Benefit Impact Differential for Employment benefit to local/regional community is +8 mil, NSW Government Royalties * 6 Mil, State taxes, Local Government rates (for Assumptions see Appendix 2 of of Appendix F) is a minus - $0.5 mil Total economic benefit SSD 5594 (Base Case) Estimate of $269.2 million and (Proposed Case) SSD 5594 Mod 1 $282.7 mil, Impact Differential $13.5 mil. The Claimed Estimate of Economic Costs for Proposed Case is $120 mil Base Case $138 mil difference of an increase by $18 Mil So the economic benefit of +13.5 mil falls very short of the claimed estimate of economic costs of $18 mil.	**Section 3.3.2**

Table 5 – Summary of Issues Raised in Submissions from Members of the Community – Individual Contributions

ID (refer Appendix B)	Issue	Section Reference
158871	In evaluating this Modification application and the accompanying Statement of Environmental Effects (SoEA), the Department should consider that there is substantially greater uncertainty as to the impact of the proposal on Temperate Highland Peat Swamps than is acknowledged in the SoEA. This uncertainty arises from the complexity of the geological and hydrogeological systems concerned. The COSLOW model used by CSIRO (Adhikary and Wilkins 2013) which underlies the predictions made by Springvale and its consultants was not able to predict the degree of fracturing, consequent changes in hydraulic conductivity or impacts on groundwater inflow to and outflow from the swamps at the detailed local level required. An attempt was made to bracket the impacts using a number of judgmentally applied ramp functions, that is all. The apparent certainty and modelling precision presented in the SoEA are not justified. Pells Consulting (2016) provides a detailed assessment of potential impacts on the THPS, and the Independent Expert Monitoring Panel (Galvin, Timms and McTaggart 2016) has identified a significant further issue with the COSFLOW modelling with regard to its prediction of displacement in lineament zones, which has the potential to result in serious under-estimation of impacts on THPS. It has been noted that observed impacts on Carne West Swamp fall well outside the range predicted by the modelling. In these circumstances, the Department should review the CoA applying to THPS impacts, and appropriately apply the precautionary principle, bearing in mind that damage to the THPS, once it has occurred, is irreversible.	**Section 3.3.2**
156459	I am deeply concerned about the extension of this project. The environmental impact already experienced in the area are irreparable and I am concerned that there will be further damage. Protect this area from expansion.	Noted.
158428	I object to this Modification for the following reasons- **Independent Monitoring Panel Report findings** The Independent Monitoring Panel (set up as part of the Extension approval) Report was recently released. The panel concluded that mining was directly damaging the swamps. Finally, even Centennial has conceded that they have caused irreparable damage to the swamps it has undermined. And how has this report impacted the next panel LW419? It will go ahead as planned with more monitoring. More monitoring to prove that the swamps are DEAD. The Government should be ashamed of themselves. In light of the IMP Report, the conclusion in the Executive Summary of the Mod1 report (paragraph below) is just not correct. *"Benefits can be achieved with little to no risk of adverse environmental impact. Based on the predicted environmental effects of the modification elements and the ability to manage these effects to minimise harm to the environment, the Springvale Mine Extension Project as modified will present an overall minimal residual consequence.* *In conclusion, the modification is a minor alteration of the approved Springvale Mine Extension Project and can be considered to be substantially the same development. The adverse environmental impacts of the proposed modification elements are predicted not to be significant. Any potential impact can be managed appropriately to minimise harm to the environment. The benefits of the modification can therefore be achieved with little or no risk of adverse impacts on the receiving environment. The modification meets the relevant objects of the EP&A Act and is consistent with the four principles of the ecologically sustainable development."*	**Section 3.3.2**

ID (refer Appendix B)	Issue	Section Reference
	Waste water pipeline should be completed The proposed pipeline to pipe the mine water to Mount Piper Power Station should be completed before any mining continues, especially before any increase in production. The Cox's River has suffered enough damage and needs to be cleaned up. This project should be fast tracked.	Noted.
	Stockpiles not safe After the disaster of the REAIII collapse at Clarence Colliery Centennial cannot be trusted to maintain stockpiles and dumps, let alone allowing them to be larger.	Noted
	Justifications very weak The justifications for this Modification do not out way the environmental damage that will continue to occur to the Newnes Plateau Shrub Swamps. Denial of this damage continues (see below) in this report even after admission by Centennial to the IMP. *"The accelerated mining schedule resulting from the increased production rate of 5.5 Mtpa will result in earlier cessation of environmental impacts assessed and approved in SSD 5594, and the technical assessments undertaken for this SEE have concluded the environmental impacts from the proposed modification elements are not significant."* The conclusion in this statement is that Centennial denies any damage will occur, and if it does it will cease earlier. My conclusion is that the swamps will be dead quicker under this Mod1 proposal. In conclusion - There is no justification to increase the coal production at the Springvale Mine, and in light of the IMP report the Extension Approval should also be revisited. The mine plan should be changed so swamps and waterfalls are protected. The report is full of inaccuracies and false conclusions and should be rejected. Why this proposal to dig up the coal quicker and stockpile more? Why would Centennial want to do this? The answer is obvious. They just want to dig it up as quickly as they can just in case someone in Government (State or Federal) has the 'guts' to stop the total destruction of the unique Newnes Plateau Shrub Swamps. My hope is that someone in Government IS listening NOW. The remaining swamps can be saved. Please SAVE our SWAMPS.	**Section 3.3.2**
158516	*Centennial Coal Comment: No issues relating to the modification application or the SEE and the associated technical assessments were included in this 8-page submission. It is considered matters raised are not within the scope of the Response to Submissions.*	Noted.
158524	I object to this application for modification to Springvale's State Significant Development Consent. Independent experts have reported significant impacts to national heritage listed swamps due to mining in the extension area on Newnes Plateau, despite predictions of negligible impacts in previous EIS documents. As such, a proposed increase in production rates should not be approved as it may increase impacts to swamps. Furthermore, the conditions of the consent should be changed to ensure no further damage to endangered swamps, and remediation of existing damage to swamps. Additionally, I believe Centennial Coal has lost its social licence to operate in the Greater Blue Mountains World Heritage Area after polluting rivers. Continued saline discharges into Cox's River from Springvale, and unauthorised pollution of the Wollongambe River with coal fines from Clarence Colliery are unacceptable.	**Section 3.3.2**
156875	Springvale Coal should not be allowed to increase production, as they should not be financially rewarded for the continuing damage to protected swamps, damage which would in fact be accelerated.	**Section 3.3.2**

ID (refer Appendix B)	Issue	Section Reference
	Centennial Coal have continually lied to the media about not damaging the endangered swamps. Katie Brassil, spokesperson for Centennial Coal, has stated that no swamps have ever been impacted by coal mining, whereas the opposite is really the case. I contend that every swamp that Springvale Coal has mined under has been seriously impacted by longwall mining cracking and subsidence, including Kangaroo Creek, Junction, Narrow, East Wolgan, upper Sunnyside, Sunnyside East, and Carne West Swamps. The report of the Independent Monitoring Panel (dated June 2016) states that Carne West Swamp shows evidence of longwall mining impacts, which occurred even before the swamp was directly undermined. I say that the same can be said for the next swamp to the west, which is Sunnyside East Swamp. Unfortunately, last September the PAC (lead by Brian Gilligan) chose to ignore evidence of the existing damage to protected swamps presented by myself, Dr Anne Young, the Office of Environment and Heritage, and others. The PAC said that because Centennial Coal and its consultants disputed the claims, that it was “inconclusive”. The extension approval should not have occurred, in the form proposed, based on this flaw in logic alone. With the restart of mining we are now seeing a continuation of mining impacts to swamps. Rather than rewarding Springvale Coal with an increase in production, mining should proceed cautiously and the mining methodology should be examined to try to mitigate further damage to the protected swamps. The Independent Monitoring Panel has stated the more (including different) monitoring of the swamps should occur, but I think that this has not gone far enough as continued damaging and then offsetting swamps is not the answer. Prevention of damage to swamps (e.g. by avoidance) is the only proper way to protect them from future mining damage. As it stands, the current mining methods are not meeting the so-called strict conditions of the consent, so increasing mine output using these same methods is only going to accelerate the damage that is currently occurring to the protected swamps. The mine must be made to change it mining methods to meet its current consent conditions, as what they have done up to now is not working, as evidenced by impacts to every swamp they have mined near. The mine must not be allowed to accelerate the damage to protected endangered ecological communities using the current mining methods. The production increase should be denied until if and when the mine can meet it consent condition obligations, and stop damaging the swamps.	
159032	I am a bushwalker who enjoys walking in the Gardens of Stone area, north of Lithgow. I have become aware of the damage happening to upland swamps such as Carne West Swamp and its waterfall, as a result of the long-wall mining underneath the ground. Gardens of Stone is a national park, unique in my experience. Further extensions of the Park are planned, but increased mining operations will damage the area before the extension even happens. These areas were set aside by previous governments because of their unique topography and flora and fauna. Once the swamps are drained they cannot, and most likely, will not be repaired. What is the point of all this destruction of the natural world merely to extract coal and enhance a private company's profits? I request that the Department of Planning and Environment (the DPE) recommend consent variations in its assessment report for Springvale mine modification that will further protect the Gardens of Stone area. The consent conditions must be amended as the Greater Blue Mountains World Heritage Area, National Heritage listed swamps, waterfalls, the Coxs River and Sydney's drinking water resources are not adequately protected.	Noted.

3.0 RESPONSE TO SUBMISSIONS

3.1. Response to Government Agency Submissions

3.1.1. Department of Planning and Environment

Issue

The Adhikary and Wilkins (2015) [CSIRO (2015)] *report included as Appendix G of the Jacobs Groundwater Assessment (Appendix I) is based on a model for sequential mining of Springvale Mine and Angus Place Colliery. This report does not purport to take into account the proposed increase in the rate of production.*

Page 90 of the Statement of Environmental Effects Main Report states that the COSFLOW groundwater model was updated by CSIRO "to account for the change in operational status at Angus Place Colliery… and the proposed change in coal mining rate at Springvale Mine, with an increase from the approved 4.5 Mtpa to up to 5.5 Mtpa".

Can you please confirm that the Adhikary and Wilkins (2015) [CSIRO (2015)] *model does assume a 5.5 Mtpa production rate, and clarify which changes to groundwater are due to sequential mining, and which are predicted to result from the proposed increased production rate.*

The groundwater assessment report goes on to makes extensive reference to the Adhikary and Wilkins (2015) model, and draws conclusions based on that model. While there is a clear link between the alternate mining schedule and changes to mine inflows, the nexus between the proposed increased production rate and groundwater impacts is less clear.

Figures 4.2 and 4.3 of the Jacobs report compare the concurrent and sequential Springvale and Angus Place mining. It would assist the Department's assessment if you could provide a comparison between the modelled mine inflows for Springvale at the approved production rate of 4.5 Mtpa and predicted mine inflows at a production rate of 5.5 Mtpa, assuming operation of the Springvale only for both cases.

Also, the production schedule used in the CSIRO model is based on a forecast production of rate of 5.32 Mtpa. The modification application is for a production increase to 5.5 Mtpa, and the Department's assessment of the inflow rates and relative change in impacts should consider this rate.

I would appreciate it if you could respond to the issues DPI Water raises in the company's Response to Submissions. In particular, the issue of the groundwater assessment not considering all approved panels, and the effect this has for the assessment of the proposed modification.

Response

The Executive Summary of the Groundwater Assessment report CSIRO (2015) (prepared by D Adhikary and A Wilkins of CSIRO), and included as an appendix to the Jacobs (2016) Groundwater Impact Assessment (Appendix I of the SEE) notes:

> "An alternative mining schedule (i.e. 'SPR then APE') provided to CSIRO by Centennial Coal in December 2014 is studied using the numerical model."

where 'SPR then APE' simulation reported in CSIRO (2015) refers to the sequential mining operations at Springvale Mine (SPR) and Angus Place Colliery (APE), i.e. extraction at Angus Place Colliery will commence only after extraction at Springvale Mine is completed.

As requested Springvale Coal confirms the following production forecast (**Table 6**) report for Springvale Mine was provided to CSIRO in December 2014 for use in the 'SPR then APE' simulation noted above in the CSIRO (2015) report. It is noted that the production limit is referred to as the 'Total ROM tonnes' in the table and comprises contributions from development (first workings) and longwall extraction (second workings). On this basis the highest production rate for Springvale Mine assessed

in CSIRO (2015) was 5,522,863 tonne (approximately 5.523 Mt) in the year 2022, when development is forecast to contribute 206,635 tonne and longwall extraction will contribute 5,316,228 tonne of run of mine (ROM) coal. The highest production rate assessed in CSIRO (2015) is slightly greater than the proposed production increase to 5.5 Mtpa in the modification.

Table 6 – Springvale Mine Production Forecast Assessed in CSIRO (2015) Simulation

SPRINGVALE PRODUCTION REPORT		2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	TOTAL
Period Information												
Start Date	date	21/10/2014	1/1/2015	1/1/2016	1/1/2017	1/1/2018	1/1/2019	1/1/2020	1/1/2021	1/1/2022	1/1/2023	**21/10/2014**
End Date	date	1/1/2015	1/1/2016	1/1/2017	1/1/2018	1/1/2019	1/1/2020	1/1/2021	1/1/2022	1/1/2023	1/1/2024	**1/1/2037**
Calendar Days	no	72	365	366	365	365	365	366	365	365	365	**8,108**
ROM Tonnes												
Longwall	t ar	927,386	4,030,898	4,525,752	4,227,672	4,559,460	4,458,611	4,895,810	5,014,638	5,316,228	4,089,370	**42,045,823**
Development	t ar	58,562	356,622	377,812	384,122	360,157	335,081	339,720	234,240	206,635	31,142	**2,684,093**
Extraction	t ar	-	-	-	-	-	-	-	-	-	-	-
Total ROM Tonnes	t ar	**985,948**	**4,387,519**	**4,903,563**	**4,611,793**	**4,919,617**	**4,793,692**	**5,235,530**	**5,248,878**	**5,522,863**	**4,120,512**	**44,729,916**

It is noted that the groundwater model utilised in CSIRO (2015) simulation is the same as that was utilised in CSIRO (2013) simulations, the groundwater assessment report prepared by CSIRO for the Springvale Mine Extension Project *Environmental Impact Statement* (SVMEP EIS) in 2013 and approved in SSD 5594. Only the input parameters for the simulations, with respect to mining, were changed between CSIRO (2013) and CSIRO (2015) simulations.

With respect to the request to clarify which changes to groundwater are due to sequential mining, and which are predicted to result from the proposed increased production rate the following points are made:

- With reference to Figure 4.3 in the Groundwater Assessment (Jacobs, 2016) adapted from Figure G4 from CSIRO (2015), the "Basecase" simulation (blue trace) represents the inflow predictions to Springvale Mine when the mine was operating concurrently with Angus Place Colliery, as was proposed in the SVMEP EIS, and the production limit assessed for Springvale was up to 4.5 Mtpa. The "SPR then APE" simulation (red trace) are mine inflow predictions to Springvale Mine when the Springvale Mine and Angus Place Colliery are operated sequentially and Angus Place extraction will not commence until Springvale mining operations are completed. The production rates for Springvale Mine in this simulation are as shown in **Table 6**, with the maximum production limit being 5.523 Mtpa in 2022.
- As requested Figure 4.3 has been updated (refer **Figure 2**) to show the two mine inflows simulations for the 4.5 Mtpa and 5.5 Mtpa production limits, however noting that, whilst the 4.5 Mtpa simulation includes the full mine plan the 5.5 Mtpa simulation excluded four longwalls at Springvale Mine (refer to **Section 3.1.2**).

  The mine inflows have been converted from L/s to ML/day. The maximum mine inflows for the 4.5 Mtpa simulation is 18.6 ML/day in year 2022. For the 5.5 Mtpa simulation the maximum mine inflow is 18.8 ML/day, again in 2022. The SVMEP EIS (Section 10.2.3.1) noted a maximum mine inflow of 19 ML/day in 2022 for the 4.5 Mtpa.

  Section 4.2.2.1 of Jacobs (2016) notes the change in mining rate to up to 5.5 Mtpa at Springvale Mine has negligible impact on modelled inflows to the underground, compared to the 4.5 Mtpa production rate simulation (CSIRO (2013)) approved in SSD 5594. It is also noted in Jacobs (2016) that the mine inflows from the sequential mining scenario (CSIRO (2013)) is not altered or that the omission of four approved Springvale longwalls (LW423, LW501-LW503) is consequential to mine inflows. (Refer also to **Section 3.1.2**).
- With reference to Figure 4.2 in the Groundwater Assessment (Jacobs, 2016) adapted from Figure G3 from CSIRO (2015), the "Basecase" simulation (blue trace) represents the total inflow predictions for continuation of mining concurrently at Springvale Mine and Angus Place Colliery, including the Angus Place Mine Extension Project (referred to as Angus Place East in

CSIRO (2013, 2015) simulations). The basecase represents the simulation included in the SVMEP EIS. The 'SPR then APE' simulation in Figure 4.2 represents the total mine inflow predictions to both Springvale Mine and Angus Place when the mines are operating sequentially. Two points to note in Figure 4.2 of Jacobs (2016) are as follows.

- For the modelled period 2016 – ~ 2024 the mine inflows comprise contributions from both Springvale Mine and Angus Place Colliery (care and maintenance scenario). The maximum inflow of 25.2 ML/day in 2022 has contribution of 18.8 ML/day from Springvale Mine (see above) and the balance of 6.4 ML/day is mine inflows to Angus Place underground from the existing workings.
- For the modelled period ~2024 – 2036 the mine inflows are entirely due to Angus Place Colliery mining as Springvale Mine is expected to complete extraction in 2024. The maximum inflows are predicted to be 36.1 ML/day predicted for 2030.

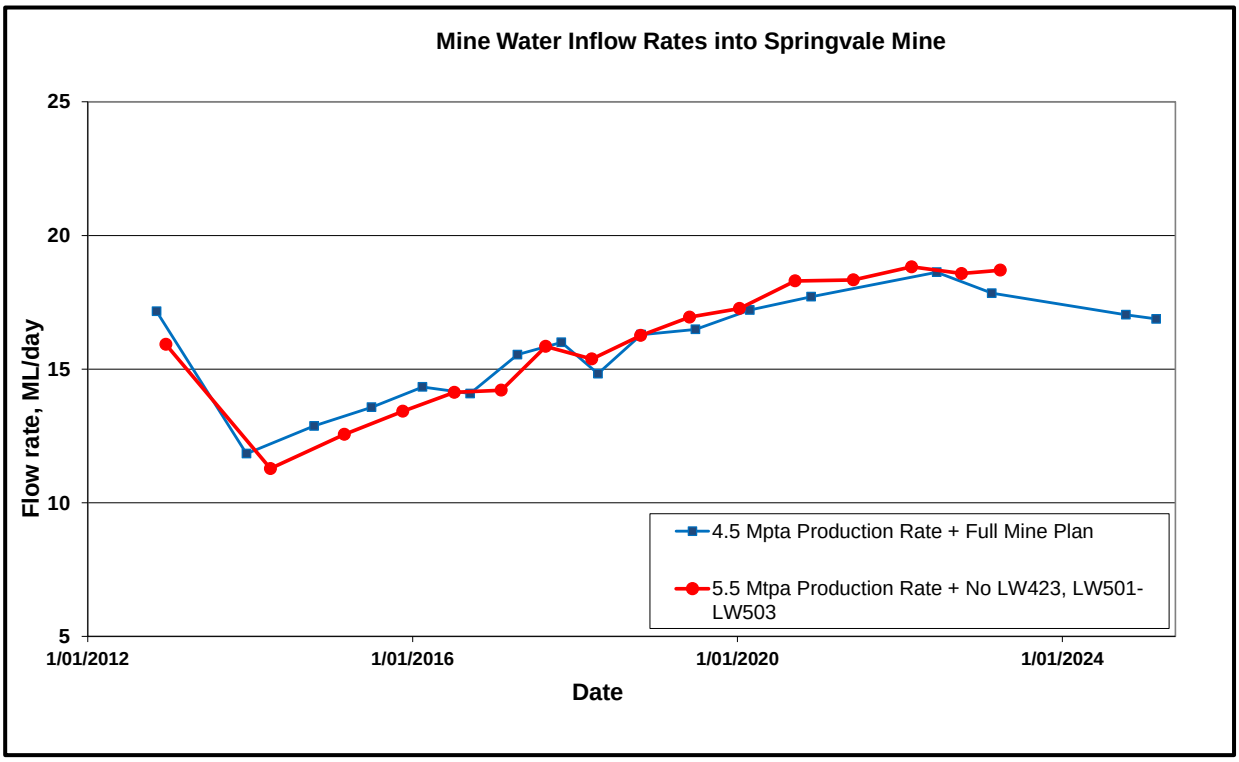

Figure 2 – Predicted Mine Water Inflow Rates at Springvale Mine for 4.5 Mtpa and 5.5 Mtpa Production Rates (Adapted from CSIRO (2013) and CSIRO (2015)

With respect to the issue raised by DPI Water in their submission (refer **Section 3.1.2**) in relation to the groundwater assessment not considering all approved panels, and the effect this has for the assessment of the proposed modification, the groundwater model was re-run with all approved Springvale Mine longwalls included. The mine inflows predictions from the re-run (CSIRO (2016)) are discussed in detail in Section 2.5 of **Appendix C** (and accompanying Appendix A comprising the CSIRO (2016) letter report) under issue identified as *NSWDPI_01)*).

3.1.2. Department of Primary Industries Water

Issue

There are issues concerning comparisons of outcomes between the 2013 and 2015 versions of the numerical groundwater model (NGM).The proponent should present a NGM reflective of the one used

in 2013 and thus representing all of the approved mine footprint, together with an amended application document for the Modification.

Note: Additional clarification provided by DPI Water on this issue as follows:

DPI Water does not regard the differences between the mine inflow predictions with (CSIRO (2013) and without (CSIR0 2015) all approved longwalls at Springvale Mine as "not consequential" but rather they could be possibly substantial, however, they cannot be correctly evaluated at this time.

Response

The response provided below is from Section 2.5 of **Appendix C** under issue identified as *NSWDPI_01)*. The response to the issue was prepared by Jacobs. The response compares three groundwater model simulations, namely, CSIRO (2013), CSIRO (2015) and CSIRO (2016) summarised below:

- CSIRO (2013) simulation – 'Basecase' representing SVMEP EIS scenario as approved in SSD 5594 at 4.5 Mtpa production limit and the approved mine plan
- CSIRO (2015) simulation – 'SPRthenAPE' scenario at 5.5 Mtpa production limit and excluding LW423, LW501 – LW503 from the approved mine plan
- CSIRO (2016) – 'SPRthenAPE Plus' scenario at 5.5 Mtpa production limit and the approved mine plan.

It is noted that the figure numbers in the Jacobs Response have been changed to make them commensurate with the figure numbering in the RTS.

Jacobs Response

As presented in the Groundwater Assessment accompanying the Modification to Consent (Jacobs, 2016a), the "Basecase" model run is that presented in the SVMEP EIS (underpinned by CSIRO (2013) predictions) and was not re-run in the revised simulation referred to as 'SPRthenAPE' (CSIRO, 2015) simulation. The "Basecase" scenario represents the approved inflows in SSD 5594 and impacts against which the modification should be assessed. The "Basecase" encompassed concurrent implementation of Springvale Mine Extension Project and the Angus Place Mine Extension Project (refer to Section 4.2.2 of Jacobs (2016a)), and the production limit for Springvale Mine was 4.5 Mtpa. The 'SPRthenAPE' (CSIRO, 2015) simulation shown in Figure 4.3 of Jacobs (2016a) represent mine inflow predictions to Springvale Mine when the Springvale Mine and Angus Place Colliery are operated sequentially. i.e. Angus Place extraction will not commence until Springvale mining operations are completed. The production rate for Springvale Mine in this simulation is 5.5 Mtpa.

DPI Water have raised that a statement in Section 4.2.1 - Model Setup of Jacobs (2016a) requires validation. The statement in Jacobs (2016a) was "…*Details are presented in the CSIRO modelling report provided as Appendix A, however, it is noted that whilst LW423 and LW501 to 503 were not included in the updated prediction simulation, these longwalls continue to be part of the current and approved mine plan. As will be shown below, model results are essentially identical to that presented in the EIS and the impact of the omission of LW423 and LW501 to 503 from the simulation is not consequential*."

To resolve this issue, additional simulations of the COSFLOW model developed in 2013 were undertaken by the CSIRO, and their report (CSIRO, 2016) is attached as Appendix A to **Appendix C** of the RTS. **Figure 3** (adapted from CSIRO (2016) and CSIRO (2015)) below presents the Springvale Mine inflow results, on a single graph, with respect to 'Basecase' (as approved in SSD 5594), 'SPR then APE' (sequential implementation without Springvale Mine's approved longwalls LW423 and LW501 to LW503) and 'SPR then APE Plus' (sequential implementation, but including LW423 and LW501 to LW503).

From **Figure 3**, modelling indicates the inclusion of LW423 and LW501 to 503 was not consequential to the results presented in CSIRO (2015). The statement in Jacobs (2016a) quoted above is therefore considered to have been validated. Generalising, the reason why LW423 and LW501 to 503 have a minimal impact to mine inflows is because depressurisation in the vicinity has already occurred.

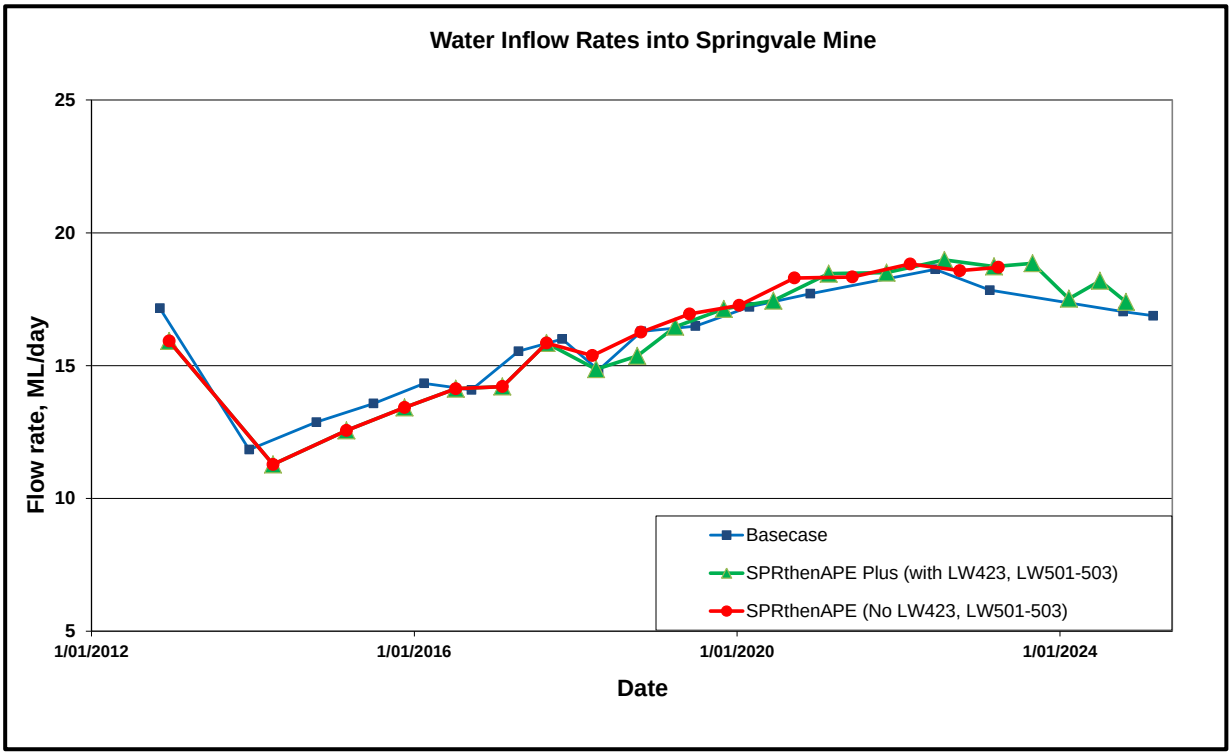

Figure 3 – Predicted Mine Water Inflow Rates at Springvale Mine (Adapted from CSIRO (2013), CSIRO (2015) and CSIRO (2016))

Key aspects are provided as follows:

- The mine inflow results presented for the 'SPRthenAPE Plus' simulation (CSIRO (2016)), which included all approved longwalls at Springvale Mine under SSD 5594, are consistent with the original 'SPRthenAPE' case (CSIRO, 2015) and the CSIRO (2013) predictions which assessed the entire mine footprint. Maximum mine inflows for the three simulations are provided below:
  - The maximum mine inflows for the 'Basecase' (CSIRO, 2013) is 18.6 ML/day in 2022
  - The maximum mine inflows for the 'SPRthenAPE' case (CSIRO, 2015) is 18.8 ML/day in 2022
  - The maximum mine inflows for the 'SPRthenAPE Plus' case (CSIRO, 2016) is 19.0 ML/day in 2022.
- The SVMEP EIS (Section 10.2.3.1) notes the maximum mine inflow for the full mine plan, the 'Basecase', as approved, as 19 ML/day in Year 2022.

Given the above, the baseflow predictions, with respect to modelled surface water reaches, and modelled mine inflows in the 'SPRthenAPE Plus' (CSIRO (2016) simulation, are consistent with the CSIRO (2015) report, and as presented in CSIRO (2015), are consistent with CSIRO (2013) report prepared for the SVMEP EIS. The impacts and environmental consequences for the proposed modification are therefore expected to be consistent, as discussed in the SEE, with the impacts presented in the SVMEP EIS and approved in SSD 5594.

Given the inclusion of four additional longwalls in the CSIRO (2016) simulation, mining at Springvale in this scenario is extended by 1.5 years over the CSIRO (2015) simulation. However, mining in the CSIRO (2016) scenario has a shorter lifespan than the CSIRO (2013) simulation due to the increased production rate of 5.5 Mtpa (and also due to the fact that mining at Springvale Mine did not occur for eight weeks in 2015), and hence the mining impacts in the proposed modification will most likely not be sustained till February 2025, as was approved in SSD 5594, but will terminate before that date. However, it is noted the proposed modification has not proposed to change the expiry date of the consent.

The revised predictions in CSIRO (2016) and the CSIRO (2013) predictions (which underpinned the SVMEP EIS and SSD 5594), shown in **Figure 4**, allow a comparison of the mine inflows for the 4.5 Mtpa (approved in SSD 5594) and 5.5 Mtpa (proposed in the modification) production limits for the full approved mine plan at Springvale Mine.

As discussed above the predicted maximum mine inflows for the approved 4.5 Mtpa production rate (CSIRO, 2013) is 18.6 ML/day in 2022, while for the proposed 5.5 Mtpa production rate (CSIRO, 2016) the predicted maximum mine inflows is 19.0 ML/day, again in 2022. The SVMEP EIS (Section 10.2.3.1) notes the maximum mine inflows for the full mine plan, the 'Basecase' (CSIRO, 2013), as approved, as 19 ML/day in Year 2022, that is, the maximum mine inflows for the proposed 5.5 Mtpa production rate is consistent with the approved basecase in SSD 5594. Therefore, the discharges to the Coxs River catchment will not increase above that approved in SSD 5594. Regardless, a sensitivity analyses to test the effect of increasing the mine water discharge flow rate by 1 ML/day on the Coxs River catchment water quality was undertaken in this RTS. This further analysis is discussed in detail in **Section 3.1.7**.

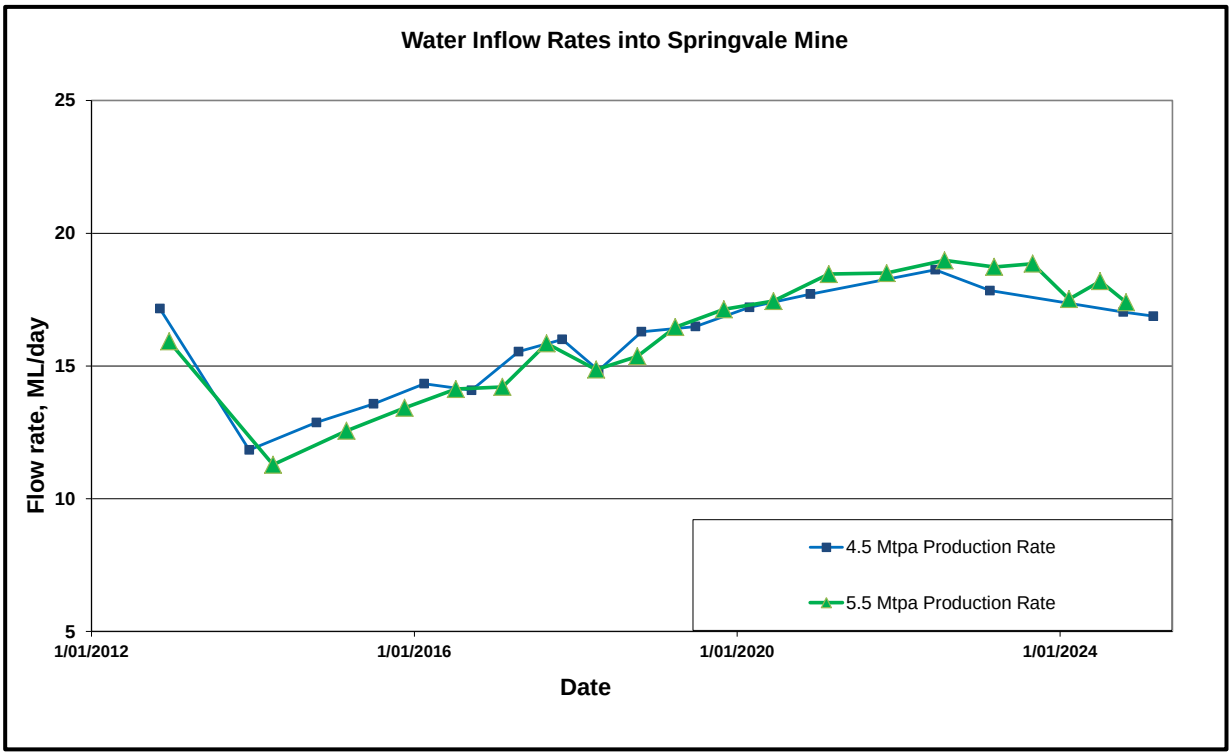

Figure 4 – Predicted Mine Water Inflow Rates at Springvale Mine (Adapted from CSIRO (2013) and CSIRO (2016))

Issue

There is a data mis-match in the interpretation based on hydrographs derived from the NGM. This should be addressed or otherwise clarified in an updated NGM.

Note: Subsequent clarification provided by DPI Water on this issue is summarised below. Hydrographs references are those used in the Groundwater Impact Assessment (Jacobs, 2016) or CSIRO (2013) report.

The proponent produced some important hydrographs in the Groundwater Assessment (Jacobs 2016a), being Figures 4.2 to 4.4, based on a comparison of model outputs to explain their case. The presentation and interpretation of these hydrographs is unclear from 3 perspectives:

(i) it is not clear whether the "Basecase" in each hydrograph for the situation presented is the same as used in the Extension EIS or whether it was redeveloped from the 2015 NGM. If the former is true, then outcomes from two different models are compared;

or

(ii) if the "Basecase" has been redeveloped in each situation using the 2015 NGM, then the blue curve in Figure 4.2 should be different to that which was used in the Extension EIS (Appendix K to Appendix E of MEP 2014, being Figure 64 in CSIRO (2013) shown as the blue curve in that figure - it does not appear to be different;

and

(iii) irrespective of which situation the hydrographs illustrate, there appears to be a mis-match in the values represented to the values expected. e.g. considering the data for just a single date – say 01/01/2020, then on the basis of the arguments presented in the Jacobs (2016a) Section 4.2.2.1:

> *"the value of the flow rate for the 'Basecase' in Figure 4.2 (about 440 L/s) should equal the addition of the value of the blue line in Figure 4.3 – flow rate about 200 L/s, plus the value of the blue line in Figure 4.3 – flow rate about 140 L/s – i.e. a total of about 340 L/s."*

The total values don't match by an approximate 30% difference which needs to be clarified.

Response

The response provided below is from Section 2.5 of **Appendix C** under issue identified as *NSWDPI_02)*. The response to the issue was prepared by Jacobs.

Jacobs Response

With respect to figures presented in Jacobs (2016a), the following points are made to provide clarification to the submission:

- The 'Basecase' presented in Figure 4.2 to Figure 4.4 of Jacobs (2016a) (after CSIRO (2015)) is the same as that presented in the SVMEP EIS (CSIRO (2013)).
- The groundwater model used in CSIRO (2015) is the same as that used in CSIRO (2013), except the input parameters were changed (mining rate and mine plan).
- Comparison of CSIRO (2013) and CSIRO (2015) is valid because the additional simulation (CSIRO, 2016) indicates mine inflows are all consistent for:
  - CSIRO (2013) simulation – 'Basecase' representing SVMEP EIS scenario as approved in SSD 5594 at 4.5 Mtpa production limit and the approved mine plan
  - CSIRO (2015) simulation – 'SPRthenAPE' scenario at 5.5 Mtpa production limit and excluding LW423, LW501 – LW503 from the approved mine plan
  - CSIRO (2016) – 'SPRthenAPE Plus' scenario at 5.5 Mtpa production limit and the approved mine plan.

DPI Water have also raised that there appears to be a mismatch between total mine inflows presented in Figure 4.2 of Jacobs (2016a) and individual inflows presented in Figure 4.3 of Jacobs (2016a) for Springvale and Figure 4.4 of Jacobs (2016a) for Angus Place East.

This is readily resolved. Figure 4.4 of Jacobs (2016a) presents inflows to Angus Place East only. Figure 4.4 does not, however, present inflows to the other Angus Place panels. The reason for not separately presenting inflow to the other Angus Place panels in Figure 4.4 is due to, as we understand it, a constraint within COSFLOW insofar as not being able to, post-construction of the model, request this output from the model. Output from COSFLOW is currently restricted to total inflow to both mines, inflow to Angus Place East and inflow to Springvale. This issue was identified in the SVMEP EIS at the time, however, Jacobs should have more clearly highlighted this in Jacobs (2016a) to avoid any confusion.

To explain the example quoted by DPI Water. At date 1 January 2020, 'Basecase' inflow (total inflow to both mines) in Figure 4.2 of Jacobs (2016a) is about 440L/s. This constitutes inflow to Springvale Mine in Figure 4.3 of Jacobs (2016a) of 200L/s and inflow to Angus Place East in Figure 4.4 of Jacobs (2016a) of 140L/s. What is not presented in Figure 4.4 of Jacobs (2016a) is the inflow to the other Angus Place panels, which is approximately 90 to 100L/s. This clarifies the reason for Figure 4.3 of Jacobs (2016a) values when added to Figure 4.4 of Jacobs (2016a) values do not match Figure 4.2 of Jacobs (2016a) values. It is highlighted that the other Angus Place panels are included in the COSFLOW model; it is merely that output from those nodes, separately, is not able to be generated.

Issue

The proponent should ensure that in all future documentation they acknowledge that the swampland of the Newnes Plateau is specifically listed in Schedule 4 of the Greater Metropolitan Water Sharing Plan for Groundwater Sources 2011.

Response

The response provided below is from Section 2.5 of **Appendix C** under issue identified as *NSWDPI_03)*. The response to the issue was prepared by Jacobs. As noted above the figure numbering and the table numbering in Jacobs responses have been changed to make them consistent with the numbering in the RTS.

Jacobs Response

We acknowledge that Schedule 4 of the Water Sharing Plan does include the Temperate Highland Peat Swamp on Sandstone (THPSS) and appreciate the clarification. We will amend our subsequent documentation accordingly.

The maps of the Water Sharing Plans were consulted as the basis of the quoted statement. **Figure 5** [Figure 2.2 from **Appendix C**] presents the map for the Sydney Basin Richmond Groundwater Source downloaded from the Water Sharing Plan (Appendix 2 of http://www.legislation.nsw.gov.au/#/view/regulation/2011/111).

As per the annotation in **Figure 5**, it is stated, in that figure, that there are no identified groundwater dependent ecosystems in the Richmond Basin. It is now apparent that the annotation to this map is inconsistent with Schedule 4 of the Water Sharing Plan.

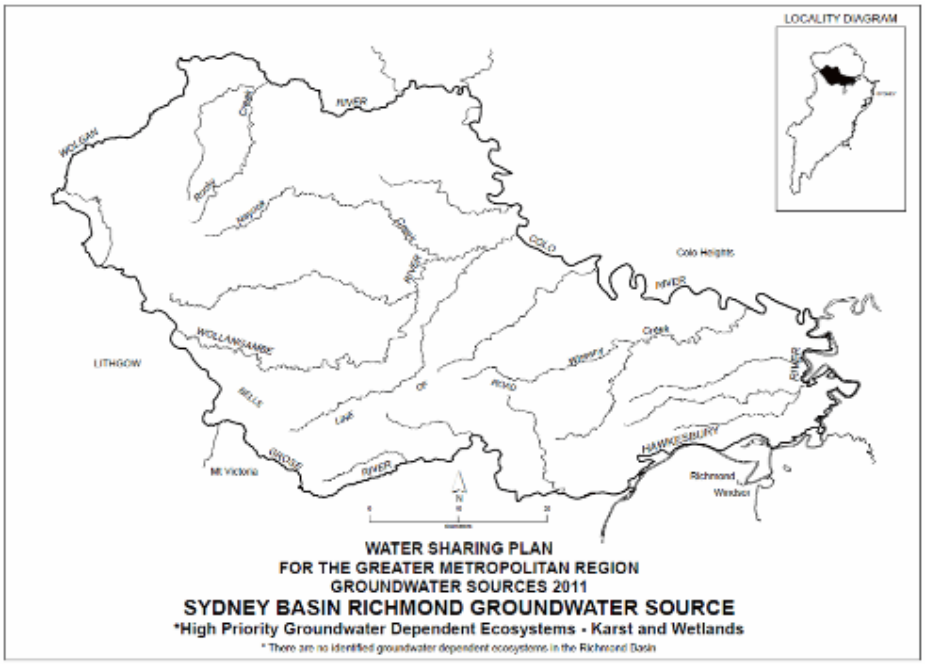

Figure 5 – High priority groundwater dependent ecosystems in the Sydney Basin Richmond Groundwater Source
(obtained from http://www.legislation.nsw.gov.au/#/view/regulation/2011/111/app2)

Issue

The Proponent should correctly identify, when discussing the influence of the proposed works on nearby groundwater users' bores, that drawdown and other aquifer impacts, these occur against groundwater works and not Water Allocation Licences.

Response

The response provided below is from Section 2.5 of **Appendix C** under issue identified as *NSWDPI_04)*. The response to the issue was prepared by Jacobs.

Jacobs Response

Table 3.3 of the Groundwater Assessment (Jacobs, 2016a) presents the water access licences (WALs) within 10 km of the Project Application Area, assessed as 10km radial distance from the centre of LW414.

In response to DPI Water's issue, a groundwater works search was also conducted on 14 September 2016 and indicated there are 235 works within that 10 km radius. A summary of the authorised works purposes is presented in **Table 7**. As noted in the Groundwater Assessment (Jacobs, 2016a) the majority of these works are monitoring piezometers.

Table 7 – Groundwater Works Purposes

Groundwater Work Authorised Purpose	Number of Groundwater Works
Exploration	5
Industrial	9
Irrigation	5
Mining, dewatering (groundwater)	9
Monitoring	156

Groundwater Work Authorised Purpose	Number of Groundwater Works
Recreation	3
Stock, Domestic	43
Test Bore	5

Of the 43 Stock/Domestic works identified in **Table 7**, these bores are located off the Newnes Plateau. Appendix A of Jacobs (2016a) presents the outcomes of groundwater modelling undertaken by Adhikary and Wilkins (2015). Table G13 of Adhikary and Wilkins (2015) presents the predicted change to groundwater level at 108 private bores included in the analysis and the net impact (water level decline at base of bore). In 2033, the median effect of the mine on private bores of depth less than 50m was approximately 0.01 m (range 0 to 0.48 m).

3.1.3. Division of Resources and Energy, Department of Industry

Issue

The following requirements are to be included in the consent conditions:

The Springvale Colliery Mining Operations Plan will need to be modified for consistency with the revised activity approval (if granted).

The company should be required to review, and modify where appropriate, their "Water Management Plan" and any other Management Plans/Procedures to take into account changes to the drainage system around the coals stockpile.

An appropriate condition should be placed on the approval to ensure the coal stockpile area is clearly delineated and designed so as to ensure containment of coal material within the delineated area.

Response

Springvale Coal confirms that the Springvale Mining Operations Plan (MOP) will be updated to include the proposed coal stockpile extension area (shown in Figure 8 of the SEE) when approved. The relevant plans in the MOP will be updated to include the stockpile extension area and the associated drainage, and the expanded stockpile area will be clearly demarcated. A buffer of appropriate width will be incorporated within the entire expanded stockpile area on the periphery, and managed to ensure that the coal is not stockpiled in close proximity to the surrounding drainage system, and to ensure the stockpiled coal will be contained within the delineated area. The Revised Statement of Commitments (Chapter 4) has been updated to reflect this commitment.

The *Stockpile Area Drainage Design Report* (GHD Pty Ltd, March 2016) included with the SEE as Appendix D noted the additional dirty water runoff generated by the proposed extension to the ROM storage area will not have an appreciable impact on the performance of the existing dirty water drainage system. Notwithstanding, and as required by Schedule 6, Condition 6 of SSD 5594, the site Water Management Plan will be reviewed and updated as relevant, following approval of the modification, to take into account the establishment of the stockpile extension area and the associated diversion drain.

3.1.4. Environment Protection Authority

Issue

The Springvale Mine (Springvale) is currently licensed by the Environment Protection Authority (EPA) by Environment Protection Licence (EPL) 3607, the EPL permits Coal Works >2000000-5000000 T handled, and Mining for Coal >3500000-5000000 T produced. In the event the modification is

approved Springvale will be required to submit a Licence Variation Application to the EPA for the increased activities.

Response

Table 9 within Regulatory Framework Chapter 5.0 of the SEE under *Protection of the Environment Operations Act 1997* noted the following

> "Condition A1.1 of EPL 3607 currently authorises extraction and handling of up to 5 Mtpa of ROM coal. The proposed modification will require a subsequent variation to EPL 3607 to allow for the increased extraction and handling of ROM coal at Springvale."

Springvale Coal confirms that a Licence Variation Application for the increased extraction rate will be submitted to the Environment Protection Authority (EPA) if the proposed modification is approved.

Issue

The Statement of Environmental Effects (SEE) states that the proposed modification to consent does not result in an increase of inflow to underground operations and therefore there is no change to mine water discharge predicted to Sawyers Swamp Creek via LDP009. The EPA notes however that within Table 15 - Broad Brush Risk Assessment Results, increased mine water discharges at LDP009 to the Coxs River Catchment is identified as a potential impact. The EPA therefore requests that any ground and surface water impact assessments that identify an increase in mine water make and subsequent discharge from LDP009 (as noted in the discussion within Table 15), be provided to the EPA.

Response

The Broad Brush Risk Assessment is a preliminary risk assessment undertaken at the start of an environmental impact assessment to identify the potential environmental risks that could arise from the proposed project elements. Given that the modification was proposing an increase in ROM coal production limit the Broad Brush Risk Assessment for the modification identified groundwater impacts (potential increase in mine inflows) and surface water impacts (discharges to Coxs River catchment) warranted further investigations. As such, the groundwater and surface water assessments were undertaken as part of the SEE. As noted in Section 9.3.3.1 of the SEE the modelled inflow rate presented in CSIRO (2015) maximum mine inflow predictions to Springvale Mine workings is 19 ML/day, which is consistent with the predictions included in the SVMEP EIS, which also noted the maximum mine inflows of 19 ML/day in 2022. Given there is no change in the mine inflows due to increase in production limit there will be no change to mine water discharge predicted to Sawyers Swamp Creek via LDP009 due to the proposed modification. No additional groundwater water access licences are therefore required for the mine, and the mine water discharges at LDP009 will continue to fall within the 30 ML/day volumetric limit for this licensed discharge point on Springvale Mine's Environment Protection Licence (EPL) 3607.

Springvale Coal will provide EPA with any groundwater and surface water assessments that identify an increase in mine water make and subsequent increase in discharges from LDP009 to the Coxs River catchment.

Issue

With regard to the expansion of the ROM coal stockpile; in September 2014 Springvale had an incident involving a discharge of coal fine sediment from the premises due to inadequate management of the existing ROM coal stockpile. Stockpiled coal had slumped and blocked drainage from the ROM pad causing coal fines to discharge into the clean water diversion and discharge off site. The EPA therefore requests that as part of the expansion to the ROM coal stockpile area, that appropriate measures are taken to ensure coal is not stockpiled in close proximity to the drainage system.

Response

A buffer of an appropriate width will be incorporated within the entire expanded stockpile area on the periphery, and managed to ensure that the coal is not stockpiled in close proximity to the surrounding

drainage system, and to ensure the stockpiled coal will be contained within the delineated area. The proposal to include a buffer will ensure that the stockpiled coal or the coal fines will not enter the dirty water diversion drains surrounding the stockpile area. Given the surface water management system in place at the pit top (refer Section 3.3.8.2 of the SEE) no dirty water discharges off site.

The Revised Statement of Commitments (Chapter 4) has been updated to reflect this commitment.

3.1.5. Office of Environment and Heritage

Issue

OEH considers that, prior to making a decision on the proposed modification, the Department of Planning and Environment (DP&E) needs to be fully satisfied that the current operations of Springvale Mine have been conducted in full accordance with the current Project Approval for SSD 5594. In particular, DP&E should ensure that all requisite management plans are finalised to an adequate standard, and all required monitoring has commenced.

Response

As at October 2016, all management required to be submitted to the Secretary of the Department of Planning for approval by SSD 5594, have been submitted. All monitoring required by Springvale's approvals, licences and management plans has been implemented.

An Independent Environmental Audit of SSD 5594 was conducted in June/July 2016. The Independent Environmental Audit report will be provided to the Department of DPE when finalised.

Issue

OEH has concerns regarding a statement in section 1.6 of the Statement of Environmental Effects (SOEE)

> *"Additional equipment to be installed will comprise longwall equipment (increased from one to two longwalls) and continuous miners (increased from three to five). While there will be two longwalls underground some of the time, only one longwall equipment will be operated at a time. Similarly, while five continuous miners will be located underground, only four will be operated at a time. Installation of an additional longwall equipment underground means the changeover period between longwalls, approximately six weeks, will be eliminated. The next longwall to be extracted can be preinstalled with the additional longwall equipment prior to the completion of the current longwall being extracted."*

It is understood from the above that, while two sets of longwall equipment may be located in two adjacent longwalls at one time, only one will be operational (so that only one longwall will be extracted at a time). However, there is no indication in the SOEE regarding whether there are additional impacts or planning requirements associated with the elimination of changeover periods. This may have implications for monitoring and management of sensitive features such as Newnes Plateau Shrub Swamps.

OEH recommends DP&E ensures that adequate management plans, baseline monitoring and adaptive management procedures are in place prior to installation of longwall equipment.

Response

Installation of an additional longwall equipment some of the time underground in the panel adjacent to a panel being extracted will not result in additional subsidence impact above that predicted in the Subsidence Impact Assessment (MSEC, 2013) supporting the SVMEP EIS (Golder Associates, 2014). Installing a second longwall or the shearer will not require a change in the mine plan. The installation will not change the approved subsidence profile or change the subsidence effects predicted in the Subsidence Impact Assessment. Thus there will be no additional subsidence impacts and environmental consequences above those discussed in the SVMEP EIS and approved in SSD 5594.

The longwall mining process comprises development (first workings) followed by extraction (second workings). The development stage of mining to form roadways (gateroads, installation face roadways and mains headings) usually results in no measurable subsidence (<20 mm). No subsidence impacts or environmental consequences result from development because the pillars formed along the roadways are long term stable. An extraction plan with environmental monitoring requirements therefore is not required to be approved prior to the commencement of development as long as DRE is satisfied that the first workings are designed to remain stable and non-subsidising in the long term (Schedule 3, Condition 9 of SSD 5594). Neither is any additional monitoring required during development (other than the ongoing monitoring undertaken in accordance with Springvale Mine management plans). There could be potentially up to three gateroads developed (comprising two defined coal panels in this case) ahead of coal extraction from these formed panels. It is the development of these gateroads in advance that will allow a second longwall equipment to be installed along the install face roadway in the longwall panel adjacent to the panel being extracted.

The extraction (second workings) of a coal block or panel results in subsidence and an extraction plan is required to be in place before any extraction can be undertaken (Schedule 3, Condition 10 of SSD 5594). Extraction Plan for LW419 currently being extracted was approved in June 2016 and informs the monitoring and management required for natural and heritage features, and the built environment overlying the mining area. The extraction plans also contain adaptive management provisions, comprising a Trigger Action Response Plan (TARP), which specifically includes both adaptive and contingency management based on results of the Subsidence Monitoring Program and relevant management plans.

As noted above no additional monitoring is required for the installation of a second longwall. Monitoring including baseline monitoring is ongoing at Springvale Mine and will continue to be undertaken in accordance with the various management plans and Extraction Plans.

3.1.6. Roads and Maritime Services

Issue

Prior to the commencement of construction work, a Channelised Right (CHR) turn lane in accordance with Figure 7.7 Part 4A of Austroads Guide to Road Design (copy enclosed) and relevant Roads and Maritime supplements, is to be provided in the Castlereagh Highway at its intersection with the Mine Access Road. The intersection works are to be designed and constructed for a 100km/h speed zone and be able to accommodate the largest vehicle accessing the intersection.

As road work is required on a state road, prior to the commencement of road work the developer is to enter into a Works Authorisation Deed (WAD) with Roads and Maritime Services.

Response

A concept design, meeting the Austroads *Extended Design Domain* CHR, for the intersection between Springvale Mine Access Road and Castlereagh Highway was submitted to Roads and Maritime Services (RMS). A response was received from RMS on the 05 July 2016 requesting Springvale Coal initiate the detailed design and the construction process. Springvale Coal is in the process of commencing the detailed design of the intersection and this will be submitted to RMS when completed. Springvale Coal will enter into a Works Authorisation Deed (WAD) with RMS when the intersection detailed design has been completed.

3.1.7. WaterNSW

Issue

1a. Potential additional mine inflows and changes to discharge water quality from the increased annual coal production

The updated modelling results with the increased mining rate at Springvale Mine indicate a minor increase in mine water (10 L/s or 0.86 ML/day) to underground workings. This increase is predicted not to lead to changes in quality of mine water discharges to Sawyers Swamp Creek. However, no data on water quality has been provided with the SEE or Appendices to substantiate this prediction.

Response

The response provided below is from Section 2.4 of **Appendix C** under issue identified as *WaterNSW_01)*. The response to the issue was prepared by Jacobs. It is noted that table references in Jacobs reposes has been updated to be consistent with the table numbering in this RTS.

Jacobs Response

Mine dewatering will ultimately access the same groundwater from storage irrespective of rate of mining – therefore an increased rate of mining will have no net change on the quality of the produced groundwater that was assessed in the SVMEP EIS.

For the purpose of completeness, a change in mine water discharge of 10L/s (0.86ML/d) was tested in the RWQIAM (Jacobs, 2015ab) with respect to the sequential mine implementation simulation, and compared with results presented in Jacobs (2015a) for Lake Burragorang. The test involved increasing the mine water discharge flow rate from the time-series presented in Jacobs (2015a) by 1ML/d to test the sensitivity of model predictions to minor changes in mine inflow rate. **Table 8** presents the outcome of prediction simulations at Lake Wallace (#074), which is equivalent to Table 3.34 of Jacobs (2015a). **Table 9** presents the outcome of prediction simulations at Lake Burragorang (#280), which is equivalent to Table 3.40 of Jacobs (2015a). The model control file associated with this simulation is 033a_UNC-WS2b-S_10_01a.gsm.

The Jacobs (2015a) report is available at the DPE website (under Additional Reviews and Information, http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

Table 8 – Prediction Daily Statistics at #074 (Lake Wallace) (adapted from Table 3.34 of Jacobs (2015a))

Percentile	Salinity (mg/L)				
	OBSERVED	**NUL[1]**	**WS1[1]**	**WS1-S[1]**	**WS2b-S-10[1]**
Minimum	218	140	121	122	121
5%	398	197	279	268	271
10%	402	209	351	324	328
20%	436	239	427	411	415
50%	519	280	540	523	527
80%	603	327	622	611	615
90%	637	354	655	648	652
95%	754	374	688	670	674
Maximum	771	427	732	746	748

Note 1. *NUL* is Null Case, *WS1* is Water Strategy 1 and comprised concurrent development of Angus Place Mine Extension Project (APMEP) and SVMEP, *WS1-S* is the sequential development of APMEP and SVMEP. The new *WS2b-S-10* simulation 'WS1-S plus 10 L/s'has been undertaken to address WaterNSW issue.

Table 9 – Prediction Daily Statistics at #280 (Lake Burragorang) (adapted from Table 3.40 of Jacobs (2015a))

Percentile	Salinity (mg/L)				
	OBSERVED	NUL[1]	WS1[1]	WS1-S[1]	WS2b-S-10[1]
Minimum	n/a	87	89	89	89
5%	n/a	90	92	92	92
10%	n/a	91	93	93	93
20%	n/a	94	97	97	97
50%	n/a	98	104	103	103
80%	n/a	99	107	105	106
90%	n/a	101	107	107	107
95%	n/a	101	109	108	108
Maximum	n/a	102	112	109	110

Note 1. *NUL* is Null Case, *WS1* is Water Strategy 1 and comprised concurrent development of Angus Place Mine Extension Project (APMEP) and SVMEP, *WS1-S* is the sequential development of APMEP and SVMEP. The new *WS2b-S-10* simulation 'WS1-S plus 10 L/s'has been undertaken to address WaterNSW issue.

From **Table 8**, modelled median salinity in Lake Wallace is 523 mg/L (781 µS/cm) under sequential implementation discharge conditions (simulation WS1-S) and is 527 mg/L (787 µS/cm) in the sequential implementation discharge conditions plus 10 L/s simulation (simulation WS2b-S-10). There is an increase of 4 mg/L in median salinity, equivalent to an increase of less than 1%.

From **Table 9**, median predicted salinity in the 'WS2b-S plus 10 L/s' scenario is 103 mg/L and is 103 mg/L in the original prediction 'WS1-S'. As noted in Jacobs (2015a), all water strategy simulations have consistent results below Lake Wallace. The predicted maximum salinity at 110 mg/L in the 'WS2b-S plus 10 L/s' simulation is 1 mg/L higher than the original simulation, being 109 mg/L, an increase of less than 1%.

It is therefore considered that the modified project is consistent with the position put in the SVMEP EIS, including subsequent work and as approved in SSD 5594, and continues to meet the neutral or beneficial effect criteria of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.

Issue

The SEE and Appendices specifies the requirement to reduce salinity of mine water discharges to the Coxs River to 500 µS/cm (90th percentile) by 30 June 2019 (as per Schedule 4, Conditions 12 and 13) however, there is no reference to the requirement to meet limits for salinity of 700 (50th percentile), 900 (90th percentile) and 1000 (100th percentile) µS/cm by 30 June 2017 (as per Schedule 4, Condition 12). WaterNSW assumes Centennial Coal still intends to achieve the 30 June 2017 targets.

Response

Since the grant of the SSD 5594 consent to Springvale Mine on 21 September 2015, Springvale Coal has made considerable and rapid progress in investigating alternatives and determining technical and financially viable solutions to meet the required water quality criteria provided in Schedule 4, Condition 12 in SSD 5594. The investigations have culminated in the proposed Springvale Water Treatment Project (SSD 7592), which involves the transfer of mine water from Springvale Mine and Angus Place Colliery to a water treatment plant at Mount Piper Power Station (MPPS). Mine water will be treated to meet the salinity target of 500 µS/cm EC (90th%ile), being the 30 June 2019 water quality criterion as per Schedule 4, Condition 12 of SSD 5594. Treated water will be reused beneficially in the cooling water system at MPPS as a first priority. Excess treated water (only when MPPS is not

operating) will be released to Wangcol Creek in the Upper Coxs River catchment. A State Significant Development (SSD 7592) application and the EIS for the Springvale Water Treatment Project have been submitted.

For the Springvale Water Treatment Project to be implemented, a number of tasks including development consent, procurement, construction and commissioning are required to be completed. In order to minimise the implementation time for the Springvale Water Treatment Project the development consent and procurement processes have been run in parallel. The procurement process has advanced through a market sounding exercise, and the Expressions of Interest process has shortlisted the preferred suppliers. Tender submissions are imminent. However, early indications are that the project will not be operational by 30 June 2017.

Springvale Coal has advised DPE that it is unlikely the mine will meet the salinity limits of 700 (50^{th}%tile), 900 (90^{th}%tile) and 1000 (100^{th}%tile) μs/cm by 30 June 2017 as per Schedule 4, Condition 12 of SSD 5594. Consultation on the matter has also been initiated with the EPA, and consultation with WaterNSW will be undertaken in the future. Springvale Coal will propose a modification to SSD 5594 consent to remove these interim water quality criteria in the near future.

Issue

WaterNSW notes an error in Table 41. The total salt outputs for existing conditions is listed as 3,624 ML/year however, the actual total figure should be 3,924.

Response

Table 41 in the SEE and Table 5-2 of the Water and Salt Balance (Appendix J) did include an error as noted in the WaterNSW's submission. The salt total output for the existing condition (2016) should have been 3924 tonne/year instead of 3624 tonne/year. The updated summary of average predicted salt inputs and outputs is provided as **Table 10**. It is noted that the typographical error does not change any conclusions in the Surface Water Assessment (Appendix J) supporting the SEE.

Table 10 – Updated Summary of Average Predicted Salt Inputs and Outputs

Inputs / Outputs	Existing conditions (2016) (tonne/year)	Proposed conditions (2021) (tonne/year)
Inputs		
Direct rainfall onto storages and catchment runoff	29.8	30.2
Groundwater inflows into underground workings	3,894.2	5,116.3
Total Inputs	**3,924**	**5,147**
Outputs		
Dust suppression	2.7	2.7
Discharge through LDP001	401.3	362.1
Discharge through LDP002	0.0	0.0
Discharge through LDP004/LDP005	0.0	0.0
Transfer to SDWTS	3,459.6	4,714.6
Removal of grit off-site	0.1	0.1
Infiltration into Renown Workings	60.4	67.3
Total Outputs	**3,924**	**5,147**
Change in Storage		

Inputs / Outputs	Existing conditions (2016) (tonne/year)	Proposed conditions (2021) (tonne/year)
Surface water storages	-0.1	-0.3
Underground storages	0.0	0.0
Total Change in Storage	**0**	**0**
Balance		
Inputs – outputs – change in storage	0	0

Issue

2. Potential impacts from the increased coal stockpile area (additional 0.3 ha)

The coal stockpile footprint will increase by approximately 23% as a result of the proposed extension area, which falls within the existing clean water catchment. The SEE proposes a new diversion drain (designed for 100 year ARI) to be constructed around the stockpile extension area to divert run-off to the existing dirty water surface water management system. WaterNSW expects that the Surface Water Management Plan will be updated to reflect these changes.

Response

The *Stockpile Area Drainage Design Report* (GHD Pty Ltd, March 2016) included with the SEE as Appendix D noted the additional dirty water runoff generated by the proposed extension to the ROM storage area will not have an appreciable impact on the performance of the existing dirty water drainage system. Notwithstanding, and as required by Schedule 6, Condition 6 of SSD 5594, the site Water Management Plan will be reviewed and updated as relevant, following approval of the modification, to take into account the establishment of the coal stockpile extension area and the associated drainage.

Issue

3. Wastewater management to cater for proposed additional staff

The SEE does not specify how the increased wastewater from the increased staff numbers will be managed at the site. However, WaterNSW notes that a development application was assessed and approved in 2015 for the Springvale Wastewater Transfer Scheme (DA 023/15) which has a design capacity for 450 staff, indicating the system can cater for the proposed additional staff and associated wastewater loads from the Modification (SSD 5594 MOD1).

It is not clear from the SEE whether the new sewage pump station required as part of DA 023/15 has been installed as yet, or whether it will be installed prior to the proposed modifications taking effect. WaterNSW would require the works approved under DA 023/15 to be completed prior to the modification taking effect, to ensure increased wastewater loads at the site can be appropriately managed.

Response

Section 3.3.8.1 of the SEE notes that the Springvale Mine's sewerage system is connected to Lithgow City Council's reticulated sewer system at Duncan Street pump station in Lidsdale. As noted in WaterNSW's submission the development application for the Springvale Wastewater Transfer Scheme (DA 023/15), with a design capacity for 450 staff and the transfer of grey water and sewage from the Springvale administration and bathhouse buildings to Lithgow City Council's sewer system, was assessed by Lithgow City Council, and approved on 6 May 2015. Springvale Coal confirms that the Springvale Wastewater Transfer Scheme has been established and is operational.

Springvale Mine's Site Water and Salt Balance (GHD Pty Ltd), included with the Surface Water Assessment (Appendix J) supporting the SEE, was updated to include the impact of the establishment of the Springvale Wastewater Transfer Scheme on the site water balance for the increased 450 full time equivalent workforce.

Issue

4. Life of consent

WaterNSW notes there is no proposal to amend the life of the consent notwithstanding that the production rate and size of the workforce is proposed to increase. WaterNSW requests the Department consider reducing the life of the consent.

Response

Section 1.6 of the SEE noted that Springvale Coal is seeking an increase in the ROM coal production limit to 5.5 Mtpa to make up shortfall in revenue when Springvale Mine did not operate for eight weeks (21/08/15 – 16/10/15) while the Springvale Mine Extension Project was being assessed. This production limit is consistent with Springvale Mine's current five-year business plan and the SEE assessed the impacts of the 5.5 Mtpa production limit.

Section 1.6 of the SEE also noted that in the event that efficiencies are gained and markets are available to accommodate those efficiency gains, the life of the mine may be reduced. However, Springvale Coal did not propose that the life of SSD 5594 be reduced in the modification application because the mine may not extract coal at 5.5 Mtpa every year of the mine life. Springvale Mine wants to retain the flexibility of managing its mining operations in response to market needs. This flexibility does not only afford operational advantages to Springvale Mine it has potentially positive implications for the State, as the ability to increase production in favourable markets would result in increased royalty returns, in particular to NSW.

Issue

It is considered that Schedule 4, Condition 14 (d)(i), (ii) and (iii) related to Site Water Balance, Surface Water Management and Groundwater Management, should incorporate proposed changes as a result of the modification.

Response

As required by Schedule 6, Condition 6 of SSD 5594, all management plans will be reviewed and updated as relevant, following approval of the modification, to take into account the outcomes of the specialist investigations and recommendations made in the Statement of Environmental Effects (SEE) and commitments made in the Statement of Commitments. This will include the update of the Water Management Plan (Schedule 4, Condition 14 of SSD 5594) to account for the updated site water and salt balance and the changes to the surface water management due to the expansion of the coal stockpile area and the construction of dirty water diversion drain.

3.2. Response to Submissions from Special Interest Groups

3.2.1. 4nature

The key points identified from the 4nature submission of relevance to the proposed modification are as follows.

Issue

Scope 2 & Scope 3 Greenhouse Gas Emissions

The Centennial Coal Summary of Environmental, Economic and Social Impact (page 1 iv & page 1 v, Vol 1) includes Scope 1 Greenhouse Gas Emissions but does not include the additional contribution of

the mine extension to Scope 2 and Scope 3 Greenhouse Gas Emissions. Ignoring Scope 2 and Scope 3 emissions significantly understates the adverse environmental effects of the proposed extension.

Response

Scope 1, Scope 2 and Scope 3 greenhouse gas emissions were calculated for the proposed increase in extraction rate of 5.5 Mtpa. Table 29 in the SEE and Table 35 of the *Air Quality and Greenhouse Gas Impact Assessment* (SLR Consulting Australia Pty Ltd) included with the SEE as Appendix H, lists the Scopes 1 – 3 emissions for both the existing and the proposed operations. Scope 2 emissions were not included in the Executive Summary of the SEE because, as noted in Section 9.3.3 of the SEE, these emissions will not change due to the modification, ie they remain unchanged from the existing operations.

Scope 3 emissions are not required to be reported under the *National Greenhouse Gas and Energy Reporting Regulations 2008* (NGER). However, they are calculated and reported in greenhouse gas emissions impact assessments to account for the carbon dioxide emissions when coal is combusted in a power station by an end user, and is therefore part of the whole of life-cycle carbon footprint of a coal mine project. These Scope 3 emissions are captured by the reporting that the end user (in Australia or overseas) must do when reporting their GHG emissions. Scope 3 emissions are therefore not included under NGER to avoid this double counting. It is also more appropriate for the end user to address the emissions from combustion of the coal, taking into account the energy efficiency of their plant and justification of fuel choice etc. Springvale Coal is not able to exercise influence over the Scope 3 emissions from combustion of the coal by the end user.

Section 9.3.4 of the SEE and Section 8.5 of the *Air Quality and Greenhouse Gas Impact Assessment*, notes that the modification's Scope 1 contribution (0.0008%) to Australia's emissions has the potential to contribute to global environmental effects (climate change), however this contribution would be relatively small. Establishing linkages between emissions of CO_2 **from an individual project**, the resulting global CO_2 concentrations and climate warming is not possible due to a host of uncertainties and a lag in the climate system. Therefore the link between the proposed modification's GHG emissions and its contribution to climate change cannot be ascertained.

Section 9.3.5 of the SEE notes that, as part of Centennial Coal's Sustainability Strategy, the company has set its "Vision 2020" which incorporates a target to reduce the company's GHG emissions by 25% by 2020. However, it is emphasized that it will be the collective actions by all countries aimed at reducing GHG emissions by sector and national totals that will result in mitigation of climate change.

Issue

Pollution of Coxs River and Neutral or Beneficial Effect

The Centennial Coal proposal contends that the environmental effects on water quality are minimal or negligible because mine water discharges would not significantly increase contaminants above current levels. However current levels of discharge are causing pollution of the Coxs River. There is published scientific evidence that current levels of discharge have contaminant levels which are known to adversely affect stream dwelling biota.

Current discharges do not adhere to the requirement of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 to maintain or improve water quality. Additional discharges arising from the mine extension would create additional pollution of the Coxs River.

Response

A detailed response is included in Section 2.1 of **Appendix C** under issue identified as *4nature_01)*. The response is summarised as follows:

- **Adverse impact on biota:** Mine water discharges at LDP009 do exhibit chronic toxicity. The toxicity is not attributable to any water quality parameters (ie. metals etc) in sufficient concentrations to produce the observed toxicity. This toxicity impact diminishes with increasing

distance downstream, with no adverse impacts identified in the upper portion of Lake Wallace or any points downstream.

- **Neutral of Beneficial Effect**: There is no significant change in the rate of mine water discharge due to the proposed modification, nor is there anticipated to be any significant change in water quality. The modification therefore, will not result in any significant change to the outcomes of water balance modelling undertaken for the SVMEP Response to Submissions (Jacobs 2015a,b). The modified project is consistent with the position put in the SVMEP EIS and as approved in SSD 5594, and continues to meet the neutral or beneficial effect criteria of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.*

Issue

Pipeline for waste water

The current levels of contaminant discharge are also in contention because 4nature has initiated a legal challenge to the process by which previous the development application was approved. There is currently a development application to pipe mine waste water to the nearby Mt Piper power station. At the power station the contaminants would be treated and not discharged into the Coxs River. It is essential that this pipeline project be completed before any additional levels of discharge occur from the mine extension and either use by the power station or treatment of the water be a mandatory condition of consent. Such a pipeline should be designed to handle the mine discharge water from all the Newnes Plateau underground coal mines. Measures to deal with discharge water must be able to operate for as long as the water is discharged. This means that a solution must be found for times when the Mt Piper Power Station is temporarily or permanently out of action or decommissioned and outlast the life of the mine.

Response

Whilst a response is provided below to this submission from 4nature it should be noted that the submission does not have any relevance to the proposed modification elements included in the SEE. In the proposed modification there is no proposal to increase discharges to the Coxs River catchment above the approved limits in SSD 5594.

The proposed Springvale Water Treatment Project (SSD 7592) has been developed to address Schedule 4 Condition 12 of Springvale Mine's consent SSD 5594 relating to water management performance measures. The overall objective of this proposed project is to improve the water quality in the Upper Coxs River catchment, as required by Springvale Mine's consent. Groundwater from all existing and future mine dewatering facilities on Newnes Plateau is proposed to be transferred to the Mount Piper Power Station (MPPS) for treatment in a new water treatment plant prior to industrial reuse in the MPPS's cooling water system. As discussed in the *Environmental Impact Statement* (EIS) of the Water Treatment Project treated water will only be discharged to the receiving environment when MPPS is not operational. The mine water is proposed to be stored temporarily underground at Angus Place Colliery when the water treatment plant is not available, ie no untreated water from the dewatering bores on Newnes Plateau will be discharged to Coxs River catchment when the Springvale Water Treatment Project becomes operational. The State Significant Development application, and the supporting EIS, for this project has been submitted to the DPE for the assessment process to commence.

Issue

Impacts on swamps

The Centennial Coal Summary of Environmental, Economic and Social Impact ignores the recent evidence from the Springvale Mine Independent Monitoring Panel that current mine operations have had significant impacts on the upland swamps listed as federally listed endangered ecological

communities. Furthermore, the current monitoring regime for water flows through the swamps was found to be inadequate by the Springvale Mine Independent Monitoring Panel.

Underground mining is demonstrably damaging groundwater that the upland swamps depend on, resulting in the permanent loss of the swamps and the loss of flows to creeks and waterfalls. Underground longwall panels for any mine extension must be reconfigured to avoid undermining the catchments of the upland swamps and creeks.

Response

A detailed response is included in Section 2.1 of **Appendix C** under issue identified as *4nature_02)*. The response is summarised as follows:

- The mechanism for addressing higher than predicted impacts to Temperate Highland Peat Swamps on Sandstone (THPSS), as applicable, is specified in the Conditions of Consent for Springvale Mine (SSD 5594), namely, Schedule 3 Conditions 1 to 6.
- Investigations are underway for the Carne West Swamp trigger. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions within the specified timeframes stipulated.
- Swamp monitoring recommended by the Independent Monitoring Panel in relation to Extraction Plan for LW419 has been implemented by Springvale Coal.
- Monitoring required under the EPBC Approval 2013/6881 has also been implemented.

3.2.2. Blue Mountains Conservation Society

The key points identified from the BMCS submission of relevance to the proposed modification are as follows.

Issue

Impact Assessment not Adequate in the SEE

The society believes that the proposed modification has not adequately assessed the likely environmental impacts on the natural environment. It failed to include the report of the Independent Monitoring Panel for Springvale Coal Mine on the Springvale Mine Extension Project - Extraction Plan for Longwall 19 (June 2016) (IMP Report). This report is an important addition to the understanding of impacts of subsidence specifically from the Springvale Mine on swamps lying above or near the Springvale Mine area.

The IMP Report concentrated on what was causing the damage to Carne West swamp in the Springvale mining area which it reported was " …the very significant drop in the water level of Carne West Swamp and the cessation of flow in the watercourse through this swamp, with consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp".

The IMP's Report concluded that impacts occurred which were not assessed in the EIS process for the determination of the Springvale Mine Expansion Project. The proposed modification (increasing coal production) will affect the whole of Springvale Mine Expansion Project (MEP) area. It is not, for instance, a modification to increase the area of the consent.

The IMP Report suggests that the current monitoring data is not the "robust monitoring" claimed by the SEE eg at p.137.

Response

A detailed response is included in Section 2.2 of **Appendix C** under issues identified as *BMCS_01)* and *BMCS_02)*. The responses from **Appendix C** are summarised as follows.

- There is no expected change to predicted impacts to THPSS, associated with the increase in mining rate, over that discussed in the SVMEP EIS. Hence, the expected environmental consequences for the proposed modification are as approved in SSD 5594.
- The mechanism for addressing higher than predicted impacts to THPSS, as applicable, is specified in Schedule 3 Conditions 1 to 6 of SSD 5594.
- Investigations are underway for the Carne West Swamp trigger. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions within the specified timeframes stipulated.
- The monitoring network within swamps is as comprehensive as is required by Springvale Mine's consents and approvals, and as included in all approved management plans.
- Swamp monitoring recommended by the Independent Monitoring Panel in relation to Extraction Plan for LW419 have been implemented by Springvale Coal. Monitoring of far field movements has also been established.

Issue

Referral to the Commonwealth

The swamps in Springvale MEP area include nationally listed swamps, therefore harm to these swamps is a matter of national environmental significance under the EPBC Act. In the light of the IMP Report, the modification and the IMP Report should be referred to the Department of Environment for consideration of the impacts under Part 9 of the EPBC Act.

Response

Section 5.7.1 of the SEE provides a justification why a referral to the Department of the Environment (DoE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is not warranted. The proposed modification had potential to impact on two matters of national environment significance (MNES):

- threatened flora and fauna species and ecological communities
- water resources.

The establishment of the proposed stockpile extension area will not result in removal of any native vegetation or threatened vegetation communities and species listed under the EPBC Act (refer Section 9.6.4 of the SEE and Appendix K).

Groundwater and surface water assessments undertaken for the SEE assessed the impacts of the increase coal extraction rate on water resources in accordance with the *Significant Impact Guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments – Impacts on Water Resources* (DoE (2013)). The Groundwater (Appendix I) and surface water *(*Appendix J) assessments discussed in Section 9.4.4.1 and Section 9.5.6.1 of the SEE, respectively, concluded that the proposed modification would not, nor be likely to, have a significant impact on water resources. Based on these conclusions the modification was not referred to the DoE under the EPBC Act.

Issue

Impacts of increased annual coal production

The Springvale Modification 1 will increase the amount and rate of annual coal extraction by up to 22 per cent. This is likely to accelerate damage occurring to the endangered swamps. The impact of accelerated extraction needs to be assessed as to its environmental impacts on the natural environment.

Response

The increased coal production rate of up to 5.5 Mtpa will result in the predicted subsidence profiles (conventional subsidence, tilt and strain included in the SVMEP EIS (Golder Associates (2014), MSEC (2013)) being developed quicker than if the coal production occurs at 4.5 Mtpa. However the subsidence effects (subsidence, strain, tilt) predictions are not influenced by the proposed increase in extraction rate, and will remain unchanged from the predictions approved in SSD 5594. Given that the subsidence effects will not change then impacts to the shrubs swamps and watercourses above the mining area will not change from those approved in SSD 5594. As noted in Section 4.2.2.3 of the Groundwater Assessment (Appendix I to the SEE), subsidence effects in the near surface zone may lead to enhanced water-rock interaction, however, this has not been observed at Springvale Mine and therefore this process may not be significant with respect to water quality.

Additionally, the predicted mine inflows for the proposed modification (CSIRO (2015); Jacobs (2016)) will not increase above those approved in SSD 5594. Similarly, the baseflows will not change and hence the impacts and environmental consequences on the natural environment overlying the Springvale mining area is consistent with that discussed in SVMEP EIS and approved in SSD 5594.

Issue

Impacts of installing longwall machines earlier

It is understood that removing a longwall machine would not be possible without actually mining, as Springvale will use "the retreat mining configuration whereby the longwall face equipment is established at the end of the panel that is remote from the main headings…" SEE p.25]. Thus, putting the mining equipment in place before the extraction plan has been prepared and approved puts pressure on the consent authority not to change the mining plan even when it might be a necessary action depending on the outcomes and monitoring of previous longwalls. .

Response

Section 1.6 of the SEE notes that an additional longwall equipment (shearer) will be installed underground some of the time, ie there could potentially be two shearers installed underground at Springvale Mine some of the time. However, the two shearers will not be operated concurrently.

Installing a longwall equipment underground can be undertaken without an approved extraction plan in place since the installation does not result in any subsidence and environmental impacts. Before installation of the longwall equipment can occur, development (first workings) to form gateroads defining the extraction panel is undertaken. The development stage of longwall mining usually results in no measurable subsidence (<20 mm), and there are no potential subsidence impacts or environmental consequences.

Development of longwall panels and installation of an additional longwall equipment will not result in any change in the subsidence effects predicted in the Subsidence Impact Assessment (MSEC, 2013) supporting the SVMEP EIS. Conversely, the extraction (secondary workings) of a coal block or panel does result in subsidence. An extraction plan is therefore required to be in place before any extraction can be undertaken as per Schedule 3, Condition 10 of SSD 5594. An extraction plan is required to be approved by the DPE before any extraction can be undertaken (Schedule 3, Condition 10 of SSD 5594). The Extraction Plan is developed in consultation with various government agencies, and the Independent Monitoring Panel (Schedule 3, Condition 11 of SSD 5594).

Issue

There appears to be a lot of leeway in the additional time that would result from removing the down time between longwalls. There is no equivalence between the time lost before the approval of Springvale MEP (eight weeks), as is suggested [SEE at p. vi]), and the ability to make up time by the earlier insertion of the longwall in place earlier (estimated to be up to six week downtime per longwall.) With 19 longwalls still to be mined and have extraction plans approved, this is a saving of up to 18 longwalls times six weeks equals 108 weeks or just over two years. Referring to the downtime before MEP was approved is really a red herring.

Response

It is noted that LW419 is currently being extracted. Excluding LW419, there will be 16 (not 19 as noted in the BMCS submission) approved longwalls (LW420 – LW432, LW501 – LW503) that can be extracted in the future. Pre-installing an additional longwall equipment in the next longwall to be extracted prior to the completion of the longwall being extracted will result in additional weeks being available for ROM coal extraction (approximately six weeks at a time). However, BMCS's calculation of 108 additional weeks available for coal production is not correct, since as noted in Section 1.6 of the SEE, the additional longwall equipment will be installed underground only some of the time, and not for the rest of the mining life at Springvale. While additional weeks will be available with longwalls being underground, it is not known how many weeks in total will be available in total, nonetheless additional weeks will be available. Furthermore, Section 1.6 of the SEE notes the increased production will be achieved by a combination of:

- The proposed increase in workforce
- The installation and operation of additional underground mining equipment
- Improved equipment utilisation and availability.

Issue

Significant increase in size of coal reject piles

The proposed change to the size of the coal stockpile is in fact a large increase of 120,000 (235%) on the existing stockpile of 80,000 allowed. (SEE, p.iii) Given the massive and very damaging coal waste collapse in July 2015 at Centennial's Clarence Colliery, it is not clear from the SEE whether Springvale has learnt from this disaster at its associated mine and applied any learnings from Clarence Colliery to its operations at Springvale.

Response

The enlarged coal stockpile extension area will be managed appropriately to ensure that no spillages of coal and coal fines occur and leave the premises. As discussed in Section 4.2.5 of the SEE, an appropriately sized diversion drain, designed to 100 year ARI, will be constructed around the enlarged stockpile area to divert all surface run-off from that area into the existing dirty water management system at the Springvale pit top. The design specifications of the diversion drain to be constructed has been appended to the SEE as Appendix D.

A buffer of an appropriate width will be incorporated within the entire stockpile area on the periphery, and managed to ensure that the coal is not stockpiled in close proximity to the surrounding drainage system, and to ensure the stockpiled coal will be contained within the delineated area. This proposed buffer will ensure that the stockpiled coal or the coal fines will not enter the dirty water diversion drains surrounding the stockpile area. Given the surface water management system in place at the pit top (refer Section 3.3.8.2 of the SEE) no dirty water discharges off site.

Issue

Impact of Mine Water Discharges to Coxs River

The consent authority also needs to take into account the Sydney Drinking Water State Environmental Planning Policy. The mine discharge to the Coxs River will not have a neutral or beneficial impact on Sydney's drinking water supply. A river flowing through world heritage area and into a major drinking water supply should not be used as a place to dump toxic mining waste. Sydney has cleaned up the discharging of industrial waste into its rivers such as Parramatta, Georges and Cooks Rivers. The same principle should apply to a significant asset to the functioning of the greater Sydney area, its drinking water supply.

Response

For a detailed response refer to Section 2.2 of **Appendix C** under issues identified as *BMCS_03)*. The summary of the response in relation to neutral or beneficial effect is as follows. There is no significant change in the rate of mine water discharge due to the proposed modification, nor is there anticipated to be any significant change in water quality. The modification therefore, will not result in any significant change to the outcomes of water balance modelling undertaken for the SVMEP Response to Submissions (Jacobs 2015a,b). The modified project is consistent with the position put in the SVMEP EIS and as approved in SSD 5594, and continues to meet the neutral or beneficial effect criteria of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.*

3.2.3. Colong Foundation for Wilderness

The key points identified from the Colong Foundation submission of relevance to the proposed modification are summarised as follows.

Issue

Potential Impacts to Swamps

Further, the 2014 EIS omits advice or consideration of the mine's impacts as a consequence of longwall mining on the waterfall below Carne West Swamp and a 25 metre tall waterfall below Gang Gang Swamps that lie in the project area. As the Department is aware, the Carne West waterfall no longer flows due to longwall impacts on groundwater and that undermining the Gang Gang Swamps will terminate flows over a waterfall downstream. The September 2015 approval does not address these waterfalls omitted from the EIS. If nothing is done to prevent the loss of flows to a large waterfall downstream of the Gang Gang Swamps, the Department would be condoning such serious omissions.

The modification considers swamps, ground and surface water impacts in detail, but incorrectly restates negligible impacts arguments on affected swamps that are no longer relevant and also omits consideration of or reference to the 2016 water treatment project (SSD 16_7592).

In relation to swamps - Section 9 of Volume 1 of the statement of environmental effects considers the swamps, that are described as ground water dependent ecosystems. Table 34 of the statement wrongly concludes negligible impacts on Newnes Plateau swamps and also on streams.

Two expert reports now question the negligible impact claims made by Centennial Coal in the 2014 EIS (repeated in the Statement of Environmental Effects) that have led to the Commission's uncertainties referred to above. The Independent Monitoring Panel established to advise on swamp health in relation to SSD 5594 operations reported in June 2016 on 'the very significant drop in the water level of Carne West Swamp and the cessation of flow in the stream through this swamp, with the consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp. These changes begun to be detected when the mining was up to 700 metres away, well outside the impact zone predicted in the environmental impact statement (EIS) for mining in this region of the Springvale mine' (page 2 of the report, June 9, 2016).

The Pells report confirms that dramatic swamp impacts from future mining are irreparable.

The Planning Assessment Commission reported on confusion and uncertainty regarding swamp impacts. A Commission report further states 'However, the Commission believes that there also needs to be a focus on the avoidance or mitigation of damage to swamps, as well as adaptive management measures, in order to deal with the various uncertainties around subsidence-related impacts on swamps' (page 6, 2015).

In relation to mine water transfer - Appendix I on ground water and J on surface water, including a water and salt balance, bring the consideration of the neutrality and beneficial effect matters into the frame of this modification proposal. The water volumes and salt balance are relevant to the protection of the Coxs River. The SEPP (Sydney Drinking Water Catchment) 2011 is considered in the main volume of the statement of environmental effects on page 50.

Connell Wagner, Centennial consultant observed that Junction Swamp was damaged by longwall mining in 2005. The swamp has lost groundwater and surface flows, but nine years later, other Centennial consultants claimed in the 2014 EIS that no damage had occurred to the same swamp. The swamp, Junction Swamp, is now effectively non-existent.

Response

For detailed responses refer to Section 2.3 of **Appendix C** under issues identified as *ColongFoundation_01)* to *ColongFoundation_09)*. A summary of responses is provided here.

- The proposed modification will not result in any significant impacts on swamps and watercourses over and above those presented in the SVMEP EIS and approved in SSD 5594, for the following reasons.
    - The subsidence impacts predicted in MSEC (2013) will not change due to the increased coal production rate.
    - The mine inflows and baseflows, as presented in CSIRO (2015), CSIRO (2016) are consistent with the mine inflows and baseflows presented in CSIRO (2013) supporting the SVMEP EIS and approved in SSD 5594.
- Investigations are currently underway into a water level trigger that has occurred at Carne West Swamp. Springvale Coal acknowledges that the drops in the Carne West Swamp piezometers commenced at a time when the nearest longwall mining was in excess of 700 m from the piezometers. However, this observation is without known precedent at Springvale Mine. Further analysis is required to determine if the changes to water levels in Carne West Swamp are related to mine subsidence or the decline observed in the regional groundwater table aquifer. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.
- The Carne West Waterfall was assessed as a watercourse in the SVMEP EIS. As such, the applicable performance standard for the waterfall is no “No greater subsidence impacts or environmental consequences than predicted in the EIS”, as per Table 1 in the SSD 5594 consent. Any identified impact to the waterfall will be addressed and managed in accordance with the consent conditions.
- With respect to the issue on neutral or beneficial effect of mine water discharges, it is noted there will no significant change in the rate of mine water discharge due to the proposed modification, nor is there anticipated to be any significant change in water quality. The modification therefore, will not result in any significant change to the outcomes of water balance modelling undertaken for the SVMEP Response to Submissions (Jacobs 2015a,b). The modified project is consistent with the position put in the SVMEP EIS and as approved in SSD 5594, and will continue to meet the neutral or beneficial effect criteria of the *State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.*
- With respect to the claim that Junction Swamp was damaged by by longwall mining in 2005, monitoring data confirm the following.
    - There have been no significant impacts to swamp hydrology in response to longwall mining (standing water levels are similar to pre-mining levels).
    - The swamp is periodically waterlogged (standing water levels respond to rainfall).

    Connell Wagner report (Aurecon, 2009) notes the erosional and flora dieback impacts at Junction Swamp were caused by changes to swamp hydrology related to mine water discharge and were not related to subsidence. No mine water discharge on Newnes Plateau is proposed in the future.

Issue

Duplication of the Springvale Delta Water Transfer Scheme (SDWTS)

The Modification proposal also seeks an inappropriate amendment of the September 2015 consent to allow duplication of the Springvale Delta Water Transfer Scheme (condition 9), which is opposed in relation to its location on Newnes Plateau.

The duplication of the mine water transfer pipeline on Newnes Plateau proposed in the modification documentation must be required keep to the existing pipeline alignment. The proposal for an additional road and pipeline easement descending off Newnes Plateau will cause totally unacceptable scarring to a scenic part of the Gardens of Stone region.

The proposed new alignment does not follow the existing corridor through the sensitive western edge of Newnes Plateau. The road and 10 metre wide easement proposal descends into Sawyers Swamp Creek.

The existing pipeline alignment further to the south must be followed. This will avoid the destruction of a Sheltered Peppermint – Brown Barrel Shrubby Forest between two significant and well featured Pagoda spurs above the creek. It would avoid unnecessary bisection and damage to a Tableland Gully Snow Gum – Ribbon Gum Montane Grassy Forest, an endangered ecological community. This diversion of the pipeline alignment was originally rejected by the Department and the Commission and this unnecessary impact must be avoided.

Response

There is no proposal in the Springvale Modification 1 application to modify Schedule 2 Condition 9 of SSD 5594, to duplicate the pipelines or increase the capacity of the SDWTS. Section 1.3 of the SEE and **Section 1.1.2** of the RTS summarise the three proposed modification elements, none of which relate to duplication of the SDWTS on Newnes Plateau.

Issue

Beneficial Reuse of Mine Water

The Colong Foundation prefers transfer and reuse of mine water to its alternative of treatment and discharge to the Coxs River. On face value the reuse of mine waste water by the power industry is superior to that industry using water from the Coxs River that would be better consumed by Sydney residents and by also providing environmental flows to the Coxs River that flows through the World Heritage Area.

Response

Following the grant of the SSD 5594 consent to Springvale Mine on 21 September 2015, Springvale Coal commenced investigations into alternatives, and determining the technical and financially viable solutions, to meet the required water quality criteria provided in SSD 5594, specifically Schedule 4, Condition 12 and Condition 13(c). The investigations have culminated in the proposed Springvale Water Treatment Project (SSD 7592), which involves the transfer of mine water from Springvale Mine and Angus Place Colliery to a water treatment plant at Mount Piper Power Station (MPPS). Mine water will be treated to meet the salinity target of 500 µS/cm EC (90%ile), being the 30 June 2019 water quality criterion as per Schedule 4, Condition 12 of SSD 5594. Treated water will be reused beneficially in the cooling water system at MPPS as first priority. Excess treated water (only when MPPS is not operating) will be released to Wangcol Creek in the Upper Coxs River catchment. A State Significant Development application and the EIS for the Springvale Water Treatment Project have been submitted.

3.3. Response to Submissions from Members of the Community

3.3.1. Form Letter Contributions

The key points identified from the Form Letter contributions from members of the community of relevance to the proposed modification are summarised as follows.

Issue

***Impacts to Swamps**.*

In June 2016 independent experts have reported to DPE significant impacts to upland swamps due to the mine extension. The expectation in the consent of negligible impacts due to mining extension is a significant miscalculation and underestimation of mining impacts on our national heritage listed swamps.

Further, the far field impacts to upland swamps beyond the project area is a serious miscalculation not foreseen in the September 2015 consent that must be corrected.

Response

The SVMEP EIS and additional assessments provided as part of the Response to Submissions were assessed by the relevant government agencies and Planning Assessment Commission (PAC). Numerous consultations were held between Centennial Coal representatives, government agencies and the PAC. Two PAC hearings were held. Strict performance criteria, for both the natural and heritage and built features, were subsequently established in the conditions of consent SSD 5594, as provided in Table 1 and Table 2 in Schedule 3 of the consent. Conditions 2 to 6 of Schedule 3 provide mechanisms for the management of greater than predicted impacts or performance measures as applicable on natural (including shrub swamps) and heritage features listed in Table 1.

Monitoring of far field movements has been established following the outcome of consultations with the Independent Monitoring Panel during the development of the LW419 Extraction Plan.

Issue

Waterfalls and Shrub Swamps

These independent experts also advised DPE that the waterfall below Carnes West Swamp has stopped flowing due to mining. If longwall mining continues east under the Gang Gang Swamps, that waterfall will also stop flowing. The EIS and the September 2015 consent do not mention waterfalls. This is another important error that must be corrected by the modified consent.

Response

The waterfall was assessed as a watercourse in the SVMEP EIS, and Table 1 in SSD 5594 (Schedule 3, Condition 1) in SSD 5594 includes performance measures for watercourses. Condition 2 of Schedule 3 provides for management of exceedances of performance measures included in Table 1.

Similarly performance criteria for swamps have been provided in Table 1 of SSD 5594. Exceedances of performance measures noted in Table 1 pertaining to swamps will be managed in accordance with Schedule 3, Conditions 3 to 6 of Springvale Mine's consent.

Issue

Diversion of Mine Water to Mount Piper Station

The modified consent must require reuse of polluting mine water, eliminating the mine's environmentally-impacting discharges to the Coxs River. A proposal to divert mine water to Mt Piper Power Plant is now under consideration. This proposal must be made a condition of consent of this modification to ensure the transfer is constructed and not shelved as is likely unless the applicant is required to build it. This proposal must be made a condition of consent of this modification to ensure

the transfer is constructed and not shelved as is likely unless the applicant is required to build it. The Coxs River can be restored to health by piping Springvale's salt laden mine water to the Mt Piper Power Plant, then treating it for use in the plant, with a further requirement of a zero discharge to the environment. Such reuse will benefit Sydney's Drinking Water Supply and correct this error in the September 2015 consent.

I also request that any further pipeline construction for mine water transfer follow the existing pipe, and avoid any damage to endangered ecological communities and pagoda landscapes.

Response

The proposed Springvale Water Treatment Project (SSD 7592) has been developed to address Schedule 4 Condition 12 of Springvale Mine's consent SSD 5594 relating to water management performance measures. The overall objective of this proposed project is to improve the water quality in the Upper Coxs River catchment, as required by Springvale Mine's consent conditions. Groundwater from all existing and future mine dewatering facilities on Newnes Plateau is proposed to be transferred to the MPPS for treatment in a new water treatment plant prior to industrial reuse in the MPPS's cooling water system. As discussed in the *Environmental Impact Statement* (EIS) of the Water Treatment Project treated water will only be discharged to the receiving environment when MPPS is not operational. The mine water will be stored temporarily underground at Angus Place Colliery when the water treatment plant is not available, ie no untreated water from the dewatering bores on Newnes Plateau will be discharged to Coxs River catchment when the Springvale Water Treatment Project becomes operational.

The pipeline route from Newnes Plateau to MPPS in the project was selected based on outcomes of ecological, archaeological and geomorphological assessments of two alternate routes, being the existing route and a new pipeline alignment. The best system practice system of environmental management using the hierarchy of avoiding, minimising / mitigating and finally offsetting environmental impacts was adopted in the selection process and the new shorter pipeline alignment was selected, for minimal environmental impacts.

The State Significant Development application and the supporting EIS for the Springvale Water Treatment Project have been submitted to DPE for assessment.

3.3.2. Individual Contributions

(i) Submitter ID 159004

This submitter used the form letter submission but added two additional issues noted below. Responses are provided below.

Issue

GHG Emissions *GHG emissions current 10.98 (sic) proposed in MOD 1 to 13.42 (sic) represents +22%.*

Response

The submission incorrectly notes that greenhouse gas (GHG) emissions for the current operations as 10.98 and for the proposed operations as 13.42. It appears the submitter has mis-read Table 29 in the SEE and has assumed the scope 3 emissions for the current and the proposed operations as totals of Scope 1, Scope 2 and Scope 3 emissions. Table 29 notes the following:

(i) Scope 1 emissions: 30,520 tonnes $CO_{2\text{-e/annum}}$ (current) and 34,998 tonnes $CO_{2\text{-e/annum}}$ (proposed), resulting in an increase in direct (Scope 1) GHG emissions of 4,479 t CO_2-e/annum. This increase represents an increase of 15% on current approved operations.

(ii) Scope 2 emissions: 97,997 tonnes $CO_{2\text{-e/annum}}$ for both current and proposed operations, ie Scope 2 emissions will not change as a result of the proposed modification.

(iii) Scope 3 emissions: 10,893,187 tonnes $CO_{2\text{-e/annum}}$ (current) and 13,421,157 tonnes $CO_{2\text{-e/annum}}$ (proposed), resulting in an increase of 2,437,970 t CO_2-e/annum or ~22% on current operations.

The Scope 3 emissions are due to the indirect emissions associated with combustion of the additional 1 Mtpa product coal by **end users**. Springvale Coal is not able to exercise influence over the Scope 3 emissions from combustion of the coal by the end user.

The modification's contribution to Australian emissions at 4,479 tonne CO_2-e/$_{annum}$ would be considered relatively small. Estimated annual Scope 1 emissions will represent approximately 0.0032% of NSW GHG emissions and 0.0008% of Australia's total GHG emissions.

Issue

Economic Benefits and Costs*. Claimed Estimated Economic Benefit Impact Differential for Employment benefit to local/regional community is +8 mil, NSW Government Royalties * 6 Mil, State taxes, Local Government rates (for Assumptions see Appendix 2 of Appendix F) is a minus - $0.5 mil Total economic benefit SSD 5594 (Base Case) Estimate of $269.2 million and (Proposed Case) SSD 5594 Mod 1 $282.7 mil, Impact Differential $13.5 mil.*

The Claimed Estimate of Economic Costs for Proposed Case is $120 mil Base Case $138 mil difference of an increase by $18 Mil. So the economic benefit of +13.5 mil falls very short of the claimed estimate of economic costs of $18 mil.

Response

Refer to **Appendix D** for a detailed response. In summary, the submission identifies an increase in economic costs of $18 million, however, there is actually a decrease of $18 million in economic costs due to the proposed modification. Table 5 in the Economic Impact Assessment (Appendix F of SEE) and Table 12 of SEE explain the composition of the net effects (benefit and cost) of the proposed modification.

(ii) Submitter ID 158871

This submitter's issues relate to the COSFLOW Groundwater Model developed by CSIRO for the Springvale and Angus Place Mine Extension Projects in 2013, and used for mine inflow predictions for the proposed modification.

Issue

The COSLOW model used by CSIRO (Adhikary and Wilkins 2013) [CSIRO (2013)] *which underlies the predictions made by Springvale and its consultants was not able to predict the degree of fracturing, consequent changes in hydraulic conductivity or impacts on groundwater inflow to and outflow from the swamps at the detailed local level required. An attempt was made to bracket the impacts using a number of judgmentally applied ramp functions, that is all.*

Response

The response provided below is from Section 2.6 of **Appendix C** under issue identified as *CMJEWELL_01)*. The response to the issue was prepared by Jacobs.

Jacobs Response

> For the SVMEP EIS (CSIRO, 2013) and the proposed modification (CSIRO, 2015), the COSFLOW (2013) Groundwater Model was run in flow mode only, and was not coupled with mechanical deformation. As noted in the SVMEP EIS, the ramp function adopted was initially derived from coupled flow and mechanical deformation simulations and represents the "state-of-the-art" in hydrogeological modelling, as it was based on measured extensometer responses.

Due to constraints in computation time, simulations presented in the SVMEP EIS and the proposed modification are based on COSFLOW run in flow mode only. As presented in the SVMEP EIS, the current revision of the calibration model (CSIRO, 2013) adjusted parameter values of the ramp function, the nature of which was developed using the coupled simulation, to achieve a satisfactory fit to observed inflows, pressure and water level. Details of the limitations of the current model calibration (CSIRO, 2013) are presented in the Groundwater Assessment for the SVMEP EIS (RPS, 2014a).

As part of the ongoing commitment to model review (six monthly), the suitability of the applied ramp function is also assessed as new monitoring data becomes available.

Issue

The apparent certainty and modelling precision presented in the SoEA are not justified.

Response

The response provided below is from Section 2.6 of **Appendix C** under issue identified as *CMJEWELL_02)*. The response to the issue was prepared by Jacobs.

Jacobs Response

It is acknowledged that the apparent accuracy to which predicted impacts are reported in the modelling report (0.001 m and 0.001 ML) may be seen as implying a level of accuracy that in reality is not realistic. This is not the intention. In many cases, reporting to three decimal places is the difference between reporting a null impact or reporting a predicted impact, albeit very small. In this regard the reporting to three decimal places should be regarded as erring on the side of caution.

Issue

Impacts on Swamps

Pells Consulting (2016) provides a detailed assessment of potential impacts on the THPS, and the Independent Expert Monitoring Panel (Galvin, Timms and McTaggart 2016) has identified a significant further issue with the COSFLOW modelling with regard to its prediction of displacement in lineament zones, which has the potential to result in serious under-estimation of impacts on THPS.

It has been noted that observed impacts on Carne West Swamp fall well outside the range predicted by the modelling.

In these circumstances, the Department should review the CoA applying to THPS impacts, and appropriately apply the precautionary principle, bearing in mind that damage to the THPS, once it has occurred, is irreversible.

In evaluating this Modification application and the accompanying Statement of Environmental Effects (SoEA), the Department should consider that there is substantially greater uncertainty as to the impact of the proposal on Temperate Highland Peat Swamps than is acknowledged in the SoEA.

This uncertainty arises from the complexity of the geological and hydrogeological systems concerned.

Response

The response provided below is from Section 2.6 of **Appendix C** under issue identified as *CMJEWELL_03)*. The response to the issue was prepared by Jacobs.

Jacobs Response

The IMP have provided their advice to DP&E and have recommended that the mining of LW419 be allowed subject to the implementation of their recommendations, which have already been adopted by Springvale Coal.

As noted in our response to issue *4nature_02*, *ColongFoundation_01*, and *CMJEWELL_01*, the water level trigger at Carne West is currently subject to investigation by Springvale Coal. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.

Springvale Coal do not support the premise that damage to THPSS is irreversible. In the event of significant impact, where natural recovery or self-healing is insufficient, rehabilitation and engineering measures can be implemented. Potential mechanisms for remediation of impacted swamps, if found to be required, are presented briefly in the SVMEP EIS (Golder Associates, 2014), and in detail in Section 3.1.14 and Section 3.1.18 of the Response to Submissions to SVMEP EIS, dated September 2014 available from the DPE website:

(http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

Rehabilitation works at East Wolgan Swamp, undertaken as described in detail in Section 3.1.14 and Section 3.1.18 noted above, have shown the rehabilitation works to be successful, and the vegetation cover within the swamp is starting to recover.

(iii) Submitter ID 158524

Issue

Independent experts have reported significant impacts to national heritage listed swamps due to mining in the extension area on Newnes Plateau, despite predictions of negligible impacts in previous EIS documents. As such, a proposed increase in production rates should not be approved as it may increase impacts to swamps. Furthermore, the conditions of the consent should be changed to ensure no further damage to endangered swamps, and remediation of existing damage to swamps.

Response

The Independent Monitoring Panel for LW419 Extraction Plan has noted that a trigger has occurred at the Carne West Swamp, reported in December 2015. This trigger is currently undergoing investigations and assessment. Schedule 3, Conditions 1 to 6 of Springvale Mine's consent provide performance and management measures for impacts on natural and heritage features. The outcomes of the investigations will be managed in accordance with these consent conditions.

Issue

Additionally, I believe Centennial Coal has lost its social licence to operate in the Greater Blue Mountains World Heritage Area after polluting rivers. Continued saline discharges into Cox's River from Springvale.

Response

Springvale Mine's consent allows discharge of mine water into Coxs River catchment. Refer to Schedule 4 Condition 12 of the consent SSD 5594. Springvale Mine's EPL 3607 allows discharge of up to 30 ML/day of mine water from LDP009 and up to 10 ML/day of mine water from LDP001.

(iv) Submitter ID 156875

Issue

I contend that every swamp that Springvale Coal has mined under has been seriously impacted by longwall mining cracking and subsidence, including Kangaroo Creek, Junction, Narrow, East Wolgan, upper Sunnyside, Sunnyside East, and Carne West Swamps.

Response

Monitoring of swamp piezometers located in the following Newnes Plateau swamps has not detected long term changes to swamp groundwater levels in response to mining related activities at the following shrub swamps:

- Junction Swamp
- West Wolgan Swamp
- Sunnyside West Swamp
- Sunnyside Swamp.

Subsidence effects to aspects of swamp hydrology have been noted at two swamps (Kangaroo Creek Swamp and East Wolgan Swamp). The investigations into these impacts have been discussed in detail previously, for example in the SVMEP EIS (Golder Associates, 2014), Corbett et al (2014), Appendix 16 of Response to Submissions on SVMEP EIS (pages 7 – 10), and Springvale Coal's Response to OEH Submission on the Preliminary Assessment Report on the Springvale Mine Extension Project, dated 16 July 2015, all available at DPE's website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594

Investigations at East Wolgan and Kangaroo Swamps identified a number of co-incident causal factors, which when combined with mine water discharge that occurred into these swamps, could result in similar impacts in other swamps being undermined. Detailed discussions on these causal factors are provided in for example, in Corbett et al (2014) and Springvale Coal's Response to OEH Submission on the Preliminary Assessment Report on the SVMEP noted above.

In both the East Wolgan and Kangaroo Creek Swamp cases extensive investigations by Springvale Coal have revealed that mine design was a primary causative factor, and the main factor over which Springvale Coal has management control. The ratio of longwall mining void width to depth of cover over mine workings was identified to be in the critical subsidence behaviour range. Following the investigations, the mine design was modified for all future proposed mining areas in the vicinity of Newnes Plateau Shrub Swamps to ensure that the ratio of longwall mining void width to depth of cover over mine workings was in the sub-critical subsidence behaviour range. Subsidence monitoring at Springvale over previously extracted longwalls of void widths 254 m to 315 m show that narrower sub-critical longwalls (LW1, LW401 – LW409, with void widths in the range 254 – 266 m) had significantly less subsidence than the wider, critical longwalls (LW410 – LW415 with void widths of 315 m)

In consultation with State and Commonwealth regulators, Springvale Coal altered the longwall geometry of the existing mine plan to reduce the void width of longwalls from LW416 (and subsequent approved longwall panels) from 315 m to 261 m and increase the chain pillar width from 45 m to 58 m. This mine design was approved in SSD 5594 consent on 21 September 2015 and under EPBC 2013/6881 approval on 15 October 2015.

Additionally, Schedule 3, Conditions 1 to 6 of Springvale Mine's consent provide performance and management measures for impacts on natural and heritage features. The outcomes of any investigations into greater impacts than approved performance measures will be managed in accordance with these consent conditions.

Issue

The report of the Independent Monitoring Panel (dated June 2016) states that Carne West Swamp shows evidence of longwall mining impacts, which occurred even before the swamp was directly undermined. I say that the same can be said for the next swamp to the west, which is Sunnyside East Swamp.

The Independent Monitoring Panel has stated the more (including different) monitoring of the swamps should occur, but I think that this has not gone far enough as continued damaging and then offsetting swamps is not the answer. Prevention of damage to swamps (e.g. by avoidance) is the only proper way to protect them from future mining damage.

Response

The water level trigger at Carne West Swamp was identified post-EIS and is currently subject to investigation and assessment. The triggers were investigated in accordance with the Trigger Action Response Plan (TARP) within the Temperate Highland Peat Swamps on Sandstone Monitoring and Management Plan (THPSS MMP) approved for LW415-417. The TARP has recently been revised (as relevant) within the Swamp Monitoring Program supporting the Extraction Plan for LW419. Outcomes of the ongoing investigations of the Carne West trigger will be addressed using management mechanisms provided in the Springvale Mine consent conditions, namely Schedule 3, Conditions 1 to 6.

Springvale Coal has taken on board the recommendations of the Independent Monitoring Panel, with the implementation of additional swamp monitoring, installation of soil moisture probes and the implementation of additional swamp vegetation monitoring using the Rapid Assessment Methodology.

The monitoring network within swamps overlying the Springvale mining area is as comprehensive as is required in Springvale Mine's consents and approvals, and as included in the relevant management plans.

The proposed modification will not result in impacts to swamps beyond that assessed in the SVMEP EIS and approved in SSD 5594. The mine plan at Springvale Mine has been designed to avoid as far as practicable, impacts to swamps.

Notwithstanding the above, Springvale Coal has commenced initiatives to improve the current understanding of swamp impact and mining interactions through ongoing investigations, and to upgrade the existing monitoring network and management plans as required. For example, Springvale Coal is undertaking extensive research into the interactions of longwall mining subsidence and effects to Newnes Plateau shrub swamps /THPSS. Gaining a good understanding of effects of mine subsidence to standing water levels measured using swamp and aquifer piezometers has evolved to a stage that, following baseline characterisation, the use of a Before-After-Control-Impact (BACI) design monitoring program has become possible.

Springvale Coal also use the Extochart Visual software (Corbett, Sheffield and Szwec, 2014), Corbett and Sheffield, 2015) used for presentation of time-scaled geological and geotechnical spatial information plotted against monitoring data results with factors which may influence strata behaviour (including depth of cover, surface topography, geological fault model). Information on impacts to natural features due to mining can be established with this software. The Extochart Viewer as of March 2016 supports functionality to separately or collectively analyse different data types:

- Underground extensometers
- Swamp piezometers
- Aquifer piezometer
- Subsidence lines
- Mine pumping data
- Rainfall data (CRD)
- Mining face positions.

The development of the Extochart Visual software is ongoing to further enhance its capability is establishing correlations between the different data types noted above. As noted above information on potential impacts to natural features due to mining can be established with this software, and adaptive management practices in mining operations implemented as relevant.

Issue

As it stands, the current mining methods are not meeting the so-called strict conditions of the consent, so increasing mine output using these same methods is only going to accelerate the damage that is currently occurring to the protected swamps.

Response

As noted in **Section 1.3** and Section 4.2.4 of the SEE the modification is not proposing to change the approved longwall mining technique or the approved mine plan to achieve the proposed increase in production. The proposed modification does not include any physical works or significant changes to the existing underground mining operations.

It is recognised that the increased coal production rate of up to 5.5 Mtpa will result in the predicted subsidence profiles (conventional subsidence, tilt and strain included in the SVMEP EIS (Golder Associates (2014), MSEC (2013)) developing quicker than if the coal production occurred at 4.5 Mtpa. However, the subsidence effects (subsidence, strain, tilt) predictions will not be influenced by the proposed increase in production rate, and will remain unchanged from the predictions approved in SSD 5594. Given that the subsidence effects will not change then impacts to the shrubs swamps and watercourses above the mining area will not change from those approved in SSD 5594. As noted in Section 4.2.2.3 of the Groundwater Assessment (Appendix I), subsidence effects in the near surface zone may lead to enhanced water-rock interaction, however, this has not been observed at Springvale Mine and therefore this process may not be significant with respect to water quality.

Schedule 3, Conditions 1 to 6 of Springvale Mine's consent provide performance and management measures for impacts on natural and heritage features, and management of greater than approved impacts. Outcomes of any investigations into any observed impacts to swamps and watercourses will be addressed in accordance with the consent conditions.

(v) Submitter 158428

Key issues from Submitter 158428 submission have been included below and responses provided.

Issue

The Independent Monitoring Panel (set up as part of the Extension approval) Report was recently released. The panel concluded that mining was directly damaging the swamps. Finally, even Centennial has conceded that they have caused irreparable damage to the swamps it has undermined.

And how has this report impacted the next panel LW419? It will go ahead as planned with more monitoring. More monitoring to prove that the swamps are DEAD. The Government should be ashamed of themselves.

Response

Springvale Coal acknowledges that the Independent Monitoring Panel (IMP) report of 9 June 2016 has raised a number of questions in relation to potential mining related impacts to swamps, and specifically relating to the distance and timing of impacts of swamps. Springvale Coal has commenced initiatives to improve the current understanding of swamp interactions through ongoing investigations, and to upgrade the existing monitoring network and management plans in alignment with the recommendations of the IMP.

The swamp monitoring recommended by the IMP n relation to Extraction Plan for LW419 has been implemented by Springvale Coal. These monitoring requirements comprised additional swamp monitoring, installation of soil moisture probes and implementation of additional swamp vegetation monitoring using the Rapid Assessment Methodology. Monitoring required under the EPBC Approval 2013/6881 has also been implemented.

Issue

In light of the IMP Report, the conclusion in the Executive Summary of the Mod1 report (paragraph below) is just not correct.

The justifications for this Modification do not out way the environmental damage that will continue to occur to the Newnes Plateau Shrub Swamps.

The conclusion in this statement is that Centennial denies any damage will occur, and if it does it will cease earlier.

Response

Conclusions included in the Executive Summary of the SEE supporting the modification application were based on conclusions drawn in the technical assessments prepared to assess the impacts of the proposed modification elements (refer **Section 1.1.2**) on the environment. The technical assessments have been prepared by qualified specialists with many years' experience preparing environmental impact assessments in their respective areas of expertise. The specialist consultants utilised for the modification assessments also undertook the assessments for the SVMEP EIS, and are very familiar with the Springvale Mine operations and the environment that the mine operates in.

The CSIRO scientists who provide the groundwater assessments (which form the basis of the groundwater impact assessments) for the mining operations at Springvale Mine have been working with the mine since 2003 (refer **Section 1.3**). Since that time they have also conducted extensive research (refer Adhikary and Wilkins (2012), Guo et al (2007a), Guo et al (2007b) in understanding the complex hydrogeological environment of Newnes Plateau which overlie the Lithgow Coal Seam that Springvale Mine and Angus Place Colliery.

The proposed modification does not propose impacts and environmental consequences relating to swamps, watercourses and discharges to the Coxs River catchment above that assessed in the SVMEP EIS and approved in SSD 5594. The subsidence and water resources assessments undertaken for the SVMEP EIS and additional assessments provided as part of the Response to Submissions were assessed by the relevant government agencies and Planning Assessment Commission (PAC). Numerous consultations were held between Centennial Coal representatives, government agencies and the PAC. Two PAC hearings were held. Strict performance criteria, for both the natural and heritage and built features, were subsequently established in the conditions of consent SSD 5594, as provided in Table 1 and Table 2 in Schedule 3 of the consent. Conditions 2 to 6 of Schedule 3 provide mechanisms for the management of greater than predicted impacts or performance measures as applicable on natural (including shrub swamps) and heritage features listed in Table 1.

The consent conditions also provide for adaptive management, required to be included in a Contingency Plan (Schedule 3 Condition 10(x)), where monitoring indicates an exceedance of any performance measure in Table 1 and Table 2. All management plans that support the LW419 Extraction Plan (Schedule 3 Condition 10) have included adaptive management provisions as part of the Trigger Action Response Plan.

4.0 REVISED STATEMENT OF COMMITMENTS

A revised Statement of Commitments for the modification has been provided in **Table 11.** The new commitments that have been included are shown in red.

Table 11 – Revised Statement of Commitments

Desired Outcome	Action
1. General	
Undertake all operations in a manner that will minimise the environmental impacts associated with the operation of Springvale Mine.	Operations will be undertaken in accordance with operations approved in the Springvale Mine Extension Project (SSD 5594) as modified. Following approval of the proposed modification the Mining Operations Plan will be updated to include the coal stockpile extension area and the associated drainage. A buffer of appropriate width will be incorporated within the expanded stockpile area on the periphery, and managed to ensure that the coal is not stockpiled in close proximity to the surrounding drainage system, and to ensure the stockpiled coal will be contained within the delineated area.
2. Hours of Operation	
Undertake all operations within the approved operating hours.	Operations will be undertaken 24 hours a day, 7 days a week.
3. Air Quality and Greenhouse Gas Emissions	
Minimise air quality impacts to the greatest extent possible. Minimise to the greatest extent practicable greenhouse gas emissions from Springvale Mine operations.	The air quality and greenhouse gas emissions impacts will be managed in accordance with the Centennial Coal's *Western Region Regional Air Quality and Greenhouse Gas Management Plan*
5. Groundwater and Surface Water Resources	
All surface water groundwater and aquatic impacts are minimised to the greatest extent possible.	The surface and groundwater management and monitoring will be managed in accordance with the Water Management Plans, Swamp Monitoring Program and Upper Coxs River Action and Management Plan, prepared in accordance with SSD 5594 consent conditions.
6. Ecology	
Ensure no impact on any threatened species or endangered ecological communities.	The following management practices will be implemented to limit potential impacts of the proposed clearing of non-native vegetation within the stockpile extension area upon surrounding ecological communities and associated flora and fauna species. • Areas of vegetation removal will be clearly demarcated to ensure clearing works are limited to areas within the site. • Appropriate sedimentation and erosion barriers will be installed along the interface between the site and surrounds to prevent indirect impacts to adjacent areas. • Washdown procedures will be employed for all equipment used during clearing operations, if leaving the site, to prevent the spread of weed species into surrounding vegetation.

Desired Outcome	Action
7. Cultural Heritage	
Ensure that identified and unidentified Aboriginal sites or items of significance are appropriately managed.	The following management practices will be implemented prior to and during the establishment of the stockpile extension area. • If unrecorded Aboriginal object/s are identified in the Project Area during works, then all works in the immediate area will cease and the area will be cordoned off. The area will be managed in accordance with the procedures outlined in Centennial Coal's *Western Holdings Aboriginal Cultural Heritage Management Plan 2014*. • In the unlikely event that skeletal remains are identified, work will cease immediately in the vicinity of the remains and the area will be cordoned off. Procedures outlined in Centennial Coal's *Western Holdings Aboriginal Cultural Heritage Management Plan 2014* will be followed. • If, during the course of development works, suspected historic cultural heritage material is uncovered, work will cease in that area immediately. The Heritage Branch, Office of Environment & Heritage (Enviroline 131 555) will be notified and works will only recommence when an approved management strategy has been developed.

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APPENDIX A

Summary of Groundwater Model Simulations

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Table A1 – CSIRO (2013), CSIRO (2015) and CSIRO (2016) Simulation Outputs from COSFLOW (2013) Numerical Groundwater Model

	CSIRO (2013) Simulation			CSIRO (2015) Simulation				CSIRO (2016) Simulation
COSFLOW (2013) Numerical Groundwater Model	CSIRO (2013) simulation of the groundwater model with Springvale Mine and Angus Place Colliery operating **concurrently**. Also referred to as the 'Basecase' simulation in the CSIRO (2013) report.			CSIRO (2015) simulation of the groundwater model with Springvale Mine and Angus Place Colliery operating **sequentially**, with Angus Place commencing extraction after Springvale completes extraction in approximately 2024. Also referred to as the 'SPRthenAPE' simulation in CSIRO (2015) report where SPR = Springvale and APE = Angus Place East longwall block (Longwalls proposed in the Angus Place Mine Extension Project EIS).				CSIRO (2016) simulation of the groundwater model for Springvale Mine and Angus Place Colliery operating sequentially, Also referred to as 'SPRthenAPE Plus' simulation in CSIRO (2016) letter report.
Where used	Springvale Mine Extension Project EIS (Golder Associates, 2014a)	Angus Place Mine Extension Project EIS (Golder Associates, 2014b)	Regional Water Quality Model (RPS, 2014b)	Regional Water Quality Model (Jacobs 2015a, b)	Springvale MOD 1 SEE (Centennial Coal, 2016a)	Springvale Water Treatment Project (GHD, 2016a)	Upper Coxs River Action and Monitoring Program (GHD, 2016b)	Springvale MOD 1 Response to Submissions (Centennial Coal, 2016b)
Production Limit	Springvale Mine at 4.5 Mtpa, Angus Place Colliery at 4 Mtpa			Springvale Mine at 5.5 Mtpa, Angus Place Colliery at 4 Mtpa				Springvale Mine at 5.5 Mtpa, Angus Place Colliery at 4 Mtpa
Longwalls included in groundwater model simulation	Springvale - existing mine workings and EIS proposed workings (LW416 – LW432, LW501 – LW503)	Angus Place - existing mine workings and EIS proposed workings (LW1001 – LW10019) plus LW910	Angus Place and Springvale mine plans in the EISs plus respective existing workings plus Angus Place LW910	Springvale existing workings plus extraction of LW415 – LW422, LW424 – LW432 Angus Place existing workings plus extraction of LW910, LW1001 – LW1016				Springvale existing workings plus extraction of LW415 –LW432, LW501 – LW503 Angus Place existing workings plus extraction of LW910, LW1001 – LW1016
Predicted mine inflows	Maximum 19 ML/day in 2022	Maximum 29 ML/day in 2026	Springvale maximum at 19 ML/day in 2022 Angus Place maximum at 29 ML/day in 2026	Springvale maximum of 19 ML/day in 2022 (full extraction) Angus Place maximum of 36 ML/day in 2030 (full extraction)				Springvale maximum of 19 ML/day in 2022 Angus Place maximum of 36 ML/day in 2031/2032
	Combined maximum mine flows of 45 ML/day in 2024 from both Springvale Mine and Angus Place Colliery operating concurrently.			Combined mine inflows of 25 ML/day in 2022 (Springvale full extraction (19 ML/day) plus Angus Place 'care & maintenance' (6 ML/day) scenarios) Note: The Angus Place 'care & maintenance' scenario mine inflows are only from the existing workings.				Combined mine inflows of 25 ML/day in 2022 (Springvale full extraction (19 ML/day) plus Angus Place 'care & maintenance' (6 ML/day) scenarios)

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APPENDIX B

List of Community Members Who Made Submissions

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Table B1 – List of Members of Community who made Submissions

Reference ID	Name	Reference ID	Name	Reference ID	Name	Reference ID	Name
159288	Atkinson, Valerie	159097	Haines, Joanne	158053	McKay, Meredith	159002	Smart, Phillip
158024	Baird, Ian	158043	Hanson, Robin	159062	Miller, Alison	157972	Smith, Harry
159103	Bennett, Sonia	158001	Harris, Ben	159089	Minard, David	159107	Sneddon, Kathleen
159130	Bidder, Timothy	157997	Harris, Matthew	157968	Morris Wieland, Annie	159060	Stevens, Brian
159054	Bilsland, Chris	159052	Harvey, David	157803	Muir, Keith	158730	Tanner, Ian
159095	Brownhill, Meredith	159030	Harvey, William	158018	Munro, Sharyn	159008	Thirwall, Mary
159016	Butler, David	158020	Hilder, Margaret	**156459	**Name Withheld	159122	Thompson, Beverley
159126	Carpenter, Tracey	159012	Holt, Michael	**158428	**Name Withheld	158996	Topp, Greg
159099	Chadwick, Jane	157976	Hong, Vera	**158516	**Name Withheld	159024	Tran, Lien
*158851	*Cluff, Robert	157978	Jarvis, Narelle	157981	Naughton, Merryl	158998	Upton, Bruce
157995	Corrigan, Sean	**158871	**Jewell, Chris	159111	Nichols, Sandra	159004	Upton, Donna
159120	Crawley, Joan	157985	Kilminister, Sue and Ian	159000	Olsen, Ian	**156875	**Valja, Andrew
159286	Daniel, Sarah	157993	Knox, Kelvin	**158524	**Pitt, Brendan	159018	Vendramini, Josie
159105	Davis, Tom	158022	Landwehr, Torsten	158045	Purcell, Kate	158014	Walters, Colin
159058	Drinkall, Peter	158016	Lee, Carolyn	158805	Quirk, Rod	159939	Wiedmann, Tommy

Reference ID	Name	Reference ID	Name	Reference ID	Name	Reference ID	Name
157974	Drinkwater, Fabienne	157987	Lee, Cindy	159068	Robens, John	158047	Williams, Jamie
159010	Ebersoll, Thomas	159026	Lollback, Yvonne	159022	Rossiter, Tania	*157966	*Williams, Paul
159093	Fisher, Malcolm	157989	Lyall, Leonie	158049	Scarano, Frances	159042	Zaitoun, Abdul
159014	Fu, Winnie	157991	MacDonald, Lachlan	*158143	*Schultz, Adam	159048	Baigent, Rob
159945	Gardner, John	157983	MacKenzie, Alexander	*157659	*Shields, Greg	**159032	**Stuart, Peter
159044	Green, Rhonda	159028	Matthew, Kate	158012	Sinclair, Lynette		

*Supports the proposed modification

** Individual contributions

APPENDIX C

Response to Submissions – Hydrological Issues

Jacobs

September 2016

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28 September 2016

Attention: Nagindar Singh
Springvale Coal Pty Ltd
PO Box 198
WALLERAWANG
NSW 2845

Project Name: Springvale Mine
Project Number: IA097101

Subject: SSD5594 Modification 1 - Response to Submissions (Groundwater and Surface Water)

Dear Nagindar

1. Introduction

This letter has been prepared in accordance with our proposal (IA097101/033a, dated 6 September 2016) seeking hydrological advice in response to submissions received to the Application to Modify Consent at Springvale Mine (SSD5594, Modification 1).

2. Hydrological Advice

There were several sets of submissions received on SSD5594, Modification 1. Hydrological advice is provided below in regard the relevant issues. This letter report addresses submissions pertaining to hydrological and hydrogeological aspects from:

- 4nature Inc. (Section 2.1)
- Blue Mountains Conservation Society Inc (Section 2.2)
- The Colong Foundation for Wilderness Ltd (Section 2.3)
- WaterNSW (Section 2.4)
- DPI Water (Section 2.5)
- CJM Jewell (Section 2.6)

The submissions from 4nature, Blue Mountains Conservation Society, The Colong Foundation for Wilderness and CJM Jewell make reference to a report prepared by Pells Consulting (2016). This report was not formally included with the 4nature, Blue Mountains Conservation Society, The Colong Foundation for Wilderness and CJM Jewell submissions, and a full response to that report has not been provided in this letter report. Jacobs has reviewed a copy of the report on behalf of Springvale Coal, and there are several matters raised that are not factually correct. Jacobs would be happy to present our review of the report, should it be decided to formally submit it, in particular the cross-sectional modelling that was undertaken.

2.1 Hydrological Issues Raised by 4Nature Inc.

4nature_01) The Centennial Coal proposal contends that the environmental effects on water quality are minimal or negligible because mine water discharges would not significantly increase contaminants above current levels. However current levels of discharge are causing pollution of the Coxs River. There is published scientific evidence that current levels of discharge have contaminant levels which are known to adversely affect stream dwelling biota. Current discharges do not adhere to the requirement of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 to maintain or improve water quality. Additional discharges arising from the mine extension would create additional pollution of the Coxs River.

Adverse affect on biota

It is noted that 4nature has not provided details of the published scientific evidence or references that support their claim that the current levels of discharges to Coxs River catchment have contaminant levels which are known to adversely affect stream dwelling biota.

Springvale mine discharge water contains low concentrations of ions and trace metals that occur naturally in groundwater and surface water. Toxicity testing of these mine discharges on the receiving environment below SV LDP009 within the Coxs River catchment was undertaken in 2014 using a suite of bioassays. The report was submitted to the Department of Planning and Environment (DPE) during the assessment stage of the Springvale Mine Extension Project as part of Response to Submissions Appendix 10, available at the DPE Website (http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594). The results suggested that LDP009 discharges were having an acute and chronic toxicity. This toxicity impact was observed to diminish with increasing distance downstream, with no adverse impacts identified in the upper portion of Lake Wallace or any points downstream. LDP009 toxicity was not attributed to any water quality parameters (ie. metals etc) in sufficient concentrations to produce the observed toxicity. The toxicity results were attributed to the flocculent agent being used and a review of the agent and dosing rates was recommended in order to reduce toxicity and associated impacts resulting from the discharge. More recent toxicity testing undertaken in 2015 showed that acute toxicity at LDP009 was reduced by changing the flocculant but chronic toxicity remained. Chronic toxicity was attributed to ionic imbalance, and that the concentration and/or ratio of ions are outside of the physiological tolerance range of the test organisms. Ecotoxicological analysis is on-going.

A recent ACARP report (ACARP, 2016) shows aquatic biota have tolerance to higher salinity than the current salinity trigger value for upland rivers in NSW set in the ANZECC and ARMCANZ (2000) guidelines. In the ACARP study a suite of acute and chronic tests were conducted using laboratory reared species and locally caught Leptophlebiidae (acute toxicity tests) to develop a species sensitivity distribution. The results showed that salinity of 800µS/cm in the Georges River and 900µS/cm in the Wollangambe River would afford 95% ecosystem protection. As presented in the Regional Water Quality Impact Assessment Model (RWQIAM) (Jacobs, 2015ab), the predicted median salinity in Lake Wallace is 532mg/L (781µS/cm) under approved discharge conditions and is 280mg/L (418µS/cm) under modelled null conditions.

Further, aquatic ecology monitoring results provide supporting evidence that the discharges from AP LDP001 and SV LDP009 are not adversely impacting the aquatic health of the Coxs River.

NorBE

As presented in the Surface Water Assessment (Jacobs, 2016b) for the Springvale MOD 1 *Statement of Environmental Effects* (SEE), there is no significant change in the rate of mine water discharge due to the modification, nor is there anticipated to be any significant change in water quality. The increased rate of mining proposed in the modification therefore, will not result in any significant change to the outcomes of water balance modelling undertaken for the Springvale Mine Extension Project (Jacobs, 2015ab), submitted to the Department of Planning and Environment during the assessment process (available under Additional Reviews and Information at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

The water discharges in the modification are consistent with that approved in Springvale Mine's consent SSD5594. As presented in our response to issue *WaterNSW_01* (Section 2.4), a simulation was prepared of the Regional Water Quality Impact Assessment Model (RWQIAM) (Jacobs, 2015ab) to investigate the impact of an insignificant change to mine water discharge to the Coxs River compared to that presented in the SVMEP EIS. As per the results presented in issue *WaterNSW_01*, there is negligible modelled change in median daily salinity in Lake Wallace and Lake Burragorang due to a difference in mine water discharge of 10L/s (0.86ML/d).

From **Table 2.1**, modelled median salinity in Lake Wallace is 523mg/L (781µS/cm) under approved discharge conditions (simulation WS1-S) and is 527mg/L (787µS/cm) in the approved discharge conditions plus 10L/s simulation (simulation WS2b-S-10). There is an increase of 4mg/L in median salinity, equivalent to an increase of less than 1%.

From **Table 2.2**, modelled median salinity in Lake Burragorang is 103mg/L (154µS/cm) under approved discharge conditions and is 103mg/L (154µS/cm) under approved conditions plus 10L/s simulation (simulation WS2b-S-10).

It is therefore considered that the modified project is consistent with the position put in the Springvale Mine Extension Project *Environmental Impact Statement* (SVMEP EIS) (Golder Associates, 2014), including subsequent work (Jacobs 2015ab) and as approved in SSD 5594, and continues to meet the neutral or beneficial effect criteria of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.

4nature_02) The Centennial Coal Summary of Environmental, Economic and Social Impact ignores the recent evidence from the Springvale Mine Independent Monitoring Panel that current mine operations have had significant impacts on the upland swamps listed as federally listed endangered ecological communities. Furthermore, the current monitoring regime for water flows through the swamps was found to be inadequate by the Springvale Mine Independent Monitoring Panel. Underground mining is demonstrably damaging groundwater that the upland swamps depend on, resulting in the permanent loss of the swamps and the loss of flows to creeks and waterfalls. Underground longwall panels for any mine extension must be reconfigured to avoid undermining the catchments of the upland swamps and creeks.

The mechanism for addressing higher than predicted impacts to Temperate Highland Peat Swamps on Sandstone (THPSS), as applicable, is specified in the Conditions of Consent for Springvale Mine (SSD5594), namely, Schedule 3 Conditions 1 to 6.

With respect to the proposed Modification to Consent, there is no expected change to predicted impacts to THPSS, associated with the increase in mining rate over that approved in SSD5594. This is discussed in detail in the Groundwater Assessment (Jacobs, 2016a), which relied on the

predictions from Springvale Mine and Angus Place Colliery's hydrogeological model (Adhikary and Wilkins, 2015). As discussed below (Section 2.5) the mine inflow predictions in Adhikary and Wilkins (2015) are consistent with the predictions included in Adhikary and Wilkins (2013), which supported the SVMEP EIS.

It is noted the swamp monitoring recommended by the Independent Monitoring Panel in relation to Extraction Plan for LW419 have been adopted by Springvale Coal and have either being implemented or in the process of being implemented, as per timeframes agreed with the DP&E. The Independent Monitoring Panel (IMP) monitoring requirements comprised additional swamp monitoring, installation of soil moisture probes, implementation of biodiversity monitoring using the Rapid Assessment Methodology. Monitoring required under the EPBC Approval 2013/6881 has also been implemented.

As noted in the Groundwater Assessment accompanying the modification SEE (Jacobs, 2016a), investigation is currently underway into a water level trigger that has occurred at Carne West Swamp. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.

2.2 Hydrological Issues Raised by Blue Mountains Conservation Society Inc.

BMCS_01) …This report is an important addition to the understanding of impacts of subsidence specifically from the Springvale Mine on swamps lying above or near the Springvale Mine area. This report's existence was known to the proponent and if it wasn't in existence when the consultants were engaged, it was known it would exist and be relevant given the IMP's role as defined in the Springvale Mine Expansion Project Conditions of Consent (2015) (Springvale Consent Conditions). The consultants could have identified its existence through their desktop level research or by merely reading the Springvale Consent Conditions. Those conditions state that the Independent Monitoring Panel (IMP)'s role included giving advice "…to the applicant and the Secretary of the Department of Planning and Environment (DPE) regarding the collection of relevant data to predict and monitor the potential subsidence impacts and environmental consequences of second workings*" [Schedule 4, condition 11(a)].*

*The IMP Report concentrated on what was causing the damage to Carne West swamp In the Springvale mining area which it reported was" ...the very significant drop in the water level of Came West Swamp and the cessation of flow in the watercourse through this swamp, with consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp" [IMP Report, p.2]. "*These change began to be detected when mining was up to 700 m away, well outside the impact zone predicted in the EIS for mining in this region of Springvale Mine.*" [IMP Report p.2] "*It appears to the Panel on the basis of the information provided to it that this swamp (Carne West) may have started to be impacted by mining at around July 2013.*" (IMP Report p.7) The IMP concluded that the likely cause was mining causing far field movement. They comment that while the EIS "*...acknowledged the occurrence of far field movements, apparently these have not been measured in any detail to date at Springvale Mine. Based on behaviour in the southem Coalfield, reported in the EIS, these movements can be quite substantial (up to 100mm at a distance 700m from the edge of a Iongwall panel.)*" [IMP Report p.5].*

Impact Identified by IMP Report but not assessed in EIS DPE has included much of the IMP's advice in its approval of the extraction plan for Longwall 149 (LW419) under the Springvale Consent Conditions. The IMP's Report concluded that impacts occurred which were not assessed in the EIS process for the determination of the Springvale Mine Expansion Project. The proposed modification (increasing coal production) will affect the whole of Springvale Mine

Expansion Project (MEP) area. It is not, for instance, a modification to increase the area of the consent. The swamps within the MEP are listed as endangered ecological communities under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and at the state level the Newnes Plateau Shrub Swamps are declared as endangered ecological communities under the Threatened Species Conservation Act 1995. These should be taken into account in considering the environmental impacts of the modification under s.79c and conditions imposed to ensure this damage does not recur or continue.

The mechanism for addressing higher than predicted impacts to Temperate Highland Peat Swamps on Sandstone (THPSS), as applicable, is specified in the Springvale Mine's Conditions of Consent, namely Schedule 3 Conditions 1 to 6.

As discussed above, with respect to the proposed Modification to Consent, there is no expected change to predicted impacts to THPSS, associated with the increase in mining rate, over that discussed in the SVMEP EIS. Hence, the expected environmental consequences are as approved in SSD5594.

The process for evaluation of Extraction Plans has changed, with the appointment of an IMP to provide advice *"…to the applicant and the Secretary of the Department of Planning and Environment (DPE) regarding the collection of relevant data to predict and monitor the potential subsidence impacts and environmental consequences of second workings"*. Review of Extraction Plans has always been undertaken. The new approach adopted by government provides greater transparency to the process of evaluation, with publication of the advice of the IMP accompanying the determination by the Department of Planning and Environment.

It is highlighted that the role of the IMP, as quoted in issue *BMCS_01*, is to provide advice on the adequacy of monitoring to support the predictions presented during the EIS. The predictions of impacts were assessed by the Planning Assessment Committee at the time of the EIS and strict performance criteria were subsequently established in the Conditions of Consent, SSD5594.

As addressed in our response to issue *4nature_02*, Springvale Coal has taken on board the recommendations of the IMP, with the implementation of additional swamp monitoring, installation of soil moisture probes, implementation of biodiversity monitoring using the Rapid Assessment Methodology, revised management plans, and ongoing programmes of investigation.

BMCS_02) Comprehensive and targeted data is going to be important to the IMP's future reports. The IMP has been critical of the existing monitoring in place and has recommended additional monitoring equipment be put in place as soon as possible in relation to Carne West swamp damage, particularly to identify far field movement. [IMP Report pp7-8]

The IMP Report suggests that the current monitoring data is not the "robust monitoring" claimed by the SEE eg at p.137. For instance, the IMP has stated as follows:

- *there appears to be no baseline data for Carne West before it was impacted by mining [IMP Report p.7];*
- *"the existing monitoring program has been restricted and limited across lineament zones" p.5*
- *There is a lack of groundwater monitoring in swamps. The current monitoring regime is inadequate (p.6)*
- *Lack of knowledge and sufficient monitoring p.5*

- *There is no measurement of far field movements [p.5]*
- *Lack of soil moisture monitoring is unacceptable [p.7];*
- *No information available to the panel on the status of soil moisture monitoring since July 2013 at sites of relevance to assessing the impacts of mining at Springvale Mine" [p.7];*
- *"there is currently a knowledge gap in the status and dynamics of moisture content in the top 1 — 1 .5m of the substrate of the swamps, with the most critical gap being in the 0.0 to 0.5m zone, which is the zone of greatest biological activity" [p.7];*
- *Flow monitoring maybe be too Iate for Carne West (p.8)*

This situation needs to be rectified for future swamps and accelerating the extraction rate may undermine the ability of getting appropriate monitoring in place and providing the data in time for the next extraction plan's approval.

Monitoring of groundwater level commenced at Carne West in May 2005 (RPS, 2014a). Monitoring of flow within Carne West commenced in December 2004 (RPS, 2014b). Monitoring commenced at Carne West well before the potential for impact from mining due to its earlier use as a reference / control swamp.

The monitoring network within swamps is as comprehensive as was permitted, in part, due to restrictions placed by the Department of Environment (DoE), understandably, to reduce the impacts of installation of permanent monitoring stations (such as weirs to measure flow) on the THPSS, as well as the impact of regular visitation to download data and obtain grab samples of water quality. Given that several THPSS are associated with the presence of lineaments, this is the reason why monitoring does not exist at these locations.

The potential for far field movements is a view put by the IMP that is not necessarily agreed with by Springvale Coal; however, as per the outcome of interaction with the IMP, monitoring of far field movements has been established.

As discussed in response to issue *4nature_02*, Springvale Coal have engaged with the IMP and have taken on board their recommendations through the implementation of additional groundwater level and soil moisture monitoring within Carne West Swamp, Gang Gang South West and Gang Gang East Swamps; as well as incorporating recommended additions to the Water Management and Biodiversity Management Plans and the Swamp Monitoring Program.

BMCS_03) The consent authority also needs to take into account the Sydney Drinking Water State Environmental Planning Policy. The mine discharge to the Coxs River will not have a neutral or beneficial impact on Sydney's drinking water supply. A river flowing through world heritage area and into a major drinking water supply should not be used as a place to dump toxic mining waste. Sydney has cleaned up the discharging of industrial waste into its rivers such as Parramatta, Georges and Cooks Rivers. The same principle should apply to a significant asset to the functioning of the greater Sydney area, its drinking water supply.

NorBE

As presented in the Surface Water Assessment (Jacobs, 2016b), there is no significant change in the rate of mine water discharge due to the modification, and the modification will not significantly change the outcomes of water balance modelling undertaken for the SVMEP EIS and work undertaken during the assessment stage of the EIS (Jacobs, 2015ab). Therefore, the modification is consistent with the EIS with respect to the neutral or beneficial effect criteria.

As noted in the response to issue *4nature_01*, a simulation incorporating an increase in mine water discharge by 1ML/d to test the sensitivity of insignificant changes in mine inflow rate implies no significant change in predicted median salinity in Lake Wallace and Lake Burragorang.

Toxic mine waste

Mine water discharge to the Coxs River is not "toxic mining waste", it is groundwater that was, in the long term, originally sourced from the Coxs River catchment. The increase in salt content (major ions) compared to surface water quality is due to water-rock interaction, as groundwater flows through the Permian Coal Measures.

As put in the SVMEP EIS (Golder Associates, 2014), the water quality of mine water discharge meets the Australian Drinking Water Guideline, with the exception of salinity. As noted in the EIS, drinking water with a salinity (as TDS) of between 600 and 900mg/L is considered to be fair quality drinking water. It is highlighted that the guidance value for salinity in the Australian Drinking Water Guideline is an aesthetic-based value and not a health-based value.

As per our response provided to issue *4nature_01*, a toxicology assessment has found that Springvale LDP009 discharge water did not contain any parameters in sufficient concentrations that would be toxic to the local ecology and it was considered the flocculent that was added to reduce the total sediment suspended may have been the cause. As noted previously, the observed acute toxicity observed in LDP009 discharges were reduced when the floccculant was changed. As also noted above, the ecotoxicological testing undertaken in the Coxs River catchment in 2014 showed that toxicity was ameliorated as the discharge entered the Coxs River, with a decreasing trend in toxicity with increasing distance downstream of LDP009. No adverse impacts were detected in the sample taken from the upper portion of Lake Wallace or any other points downstream. Ecotoxicological analysis is on-going.

2.3 Hydrological Issues Raised by The Colong Foundation for Wilderness Ltd.

ColongFoundation_01) …Further, the 2014 EIS omits advice or consideration of the mine's impacts as a consequence of longwall mining on the waterfall below Carne West Swamp and a 25 metre tall waterfall below Gang Gang Swamps that lie in the project area. As the Department is aware, the Carne West waterfall no longer flows due to longwall impacts on groundwater and that undermining the Gang Gang Swamps will terminate flows over a waterfall downstream. The September 2015 approval does not address these waterfalls omitted from the EIS. If nothing is done to prevent the loss of flows to a large waterfall downstream of the Gang Gang Swamps, the Department would be condoning such serious omissions.

The proposed Modification to Consent will not result in any significant impacts on swamps and watercourses over and above those presented in the SVMEP EIS and approved in SSD5594. The subsidence impacts predicted in MSEC (2013) will not change due to the increased coal production rate. The mine inflows and baseflows, as presented in Adhikary and Wilkins (2015), Adhikary (2016) (refer **Section 2.5**) are consistent with the mine inflows and baseflows presented in Adhikary and Wilkins (2013) supporting the SVMEP and approved in SSD5594.

As part of the Conditions of Consent, Table 1 (Schedule 3, Condition 1) presents the Subsidence Impact Performance Measures – Natural and Heritage Features, etc. In regard to the watercourse below Gang Gang Swamp South West and Gang Gang Swamp East, the performance standard is "No greater subsidence impacts or environmental consequences than predicted in the EIS".

As acknowledged in the Groundwater Assessment accompanying the proposed Modification to Consent (Jacobs, 2016a), investigation is currently underway into a water level trigger that has occurred at Carne West Swamp. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.

ColongFoundation_02) In relation to mine water transfer - Appendix I on ground water and J on surface water, including a water and salt balance, bring the consideration of the neutrality and beneficial effect matters into the frame of this modification proposal. The water volumes and salt balance are relevant to the protection of the Coxs River. The SEPP (Sydney Drinking Water Catchment) 2011 is considered in the main volume of the statement of environmental effects on page 50.

NorBE

As discussed in response to issue *4nature_01* and *BMCS_03*, the proposed modification will not result in any significant additional discharge or salinity to that assessed in the SVMEP EIS and approved in SSD5594. It is therefore considered that the modified project will be consistent with the position put in the SVMEP EIS (Golder Associates, 2014), including subsequent work and as approved in SSD 5594, and continues to meet the neutral or beneficial effect criteria of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 at Lake Burragorang.

ColongFoundation_03) The groundwater modelling presented in Appendix I is relevant to the protection of upland swamps, bringing in these considerations for review by the Department and the determining authority.

Schedule 3, Condition 4 and 5 of the Conditions of Consent present the mechanism for addressing impacts greater than “negligible environmental consequences” to Sunnyside East, Carne West, Gang Gang South West, Gang Gang East, Pine, Pine Upper, Paddys, Marrangaroo Creek Upper Swamp.

As per our response to issue *ColongFoundation_01*, as acknowledged in the Groundwater Assessment accompanying the proposed Modification to Consent (Jacobs, 2016a), investigation is currently underway into a water level trigger that has occurred at Carne West Swamp.

ColongFoundation_04) In relation to swamps - Section 9 of Volume 1 of the statement of environmental effects considers the swamps that are described as ground water dependent ecosystems. Table 34 of the statement wrongly concludes negligible impacts on Newnes Plateau swamps and also on streams.

Table 34 of Jacobs (2016a) refers to additional impacts that are attributable to the proposed Modification, over and above those that will occur as a result of the existing approved mining operations. Given that no additional subsidence or significantly increased water take will occur as a result of the Modification, Table 34 of Jacobs (2016a) is correct in concluding that the additional impacts will be negligible.

ColongFoundation_05) The V-notch weir that used to measure flows from Junction Swamp was removed when flows ceased. Yet the Centennial Coal 2014 EIS states, “no water level changes that can be attributed to longwall mining have been observed” (2014 EIS, Appendix E, on page 75). Centennial describes all previously undermined swamps at Springvale by a euphemism - ‘rainfall-dependent swamps’, alias ‘Type A’ swamps, and these swamps are

claimed to not have experienced groundwater impacts (see Pells, 2015, page 27, Figure 22). The Colong Foundation believes this is incorrect. The Colong Foundation considers that near-surface groundwater below swamps falls five to ten metres when longwall mining passes under Newnes Plateau swamps, the groundwater available to the swamps is then irreversibly reduced. The swamps cease being groundwater dependent swamps and become 'rainfall dependent'. The nationally endangered ecological community is destroyed. The groundwater dependent vegetation slowly dies, and is ultimately replaced by dry land vegetation. The 'rainfall dependent' swamps are then prone to destruction by bushfires that will…

Long term monitoring at Springvale has shown that swamps away from the influence of mining can transition for being permanently water logged to being periodically water logged (rainfall dependent) under prevailing dry conditions. This is the case with reference swamps that display the same responses as those observed at impact swamps.

Under conventional subsidence impacts, groundwater supply to swamps is not irreversibly reduced. The water table is lowered due to the increased storage available resulting from bed separation and fracture dilation. There is no net loss of water from the system. Shallow groundwater monitoring at Springvale shows the aquifer to respond to the medium term climatic trends (i.e. months to years, as opposed to days/weeks) indicating that there is an element of rainfall recharge occurring. Once this recharge meets the increased storage the system will be re-equilibrated and function as it did prior to the subsidence event.

In the event of unconventional subsidence, where there may be a loss of water from the system through fracturing or dilation of lineaments, there is the likelihood that these fractures will be self-healing, or if not, can be sealed by grouting. Potential mechanisms for remediation of impacted swamps, if found to be required, are presented briefly in the SVMEP EIS (Golder Associates, 2014), and in detail in Section 3.1.14 and Section 3.1.18 of the Response to Submissions to SVMEP EIS, dated September 2014, available from the DP&E website (http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594). Rehabilitation works at East Wolgan Swamp, undertaken as described in detail in Section 3.1.14 and Section 3.1.18, noted above, have shown the rehabilitation works to be successful and the vegetation cover within the swamp is starting to recover.

ColongFoundation_06) The Planning Assessment Commission reported on confusion and uncertainty regarding swamp impacts. A Commission report further states 'However, the Commission believes that there also needs to be a focus on the avoidance or mitigation of damage to swamps, as well as adaptive management measures, in order to deal with the various uncertainties around subsidence-related impacts on swamps' (page 6, 2015). The Commission's belief should be now translated into amended consent conditions that protect swamps from being undermined. This would correct the misleading statements in and wilful omissions of waterfalls from the 2014 EIS, as well as new information by experts that point to other errors in the 2014 EIS in relation to swamp impacts.

With respect to the potential impact to downstream watercourses, please refer to our response provided to issue *ColongFoundation_01*.

In regard to impacts outside of that predicted in the SVMEP EIS, as presented in our response to issue *ColongFoundation_03*, the mechanism for addressing greater than "negligible environmental consequences" is specified in the SSD 5594 Conditions of Consent. The consent conditions also provides for adaptive management, required to be included in a Contingency Plan (Schedule 3 Condition 10(x), where monitoring indicates an exceedance of any performance measure in Table 1 (Performance Measures – Natural and Heritage Features) and Table 2 (Performance Measures – Built Features). All management plans that support the

LW419 Extraction Plan (Schedule 3 Condition 10) have included adaptive management provisions as part of the TARP.

The proposed modification, as presented in the Groundwater Assessment and Surface Water Assessment (Jacobs, 2016ab) will not result in a change to impacts presented in the SVMEP EIS and approved in SSD5594.

ColongFoundation_07) Two expert reports now question the negligible impact claims made by Centennial Coal in the 2014 EIS (repeated in the Statement of Environmental Effects) that have led to the Commission's uncertainties referred to above. The Independent Monitoring Panel established to advise on swamp health in relation to SSD 5594 operations reported in June 2016 on 'the very significant drop in the water level of Carne West Swamp and the cessation of flow in the stream through this swamp, with the consequential drying out of the swamp and loss of the waterfall at the downstream end of the swamp. These changes begun to be detected when the mining was up to 700 metres away, well outside the impact zone predicted in the environmental impact statement (EIS) for mining in this region of the Springvale mine' (page 2 of the report, June 9, 2016).

The water level trigger at Carne West Swamp was identified post-EIS and is currently subject to investigation and assessment, as per the Water Management Plan for the Springvale site. Springvale Coal has confirmed that the observed decline in water levels at CW1 and CW2 piezometers within Carne West Swamp commenced at a time when the nearest longwall mining was in excess of 700 m from the piezometers. However, Springvale Coal contends if changes to water levels at CW1 and CW2 piezometers are related to mine subsidence, they are without known precedent. Changes to groundwater levels known to be caused by mine subsidence at Kangaroo Creek Swamp occurred at the time when the longwall passed under the piezometer (at an angle of draw (AoD) of zero degrees). In the case of Sunnyside Swamp (which has four piezometers displaying permanently waterlogged behaviour), where longwall mining was conducted on both sides of the swamp at an AoD of less than 26.5 degrees, there was no change to groundwater behaviour in response to mining. Detailed discussions of the previous mining related impacts on undermined swamps are provided, for example, in the SVMEP EIS (Golder Associates, 2014), Corbett et. al. (2014), and Springvale Coal's response to OEH Submission on the Preliminary Assessment Report on the Springvale Mine Extension Project, dated 16 July 2015, available at DPE's website, (http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

Further analysis is required to determine if the changes to water levels in Carne West Swamp are related to mine subsidence or the decline observed in the regional groundwater table aquifer, which appears to be a delayed response to longer term climatic influences. Detailed spatial and temporal analysis of all relevant geological, topographic, mine subsidence, groundwater, rainfall and underground monitoring data is being undertaken to elucidate the cause of the changes in groundwater behaviour patterns at CW1 and CW2 piezometers.

Notwithstanding the above, the outcomes of the investigations on Carne West trigger will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.

As noted in our response to issue *4nature_02*, Springvale Coal have commenced initiatives to improve the current understanding of swamp interactions through ongoing investigations, and to upgrade the existing monitoring network and management plans in alignment with the recommendations of the IMP.

ColongFoundation_08) …Furthermore, according to the Independent Expert Panel, 'it is now concluded by Centennial Coal that mine subsidence interactions with lineament fault zones at Springvale mine do appear to impact standing water levels well outside the designed buffer zone (defined by a 26.5 degree angle of draw or a 20mm vertical subsidence contour, whichever produces the widest buffer) and, furthermore, these water levels do not fully recover. In some cases, the impacts extended for more than three times the width of the designed buffer zone' (page 2).

The problem arises now that the mine is having and has had impacts outside the mine project area since it began operations and that these impacts have not been subjected to environmental assessment. Review consent conditions to protect these significant environmental values is justified by the fact that swamp impacts haven't been and will never be 'negligible', further unassessed impacts are occurring and have occurred outside the project area, and the waterfalls mentioned above were not considered in the 2014 EIS despite being in the project area. The expert identified far field impacts outside the project area are not permitted by the development consent. Technically the consent has been and will remain invalid, and required immediate correction to protect the environment.

The abovementioned views of the Independent Monitoring Panel are confirmed by Pells Consulting (2015) in its report to the Colong Foundation and the Blue Mountains Conservation Society regarding the Impacts from coal mining at the Springvale Colliery on the temperate highland peat swamps of Newnes Plateau *report.*

The Pells report confirms that dramatic swamp impacts from future mining are irreparable. Pells Consulting believes mining will slowly change swamps, drying them out and this will be reflected in changes to swamp ecology. Mine dewatering will also ultimately affect swamps, but it is not known by when, and by how much. These findings are consistent with longwall mining being a key threatening process to these nationally endangered swamps, but directly contradict Centennial Coal's negligible impacts claim. The Pells report states that the theory used by Centennial to justify the claim of minor swamp impacts is based on an assumption that is not supported by measurement.

Swamp monitoring and offsets are all very well, but they do not fix errors in the consent that will cause unexpected damage national heritage listed swamps or ensure flows over waterfalls. Centennial's proposed offsets for Newnes swamps are on private land in the Blue Mountains across many parcels of land and are not like-for-like offsets. Such offsets are already protected in Environmental Protection zones 2 and 3. Protection of protected swamps can in no way compensate for the damage to the public interest from loss of swamps on public forests within the Gardens of Stone Sage 2 reserve proposal.

These deficiencies were foreseen by the Planning Assessment Commission who stated that in its determination report that 'the role of the Independent Monitoring Panel should be more clearly defined, as well as broadened to enable greater focus on avoidance and minimisation of swamp impacts, and adoptive management measurers' (my emphasis). These broader powers for the Independent Panel were not included into the consent, but while that may be the case, there remains a need to adapt the consent to protect Newnes Plateau swamps from longwall mining.

It is immaterial to a swamp or waterfall whether the responsibility falls to the Planning Assessment Commission, Department of Planning and Environment or the Independent Monitoring Panel to adapt the consent. Given the modification for determination, it would be appropriate for the Planning Assessment Commission to amend the development consent to protect swamps and the waterfall by placing protection zones over and around them.

As acknowledged in the Groundwater Assessment accompanying the proposed Modification to Consent, the trigger level investigation at Carne West is currently underway. The outcomes of the investigations on the Carne West trigger will be managed in accordance with the SSD5594 consent conditions (Schedule 3 Conditions 1 to 6), within the specified timeframes stipulated.

As presented in our response to issue *ColongFoundation_01* and *ColongFoundation_03*, the Conditions of Consent for SSD5594 is explicit in its presentation of the mechanism for addressing 'greater than negligible environmental consequences' to swamps and downstream watercourses, which was the position put in the SVMEP EIS by Springvale Coal, based on data, modelling, and understanding of interaction between of groundwater behaviour and mine subsidence at the time.

Reference is made to work undertaken by Pells Consulting (2016) on behalf of The Colong Foundation and the Blue Mountains Conservation Society. Springvale Coal have received a copy of this report, however, the report was not formally included in the submission from The Colong Foundation and the Blue Mountains Conservation Society. There are several matters raised in the report by Pells Consulting (2016) that are not factually correct. Jacobs would be happy to present their review comments on the report, should it be decided to formally submit it.

With regard to the IMP, Springvale Coal has adopted the IMP's recommendations of increased monitoring and management, with respect to LW419, and will do the same for LW420 to 422, as per the current Conditions of Consent. In regard to the proposed Modification to Consent (Jacobs, 2016a), the increase in mining rate has been shown to not lead to additional impacts outside of that presented in the SVMEP EIS and approved in SSD5594. The mechanism for addressing impacts that are not consistent with that presented in the SVMEP EIS, are specified in the current consent, as discussed above. Additionally, as required by Schedule 3 Condition 10(x) adaptive management provisions with the respective TARPs have been included in all management plans that support the LW419 Extraction Plan (and subsequent extraction plans).

ColongFoundation09) Connell Wagner, Centennial consultant observed that Junction Swamp was damaged by longwall mining in 2005. The swamp has lost groundwater and surface flows, but nine years later, other Centennial consultants claimed in the 2014 EIS that no damage had occurred to the same swamp. The swamp, Junction Swamp, is now effectively non-existent.

Section 2.6.2.6 of the SVMEP EIS (Golder Associates, 2014) shows hydrographs (refer Figure 2.19) of the swamp piezometers installed at Junction Swamp together with the time of longwall mining beneath the piezometers and the cumulative rainfall deviation. This swamp was undermined directly by two adjacent longwalls (LW408 in May 2003 and LW409 in April 2004). There is a very strong correlation between the trend lines of standing water levels beneath the swamp and the cumulative rainfall deviation trend line for all swamp piezometers over the more than eleven years of monitoring at this location. These data indicate that the swamp is periodically waterlogged (standing water levels respond to rainfall). The data also indicate that there have been no significant impacts to swamp hydrology in response to longwall mining (standing water levels are similar to pre-mining levels).

The Connell Wagner report (Aurecon, 2009) notes the erosional and flora dieback impacts at Junction Swamp were caused by changes to swamp hydrology related to mine water discharge and were not related to subsidence. Springvale Coal has not discharged any mine water via emergency discharge points LDP004 and LDP005 since April 2010. There is no plan to discharge mine water on Newnes Plateau in the future.

The impacts on Junction Swamp was discussed in Section 3.1.14 of the SVMEP Response to Submissions and on page 10 of 'Centennial's Response to OEH Comments on PAR_16 July 2015'. Both of these documents are available at the DPE website.

2.4 Hydrological Issues Raised by WaterNSW

WaterNSW_01) The updated modelling results with the increased mining rate at Springvale Mine indicate a minor increase in mine water (10L/s or 0.86 ML/day) to underground workings. This increase is predicted not to lead to changes in quality of mine water discharges to Sawyers Swamp Creek. However, no data on water quality has been provided with the SEE or Appendices to substantiate this prediction.

Mine dewatering will ultimately access the same groundwater from storage irrespective of rate of mining – therefore an increased rate of mining will have no net change on the quality of the produced groundwater that was assessed in the SVMEP EIS.

For the purpose of completeness, a change in mine water discharge of 10L/s (0.86ML/d) was tested in the RWQIAM (Jacobs, 2015ab) with respect to the sequential mine implementation simulation, and compared with results presented in Jacobs (2015a) for Lake Burragorang. The test involved increasing the mine water discharge flow rate from the time-series presented in Jacobs (2015a) by 1ML/d to test the sensitivity of model predictions to minor changes in mine inflow rate. **Table 2.1** presents the outcome of prediction simulations at Lake Wallace (#074), which is equivalent to Table 3.34 of Jacobs (2015a). **Table 2.2** presents the outcome of prediction simulations at Lake Burragorang (#280), which is equivalent to Table 3.40 of Jacobs (2015a). The model control file associated with this simulation is 033a_UNC-WS2b-S_10_01a.gsm.

The Jacobs (2015a) report is available at the DPE website (under Additional Reviews and Information, http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

Table 2.1 : Prediction Daily Statistics at #074 (Lake Wallace) (adapted from Table 3.34 of Jacobs (2015a))

Percentile	Salinity (mg/L)				
	OBSERVED	NUL[1]	WS1[1]	WS1-S[1]	WS2b-S-10[1]
Minimum	218	140	121	122	121
5%	398	197	279	268	271
10%	402	209	351	324	328
20%	436	239	427	411	415
50%	519	280	540	523	527
80%	603	327	622	611	615
90%	637	354	655	648	652
95%	754	374	688	670	674
Maximum	771	427	732	746	748

Note 1. *NUL* is Null Case, *WS1* is Water Strategy 1 and comprised concurrent development of Angus Place Mine Extension Project (APMEP) and SVMEP, *WS1-S* is the sequential development of APMEP and SVMEP, *WS2b-S-10* is simulation WS1-S plus 10L/s.

Table 2.2 : Prediction Daily Statistics at #280 (Lake Burragorang) (adapted from Table 3.40 of Jacobs (2015a))

Percentile	Salinity (mg/L)				
	OBSERVED	NUL[1]	WS1[1]	WS1-S[1]	WS2b-S-10[1]
Minimum	n/a	87	89	89	89
5%	n/a	90	92	92	92
10%	n/a	91	93	93	93
20%	n/a	94	97	97	97
50%	n/a	98	104	103	103
80%	n/a	99	107	105	106
90%	n/a	101	107	107	107
95%	n/a	101	109	108	108
Maximum	n/a	102	112	109	110

Note 1. *NUL* is Null Case, *WS1* is Water Strategy 1 and comprised concurrent development of Angus Place Mine Extension Project (APMEP) and SVMEP, *WS1-S* is the sequential development of APMEP and SVMEP, *WS2b-S-10* is simulation WS1-S plus 10L/s.

From **Table 2.1**, modelled median salinity in Lake Wallace is 523mg/L (781µS/cm) under sequential implementation discharge conditions (simulation WS1-S) and is 527mg/L (787µS/cm) in the sequential implementation discharge conditions plus 10L/s simulation (simulation WS2b-S-10). There is an increase of 4mg/L in median salinity, equivalent to an increase of less than 1%.

From **Table 2.2**, median predicted salinity in the 'WS2b-S plus 10L/s' scenario is 103mg/L and is 103mg/L in the original prediction 'WS1-S'. As noted in Jacobs (2015a), all water strategy simulations have consistent results below Lake Wallace. The predicted maximum salinity at 110mg/L in the 'WS2b-S plus 10L/s' simulation is 1mg/L higher than the original simulation, being 109mg/L, an increase of less than 1%.

It is therefore considered that the modified project is consistent with the position put in the SVMEP EIS, including subsequent work and as approved in SSD5594, and continues to meet the neutral or beneficial effect criteria of the State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011.

2.5 Hydrological Issues Raised by NSW DPI Water

NSWDPI_01) There are issues concerning comparisons of outcomes between the 2013 and 2015 versions of the numerical groundwater model (NGM). The proponent should present a NGM reflective of the one used in 2013 and thus representing all of the approved mine footprint, together with an amended application document for the Modification.

Note: Additional clarification provided by DPI Water on this issue as follows:

DPI Water does not regard the differences between the mine inflow predictions with (CSIRO (2013) and without (CSIRO 2015) all approved longwalls at Springvale Mine as "not consequential" but rather they could be possibly substantial, however, they cannot be correctly evaluated at this time.

As presented in the Groundwater Assessment accompanying the Modification to Consent (Jacobs, 2016a), the "Basecase" model run is that presented in the SVMEP EIS (underpinned by Adhikary and Wilkins (2013) predictions) and was not re-run in the revised model referred to as 'SPRthenAPE' (Adhikary and Wilkins, 2015)). The "Basecase" scenario represents the approved inflows in SSD5594 and impacts against which the modification should be assessed. The "Basecase" encompassed concurrent implementation of Springvale Mine Extension Project and the Angus Place Mine Extension Project (refer to Section 4.2.2 of Jacobs (2016a)), and the production limit for Springvale was 4.5 Mtpa. The 'SPRthenAPE' (Adhikary and Wilkins, 2015) simulation shown in Figure 4.3 of Jacobs (2016a) represent mine inflow predictions to Springvale Mine when the Springvale Mine and Angus Place Colliery are operated sequentially. i.e. Angus Place extraction will not commence until Springvale mining operations are completed. The production rate for Springvale Mine in this simulation is 5.5 Mtpa.

DPI Water have raised that a statement in Section 4.2.1 - Model Setup of Jacobs (2016a) requires validation. The statement in Jacobs (2016a) was "*…Details are presented in the CSIRO modelling report provided as Appendix A, however, it is noted that whilst LW423 and LW501 to 503 were not included in the updated prediction simulation, these longwalls continue to be part of the current and approved mine plan. As will be shown below, model results are essentially identical to that presented in the EIS and the impact of the omission of LW423 and LW501 to 503 from the simulation is not consequential.*"

To resolve this issue, additional simulations of the COSFLOW model were undertaken by the CSIRO, and their report is attached as Appendix A (Adhikary, 2016). **Figure 2.1** (adapted from Figure 1 of Adhikary (2016) to include the 'Basecase') below presents the Springvale Mine inflow results, on a single graph, with respect to 'SPR then APE' (sequential implementation without Springvale Mine's approved longwalls LW423 and LW501 to LW503) and 'SPR then APE Plus' (sequential implementation, but including LW423 and LW501 to LW503).

From **Figure 2.1**, modelling indicates the inclusion of LW423 and LW501 to 503 was not consequential to the results presented in Adhikary and Wilkins (2015). The statement in Jacobs (2016a) quoted above is therefore considered to have been validated. Generalising, the reason why LW423 and LW501 to 503 have a minimal impact to mine inflows is because depressurisation in the vicinity has already occurred.

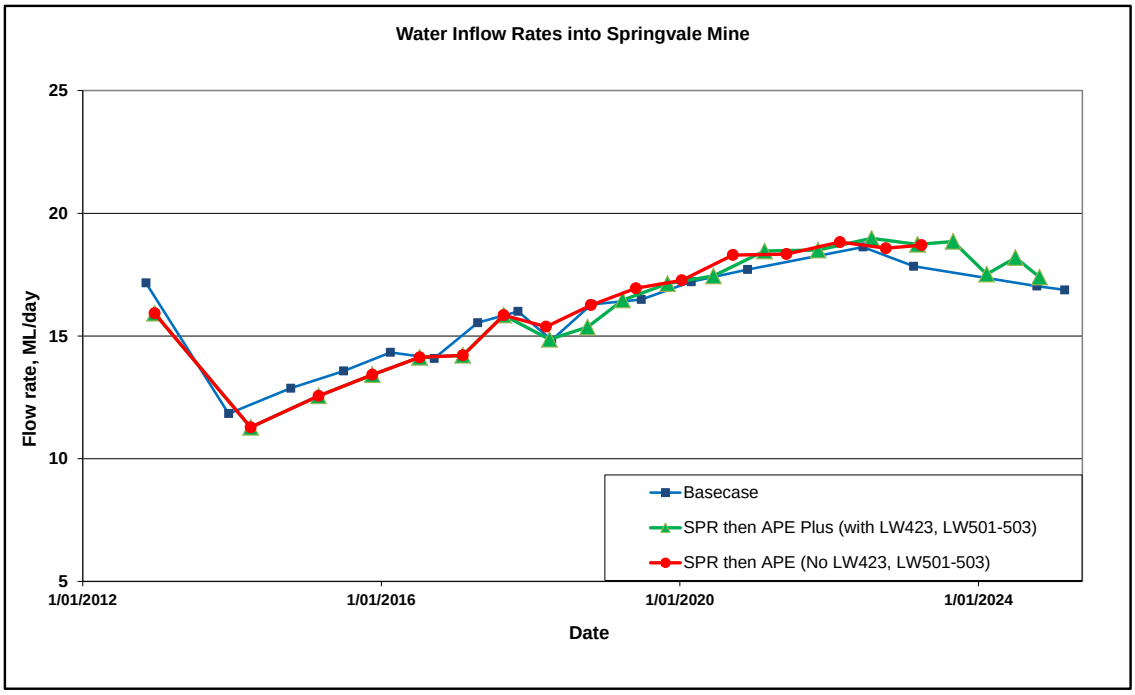

Figure 2.1 : Predicted Mine Inflow Rates (adapted from Adhikary and Wilkins (2013), Adhikary and Wilkins (2015) and Adhikary (2016))

Key aspects are provided as follows:

- The mine inflow results presented for the 'SPR then APE Plus' simulation, which included all approved longwalls at Springvale Mine under SSD5594, are consistent with the original 'SPR then APE' case (Adhikary and Wilkins, 2015) and the CSIRO (2013) predictions (Adhikary and Wilkins, 2013) which assessed the entire mine footprint. Maximum mine inflows for the three simulations are provided below:
  - The maximum mine inflows for the 'Basecase' (Adhikary and Wilkins, 2013) is 18.6 ML/day in 2022
  - The maximum mine inflows for the 'SPR then APE' case (Adhikary and Wilkins, 2015) is 18.8 ML/day in 2022
  - The maximum mine inflows for the 'SPR then APE Plus' case (Adhikary, 2016) is 19.0 ML/day in 2022.
- The Springvale Mine Extension Project EIS (Section 10.2.3.1) notes the maximum mine inflow for the whole mine plan, the 'Basecase', as approved, as 19 ML/day in Year 2022.

Given the above, the baseflow predictions, with respect to modelled surface water reaches, and modelled mine inflows in the 'SPR then APE Plus' simulation, are consistent with Adhikary and Wilkins (2015) report, and, as presented in Adhikary and Wilkins (2015), are consistent with Adhikary and Wilkins (2013). The impacts and environmental consequences for the proposed modification area are therefore expected to be consistent, as discussed in the SEE, with the impacts presented in the SVMEP EIS and approved in SSD5594.

NSWDPI_02) There is a data mis-match in the interpretation based on hydrographs derived from the NGM. This should be addressed or otherwise clarified in an updated NGM.

Note: Subsequent clarification provided by DPI Water on this issue is summarised below. Hydrographs references are those used in the Groundwater Assessment (Jacobs, 2016a) or CSIRO (2013) for the proposed modification.

The proponent produced some important hydrographs in the Groundwater Assessment (Jacobs 2016a), being Figures 4.2 to 4.4, based on a comparison of model outputs to explain their case. The presentation and interpretation of these hydrographs is unclear from 3 perspectives:

(i) it is not clear whether the "Basecase" in each hydrograph for the situation presented is the same as used in the Extension EIS or whether it was redeveloped from the 2015 NGM. If the former is true, then outcomes from two different models are compared;

Or

(*ii) if the "Basecase" been redeveloped in each situation using the 2015 NGM, then the blue curve in Figure 4.2 should be different to that which was used in the Extension EIS (Appendix K to Appendix E of MEP 2014, being Figure 64 in CSIRO (2013) shown as the blue curve in that figure - it does not appear to be different;*

And

(iii) irrespective of which situation the hydrographs illustrate, there appears to be a mis-match in the values represented to the values expected. e.g. considering the data for just a single date – say 01/01/2020, then on the basis of the arguments presented in the Jacobs (2016a) Section 4.2.2.1:

> *the value of the flow rate for the 'Basecase' in Figure 4.2 (about 440 L/s) should equal the addition of the value of the blue line in Figure 4.3 – flow rate about 200 L/s, plus the value of the blue line in Figure 4.3 – flow rate about 140 L/s – i.e. a total of about 340 L/s.*

The total values don't match by an approximate 30% difference which needs to be clarified.

To clarify the figures presented in Jacobs (2016a), the following points are made:

- The 'Basecase' presented in Figure 4.2 to Figure 4.4 of Jacobs (2016a) (after Adhikary and Wilkins (2015)) is the same as that presented in the SVMEP EIS (Adhikary and Wilkins (2013)).
- The groundwater model used in Adhikary and Wilkins (2015) is the same as that used in Adhikary and Wilkins (2013), except the input parameters were changed (mining rate and mine plan).
- Comparison of Adhikary and Wilkins (2013) and Adhikary and Wilkins (2015) is valid because the additional simulation (Adhikary, 2016) indicates mine inflows are all consistent for:
  - Adhikary and Wilkins (2013) – 'Basecase'
  - Adhikary and Wilkins (2015) – 'SPRThenAPE'
  - Adhikary (2016) – 'SPRThenAPE Plus'

DPI Water have also raised that there appears to be a mismatch between total mine inflows presented in Figure 4.2 of Jacobs (2016a) and individual inflows presented in Figure 4.3 of Jacobs (2016a) for Springvale and Figure 4.4 of Jacobs (2016a) for Angus Place East.

This is readily resolved. Figure 4.4 of Jacobs (2016a) presents inflows to Angus Place East only. Figure 4.4 does not, however, present inflows to the other Angus Place panels. The reason for not separately presenting inflow to the other Angus Place panels in Figure 4.4 is due to, as we understand it, a constraint within COSFLOW insofar as not being able to, post-construction of the model, request this output from the model. Output from COSFLOW is currently restricted to total inflow to both mines, inflow to Angus Place East and inflow to Springvale. This issue was identified in the SVMEP EIS at the time, however, Jacobs should have more clearly highlighted this in Jacobs (2016a) to avoid any confusion.

To explain the example quoted by DPI Water. At date 1 January 2020, 'Basecase' inflow (total inflow to both mines) in Figure 4.2 of Jacobs (2016a) is about 440L/s. This constitutes inflow to Springvale Mine in Figure 4.3 of Jacobs (2016a) of 200L/s and inflow to Angus Place East in Figure 4.4 of Jacobs (2016a) of 140L/s. What is not presented in Figure 4.4 of Jacobs (2016a) is the inflow to the other Angus Place panels, which is approximately 90 to 100L/s. This clarifies the reason for Figure 4.3 of Jacobs (2016a) values when added to Figure 4.4 of Jacobs (2016a) values do not match Figure 4.2 of Jacobs (2016a) values. It is highlighted that the other Angus Place panels are included in the COSFLOW model; it is merely that output from those nodes, separately, is not able to be generated.

*NSWDPI_03) The proposal states; "*Whilst not identified as high priority groundwater dependent ecosystems in the Water Sharing Plan, the Newnes Plateau shrub swamps are listed as an ECC the TSC Act and in accordance with the EPBC Act, the shrub swamps and hanging swamps are collectively referred to as the Temperate Highland Peat Swamps Sandstone (THPSS).*"*

The proponent should ensure that in all future documentation they acknowledge the swampland of the Newnes Plateau is specifically listed in Schedule 4 of the Greater Metropolitan Water Sharing Plan for Groundwater Sources 2011.

We acknowledge that Schedule 4 of the Water Sharing Plan does include the THPSS and appreciate the clarification. We will amend our subsequent documentation accordingly.

The maps of the Water Sharing Plans were consulted as the basis of the quoted statement. **Figure 2.2** presents the map for the Sydney Basin Richmond Groundwater Source downloaded from the Water Sharing Plan (Appendix 2 of http://www.legislation.nsw.gov.au/#/view/regulation/2011/111).

As per the annotation in **Figure 2.2**, it is stated, in that figure, that there are no identified groundwater dependent ecosystems in the Richmond Basin. It is now apparent that the annotation to this map is inconsistent with Schedule 4 of the Water Sharing Plan.

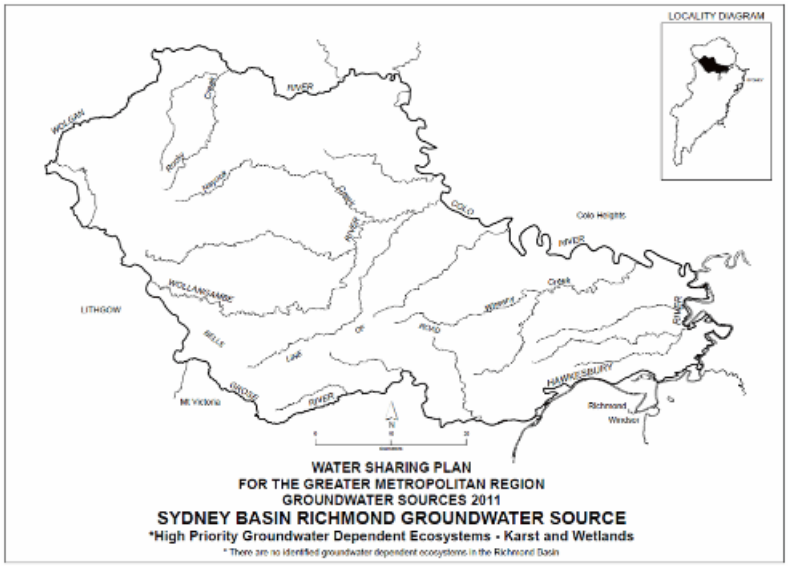

Figure 2.2 : High priority groundwater dependent ecosystems in the Sydney Basin Richmond Groundwater Source (obtained from http://www.legislation.nsw.gov.au/#/view/regulation/2011/111/app2)

NSWDPI_04) The Proponent should correctly identify, when discussing the influence of the proposed works on nearby groundwater users' bores, that drawdown and other aquifer impacts, these occur against groundwater works and not Water Allocation Licences.

Table 3.3 of the Groundwater Assessment (Jacobs, 2016a) presents the water access licences (WALs) within 10km of the Project Application Area, assessed as 10km radial distance from the centre of LW414.

In response to DPI Water's issue, a groundwater works search was also conducted on 14 September 2016 and indicated there are 235 works within that 10km radius. A summary of the authorised works purposes is presented in **Table 2.3**. As noted in the Groundwater Assessment (Jacobs, 2016a) the majority of these works are monitoring piezometers.

Table 2.3 : Groundwater Works Purposes

Groundwater Work Authorised Purpose	Number of Groundwater Works
Exploration	5
Industrial	9
Irrigation	5
Mining, dewatering (groundwater)	9
Monitoring	156
Recreation	3
Stock, Domestic	43
Test Bore	5

Of the 43 Stock/Domestic works identified in **Table 2.3**, these bores are located off the Newnes Plateau. Appendix A of Jacobs (2016a) presents the outcomes of groundwater modelling

undertaken by Adhikary and Wilkins (2015). Table G13 of Adhikary and Wilkins (2015) presents the predicted change to groundwater level at 108 private bores included in the analysis and the net impact (water level decline at base of bore). In 2033, the median effect of the mine on private bores of depth less than 50m was approximately 0.01 m (range 0 to 0.48 m).

2.6 Hydrological Issues Raised by CM Jewell

CMJEWELL_01) COSFLOW… was not able to predict the degree of fracturing, consequent changes in hydraulic conductivity or impacts on groundwater inflow to and outflow from the swamps at the detailed local level required. An attempt was made to bracket the impacts using a number of judgementally applied ramp functions, that is all.

For the SVMEP EIS (Adhikary and Wilkins, 2013) and the proposed Modification (Adhikary and Wilkins, 2015), COSFLOW was run in flow mode only, and was not coupled with mechanical deformation. As noted in the EIS, the ramp function adopted was initially derived from coupled flow and mechanical deformation simulations and represents the “state-of-the-art” in hydrogeological modelling, as it was based on measured extensometer responses.

Due to constraints in computation time, simulations presented in the SVMEP EIS and the proposed Modification are based on COSFLOW run in flow mode only. As presented in the SVMEP EIS, the current revision of the calibration model (Adhikary and Wilkins, 2013) adjusted parameter values of the ramp function, the nature of which was developed using the coupled simulation, to achieve a satisfactory fit to observed inflows, pressure and water level. Details of the limitations of the current model calibration (Adhikary and Wilkins, 2013) are presented in the Groundwater Assessment for the SVMEP EIS (RPS, 2014a).

As part of the ongoing commitment to model review (six monthly), the suitability of the applied ramp function is also assessed as new monitoring data becomes available.

Investigations are currently underway, using COSFLOW, to assess various mechanisms for the observed impacts on Carne West Swamp.

CMJEWELL_02) The apparent certainty and modelling precision presented in the SoEA are not justified.

It is acknowledged that the apparent accuracy to which predicted impacts are reported in the modelling report (0.001 m and 0.001 ML) may be seen as implying a level of accuracy that in reality is not realistic. This is not the intention. In many cases, reporting to three decimal places is the difference between reporting a null impact or reporting a predicted impact, albeit very small. In this regard the reporting to three decimal places should be regarded as erring on the side of caution.

CMJEWELL_03) Pells Consulting (2016) provides a detailed assessment of potential impacts on the THPS, and the Independent Expert Monitoring Panel (Galvin, Timms and McTaggart 2016) has identified a significant further issue with COSFLOW modelling with regard to its prediction of displacement in lineament zones, which has the potential to result in serious under-estimation of impacts on THPS.

It has been noted that observed impacts on Carne West Swamp fall well outside of the range predicted by modelling.

In these circumstances, the Department should review the CoA applying to THPS impacts, and appropriately apply the precautionary principle, bearing in mind that damage to the THPS, once it has occurred, is irreversible.

The IMP have provided their advice to DP&E and have recommended that the mining of LW419 be allowed subject to the implementation of their recommendations, which have already been adopted by Springvale Coal.

As noted in our response to issue *4nature_02*, *ColongFoundation_01*, and *CMJEWELL_01*, the water level trigger at Carne West is currently subject to investigation by Springvale Coal. The outcomes of the investigations will be managed in accordance with the SSD 5594 consent conditions (Schedule 3 Conditions 1 to 6) within the specified timeframes stipulated.

Springvale Coal do not support the premise that damage to THPSS is irreversible. In the event of significant impact, where natural recovery or self-healing is insufficient, rehabilitation and engineering measures can be implemented. Potential mechanisms for remediation of impacted swamps, if found to be required, are presented briefly in the SVMEP EIS (Golder Associates, 2014), and in detail in Section 3.1.14 and Section 3.1.18 of the Response to Submissions to SVMEP EIS, dated September 2014 available from the DPE website (http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=5594).

Rehabilitation works at East Wolgan Swamp, undertaken as described in detail in Section 3.1.14 and Section 3.1.18 noted above, have shown the rehabilitation works to be successful, and the vegetation cover within the swamp is starting to recover.

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4. Closing

Should you require additional information then please do not hesitate to contact our office.

Yours sincerely

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Attachment A – CSIRO Letter – SPR then APE including LW423, LW501 to LW503 Model Results

Sept 15, 2016

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Principal Technical Services manager
Springvale Colliery
Centennial Coal Company Ltd
Lidsdale House
1384 Castlereagh Highway, Lidsdale NSW 2790 Australia

As per your request CSIRO has conducted additional modelling (SPR then APE plus) incorporating Springvale Mine's LW 423, 501 to 503 panels, that is, this simulation has assessed the entire mine footprint approved at Springvale Mine under consent SSD 5594. The additional model used parameters identical to the 'original SPR then APE' (no LW423, LW501-503)" modified mining schedule reported in CSIRO (2015).

I. The mine inflow results for Springvale Mine presented for the combined case (SPR then APE plus) are consistent with the original SPR then APE case (CSIRO, 2015) (see Figure 1) and are also consistent with the predictions presented in CSIRO (2013).

II. Due to the resolution used in both the temporal and spatial discretisation of the model, it is highlighted that the predicted mine water inflows should be understood as average inflows. Accordingly, compared to observed instantaneous daily pumping rates, modelled inflows do not show such short-term fluctuations. In previous work, at the time of simulations including coupled mechanical deformation and fluid flow, the difference between modelled average flow rate and instantaneous daily flow rate ranged between ±2 ML/day.

We consider, given the above, that the baseflow predictions with respect to modelled surface water reaches, and modelled mine inflows in the 'SPR then APE plus' simulation are consistent with the CSIRO (2015) report, and, as presented in CSIRO (2015), are also consistent with that presented in CSIRO (2013).

It is noted, as a matter of completeness, that the simulation including LW423 and LW501-503 (SPR then APE plus) used the same mining schedule for APE as the 'original SPR then APE' simulation, and as a result the predicted mine inflows at Angus Place Colliery remain unchanged in the 'SPR then APE plus' simulation.

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Sincerely

Deepak Adhikary
Senior Principal Research Scientist
Coal Mining Program
Energy, CSIRO

Mob 0417889190

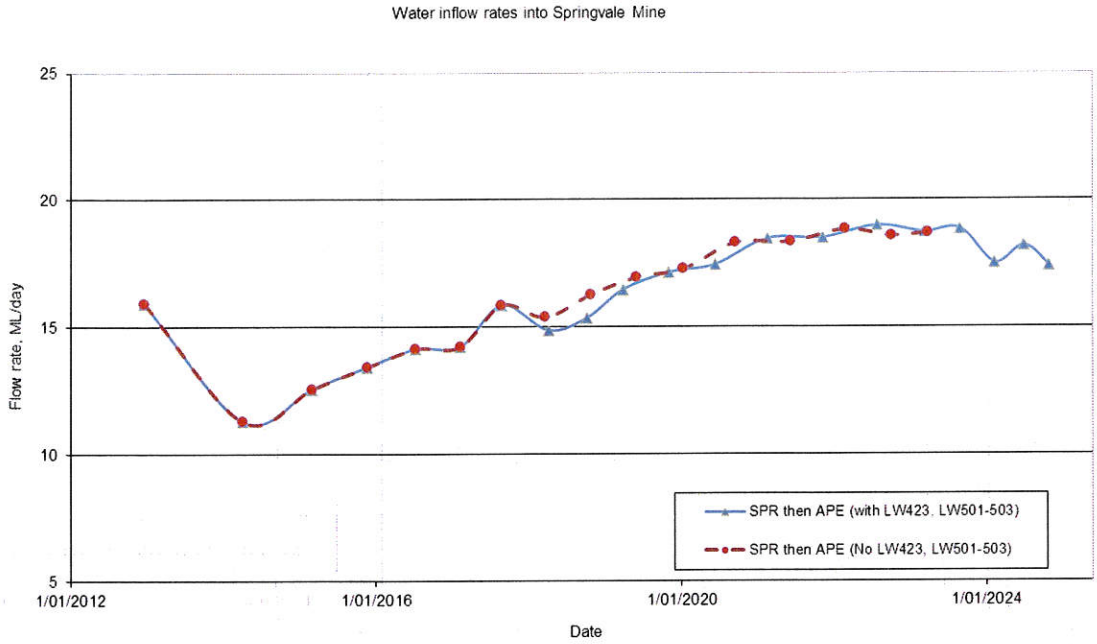

Figure 1 Inflow rates in Springvale Mine with and without the approved LW423, LW501-503 panels

References

CSIRO (2013). *Angus Place and Springvale Colliery Operations - Groundwater Assessment.* Consultant report prepared for Centennial Angus Place Pty Ltd and Springvale Coal Pty Ltd by the CSIRO (Adhikary, D.P and A. Wilkins). Reference No. EP132799, dated May 2013.

CSIRO (2015). *Appendix G – Alternative Mine Schedule: Angus Place and Springvale Colliery Operations - Groundwater Assessment.* Consultant report prepared for Centennial Angus Place Pty Ltd and Springvale Coal Pty Ltd by the CSIRO (Adhikary, D.P and A. Wilkins). Reference No. EP15346, dated January 2015.

APPENDIX D

Response to Submissions – Economic Issue from Submitter 159004

AGIS GROUP

September 2016

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AIGIS GROUP
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16 September 2016

Nagindar Singh
Approvals Coordinator
Centennial Coal Company Limited
Lidsdale House, Lidsdale NSW 2790
By email: Nagindar.Singh@centennialcoal.com.au

Re: Springvale Mine SSD-5594 Modification 1 Submission

Dear Nagindar,

I am in receipt of your email correspondence of this date in relation to a submission made querying an aspect of the economic assessment for the above project. I include the relevant text of that submission as provided, for reference:

*'Claimed Estimated Economic Benefit Impact Differential for Employment benefit to local/regional community is +8 mil, NSW Government Royalties * 6 Mil, State taxes, Local Government rates (for Assumptions see Appendix 2 of of Appendix F) is a minus - $0.5 mil Total economic benefit SSD 5594 (Base Case) Estimate of $269.2 million and (Proposed Case) SSD 5594 Mod 1 $282.7 mil, Impact Differential $13.5 mil.*

The Claimed Estimate of Economic Costs for Proposed Case is $120 mil Base Case $138 mil difference of an increase by $18 Mil So the economic benefit of +13.5 mil falls very short of the claimed estimate of economic costs of $18 mil'.

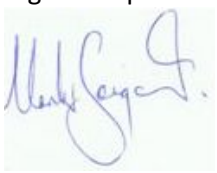
Response to issue raised in submission

The issue raised in the submission appears to be based on a misreading of the relevant parts of the economic assessment. The submission identifies an increase in economic costs of $18 million. This change in the estimate of economic costs identified in the EIA is actually a decrease of $18 million. The assessed decrease is chiefly associated with the earlier cessation of mining and its associated impacts (assessed as costs). Table 5 (extracted from the EIA) is presented below, this explains the composition of the net effects (benefit and cost) of the proposal.

Table 5: Comparison of Project & Modification net benefit/cost			
	SSD-5594 as approved	**SSD-5594 with Modification**	**Differential (+/-), proposed to approved**
Economic benefit (PV)	**$269 million**	**$283 million**	**$14 million**
Net economic cost (PV)	**$138 million**	**$120 million**	**($18 million)**
Net Present Value (NPV)	**$131 million**	**$163 million**	**$32 million**
Benefit-Cost Ratio (BCR)	**1.9**	**2.4**	**-**

I trust that this information adequately addresses the submission. However, should you require any further clarification, please contact me at your convenience to discuss this.

Yours sincerely
Aigis Group



Dr Mark Sargent
Principal

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