



BYLONG COAL PROJECT

PLANNING ASSESSMENT COMMISSION
Public Hearing Response
Development Application SSD 14-6367

for

WorleyParsons Services Pty Limited

19 May 2017

Hansen Bailey

ENVIRONMENTAL CONSULTANTS

BYLONG COAL PROJECT
DEVELOPMENT APPLICATION SSD 14-6367

PLANNING ASSESSMENT COMMISSION
PUBLIC HEARING RESPONSE

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1 INTRODUCTION

1.1 BACKGROUND

KEPCO Bylong Australia Pty Limited (KEPCO) owns the Bylong Coal Project (the Project) which is located within the Mid-Western Regional Council (MWRC) Local Government Area (LGA) approximately 55 km to the north-east of Mudgee. The Project involves the construction and operation of a coal mine utilising open cut and underground mining methods to recover up to approximately 6.5 Million tonnes per annum (Mtpa) of Run of Mine (ROM) coal for a period of approximately 25 years. The Project will recover approximately 124 Million tonnes (Mt) of ROM coal, including approximately 33 Mt of ROM coal (or 26%) utilising open cut mining methods and approximately 91 Mt of ROM coal (or 74%) from the longer term underground mining operations. The key features of the Project are illustrated on **Figure 1**.

KEPCO submitted an Application for State Significant Development (SSD) Development Consent under Division 4.1 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) on 23 July 2015 to permit the development of the Project (SSD 14_6367).

KEPCO also submitted a Referral to the Commonwealth Department of the Environment and Energy (DoEE) (formerly Department of the Environment) for the Project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 12 February 2014. The Project was determined to be a 'Controlled Action' under the EPBC Act on 12 March 2014 and will be assessed under the "Bilateral Agreement" between the Commonwealth and NSW Governments.

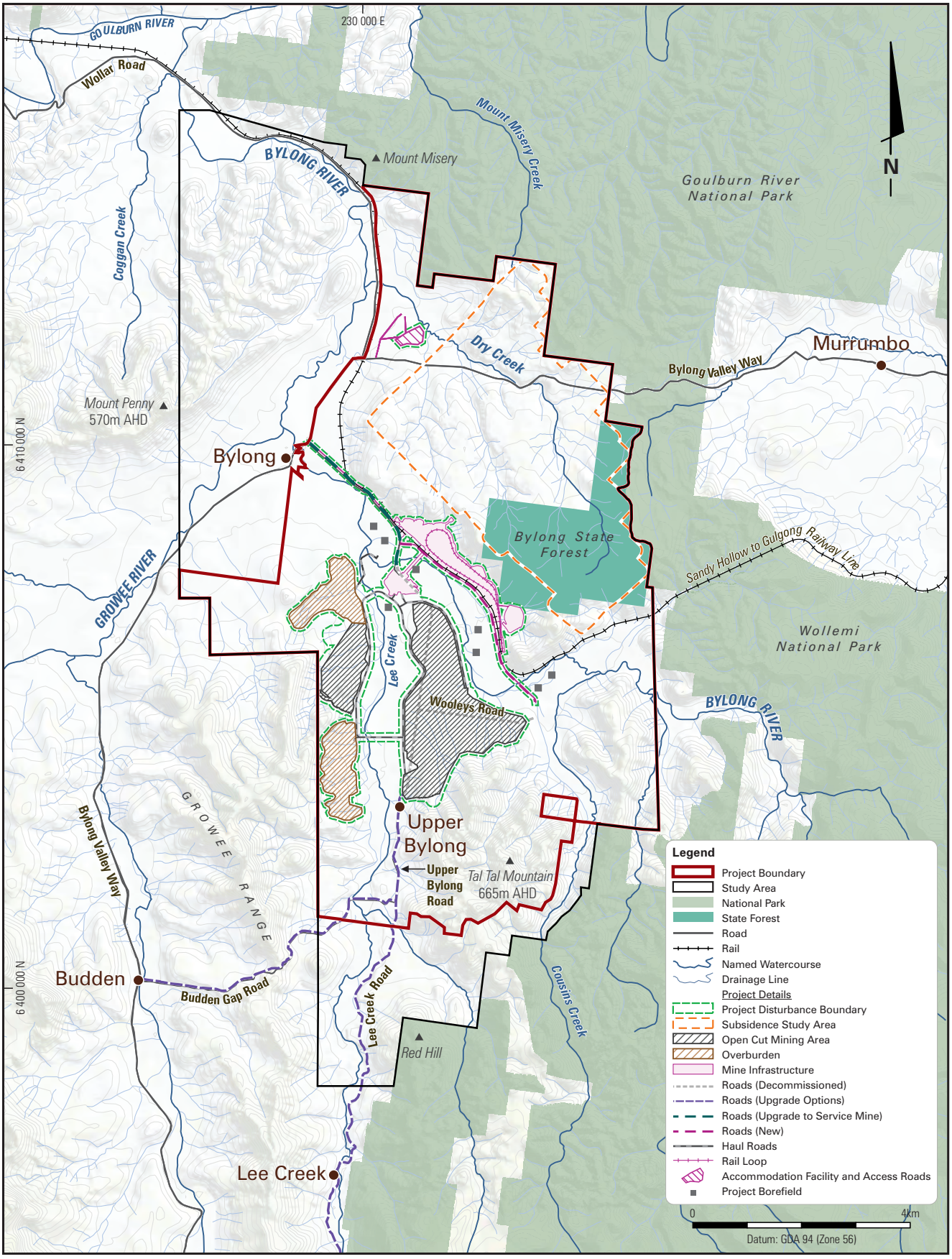
The NSW Department of Planning and Environment (DP&E) issued the Secretary's Environmental Assessment Requirements (SEARs) for the Project on 23 June 2014 (with minor amendments on 11 November 2014).

The '*Bylong Coal Project Environmental Impact Statement'* (EIS) (Hansen Bailey, 2015) was prepared in accordance with the SEARs and was placed on public exhibition between 23 September 2015 and 6 November 2015. A total of 383 submissions were received by DP&E during the public exhibition of the EIS.

The '*Bylong Coal Project Response to Submissions*' (RTS) (Hansen Bailey, 2016) was prepared on behalf of KEPCO and submitted to DP&E in March 2016. The RTS responds to the issues raised in submissions by stakeholders during the public exhibition period.

DP&E provided the RTS to various regulatory agencies seeking any further comments. DP&E received supplementary submissions on the RTS from 11 regulatory agencies, one from a special interest group and one submission from a neighbouring organisation representing a landholder adjacent to the Project. At DP&Es request, KEPCO subsequently provided a response to a number of residual issues raised within the supplementary submissions on 19 August 2016.

Further matters were also discussed and resolved with DP&E and the relevant regulators prior to the finalisation of DP&E's Preliminary Environmental Assessment Report (PEAR).



HB BYLONG RTS Post Works 1538 Fx Revised Conceptual Project Layout 04 05 2017

BYLONG COAL PROJECT

Conceptual Project Layout

FIGURE 1

1.2 GOVERNMENT ASSESSMENT

DP&E finalised the PEAR for the Project at the end of March 2017 and released the report publically on 5 April 2017.

The Preliminary Environmental Assessment Report concluded that:

> *"The Department has carefully weighed the impacts of the project against its benefits. On balance, the project is approvable, subject to stringent conditions."*

The PEAR included recommended conditions of approval.

On 9 January 2017, the Minister for Planning directed the Planning Assessment Commission (PAC) to review the merits of the Project as a whole under Section 23D of the EP&A Act. The PACs Terms of Reference for the Project were issued on 9 January 2017 which required them to:

"1. Carry out a review of the Bylong Coal Project, and:

a) considering the EIS for the project, additional information provided to the Department, all issues raised in public and agency submissions, and any relevant information provided during the course of the review;

b) assess the merits of the project as a whole, having regard to all relevant NSW Government policies, and paying particular attention to:

- *the impacts on the water and agricultural resources of the Bylong Valley;*
- *the social impacts on the Bylong village and surrounds;*
- *impacts on heritage values associated with the Tarwyn Park property, including natural sequence farming; and*
- *the justification for the open cut stage of the project; and, if necessary*

c) recommend appropriate measures to avoid, minimise and/or manage significant impacts of the project;

2. Conduct public hearings during the review as soon as practicable after the Department of Planning and Environment provides its preliminary assessment report to the Commission.

3. Submit its final report on the review to the Department of Planning and Environment within 12 weeks of receiving the Department's preliminary assessment report, unless the Secretary agrees otherwise."

KEPCO hosted a site inspection for the PAC site on 10 May 2017 and a public hearing was conducted on 11 May 2017 at Club Mudgee. At the public hearing, the chairperson of the PAC indicated that the PAC Peer Review is scheduled to be provided to DP&E by 26 June 2017, unless otherwise agreed by the Secretary.

1.3 DOCUMENT PURPOSE

This document has been prepared to respond to queries from the PAC during the site inspection on 10 May 2017 (and subsequent queries) and the public hearing on 11 May 2017. A full list of speakers at the public hearing is provided in **Appendix A**.

Input from specialist consultants, WorleyParsons and KEPCO has been relied upon in the preparation of this response document.

1.4 DOCUMENT STRUCTURE

This document is structured as follows:

- **Section 1** provides a background summary of the Project;
- **Section 2** provides a summary of documents referred to in this Response to assist with references in Sections 3 and 4 and it does not include all documents prepared on the Project;
- **Section 3** provides responses to information and clarification requests from the PAC;
- **Section 4** provides responses to presentations made at the public hearing;
- **Section 5** provides a conclusion to the matters addressed within this Response; and
- **Section 6** tabulates abbreviations used in this Response; and
- **Section 7** lists references used in this Response.

2 RESPONSES TO DATE

Table 1 provides a summary of documents referred to in this Response to assist with references in **Sections 3** and **4**.

Some of the documents listed in **Table 1** below are available on the DP&E website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=6367. Those documents which are not available on this website are reproduced in the appendices to this Response.

Table 1
Document Summary

Ref	Date	Title	Abbreviated Name	Location
1	July 2015	Bylong Coal Project Environmental Impact Statement	EIS	DP&E website
2	March 2016	Bylong Coal Project Response to Submissions	RTS	DP&E website
3	August 2016	Bylong Coal Project Supplementary Response to Submissions	Supplementary RTS	DP&E website
4	September 2016	Bylong Coal Project – Peer Review of Social Impact Assessment and Response to Submissions	SIA Peer Review	DP&E Website
5	September 2016	Bylong Coal Project Social Impact Assessment Peer Review	SIA Peer Review Response 1	**Appendix B**
6	October 2016	Bylong Coal Project EIS Response to Peer Review of Social Impact Assessment	SIA Peer Review Response 2	DP&E website

3 PAC INFORMATION REQUEST

This section provides a response to queries from the PAC during the site visit on 10 May 2017. Queries from the PAC are summarised in **Table 2** with a response provided below.

Table 2
PAC Queries Summary

Query	Where Addressed
Proof of the successful reinstatement of BSAL/agricultural land on mine rehabilitation	**Section 3.1.1**
Topographical cross sections of the landform to be created for the Project in relation to surrounding natural topography	**Section 3.2**
What capacity does the open cut mining void remaining at the end of the open cut mine life have to accommodate the reject materials and water during the underground mine life	**Section 3.2.1**
What proportion of the Registered Aboriginal Parties (RAPs) are representing Wonnarua, Wiradjuri or Gomeroi	**Section 3.3.1**
What were the key concerns raised by the RAPs during the completion of the Aboriginal Heritage Impact Assessment	**Section 3.3.2**
What is being undertaken to confirm the potential connection between the underground mining area and the alluvial aquifer	**Section 3.4.1**
Further details on the plans to encourage workers and their families to permanently relocate and reside within KEPCO's houses within the Bylong Valley	**Section 3.5.1**
Further detail on the intention to keep the Bylong General Store open throughout the life of the Project	**Section 3.5.2**
Further clarification on the justification for the proposed extent of open cut mining in relation to Tarwyn Park Farm Complex	**Section 3.2.2**
How is the fertility and microbial activity of the soil resources maintained for the ultimate use in rehabilitation activities	**Section 3.1.2**
Will the final rehabilitated landform comprise wind breaks and tree screens on the landform to manage wind erosion	**Section 3.1.4**

3.1 REHABILITATION ACTIVITIES

3.1.1 Successful Rehabilitation of BSAL/Agricultural Land

The PAC enquired regarding the ability to successfully rehabilitate BSAL on mined land and to provide examples of such an approach.

Response

As explained during the site visit and described within Section 4.4.6.1 of the RTS, the term 'Biophysical Strategic Agricultural Land' (BSAL) was coined in March 2012 with the release of the initial draft Strategic Regional Land Use Plan (NSW Government, 2012). The aim of categorising parcels of land as BSAL is to identify the land with "*a rare combination of natural resources highly suitable for agriculture*" (NSW Government, 2013).

The interim protocol for site verification and mapping of BSAL (Interim Protocol) (2013) has created a systematic process of identifying the important criteria is to be met for a soil profile to be classified as BSAL. Therefore in reality, for a soil profile to be classed as BSAL requires each criteria to be met within the thresholds and definitions. This standardised system can be applied to any soil profile including rehabilitated mined land. Further, all criteria, except Inherent General Fertility, can be assessed to verify the land as BSAL.

It is noted that the BSAL which has been identified to be directly impacted by the Project (and to be rehabilitated) is the lower quality Land and Soil Capability (LSC) Class 3 to Class 5. That is it is not the better quality Class 1 or Class 2 land found on fertile areas, such as the Liverpool Plains. This fact demonstrates that the current NSW Government BSAL verification criteria encompasses a broad range of land with varying land capabilities and not the State's best agricultural lands.

Given the short term (approximately 4-5 years) experience with the Interim Protocol being available, there are no mines in NSW that have (to date) attempted to re-instate soil profiles to a BSAL standard. As such there are no examples of rehabilitation on mined land specifically aimed at re-instating BSAL. However, as explained during the site visit and within Section 3.4 of Appendix W in the EIS, there are numerous examples of mine rehabilitation aimed at returning mined land to a productive agricultural use post-mining. These examples are outlined to provide a basis for the rehabilitation principles and methods, which have been proposed and outlined in Sections 8 to 12 of Appendix W of the EIS.

Traditionally mines have been required to rehabilitate mined land to a standard with potential for light to medium grazing, if required to use the rehabilitated land for agricultural purposes at all. Often the aim for rehabilitation has been limited to providing a stable, non-polluting landform. However, as the industry has progressed over the last 15 years, other aims have been pursued such as biodiversity outcomes, targeted species and communities, higher quality grazing land and more recently cropping land.

There is a vast knowledge base in mine rehabilitation which has been drawn upon to structure the Project's Rehabilitation Strategy including Soil Scientists, Agronomists, Erosion and Sediment Control Experts, Mine Planners and Environmental Consultants. Furthermore, the strategy is based on early trials to ensure the rehabilitation program is on track to meet the closure criteria, with a Trigger Action Response Plan (TARP) approach to identify and manage potential short falls in the rehabilitation. The rehabilitation strategy has already received valuable feedback from the NSW Department of Primary Industries - Agriculture (NSW DPI-Agriculture) which will be consulted when initiating the rehabilitation trials.

As outlined in Appendix W of the EIS and presented by Clayton Richards of SLR Consulting during the public hearing, the proposed techniques for rehabilitation activities to be implemented for the Project, including; selective stripping of soil layers, separation of stockpiles, ripping and keying in soil with overburden and final placement of topsoil, are proven methods to the NSW coal mining industry. These techniques have been successfully applied on most NSW coal mine sites over the last 20 to 30 years.

The BSAL criteria which requires a soil depth of greater than 750 mm is the only relatively new parameter of which there are limited examples in NSW. Whilst there are many examples of successful mine rehabilitation to grazing land capability classes 4, 5 and 6 land (similar to that generally being impacted by the Project), which has proven agriculturally productive, only two examples within NSW of a greater than 750 mm reinstated soil depth has been through post rehabilitation auditing and analysis to prove their successful establishment. These examples are the Hunter Valley Operations Alluvial Lands Project and the Bengalla Class III Rehabilitation Project, as outlined below. An example of mine rehabilitation in the United States is also referred to below.

Hunter Valley Operations Alluvial Lands Project

The Alluvial Lands Project at the Rio Tinto owned Hunter Valley Operations (Nelson and Stewart, 2007) provided evidence that rehabilitation of more than 65 ha of mined land to the former Rural Land Capability Class I and II land is achievable and that this land can facilitate agricultural production. The operations required selective handling and reinstatement of 630,000 m^3 of subsoil to a depth of 1 m, along with 252,000 m^3 of topsoil to 0.4 m depth. The entire process followed particular rigour with tolerance for the final land surface set to be within 0.5 m of the pre-mining survey.

A lucerne hay productivity yield of "*at least equivalent to the average crop productivity yields for the Upper Hunter Region for three consecutive years*" was required. Regular inspections and meetings with officers from NSW Department of Primary Industries (DPI)'s Environmental Sustainability Branch and the NSW DPI's regional agronomist (now NSW DPI-Agriculture) demonstrated Rio Tinto's compliance with yield, quality and monitoring requirements for the reinstatement to Class I and II land capabilities. As such, the Alluvial Lands Project achieved the conditioned target land capability class characteristics for agricultural production and was endorsed by the NSW Government at the time.

The Alluvial Lands Project is the benchmark project for re-instating valuable agricultural land on mine rehabilitation in NSW. The methodology and re-construction principles from the Alluvial Lands Project can be considered for the Bylong Coal Project. It must be reiterated that the NSW government signed off on the Alluvial Lands Project as achieving the target outcomes in terms of mine rehabilitation to re-instate productive agricultural land.

Bengalla Mine Class III Land Capability Class

In 2012, Bengalla Mining Company committed to re-instating 5.7 ha of Land Capability Class III, based on Emery (1985) guideline, on the Overburden Emplacement Area. The Class III land included the re-instatement of a soil depth of 900 mm (500 mm topsoil and 400 mm subsoil). This site is included in Bengalla's annual rehabilitation audit, and reported in the Annual Review. The Bengalla Mine Annual Review (2016) stated:

> *"Topsoil cover in the Class III rehabilitation is satisfactory. The soil generally showed chemical and physical properties within the satisfactory range for plant establishment and plant growth across the site.*"

Whilst the rehabilitation of this area is aimed at Class III land, as the BSAL criteria had not yet been widely introduced, it is expected (based on the soil information available) the 5.7 ha is likely to also satisfy the BSAL criteria. The area continues to be managed for soil stability, pasture growth and re-establishment of soil function, however early indications show the process is on track to achieve a long term resilient area of Class III land, using similar techniques to those proposed for the Bylong Coal Project.

United States Rehabilitation Examples

In the Midwestern United States, a reclamation research program was initiated at the Universities of Illinois and Kentucky to investigate the best reclamation strategies for reinstatement of good quality agricultural land. Darmody *et al*. (2002) compiled research, which has shown that surface mining can be a short term land use which can be followed by productive higher agricultural uses, if rehabilitation is undertaken correctly. Achieving a higher mine land productivity is possible if rehabilitation plans are designed to minimise compaction, if good quality soil materials are used, and if high management levels (herbicides, fertility, adapted crop varieties) and practices are followed.

Conclusion

Given the relatively gentle topography and landscape characteristics of the proposed post-mining landform, and the available topsoil and subsoil resources, KEPCO and its specialist technical consultants are confident that land within the Project Disturbance Boundary can be successfully returned to BSAL provided that the detailed Bylong Coal Project BSAL Reinstatement Plan provided in Appendix W of the EIS is implemented.

The NSW DPI-Agriculture has been consulted in regard to the proposed methodology to reinstate BSAL on post mining landforms at the Project. The DP&E states in the PEAR for the Project (March 2017):

> *"The NSW DPI Agriculture does not object to the agricultural impacts of the project, and is satisfied that the proposed rehabilitation outcomes can be achieved subject to the implementation of a range of management and monitoring measures that have been incorporated into the Department's recommended conditions*."

Continued consultation will take place with NSW DPI-Agriculture on the rehabilitation, management and monitoring of reinstated BSAL on site.

3.1.2 Maintaining Soil Resources

The PAC questioned how the soil resources would be maintained to ensure that the soil health and microbial activity would be managed to facilitate the successful use of rehabilitation post mining.

Response

In 2005, Dr Nadia Keipert (PhD) undertook a research project titled *"Effect of different stockpiling procedures on topsoil characterisation in open cut coal mine rehabilitation in the Hunter Valley, NSW"*. This research project included a thorough literature review as well as a soil sampling and testing program across 12 mines in the Hunter Valley. The key outcomes from this project, related to maintaining soil quality in stockpiled soils include:

- Direct placement on final landform should be encouraged where possible, to avoid stockpiling requirements;
- Stockpiles should consist of a free draining design to minimise anaerobic zones forming. Anaerobic zones potentially cause layers of higher or lower chemical and physical parameters. Therefore, stockpiles should be shaped to prevent erosion but encourage water runoff, without the loss of soil;
- Leaching of nutrients to the lower layers of a stockpile profile is observed during longer term storage, however this can be rectified (along with impacts from anaerobic layering) during pick up and respreading, by mixing upper and lower profiles when loading or scraping;
- Soil testing will clarify amelioration requirements for greater vegetation establishment success. Amelioration efforts should be undertaken during respreading; and
- Soil stockpile heights can vary to greater than 3 m, and is dependent on a variety of factors. However, it is generally accepted that in regard to soil texture, loam and sandy material should be stockpiled to 2 m to 3m, whilst clay material is recommended to be stockpiled to 1 m to 2 m.

The conclusion of this research project found that compared with the initial deterioration of soil resulting from handling with heavy machinery in stripping and creating stockpile, stockpiling to greater heights only led to minor decreases in soil quality. Deterioration during stockpiling was relatively easily rectified in the rehabilitation process.

Therefore, it is generally accepted that there is a level of soil quality deterioration during the stripping and stockpiling phase, which increases slightly the longer soil is stored. However maintaining soil stockpiles between 2 m to 3 m, establishing deep rooted cover crops on the stockpile and maintaining vegetation cover, these impacts can be minimised. Once the soil is mixed, re-spread and ameliorated on the final post mining landform, the soil quality begins to be restored indicating soil structure, function and biological activity increases rapidly over 5 to 10 years, if managed with a pasture/grass regime.

The results of the above mentioned research study have been applied to the soil resource management regime for the Project as identified in Section 7.14.4 of the EIS. The mitigation and management measures identified in Section 7.14.4 of the EIS will be further detailed within the Soil Resource Management Plan and Rehabilitation Management Plan for the Project which will be prepared in consultation with NSW DPI-Agriculture and to the satisfaction of DP&E.

3.1.3 Final Landform Cross Sections

The PAC enquired in relation to the extents of the final landform of the open cut mining areas in relation to the neighbouring Tal Tal Mountain and other elevated landforms surrounding the open cut component of the Project.

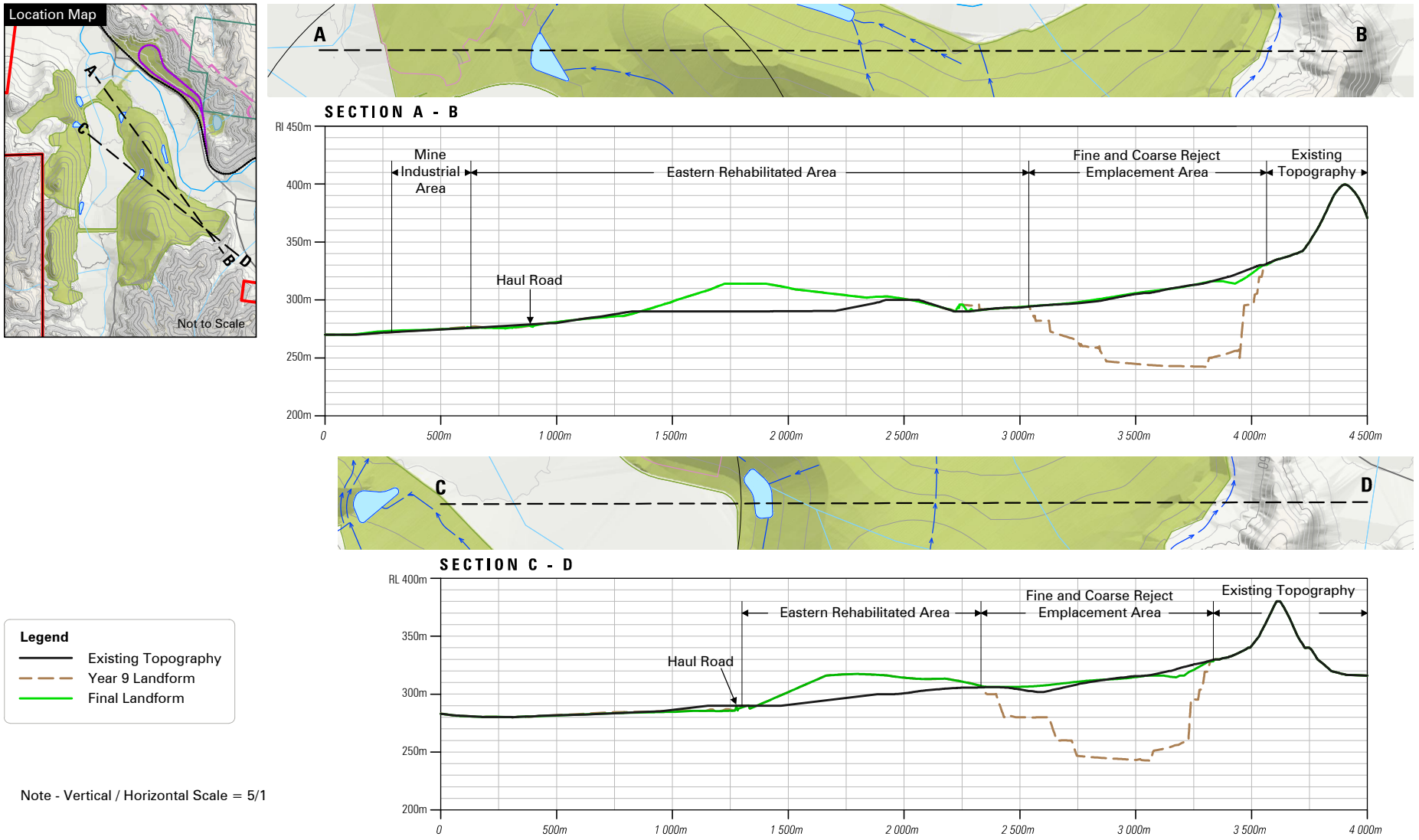
Response

Figure 24 from Section 3.3.1 of the EIS (reproduced as **Figure 2**) provides cross sections through the conceptual final landform in relation to the existing topography and the fine and coarse reject emplacement area to remain at the cessation of open cut mining activities. It is noted that the cross sections are presented with a vertical to horizontal scale of 5 to 1 to graphically illustrate the small differences in landforms.

These cross sections illustrate that the surrounding elevated areas of Tal Tal Mountain will continue to remain the key features of the Bylong River valley landscape post mining. Whilst the rehabilitation of the conceptual final landform will modify the landform on the lower slopes up from the Bylong River floodplain, this change will not result in a significant change to the wider valley landscape.

In light of the queries raised by the PAC members during the site visit, some additional cross sections have been prepared to illustrate the changes to the wider Bylong River and Lee Creek valley landscape from the Tarwyn Park Homestead. These additional cross sections are illustrated within **Figure 3** and **Figure 6**. Similar to the EIS cross sections, it is noted that two of these cross sections are presented with a vertical to horizontal scale of 5 to 1 to graphically illustrate the small differences in landforms. The 1 to 1 scaled cross sections are also provided to illustrate how small the differences in landforms are in relation to more elevated areas of Tal Tal Mountain and the Growee Range.

The cross sections illustrate that the elevated features which dominate the Bylong River and Lee Creek valleys of Tal Tal Mountain and the Growee Ranges will continue to dominate the landscape post mining. The rehabilitated conceptual final landform will occur as intervening topography within these views. The rehabilitation strategy to be implemented for the Project will ensure that the rehabilitated landform will blend in with the surrounding landscape which will minimise the effect on the visual catchment.



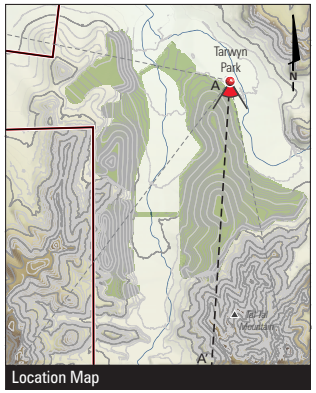
HB 1451 BYLONG (EIS) - F24 Conceptual Staged Final Landform Cross Sections (9/07/2015)

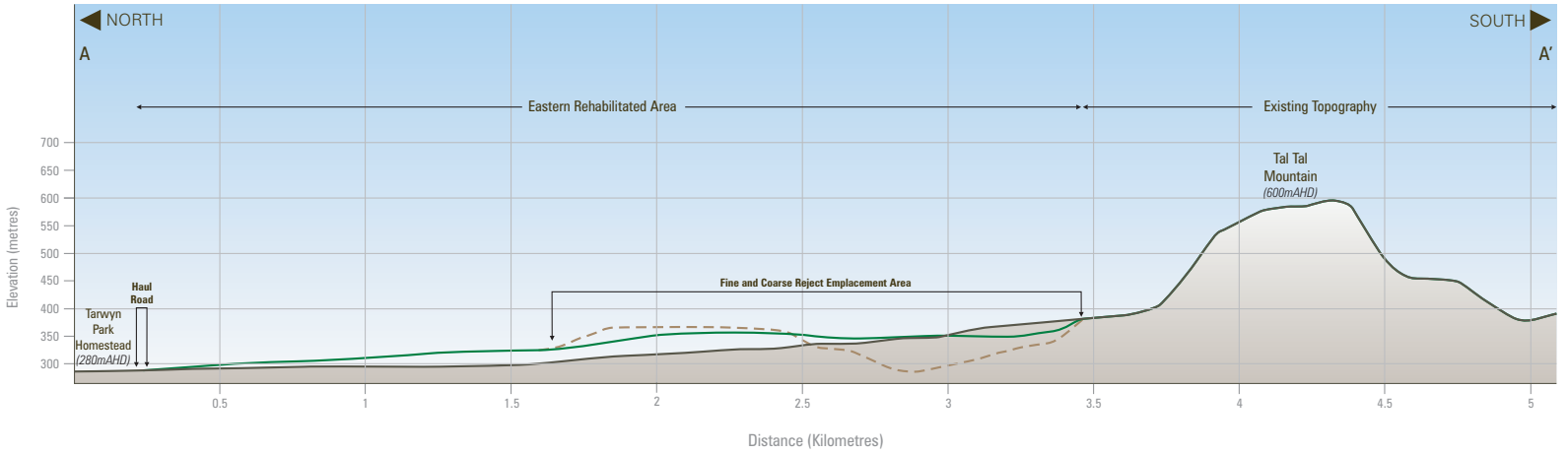
BYLONG COAL PROJECT

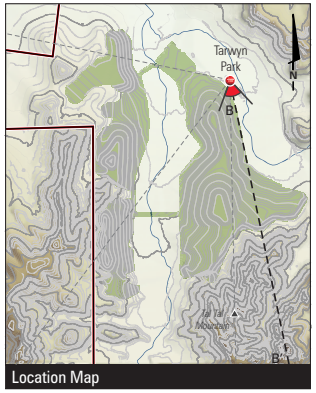
KEPCO BYLONG AUSTRALIA | Hansen Bailey ENVIRONMENTAL CONSULTANTS | WorleyParsons resources & energy

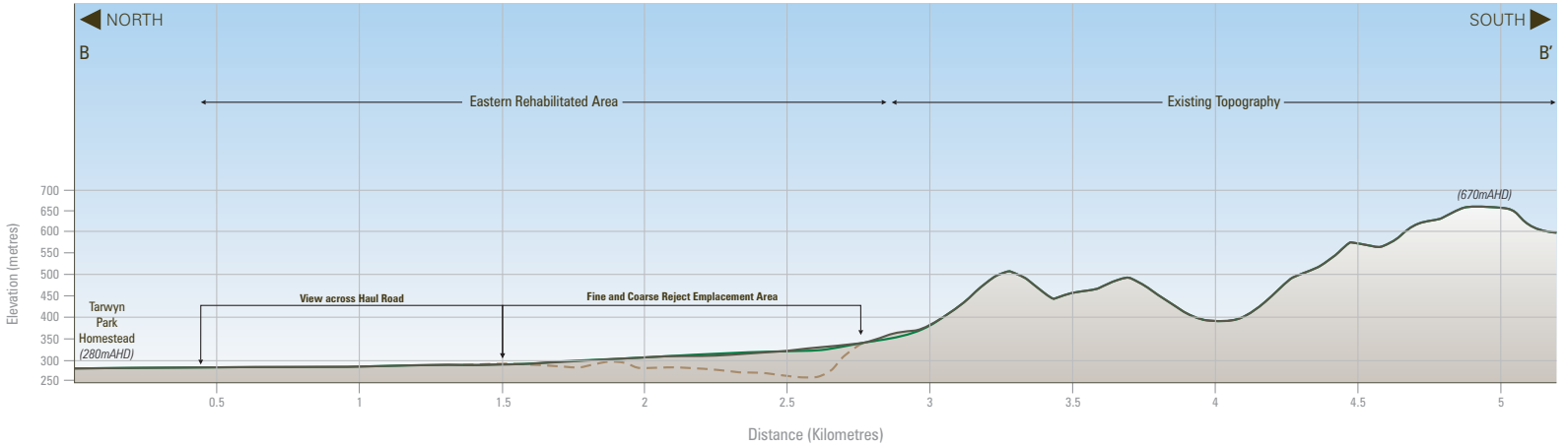
Conceptual Staged Final Landform Cross Sections

FIGURE 2









Legend

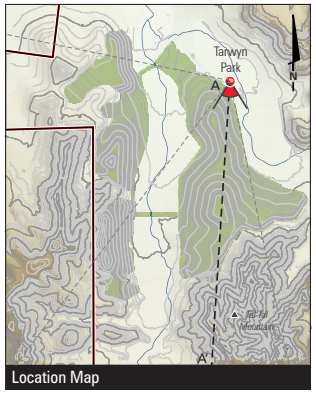
- Existing Topography
- Year 9 Landform
- Final Landform

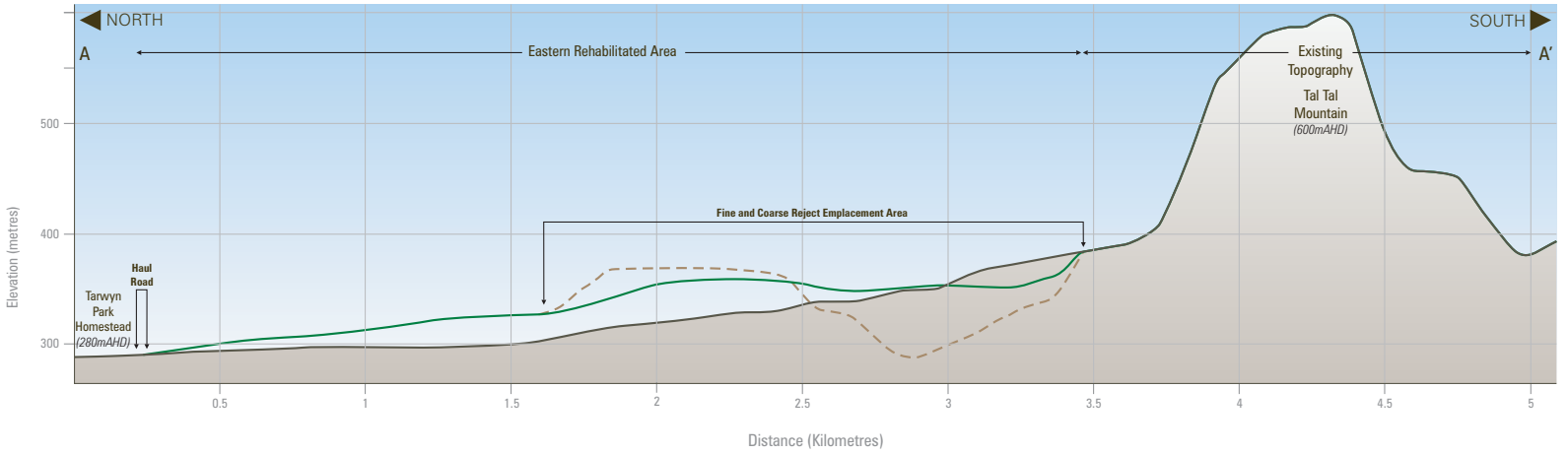
H:\BYLONG RITS Post Works 15\38 F3 Cross Sections A-A and B-B 18.05.2017 Rev C

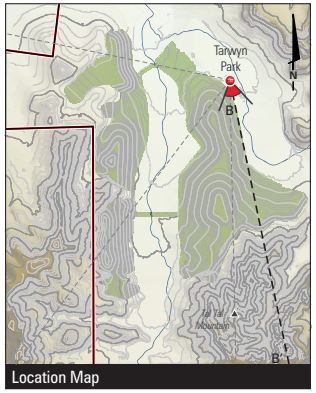
BYLONG COAL PROJECT

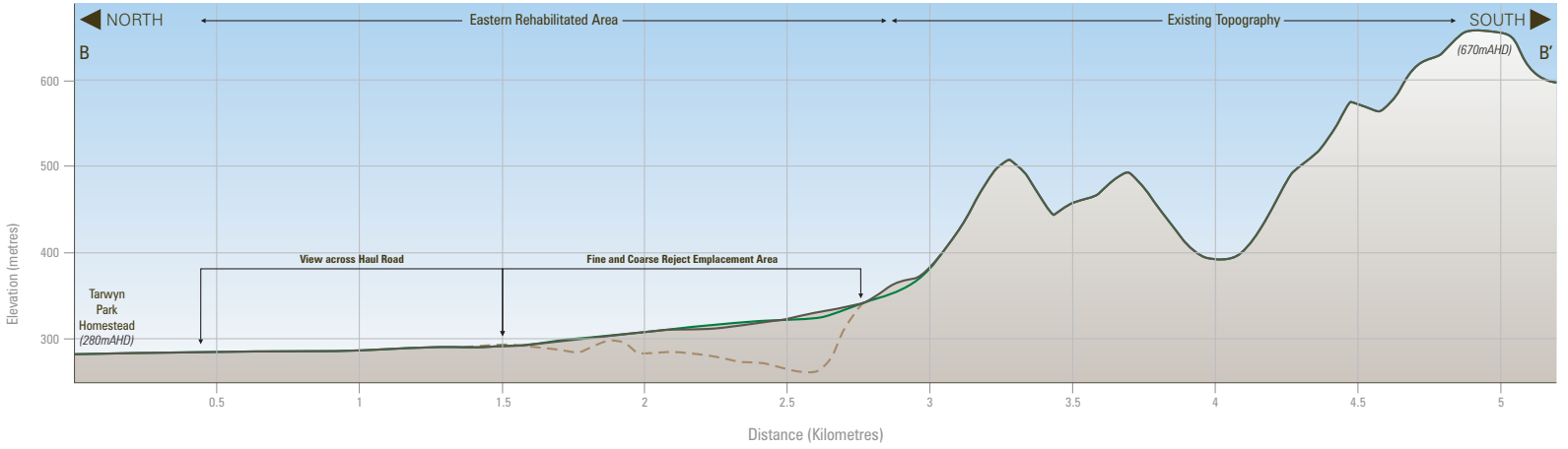
Conceptual Staged Landform Cross Sections Looking South from Tarwyn Park Homestead

FIGURE 3









Legend

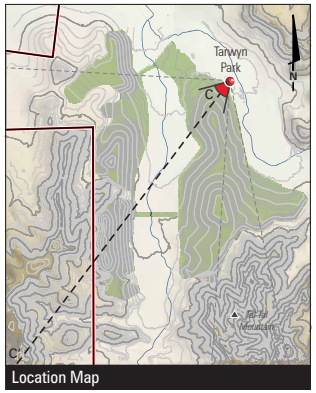
- Existing Topography
- Year 9 Landform
- Final Landform

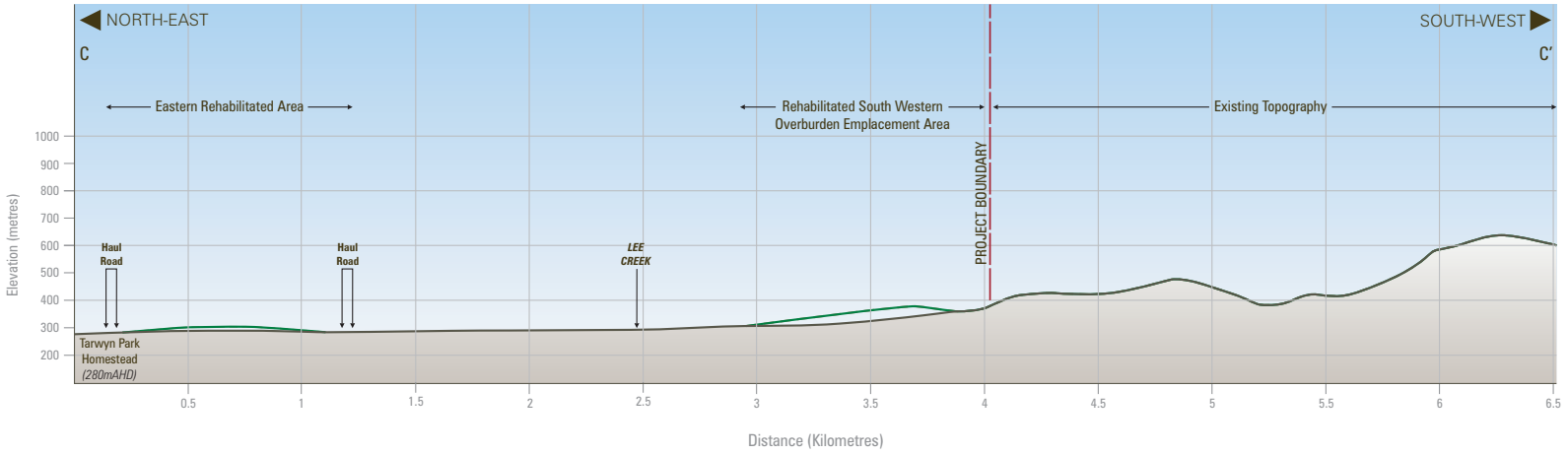
Note - Vertical / Horizontal Scale = 5/1

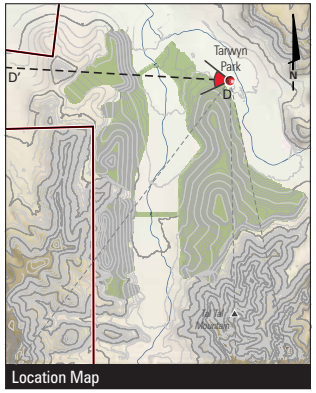
BYLONG COAL PROJECT

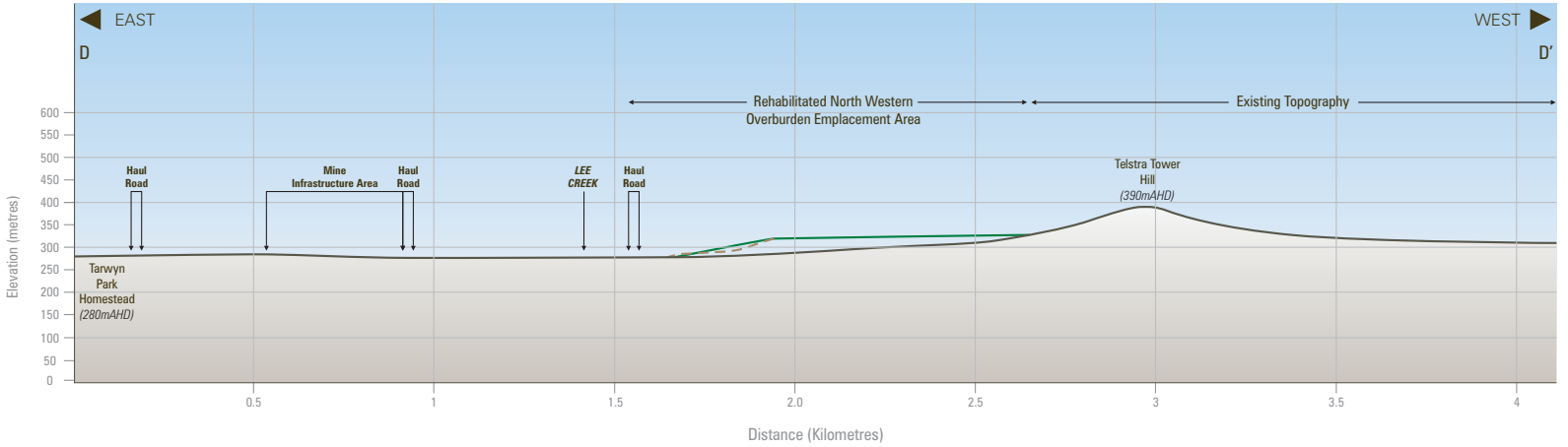
Conceptual Staged Landform Cross Sections Looking South from Tarwyn Park Homestead (Vertical Exaggeration)

FIGURE 4









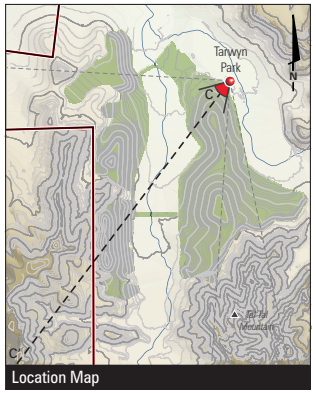
Legend

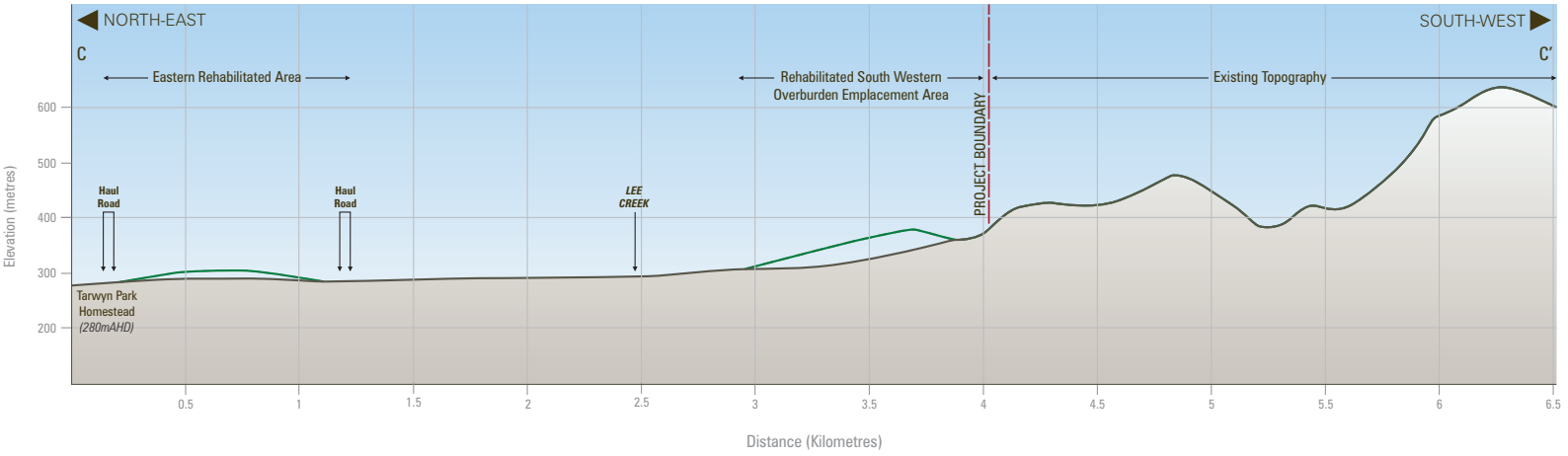
- Existing Topography
- Year 9 Landform
- Final Landform

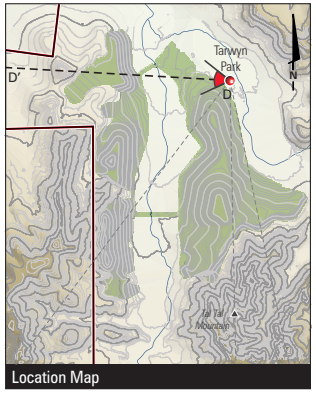
BYLONG COAL PROJECT

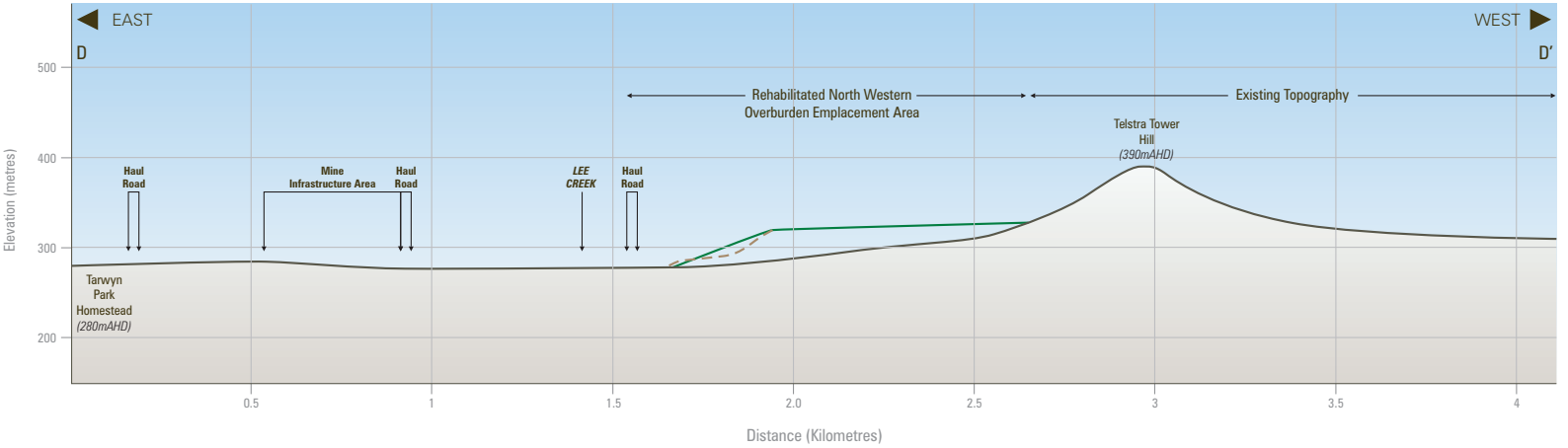
Conceptual Staged Landform Cross Sections Looking West from Tarwyn Park Homestead

FIGURE 5









Legend

- Existing Topography
- Year 9 Landform
- Final Landform

Note - Vertical / Horizontal Scale = 5/1

BYLONG COAL PROJECT

Conceptual Staged Landform Cross Sections Looking West from Tarwyn Park Homestead (Vertical Exaggeration)

FIGURE 6

3.1.4 Post Mining Landform Vegetation

The PAC enquired about the proposed vegetation to be utilised on the final landform and whether there would be treed corridors along paddocks, similar to some areas within the Project Disturbance Boundary.

Response

As outlined in Section 7.15.3 of the EIS (and in Appendix W of EIS) (and as updated within the RTS and Supplementary RTS), the proposed land use/vegetation types to be established on the post mining landform include the following:

- 423.1 ha of BSAL/LSC Class 3 land will be initially managed as a grass/pasture regime for a period of 5 to 10 years, this may include light grazing, only as a management tool to assist in pasture management. The intention of this is to manage the vegetation purely for the purpose of stabilising the soil profile following handling and placement, and allowing soil function (such as nutrient cycling, biological activity, structure development etc) to re-establish throughout the profile. It is anticipated that following the 5 to 10 year period of stabilisation, typical pasture improvement activities, including occasional cultivation may be introduced as land and agricultural management techniques.
- 172.3 ha of LSC Class 4, and 232.2 ha of LSC Class 5 grazing land will be managed as per the BSAL/Class 3 land above, however it is proposed that this land be limited to grazing only, with no surface disturbance such as cultivation recommended.
- 33.6 ha of LSC Class 6 and 7, woodland will be initially established with the suitable grass, shrub and tree species targeted to be established long term. It is not anticipated that grazing of livestock will be used as a management tool on this land, except in the occasional situation when the fuel load levels require reduction to manage the risk of bushfire impact.

Whilst the majority of the conceptual final landform is proposed to be rehabilitated to a grass/pasture regime (with exception of the LSC Class 6 and 7 land), it is likely that post mining, these rehabilitated pasture areas will be fenced off for use in agricultural grazing activities. Similar to the existing landscape (and areas which will remain undisturbed by the Project), wind breaks (via linear tree planting) will likely be established to break up the landscape and minimise the effects of wind erosion.

3.2 OPEN CUT MINING AREA

3.2.1 Coarse and Fine Reject Emplacement within Open Cut Mining Area

The PAC enquired regarding the size of the open cut mining void which will remain at the cessation of open cut activities to accommodate the coarse and fine reject materials generated throughout the remaining life of the underground mining operations.

Response

Due to the open cut mining process, a sub-surface void is typical of the final landform following the completion of mining. There are several alternatives that currently exist to treat a void at the cessation of open cut mining. These alternatives may range from leaving the void open in perpetuity or, alternatively, backfilling the final void by some means to achieve a final landform that best represents the existing and surrounding topography. Stand-alone open cut mining operations generally result in some level of final void following mining because of the cost and magnitude of material quantity imbalance associated with backfilling the final voids. In the event where underground mining follows open cut mining, a synergistic opportunity exists, whereby the reject material produced from the processing of coal recovered by underground mining may be used to ultimately backfill the open cut void. The Project has been carefully designed to enable this approach to be adopted.

The Project's open cut interim void materialises in the later years of open cut mining and is located within the south-eastern extents of the Eastern Open Cut. The void will comprise an area of more than 155 ha, extend to depths of approximately 90 m, and will have an estimated nominal volume of approximately 18,800 ML. The capacity of the open cut void has been designed to accommodate the anticipated volume of underground mining rejects whereby the total volume of rejects attributed to underground mining operations is envisaged to be 11,700 ML. Therefore, more than 7,000 ML of free capacity is available over and above the planned underground rejects storage requirements. This additional volume has been purposefully incorporated within the mine design to accommodate any surplus site water as accounted for in the site water balance. Isolated periods of surplus site water make, which are more likely to occur during underground operations, can be successfully managed with storage of such water in the designated void. During extremely wet climatic conditions, Appendix J of the RTS estimated up to 6,940 ML may be required to be stored within the designated interim void, which can be accommodated within the available and planned 7 GL available storage capacity. Further detailed work on this matter will be undertaken at a post-approvals stage. If water remains in the void at the end of mining, the removal of this water to facilitate rehabilitation can be undertaken by pumping this water to abandoned underground workings, further ensuring a zero-discharge site. The purpose of the Project's interim void is two-fold: that is, satisfying longer-term underground mining operations reject storage requirements, as well as providing a suitable buffer to assist with managing the site water balance and allowing for a zero-discharge mining operation.

Following the completion of both open cut and underground mining operations, the interim void will have a much-reduced volume because of progressive backfilling utilising underground rejects material. The stored rejects material will be capped and rehabilitated at the end of mine life, so that no final void remains at completion of the Project. Overburden material which has been emplaced and temporarily rehabilitated during operations within the Eastern Mining Area will be rehandled, placed, compacted and shaped to cover the rejects material to generate the final landform.

Rehabilitation will be focussed towards establishing a safe and stable final landform that integrates into the neighbouring environment. The typical cross section of the void as well as the rehabilitated conceptual final landform is shown in **Figure 2** to **Figure 6**.

3.2.2 Open Cut Mine Footprint Relative to Tarwyn Park House and Stables

PAC members enquired regarding the proposed open cut mine plan design in relation to avoiding impacts to the Tarwyn Park Homestead and Stables.

Response

The overall mine design and mine plan justification has been documented in detail within the Project's EIS, RTS and Supplementary RTS and associated technical appendices. However, with respect to the proximity of the Eastern Open Cut to the Tarwyn Park Homestead and Tarwyn Park Stables, the following mine design assumptions are of interest.

Offset From Alluvials

In view of the suitable coal resource extending for the large proportion of the Bylong Valley, the preliminary consideration and input into the constraints to open cut mining were underpinned by the NSW Government *Guidelines for the Management of Stream/Aquifer systems in Coal Mining Developments*. The requirement to adopt a suitable offset of the Eastern Open Cut highwall from the Bylong River alluvials facilitates the opportunity whereby the Tarwyn Park House and Tarwyn Park Stables effectively lie within this offset area and are therefore not directly impacted by open cut mining.

Haul Road Adjustments

The haul road adjoining the Eastern Open Cut was re-aligned during the mine design process to ensure that the Tarwyn Park House and Tarwyn Park Stables will not be directly impacted by the Project and will remain in their current locations.

Indirect Impacts

With respect to proximity of the Project to the Tarwyn Park House and Tarwyn Park Stables, the following considerations are noted:

- The window of operations whereby open cut mining and overburden emplacement occur within the immediate area is short relative to the Project life. That is, between Years 3 and 5 of the Project (years 1 and 3 of mining activities), the immediate open cut mining areas and associated overburden emplacement activities will have been completed to facilitate the final rehabilitated activities (refer to Figures 19 to 20 of the EIS).
- The progressive rehabilitation adopted by the Project will further reduce the potential short-term visual effects associated with the open cut mining areas and overburden emplacement areas.

- The net result following Year 5 of the Project is a slight increase in topography, by 20 - 30 m, within approximately 1 km of Tarwyn Park House and Tarwyn Park Stables. The overall final landform perspective of this area is illustrated in the cross sections provided in **Figure 3** to **Figure 6**. The resultant increase in overall rehabilitated topography is considered minor when viewed with the consideration of the topography of the more distant views which is characterised by steep slopes and much larger elevation changes (for example, Tal Tal Mountain).
- The current more contemporary gateway to the Tarwyn Park Farm Complex is located within the Project Disturbance Boundary and will be disturbed by mining activity. This gateway was only constructed within the last seven years and as such clearly cannot be considered as having significant heritage value.

As explained in Section 7.12.4 of the EIS, KEPCO is committed to conducting specific monitoring programs throughout the life of the open cut and underground mining operations and to complete any restoration works to items of assessed heritage value (including the Tarwyn Park Homestead and Stables) to conserve their pre-existing structural condition. The Tarwyn Park Homestead is proposed to be utilised as mine site offices in the short-term, returning to a potential residential dwelling in the mid to longer-term (particularly during the underground mining operations).

3.3 ABORIGINAL CONSULTATION

3.3.1 Registered Aboriginal Parties Involved

The PAC questioned the makeup of the Registered Aboriginal Parties (RAPs) involved with the completion of the Aboriginal Archaeology and Cultural Heritage Impact Assessment for the Project.

Response

As explained within Section 5.6.1 and listed within Table 21 of the of the EIS, there were 27 RAPs who registered their interest in being involved in the Aboriginal Archaeology and Cultural Heritage Impact Assessment for the Project. Table 21 of the EIS is reproduced as **Table 3**.

Table 3
Registered Aboriginal Parties (RAPs) for the Project

Ref	Registered Aboriginal Party
AGA	AGA Services
AFT	Aliera French Trading
BAT	Bathurst
BUD	Buddang
CA	Culturally Aware
CAC	Cacatua General Services
DD	Divine Diggers Aboriginal Cultural Consultants
GNTO	Gomeroi-Namoi Traditional Owners
GOM	Gomery
HEC	HECMO Consultants
JLC	JLC Cultural Services
KM	Katrina McKinnon
LHW	Lower Hunter Wonnarua Cultural Services
MG	Murong Gialinga
MIN	Mingaan Aboriginal Corporation
MLALC	Mudgee Local Aboriginal Land Council
NEW	North East Wiradjuri Company Ltd
PB	Paul Brydon
YAR	Yarrawalk
YIN	Yinaar Cultural Services
UAC	Ungooroo Aboriginal Corporation
W1C	Wonn 1 Contracting
WAL	Wallangan Cultural Services
WAR	Warrabinga Native Title Claimants Aboriginal Corp
WCE	Wiradjuri Council of Elders
WLALC	Wanaruah Local Aboriginal Land Council
WVWAC	Wellington Valley Wiradjuri Aboriginal Corporation

As represented within the names of many (but not all) of the 27 RAPs, they are generally based between the Wiradjuri, Wanaruah, and Gomeroi nations and traditional boundaries. As stated within Section 5.1.1 of the Aboriginal Archaeology and Cultural Heritage Impact Assessment (Appendix S of the EIS), historic records suggest that the general area of Bylong is located within Wiradjuri country, but is also closely aligned with Wanaruah country.

3.3.2 Key Issues Raised by RAPs

The PAC enquired regarding the key issues which were raised by the RAPs throughout the preparation of the Aboriginal Archaeology and Cultural Heritage Impact Assessment for the Project.

Response

The key issues which were raised by the RAPs throughout the preparation of the Aboriginal Archaeology and Cultural Heritage Impact Assessment are provided within Appendix S of the EIS and summarised within Section 5.6.4 of the EIS.

As stated within Section 6.5 of the DP&E PEAR, the RAPs generally considered that the sites and features within the study area have moderate to high cultural significance, with the highest level of significance apportions to:

- Ochre site;
- Modified trees;
- Grinding grooves; and
- Two sandstone cultural features (CUL004 and CUL007).

In addition to the commitments to the management of Aboriginal cultural heritage described within Section 7.11.4 of the EIS, DP&E has recommended conditions of approval to be incorporated within the Heritage Management Plan to be prepared for the Project.

3.4 GROUNDWATER ASSESSMENT

3.4.1 Groundwater Connection to Underground Mining Area

The PAC commented that they had read about a concern relating to the direct hydraulic connection between the underground mining area and the base of the alluvium and questioned the uncertainty in impacts.

Response

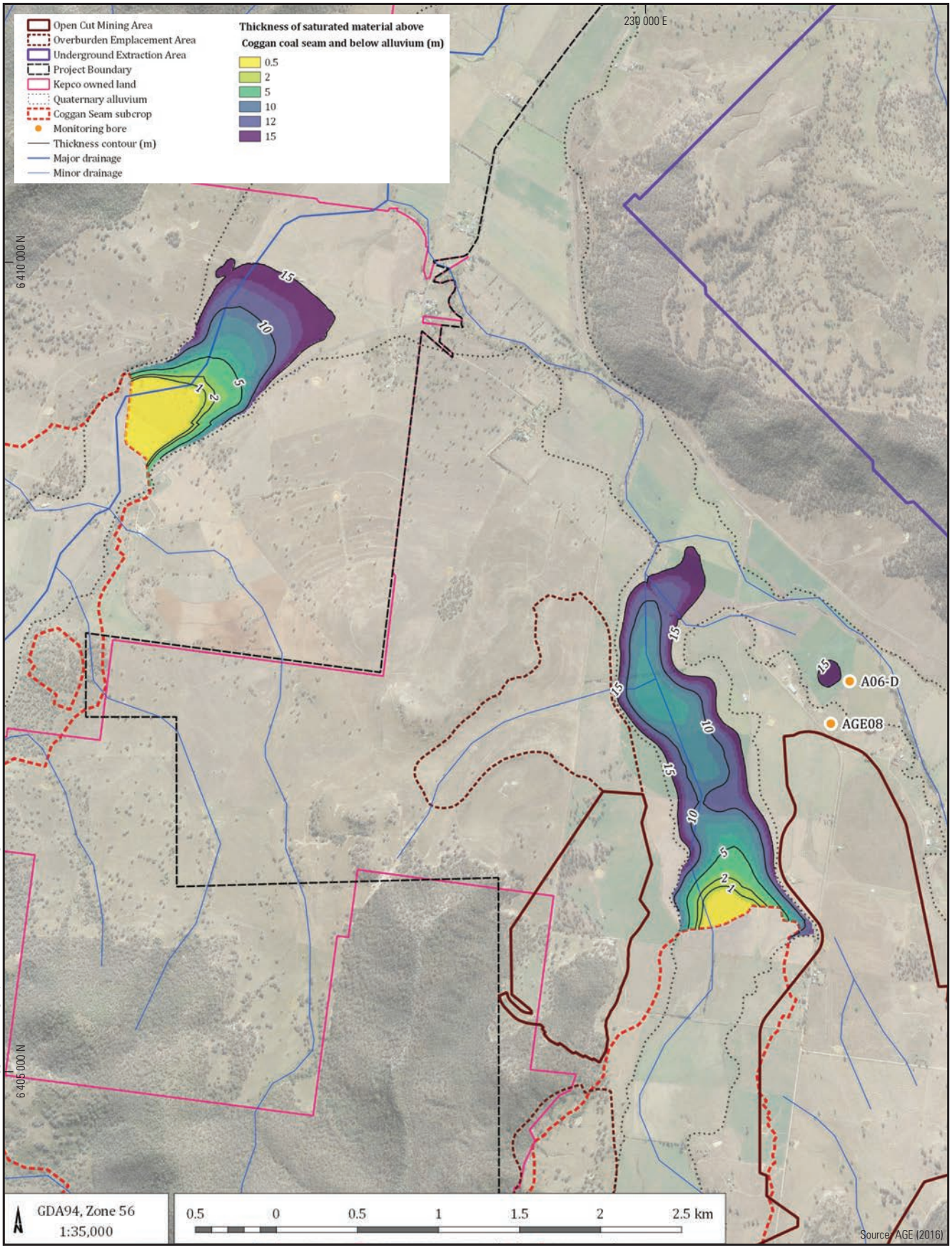
As acknowledged within Section 6.3 of the DP&E PEAR, this issue was raised by the NSW Department of Primary Industries – Water (NSW DPI-Water) following the completion of the RTS. In this regard, additional groundwater work was completed for inclusion into the Supplementary RTS for the Project. This specific matter is addressed within Section 5.3.2 of the groundwater report provided in Appendix J of the RTS.

Following this, further clarification was sought from NSW DPI-Water. KEPCO responded to this request in a letter to DP&E dated 22 November 2016 (refer to Appendix F9 of the DP&E PEAR).

Section 2.4, Issue 2 of this letter succinctly describes the issue as follows:

> "*Direct connection between the coal seams and the alluvial aquifer occurs only where erosion along the stream bed has cut into the underlying coal seam. This is a thin and limited zone known as the subcrop line. This direct physical connection has been identified within the groundwater assessments since the Gateway process and has been represented within the numerical models that have been developed for the Project to date. Elsewhere, the overlying less permeable sedimentary rocks do form an aquiclude between the base of the alluvial aquifer and the coal seam, retarding the hydraulic connectivity between these units. Again, this physical architecture of the geological units has been represented in the various numerical models for the Project.*
>
> *The Supplementary RTS groundwater report (Appendix J of the Supplementary RTS) discussed this connectivity and provides a map (see Figure 5-19)* [reproduced as **Figure 7** below] *showing where the coal encroaches closer to the base of the alluvium. Since the numerical models represented the connectivity created by the geological units (particularly in the case of the MODFLOW USG model which allows the pinching out of layers) the alluvial aquifer water is allowed to leak into the areas of sub-cropping Permian aquifers which are connected to the exposed faces within the open cut and underground mine areas.*
>
> *The modelling results have therefore appropriately captured the impacts of this process and the results provided encompass this impact. The reason the alluvial groundwater system is not predicted to be completely drained by the proposed mining is that the recharge processes including stream leakage, diffuse rainfall and lateral through flow from upstream within the alluvium serve to replenish the water lost from the alluvial aquifer due to mining.*"

Section 6.3 of the DP&E PEAR acknowledged that NSW DPI-Water's issue was addressed within the Supplementary RTS. NSW DPI-Water's recommendations have been incorporated into DP&E's recommended Development Consent conditions of approval (Appendix M to the PEAR).



H8 BYLONG RTS Post Works 1538 F7 Coggan Seam Subgroup Below Water Table and Recharge Area 18 05 2017

BYLONG COAL PROJECT

Coggan Coal Seam Subcrop below Water Table and Recharge Area

FIGURE 7

3.5 BYLONG VALLEY BENEFITS

3.5.1 Use of KEPCO's Houses

The PAC sought further clarification in relation to the proposed use of KEPCO owned houses in the Bylong Valley by the Project workforce.

Response

There are 31 residences on properties currently owned by KEPCO within the Bylong Valley. Of these existing residences, 19 are currently available for use by Project staff, including staff employed in relation to KEPCO's farming activities. The residences which are currently unoccupied, but are located close to the open cut mining areas include: Tarwyn Park Homestead and Cottage and Helvetia Main House. The remaining residences (N=12) are either uninhabitable, currently utilised for office space, or are houses that will be demolished to facilitate the Project.

KEPCO has recently exchanged contracts for the acquisition of four properties containing a total of eight additional houses (one of which is the residence attached to the Bylong General Store). An additional residence is located on a property which is predicted to be significantly affected by noise from the Project's open cut mining activities. KEPCO is currently negotiating with the owner of this property in relation to the potential for land acquisition and/or other mitigation measures. In total, an estimated 28 residences are likely to be available for use by Project-related employees and their families (including employees associated with KEPCO agricultural activities and management of the Bylong General Store), during some aspects of the open cut mining phase and primarily during the underground operations phase. The number of residences available for use by employees during the initial construction phase and open cut operations phase will be less than 28 due to the temporary amenity related impacts of the open cut operations.

KEPCO is committed to restoring social capital to the Bylong Valley through the Project. KEPCO is committed to encouraging operations phase employees, contractors and subcontractors (and their families) to reside permanently in the above mentioned houses. KEPCO is continuing with the survey and refurbishment of all KEPCO owned residences to be ready the properties for occupation by employees.

Section 6.3.3 of the Bylong Coal Project EIS Appendix AC describes the predicted direct Project induced population growth in the Bylong Valley. Table 33 of Section 6.3.3 indicates a predicted 23 persons are anticipated to relocate to the Bylong Valley by Project Year (PY) 3 and a total of 50 persons by PY9. During underground operations (PY13-PY23) 29 additional persons are predicted to reside in the Bylong Valley. Using the 2015 Bylong Valley population estimate of 100 residents as a baseline, the percentage increase in population due to the Project is predicted to be 23% at PY3, 50% at PY9 and 29% from PY13.

KEPCO has confirmed that it can comply with draft Development Consent Condition 20 which has been recommended by DP&E (Appendix M of the PEAR) in relation to the impact of Project activities on occupied residences on mine-owned land.

3.5.2 Bylong General Store

The PAC sought further clarification in relation to the impact of the Project on the Bylong General Store.

Response

KEPCO has recently exchanged contracts for the acquisition of the Bylong General Store. During consultation conducted to inform the SIA, Bylong Valley residents identified the Bylong General Store as a valued community asset. KEPCO has committed to ensuring the long-term operation of the store throughout the life of the Project. In this regard, KEPCO has sought expressions of interest for an experienced proprietor to manage the long-term operation of the Store and has recently released tender documents to prospective lessees to bid for the lease of the Store.

3.6 GML HERITAGE REVIEW

The PAC chairperson announced during his opening comments to the Public Hearing on Thursday, 11 May 2017 that it had engaged GML Heritage to provide advice over the potential impacts of the Project on Tarwyn Park Farm Complex, including natural sequence farming. The Chairperson also confirmed that the GML Heritage scope goes beyond the Terms of Reference to address additional requirement of the Minister for the Environment. The Chairperson confirmed that GML Heritage had briefed the PAC on its preliminary findings on Tuesday, 9 May 2017 and that components of the Tarwyn Park Farm Complex, including natural sequence farming had been assessed to meet some of the criteria on a State level and as such may be considered for listing on the State Heritage Register.

Response

The Historic Heritage Impact Assessment (Appendix T of the EIS) included an assessment of significance for the Tarwyn Park Farm Complex. The assessment identified the following items comprising heritage values at the Tarwyn Park Farm Complex:

- Tarwyn Park Homestead;
- Tarwyn Park Stables;
- Various Farm Buildings;
- Archaeological Site (rubbish mound);
- Horse Burials; and
- Natural Sequence Farming (soil hydrology techniques) land use.

Table 4 reproduces the table from Section 8.16.3 of the Historic Heritage Impact Assessment (Appendix T of the EIS) which summarises the significance assessment for the Tarwyn Park Farm Complex. AECOM concluded that the Tarwyn Park Farm Complex is of local historical, associative, technical, social, contributory, rarity and representative significance.

Table 4
AECOM Significance Assessment for Tarwyn Park Farm Complex

Significance Criteria	Assessment Against Criteria
Criterion A – Historic Value an item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)	Tarwyn Park Farm Complex is of local historical significance for several reasons. The farm is associated with William Lee's original land grant and was subsequently used by the Lee family to produce shorthorn cattle and thoroughbred horses both of which were famous throughout the nineteenth and twentieth centuries. Herbert Thomson continued breeding horses on the property and built Tarwyn Park house and stables. The farm is associated with a number of successful racehorses throughout the twentieth century including Heroic and Melbourne Cup winners Hall Mark and Rain Lover.
Criterion B – Associated with a NSW identity an item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)	Tarwyn Park Farm Complex is of local significance through its association with the works of a person of importance in the local area's cultural history. The farm is associated with Herbert Thompson, an important figure in Australian horse breeding, and the work of Peter Andrews who developed the Natural Sequence Farming technique for which he was awarded the Order of Australia Medal.
Criterion C – Technical Achievement an item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)	Tarwyn Park Farm Complex is of local significance for demonstrating a high degree of creative or technical achievement in the local area. Tarwyn Park Farm Complex is well-known for its association with thoroughbred horses of exceptional quality, including a number of Melbourne Cup winners. The complex is also well-known for the development and application of the Natural Sequence Farming technique. These values relate to the farm complex as a whole and are not invested in a single component.
Criterion D – Social Value an item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons	Tarwyn Park Farm Complex is of local significance for its strong association with the NSW horse breeding and racing community. Tarwyn Park Farm Complex is well-known by breeders and the racing community for its association with thoroughbred horses of exceptional quality, including a number of Melbourne Cup winners. The farm is also well known regionally for its successful application of NSR.
Criterion E – Contributory Value an item has potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)	Tarwyn Park Farm Complex is of local significance as it has the potential to yield information that could contribute to the area's cultural history. Tarwyn Park Farm Complex has the potential to yield information related to the construction and use of farm buildings in the early twentieth century. Potential archaeological deposit associated with the complex may also have potential to yield information regarding rural life and thoroughbred horse breeding in the early twentieth century.
Criterion F – Rarity an item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)	Tarwyn Park Farm Complex is of local significance as rare item in the area's cultural history. Tarwyn Park Complex is one of two farm complexes in the area with architecturally designed houses from the 1930s.
Criterion G - Representativeness an item is important in demonstrating the principal characteristics of a class of NSW's - cultural or natural places; or - cultural or natural environments (or a class of the local area's • cultural or natural places; or • cultural or natural environments.)	Tarwyn Park House is of local significance as a fine example of a 1930s Federation/Californian Bungalow style rural homestead.
Integrity	The farm complex is in good condition.

At the time of preparing this Response, the GML Heritage report had not been publically released and published on the PAC's website. KEPCO and its technical consultants look forward to the opportunity to extensively review and provide a response to the GML Heritage technical report and associated significance assessment for the Tarwyn Park Farm Complex prior to its findings being relied upon for decision making purposes.

4 PAC PUBLIC HEARING ISSUES

This section provides a response to issues raised in the 44 presentations delivered on 11 May 2017. ***Appendix A*** *includes the full list of speakers beyond those referenced below. Where issues have been previously responded to in detail, a reference to where the issue has been addressed is provided, rather than duplicating the response.*

Table 1 *provides a tabulated list of responses and documentation which are referenced below.*

4.1 OVERVIEW

Out of the 44 presentations provided during the public hearing, 31 were in support of the Project, generally due to the creation of job and opportunities for the MWRC LGA and, more particularly, the local community. This Response does not provide a response to these supporting presentations.

Three of the presentations were either not related to the Project or provided comment on how to improve the enforceability of compliance. Ten presentations were in objection to the Project and raised various concerns.

4.2 MARTIN RUSH – MUSWELLBROOK SHIRE COUNCIL

4.2.1 Proportion of Workforce from MSC

MSC stated that it did not agree with the assumptions utilised for the traffic and social impact assessments for the Project EIS.

Response

KEPCO has previously responded to comments from Muswellbrook Shire Council (MSC) regarding the forecast Project traffic distributions in letter correspondence to the DP&E dated 7 July 2016 (refer to Appendix F of the Supplementary RTS). KEPCO has undertaken an extensive amount of work from the initial mine planning phase and throughout the preparation of the EIS and associated approvals process to determine the availability of potential employees for the Project and their likely place of residence.

The Project is located wholly within the MWRC LGA. In addition to the townships within the MWRC LGA, the nearby townships of Denman and Sandy Hollow (within the MSC LGA) were also identified to be within a one hour commute from the Project site (the Local Area) and have therefore been considered as acceptable places of residence for Project employees.

The availability of accommodation and potential employees has been reflected within the forecast traffic distributions for the Project. The township of Muswellbrook (and other localities to the east of the Project) is located more than a 1 hour commute from the Project site. Therefore, due to concerns with driver fatigue, Muswellbrook is not considered to be an acceptable place of residence for Project-related employees whom are likely to travel to the Project site on a daily basis.

During early consultations with MWRC, it was identified that MWRC was considering an upgrade to the Wollar Road to facilitate a more direct route for tourists to travel to and from the Mudgee Region. Resources for Regions funding for this road upgrade was announced in May 2015 and these works have since commenced. The upgraded Wollar Road will provide the most appropriate route from Mudgee to the Project as the closest regional centre to the Project within MWRC LGA. Mudgee has therefore been forecast to be the primary place of residence for the majority of Project-related employees. As heard from a number of presentations during the public hearing, the towns of Rylstone and Kandos (also within the MWRC LGA) are also likely to provide a substantial proportion of the Project workforce. DP&E acknowledged within its PEAR, the strong commitment which has been made by both KEPCO and MWRC to encourage the construction and operational workforces to reside within the MWRC LGA.

Whilst Denman and Sandy Hollow are located within the Local Area for the Project, the accommodation and personnel available from these townships has historically been heavily influenced by the extensive mining development, which is located much closer to home within the Muswellbrook and Singleton LGAs. Whilst there is predicted to be a proportion of employees (and associated traffic movements) from these areas, it is anticipated that this would be a small proportion compared to those likely to be residing within the MWRC LGA. The Revised Traffic and Transport Impact Assessment (RTTIA) (Appendix D of the Response to Submission report) considered an amended distribution of Project-related traffic to the east when compared to the EIS assessment. This amended distribution was made as a result of the updated surveys completed during late 2015 indicating the increased availability of accommodation and employees within Denman and Sandy Hollow.

MSC has also previously commented that there are a number of mining contractors whom have established bases within the MSC LGA (and at other locations to the east of the Project) would likely travel the Bylong Valley Way to the Project site. KEPCO acknowledges that there is an established base of mining related suppliers and contractors within the Hunter Valley. However, it is noted a number of these suppliers and contractors (with whom KEPCO is in ongoing discussions) already support the existing mines from within the Mudgee region having satellite bases within Mudgee and surrounds. KEPCO has previously noted its preference to utilise suppliers and contractors located within their Local Area and have canvassed this strongly with the MWRC LGA business communities. The evidence of experienced mining support services was evident during presentations heard following Mayor Rush's presentation during the public hearing.

As noted within DP&Es PEAR and included into the recommended Development Consent conditions, KEPCO has made the commitment to restrict Project-related heavy vehicles from utilising the Bylong Valley Way (to the east). KEPCO supports the condition from the recommended Development Consent conditions which restricts heavy vehicles related to the development (excluding light rigid heavy vehicles and medium rigid heavy vehicles up to a GVM of 10 tonnes) from utilising Bylong Valley Way between the Golden Highway intersection and the entry into the Bylong Quarry.

This commitment will further minimise the potential impacts of the Project to the 40 km section of Bylong Valley Way within the MSC LGA from those assessed within the RTTIA. Accordingly, KEPCO remain confident that the forecast traffic movements on Bylong Valley Way which are directly related to the Project as assessed within the RTTIA remains appropriate.

4.2.2 Minimal Consultation with MSC

MSC commented that it had only been consulted once over the Project.

Response

Despite the Project being located entirely within the MWRC LGA, KEPCO and its consultants have met with and corresponded with MSC representatives on five occasions since acquiring the Project in 2010.

As provided in Table 14 of the EIS, KEPCO met with MSC personnel in relation to the Project EIS in July 2014 and then again in September 2015 to present the findings of the traffic assessment.

DP&E publically exhibited the SSD Application and supporting EIS between 23 September 2015 and 6 November 2015. DP&E did not receive a submission from MSC during the public exhibition period. However, MSC provided its submission on the Project to DP&E on 15 March 2016. The RTS was being finalised at this time of receiving this submission and as such it was not able to be addressed within the document lodged with DP&E on 23 March 2016.

KEPCO responded to MSC's submission following a meeting with them on 27 May 2016 in letter dated 7 July 2016. KEPCO received further correspondence from MSC dated 9 August 2016 which provided further comments on KEPCO's letter dated 7 August 2016. KEPCO received further correspondence from MSC dated 31 August 2016 specifying its expectations for payments in relation to road safety and maintenance. KEPCO sought clarification from DP&E on how MSC's requested contributions had been derived. This information was received by KEPCO on 12 September 2016.

A further meeting was held with representatives from MSC on 5 October 2016 to discuss the various correspondences received from MSC over the Project. Additional correspondence was received from MSC on 9 November 2016 providing revised calculations of requested contributions. KEPCO responded to this latest correspondence in letter dated 9 December 2016 providing an offer of a one off upfront contribution to resolve road safety issues which have been identified on the existing section of Bylong Valley Way. MSC responded to this offer in letter dated 19 January 2016. A meeting was subsequently held with MSC representatives on 8 February 2017 following which response to MSC was provided in letter dated 13 April 2017. At the time of preparing this Response, KEPCO had not received a response from MSC.

In light of the above correspondence (see **Table 5**), it is concerning that MSC is publically stating that KEPCO has only consulted with the MSC on one occasion when in fact there have been numerous consultations.

Table 5
Correspondence and Meetings with MSC

Ref	Date	Description of Interaction
1	1 July 2014	Cockatoo Coal meeting with MSC to provide an overview of the Project
2	15 September 2015	Meeting with MSC to present the Project EIS and impact assessments
3	15 March 2016	Late submission from MSC dated 15 March 2016 on the EIS. Not able to be addressed within the RTS dated 23 March 2016
4	26 May 2016	Meeting with MSC to discuss their late submission on the Project and present the facts about the Traffic Impact Assessment (Appendix Z of the EIS)
5	20 June 2016	Email from MSC seeking an update on the response to MSC's late submission
6	7 July 2016	Response to MSC late submission provided to DP&E and MSC
7	9 August 2016	Letter from MSC to DP&E commenting on KEPCO's response to the MSC submission
8	31 August 2016	Letter from MSC to DP&E providing a request for road maintenance and road safety upgrades
9	12 September 2016	Email from DP&E providing further information on the calculations for road maintenance and road safety upgrades
10	5 October 2016	Meeting with MSC to discuss their calculations behind their request for road safety and maintenance
11	14 October 2016	Email to MSC providing information from the Revised Traffic and Transport Impact Assessment (Appendix D of the RTS)
12	9 November 2016	Email from MSC with updated calculations and amounts for road maintenance and safety upgrades
13	9 December 2016	KEPCO letter to MSC providing the proposed offer for a one off road safety upgrade contribution consistent with initial discussions with MSC
14	19 January 2017	Letter from MSC responding to KEPCO's letter dated 9 December 2016
15	8 February 2017	Meeting with MSC to discuss latest letter correspondence and work on an acceptable way forward
16	13 April 2017	KEPCO letter to MSC providing the information requested during meeting and resubmitting an offer of one off road safety upgrade contribution.

4.2.3 MSC Documents Provided to PAC

MSC provided a number of hard copy documents to the PAC.

Response

At the time of preparing this Response, the above mentioned documents had not been released on the PAC's website. KEPCO and its technical consultants look forward to the opportunity to extensively review and provide a response to these documents prior to the PAC considering the findings of these documents being utilised for decision making purposes.

As was evidenced throughout the public hearing for the Project, the Project presents an obvious opportunity for local people, mine workers and mine suppliers located within the MWRC LGA which have experienced the effects of the industry downturn in the region over the past few years.

4.3 BRENDAN TOBIN – ON BEHALF OF THE OBIED FAMILY PROPERTY CHERRYDALE (LOCAWAY PTY LTD)

4.3.1 Noise Criteria

Locaway Pty Ltd stated that the noise criteria under the NSW Industrial Noise Policy is set at 35 dBA and any exceedance of this should be mitigated.

Response

The lowest intrusive noise criteria provided under the NSW *Industrial Noise Policy* (INP) is set at 35 dBA (based on a default minimum background noise level of 30 dBA plus 5 dBA). Exceedances of the intrusive noise criteria (which was set as the Project Specific Noise Criteria (PSNL)) for the Project have been demonstrated and accepted by EPA and DP&E to be subject to mitigation and management in accordance with relevant policy, including the INP and the Voluntary Land Acquisition and Mitigation Policy (VLAMP) (DP&E, 2014).

Table 59 of the EIS presents the predicted noise levels which exceed the PSNL. Receivers 56, 57A and 57C are owned by Locaway Pty Ltd. The predicted noise levels for the Project include the application of reasonable and feasible noise mitigation measures which are described within Section 7.9.4 of the EIS (and Appendix Q of the EIS). **Section 4.3.2** provides further detail on the application of reasonable and feasible noise management and mitigation measures to the Project.

The noise modelling predicted noise levels up to 2 dBA greater than the PSNL at receiver 56 in Project Year 3, with predicted noise levels up to 1 dBA greater than the PSNL at receivers 56, 57A and 57B during Project Year 5. Noise impacts from the Project are anticipated to remain below the PSNL during the Project Year 7 noise modelling scenario and during the period of underground mining operations.

In accordance with the VLAMP, residual noise levels predicted for receivers 56, 57A and 57C are characterised as "*negligible*" impacts and do not require receiver based treatment or control. The VLAMP explains that for this category of noise "*the exceedances would not be discernible by the average listener and therefore would not warrant receiver based treatment or controls*".

Table 1 of the VLAMP is reproduced as **Table 6** below (also provided as Table 60 in the EIS), and is described within the VLAMP as "*the NSW Government's interpretation of the significance of any potential exceedances of the relevant noise criteria, and identifies potential treatments for these exceedances*".

Table 6
Characterisation of Noise Impacts and Potential Treatments

Residual Noise Exceeds INP Criteria By	Characterisation of Impacts	Potential Treatment
0-2 dB(A) above the PSNL	Impacts are considered to be negligible	The exceedances would not be discernible by the average listener and therefore would not warrant receiver based treatments or controls
3-5 dB(A) above the PSNL in the INP but the development would contribute less than 1dB to the total industrial noise level	Impacts are considered to be marginal	Provide mechanical ventilation / comfort condition systems to enable windows to be closed without compromising internal air quality / amenity.
3-5 dB(A) above the PSNL in the INP and the development would contribute more than 1dB to the total industrial noise level	Impacts are considered to be moderate	As for marginal impacts but also upgraded façade elements like windows, doors, roof insulation etc. to further increase the ability of the building façade to reduce noise levels.
>5 dB(A) above the PSNL in the INP	Impacts are considered to be significant	Provide mitigation as for moderate impacts and see voluntary land acquisition provisions below.

Source: DP&E, 2014

4.3.2 Reasonable and Feasible Noise Management

Locaway Pty Ltd stated that they do not agree that reasonable and feasible noise management and mitigation measures have been applied to the Project to avoid noise impacts. Hence the noise criteria should remain as 35 dBA in accordance with the NSW Industrial Noise Policy.

Response

The assessment of reasonable and feasible noise management and mitigation measures does not impact on the development of the PSNL. The PSNL is unaffected by the assessment of reasonable and feasible noise management and mitigation and as such remains at 35 dBA. The consideration of how to address exceedances to the PSNL (or intrusive criteria) is outlined by the INP and VLAMP.

Section 7.9.4 of the EIS (and detailed in Section 5.4.1 of Appendix Q of the EIS) presents an analysis of the investigations undertaken in relation to the application of reasonable and feasible management and mitigation measures for the Project.

The INP states that "*Reasonableness*" relates to the application of judgement in arriving at a decision, taking into account noise mitigation benefits and noise level reductions, the cost of mitigation versus the benefit, community views and the noise levels for affected land uses. The term "*feasibility*" relates to engineering considerations and what is practical to build.

Noise modelling investigations involved the consideration of 18 separate scenarios during the preparation of the NBIA (Appendix Q of the EIS). These scenarios considered a range of mitigation measures to control noise from the source, including source controls such as suppression kits and enclosures, path controls including noise barriers, and operational noise management measures such as shifting operational noise sources further away from receivers. The noise mitigation measures were investigated under enhancing weather conditions where noise exceedances were predicted, which included inversions and south easterly winds.

The results of the investigation into reasonable and feasible noise mitigation measures is summarised in Table 5-3 of the NBIA (Appendix Q of the EIS). This table quantifies the noise benefits of each mitigation option on a cumulative basis. The noise mitigation measures adopted for the Project were identified as providing the best possible noise reductions, whilst being feasible and reasonable to implement.

Specific to receivers 56, 57A and 57C, the reasonable and feasible noise investigation identified that haul truck movements to the western mining areas were a primary contributor to noise levels at these receivers. Modelling identified that the use of noise bunds adjacent to haul roads did not provide a significant benefit during noise enhancing weather (inversion) conditions. This is due to temperature inversion providing a path for noise to refract over the bund, minimising the acoustic benefits. Hence, the application of source controls in the form of noise suppression kits on haul trucks was adopted as it provided a greater overall noise benefit.

The use of noise bunds adjacent to haul roads was also considered not a feasible mitigation scenario due to the need of reducing disturbance footprints, particularly with the haul road crossings over the Lee Creek floodplain.

4.3.3 Low Frequency Noise Assessment

Locaway Pty Ltd stated that the low frequency noise assessment was not undertaken in accordance with the methodology provided within the NSW Industrial Noise Policy.

Response

Section 4.1.3 of the NBIA (Appendix Q of the EIS) provides an outline of the assessment methodology applied for the low frequency noise impacts of the Project. As stated in section 6.1 of DP&E' PEAR:

> "*The current INP provides that a +5dB modifying factor (or penalty) should be applied to the noise source level if the dBC noise level minus the dBA noise level is 15 dB or more – that is, where noise has a significant low frequency component. This methodology is also known as the 'C-A method', and has been incorporated in the INP since its introduction in 2000. It was originally developed for assessing LFN impacts associated with train locomotives in close proximity to the noise source.*

> *For some time, the EPA's noise branch and the Department have acknowledged that the C-A method in the INP has significant limitations, particularly when assessing LFN impacts at locations distant from noise sources. This is because mid and higher frequencies are naturally attenuated as distance from the noise source increases, resulting in larger differences between dBC and dBA levels due to distance alone (i.e. rather than any low frequency noise source)."*

In light of the known limitations with the C-A method specified in the INP, the NBIA justified the use of alternative methods.

Section 4.8.7.1 of the RTS (and Section 6 of the Addendum Noise Report (Appendix F of the RTS)) and Section 2.2 of Appendix G of the Supplementary RTS provide further detail and discussion regarding the assessment of low frequency noise impacts for the Project with regard to research and literature reviews conducted over recent years. This research has demonstrated that the characterisation / assessment of low frequency noise using the INP method is not necessarily appropriate in all circumstances. This is due to the threshold of audibility of low frequency noise components compared to the measured or predicted C weighted noise level.

As noted within the DP&E PEAR, the EPA has since accepted the low frequency noise assessment for the Project utilising the UK's Department of Environment, Food and Rural Affairs' method (DEFRA method) quoting the EPA stating that this method is "*consistent with current science*".

Since the finalisation of the EIS in July 2015, it is noted that the EPA's approach to the assessment of low frequency noise has been updated in the EPA draft Industrial Noise Guideline (Draft ING) (EPA, 2015). The Draft ING methodology includes further investigation into the received low frequency spectrum to determine whether or not a low frequency noise penalty should apply. The draft ING approach is based on the audibility of low frequency noise components to determine whether a penalty should be applied.

The low frequency penalties would be applied where the C minus A level exceeds 15 dB and the low frequency component noise levels exceed the thresholds in Section C2 of the Draft ING (EPA, 2015) as shown in **Table 7**.

Table 7
Draft ING Low Frequency Noise Criteria

Source	f,Hz	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
Draft ING[1]	dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Source: 1. Table C2 of the Draft ING (EPA, 2015a).

The Draft ING method was considered for comparison of the predicted noise levels. The results indicated that low frequency modifying factors would not be applicable to any private receiver in the vicinity of the Project, with the exception of receiver 69 which had already been identified as significantly affected and required acquisition (and has since been acquired by KEPCO). All other receivers, where the difference between C and A weighted noise levels exceeds 15 dB, the Z-weighted noise levels do not exceed the thresholds when comparing to the modelled results at 125Hz and 63 Hz octave bands.

In this regard, receivers 56, 57A and 57C are not predicted to result in low frequency noise impacts from the Project where a correction is required to be applied. Therefore the negligible noise impacts predicted for the Project remain.

4.3.4 Impacts on Water

Locaway Pty Ltd stated their concern in relation to the impacts of the project on water availability given that the property manager currently experiences periods of time when water is not able to be extracted. Locaway Pty Ltd also raised concerns over the ability to obtain a water licence to cover off on the predicted water takes from the Permian.

Response

It was noted in the PAC meeting that Locaway Pty Ltd can sometimes not extract its full allocation of 860 ML of alluvial groundwater. The reliability of the bores utilised by Locaway Pty Ltd for agriculture is expected to be a function of a variety of factors, including: the depth of the bore casing, the nature of the screen zone, the pumping infrastructure and how climatic conditions influence the groundwater levels. The fact that the infrastructure on the property can sometimes not yield the desired volumes of water cannot be used to infer that either the alluvial aquifer is sometimes dry, or that the Project will impact on water availability on the property owned by Locaway Pty Ltd (Cherrydale).

The modelling of groundwater for the EIS, RTS and Supplementary RTS has consistently indicated no potential for a significant impact to occur to groundwater levels at the Cherrydale property. There are several reasons for this. Firstly, changes in groundwater levels are always most significant in areas in close proximity to the mining areas and then reduce with distance from the impact source. The Cherrydale property is relatively remote from the areas proposed for mining being some 4.4 km west of the proposed underground mine, and 4 km to the north-west of the open cut mining area. At these distances, the extraction due to mining is negligible compared to the natural processes that recharge the alluvium including diffuse rainfall, lateral through flow from upstream within the alluvium and leakage from streams. Secondly, the coal seams proposed for mining outcrop to the east and do not occur on the Cherrydale property. This means the alluvium at the Cherrydale property overlies deeper Permian bedrock that will not be disturbed by the proposed mining and therefore is less subject to drawdown. Finally the Cherrydale property is in an upstream area, and not within the sub-catchment of the Bylong River catchment where open cut and underground mining is proposed, which means upstream flows of surface water and groundwater will not be influenced by the Project and continue to deliver water to the Cherrydale property.

Locaway Pty Ltd's representative at the PAC public hearing suggested that the conditions of Development Consent for the Project should require KEPCO to obtain the full water entitlement from the Triassic/Permian bedrock prior to the Project commencing. KEPCO has applied to NSW DPI-Water for a water licence to abstract 2,093 ML of groundwater from the Triassic/Permian sequence under the *Water Act 1912*. NSW DPI-Water has indicated that this licence application will be transferred to the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016* (North Coast WSP) which came into effect in July 2016. The groundwater modelling for the Project which has been undertaken in response to queries from various stakeholders (including NSW DPI-Water) has determined that up to 4,099 ML may be affected from this Triassic/Permian strata during the later years of underground mining. The current application (i.e. 2,093 ML) will cater the Project's predicted demands based on the base case scenario (RTS2 USG (Upstream weighting – mean)) until Project Year 19.

It is planned that if required, the additional water shares up to the 4,099 ML of groundwater inflow predicted for Project Year 23 will be secured by trading with other users within the water source prior to these impacts occurring. Alternatively, in light of the Project not affecting other water users within the North Coast WSP, may seek to apply to NSW DPI-Water for a new water licence allocation. The PAC should note there are precedents for this occurring at other mining projects where an initial entitlement is granted which is less than the peak predicted by numerical modelling during the greenfield stage. Once mining commences and the volume of groundwater intercepted can be validated by observations, measurements and groundwater model updates, additional entitlements can then be purchased on the open market (or a new licence applied for). If this entitlement is not available, then KEPCO have committed to reducing the scale of mining to match the available water licenses. This process will be documented within the Water Management Plan for the Project.

4.3.5 WAF

Locaway Pty Ltd highlighted to the PAC that the Recommended Development Consent conditions effectively provide an approval for the WAF for the Project. Accordingly the PAC must assume that the WAF will need to be in place.

Response

Condition 8 of Schedule 2 of the recommended Development Consent conditions was been developed following the extensive consultations with MWRC and DP&E to establish a risk management approach to ensure that suitable accommodation is available to accommodate the construction workforce for the Project within the Local Area (i.e. within a 1 hour commute from the Project).

In light of the results from the detailed accommodation availability work conducted by KEPCO's technical consultants in late 2015 and then again during late 2016, there is unlikely to be sufficient and suitable accommodation available within the Local Area to accommodate the construction employees anticipated to be required for the Project. MWRC is assured that the construction employees will be able to be accommodated within the Local Area.

In this regard, KEPCO appreciates that should sufficient and suitable accommodation be available at the time of constructing the mine, then it may not require to build the WAF. However, the condition provides a logical approach to demonstrate to the MWRC and DP&E that there is insufficient appropriate accommodation capacity available to support the construction workforce for the Project.

4.3.6 Economic Assessment

Locaway Pty Ltd referred to the CIE Peer Review report and stated that only $7 million per year will be provided to the government from the Project. Locaway Pty Ltd raised concern that the benefits of the Project will be going to Korea not locally or within NSW.

Response

This statement is incorrect. The CIE Peer Review (p. 15) (Appendix G of the DP&E PEAR) identifies that "*For the purposes of the CBA it is reasonable to assume royalties of around $290M in present value terms over the life or the Project*". This confirms the estimate made by Gillespie Economics. This $290 M in present value terms is equivalent to $763 M in total royalties over the life of the Project or an average of $33 M per year for 23 years of operation. This benefit of the Project all accrues to NSW. In addition, NSW will obtain a share of the company tax from the Project. The Economic Impact Assessment (Appendix AE of the EIS) conservatively estimated this at $21 M in present value terms, based on a company tax rate of 28.5%[1] and 7% of company tax accruing to NSW[2]. The NSW Government (2015) Guidelines which post-dates the Economic Impact Assessment (Appendix AE of the EIS) suggest the allocation of 32% of company tax to NSW. On this basis, company tax accruing to NSW is $102 M present value or $366 M in total over the life of the Project. Hence the revised benefits accruing to NSW are actually in the order of $392 M, present value.

4.4 JOHN WEAVER – TIMNATH PTY LIMITED

4.4.1 Management of Potential Impacts to Groundwater Resources

Timnath Pty Limited did not oppose the Project, although is concerned over the potential impacts that the Project may have on groundwater resources on its property which is critical to the success of its business. Timnath Pty Limited requested that further certainty is provided to them by way of a Make Good Agreement prior to the commencement of mining.

[1] At the time that the analysis was undertaken the government had proposed a reduction in the company tax rate to 28.5% of taxable income. The analysis was undertaken on this basis but the reduction in tax rate did not eventuate.

[2] Refer to Attachment 7 of Gillespie Economics (2015) for an explanation of this estimate.

Response

The modelling of groundwater for the EIS, RTS and supplementary RTS has consistently indicated no potential for a significant drawdown to occur at the property owned and managed by Timnath Pty Limited (Budden).

There are several reasons for this. Firstly, changes in groundwater levels are always most significant in areas in close proximity to the mining areas and then reduce with distance from the impact source.

The Budden property is relatively remote from the areas proposed for mining being some 3.8 km south-west of the proposed open cut, and 6.2 km from the underground. At these distances, the extraction due to mining is negligible compared to the natural processes that recharge the alluvium including diffuse rainfall, lateral through flow from upstream within the alluvium and leakage from streams. Secondly, the coal seams proposed for mining outcrop to the east and do not occur on the Budden property. This means the alluvium at the Budden property overlies deeper Permian bedrock that will not be disturbed by the proposed mining and therefore is less subject to drawdown. Finally, the Budden property is in an upstream catchment area of the Growee River and separated from the Project catchments by a high north-south ridgeline (i.e. Growee Range). Budden is not located within the sub-catchment of the Bylong River catchment where the open cut and underground mining is proposed, which means upstream flows of surface water and groundwater will not be influenced by the Project and continue to deliver water to the Budden property.

KEPCO and their consultants have met with representatives of Timnath Pty Limited on two occasions (28 October 2015 and 22 August 2016) to discuss the potential for the project to impact on alluvial groundwater supplies on the 'Budden' Property. During the meeting on 28 October 2016, KEPCO explained why the Project will not impact upon the property, but did provide an offer to the property manager to monitor groundwater levels within water supply bores on the property. This offer was rejected by Timnath Pty Limited. The extensive groundwater monitoring network proposed along with the conditions for monitoring specified within the recommended conditions of approval prepared by DP&E (including make good provisions) are considered sufficient to validate there will be no impact upon water within this property and will provide an appropriate level of protection for the owners.

4.5 KRISTIAN BROCKMAN

4.5.1 Impacts to Surface and Groundwater Resources

Mr Brockman raised general concerns regarding the significant environmental damage which will result from the Project, including impacts to creeks and rivers which run through the area.

Response

The EIS and supporting documentation includes detailed Groundwater and Surface Water impacts assessments which have been prepared for the Project in accordance with the relevant government policies and guidelines. These assessments have identified the impacts of the Project with the relevant level of certainty and have recommended the implementation of appropriate management and mitigation measures for the Project.

The predicted water usages from the alluvial aquifer will be in accordance with existing water allocations held by KEPCO. No neighbouring private landholder bores are predicted to be impacted as a result of the Project's activities.

4.5.2 Impacts to Threatened Flora and Fauna

Mr Brockman raised concerns about the impacts to the threatened flora and fauna and biodiversity values of the region.

Response

A detailed assessment of the biodiversity values present within the Study Area is provided in the EIS Ecological Impact Assessment (Appendix J of the EIS). The Ecology Impact Assessment includes an assessment of species known to occur within the Study Area as well as those considered to have the potential to occur. It is acknowledged that there are high biodiversity values, including the occurrence of threatened flora and fauna species within the Study Area and locality, which is likely the result of proximity to Wollemi National Park and Goulburn River National Park.

The Project has been designed to minimise impacts on biodiversity (such as position of the Project Disturbance Boundary predominantly within cleared areas and avoidance of several significant cliff lines).

Following consultation with the NSW Office of Environment and Heritage (OEH) and DP&E, further assessment of the Project was undertaken to align the Project's ecological assessment with the requirements of the '*NSW Biodiversity Offsets Policy for Major Projects'* (NSW Offsets Policy) and associated Framework for Biodiversity Assessment (FBA). The findings of this further assessment are contained within a Biodiversity Assessment Report presented within Appendix J of the RTS.

These biodiversity impact assessments completed for the Project have identified the biodiversity values present, the potential impacts resulting from the Project and have recommended appropriate management, mitigation and offsetting measure to avoid and compensate for any residual impacts to the identified biodiversity values.

4.6 MARTIN EAGAN

4.6.1 High Voltage Transmission Line

Mr Eagan raised concerns over the proposed re-alignment of the High Voltage Transmission Line in relation to the Emergency Services (Westpac) Helicopter landing site adjacent to the Rylstone Hospital.

Response

Mr Eagan is referring to a separate environmental assessment which has been prepared by KEPCO for the consideration of Endeavour Energy under Part 5 of the EP&A Act to facilitate an upgrade to and minor realignment of a small section of an existing High Voltage Transmission Line which runs between Ilford and Bylong. This Part 5 environmental assessment does not relate to the development, the subject of SSD 14-6367 (i.e. the Project). This Part 5 environmental assessment involves an upgrade to a transmission line which will be carried out by KEPCO, on behalf of Endeavour Energy and will continue to be owned and managed by Endeavour Energy throughout the life of the Project and beyond.

Mr Eagan owns land bordered by Mill Street to the west and Narrango Street/Fitzgerald Street to the north. The Rylstone Hospital is located on the corner of Fitzgerald Street and Ilford Road and a back boundary of Mill Street. The helipad is located on the western side of the main hospital building, closest to Ilford Road. The proposed High Voltage Transmission Line alignment is situated along the rail line easement located to the east of Mr Eagan's property and more than 240 m east from the helipad location. An existing powerline is located along Mill Street which divides the Rylstone Hospital from land owned by Mr Eagan.

KEPCO's Community Liaison Officer (CLO) has met with Mr Eagan on a number of occasions to discuss the proposed High Voltage Transmission Line upgrade and relocation. In light of Mr Eagan's concerns to safety of emergency helicopter flights, KEPCO has met with the Rylstone Hospital emergency personnel and Ambulance staff to discuss the potential for interference with the use of the emergency helicopter landing pad. These consultations did not identify any concerns with the proposed transmission line, however contact details were provided for the body responsible for managing the helicopter landing site.

KEPCO is committed to meeting with the body responsible for managing the helicopter landing site following the completion of the detailed design plans and associated information to discuss any potential issues with the emergency helicopter landing pad which require resolution.

4.7 STEPHEN PELLS – ON BEHALF OF BYLONG VALLEY PROTECTION ALLIANCE

4.7.1 Groundwater Assessment

Mr Pells agreed that the groundwater impact assessment was robust and the impacts were predicted with certainty, however he raised whether the impacts on the regional groundwater regime were acceptable, referring to the uncertainty modelling completed.

Response

When mining projects are at a greenfield stage, it is normal for there to be a level of uncertainty in the level of impact predicted. As projects become active operations, predictions from numerical models can be validated with measurements of water level drawdown and seepage to mining areas. This information can be used to reduce the uncertainty in future models.

The inherent uncertainty cannot be practically reduced at a greenfield stage. Uncertainty is only problematic when it indicates a 'tipping point' could occur from acceptable to unacceptable impacts. However, this is not the case for the Project, as the potential range of impacts from the lower to upper bounds do not result in any impacts on private landholders or the environment. The predicted impacts to the alluvial aquifers remains on the landholding purchased by KEPCO to buffer surrounding landholders from effects. There are no flow on effects to surrounding landholders, and therefore the buffer zone created by the KEPCO landholding serves an important purpose. The Project will also operate within the sustainable limit imposed by water licenses released by the NSW Government.

4.7.2 Subsidence Impacts on Land Owned by KEPCO

Mr Pells identified that whilst the impacts of the subsidence assessment had been appropriately identified in the assessment, the assessments confirm that it is ok because the impacts are occurring on KEPCO land. Remediation of impacts are pushed back rather than being firm on the measures that will be implemented to the impacted items.

Response

Remediation of impacts on all land (including that owned by KEPCO) will be outlined in detail in the future Extraction Plan(s) as discussed in Section 7.1.4 of the EIS. The Extraction Plan(s) will be prepared prior to the commencement of longwall mining activities and will include monitoring programs, management plans, and TARPs to respond to impacts as they arise from underground mining. This will include timely remediation of subsidence impacts on all land within the subsidence study area, including land owned by KEPCO.

4.7.3 Subsidence Impacts to Cliff Features

Mr Pells questioned whether a proactive management approach is appropriate for managing impacts from subsidence.

Response

A proactive management approach for managing impacts from subsidence forms the key strategy for modern management of impacts from mine subsidence. The proactive management approach involves:

- Engagement with regulatory departments and stakeholders;
- Comprehensive assessment of the impacts based on modelling and experiences at the subject mine and other mines;
- Development of detailed monitoring and management strategies as part of the preparation of the Extraction Plan(s);
- Mitigation works (or avoidance strategies) where considered appropriate;
- Adequate monitoring for the timely identification of subsidence impacts; and
- Preparation and implementation of action and response plans.

The proactive management approach for cliffs involves obtaining actual site based information from the mining of the initial longwall panels preceding critical areas and therefore assists in the minimisation of the risk of impact to selected cliffs. That is, should actual subsidence effects differ from those initially modelled, then revised modelling can be undertaken with this information to implement proactive mine design changes to alleviate such impacts. An outline of the proposed management strategy for the cliff features is provided in Section 4.11.6 of the RTS and includes the following key strategies:

- Sterilisation of coal by setting back longwall panels in order to minimise the risk of impact to specific cliffs C1 (24279), C2 (24324), C3 (24324), and C4 (24278);
- Commitment by KEPCO to minimising impacts to Cliff 5 as a result of its longwall mining operations;
- Monitoring ground movements and cliff conditions as longwall extraction progresses;
- Review of monitoring data during mining and at the completion of each longwall panel; and
- Adaptive management approach applied to the extracted length by reducing (or increasing if considered appropriate) the extracted length of the longwall panels to minimise the risk of impact to selected cliffs.

The underground mine plan for the Project is considered to be well suited to an adaptive management approach, as the longwall panel extraction sequence progressively approaches the cliffs, and the direction of longwall mining is towards the cliffs.

4.7.4 Subsidence Impacts on Dry Creek

Mr Pells raised concerns over the predicted cracking to Dry Creek and raised concern over the effectiveness of the mitigation and management measures proposed.

Response

The mitigation and management measures proposed to be implemented for Dry Creek are outlined in Section 7.4.4 of the EIS and Section 4.3.11 of the RTS. These measures, which are common practice within contemporary longwall mining operations, include:

- Allowing natural infilling to occur;
- Infilling with surface soils or other suitable materials;
- Locally regrading and compacting the surface;
- Erosion protection;
- Relining the beds of the drainage lines; and
- Grouting of cracked stream beds to restore integrity or pools.

The effectiveness of the proposed mitigation and management measures are controlled by the development and implementation of suitable management plan(s) that provides a comprehensive outline of the mitigation and management strategies. These management plans are to be prepared in consultation with various government agencies and to the approval of DP&E.

Detailed remediation strategies will be developed during the preparation of the Extraction Plan(s), and will include a review process for ongoing assessment of the effectiveness of the mitigation and remediation strategies.

4.7.5 Subsidence Impacts on Bylong Valley Way

Mr Pells raised concerns over the predicted impacts to Bylong Valley Way and the potential impacts that this would have on vehicles motorists using this road. Mr Pells referred to the work that he had been involved with on the Hume Highway, however raised concern over vehicle road safety on the Bylong Valley Way.

Response

A detailed discussion of the potential impacts and the management measures to be implemented for the Bylong Valley Way is outlined in Section 7.1.3 of the EIS, Appendix H of the EIS and Section 5.4.10 of the RTS.

In response to concerns raised by stakeholders over the impacts to Bylong Valley Way, Section 5.4.10 of the RTS notes that there are substantial differences between the Hume Highway and the Bylong Valley Way, including traffic volumes, pavement type and duration of active subsidence experienced along the road during the mining of each longwall panel.

The traffic volumes and pavement type for Bylong Valley Way were shown to be similar to Charlton Road, which was mined beneath by 10 longwall panels at Beltana No. 1 Mine. With similarities in the predicted strain and curvature along Bylong Valley Way, Charlton Road is considered to provide a reasonable guide to the potential impacts along Bylong Valley Way.

Charlton Road was successfully directly mined beneath by Longwalls 1 to 10 without incident or community complaint. Following the completion of a risk assessment, a number of management plans were developed in consultation with Singleton Shire Council (as the relevant roads authority) and the former Mine Subsidence Board, to safely manage the mining of longwalls beneath Charlton Road, including:

- Public Road Management Plan;
- Public Road Safety and Environmental Plan; and
- Charlton Road Monitoring Action Plan.

The management actions which were implemented at the Beltana No. 1 Mine included:

- Pre-mining inspections of the road;
- Review of subsidence movements prior to longwalls influencing the road to compare the accuracy of the subsidence predictions;
- Notifications to the public and emergency services of the timing and location of the mining of each longwall beneath the road;
- 24 hour monitoring of the road during critical periods of active subsidence, with repair crews on hand to maintain the integrity of the road;

- Temporary repairs of surface cracks as required; and
- A post-mining inspection by Singleton Shire Council and the former Mine Subsidence Board to review the results of the temporary repair work and determine the extent of permanent repairs required.

The Charlton Road Monitoring and Action Plan was reviewed and updated for each longwall to refine the management strategies with monitoring experience.

It is considered that with the implementation of an effective subsidence management strategy, mine subsidence impacts on Bylong Valley Way can be effectively managed by the Project to ensure that the road remains safe and serviceable during and after the mining of the proposed longwalls. The fact that the majority of impacts will occur within the later years of the underground mine life suggests that there will be the knowledge and experience necessary to appropriately manage the subsidence impacts on Bylong Valley Way.

4.8 DAVID PAULL – CENTRAL WEST ENVIRONMENT COUNCIL

4.8.1 Regent Honeyeater

Mr Paull highlighted that a Regent Honeyeater had been identified within the Project Study Area. Mr Paull identified that the Ecology Impact Assessment failed to recognise the sighting which had occurred at the neighbouring Mt Penny Project. Mr Paull did not agree that the vegetation to be cleared by the Project is not part of a regionally significant Regent Honeyeater corridor.

Response

Mt Penny Project Record

A suite of literature and databases were reviewed and consulted during the preparation of the EIS Ecological Impact Assessment (Appendix J of the EIS) as outlined within Section 2.1 and Section 2.2 of the report. Section 2.1 lists the Mt Penny Coal Project: Preliminary Environmental Assessment (Wells Environmental Services 2011) as being a key document reviewed. This document is the only publicly available report for the Mt Penny Project that addressed biodiversity values. This document refers to the occurrence of the Regent Honeyeater within the Mt Penny Project area, however no further detail is provided. Records of threatened fauna species detected during surveys undertaken for the Mt Penny Project should have been submitted to OEH as part of licensing requirements to undertake studies of fauna species.

Such records appear in the OEH Atlas of NSW Wildlife database, which was consulted on numerous occasions during the preparation of the EIS Ecological Impact Assessment (Appendix J of the EIS). As such, it is anticipated that any threatened fauna species, including the Regent Honeyeater, detected during surveys for the Mt Penny Project have been considered within the assessments.

Within the Biodiversity Assessment Report (Appendix J of the RTS) prepared for the Project, the Regent Honeyeater has been conservatively assumed as occurring within the Project Disturbance Boundary, despite only having been recorded at a location that is outside of this area.

Regionally Significant Regent Honeyeater Corridor

Section 6.2.3.ii.b of the Biodiversity Assessment Report (Appendix J of the RTS) provides further information on the assessment of the Regent Honeyeater. It is noted within this section that the local population of the Regent Honeyeater extends beyond the Study Area and likely includes individuals occurring in the Capertee Valley, Munghorn Gap Nature Reserve, Goulburn River National Park, Wollemi National Park and the Hunter Valley. It was also noted that the species is expected to move between the Capertee Valley, located to the south of the Study Area, and Munghorn Gap Nature Reserve, located to the west of the Study Area.

Neither OEH nor the Commonwealth Department of the Environment and Energy have identified any regionally significant Regent Honeyeater corridors. Additionally, the '*National Recovery Plan for the Regent Honeyeater (Anthochaera phrygia)'* (Commonwealth of Australia 2016) contains no reference to regionally significant corridors for the species.

4.8.2 Brush-tailed Rock Wallaby

Mr Paull raised concern over the further impacts to the breeding or shelter habitat for the Brush-tailed Rock Wallaby, in light of the FBA requiring no further impacts. Mr Paull raised concern over the 20 m buffer applied to cliffs and suggested that a 200 m buffer would have been more appropriate.

Response

Section 4.4.5.ii.c of the Biodiversity Assessment Report (Appendix J of the RTS) outlines how the extent of Brush-tailed Rock-wallaby habitat within the Project Disturbance Boundary was determined. The area of habitat assessed was based on the occurrence of riparian woodland/forest, grassy woodland, shrubby woodland, shrubland and forest located within 500 m of identified cliff lines (extent of foraging habitat beyond breeding habitat identified within the Threatened Species Profile Database). This was then refined to only include areas in close proximity to the known record at Tal Tal Mountain, whereby the source population would be expected to occur. Tal Tal Mountain does not occur within the Subsidence Study Area. This approach was adopted following close consultation with and to the satisfaction of OEH.

4.8.3 Groundwater Dependent Ecosystems

Mr Paull raised his previous concerns over the GDEs within the riparian zone of Dry Creek in areas overlying the underground mine and referred to a response suggesting that there was a perched groundwater aquifer known to occur within this area.

Response

During the preparation of the RTS, KEPCO engaged Douglas Partners to drill an additional five bores along the alignment of Dry Creek to characterise the nature of any alluvial sediments along the creek line, and the potential for this material to form an aquifer that could support deep rooted vegetation.

The new monitoring bores indicated that Dry Creek has not developed a significant sequence of alluvium along its alignment and that within the Project Boundary, the Dry Creek alluvium is dry. It was noted that whilst preparing the RTS that there is not a long term record of monitoring within the new monitoring bores, and therefore as discussed within the EIS, it is possible a thin zone of perched water occurs ephemerally at the interface between the alluvium and the less permeable rock along the alignment of Dry Creek. Further monitoring of the new bores along Dry Creek (AGE16, AGE18, AGE19 and AGE20) since installation has not indicated the presence of any ephemeral groundwater.

The EIS groundwater report also indicated the potential for a perched water table to occur at the base of the Tertiary basalt. During the RTS, the data from monitoring bores penetrating through the basalt was further examined and it was concluded the basalt was likely to be largely above the water table and dry. This is detailed in Section 4.15.13.1 of the RTS which notes that the Tertiary basalt does not support an extensive perched aquifer, or there is only groundwater occurring within low points within the basalt footprint.

Section 4.11.7 of the RTS notes that considerable circumstantial evidence exists to indicate that the GDEs present in the study area are not heavily reliant upon groundwater. This evidence is provided within the Ecological Impact Assessment (Appendix J of the EIS) and GIA (Appendix M of the EIS).

Section 4.15.6 of the RTS outlines how impacts to GDEs have been assessed. A quantitative assessment of the potential impacts of subsidence on the vegetation and habitats, including GDEs, within the Subsidence Study Area was also provided within the Biodiversity Assessment Report (Appendix J of the RTS).

4.9 JULIA IMRIE – MUDGEE DISTRICT ENVIRONMENT GROUP

4.9.1 Salinity Levels in Goulburn River

Ms Imrie raised concerns over further impacts of the Project to the salinity levels in the Goulburn River.

Response

The Project is located within the catchment of the Bylong River, a tributary of the Goulburn River, which in turn is a tributary of the Hunter River. The confluence of Bylong River and Goulburn River is located more than 15 km downstream of the Project.

The results of water balance modelling conducted for the Project show that no releases will occur from mine water dams containing water affected by contact with coal throughout the life of the Project. Some overflows from sediment dams may occur during events that exceed the relevant design standard, which will ensure that water quality impacts to receiving waters are minimal. This key design aspect of the Project's water management system will ensure that impacts to the downstream Goulburn River salinity levels will be negligible.

Section 4.15.1 of the RTS provides a summary of the work completed to assess the impacts to the Bylong River and downstream catchments post mining. Potential salinity loads as a result of the Project were assessed within the Groundwater Impact Assessment (Appendix M of the EIS) and the Surface Water Impact Assessment (Appendix L of the EIS).

The Groundwater Impact Assessment indicated that salinity in the alluvium may rise by 12%. This assumes that the groundwater salinity increases on average from 699 mg/L to 783 mg/L and therefore potentially in the surface water baseflow when no rainfall runoff occurs.

The Surface Water Impact Assessment concluded the total salt load (surface runoff plus baseflow) could increase from 4,297 to 4,339 tonnes per year, which represents an increase of about 1%. A 1% change in salinity is considered to be well within the range for natural variation, based on the data that has been collected within the system to date given the wide fluctuations in salinity that naturally occur in the streams in the Study Area. In addition, the estimated change does not change the beneficial use of the groundwater and connected surface water, as it remains fresh.

The Groundwater Impact Assessment results indicate that the Project will not cause a significant impact to groundwater resources when compared to existing background salinity loads. Accordingly, it is not expected that the Project will elevate salinity levels of groundwater significantly relative to current levels, and vegetation potentially dependent on groundwater is not expected to be affected.

Similarly, impacts to the Goulburn River located more than 15 km downstream from the Project are therefore considered to be negligible.

4.9.2 Uncertainty in Water Modelling

Ms Imrie commented that the other mines within the region had also proposed to run as a no discharge site. However, they have had to come back and seek approvals to discharge mine water to the natural environment and questioned how the Project can be any different.

Response

It is recognised that hydrogeology, is a relatively uncertain science, and that when assessing the impacts of mining, it is important to acknowledge and quantify this uncertainty as much as possible for the decision making process. In this regard, since acquiring the Project in 2010, KEPCO has installed an extensive groundwater and surface water monitoring network within and surrounding the Bylong River catchment to understand the key features of the hydrological regime to be impacted by the Project.

There are two processes the Groundwater Impact Assessment (Appendix M of the EIS) used to manage uncertainty. Firstly, when there was the need to adopt modelling parameters, which were not fully quantified, the approach was to ensure the parameter utilised was conservative in that it would result in a greater impact, not a lesser impact. Secondly, a detailed sensitivity analysis was undertaken to examine how the predictions from the numerical models changes as the input assumptions to the models are varied. As described within Appendix F of the Groundwater Impact Assessment (Appendix M of the EIS), the uncertainty in the model predictions was assessed using a traditional sensitivity analysis where model inputs were changed individually to assess the impact upon the predictions. A more complex Monte Carlo style uncertainty analysis was also undertaken where numerous model inputs were changed at the same time.

Further uncertainty analysis was completed within Appendix H of the RTS to assess the sustainable yield from the alluvial borefield. It is considered the range of potential outcomes have been sufficiently quantified within the Groundwater Impact Assessment. Further the various management and mitigation measures committed to by KEPCO address the inherent uncertainty in numerical modelling predictions.

Field investigations and associated data can assist in reducing the uncertainty in predictions from numerical models. Beyond the preparation of the RTS, KEPCO installed four additional test pumping bores within the Bylong River alluvium in an effort to gain further data of the hydraulic properties of the alluvium and further reduce the modelling uncertainty. Appendix J of the Supplementary RTS provides the additional groundwater uncertainty modelling completed following the collection of the additional monitoring data as well as to address further uncertainty scenarios raised by NSW DPI-Water and DP&Es Groundwater Peer Reviewer, Dr Frans Kalf. A groundwater model audit was also undertaken by HydroSimulations as a request from Dr Frans Kalf.

The outcome of all the modelling scenarios completed is that the water management system for the Project will be sufficient to contain all mine water generated throughout the life of the Project onsite.

4.10 HEDDA ASKLAND – HUNTER COMMUNITIES NETWORK

4.10.1 General Response to Presentation

Ms Askland is an anthropologist who has had significant and recent engagement with the Wollar community in relation to the longitudinal social impacts of mining (specifically Wilpinjong Mine) on the Wollar community. Ms Askland's issues and concerns in relation to the Project appear to be derived largely from her discussions with the Wollar community and her analysis of impacts on the Wollar community. Ms Askland's perspective of the Project appears to be driven by her immersion in the Wollar community and residents experienced impacts. Whilst her concerns may be valid in the context of Wollar and the approved Wilpinjong Extension Project, their relevance to the Project is limited. This is because the socio-economic setting of the Bylong Valley is significantly different to that of Wollar and consequently the impacts of mining are likely to be experienced differently in each location.

Unlike Wollar, the Bylong Valley:

- Has a dispersed population of 100 people, only seven of whom resided in the Bylong Village on residential blocks, the remainder reside on agricultural landholdings. In Wollar, the majority of the residential population has historically been located in the Wollar village area;
- Covers a significant geographic area (approximately 60,000 ha) and is more than 30 km long. The dispersed population means that residents have connections to different nearby communities. Residents at the southern end of the Bylong Valley have stronger connections to Kandos and Rylstone due to their relative accessibility than residents at the northern end of the Bylong Valley. Given the spatial distribution of the population it is unlikely that all residents of the Bylong Valley have social connections with Wollar and Ulan.
- Has always had a small village centre with little residential development. Bylong Village has generally never comprised more than a few centrally located community buildings and store (refer Section 3.3 of the *Bylong Coal Project EIS Appendix T - Historic Heritage Impact Assessment*) in comparison to Wollar village which has historically supported a sizeable rural residential population;
- Has dispersed civic facilities. Many of the original facilities and services for the Bylong Valley were located at Upper Bylong. These include the Upper Bylong Public School, the Bylong Post Office and store, and Bylong Upper Hall (refer Section 3.3 of the *Bylong Coal Project EIS Appendix T - Historic Heritage Impact Assessment); and*
- A mixture of long-term landholders and landholders who have settled in the Bylong Valley in more recent years (~10 years).

4.10.2 Adequacy of the Social Impact Assessment

Ms Askland's presentation raised concerns in relation to the content of the Social Impact Assessment (SIA) and associated Response to Submissions (RTS) document for the Bylong Coal Project. Specific issues identified relate to the:

- *Choice of social baseline used in the SIA;*
- *Adequacy of the adopted SIA Methodology;*
- *Adequacy of consultation conducted to inform the SIA;*
- *Treatment of cumulative impacts;*
- *Consideration of social impacts of property displacement on landholders i.e. stress and anxiety;*
- *Negotiation strategies and impact on landholder ability to object to the Project; and*
- *Use of circular referencing in RTS and a belief that this obscures a lack of response.*

Response

The issues raised by Ms Askland are consistent with the issues raised in the *Bylong Coal Project – Peer Review of Social Impact Assessment and Response to Submissions* document (SIA Peer Review) prepared by Elton Consulting for the DP&E, dated 2 September 2016. Ms Askland has simply restated a select few of the points raised by Elton Consulting in the Peer Review document. KEPCO has already prepared and submitted to the DP&E a detailed response to the SIA Peer Review. We refer the PAC to the following two documents for details of KEPCO's response:

- SIA Peer Review Response 1 (provided in **Appendix B**); and
- SIA Peer Review Response 2 (Appendix G7 of the DP&E SEAR).

SIA Peer Review Response 1 highlighted a number of errors of fact contained in the SIA Peer Review that when considered together, undermine the robustness of many of the Peer Review findings.

SIA Peer Review Response 2 provides a detailed response to every issue raised by Elton Consulting in the SIA Peer Review. This includes our response to questions related to the:

- Choice of social baseline – Refer to Section 3.5 (*Key Issue 4 – Choice of Social Baseline)* in the SIA Peer Review Response 2;
- SIA methodology (including treatment of cumulative impacts) – Refer to Section 4.4 (*Chapter 3 – SIA Methodology and Best Practice)* of the SIA Peer Review Response 2;
- SIA consultation – Refer to Section 4.6 (*Chapter 5 – Effectiveness of the Community Engagement Process)* of the SIA Peer Review Response 2;
- Negotiation strategies – Refer to Section 4.6.2 (*Issue 2 – Negotiation Strategies)* of the SIA Peer Review Response 2; and
- Adequacy of the RTS – Refer to Section 4.7.1 *(Chapter 6 – Adequacy of the RTS)* of the Peer Review Response 2.

In consideration of KEPCO's responses to queries raised within the SIA Peer Review, it is clear that the SIA completed for the Project is adequate and that the social impacts of the Project will be able to be appropriately managed throughout the life of the Project. The draft Development Consent conditions have recommended the preparation and implementation of a Social Impact Management Plan will assist in managing the social impacts throughout the life of the Project.

4.10.3 Consideration of Equine Critical Industry Cluster

Ms Askland raised concern in relation to the Project's impact on the Equine Critical Industry Cluster (CIC) in the Bylong Valley. Ms Askland considers that the Equine CIC has already been devalued by the Project and disagrees with the argument that the impacts are acceptable given the Bylong Valley is at the extremity of mapped Equine CIC and that there are currently no thoroughbred horse studs within 10 km of the Project boundary.

Response

Historically, Tarwyn Park and Bylong Park in the Bylong Valley have been used for thoroughbred breeding. However, Tarwyn Park has not been used as a thoroughbred operation for well over a decade, and Bylong Park relocated its breeding operations closer to the Hunter Valley in 2012. There are no other operating thoroughbred studs remaining in the Bylong Valley, or within 10 km of the Project site.

There is approximately 1,933 ha of mapped Equine CIC within the Study Area for the Agricultural Impact Statement (Appendix X of the EIS). Of this 700 ha will be disturbed by the Project or included within the Biodiversity Offset Areas. This represents 0.27% of the approximate 255,000 ha of mapped Equine CIC in the Upper Hunter. Also there are no thoroughbred enterprises currently within the Bylong Valley, including the Project disturbance footprint or Biodiversity Offset Areas. The mapping of this area by the NSW Government appears to be the result of historical equine related activities which occurred within the area. Equine related activities have not been undertaken within the Project Disturbance Boundary for several years.

The purchase of the Bylong Park property (located north of the Project Boundary) by KEPCO, which was one of the previous properties associated with the Bylong Park Stud (the other being located in the Hawkesbury Valley) was completed in August 2012, well before the first draft Equine CIC maps were published let-a-lone the final maps in 2014. It is noted that Bylong Park Stud has moved both parts of its thoroughbred operations previously operating in the Bylong Valley and the Hawkesbury Valley, to Benchmark Park, Martindale near Denman (closer to the centre of Scone) within the mapped Equine CIC, thus this enterprise continues to thrive.

The argument surrounding the impacts of the Project occurring at the south western extremity of the mapped Equine CIC resulting in minimal impact to the wider Equine CIC is reasonable given that there are limited support services available to the industry which are proximate to Bylong. Further, with the nearest stud located more than 30 minutes' drive away, it is difficult to comprehend how Bylong could possibly fall within a cluster.

4.11 RODERICK CAMPBELL – THE AUSTRALIA INSTITUTE

4.11.1 Lack of Demand for Coal

Mr Campbell stated that no new coal mines are needed. He stated that there is no shortage of coal in a shrinking market.

Response

The demand for coal and supply of coal is primarily determined by the global market. The International Energy Agency (2015) forecast global demand for coal to increase by 1.6% per annum to 2040 under the continuation of existing policies scenario, with coal continuing to be a major part of the international energy mix at 2040.

The main demand for the coal from this Project is from South Korea. South Korea has limited coal resources of its own, with the available resource being low-quality anthracite used in home heating and small boilers. Bituminous coal supplies (steam coal for power plants and industrial boilers and metallurgical coal for steelmaking) need to be imported, mainly from Australia and Indonesia. Coal consumption in South Korea increased by 59% between 2005 and 2014, driven primarily by growing demand from the electric power sector and the forced shutdowns of some nuclear plants in late 2012 because of safety issues.

KEPCO Korea is forecasting its demand for thermal coal to rise significantly in the future. KEPCO forecasts demand for thermal coal to rise to approximately 110 Mtpa by 2020, representing a 27% increase from 2014.

KEPCO is seeking to develop the energy resources located within the Project site so as to reduce KEPCO Korea's exposure to global supply and demand fluctuations and to assist in ensuring energy security for South Korea as a whole. In addition, the development of the coal resource will ensure coal supply is secured for KEPCO Korea and the people of South Korea. In this regard, the comment that no new coal mines are needed is considered unreasonable in the context of whom is developing this mine and who is driving the main demand for the coal from this Project.

4.11.2 Incorrect Coal Price

The key flaw in the Economic Impact Assessment is that it is based on coal price that is too high and higher than the long term coal price of the Commonwealth Treasury.

Response

Commonwealth Treasury does not provide long term coal price forecasts. The reference provided by The Australian Institute refers to a working paper that clearly states that, "*The views expressed in this paper are those of the authors and do not necessarily reflect those of the Australian Government*".

The USD coal price assumption used in the Economic Impact Assessment were from Wood Mackenzie, a leading global energy, metals and mining research and consultancy group, together with an AUD:USD exchange rate of 0.84.

The CIE review states that "*the implied coal price...for export thermal coal used in the CBA is reasonable*".

The forecast for the exchange rate is now considerable lower than 0.84 i.e. around 0.70. Consequently, all other things being equal, the Economic Impact Assessment is likely to understate the benefits of the Project to Australia and NSW.

Notwithstanding, there is some level of uncertainty around the forecast future coal prices and exchange rates. Consequently, the Economic Impact Assessment includes sensitivity testing of +/- 20% changes in the AUD coal price. In response to a comment from CIE in its peer review, sensitivity testing of +/- 30% changes in AUD coal price was provided in Appendix N of the RTS.

The recent coal prices negotiated by Glencore (highest in three years) as reported within the Financial Times (8 May 2017), is an indicator that the demand for coal is real and will be for a substantial period of time.

4.11.3 Project Not Viable

The Project is not financially viable. The decision to proceed with approval is more likely a corporate decision to defend KEPCO's decision and some value in the investment.

Response

The Economic Impact Assessment makes no comment on the financial viability or profitability of the Project. As identified by the NSW Department of Planning and Environment (2015, p. 47-48)[3]:

> *"The profitability of the proposal is not a relevant matter for consideration under Section 79C of the EP&A Act."*
>
> *International mining companies routinely make investment decisions across their portfolios that on the surface may appear sub-economic, but for other strategic reasons are attractive to the broader business. Even if* ***the proponent***[4] *does not make a significant profit from the mine, the State would still realise the royalties for each tonne of coal produced, a significant number of people would be employed, and there would be a range of associated flow-on benefits for the regional economy.*
>
> *Ultimately, if the mine is truly not economically viable (as claimed in many submissions) the project would be unlikely to proceed. This would result in the claimed benefits of the project not being realised, but would equally mean that none of the impacts of the mine would eventuate either."*

It is unclear why The Australia Institute oppose the Project, if they truly believe it to be unviable. If the Project really was unviable, then the Project would not even proceed even if approved.

Obtaining an approval for a Project would only have some "value" if it were financially viable. It is incomprehensive that KEPCO would spend more than $650 million obtaining an approval for an unviable Project for which there is no demand.

4.11.4 Banks Walking Away from New Coal Mines

Mr Campbell suggests that banks like Westpac are walking away from investing in new coal mines because such projects are unviable.

[3] NSW Department of Planning and Environment (2015) *State Significant Development Assessment Drayton South Coal Project* (SSD 6875) Secretary's Environmental Assessment Report Section 89E of the *Environmental Planning and Assessment Act 1979*
[4] This has been changed to make it generic rather than reference the name of proponent that the NSW DP&E was referring to.

Response

This is incorrect. There are numerous banks around the world that provide funding for coal mine projects, based on an assessment project risk and viability. However, some banks are limiting funding based on environmental or other objectives. Westpac's recent announcement regarding the funding of the Adani Project did not say that it would withdraw from funding of all coal mining projects but that *"we will limit lending to new thermal coal projects to existing coal producing basins only, and where the energy content of the coal ranks in the top 15% globally."*

In addition to the above, it is noted that KEPCO Korea is 51% owned by the South Korean Government and the Project is part of South Korea's strategy to supply the critical energy supplies to its people of South Korea. Despite what Mr Campbell says, there is no question over the availability of funding over this Project. KEPCO has other financing methods that may not include bank funding.

4.11.5 Comparisons to Cobbora

If the project is approved but does not proceed, it can still impose costs on the community. Uncertainty about the future of the mine can impact the local economy and reduce landholders' willingness to invest in their land. An example of this is nearby Cobbora Coal Project.

Response

The land proposed for the Project is predominantly owned by KEPCO. It is currently being managed by KEPCO for agricultural purposes. In the unlikely event that the Project was approved and did not proceed; it would continue to be managed for agricultural purposes by either KEPCO or the new owners of the land. No significant impacts on the community are therefore envisaged.

Comparisons to the Cobbora Coal Project are spurious since that project was a NSW Government Project proposing the mining of lower energy value coal, mainly to provide greater long term cost and supply certainty for the domestic electricity generation. It was always identified as a cost recovery project (EMGA Mitchell McLennan Pty Ltd, 2012), and did not proceed for political reasons. If it had proceeded, it would have generated significant royalties and other benefits for NSW. The land acquired for the Cobbora Coal Project is currently being sold on the open market and will presumably be utilised for its next best utilisation value.

4.11.6 Externality Costs

The Economic Assessment assumes that all mitigation and offset measures work perfectly to reduce the external cost of the Project to zero. This is unlikely. In the case of biodiversity offsets, most ecologists doubt the efficacy of such offsets.

Response

The consideration of environmental, social and cultural impacts of the Project are based on the results of the individual technical assessments. What is relevant for inclusion in the Cost Benefit Analysis of the Project is the residual impacts of the Project after mitigation, offset and compensation. Mitigation, offset and compensation internalises the all or some of the external costs of the Project into the operating costs of the proponent.

Costs that are fully internalised in to the operating costs of the proponent include:

- Agricultural impacts via acquisition of land. Land values reflects future potential agricultural production.
- Water impacts via acquisition of WALs. The value of WALs reflects its value in alternative uses.
- Significant noise impacts via acquisition costs of affected properties. Noise impacts would be reflected in a partial property value effect, however, the total value of the land is included as a cost.
- Road and intersection impacts via the cost of upgrading the road network.
- Ecological impacts via the capital and operating costs of biological offsets, the extent of which have been developed with OEH so as to have no net impacts in accordance with Government policy.

In addition, the CBA includes the cost estimates for greenhouse gas emissions ($0.4 M to Australia), and local heritage impacts ($3.7 M to Australia) using benefit transfer. Aboriginal heritage impacts and visual impacts after the implementation of the AACHMP and other mitigation measures remain unvalued in the analysis, but have been assessed in the technical assessments as not being significant. No significant air quality impacts or blasting impacts were identified in technical assessments, although CIE estimated residual air quality impacts at $0.3 M.

Any residual impacts after mitigation, offset and compensation are dealt with in the CBA using the threshold value method, where the quantified net benefits of the Project provide a threshold value that unquantified residual impacts would need to exceed for the Project to be questionable from an economic efficiency perspective. As identified in the Economic Impact Assessment, p. 41 (Appendix AE of the EIS):

> *"While the major environmental, cultural and social impacts have been quantified and included in the Project BCA, any other residual environmental, cultural or social impacts that remain unquantified would need to be valued at greater than between $592M and $757M for the Project to be questionable from an Australian economic perspective."*

While there may be some contention between technical specialists as to the extent of the residual impacts, what is clear is that the net production benefits of the Project are orders of magnitude greater than any potential residual impacts. Significant changes in cost assumptions in the sensitivity testing does not alter the conclusion that the Project will have net benefits to Australian and NSW and very material benefits to the MWRC LGA and its smaller townships such as Kandos and Rylstone.

4.11.7 Multiplier Methodology Flawed

The impact analysis is based on multiplier methodology described as "biased" by the Australian Bureau of Statistics, "abused" by the Productivity Commission and "deficient" by the NSW Land and Environment Court.

Response

The methodology used to assess the regional economic impacts of the Project was input-output (IO) analysis. IO analysis is a cost effective and simple method for estimating the gross market economic activity (i.e. financial transactions and employment, in a specified region that is associated with a project). As identified by World Bank economist Mustafa Dinc (2015), it is one of the most widely used models around the world for regional impact assessment and provides a solid framework to analyse the interdependence of industries in an economy. The methodology is supported by the two peer reviews of the Economic Impact Assessment and the recently released NSW Government (2015) *Guidelines for the economic assessment of mining and coal seam gas proposals*.

As identified by CIE (2015, p. 28) in its peer review of the Project *"The IO methodology is reasonable but should be considered an upper bound of the regional effects".*

Similarly, the BDA Group in its peer review (Appendix AF of the EIS) states:

> "*The consideration of regional economic benefits, contrary to assessment at the global or national level, requires consideration of second round benefits. Gillespie Economics has done this through drawing on an Input-Output (I/O) analysis (subsequently presented in the report for an examination of regional impacts). This is a useful extension of the economic analysis..... Nonetheless, the model of the regional economy has been built using appropriate datasets, and the 'order-of-magnitude' results provides confidence to support the conclusion that regional economic benefits are substantial."*

The NSW Government (2015, p. 23) *Guidelines for the economic assessment of mining and coal seam gas proposals* identifies that *"the Local Area Analysis should include second round effects"*. It also identifies that *"A range of techniques are available for estimating second round or flow-on effects. These include CGE (computable general equilibrium) modelling, input-output (I-O) or multiplier analysis".*

The Economic Impact Assessment (Appendix AE of the EIS) states that the criticism made of IO analysis are misrepresented by extremely selective quotations. The main concern that economists (e.g. the Productivity Commission, NSW Treasury and ABS) have with IO is its use as a substitute for CBA, not its use for estimating direct and indirect regional economic activity impacts as reproduced below:

- NSW Treasury (2009) "*Model based economic impact assessment [such as IO analysis] is not a substitute for a thorough economic analysis of a policy. The appropriate method for analysing policy alternatives is benefit cost analysis (BCA)*". This reference is actually a NSW Treasury Guideline for the use of IO in estimating jobs effects of Government Actions, Programs and Policies;
- The main "*abuse*" reported by the Productivity Commission (Gretton, 2013) is using IO analysis to "*make the case for government intervention*" when CBA is the appropriate method for doing this;
- The ABS's (2015) concerns with IO being "*biased*" refer to it being a "*biased estimator of the benefits or costs of a project*". IO does not estimate benefits and costs but economic activity;
- Concerns of the Warkworth Judgement (Preston 2013) with IO analysis being "*deficient*" related to the data (industry data from surveys undertaken in 2001 and assumptions used (see next dot point)), but more fundamentally for not "*assisting in weighing the economic factors relative to the various environmental and social factors, or in balancing economic, social and environmental factors*". This is an inappropriate criticism of the IO method, since it does not pretend to do this; and
- IO analysis does not depend on the assumption "*that there is a ghost pool of highly skilled yet unemployed people*" in a region as suggested in the Warkworth Judgement. It allows for labour to come from within or outside the region.

The Economic Impact Assessment (Appendix AE of the EIS) of the Project correctly uses IO analysis to consider regional economic activity, not as a substitute for BCA.

4.12 STEPHEN GOULD – HUNTER ENVIRONMENT LOBBY

4.12.1 Low Background Levels & Assessment Criterion

Mr Gould commented that the Bylong Valley has exceptionally low background noise levels and that the assessment criterion should be strictly applied in these situations.

Response

Background noise monitoring was undertaken at 5 locations (Bylong Station, Bylong Village, Wingarra, Harley Hill and Redbank cottage) on a seasonal campaign basis between Autumn 2012 and Summer 2014 (1 week of monitoring per season). Results of the monitoring indicated ambient background noise levels ranging between approximately 20 – 30 dB(A), across the day time, evening and night time periods.

In situations where ambient noise levels are lower than 30 dB(A), the NSW INP establishes a minimum background level of 30 dB(A). This commonly occurs in quieter rural environments and is routinely implemented as the lower limiting noise criteria for the assessment of industrial noise impacts in NSW. It is noted that the Sandy Hollow to Gulgong Railway Line divides the Project Boundary and provides some industrial related noise to the Bylong Valley area.

In addition to the INP, the VLAMP has been applied to the Project's noise levels. The VLAMP provides "*the NSW Government's interpretation of the significance of any potential exceedances of the relevant noise criteria, and identifies potential treatments for these exceedances*".

4.12.2 Reasonable and Feasible Noise Management & Mitigation

Mr Gould raises concerns that reasonable and feasible noise mitigation and management measures have not been applied to the Project. He further commented that not including noise bunds is not reasonable and should have been applied to the Project.

Response

Refer to the response provided in **Section 4.3.2** in relation to the application of reasonable and feasible noise mitigation and management measures for the Project. This section also explains why it is not reasonable or feasible to incorporate noise bunds along the length of haul road.

4.12.3 Changes to Amenity

Mr Gould raised concerns that the Project would result in changes to the noise amenity of the Bylong Valley from being a quiet rural place to an industrial area.

Response

The Project will result in changes to the ambient noise environments within the Bylong Valley area and hence influence the local acoustic amenity. It is noted that the Sandy Hollow to Gulgong Railway Line divides the Project Boundary and provides some industrial related noise to the Bylong Valley area. The extent of this change is expected to be most prevalent in the area surrounding the Bylong Village, during initial open cut mining years. These impacts will progressively reduce during the later years of the Project as open cut operations extend to the south and eventually cease with the longer term underground operations continuing.

The INP recommends noise levels from industrial noise sources at rural residential locations be limited to 50 dB(A) during the day time, 45 dB(A) evening and 40 dB(A) night time. The predicted noise impacts of the Project at receivers within the Bylong Village have been confirmed to apply with the relevant acoustic amenity criteria provided within the INP.

4.12.4 Low Frequency Noise Assessment

Mr Gould also raised concerns that the low frequency noise assessment has not been undertaken strictly in accordance with the INP.

Response

Refer to the response provided in **Section 4.3.3** in relation to the approach with assessing low frequency noise for the Project. The results of the low frequency assessment for the Project indicate that low frequency modifying factors would not be applicable to any private receiver in the vicinity of the Project. The approach applied to the low frequency noise assessment has been questioned and accepted by the EPA and DP&E throughout the RTS, Supplementary RTS and DP&E PEAR.

5 CONCLUSION

Hansen Bailey has conducted an exhaustive environmental impact assessment over the Project commencing in 2010 and culminating in the *Environmental Impact Statement Bylong Coal Project Supplementary Response to Submissions August 2016*.

The whole of Federal, State and Local Government, co-ordinated by the NSW DP&E have reviewed and scrutinised the assessment documentation with the assistance of independent peer review experts culminating in an authoritative PEAR for the Project concluding that:

> *"the Department considers that KEPCO has designed the project in a manner that achieves a reasonable balance between maximising the recovery of a recognised coal resource of State significance and minimising the potential impacts on surrounding land users and the environment as far as is practicable, particularly through:*
>
> - *avoiding disturbance of the Bylong River and Lee Creek alluvial aquifers;*
> - *reducing the open cut pits to a reasonable size and layout;*
> - *fully backfilling and rehabilitating the open cut voids;*
> - *avoiding subsidence impacts on the Goulburn River and Wollemi National Parks;*
> - *avoiding and/or minimising subsidence impacts on significant cliff lines;*
> - *minimising noise and dust impacts on Bylong village and surrounds; and*
> - *reducing impacts on biodiversity, agricultural land, Aboriginal sites and historical heritage sites."*
>
> and
>
> *"The Department has carefully weighed the impacts of the project against its benefits. On balance, the project is approvable, subject to stringent conditions."*

DP&E has recommended a comprehensive and precautionary suite of current best practice conditions to ensure that the Project complies with the relevant criteria and standards, and to ensure that the predicted residual impacts are effectively minimised, mitigated and/or compensated for consistent with contemporary NSW regulation.

KEPCO has confirmed that the proposed conditioning is achievable and enforceable and that it will not detract from the viability of the Project. As such, if approved, it proposes to expedite the construction of the mine causing the very material resultant benefits of the development to flow from this action to the local region and NSW more broadly.

The Minister for Planning has requested that the PAC carry out a review of the Project. As part of this review, the PAC has conducted a site inspection, constructively interviewed the proponent and its advisors, met with MWRC and conducted a public hearing in Mudgee.

During this process, Hansen Bailey has not become aware of any new information that should influence the findings of the PEAR and its conclusion that the Project is in the public interest and should be approved with conditions.

Conversely, evidence delivered at the public hearing has confirmed the robustness of the water and agricultural resource impact assessments and that any residual impacts to water and agriculture are not material over the term of the Project as a consequence of the proposed conditioning.

Importantly, the proponent has recently taken further actions as encouraged by the NSW Government and facilitated by the local landholders in question to courageously acquire additional properties adjacent to the proposed development. This has further diminished the potential for any residual social impacts such that there remains only one privately owned residence which is predicted to be significantly impacted and only one private residence which will be moderately impacted if the Project proceeds.

The significantly impacted property owner is an absentee landlord with her residence tenanted to an outspoken objector to the Project. KEPCO is in negotiations with the property owner in relation to the potential purchase or the application of mitigation measures for the predicted impacts to this property. The moderately impacted property was acquired by the current owner in 2016 and as such they were fully aware at the time of the off market purchase that the residence had the potential to be impacted by the development. Neither property will be directly impacted by the Project and each will remain habitable for its duration.

It is against this residual social impact that the material benefits of the development needs to be weighed when the PAC considers the merits of the Project. These material benefits have been concluded by DP&E to include:

- 830 direct and indirect jobs for the regional economy and 1,496 jobs for the State economy;
- $624 million in annual business turnover within the regional economy and $855 million for the State economy;
- Direct capital investment value over the life of the project of $1.5 billion; and
- $763 million ($290 present value) in royalties for the NSW Government.

The economic assessment undertaken for the Project includes a Cost Benefit Analysis (CBA), which seeks to identify and weigh up all of the project's benefits and costs based on its full range of environmental, social and economic impacts and benefits.

The assessment calculated that the Project would have a net benefit to society of approximately $807 million, with a minimum of $596 million of these net benefits accruing to Australia. Taxes and royalties over the Project life will amount to some $302 million in company tax and $290 million in royalties (present value).

In regard to heritage impacts associated with Tarwyn Park and natural sequence farming, it has been confirmed that the local significance value of Tarwyn Park will not be diminished by the Project in the medium term as a consequence of the open cut component of the Project being so short term in nature and the avoidance and mitigation measures proposed. As evidenced on site by the PAC, KEPCO is currently investing significant capital to further improve the knowledge of land use and has both the resources and resolve to maintain and improve over time the heritage value of Tarwyn Park.

We note that the PAC has commissioned an independent report from GML Heritage over the heritage value of Tarwyn Park. As a matter of procedural fairness, we reserve the right to be provided ample time to review and comment on this report once it is made available to us.

Finally, in relation to the further justification over the criticality of the short term open cut mining component of the Project in regard to its economic viability and technical achievability, KEPCO has commissioned an additional pre-eminent authoritative expert to undertake an independent peer review of the mine plan. Ian Alexander, Managing Director of John T Boyd Company (Australia) Pty Ltd has confirmed the magnitude of compromise that has occurred in developing a mine plan which balances the extent of proposed coal extraction with the social and environmental constraints of the agricultural setting in place. He has concluded in his review that:

> *"The project footprint has been determined by appropriate recognition of the potential environmental risk and incorporates adjustment to account for the technical features of the proposed surface and underground mining operations."*
>
> *"A void space (unreclaimed final pit area) remains at closure of open cut operations and will be used to dispose of the rejects (coarse and fine) material from the CHPP's processing of the underground coal feed. Should a void not remain upon closure of the open cut or the open cut did not commence, then either a co-disposal emplacement (dam) or holding cells would be required. These are considered sub optimal outcomes as they present increased cost, increased management requirement and higher risk of environment concern from material leakage or dam failure."*
>
> *"The financial impact of not including open cut mining as part of the Bylong project, was found to be significant…… If the open cut mine were not approved, BOYD considers that the impact on the Bylong Project to be very detrimental to the Projects feasibility and viability. "*

This report is attached as **Appendix C**.

Mr Alexander's conclusions also contradicts the preposterous assertion by The Australian Institute that the Project is somehow unviable or will not be constructed by KEPCO. You also have direct irrefutable evidence from the CEO of KEPCO Australia that these assertions are quite simply false.

In summary, the conduct of the public hearing did not raise any new issues which have not previously been comprehensively addressed within the EIS, RTS or the Supplementary RTS. This response provides further clarification and context over some of the key matters to ensure that the PAC is appropriately informed when assessing the merits of the Project.

It serves to reconfirm conclusion in the DP&E's PEAR that:

> '*the project achieves a reasonable balance between recovering the coal resource and avoiding, minimising and/or offsetting adverse social, amenity and environmental impacts*'.

We trust that this report provides the PAC with the information required to inquisitorially address the matters raised during the PAC merit review process. Please do not hesitate to contact the undersigned should you require any further information.

For
HANSEN BAILEY

Nathan Cooper
Principal

James Bailey
Director

6 ABBREVIATIONS

Term	Definition
ABS	Australian Bureau of Statistics
Approved Methods	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (2005)
BMP	Biodiversity Management Plan
BSAL	Biophysical Strategic Agricultural Land
CBA	Cost Benefit Analysis
CEO	Chief Executive Officer
CIC	Critical Industry Cluster
CIE	Centre of International Economics
CLO	Community Liaison Officer
dBA	Decibels (A-weighted)
DEFRA	UK Department of Environment, Food and Rural Affairs
DoEE	Commonwealth Department of Environment and Energy
DP&E	NSW Department of Planning and Environment (formerly DP&I)
DPI-Agriculture	NSW Department of Primary Industries - Agriculture
DPI-Water	NSW Department of Primary Industries - Water
EIS	Bylong Coal Project Environmental Impact Statement
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	*Environmental Planning and Assessment Regulation 2000*
EPA	NSW Environment Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Ecologically Sustainable Development
GDE	Groundwater Dependent Ecosystem
GIA	Groundwater Impact Assessment
ha	Hectare
IESC	Independent Environmental Scientific Committee
ING	Industrial Noise Guideline
INP	Industrial Noise Policy
IO	Input-Output
KEPCO	KEPCO Bylong Australia Pty Limited
LEC	NSW Land and Environment Court
LGA	Local Government Area
LSC	Land and Soil Capability
MSC	Muswellbrook Shire Council
Mtpa	Million tonnes per annum
MWRD	Mid-Western Regional Council
NBIA	Noise and Blasting Impact Assessment
NSW	New South Wales
OAS&FS	NSW Office of Agricultural Sustainability and Food Security
OEH	NSW Office of Environment and Heritage

Term	Definition
PAC	Planning Assessment Commission
PEAR	Preliminary Environmental Assessment Report
PM	Particulate Matter
Project	Bylong Coal Project
PSNL	Project Specific Noise Criteria
RAP	Registered Aboriginal Party
RTS	Bylong Coal Project Response to Submissions
ROM	Run of Mine
RTTIA	Revised Traffic and Transport Impact Assessment
SEARs	Secretary's Environmental Assessment Requirements
SIA	Social Impact Assessment
SSC	Singleton Shire Council
SSD	State Significant Development
Supplementary RTS	Bylong Coal Project Supplementary Response to Submissions
TARP	Trigger Action Response Plan
Updated Approved Methods	*Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (2016)
VLAMP	Voluntary Land Acquisition and Mitigation Policy

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Appendix A

Public Hearing Speakers List

Table A1 Planning Assessment Commission Hearing Schedule

Date & Time: 10:00am, Thursday 11 May 2017

Place: Club Mudgee, 99 Mortimer Street, Mudgee NSW 2850

Hearing Schedule	
i	Opening Statement from the Chair – Brian Gilligan
Ref	**Registered Speakers:**
1.	Mayor Martin Rush (Muswellbrook Shire Council)
2.	Bill Vatovec (KEPCO)
3.	Rusty Russell
4.	James Armitage
5.	Nick Godfrey Smith
6.	Brendan Tobin (Locaway Pty Ltd)
7.	Travis Rixon
8.	Ken Hopkins (Harley Museum NSW)
9.	John Weaver
10.	Andrew Palmer (Mudgee Chamber of Commerce)
11.	Flinn Malnic (Sydney Mining Club)
12.	Kristian Brockmann
13.	Wayne Diemar (HunterNet)
14.	Hugh McMahon
15.	John Epton
16.	Craig Hord
17.	Chirs Dickson
18.	Henry Bosman
19.	Annette Rhodes
20.	Geoff Miell
21.	Cory Robertson
22.	Martin Eagan
23.	Caitlin Gilbert
24.	Vinesa Walker
25.	Lionel Braithwaite
26.	Andrew Burleigh
27.	Steve Bennett
28.	Shaun Mace
29.	Robert Gillespie
30.	James Tomlin
31.	Grant Gjessing
32.	Beatrice Ludwig
33.	Clayton Richards
34.	Cassandra Jones
35.	Bronwyn Pressland
36.	Rochelle McDonald
37.	Steven Pells (Bylong Valley Protection Alliance)
38.	David Paull (Central West Environment Council)
39.	Julia Imrie (Mudgee District Environment Group)
40.	Hedda Askland (Hunter Communities Network)
41.	Rod Campbell (The Australia Institute)
42.	Jeff Braithwaite
43.	Stephen Gould (Hunter Environment Lobby)

APPENDIX B

SIA Peer Review Response

KEPCO BYLONG AUSTRALIA
Suite 1301, 141 Walker Street North Sydney NSW 2060
Phone: 02 8904 9508

Mr Stephen O'Donoghue
Team Leader – Resource Assessments
Department of Planning and Environment
Via email: Stephen.ODonoghue@planning.nsw.gov.au

15 September 2016

Dear Mr O'Donoghue,

BYLONG COAL PROJECT (SSD 6367): SOCIAL IMPACT ASSESSMENT PEER REVIEW

KEPCO Bylong Australia (KEPCO) and the Bylong Coal Project team have read the "*Bylong Coal Project – Peer Review of Social Impact Assessment and Response to Submissions*" document prepared by Elton Consulting for the Department of Planning and Environment (DPE), dated 2nd September 2016. KEPCO and its consultants are currently preparing a response to DPE regarding the Peer Review, in the form of a letter anticipated to be submitted to DPE in the coming week (week commencing 19th September 2016).

Our initial examination of the Peer Review document completed by Elton Consulting has identified that that it includes several material errors of fact. For example, the Peer Review states:

- "*Initial conclusions in relation to adequacy, gaps and areas for additional research highlighted: No information on community health*" (page 1).
  This is incorrect. Community wellbeing and health related matters are addressed in the Bylong Coal Project Social Impact Assessment (SIA) on page 157. Further, potential impacts to local health services have been comprehensively addressed throughout the SIA.

- *"However, several key social impacts have been overlooked in the analysis, including the significant effects of historical property acquisitions on community structure"* (page 2).
  This is incorrect. This is addressed on page 162 of the SIA, and acquisition is further addressed on pages 157, 167, 168 of the SIA.

- *"Consultations for the Stage 2 review were held in Mudgee and Bylong village during a visit to the region over two days in April 2016. Consultations included a meeting with officers of MWRC, a series of organised one-on-one or small group discussions with residents of the Bylong Valley, representatives of the Bylong Valley Protection Alliance (BVPA) and the Wollar Progress Association and a larger open house question and answer session open to all interested. Arrangements for these meetings were made by DPE"* (page 3).
  KEPCO interprets this to be incorrect as the "open-house" session was not advertised publically and was an invitation-only event. As such, it was not open to "all interested". During the time of the SIA Peer Review consultations in April 2016, the Bylong Coal Project community liaison officers were approached by local landholders who were interested in attending the Peer Review consultation sessions, but who had not been invited. This information was relayed to DPE at the time.

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Phone: 02 8904 9508

KEPCO will provide further examples of errors of fact in our forthcoming letter response to DPE regarding the Peer Review. We will also outline additional concerns and responses regarding the SIA Peer Review methodology and document.

KEPCO would appreciate DPE entailing Elton Consulting to address the errors of fact noted in this letter, and the forthcoming comprehensive letter, prior to DPE publicly releasing a final version of the Peer Review.

Yours sincerely

Bill Vatovec
Chief Operating Officer
KEPCO Bylong Australia Pty Ltd

APPENDIX C

Mine Plan Peer Review Report

INDEPENDENT MINE PLAN PEER REVIEW
BYLONG COAL PROJECT

New South Wales, Australia

Prepared For

HANSEN BAILEY PTY LTD

By

John T. Boyd Company

Mining and Geological Consultants

Brisbane, Australia

Report No. 5172.000

MAY 2017

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Mining and Geological Consultants

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19 May 2017
File: 5172.000

Mr James Bailey
Director
Hansen Bailey Pty Ltd
6/127-129 John Street
Singleton NSW 2000

Subject: Independent Mine Plan Peer Review
Bylong Coal Project

Dear Sir

John T Boyd Company [BOYD] is pleased to provide our independent peer review of the Bylong Coal Project. BOYD was engaged by Hansen Bailey to undertake this review as part of the approvals process.

1.0 Summarised Findings

BOYD's summarised findings follow:

Geology

- Borehole density is considered reasonable for the type of deposit and proposed mining activities.
- Multiple seams are identified and the prospective units evaluated for mining. Only the Goulburn G ply, the Glen Davis A ply, the Lower Ulan working section and primarily the Coggan Seam represent realistic open cut working sections. Notwithstanding adjacent seams, only the Coggan Seam presents a practical, efficient, feasible underground mining target.
- Structures, including faulting and anticlines, are identified. Further pre-operation exploration will be conducted.
- Intrusions are reported in borehole data. The impact of these is unknown due to borehole spacing and a lack of local mining experience. Sills are evident across the region and have impacted zones of the coal domain and surface areas. Magnetic surveys have been completed, but the interpretations do not appear to be always included in other data.

Resources and Reserves

- The methods applied to estimate the resources are sound and reasonable and are consistent with industry standards. Thin plies in the Ulan and Glen Davis seams, which may be problematic to be efficiently mined, are included as coal resources and marginally inflate the reported tonnages.

- There is no reason any of the seams and plies scheduled for extraction should not be considered as resources.

- The vertical interval between the Ulan Seam and Coggan Seam is close (7 m). From a practical standpoint, only one seam will be extracted by underground mining.

- Prospective coal seams and coal plies are present, which if appropriately extracted, could deliver a profitable mine product. Mine planning has identified the thicker, more productive coal seams and constituent coal plies and targeted these using appropriate mining methods.

- The target seams are capable of providing a mid tier product that is marketable to the export thermal coal market.

Project Schedules

- The project footprint has been determined by appropriate recognition of the potential environmental risks, and incorporates adjustments to account for the technical features of the proposed surface and underground mining operations. The planned operations and infrastructure areas are confined, but the planned barriers are considered reasonable, practical, and feasible.

- The project has optimised coal resource recovery by utilising open cut mining where possible to enable multiple coal seams to be extracted. In comparison, the alternative extraction method (underground) would result in the recovery of only one seam.

- The planned use of the open cut mining method has increased resource recovery by selective mining of some coal plies, enabling them to be bypassed, thereby increasing product yield and reducing operating costs, albeit at a lower coal price realisation per tonne due to lower product quality.

- The underground mine plan indicates that raw coal quality is sufficient to periodically support bypass of mined coal and blending with a portion of the washed coal product, to produce a marketable product, thereby enhancing coal utilisation.

- The open cut mining evaluation has considered that a contractor operation utilising excavator/truck haulage methods is appropriate for the Project as proposed with the constrained open cut footprints, proposed recovery of multiple coal seams and the limited project life. Out-of-pit dumps are required to accommodate some of the overburden waste material generated during initial open cut activities, with the majority of overburden dumped in-pit to back fill the excavated voids.

- BOYD has considered the potential to mine the open cut areas by underground methods. It was identified that:

    - Only one seam could potentially be extracted.

- The Coggan Seam has a relatively shallow depth of cover of 15 m – 90 m, with weathering reaching 25 m. The underground mine footprint would be reduced substantially due to the geotechnical and hazard management constraint for underground mining to have 50 m of cover, and competent roof strata (nominally 25 m). The 50 m depth of cover isopach is also observed to lie towards the southern extent of both Open Cut Pit 1 and 5. The southern boundary for both Pits are coincident with rising topography and the loss of open cut economic margin. Pit 1 final highwall would provide a opportunity to establish future underground mining operations.
- Underground access requirements, surface infrastructure and surface subsidence would still impact the surface areas.

These matters would substantially reduce the tonnages of coal capable of being recovered by underground mining of the open cut. The underground option was discarded as being impractical, as well as a poor utilisation of coal resources.

- Available data for the identified underground resources indicates that a conventional longwall operation will be appropriate to productively extract coal within a relatively favourable mining environment. Geological features are identified that will potentially affect mine operations.

- An alternate option to longwall mining, bord and pillar using continuous miners, was considered in order to reduce surface subsidence impacts. This option, whilst technically feasible, potentially reduced mine recovery of coal resources to 40% to 50%. This compares to a recovery of 80% to 85% with the use of longwall mining. In addition, the cost of production (under bord and pillar) will be higher along with the reduced annual production rates. This option was correctly discarded by the project.

- Production rates are reasonable and mining risk is considered low.

<u>Landform and Rejects</u>

- A void space (unreclaimed final pit area) remains at closure of open cut operations and will be used to dispose of the rejects (coarse and fine) material from the CHPP's processing of the underground coal feed. Should a void not remain upon closure of the open cut or the open cut did not commence, then either a co-disposal emplacement (dam) or holding cells would be required. These are considered to be sub-optimal outcomes as they would result in increased costs, increased management requirements and higher risk of environment concern from material leakage or dam failure.

- Alternatively, disposal of CHPP rejects underground (pumping of rejects into abandoned portions of the underground mine), is technically possible but will be up to four times more costly than surface disposal. An underground void would be available for the final 7 to 8 of years of the 20 years of underground operations. Underground storage of rejects would require the following:

  - Multiple surface to underground boreholes with surface dams and pumps.
  - The waste material to be re-liquefied to enable flow around the pillars, resulting in increased water usage from the catchment.
  - Permanent storage on surface areas of significant volumes of CHPP rejects.

The required volume balance and business case analysis have not been completed. This option is considered inefficient, unreliable, to increase operating costs and will not preclude the surface storage of reject material .

Impact of Open Cut on the Bylong Project

- The financial impact of not including open cut mining as part of the Bylong project was found to be significant. A high level financial model was prepared by BOYD using supplied data to compare the potential outcomes of the combined mines with the underground only case.

- Coal resource recovery would decrease by 32% and project life would be reduced by three years. Whilst total capital expenditure would remain relatively unchanged due to the adoption of open cut production using low capital contract operations, the economic impacts of not proceeding with open cut mining are substantial. Positive cash flow would be delayed by five years, royalties decreased by 27%, net cash flow reduced by 35%, and NPV decreased by 93%. Further details are summarised below:

		Variance	% Change
Mined Coal	Mt ROM	(33)	(26)
Output	Mt Product	(26)	(29)
Yield	%	(3)	(4)
FOR Cost	$M	(1,537)	(34)
	$/t Product	(3.31)	(6)
FOB Cost	$M	(2,081)	(32)
	$/t Product	(3.04)	(4)
Revenue	$M	(3,158)	(30)
Royalties	$M	(215)	(27)
Capital	$M	9	1
Net Cash Flow	$M	(671)	(35)
Positive Cash Flow	Years from Construction commencing	(5)	250
NPV	$M	(349)	(93)

The option of eliminating the open cut operation is highly detrimental to the feasibility of the Bylong project.

2.0 BOYD's Scope of Work

In performing the scope of work for this independent peer review BOYD:

- Reviewed background information and associated justification documentation relating to the Project coal resources and the current proposed mine plan.

- Considered the merits of the proposed project mine plan, with reference to:
  - Robustness of mining techniques and methodologies within the project constraints that include the planning guidelines and available resources.
  - Progression of rehabilitation activities, and specifically the robustness of the rejects/waste disposal strategy and available alternatives if only the underground component of operations is approved.
  - Final post mining landform.

- Opined on the consequences of the open cut component not being approved in terms of:
  - Mining and operations.
  - Economic consequences (i.e. revenue, royalties, cash flow, investment return).

Our study was completed based on a desktop review of data supplied. A site visit was not undertaken.

Documents provided included:

- The Environmental Impact Statement and associated Appendices, and the Response to Submissions (including relevant mine plan justification reports);
- The Feasibility Study: Chapters and Appendices;
- The Mine Options Study (8.1.2.2 – Margin Ranking).

A summary of documents is provided as Appendix A, following this report.

BOYD assumed that all available information was developed by experienced, competent, trained professionals in each area of study. Re-work of matters, such as the generation of alternative resources or reserves quantities, schedules or operating costs and capital estimates, was not undertaken. BOYD did not evaluate alternative mine plans. We use the terms resources and reserves in the same context as used in the JORC Code[1].

This report was prepared by BOYD personnel. Their resume's are provided as Appendix B following this report.

3.0 Bylong Coal Project Background

The Bylong Coal Project (Bylong, or the Project) is a greenfields thermal coal project owned by KEPCO Bylong Australia Pty Limited [KEPCO]. Bylong is located in the Western Coalfields of New South Wales, approximately 55 km north-east of the regional centre of Mudgee and 230 km by rail from the Port of Newcastle.

The Project comprises of two coal exploration Authorisations, namely A287 and A342 (the Authorisations) which encompass an area of approximately 10,317 ha.

KEPCO is seeking to develop an open cut mine which will transition into a longer term underground mine. A total of 124 Mt of coal is planned to be recovered over an operational period of 23 years. Coal will be exported through the Port of Newcastle.

[1] Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves, The Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia, 2012 Edition

KEPCO is seeking State Significant Development Consent under the *Environmental Planning and Assessment Act* 1979. The Department of Planning and Environment's Preliminary Assessment Report for the Project has been issued. This will enable the Planning and Assessment Commission (PAC) to conduct a review prior to the finalisation of the Secretary's Environmental Assessment Report and ultimate determination by the PAC.

Bylong was initially evaluated in 2012 when a prefeasibility study was completed, with the primary aim of maximising coal resources within the Authorisations. The prefeasibility study considered four underground areas and seven open cut areas within the Authorisations.

In October 2013, Parsons Brinkerhoff completed a Mine Options Study, in collaboration with Runge Pincock Minarco (RPM), the specialist mining consultant. During this phase of study, an "Optimiser" assessment was used to relatively rank areas by margin, identify optimal mine resource size and indicate a potential development strategy.

The Mine Options Study assessed a number of options that considered:

- Mining methods/technology: open cut/dragline stripping or truck shovel, underground/bord and pillar using continuous miners or conventional longwall.
- Mine plan layouts.
- Product specification and processing.
- Strategic operating options including:
    a. Combined open cut and underground operations, with mining occurring concurrently.
    b. Open cut operations only.
    c. Underground operations only.
    d. Underground operations, followed by open cut operations.
    e. Open cut operations, followed by underground operations.

Financial evaluations were utilised to determine the relative margin between mine areas and operating options.

The development strategy options and associated mining target areas were evaluated by applying integrated key criteria drawn from consulting with stakeholders and planning requirements and guidelines including:

- Department of Planning and Environment – Secretary's Environmental Assessment Requirements (SEARs).
- NSW Management of Stream/Aquifer System in Coal Mining Developments - Stream Aquifer Guidelines.
- NSW Aquifer Interference Policy.

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* and the *Strategic Regional Land Use Policy*, and
- KEPCO corporate strategy.

This approach recognised that the identified areas had the potential to impact matters of environmental significance. Constraints applied that substantially modified the mines' operating and development strategy included:

- The discarding of some open cut mining areas.
- Increasing standoff distance and barriers – open cut pits, highwall locations, underground longwall panels.
- Selectively locating some activities and mine infrastructure - rail loop, ex-pit spoil dumps.
- Minimising the footprint of mining activities and infrastructure by elevating dump heights, and minimising the area of the open cut, underground mine and CHPP coal handling areas.

Following these assessments, a preferred development strategy was determined. The selected strategy included an initial open cut operation utilising two working two areas with some external dumps, and a single longwall mine over the longer term.

The Feasibility Study adopted the Mine Options Study preferred strategy, refined the mine layouts and schedules and undertook detailed planning and analysis. The Feasibility Study underpins the JORC Resource and Reserve statements, the preparation of the Environmental Impact Study, and the assessments conducted with the application (i.e., the Mine Justification Reports).

4.0 Geology

4.1 Exploration

A total of 525 drill holes were drilled to 25 June 2015. Since then exploration activities have continued. The distribution of boreholes is fairly evenly spread across the proposed mining areas at a spacing of approximately 500 m between holes. Some closer spaced drilling has been undertaken in designated mining areas.

A total of 284 holes have been either partly or fully cored, whilst the other 241 have been drilled using open hole methods. Geophysical logging of drill holes has been a standard practice. The types of drill holes, as well as their purpose, are listed below:

- 266 fully cored or partly cored holes for coal quality analysis.
- 141 open holes for structural definition.
- 100 holes to delineate the line of oxidation (LOX) for open cut boundaries.

- 18 large diameter (200 mm or 8C) holes for washability and boiler simulation testing.

BOYD considers that the number and type of drill holes are typical for a project at this stage of development. The drill hole density provides a high degree of confidence in the quantity of coal that makes up the deposit, as well as the broad stratigraphic and structural setting. It is expected that closer spaced drilling will be progressively undertaken ahead of mining, as is standard practice in the coal industry. This is particularly relevant for underground mining, particularly along main headings and gateroads where certainty is required in the continuity of the target coal seam.

The following seismic surveys have been undertaken:

- 2-D seismic lines were run in 2011 by Velseis totalling 38.2 km of survey line along roads within the authorisations.
- A small trial 3-D seismic survey was undertaken in 2014. This survey covered an area of 0.70 km^2 along the base of the escarpment near the proposed underground mine portals. The survey excluded the top of the escarpment due to the presence of basalt, as well as areas having tree cover within the Bylong State Forest.

4.2 Geological Setting

The Bylong Project is located in the Western Coalfields of the Sydney-Gunnedah Basin. The coal seams proposed to be mined are within the Illawarra Coal Measures. The coal measures comprise the following four main sub-groups:

- Wallerawang.
- Carbon.
- Cullen Bullen.
- Nile.

The Cullen Bullen Subgroup is the only one that hosts coal seams of economic interest in this Authorisation. Further discussion on these seams is provided in the following section.

The Triassic age Narrabeen Group overlies the Permian stratigraphy and occurs north, east and west of the Authorisations. The Narrabeen Group comprises conglomerate and sandstone interbeds and forms the escarpments that are prominent in the region. The thickness of this unit is variable owing to the processes of erosion and scouring from incising watercourses. A drill hole in the underground area recorded 112.5 m of this material.

Tertiary basalts are present in the area overlying the proposed underground mine as well as in some minor areas located outside of the proposed mine plan. The presence of this basalt is likely to hinder the performance of seismic surveys which will be essential for understanding the structural setting of the geology of the proposed underground mine. Quaternary aged alluvium is present in the valleys and along creek beds. Alluvium has been found to be up to 20 m thick in drill holes. The alluvium has been considered for the

presence of aquifers which will directly impact the proposed open cut areas, as well as likely ground water recharge from industrial areas.

4.3 Coal Seams

There are six seams, or seam groups, recognised within the Bylong area, all of which are within the Illawarra Coal Measures. Each seam has been differentiated into plies based on intra-seam partings and brightness profiles. The table below shows the seams that have been included in the geological model of the deposit and the number of plies recognised within each seam or seam group.

Seam Group	No. of Coal Plies
Farmers Creek	16
State Mine Creek	5
Goulburn	6
Glen Davis	10
Ulan	13
Coggan	5

The mining targets within the Cullen Bullen Subgroup are predominantly the Coggan Seam and the Ulan Seam with minor quantities of Glen Davis and Goulburn seams recovered during open cut operations. Only the Coggan Seam is proposed to be mined by underground methods in the current mine plans. The primary seams proposed to be mined are discussed below.

4.3.1 Coggan Seam

Thickness of the Coggan Seam ranges from 2 m along the western margin of the tenements, to 5 m along the eastern margin of the tenements. The seam has been differentiated into four plies which are mostly continuous across the deposit. Raw ash isolines show minor variability across the deposit for each ply. Plies C, D and E have raw ash content less than 15% (ad) with some minor higher values, including a high ash zone in the central east of A287. Raw ash content for Ply B ranges from 15% to 40%. The high ash zone is within the proposed underground mine area, although the ply is relatively thin in this area. The isolines of raw ash content in the open cut areas appear consistent for each ply. This will ensure consistent CHPP feed and assist density and product ash control for the coals mined from these areas.

4.3.2 Ulan Seam

The Ulan Seam has up to nine coal plies, as well as two tuffaceous members that are within the lower part of the seam. The plies are generally less than 1 m thick. Total coal thickness is up to 9 m and coal plys are distributed across a total thickness of 20 m. Only the section from Ulan Seam H ply (ULNH) through to Ulan Seam N ply (ULNN) is continuous. This section also includes the two tuffaceous members. Separating these tuffaceous units is prudent to allow efficient beneficiation. Thickness of the Ulan Seam working section was not described in the material provided to BOYD. Raw ash content is mostly greater than 30% (ad) for each of the plies, with ash content of some plies being as high as 56% (ad). The Ulan Seam will require beneficiation where mined.

4.3.3 Glen Davis and Goulburn Seams

The Glen Davis Seam has been differentiated into 10 plies within the Authorisations. The average thickness of these plies is 0.3 m, except for the GDA ply which averages 1.1 m and has a maximum thickness of 1.7 m. The thickest part of the GDA overlies the proposed underground workings in the Coggan Seam by around 63 m, which will make recovery difficult. Raw ash content of the GDA ply in the area of mineable thickness is approximately 20% (ad). The GDA ply also exists in the proposed open cut area and has a thickness of approximately 1.5 m and a raw ash content of approximately 20% (ad). This represents a realistic target for open cut mining.

The Goulburn seam has 6 plies, with the exception of G ply being <1.0 m thick, poorly defined and moderate to high ash (15% ad to 60 % ad). The G ply, GOG, is reasonably well defined, and < 0.9 m thick albeit with an ash of 42% ad.

4.4 Structure

The overall dip of the coal measures within the Authorisation is consistently between 1 degree and 3 degrees to the north-northeast, which is favourable for mining. Depth of cover for the Coggan Seam ranges from 10 m at the sub-crop to approximately 380 m at the deepest point. The irregular topography is responsible for the large variations in the depth of cover.

There have been no large faults identified within the Authorisations. The current drilling density is adequate to identify large structures (e.g., faults with displacement greater than 20 m. However, drill hole spacing is currently too large to identify smaller structures that may be large enough to cause disruptions to underground operations. The 2-D seismic lines identified twelve structural anomalies that were determined to be possible faults. There have also been fault planes intersected in drill core, the nature of which could not be clearly determined. The level of detail is satisfactory for this level of study. These features will be further investigated in pre-operational exploration programs.

A series of complementary anticlines and synclines have been identified from the interpretation of the seismic surveys. The fold axes are oriented north-south with variation in dip angle of the fold limbs up to seven degrees. These structures have been identified in the proposed underground mine area. The area of these structures has been referred to as the discontinuous structure zone.

There are 49 drill holes that have intersected igneous material. The igneous material is comprised of basalt and dolerite. There is no distinct pattern or trend in these intersections and they are distributed across the deposit. The most prominent igneous feature is the Coggan Sill which has either partly or wholly replaced the Coggan and Ulan seams. The Coggan Sill is located outside the proposed mining areas. Dykes are also present throughout the deposit. These have been identified through field mapping, as well as by intersections of boreholes.

The extent and orientation of the majority of the igneous intersections in drill holes are unknown as is their potential impact on mining operations. Attempts to define the extent of some of these igneous bodies by drilling have been largely unsuccessful. BOYD observed that data from magnetic surveys conducted over the area may assist in the interpretation of the features.

4.5 Coal Quality

4.5.1 Raw Coal

Average raw coal qualities of the estimated reserves are shown below:

Category	Mining Method	Coal Seam	ROM Coal	Ash % (ad)	Specific Energy (Mj/kg)	Fixed Carbon % (ad)	Volatile Matter % (ad)	Total Sulphur % (ad)
Proved	OC	Glen Davis	0.1	47	16.8	24	18	0.3
		Ulan	13.3	37	16.0	33	21	0.3
		Coggan	16.8	17	23.0	45	28	0.4
		Total OC	30.2	26	19.8	40	25	0.4
	UG	Coggan (B-E)	62.2	27	22.6	43	26	0.4
	Total		92.4	27	21.7	42	26	0.4
Probable	OC	Glen Davis	1.3	39	16.8	30	22	0.3
		Ulan	1.1	40	21.2	30	20	0.3
		Coggan	0.1	19	23.0	44	27	0.5
		Total OC	2.5	39	19.0	30	21	0.3
	UG	Coggan (B-E)	24.7	27	22.5	43	26	0.4
	Total		27.2	28	22.2	42	25	0.4

4.5.2 Washability Analysis

Washability analysis has been performed on HQ sized drill core samples. The washability analyses were carried out on a single size fraction, +0 mm. The cumulative ash % and mass % for each floats fraction was then gridded to form part of the computer model for the deposit. The cumulative float values that have been gridded represent 100% efficiency of separation on all size fractions and are not representative of the yield that can be achieved through beneficiation.

To account for CHPP efficiency factors, an offset has been developed by comparing the difference between LIMN simulations and the 100% efficiency yield of the +0 mm size fraction of nine large diameter bore cores. The average of the difference between the yields derived by the two methods was subtracted from the theoretical yield to provide an estimated CHPP yield that was used in subsequent mine planning, scheduling and reserve estimation processes.

BOYD considers that given: (1) the different types of washability analysis, and (2) the bulk of the analyses being performed on the +0 mm size fraction, the description of the methodology used to derive the estimated CHPP product yield is reasonable. However, the data supporting the relevant offsets and their application during the mine planning, scheduling and reserve estimation processes are unclear. BOYD assumed that the yield offsets and their application in the mining schedules to derive the estimated CHPP yield are reasonable.

4.5.3 Product Coal

Typical product specification for the 16% ash product is shown below:

Product Coal 16% Ash		
Property	Basis	Value
Ash (%)	ad	16
M (%)	ad	4
TM (%)	ar	11
CV (kcal/kg)	gad	6,370
CV (kcal/kg)	gar	5,906
CV (kcal/kg)	daf	7963
Carbon (%)	daf	81.1
Hydrogen (%)	daf	4.9
Oxygen (%)	daf	11.6

The data indicate that this product specification will be achievable from the Coggan Seam. Higher ash products will be produced from the other seams with a 22% ash product shown in the plan. This product will be produced from the Glen Davis and Ulan seams. The quality specification for the 22% ash product was not provided to BOYD and a reduction in energy and other ash dependent parameters will occur from the quality specification shown below. Non-ash dependent parameters, such as Sulphur, are expected to be consistent with the 16% ash product.

4.6 Coal Resources

Resources were estimated in 2013 and reported in accordance with the 2012 edition of the JORC Code. A summary of reported resources is shown in the table below.

		Insitu Resources (Mt) by Classification			
Assigned Mining Method	Coal	Measured	Indicated	Inferred	Total
Open Cut	Goulburn	0	5.2	0.9	6.1
	Glen Davis	3.9	11.4	6.9	22.2
	Ulan	67.0	66.1	42.5	175.6
	Coggan	71.2	66.0	51.1	188.3
	Subtotal	142.1	148.7	101.4	392.2
Underground	Glen Davis	5.0	10.1	22.9	38.0
	Ulan	50.3	66.4	48.5	165.2
	Coggan	96.6	93.7	89.1	279.4
	Subtotal	151.9	170.2	160.5	482.6
	Total	294.0	318.9	261.9	874.8

Resources were differentiated into open cut and underground categories based on the criteria below:

4.6.1 Open Cut

- Minimum ply or working section thickness of 0.3 m.
- Cumulative vertical overburden ratio of 6:1 bcm/t to the base of the Coggan Seam.
- Restricted to valleys.
- Maximum depth of 150 m.
- Maximum raw ash content of 50% (ad) was applied to each ply.

4.6.2 Underground

- Areas classified as open cut resources are excluded.
- Resources have a minimum depth of 50 m, longwall mining 100 m.
- Maximum raw ash content of 50% (ad) was applied to each ply.

The Farmers Creek Seam Group and State Mine Creek Seam Group were excluded for resource consideration because they are generally poorly defined, thin, have high ash contents and are not considered economic for extraction.

The confidence of the resource classification was derived from polygons surrounding the points of observation. Points of observation were cored intersections of the coal seam having at least 90% core recovery, which were sampled and analysed for proximate analysis and relative density. The distances surrounding the points of observation are consistent with the Coal Guidelines (2003)[2]. These are listed below.

Classification	Resource Classification Criteria
Measured	Less than 500 metres from a point of observation
Indicated	Between 500 metres and 1,000 metres from a point of observation
Inferred	Between 1,000 metres and 4,000 metres from a point of observation

Isolated polygons were excluded from the respective resource category.

The estimation methods applied to the resources are sound and reasonable and are consistent with industry standards. The distance criteria for resource classification specified in the Coal Guidelines (2003) was superseded in the JORC Code (2012). However, based on the quantity of data and the consistency of the coal properties, the distance between points of observation are considered reasonable. It should be recognised that some of the resources reported may not demonstrate reasonable prospects for eventual economic extraction for the following reasons:

- Underground extraction of the lower Ulan Seam is unlikely to be achievable if the Coggan Seam is also mined. The interburden thickness between these seams is approximately 6 m, which is considered to be too thin to allow extraction of both seams.
- Underground extraction of the Glen Davis Seam is also unlikely. Since the Coggan Seam will be mined first, the overlying Glen Davis Seam would be undermined and the coal seam, roof, and floor material would be fractured. The Glen Davis Seam is only approximately 1.2 m thick and extraction is considered highly problematic.
- Open cut mining of the Upper Ulan plies is probably impractical owing to the thin nature of these plies, the high ash content and relatively low value of the coal.

[2] Australian Guidelines For The Estimating And Reporting Of Inventory Coal, Coal Resources And Coal Reserves, The Coalfields Geology Council Of New South Wales And The Queensland Mining Council, 2003 Edition.

- Open cut resources in the valley near the village of Bylong will be problematic to recover due to existing surface features, including: The Bylong Valley Way, Wollar Road and the existing rail line, all which would require relocating. There appear to be limited areas to allow relocation of these structures. The Bylong River and associated floodplain lies adjacent to the resource constraining mining options.

Notwithstanding the above concerns, there is a large resource base that is capable of supporting the mine plan as proposed. BOYD opines that there is no reason that any of the resources proposed to be mined should not be considered as resources at this point in time.

4.7 Coal Reserves

Reserves were estimated in 2013 in accordance with the JORC Code. A summary of the reserve estimate (tonnage and average quality) follows:

Mining Method	Coal Seam	Product (Mt)	Ash % (ad)	SE (MJ/kg)	Product (Mt)	Ash % (ad)	SE (MJ/kg)
OC	Glen Davis	0.1	22.0	22.4	0.8	22.0	22.4
	Ulan	8.1	22.0	22.4	0.7	22.0	22.4
	Coggan	16.0	16.0	23.9	0.1	16.0	23.9
	ubtotal	24.1	18.0	23.4	1.6	21.6	22.5
UG	Coggan	40.5	15.7	24.6	15.4	15.8	24.6

The key parameters used to define the open cut working sections are provided below.

Modifying Factor	Units	Value
Roof Loss	mm	75
Roof Dilution	mm	25
Floor Loss	mm	25
Floor Dilution	mm	25
Minimum Seam Thickness	mm	250
Maximum Included Parting	mm	300
Global Loss	%	5
Maximum Ply Ash	%	50

BOYD considers that the modifying factors applied to define and estimate the open cut reserves are reasonable with the exception of the minimum seam thickness and maximum included parting. The specified assumptions may not reflect the probable mine operations as they indicate the working section may have a non-coal material thickness greater than the thickness of the coal. Mining of these seams is likely to be the source of very high dilution in open cut workings. Mining coal seams that are as thin as 0.25 m are assumed to be mined by a small excavator; however, the resulting productivity may be lower and the associated coal loss and dilution greater than that assumed.

Assumptions applied to the underground reserves appear to be reasonable.

5.0 Mine Plan

5.1 Mining Strategy

Mining is undertaken using commercially demonstrated mining methods and technology to recover available Resources in a cost-effective and profitable manner.

A robust mine utilises inherent features that support acceptable economic extraction of resources. Key characteristics include:

- Practical and efficient operations:
  - Mining of the identified resource using proven mining methods.
  - Efficient use of the coal resource by optimising the market value, the recovery of the target seam and the benefit to stakeholders.
- Feasible:
  - Conduct mining activities to extract, beneficiate and deliver a marketable quality coal product at an acceptable operating margin.
  - Deliver an acceptable profit to the project owners considering capital requirements, project financing and overheads, project risk; calculated by analysis of cash flows using mine plans, production schedules and economic modelling to indicate acceptable hurdle rates (i.e., IRR, NPV, ROC, payback period).
- Achievable:
  - Within identified environmental, geological, mining and other constraints.

Key characteristics of the two predominant mining methods, open cut or surface mining and underground mining are presented in Appendix C.

5.2 Proposed Mine Development

The proposed mine development consists of initially mining two areas using open cut methods for a period of seven to eight years. During the period that the open cut mine is operating, an underground mine using longwall extraction techniques will be established. Longwall production is scheduled to reach full capacity to coincide with the cessation of the open cut production. The underground mine will commence two years prior to closure of the open cut mine and continues for 20 years. Backfilling of the void remaining at the cessation of open cut mining operations is planned to occur throughout the longer term underground operations. A coal handling and processing plant (CHPP) will be constructed to process the coal mined from both open cut and underground operations. Some coal will bypass the CHPP and will be blended with washed coal to deliver the targeted product coal quality. The CHPP will produce a washed coal product, as well as coarse and fine rejects materials which will be co-disposed in open cut backfill and final pit void areas.

The project has scheduled:

- A total of 32.8 Mt ROM is to be mined by the open cut mine.

- 91.3 Mt ROM coal from the underground mine.
- Average output of approximately 5.5 Mtpa ROM, peaking at 6.5 Mtpa ROM.
- 154 Mbcm of waste material to be removed by open cut operations as part of mining the coal.
- An additional rejects waste quantity of 22 Mt (equivalent to 26.3 milion cubic metres) to be created by the CHPP.
- Product coal totalling 87.9 Mt over the life of the Project, an average rate of 3.85 Mtpa product, will be dispatched by rail for export sale.

BOYD considers that the proposed mine operations have been appropriately developed in a staged and iterative process.

5.3 Recovery of Coal Resources

Beneficiation of selected mined coal plies is required in order to deliver a marketable coal product, Simulations were conducted to determine CHPP process options, optimal recovery and CHPP set points. Marketing analysis evaluated marketability and revenue of forecast coal product streams. The selection of open cut mining enables multiple coal seams to be exploited. Processing costs are reduced by selective mining and bypassing the CHPP (i.e., selling the coal on a raw basis) of some Coggan Seam plies. Whilst the revenue was indicated to reduce 8% (US$97/t vs. $89/t) due to the increased ash/lower energy value, the strategy provides overall profitability and is considered to be standard in the industry. Underground mining is unable to selectively mine individual coal plies. However, some coal is still bypassed to be blended with washed coal to provide a marketable product at a higher yield than if 100% was processed by the CHPP.

The project has endeavoured to extract targeted coal resources efficiently.

Coal Resources reported in the 2014 JORC statement are substantially higher than those included in the current mine plans, as summarised in the table below:

	Reported (Mt In Situ)	Mined (Mt ROM)
Open cut	391.6	32.8
Underground	482.7*	91.3
Total	874.3	124.1

* Includes seams 1.2 m thick which are considered to be too thin for underground mining.

Based on the reported total resources, a significant portion of the identified coal resources are not included in the current project mine plan(s). Future opportunities may exist for additional mining within the Authorisations; however, these are not evaluated at this time.

5.4 Constraints to Mining Areas

The Authorisations contain a number of surface and subsurface features that presented constraints to mining operations as presently identified.

The proposed mining operations are located adjacent to or in the vicinity of significant surface features: Bylong town, regional roads, railway easement, water courses, valley areas, alluvial flood plains, aquifers, Tal Tal Mountain, sandstone escarpments (cliffs), critical industry clusters (CIC) and biophysical strategic agricultural land (BSAL). Protecting these features from potential environmental harm required the mine design to incorporate controls and barriers, as summarised in the following table:

Surface Feature	Barrier/Control	Mine Design Provision
Town, roads, rail, alluvial plains, aquifers, BSAL areas, water courses	Increasing separation or standoff distances	Mining pits, emplacement areas and infrastructure, include a 40 m subsidence barrier with an increased subsidence angle to 35 degrees (from 26.5 degrees).
Water courses	Barriers/levees	Place open cut crests above 1:1,000 year flood levels.
Escarpments (cliffs), BSAL areas	Minimise surface subsidence	Constrain mining to mains roadway driveage and critically locating these activities, mine design to allow a maximum surface subsidence of 20 mm in these areas.
BSAL, watercourses, alluvial plains	Minimising mining activity impact	a. Locate mine infrastructure areas and spoil emplacements to have minimal footprints. b. Place the CHPP inside the rail loop. c. Locate the rail loop adjacent to the rail network. d. Drive underground drifts to access the underground resources. e. Strip and store BSAL soil resources prior to mining for reclamation and rehabilitation. f. Raise spoil dump elevations. g. Store CHPP rejects material within waste/spoil emplacements. h. Selectively position ex-pit spoil emplacements to create a visual screen and minimise impact on BSAL.
Town, roads, rail, alluvial plains, aquifers, BSAL areas, water courses	Excluding mining activity	Defer or discard open cut and underground activities and identified resources.

BOYD opines that reasonable barriers, which are both practical and feasible, have been implemented.

5.5 Open Cut Operations

The Bylong open cut schedule has addressed a number of strategic issues as discussed in the following sections. BOYD opines that these issues have been reasonably determined and are addressed in a prudent and reasonable manner.

5.5.1 Mining Method

Constraints have impacted the footprint of the open cut pits to reduce the mine areas to irregular shapes and relatively low stripping volumes. The resulting pit configurations are not conducive to cost-effective dragline mining techniques.

The use of draglines was evaluated, but discarded by KEPCO. This is because: (1) the requirement for capital expenditure is likely to be in the order of $160M for equipment (if purchased new), (2) operating life of a new dragline is more than 30 years whilst the mine was planned for 7 years, and (3) over the life of the open cut mine, a total of 154 Mbcm of overburden will be removed, which is well below the productive capacity of a moderate sized dragline. Consequently, KEPCO adopted the use of truck and excavator/shovel mining methods which will provide a practical, flexible mining method. This will enable the development of multiple benches to selectively target the coal seams, strip overburden and also remove interburden between plies/seams.

Utilising excavator/truck methods will enable selective mining of a number of coal plies from four seams, to recover a total of 32.8 Mt ROM or 26 Mt product coal.

Only the Glen Davis A ply, the Lower Ulan working section and the Coggan Seam, represent realistic open cut working sections.

5.5.2 Alternative Underground Mining Option

Should KEPCO be required to implement underground mining methods in place of surface mining, a number of issues will present themselves. Impacts include reduced coal recovery as less coal will be extracted, and the occurrence of surface subsidence and possible disruption, assuming high extraction underground mining practices are utilised to maximise recovery.

To protect surface features from the effect of surface subsidence, a 40 m barrier and 35 degree subsidence angle would be required to define the mining area in the underground mine plan, restricting it to a size that is not dissimilar to that of the open cut.

Data show that only the Coggan Seam has sufficient thickness to be a viable target for underground mining, indicating the planned extraction of Ulan, and Glen Davis seams (under the open cut mine plan) would not occur. Mining practice and geotechnical considerations also result in only one seam, either the Coggan or Ulan seam, being extracted.

The probable underground mine footprint for the Coggan Seam results in 17 Mt of ROM coal being underground mined. In comparison, the open cut mine plan recovers 32.8 Mt ROM, indicating a loss of 16 Mt of ROM coal.

Open cut mine plans indicate the depth of the initial boxcuts is 25 m to 35 m and the boxcuts are located to intersect the lowest, Coggan Seam, in fresh coal. Current mining practice considers that a minimum depth of 25 m of competent rock, or a minimum depth of 50 m) is required to provide a stable roof to operate underground. Allowing for depth of weathering which reaches 25 m over the area it is likely that an offset of up to 2000 m from the LOX line, and potentially greater, may be required to position a potential underground operation, with a subsequent further loss of coal resources (as compared to open cut mining).

5.5.3 Mine Schedule

Open cut schedules, developed using an optimiser analysis process, indicate that mining will progress from shallow coal, having low strip ratios, to deeper cover with higher strip ratios. Consequently, margins decrease with time in the open cut schedule, albeit higher cash flow is earned in the earlier years. Targeting shallow areas enables initial mining operations to accelerate project mobilisation and reach target production rates more quickly, due to the relatively low volumes of overburden. This reduces project start-up risk and costs.

5.5.4 Contractor vs. Owner Operator

KEPCO intends to utilise contractors to undertake all open cut operations at Bylong. BOYD concurs with the planned use of contractors, which we consider to be prudent due to the open cut plan having a relatively short operating life of seven to eight years. Opportunities resulting from the adoption of this strategy include:

- Minimal requirements for capital expenditure as a contractor will supply all mining equipment.
- Staged mobilisation of fleets.
- Potential for lower labour costs through established labour agreements, workforce and staff flexibility, and reduced redundancy costs.

It is recognised that a contractor will generally require a higher operating cost to cover their profit margins, internal overheads, workshop and office infrastructure and equipment financing costs. However, the benefit to Bylong is a reduction in initial capital expenditure to purchase fleets to support an overburden removal rate of approximately 35 Mbcm per annum for the short project life. Capital expenditure is required for long life infrastructure – including supply of key services, CHPP and coal handling, and a rail spur at the commencement of the open cut operations.

5.5.5 Mining Rate

Bylong proposes an open cut mining rate which is similar to that projected for the planned underground operation. The adoption of a sequential, development provides a constant feed rate which enables the capital efficient construction of a CHPP and coal

handling system. By adopting both surface and underground mining plans, an additional 36% of ROM tonnage, in addition to the underground production of 91 Mt ROM, is processed by the CHPP and coal handling system and rail system. This provides increased efficiency of capital utilised.

5.5.6 Final Landform

Once an initial pit void is created, mining activities are scheduled to continuously backfill the excavated mine void with overburden material. Complete backfilling of the total open cut void is planned. The schedule has correctly identified that material from the initial boxcut excavations must be placed out-of-pit in selected ex-pit emplacements. Over the eight year life of the open cut, approximately 154 Mbcm of material is removed, as well as 32.8 Mt ROM (a volume of 22 million cubic metres of coal). Life-of-mine activities will result in a void of 176 million cubic metres. However, overburden swells during its excavation (to approximately 125% of original in situ volume) resulting in an estimated loose volume of 190 million cubic metres. The additional volume of rejects from the CHPP generated during the life of the underground (totalling 36 Mt or approximately 29 million cubic metres) are required to be stored in contained waste repositories. The open cut excavation void is insufficient to hold the combined overburden and rejects volumes. Options are limited as an additional 43 million cubic metres, (shown as 72.6 million cubic metres – Vol C EIS Table 4.1), of material has to be placed and include:

1. On-pit emplacement – over the footprint of existing mine activity albeit at an increased dump elevation, or
2. Ex-pit emplacement – adjacent to mining areas.

Both options will place a storage area which will be higher in final elevation than the initial land profile.

BOYD opines that the Project has correctly identified efficient and feasible emplacement considering the options of increased footprint or increased dump height. Ultimately a trade-off is required between the competing and significant issues of environmental management, operating efficiency, reasonableness and project feasibility.

5.5.7 Coarse and Fine Rejects Management

The current management strategy for plant rejects from the CHPP is to prepare the coarse and fine reject materials for co-disposal (as a solid dewatered combined rejects material). This waste material will be removed by overland conveyor and truck haulage for disposal in the open cut void areas. Information provided to BOYD indicated that a limited amount of rejects material has the potential to be acid forming if not appropriately managed. Following cessation of the open cut, it is planned to leave a void which will be used to receive CHPP rejects during the life of underground operations. Upon mine closure, the rejects area would be capped and fully rehabilitated. Some small quantities of potentially acid forming materials will be appropriately managed and disposed of in-pit

below surface level, which will minimise the risk of above ground dam failure, or release of this material. BOYD considers this to be a low risk, robust solution to rejects disposal. In the event that an open cut emplacement area is not available for rejects disposal, options are limited to dispose 29 Mt or 23 million cubic metres of coarse and fine rejects materials. A high level review of identified options included:

- Storage in an on-pit or ex-pit emplacement area by constructing a dam, or
- Storage of sufficient volumes until underground activities have retreated to the northern extent of the mine. Under this case, for the final seven to eight years of underground operations, when some material could be placed underground. At a conceptual level, this option requires surface storage of more than 13 million cubic metres with the balance disposed of in the abandoned underground main heading voids. Seals would need to be installed underground (to isolate the disposal area from the active mine) and re-liquefaction of the co-disposal material would be required in order to pump and inject via multiple borehole the disposal material. This activity whilst possible technically, is considered and is not commonly practiced in the industry. The balance of co-disposal material that would not fit underground and the water decanted from the stored material, would be stored on the surface with the associated environmental concerns and risks. A volume balance and business case analysis are required to fully vet this option.

5.6 Underground Operations

The Bylong underground schedule has addressed a number of strategic issues. BOYD opines that these have been reasonably identified and that the resulting plans are prudent, reasonable and cost effective.

Key matters assessed by BOYD are discussed below.

5.6.1 Alternative Option to Underground

Depth of cover is impacted by the presence of an escarpment, and is generally greater than 160 m. The depth to the target Coggan Seam is significant, which excludes open cut mining as a viable option due to the high cost of overburden removal compared to coal reflected in the strip ratio (i.e. overburden to coal ratio).

Other impediments to possible surface mining include the existing surface features.

5.6.2 Access to Underground Resources

Drift access into the underground coal resources is planned. Alternative options to provide access for the underground mine include excavation of a box cut, or construction of vertical shafts.

Drifts are both cost efficient and provide reasonable access and egress for men, materials and equipment, removal of the mined coal by conveyor. Use of drift access is the most common method employed by Australian mines.

Excavation of a boxcut to provide direct seam access, is precluded by existing surface constraints. The option to use shaft access requires an extended period for mine development, and is high cost and relatively inefficient, as compared to the use of drifts.

5.6.3 Mining Methodology

Where site and geological conditions are favourable, the extraction of coal by longwall methods is an efficient and feasible approach to recovering the underground coal resource. Practiced widely in underground coal mines across Australia and internationally, the equipment is readily available and supported, and processes are well established. The resource has very favourable geologic conditions: depth less than 300 m, thick seam section varying from 3.4 m to 5.0 m, and shallow seam dip. Little seam gas has been detected.

The bord and pillar mining method was considered as an alternative to longwall, to reduce subsidence impacts. This option whilst technically feasible, potentially reduced mine recovery of coal resources to 40% to 50% (as compared to 80% to 85% for longwall mining), and incurs at increased cost of production and a reduced annual production rate. BOYD opines that this option was correctly discarded by KEPCO.

The underground mining plan scheduled the more efficient, thicker seam, higher quality eastern areas to be mined initially, before relocating operations into the less productive, thinner seam, western areas. To mitigate the thinning seam, longwall panels have been widened. BOYD opines that the technical parameters and associated productivities adopted by the Project are reasonable.

The main headings, which will result in negligible surface subsidence effects, have been aligned with the escarpments. This mine layout locates necessary underground infrastructure efficiently, and will result in a lesser impact on the surface environment.

5.6.4 Spontaneous Combustion

The plan has indicated the adjacent seams and relatively shallow workings may present the mine with a risk of a spontaneous combustion event. BOYD opines that this risk is reasonably manageable with current industry operating practices and management controls, and is not considered significant.

6.0 Consequence of Non Approval of Open Cut Operations

The impacts and consequences of the open cut failing to obtain necessary regulatory approvals are significant and are evaluated by considering the following:

- Mining operations,
- Economics (i.e., revenue, royalties, cash flow, investment return).

6.1 BOYD Model

Using available data, BOYD created a high level financial model in an attempt to replicate the potential economic impacts of eliminating open cut operations from the proposed Bylong Project. BOYD used our experience and judgement to determine the appropriate interpretation where data was not definitive. The model was confirmed to replicate the Feasibility Study and was considered adequate to model the key changes and the resulting impact to the Bylong Business Case by deleting the open cut related output, costs and revenue from the Project.

The financial assumptions adopted by BOYD were shown in the Feasibility Study and included:

- Revenue assumed average prices of A$119.91/t, at a exchange rate of US$1:A$0.84. However, the average pricing assumed masks the pricing increment between high ash (US$72.89/t) and moderate ash (US$104.48/t) products.
- A 28.4% tax rate was assumed. A 20-year flat depreciation rate was assumed to calculate net cash flows.
- NPV was estimated using an annual, after-tax discount rate of 7% (which is at the low end of typical project discount rates).

6.2 Mine Output and Life

6.2.1 Mine Output

Eliminating the open cut will reduce the total mine output by 32.8 Mt ROM, to 92 Mt ROM (an overall decrease of 26%). The relative impact on product tonnage is greater due to the higher total yield (78%) from the open cut achieved by bypassing some open cut ROM coal. Product tonnage reduces 29% or by 25.7 Mt, to 62.1 Mt product.

This variance in output affects the total CHPP throughput and railing transport tonnages.

6.2.2 Mine Life

Underground mine operations were assumed to accelerate by two years, currently lagging three years behind the open cut, should open cut mining not be included. This delay enabled the installation of infrastructure and services, and provides the time necessary to excavate and drive the drifts, and to order equipment. Mining would continue over a 20-year period, which is a reduction of three years.

6.3 Economic Considerations

A number of economic impacts, detrimental to the project, are derived from the financial model, should the open cut not be approved. These are summarised below:

- Capital expenditure is likely to increase due to the requirement to construct a rejects emplacement (disposal) area with associated haul road and bunding, resulting from the loss of the open cut void for storage. A suitable area was not determined, but conceptual costs were assumed to be at $10M. We do not anticipate any additional

savings as the open cut operations were predicated on minimal capital expenditure (via the use of a contractor albeit at increased operating cost). Expenditure on infrastructure, services and coal handling and processing is required for the underground and the quantum is not likely to change. The project strategy that maintained a steady coal output to 5 Mtpa ROM and sequential operation of the two mining operations, means there are no savings from reduced rates of through-put.

- Mine Costs: FOB costs improve by $3.04/t product, or 4%, providing a higher profit (ash flow) margin.
- Revenue decreases by $3,251M or 30%, due to reduced sales tonnage.
- Royalty payments reduce by $215M or 27%. The quantum of the impact is dependent upon sales price achieved for the two products. However, the magnitude of change will not vary.
- Positive cash flow occurs five years later than that for the combined open cut/underground mining plan.
- NPV drops by 93% but remains positive under the assumptions made. This case could be considered marginal considering the level of study.

The following summary is prepared to show the relative changes that would occur should the open cut not be approved. The actual metrics are not shown as they may not be accurate compared to the Project economic analysis, but instead show changes on a comparative basis.

		Variance	% Change
Mined Coal	Mt ROM	(33)	(26)
Output	Mt Product	(26)	(29)
Yield	%	(3%)	(4)
FOR Cost	$M	(1,537)	(34)
	$/t Product	(3.31)	(6)
FOB Cost	$M	(2,081)	(32)
	$/t Product	(3.04)	(4)
Revenue	$M	(3,158)	(30)
Royalties	$M	(215)	(27)
Capital	$M	9	1
Net Cash Flow	$M	(671)	(35)
Positive Cash Flow	Years from Construction commencing	(5)	250
NPV	$M	(349)	(93)

BOYD concludes that if the open cut mine were not approved, the impact on the Bylong Project would be highly detrimental to the projects feasibility and viability.

7.0 Disclaimer

The findings and conclusions presented herein represent the independent opinions of BOYD based on available source documentation, which has been supplemented by BOYD's general industry knowledge. Our findings have been prepared in a manner consistent with prudent engineering practices and accepted industry standards.

There are inherent risks in all coal mining operations, including geological, operational, and market. The mining environment is exposed to a variety of hazards where both the probability of occurrence and consequence of an event are not predictable with a high degree of confidence. The level of uncertainty increases with greenfield projects, where an operating history is not available.

The ability of any mine operator or mining complex to achieve production, quality, and financial targets is dependent on numerous factors that are beyond the control of (and cannot be fully anticipated by) BOYD. These factors include mining and geologic conditions, the capabilities of management and employees, the timely acquisition of reserves and properties, variations in market conditions, securing permits and bonding, the competitive position of the subject properties, the ability to develop and operate mines in an efficient fashion, etc. Unforeseen changes in legislation and new industry developments could substantially alter the performance of any mining company.

The findings and opinions presented herein are prepared for the internal use of Hansen Bailey to update KEPCO, and are not warranted in any manner, express or implied.

Following this text are:

Figures
1: General Location Map
2: Map showing Conceptual Project Layout

Appendices
A: List of Supplied Documents
B: BOYD Personnel Curricula Vitae
C: Open Cut and Underground Mining - Key Characteristics

Respectfully submitted,

JOHN T. BOYD COMPANY
By:

Mark Benson
Senior Geologist

Hugh Morrison
Principal Mining Engineer

Ian Alexander
Managing Director – Australia

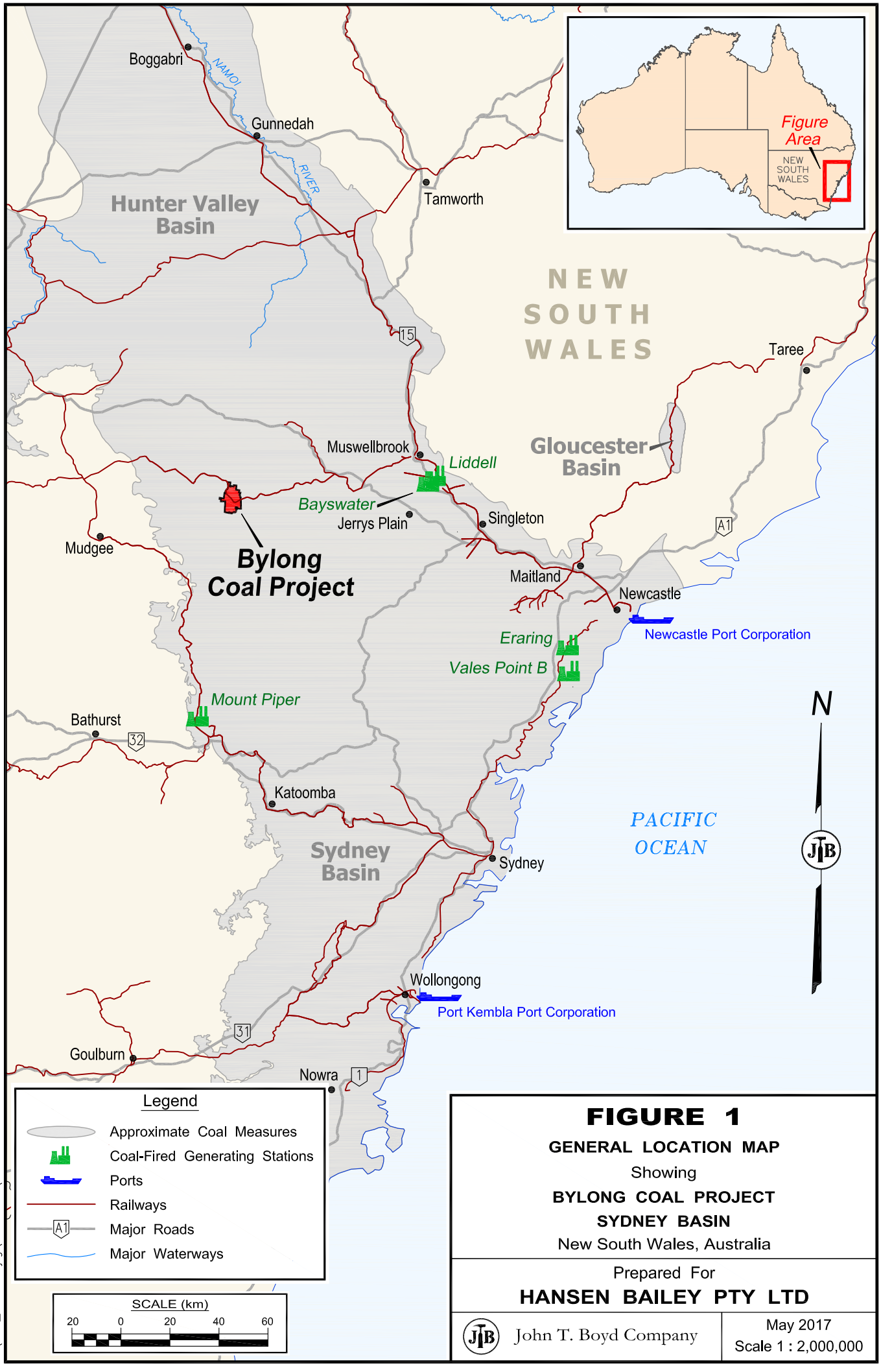


FIGURE 1

GENERAL LOCATION MAP

Showing

BYLONG COAL PROJECT

SYDNEY BASIN

New South Wales, Australia

Prepared For

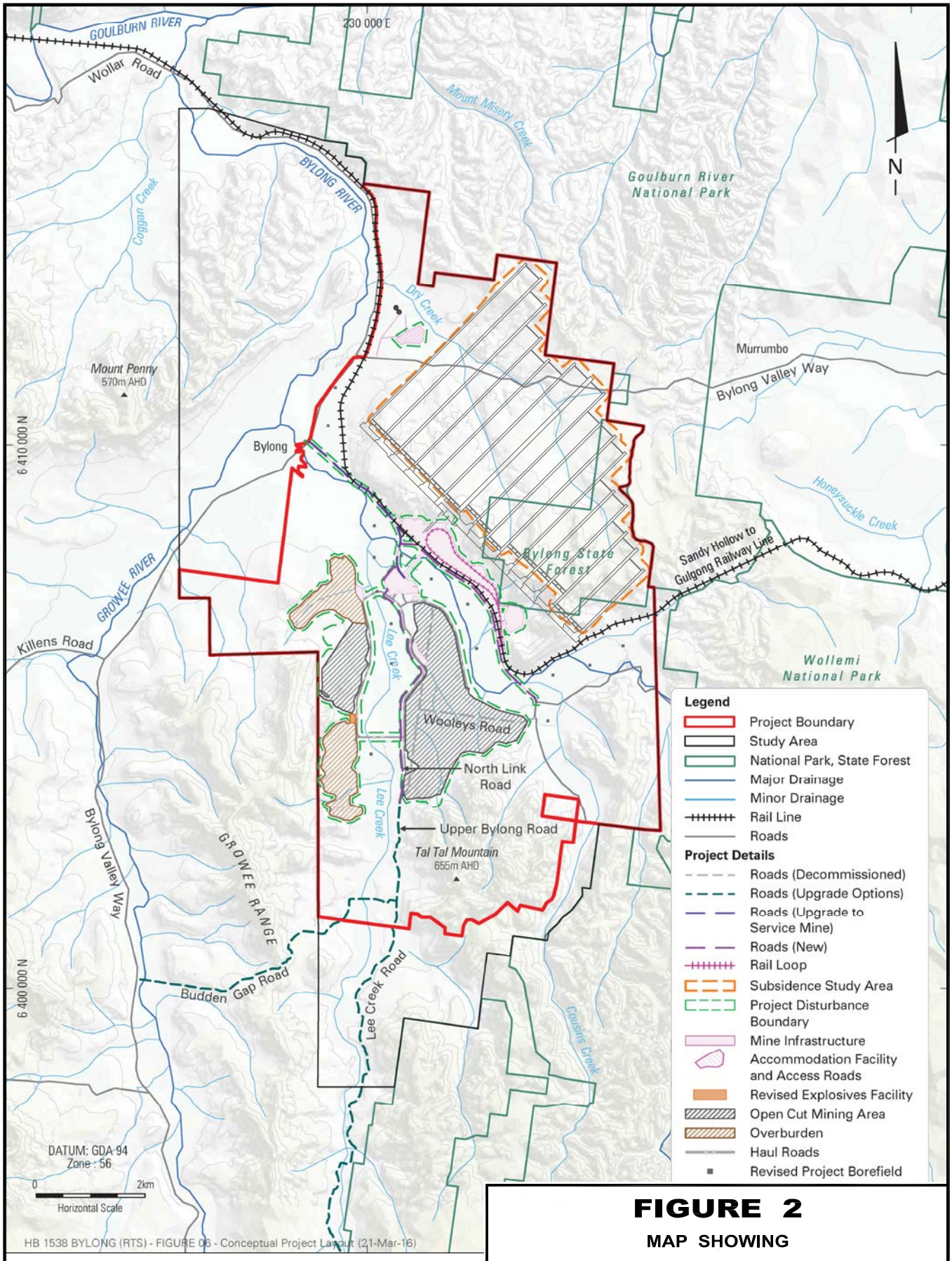
HANSEN BAILEY PTY LTD

John T. Boyd Company

May 2017

Scale 1 : 2,000,000

P:\CAD_GROUP–jfg\5172.000\FIGURE 1.DWG



SCALE (km)
1 0 1 2

Image Source : Bylong Coal Project, Environmental Impact Statement, September 2015 (Figure 6, Page 14), Hansen Bailey Environmental Consultants, with Additions by John T. Boyd Company.

FIGURE 2

MAP SHOWING
CONCEPTUAL PROJECT LAYOUT
BYLONG COAL PROJECT
SYDNEY BASIN
New South Wales, Australia

Prepared For
HANSEN BAILEY PTY LTD

John T. Boyd Company

May 2017
Scale as Shown

P:\CAD_GROUP-jfg\5172.000\FIGURE 2.DWG

APPENDIX A

LIST OF SUPPLIED DOCUMENTS

- Bylong Coal Project EIS, 2015, Submissions and Appendices, sourced via the DEHP website, including:
  - Section 2 - Geology
  - Section 3 - Project Description
  - Section 9 - Project Justification
  - Appendix C - Geology Technical Report
  - Appendix E – Mine Plan Justification Report
  - Response to Submissions Report – Relevant Sections
  - Supplementary Mine Plan Justification Report
  - Mine Plan Justification Report – Additional Supporting Information

- Bylong Feasibility Study, sections:
  Relevant Sections from Consolidated_2172857B-MNG-001 Rev C
  - Vol B_Geology_2172857B-MNG-REP-VOLB RevB
  - Vol C_Open Cut Mining_2172857B-MNG-REP-VOLC RevB
  - Vol D_Underground Mining_2172857B-MNG-REP-VOLD RevC
  - Vol I_Capital Cost Estimate_2172857B-MNG-REP-VOLI RevC
  - Vol J_Operating Cost Estimate_2172857B-MNG-REP-VOLJ RevC
  - Vol M1_JORC Resources Report_2172857B-MNG-REP-VOLM1 RevA
  - Vol M2_JORC Reserves Report_2172857B-MNG-REP-VOLM2 RevC

- Other Studies
  - Bylong Option Study_UG Area Ranking_PB RPM QCC_ 2013
  - Bylong PFS_In Situ OC Stripping Ratio_Golder Associates 2012
  - Optimiser: 04064FS_Optimiser_v03client

APPENDIX B

BOYD PERSONNEL CURRICULE VITAE

Ian Laurence Alexander
Managing Director - Australia

Summary of Expertise

Thirty-seven years experience in industry with over twenty-two years in senior management roles. Experience includes business planning on strategic and tactical levels, project planning, project management, significant business improvement initiatives. Expertise in the management of major surface mine operations in iron ore and coal. Extensive consulting related experience.

Experience

2001 to Date - John T. Boyd Company

Expert Witness, Expert Reports

- Provided expert advice to the legal team acting for the Administrators of a coal mining company which had been sold at the end of 2010. Duties included the provision of advice to Counsel, analysis of various scenarios, and review of reports.
- Provided an expert report on the actions of the mine operator and whether they met the standards required of a reasonably prudent mine operator in protecting an open cut coal mine from flooding. Prior to proceeding to arbitration the parties reached a confidential settlement.
- Provided an expert report on the nature of the work undertaken and activities performed on an exploration project. Opined on how the information from those activities was used; and whether the activities undertaken were first used for "exploration and prospecting" for minerals.
- Provided expert advice in relation to the development of a coal mine in order to meet the coal requirements of the adjacent electricity generating station. The matter related to the coal quality and quantity provided by the mine over a specified period of time.
- Provided expert advice in relation to the project development and approvals process undertaken by a company in developing a mine which was the subject of a tax claim pertaining to the acquisition of depreciating assets.
- Provided an expert report to the Arbitrator in relation to claims for breach of a mining services contract at an open cut coal mine located in New Zealand. The report opined on the overall mine planning process as contemplated and as undertaken at the mine, as well as other related issues. The matter was settled during arbitration.
- Provided an expert report to the Administrative Appeals Tribunal pertaining to a number of activities undertaken in relation to coal mining operations at a mine located in the Hunter Valley during a five year period. Testified in conjunction with two other expert witnesses, to support the findings of the report including cross examination by Counsel.
- Provided an expert witness report to the Supreme Court of Queensland regarding the validity and/or appropriateness of the assumptions, observations, methodology and conclusions of an expert witness report provided by the plaintiff; including the assumed mining methods, mining options, and resultant sterilisation of coal for a coal project located in the Galilee Basin, Queensland.
- Provided an expert opinion on the quantum of a claim instituted in the Federal Court of Australia regarding a fire which damaged an excavator at Drayton in 2001.

Experience – Continued

- Developed an independent valuation of a very large coal mine in Indonesia, including the mining operations, shipping terminal and transfer facilities, and coal marketing activities. Our opinion was developed for two separate points in time. Testified in the High Court of Singapore.
- Provided an expert witness report to the Supreme Court of Queensland on the application and suitability of the use of a dragline at a Central Queensland coal mine. Testified in court to support the findings of the report including cross examination by the parties.

Mining Property Valuations

- Engaged by the Administrators of a coal exploration company to develop a market valuation of the exploration projects located in the Bowen and Galilee Basins. The valuation will be used to determine future management strategies.
- Engaged by our Client to develop a fair market valuation of twenty-six coal exploration and development projects located in Queensland for internal company purposes.
- Developed market valuations for mining tenements held by various companies for MRRT, impairment, and stamp duty purposes.
- Conducted a strategic valuation of a number of coking coal properties in the Bowen Basin who were potential competitors to our client. The project considered future expansion opportunities for each property, including a review of the mining methodology and cost structure. Our evaluation was used as the basis for a non-binding bid for one of the properties.
- Undertook an indicative market valuation for six coal projects located in the Bowen and Galilee Basins for Stamp Duty purposes.

Operational Reviews

- Completed an operational review of an oil sands mine located in Canada. Reviewed and analysed operations. Identified opportunities to improve truck operations by 15% and shovel operations by 60% and developed improvement strategies for implementation.
- Engaged by client who is constructing a 4,000 MW power plant and associated coal mine in central India. Providing technical and operational expertise in the operational improvement initiatives being undertaken including analysis of opportunities and development of the improvement program. Activities include benchmarking performance of major processes against international operations.
- Completed an engagement for the largest coal mining company in India to study approximately 70 open cut and underground mines, assess the gaps in technology relating to safety, production, and productivity, and develop a road map to upgrade technology. Observed numerous Surface Miners (Wirtgen and Larsen & Tubro) in operation and assessed operating techniques employed.
- Conducted an operational review of a mine located in the Collie Basin, WA. Recommended significant improvements and action plans to enable the mine to meet or exceed equivalent industry standards in terms of output, productivity and cost. Activities included review of mining operations and personnel, and identification of improvement areas. Identified implementation actions that resulted in operational savings of $50M.

Experience – Continued

- Developed alternative development scenarios for mining operations located in the Hunter Valley to increase overall profitability and financial returns. Reviewed mining methods, equipment applications and productivities, and manning levels. Recommended improvement opportunities and organisational restructuring.
- Reviewed information and developed an operational readiness report pertaining to mining and mine planning related activities for a coking coal project located in Kalimantan.
- Reviewed the proposed operations, mine plan, operating costs, capital expenditure and risks to a coal project located in the Galilee Basin, Qld.

Feasibility Studies

- Managed a feasibility study into an owner-operated large electric shovel truck system proposed to replace contractor moved pre-strip material. Assignment included benchmarking of shovel-truck systems operating globally.
- Project sponsor of the team undertaking a pre-feasibility study of mobile crushing conveying system options at a Central Queensland mine. The study reviewed redeployment of an existing system, the application of additional fully-mobile and semi-mobile systems. Considered equipment placement in the mine, highwall bench design, spoil dump design, blasting considerations, and potential interface / interference between truck fleets and conveyor systems.
- Managed a study into the application of dragline pullback methods in particular areas of the mine including the development of high level implementation plans in a particular pit, detailed equipment scheduling, and examining the business drivers to identify value opportunities.
- Participated in an IPCC study that reviewed potential applications in a NSW coal mine. The study considered fully mobile and semi-mobile systems. It considered pit truck dump locations, conveyor routes, dump location and design, conveyor / haul road crossings, truck dump re-location, and pit preparation.

Strategic Studies

- Managed an independent review on behalf of the Board of Directors of the proposed coal supply options for the Tarong Power Stations from the Kunioon deposit and Meandu mine.
- Coordinated a project to develop a comprehensive independent review of costs (“shadow bid”) of the all operations undertaken by the contractor at a multi-operation mine site in Kalimantan. Costs were derived from first principles and will be used during the arbitration process between the mine and the contractor.
- Coordinated an independent review of the future fuel supply alternatives considered by a very large electricity producer in Australia. Reviewed transport infrastructure, fuel utilisation, and mining plans and schedules for three operations. Recommended further strategic alternatives for consideration and study.

Due Diligence Reviews

- Led the team that undertook a detailed technical due diligence review of the Moranbah North and Grosvenor underground coal mines located near Moranbah, Central Queensland.

Experience – Continued

- Completed a due diligence review of a coal deposit near Tete, Mozambique. Report included a review of the geology of the deposit; resources; mine plans, product coal quality; operating costs and capital expenditure.
- Completed a due diligence review and opined on the reasonableness of technical issues related to a mine located near Collie, WA: geology, resources and reserves, mining, environment, costs, logistics. The client declined to participate further in the bid process.
- Undertook a due diligence review of the Zambeze coal deposit located in the vicinity of Tete, Mozambique. Report included a review of the geology of the deposit; exploration efforts; product coal quality; and the resource statement
- Reviewed information for a deposit located in the Gunnedah Basin, New South Wales. Provided findings in relation to potential operating costs, capital costs, and project development issues to enable the client to determine their investment strategy.
- Undertook a due diligence review of coking coal properties located in Central Kalimantan. Our involvement related to the geological, mining and mine planning, and coal quality issues however our opinions were extensively canvassed in relation to options and strategies that could be adopted for project development.
- Managed the due diligence review of the multiple underground and surface facilities of a major coal producer in New South Wales. Site visits were conducted and quantity and cost inputs provided for modelling. Following consideration the client elected not to pursue the acquisition.
- Managed a fatal flaw review of the mining engineering implications of a large coal mining project located in Bangladesh.

<u>Independent Technical Reports</u>

- Undertook an Independent Technical Report of the coal resources, projected production profiles, infrastructure, and mine economics used as inputs in the valuation of the assets of Northern Energy by the independent expert; and provided opinion on the reasonableness of those estimates and projections. Report was provided to shareholders during takeover proceedings.
- Managed an independent review of a coal deposit located in the Canning Basin, Western Australia. Provided an opinion of reported resources, and indicative operating and capital costs for a conceptual level mining operation.
- Managed an independent technical review of an open cut coal mine in Indonesia, which was included in the prospectus used in the equity offering process on the Singapore Stock Exchange.

<u>Project Management</u>

- Managed project to plan a major surface mining operation in Central Queensland through river basin and adjacent alluvia areas. Deliverables included development of an environmental impact study, cultural heritage management plans, and application for a mining lease.
- Provided long-term technical coordination of the expansion and development projects being undertaken by a thermal coal mine in Central Queensland. This included an understanding of the adequacy of resources, determination of technical veracity and focus, risk profile and risk mitigation requirements, and prioritising the action plan going forward.

Experience – Continued

2000 to 2001 – Alexander & Associates Pty Ltd, Brisbane, Queensland, Director

- Established company to provide consulting expertise to the mining industry in the areas of operational and performance management, business planning, business improvement and cultural change.

1996 to 2000 – BHP Coal, Saraji Mine, Queensland, General Manager

- Managed the production and delivery of approx. 5 Mtpa of export coking coal to customers within a corporate mandate. Senior site executive responsible for all aspects of the business (approximately A$300 million revenue) including safety, production, statutory, environment, strategic, and technical issues.
- Altered business focus from production to cost of production. Reduced site controllable costs by 35%. Developed and implemented cultural change and equipment performance strategies resulting in productivity gains of 40%, with workforce reductions of 42% over two years.
- Led team that produced detailed project justification for A$190 million expansion of mine from 5.2 to 6.5 million tonnes per annum.

1994 to 1996 – BHP Australia Coal, Saraji Mine, Dysart, Queensland, Mining Manager

- Implemented alternative excavation methods and achieved record annual production levels. Improved operations by implementing greater planning and scheduling emphasis, including ISO 9000 Quality system.
- Conducted replacement studies and equipment selection for the replacement of high operating hour fleets (overburden drills, trucks, and loaders).

1992 to 1994 – BHP Australia Coal, Gregory Mine, Emerald, Queensland, Mine Planning and Environment Manager

- Coordinated all mine planning and environmental compliance activities. Increased planning and more focused mine operations by implementing alternative dragline methods. Appointed as Registered Mine Manager *(statutory appointment in accordance with Coal Mining Act 1928)*.

1990 to 1992 – BHP Utah Int., Navajo Mine, New Mexico, Production Engineering Coordinator

- Coordinated activities of planning and production department activities to achieve scheduled quantities. Liaised with environmental and maintenance departments. Prepared budget submissions and initiated equipment selection purchases including performance and productivity studies.

1986 to 1990 – BHP Utah Coal, Goonyella and Riverside Mines, Queensland

- Served in the capacities of Superintendent (Stripping, Mining, Production), and Mining Engineer pre and post merger of operations.

1980 to 1986 – Goldsworthy Mining Ltd, Shay Gap, and Perth, Western Australia.

- Served in the capacities of Assistant Mine Superintendent, Mine Planning Engineer and Mine Engineer.

Foreign Consulting Experience

Canada, India, Indonesia, Mozambique, New Zealand, United States

Education

1979 Diploma of Engineering (Mining), Royal Melbourne Institute of Technology, Melbourne, Victoria.

1996 Graduate Certificate in Management, University of New England, Armidale, New South Wales.

Registration

Limited Mine Manager's Certificate of Competency—Queensland, Australia.

Registered Professional Engineer of Queensland (RPEQ No. 9651)

Memberships

Member of Australasian Institute of Mining and Metallurgy (No. 101334)

Chartered Professional (Mining)

Publications and Papers

Opencast versus Underground Mining in Indian Coal Production, Twelfth Indian Conference, Coaltrans, March, 2013
Prospects for Mining Operations in the Current Global Context, Coal Mining Operations & Economics Conference, Coaltrans, October, 2009
Analysis of Cost Trends – Evolution of Cost Structure and Creation of a New Price Floor, Third Australian Conference, Coaltrans, August, 2007
Investing in Operational Performance, Coal Mining Operations & Economics Conference, Coaltrans, December, 2006
Thermal Coal – Australia in the Global Context, The AusIMM Bulletin, Australasian Institute of Mining and Metallurgy, January/February, 2003

Hugh Morrison
Principal Engineer

Summary of Expertise

Thirty-five years experience in the mining industry with over eleven years in senior mine management roles and twelve as a consultant. Experienced in the operations and technical processes in both surface (truck/shovel, draglines, dredge and bulk materials handling, highwall mining) and underground (continuous miner, longwall, pillar extraction) mining. Strong background in technical analysis, due diligence, mine operations, contracts, systems design and re-engineering, feasibility and valuation assessments, the management of change, mine statutory requirements, risk assessment, safety management and business loss insurance claims.

Experience

2005 to Date – John T Boyd Company (Australia) Pty Ltd

- Competitor analysis: Conducted a desk top review of public domain data of a number of underground mines to determine current business status and potential acquisition and development opportunities. Data was delivered to the client for further analysis.
- Part of a team carrying out a peer review of a Bankable Feasibility Study for a large Galilee Basin coal deposit. Reviewed the underground mining, productivity, time usage and operating cost estimates.
- Part of a team that reviewed the operations of a number of Coal India mines. Coal India had sought international assistance to modernize and upgrade the mining technology utilized at their operations to increase output, overall profitability and financial returns. Reviews were conducted across both surface and underground operations in the various Company's and districts. Opportunities and strategies were identified in exploration, maintenance, blasting, mining methods, equipment applications, productivities and planning were identified. The recommended improvements were reported to our direct client, KPMG, who made a number of recommendations and presentations to Coal India management.
- Project managed a team that conducted a due diligence review of the operation and development plans of a Queensland surface coal mine. Various production and processing strategies were evaluated.
- Part of team carrying out independent review of insurance claim resulting from 2010 Queensland rainfall events. Reviewed production plans and actual data to confirm data integrity. Reviewed production loss estimates, confirmed integrity of calculations and tested using alternative assumptions and estimation methodology. Claim was resolved by mediation.
- Project managed and conducted a conceptual evaluation to exploit underground coal resources for a mine operator. Both longwall and bord and pillar operations were evaluated and inputs supplied to the mines financial model.
- Participate in value engineering and technical evaluation and toll gate workshops for underground projects. Projects evaluated included OoM and PFS studies of both moderate and thick coal seams.
- Conducted the valuations of development projects and exploration tenements in Queensland in accordance with the Valmin Code. Valuation was undertaken to support the estimation of stamp duty, impairment or for one project, value for the Administrator.
- Conducted a review of relevant Queensland legislation to issues relevant to a business claim loss. Matters including identifying the chain of command and required documentation for surface mines from relevant Safety and Health and

Experience – Continued

Environment legislation were determined.

- Project managed the due diligence evaluation of coal development projects in the Galilee Basin, Queensland, for an Indian Client.
- Project managed and conducted a technical assessment to evaluate the potential acquisition, as a joint venture partner, of an underground longwall coal mine expansion. Client was an international steel manufacturer.
- Project managed and conducted a Technical Assessments to support the decision to acquire a mine development project.
- Project managed and conducted two Independent Technical Assessments for the Board to support the divestment of multi mine operations. Technical data and advice was provided to the Financial Advisor appointed in accordance with ASX requirements. An Independent Technical Report was provided to the Advisor and included in the Board recommendation to shareholders.
- Assisted studies in the application of In-pit crushing and conveying (IPCC) technology. Studies evaluated applicability of the system and lead to a pre feasibility level analysis of system option for use in an iron ore mine. Collated existing IPCC operations and vendor data and documented key considerations and assumptions for assessing IPCC applications.
- Conducted the concept level study of multi seam longwall in environmental sensitive area. Prepared a financial evaluation. Project not progressed.
- Assessed the integrity, reliability and risk of a feasibility study of multi seam underground expansion.
- Provided technical expertise to assist the evaluation of Insurance claims for business loss resulting from the following incidents:
  - Impact of a weather event on a number of surface mines
  - Underground coal mine explosion (resultant: loss of mine, fatalities)
  - Underground coal mine fire and abandoning of longwall face equipment and block
  - Flooding of a operating longwall panel
  - Catastrophic collapse of dragline boom
  - Collapse of haulroad in open cut coal mine
  - Fire on conveyor head end (drivehead) in surface brown coal mine

  Incidents resulted in loss to insured from matters including equipment damage, loss of mine access, flooding, other material damage and lost production. Project activities included:

  - Conduct site inspections, interviews and examination
  - Evaluation of causal factors, business plans and subsequent mine performances.
  - Preparation of assessments of cause, damage and loss.
  - Evaluation of Loss Assessors claim estimates.
  - Support during mediation negotiations.
- Conducted a technical review of a greenfield longwall project in the Gunnedah region for an Australian coal operator.
- Conducted a business case evaluation with Client's personnel for the recovery of remnant coal blocks utilising longwall and continuous miner technology in Central Queensland. Prepared capital expenditure applications for Board submission. Led minesite workshops. The project assisted the client to plan their coal supply strategy. A number of sub optimal longwall blocks were eventually mined.
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Experience – Continued

- Provided technical expertise to Re-Insurance companies assist the evaluation of a billion dollar Insurance claim for business loss relating to equipment damage, loss of mine access, flooding, damage and production loss to a number of surface and underground coal mines in Australia due to rain in 2008. Conducted site inspections and evaluation of business plans and subsequent mine performance. Prepared assessments of each mine and critically appraised Claim estimates and material damage claims. The Claim continued over four years. Represented Reinsurers at mediation that resulted in a settlement being reached.
- Conducted a number of due diligence and fatal flaw reviews of prospective Queensland coal tenements for clients. The client included a major mining house and an overseas mid tier mining investor. Business case estimates were provided to support corporate evaluation.
- Conducted a due diligence of an open cut mine that direct feeds adjacent power stations, for purchase by the electricity generator. Study included assessment of future short term and long term reserves, operations and fatal flaws including the activities of a proposed satellite deposit. Advice was provided to assist in the purchase negotiations and introduction of a mine services contractor. Mine was subsequently purchased and successfully operated. Provided supplementary technical advice.
- Fatal flaw analysis of steep dip surface PCI coal mine, Queensland for an international mine operator.
- Undertook a highwall mining feasibility study as a brownfield development for a Queensland coal mine. The study included mine planning, development of the proposal to equipment suppliers, and recommendations.
- Project managed a due diligence review of a dragline and truck shovel operation in Queensland.
- Conducted a fatal flaw review of a longwall feasibility study. Tasks included benchmarking, analysis of results, delivery, and presentation of findings.
- Project managed and conducted a due diligence review of an operation that included surface and underground mines with dragline, truck shovel, longwall and mines and exploration tenements in various stages of development in Queensland and NSW. Client subsequently purchased the mines.
- Conducted a truck and shovel prestrip feasibility study. The study analysed the benefit of replacing contract operations with an owner operated, large electric rope shovel and rear dump truck fleet.
- Undertook a business development review for a major equipment manufacturer into the introduction of high pressure direct injection diesel engines using LNG.
- Assisted a loss assessor to review recovery efforts and the potential business loss exposure due to a face failure on a longwall in Queensland.
- Project managed a due diligence review of two underground coal projects in Shandong province, China.
- Assisted with a due diligence study of a large, greenfield open cut coal project. Specific tasks included assessing the capability and risk of a high volume bulk material handling system including shovel, mobile crusher, conveyors and stacker. Tasks included reviewing cost and mining assumptions and economic outputs supplied in the feasibility report, and advising the client of appropriate mitigation to feasibility inconsistencies and business risk exposures.
- Conducted a cost benefit analysis of recovering remnant reserves in an existing longwall operation in Queensland.
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Experience – Continued

- Conducted a due diligence review of two high tonnage surface mining operations in Indonesia. The project included inspection of the operations, coal chain and ports, a critical review of the operations, business plans and budgets and the evaluation of up-side scenarios.
- Drafted interim feasibility report on environment, safety management and risk for a proposed underground mine.
- Conducted a benchmarking study and evaluated the cost and operations outcomes of underground gateroad driveage options including place changing for a proposed underground coal mine.
- Reviewed, updated and redrafted a pre-feasibility study of thick seam underground operations in NZ.
- Assisted in a competitor analysis study of PCI and coking coal mines and developments. Work included reserve analysis, project development timelines and preparation of production, operating and capital cost forecast for opencut and underground operations.
- Reviewed and evaluated alternative option s for the expansion plans of a NZ mineral sand continuous mine (BWE) operation
- Conducted a fatal flaw assessment of a large surface sand mine operation in Western Australia

2004 to 2005 – Mining Consultancy Services Australia, Senior Mining Engineer

- Conducted a pre feasibility investigation and cost estimation for a proposed open cut truck and shovel project in Mozambique.
- Developed a cost estimate for a pre feasibility study of an underground coal mine.
- Conducted a process and systems review of a longwall mine's gateroad development operation.
- Conducted a process review and analysis, performance monitoring and commenced a system improvement process in an NZ underground mine.

2003 to 2004 – AMC Consultants, Principal Mining Engineer

- Acted as the technical engineer for a syndicate of International Banks monitoring, reviewing and making recommendations regarding the mining operations, performance and expansion at a NSW underground longwall operation.
- Conducted a resource analysis for a NSW power generator.
- Drafted a strategic change management and implementation plan for a block cave underground gold mine.
- Assisted in drafting and costing a two year operations plan for a large sand dredge operation.
- Constructed and submitted a shadow bid estimate for an underground service contract.

2002 to 2003 – Roche Mining, Senior Underground Estimator

- Performed mine scheduling, tender estimation, tender preparation and presentations.
- Conducted tender and contract negotiations.

Experience – Continued

- Provided technical, operations support and supervision to on site and on shift operations.
- Developed safety management plans.

2000 to 2002 – Morrison Mining Services, Consultancy, Principal

- Developed a cut and flit (place change) gate road mining management system.
- Provided operator training for gate road development for Beltana Highwall Mine contract operations.
- Prepared tender submissions for an underground mining contractor (which was subsequently awarded to the contractor).
- Provided technical expertise in a due diligence review of an Open cut mine.
- Conducted a complete system review of an underground cut and flit contract (operations, cost and contract). A comparison was made with in place mining systems
- Provided technical presentations on systems, safety, and legislation and management practices to three Chinese trade missions.

1999 to 2000 – Anglo Coal Australia, Moranbah North Mine, Mine Manager

- Responsible for the statutory and mining (development and longwall) operations in a 7Mt budget, thick seam, modern underground coal mine.
- Managed the mining department in planning operation and review process and regulating the interaction between the seven departments on site.
- Developed, maintained and controlled a $40M annual operating budget.
- Maintained a healthy relationship between the mine stakeholders including government inspectors, marketing, customers and potential mine owners.
- Created a heat management plan.
- Introduced a performance appraisal system.
- Acted as relief General Manager.

1993 to 1999 – South Blackwater Coal, Laleham No 1 Underground, Mine Manager

- Responsible for all operations, statutory and mining in the underground, continuous miner and business unit in supplying coal to the CHPP.
- Developed and implemented a significant mining system change and introduced multi heading place changing to Queensland. Mine produced +1Mt ROM pa from two continuous mine panels on a 5 day roster.
- Assisted in the drafting of legislation to introduce safety management system to Queensland coal mining.
- Introduced initiatives that resulted in a unit cost reduction of 30% and decrease in lost time injury rate by 66%.
- Implemented work place change strategies that resulted in true multi skilling and use of contractors.
- Introduced double sided pillar extraction with mobile roof supports (BLS).
- Conducted work place change negotiations with industrial organizations.

Experience – Continued

1989 to 1993 – MIM Collinsville Coal, BOCUM and No 2 Underground, Mine Manager

- Statutory and business unit coal mine manager.
- Managed a total and partial extraction continuous miner operation, mining of seams greater than 5m.
- Oversee and managed the rationalisation of the mine's operation resulting in significant change in work practices in an industrially active operation with no lost time action.

1987 to 1989 – MIM Newlands Coal, Open Cut Mine, Field and Long Term Planning Engineer

- Assisted in the selection and purchase of a large pre-stripping fleet including a 42m^3 rope shovel and 240t rear dump trucks.
- Initiated a change to throw blasting techniques and floor blasting to stabilise spoil pile failures
- Supervised dragline and drilling fleets.

1981 to 1987 – CSR Lemington Mine NSW, Various Positions

- Supervisor
  - Underground shift undermanager
  - CHPP supervisor and coal handling
  - Drill and blast (introduced NONEL system of blast initiation)
- Engineer
  - Open cut mining engineer (dragline design, Callide Mine)
  - Conducted a pre feasibility study of a proposed underground operation
- Worked as underground miner

Foreign Consulting Experience

Mozambique, South Africa, New Zealand, Indonesia, China, India

Education

1981 Bachelor of Engineering (Mining), University of Sydney

2003 Graduate Certificate - Applied Finance & Investment

2003 MMME7033 Minerals Industry Risk Management

2003 MNC.G3.A Manage the Risk Control System

Registration and Certificates

First Class Mine Manager Certificate - Queensland

First Class Mine Manager Certificate - NSW

Second Class Mine Manager Certificate – NSW

Registered Professional Engineer of Queensland #9056

Memberships

Member of the Australasian Institute of Mining and Metallurgy, #106777

Member of the Society of Mining Engineers, # 2287120

Presentations and Papers

2000 - Keynote speaker for Case Study Presentation at Longwall Conference Australia

Mark Benson
Senior Geologist

Summary of Expertise

Fourteen years of experience in coal geology from exploration planning and execution through to modelling and resource estimation. Experience in site based mine support work including geological and geotechnical work. Experience in market valuation of exploration properties and technical due diligence studies of coal mines and coal mine developments.

Experience

January 2013 to Date - John T Boyd Company (Australia) Pty Ltd

- Classification of resources and resource report in accordance with the JORC Code for a coal mine and surrounding deposit in the Bowen Basin, Central Queensland.
- Developed a tenure management strategy for a large portfolio of exploration and mining tenements in the Surat, Galilee and Bowen Basins, Queensland.
- Technical review of two mining operations in Central Kalimantan, Indonesia for fuel supply assurance for a new coal fired power station.
- Participated in a technical review of two metallurgical coal mines in Central Queensland including review of resources, reserves and life of mine plans.
- Due Diligence study of two underground metallurgical coal mines in Central Queensland. Investigations into adequacy of exploration data, future exploration plans and budgets, geological models, coal quality characterisation and future profiles, yield estimations, gas and geotechnical studies.
- Geological support for a technical review and options study of a large coal mining portfolio in Queensland.
- Review of twelve geological models and supporting data for a metallurgical coal mine in Central Queensland. The review was part of a Due Diligence study in the mine and associated tenements.
- Technical Review of an underground coal mine development in the Bowen Basin. The review included reliability of the geological data, resource and reserve estimates and potential product characterisation.
- Developed an independent market valuation for a coal exploration property located in Central Queensland using comparable sales methods.
- Technical review of two mining operations in Central Kalimantan, Indonesia. Reviewed: coal resources and reserves, data acquisition and modelling methods, and suitability of product coal for a new power station.
- Participated in a review of client's competitors mines in the Hunter Valley and potential synergies between the client's and competitors operations.
- Technical analysis of nine coal mines in Sumatera and Kalimantan, Indonesia. The analysis was focused on the ability of the mine owner's ability to supply coal in accordance with existing contracts.
- Developed independent market valuations for nine undeveloped coal properties in Queensland using comparable sales methods with adjustments made for various parameters.
- Geological review of an undeveloped coal deposit in Central Queensland. The review included reliability of the geological data and resource estimation as well as product characterisation and yield estimation.

Experience - Continued

- Completed a review and standardisation of the geological database for a coal deposit in the Bowen Basin, QLD. The standardised data was used to develop a geological model using Minex mine planning software with subsequent reporting of resources in accordance with the JORC code (2012).
- Development of two geological models using Maptek's Vulcan mine planning software for structurally complex deposits in the Bowen Basin, QLD. The models were compared to the existing Minescape models to analyse the effects of different interpolators and methods on the effectiveness of modelling the complex structures within the deposit.
- Assessment of the prospectivity of the German Creek Formation within large tenements in the Central Bowen Basin
- Provide independent expert advice to a government agency regarding exploration methods and the stages at which they would be used.
- Created a geological model using Minescape software for a Bowen Basin coal deposit. Identified potential resource areas from the model including overburden ratio and yield estimation.
- Conducted a due diligence review of three mining operations in East Kalimantan, Indonesia. Reviewed: Resource and Reserve Statements, geological models and drill hole databases.

April 2011 to December 2012 - Northern Energy Corporation Ltd, Queensland, Resource Geologist

- Responsible for development and maintenance of geological models and geological data for coal development projects located in the Bowen, Maryborough and Surat Basins using Minescape software.
- Prepared resource statements for coal development projects and accepted responsibility as Competent Person in accordance with the JORC Code.
- Developed exploration plans and budget estimates for future exploration programs.
- Developed laboratory test procedures to obtain quality information from coal samples provided by exploration programs.
- Undertook tenure related maintenance duties.
- Involved in mine planning activities including pit design and long term scheduling as well as project evaluation.

April 2010 to April 2011 - Newlands Coal Pty Ltd, Queensland, Senior Mine Geologist

- Supervised team of geologists responsible for surface operations.
- Coordinated pit inspection programs and collection of geological data from pit exposures.
- Provided input to exploration drilling programs, assisted with prioritisation of drilling areas, and provided feedback to resource geologist.
- Developed short term models, estimated and monitored in-pit inventories

Experience - Continued

- Development of short term CHPP feed schedules and coal stockpile management including reporting of coal stockpile balances and stockpile reconciliations, and production statistics.
- Identified and reported on geotechnical hazards including hazard alerts to reduce exposure to risk, updated principal hazard management plans, and geotechnical review of short term mine designs and dragline sequences.

Feb 2008 to March 2010 - Thiess Ltd, Tarong Coal Project, Queensland, Project Geologist

- Maintained all site geological, geotechnical and coal quality data.
- Responsible for update and maintenance of structural and quality geological models using Minescape software.
- Provided geological site support including identification of geological hazards and risk mitigation actions; and geotechnical hazards and hazard alerts.
- Assisted in preparation of resource estimate reports in accordance with the JORC Code.
- Participated in mine planning assignments by developing long term pit designs, estimation of coal quantities and qualities and forecasting CPP yields.
- Provided input into life of mine planning projects and additional exploration programs.
- Participated in risk assessment including development and review of site health and safety management system.

May 2005 to September 2007 - Millennium Coal Pty Ltd, Queensland, Project Geologist

- Responsible for the planning, organisation and execution of coal exploration programs including liaising with local landholders and cultural heritage representatives.
- Supervised exploration drilling operations including sampling and testing, and logging of chip samples, core samples and wire line logs.
- Undertook interpretation of geophysical logs.
- Maintained structural and quality geological models using Minex 5 software including all database management activities.
- Developed internal reports on exploration activities.
- Provided geological and coal quality guidance to engineers and production supervisors in a structurally complex deposit.
- Scheduled and monitored coal mining operations to ensure customer requirements were achieved.
- Monitored coal loss and dilution by mining activities, and managed raw and product coal stockpiles.

Experience - Continued

June 2002 to May 2005 - Ullman & Nolan, Mackay, Queensland and Darwin, NT, Engineering Geologist

- Planned, organised and conducted field investigations in accordance with recognised standards.
- Undertook logging of boreholes and test pits for soil and rock strata; collected samples of soils and rocks.
- Collected environmental samples and field tests of soils, surface water and ground water.
- Installed groundwater monitoring wells.
- Undertook laboratory test programs.
- Assisted in preparation of reports and provided basic geotechnical design.

Education

Bachelor of Science (Geology), James Cook University, Townsville, Queensland.

Software Usage

Expert User of Minescape and Minescape GDB

User of Surpac Minex 5, Vulcan, XPAC, and MapInfo

Registration and Certificates

Mine Supervisors Course G1, G8, G9 (formerly S1, S2, S3)

Foundations of Supervision

Training

Coal Preparation course, Australian Coal Preparation Society

Geostatistics Fundamentals for Coal Resource Estimation, Geovariances

Memberships

Member of the Australasian Institute of Mining and Metallurgy

Member of Geological Society of Australia

APPENDIX C

OPEN CUT AND UNDERGROUND MINING - KEY CHARACTERISTICS

Open Cut

- Requires the removal of overlying material (overburden) to an adjacent location to access the coal resource(s). The dominant mining activity is overburden removal. In undertaking mining, the surface is significantly disrupted and a void created to mine the coal. The created void is generally backfilled being more cost effective than dumping externally to the excavation area. The overburden material is fractured (generally by blasting) to assist removal and it swells by 125% of the initial volume. Where spoil volume exceeds the available void out of pit spoil dumps are required. To minimise additional surface disruption these may be placed over existing mined areas.

- Topsoil is reclaimed and stored before mining for reclamation and restoring of the post mining landforms and dumps.

- A low cost option utilising a walking dragline to strip overburden by side casting overburden along a mine with pit lengths from 2-3 km. Alternative methodology utilises shovel/excavator and truck fleets to haul material to emplacements – preferably inside the pit shells to refill the excavated void. The shovel truck methodology is inherently more flexible and requires a smaller operating mine footprint. Truck shovel options are most effective when the truck cycle time (from load unit to dump is minimised both by short length and minimal elevation).

- Where multiple seams are present, these may be exploited with selective mining practiced to discard bands of waste material or poor quality coal plies.

- The cost/benefit of the process is the combined cost of material removal compared to the value of the final mining product (including dilution, losses, beneficiation and transport to market).

- The open cut process enables waste material including rejects from the CHPP to be contained within the excavated void avoiding construction of superstructures above ground level such as dams, with a higher cost and increased risk of operation.

- Open cut operations enable extraction of multiple coal seams from 300 mm up to 40 m.

- Open cut depth of mining: Open cut can extend as deep as can be justified by adequate economic margin. A relative measure to reflect margin is product strip ratio i.e. bank cubic metre of prime overburden to product tonne of coal (bcm/product t). Rule of thumb: open cut product strip ratio mining thermal coal – 6-8 bcm prime/product tonne.

APPENDIX C - Continued

Underground Mining

- Underground mining requires the mining of supported tunnels to enable extraction of blocks of the target seam by highly productive extraction methods. The tunnels (roads) are generally driven in the coal seam at 2.6 m -3.5 m high to form panels (blocks) for longwall mining or pillars to enable access and supply of services (including ventilation, electricity, coal conveying). The longwall panels, typically 150-400m wide and greater than 2-3km long, are extracted by longwall mining methods. Panels of reduced dimension containing comparative lower coal tonnages can be mined albeit at reduced productivity, efficiency and economics. Mining recovery reaches 80-85% (area basis) with coal loss due recovery of a thin seam section and areas left for stability including roadway pillars, barrier pillars, protection of the mine infrastructure, shafts, main roads and standoff from geological structures: faulting, intrusions and excessive seam dip. The roadways and adjacent pillars are designed to have a high factor of safety to prevent roadway movement, pillar failures and subsidence of the surface.

- The seam extraction thickness from underground mining practiced in Australia ranges 2.2 m to 6.5 m. Underground mining induces mining stress and subsidence of seams overlying the target seam –frequently preventing extraction of adjacent seams.

- A competent roof beam above the operating mining height is integral to operating a productive longwall. Fresh unweathered competent strata from 15-25 m thick, depending upon material characteristics, is required as an immediate roof. When considering a project site depth of weathering (including alluvial material) can reach 20 m-50 m before fresh material is intersected. Consequently, for technical reasons, underground mining is excluded from seam depths shallower than the total of the thicknesses of the weathered zone and competent strata. NSW Coal underground legislation states a minimum of 50 m depth of cover as a key metric requiring specific hazard management and legislative approval, due to the associated risks.

Financial Schedules

As initial project development may require significant levels of capital for matters including purchase of land and equipment, construction of infrastructure and operations pre-work to allow coal mining to commence (i.e. boxcuts, drift driveage and underground roads). As a consequence the initial years of operation may deliver negative net cash flows a proxy for negative profitability.

Conventionally mine operations are strategically developed and operate to advance from areas of lowest operating cost and lowest capital cost i.e. delivering increased margins and therefore increased profitability/reduced loss before progressing to domains of reduced economics. Mine infrastructure, ideally is centrally located at the economic centroid over the projects scheduled lifespan.