



New South Wales Government
Independent Planning Commission

Vickery Extension Project SSD 7480

Issues Report

John Hann (Chair)
Professor Chris Fell
Professor Garry Willgoose

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Vickery Extension Project Issues Final Report ©
State of New South Wales through the Independent Planning Commission 2019

Independent Planning Commission NSW
Level 3, 201 Elizabeth St Sydney NSW Australia
Telephone: (02) 9383 2100
Email: ipcn@ipcn.nsw.gov.au
ABN: 38755709681

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EXECUTIVE SUMMARY

The Vickery Extension Project (SSD 7480) (**Project**) is seeking approval to incorporate and extend the mining and ancillary activities of the Vickery Coal Project (**Approved Project**). The key proposed changes include:

- extending the footprint of the open cut mine to the north and south of the approved footprint, extracting an additional 44 million tonnes of run of mine (**ROM**) coal;
- increasing the extraction rate of ROM coal from 4.5 to 10 million tonnes per annum, with an average extraction of 7.2 million tonnes per annum;
- constructing and operating a coal handling and processing plant, train load out facility, rail loop and rail spur line at the project site;
- constructing and operating a water supply borefield and pipeline; and
- changing the final landform by removing the eastern overburden emplacement area (which is now proposed to be used as a secondary infrastructure area), increasing the size of the approved western overburden emplacement area, and retaining one pit lake void (rather than two), excluding the existing Blue Vale void.

On 6 September 2018, the Minister for Planning requested that the Independent Planning Commission (**Commission**) conduct an initial public hearing into the carrying out of the Project.

The Commission is comprised of John Hann (as Chair), Professor Chris Fell and Professor Garry Willgoose. The Commission considered the documents referred to in the Minister's Terms of Reference, including the Environmental Impact Statement, Preliminary Response to Submissions, and all other relevant information relating to the Project. The Commission also received public submissions, held an initial public hearing, conducted an inspection of the Project site and the surrounding locality, met with the Applicant, Gunnedah Shire Council, Narrabri Shire Council and the Department of Planning and Environment (**Department**).

The Commission notes that the Department's Preliminary Issues Report dated 30 November 2018 (**PIR**) contains the Department's initial summation of the Project application and the submissions received during the public exhibition of the Project. The PIR considered the key aspects of the Project, as raised through the public submissions, to be the rail spur, impacts on water resources, amenity, biodiversity, final landform and land use and economics and social considerations. Other aspects of the Project identified included Aboriginal and non-indigenous heritage, traffic and transport, hazards and risk and climate change. While the PIR identified areas where further information, assessment and consideration would be required, no preliminary assessment or findings by the Department were provided.

The role of this report is to set out the actions taken by the Commission, to summarise the submissions and other relevant information and to identify the key issues of the Project in accordance with the Minister's request.

Based on the information available, views expressed at the initial public hearing, and submissions received, the Commission considers that the following issues require detailed consideration by the Department in considering the merits of the Project.

SUMMARY OF ISSUES

As explained in detail below, in response to the Minister's request the Commission has identified a number of issues under broad subject headings that require detailed consideration by the Department in evaluating the merits of the Project. These issues may be summarised as follows:

Project Justification

The Department should give detailed consideration to all relevant matters the Applicant has provided to justify the Project, including but not limited to:

- whether there are limitations imposed by the conditions of consent for the Approved Project, and the Tarrawonga and Rocglen Mines which are located near the Project site (see **Figure 1**);
- any need for a Coal Handling Preparation Plant (**CHPP**) and rail load out facility at the Project site itself;
- the economic impacts of any limitations imposed by the current consents which prevent maximum production for the Approved Project, Tarrawonga and Rocglen Mines, and the Gunnedah CHPP and train load out facility;
- the economic evidence for an annual production threshold sufficient to support a viable new CHPP and rail loop;
- details of the additional resources secured within the Vickery South tenements, timing and why these were not included in the Approved Project application; and
- details of the additional resources confirmed within the northern area of the Approved Project tenements, timing and why these were not included in the Approved Project application.

Groundwater, Surface Water and Flooding

The Department should give detailed consideration to:

- the Applicant's groundwater model and surface water assessment, including by reference to the information requirements highlighted by government agencies and the IESC and Additional Material provided by the Applicant to the Commission. The Department may wish to consider obtaining further information from the Applicant in this regard, including a meaningful discussion of the impacts of both the Approved Project and the Project;
- the adequacy of the Applicant's justification and costing of a no void option for consideration. The justification should reflect the requirements in the EP&A Act to ensure intergenerational equity and should appropriately incorporate the cost of the long-term management of the void, including the loss of the water resources to the void;
- the Applicant's consideration of long-term groundwater and water quality models for a no void option to assess the potential impacts of groundwater flow through such a rehabilitated Project site;
- post-mining studies, which should provide details of the groundwater flows to the east of the site and how they interact with drawdowns from the Rocglen Mine site including any potential impacts on the water sharing plan catchment to the east;
- a more extensive sensitivity study of the groundwater model be undertaken by the Applicant, or an explanation to be given by the Applicant for the absence of a more extensive study;
- the provision of maps that illustrate the potential distribution of GDEs, as indicated by the IESC in paragraph 84;
- a risk analysis as indicated by the IESC in paragraph 84;
- how the Applicant proposes to ensure that the walls of sedimentation dams and other site water storages are constructed to the appropriate standard of impermeability;
- the commitment of the Applicant to an appropriate water quality monitoring program for water contained in sediment basins and other mine storages. Detail of any such

program should include whether it includes a full range of analytes, including those outlined in paragraph 137, that will aid in its meeting discharge standards consistently with the quality of target watercourses and, by pre-commencement monitoring, sets up appropriate trigger values for acceptable discharge;

- whether the flood study could be performed for the Namoi, Stratford and South Creeks alone, and also for the combination of them occurring simultaneously unless the Applicant can show that the extreme floods on the smaller tributaries are not embedded in the storms that cause the larger floods in the Namoi;
- whether this flood study could also be carried out for any alternative infrastructure options suggested elsewhere in this report (e.g. CHPP in the SE corner, and any other location option investigated);
- whether the flood studies around the rail loader, final void, and CHPP which were done using an empirical factor for the probable maximum flood (PMF) estimating the PMF discharge to be 3 x the 1% AEP flood could instead be done using either:
 - the GSDM method for PMF estimation developed by the Bureau of Meteorology; or
 - the PMF methodology recommended in Australian Rainfall and Runoff; and
- whether a QRA of the off-site water quality consequences of flood exceedances of the on-site infrastructure (i.e. dams, stockpiles, CHPP) could be carried out.

Water Balance

The Department should give detailed consideration to:

- the water balance for the Project site while operational and whether the Applicant holds sufficient water extraction licences in the event of restrictions on extraction during drought, as has occurred in the Zone 4 alluvial aquifers and Namoi River in the past, and methods for addressing any water shortfall; and
- a water balance model for the two final void lakes, which should include an assessment of the uncertainties in inflow rates, infiltration, evaporation, and sensitivity studies of the long-term trajectory to equilibrium (i.e. duration of recovery, salinity trends, rate of lake rise relative to groundwater recovery rates).

Noise and Blasting

The Department should give detailed consideration to:

- the Applicant's demonstration of which years are the 'worst case' years for operations and any articulation of what impacts are predicted for nearby residents. Predicted noise emissions and impacts at sensitive receptors for all years of operation may be of assistance in this regard;
- the Applicant's justification for the construction hours being beyond what is set out in the Interim Construction Noise Guideline (ICNG);
- the Applicant's monitoring data of trains, both loaded and empty, travelling across the Maules Creek viaduct, which will provide the stakeholders with a sense of the noise level that could be expected from the project's viaduct. The Department should also give detailed consideration to noise modelling across the floodplain based on this monitoring data and other appropriate data for resonance emissions of the viaduct superstructure;
- details on the investigation of noise and blast exceedances at Maules Creek, Rocglen and Tarrawonga Coal Mines in the past 5 years, including the findings of the investigations by the regulatory authorities; and
- whether any of the recommendations made in the report summarising Whitehaven's

- 2016 Mandatory Noise Management Audit will be implemented on this Project; and whether the blasting criteria determined for the Kurrumbede Homestead will protect the Homestead from damage due to blasting.

Air Quality

The Department should give detailed consideration to:

- why the dust levels of the Project are predicted to be lower than those for the Approved Project, even though the Project will be extracting and handling more coal, will have a higher production rate and includes operating a CHPP and rail load out facility;
- any comparison of modelling assumptions used for the Approved Project and the Project provided by the Applicant to demonstrate how the changes in technology and practices impact the results; and
- which years are the 'worst case' years for operations from the perspective of air quality emissions and identify what are the impacts predicted for nearby residents. The Department may be assisted in this regard by the Applicant providing annual predicted air quality emissions and impacts at sensitive receptors for each year of operation.

Project Infrastructure Area

The Department should give detailed consideration to:

- any noise modelling results provided by the Applicant for alternative rail spur and CHPP locations. Specifically, the Department should consider noise modelling results for the siting of the CHPP approximately 400 m east to enable a noise bund to be located on the western side of the plant, and quantifying any impacts from a loss of reserves. In addition, the Department should consider noise modelling of an alternative site for the CHPP and rail spur located within the infrastructure area allocated for the Approved Project in the south east;
- any details of the comparative noise impacts from the construction of an alternative rail spur in the south east, including but not limited to the intensity and duration of construction of the rail spur;
- any assessment provided by the Applicant as to the potential for locating the CHPP and rail spur in the south-eastern portion of the Project including, in particular, a comparison of the impacts of the CHPP and rail spur in the proposed location and the south-eastern location, including flooding, noise, air quality and economic impacts; and
- the Applicant's justification as to why the CHPP cannot be fitted with acoustic cladding to reduce the noise of the CHPP, given the apparent constraints on bunding the CHPP.

Biodiversity

The Department should give detailed consideration to:

- the Commonwealth Matters;
- any quantification of the potential impact to the local Koala population and measures to avoid impacts and offset to any impacts to Koalas, within the Koala Plan of Management;
- any evidence-based feasibility assessment provided by the Applicant for establishing self-sustaining woodland communities to a standard to satisfy the biodiversity offset requirements;

- any offsetting approach provided by the Applicant, which may include, if necessary, details of how its approach will be staged, the timing, offset value and how it could be successfully undertaken, as well as alternative measures to meet the credit requirements if rehabilitation is not considered achievable; and
- the Applicant's *Biodiversity Assessment Report and Biodiversity Offset Strategy (BARBOS)* and, in particular, whether its BARBOS addresses the information requirements set out by the Office of Environment and Heritage (OEH), including agreed upon credit calculations, and provides adequate supporting information in relation to the use of mine rehabilitation.

Rehabilitation, Final Void and Final Landform

The Department should give detailed consideration to:

- how areas of existing rehabilitated soils would be effectively used for further rehabilitation in other areas of the Project site;
- how the final landform (including the outer batters) would be designed using both macro and micro relief to ensure that the final landform is consistent with and ties into the surrounding landscape;
- the suitable land uses for the final landform. For example, could the rehabilitated area could be classified as Class 2 or Class 3 Agricultural Land or used as an offset (i.e. rehabilitated to a woodland community);
- whether the definition of the long-term sediment and chemical consequences of runoff from the external batters could be better defined. For example, the Department may be assisted with the information at what date the sediment basins would fill with sediment and what would the sediment loads be that subsequently drain offsite;
- whether the Applicant should revise the Rehabilitation Strategy to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be considered following closure of the Project;
- whether the Applicant should quantify the water quality impacts offsite of the surface runoff (and any groundwater seeps) from the rehabilitated landform. The Department may be assisted with the assessment of the potential impact of the type of ecosystem to be developed on the Project site (e.g. woodland versus agriculture will have different implications for sediment delivery and thus transport of sorbed pollutants);
- the Applicant's evidence of the trials that were taken for three different spoil properties that demonstrate that the change in spoil properties did not have an impact on the groundwater inflows;
- any available evidence (including such evidence as the Applicant may provide) to support final voids as a preferred landform outcome versus infill, and evidence of all risks associated with each landform outcome; and
- the definition of the incremental long-term deep hard rock (i.e. non-alluvial) groundwater impacts (both head and flow) over the long-term (at least to the 300 years that it takes for the final void water levels to stabilise), particularly to the east of the Project where drawdowns interact with the drawdowns from the Rocglen Mine site.

Heritage

The Department should give detailed consideration to:

- the deficiencies identified by the Commission in the Applicant's engagement with the local traditional owners and the Aboriginal surveys; and
- how the Kurrumbede Homestead could be protected from the impacts of the Project, and details of the proposed Kurrumbede Homestead Management Plan, including timing and funding, to be provided by the Applicant.

Social and Economic

The Department should give detailed consideration to:

- the impacts of a 'mining' based economy on that section of the community that does not receive 'mining' income;
- all matters relevant to the economic contribution of the Project, including but not limited to:
 - assumptions used in the cost-benefit analysis (**CBA**) in comparing the Approved Project to the Project, particularly in regard to the current consent conditions for the Approved Project relating to total combined output of the three mines (i.e. Approved Project, Tarrawonga and Rocglen Mines);
 - economic impact of the Approved Project scenario after accounting for the restrictions on output from the Rocglen and Tarrawonga Mines and current approval limitation of the Gunnedah CHPP;
 - incremental economic impact of the Project compared to the Approved Project, after taking account of the Approved Project 2014 consent conditions for combined mine output and the CHPP;
 - comparative economic assessment of the relocation of the CHPP 400 m east to accommodate a bund to the west of the CHPP, including impact on sterilisation of coal resources;
 - comparative economic assessment of the relocation of the CHPP and rail loop, to an alternative location in the south east (secondary infrastructure area); and
- the SIA risk assessment for post mining impacts could be expanded to provide more detail, particularly focused on transitional strategies for impacted communities such as Boggabri.

Visual Amenity

The Department should give detailed consideration to:

- mitigation options for those residences forecast to experience high visual impact, particularly from the waste emplacement areas during the Project's operation;
- requesting the Applicant to provide montages showing the proposed infrastructure and waste and coal handling areas superimposed on photographs of existing land forms, to be done from a number of vantage points;
- the Applicant's ongoing consultation with the Siding Spring Observatory; and
- the potential night-time lighting impact on the Siding Spring Observatory, in line with the Department's Dark Sky Planning Guideline.

Traffic and Transport

The Department should give detailed consideration to:

- whether it would be appropriate to require that once the CHPP and rail spur is operational, all movement of product coal must be via the Project's rail spur; and
- the available information/data on road and rail capacities and wait times at level crossings, and whether or not further information is required from the Applicant in this regard.

Public Interest

The Department should give detailed consideration to:

- how the Project adheres to the objects of the EP&A Act, in particular the principles of ecologically sustainable development (**ESD**);
- the assessments which have been completed for the Project in relation to the forecast of direct and indirect greenhouse gas (**GHG**) emissions (i.e. Scope 1, Scope 2 and Scope 3 emissions);
- GHG emission forecasts provided by the Applicant having regard to applicable relevant climate change policy frameworks (e.g. NSW Climate Change Policy Framework and the Paris Agreement); and
- the demand for product coal from the Project and whether its sale will be to a country that is a signatory to the Paris Agreement.

1 INTRODUCTION

1.1 The Minister's Request

1. On 6 September 2018, the Minister for Planning (**Minister**) made the following request under section 2.9(1)(d) of the *Environmental Planning and Assessment Act 1979 (EP&A Act)* to the Independent Planning Commission of New South Wales (**Commission**):

"I, the Minister for Planning, request the Independent Planning Commission to:

1. *Conduct a public hearing into the carrying out of the Vickery Extension Project as soon as practicable after the public exhibition of the Environmental Impacts Statement (EIS) for the project.*
 2. *Consider the following information:*
 - a. *EIS for the project;*
 - b. *Submissions on the project;*
 - c. *Any relevant expert advice; and*
 - d. *Any other relevant information.*
 3. *Publish a report to the Department of Planning and Environment within 12 weeks of the submissions being published on the Department's website, unless otherwise agreed with the Planning Secretary, that:*
 - a. *Sets out the actions taken by the Commission in conducting this initial stage of the public hearing;*
 - b. *Summarises the submissions made during the public exhibition of the EIS and any other relevant information provided to the Commission during this stage of the public hearing; and*
 - c. *Identifies the key issues requiring detailed consideration by the Department of Planning and Environment in evaluating the merits of the project under section 4.6 of the Environmental Planning and Assessment Act 1979.*
2. In communicating the Minister's Request on 15 October 2018, the Deputy Secretary of the Department of Planning and Environment indicated that the Department would be preparing a Strategic Issues Report for the Commission's consideration. This report (i.e. PIR) was subsequently provided to the Commission and formed part of the Commission's consideration.
3. Mary O'Kane AC, Chair of the Commission, appointed Peter Duncan (as Chair), Professor Alice Clark and Professor Garry Willgoose to constitute the Commission.
4. Following the constitution of the Commission, Peter Duncan and Professor Alice Clark stepped down from their appointments.
5. Mary O'Kane AC appointed John Hann (as Chair) and Professor Chris Fell to replace Peter Duncan and Professor Alice Clark respectively, such that John Hann (as Chair), Professor Chris Fell and Professor Garry Willgoose constituted the Commission for this Minister's Request.
6. For the avoidance of doubt, the Commission notes that the role of this report is not to determine whether the Project should or should not be approved. Rather, the role of this report is limited to the matters set out above in the Minister's Request.

1.2 Existing Vickery Coal Project Approval and Locality

7. According to the Department's PIR, on 19 September 2014 approval was granted to Whitehaven Coal Pty Ltd (the **Applicant**) to construct and operate the Vickery Coal Project (SSD 5000) (the **Approved Project**). The Approved Project is yet to be developed.
8. The Approved Project is located within CL 316, ML 1718 and ML 1471, approximately about 25 kilometres north of Gunnedah in the Gunnedah and Narrabri local government areas. A considerable portion of the Approved Project site has been subject to previous open cut and underground mining activities. In the Approved Project the Applicant is seeking to extract coal from deeper coal than in past mining activities.
9. The Approved Project involves the extraction of 135 million tonnes of coal over 30 years, at an extraction rate of up to 4.5 million tonnes of run-of-mine (**ROM**) coal a year. Associated development includes a mine infrastructure area, mine access roads, mobile crushers, an overpass of the Kamilaroi Highway and other ancillary infrastructure. The Approved Project also includes the deviation of local roads around the mine site including Blue Vale Road, Shannon Harbour Road, Hoad Lane and Braymont Road.
10. Extracted coal would be transported by road for processing at Whitehaven's existing coal handing and processing plant (**CHPP**) near Gunnedah, prior to being railed to Newcastle for export. The existing road transport route to the CHPP is used by other mines operated by the Applicant in the region, specifically the Rocglen and Tarrawonga Mines. The Approved Project consent includes a cumulative road transport restriction of 4.5 Mtpa for the three mines.

1.3 Summary of the Vickery Extension Project

11. The Project site is situated within the Namoi catchment. The Namoi River is located to the west of the Project mining area and generally flows in a north-westerly direction from its headwaters in the Great Dividing Range. The Project site consists of undulating hills and slopes; the topography is more dissected and steeper within the Vickery State Forest to the east of the Project.
12. The Project site is predominately cleared and dominated by grassland areas with occasional re-growth trees. Scattered remnants of woodland, semi-cleared woodland and White Cypress Pine (*Callitris glaucophylla*) re-growth occur in the Project site. In addition, the Project site includes areas of land that have been previously disturbed by mining activities and are now rehabilitated.
13. The region surrounding the Project includes a range of mining, agricultural, light industrial, rural residential and residential land uses. Coal mining and supporting industries, agriculture and associated service industries provide the largest contributions to the regional economy.
14. The Project was lodged with the Department on 13 August 2018. The Project was publicly exhibited by the Department from 13 September 2018 until 25 October 2018. **Table 1** provides the Department's summary of the key aspects of the Vickery Extension Project compared with the Approved Project, from pages 6-7 of the Department's PIR.

Table 1: Key components of the Project as described in the Department's PIR

Project Component	Approved Project	Vickery Extension Project
ROM Coal Production Rate	<ul style="list-style-type: none"> Up to 4.5 Mtpa 	<ul style="list-style-type: none"> Average rate of 7.2 Mtpa over 25 years, with a peak production rate of up to 10 Mtpa
Project Life	<ul style="list-style-type: none"> Approximately 30 years 	<ul style="list-style-type: none"> 26 years (one year of construction and 25 years of mining operations)
Mining and Reserves	<ul style="list-style-type: none"> Extraction of approximately 135 million tonnes of ROM coal from 7 coal seams within the Maules Creek Formation 	<ul style="list-style-type: none"> Extraction of approximately 179 million tonnes of ROM coal from 8 coal seams within the Maules Creek Formation
Processing	<ul style="list-style-type: none"> On-site coal crushing and screening facilities ROM coal transported from the mine to the Whitehaven CHPP near Gunnedah for processing 	<ul style="list-style-type: none"> On-site stockpiling and processing of 13 Mtpa of ROM coal from the mine and other Whitehaven mining operations Production of up to 11.5 Mtpa of product coal from the CHPP
Coal Transport	<ul style="list-style-type: none"> ROM coal transported by truck along the approved road transport route from the mine to the Whitehaven CHPP near Gunnedah at a cumulative rate not exceeding 3.5 Mtpa, or 4.5 Mtpa with construction of an overpass on the Kamilaroi Highway Product coal transported by rail from Gunnedah CHPP to market <p>Note: The cumulative transport rate includes transport of ROM coal from Rocglen and Tarrawonga Coal Mines.</p>	<ul style="list-style-type: none"> Up to 11.5 Mtpa of product coal to be transport to market by rail via the project rail spur to the Werris Creek Mungindi Railway approximately 6 km north of Emerald Hill. ROM coal to be delivered by truck to Whitehaven's CHPP near Gunnedah for processing and despatch via rail not exceeding the Approved Project cumulative rate, until the project CHPP, train load out facility and rail spur reach full operational capacity.
Waste Management	<ul style="list-style-type: none"> Production of 1,269 million bank cubic metres (Mbcm) Overburden emplacement in the Eastern and Western Emplacements and within the open cut void footprint Co-disposal of reject material from the CHPP within the waste rock emplacement areas 	<ul style="list-style-type: none"> Production of approximately 1,830 Mbcm of waste rock (44% increase in waste rock volume) Overburden emplacement in the Western Emplacement and within the open cut void footprint. Co-disposal of reject material from the CHPP within the waste rock emplacement areas
Roadworks	<ul style="list-style-type: none"> Construction of a section of private haul road and overpass of the Kamilaroi Highway; Realignment of Blue Vale Road, Shannon Harbour Road, Hoad Lane and Braymont Road. 	<ul style="list-style-type: none"> Construction of a section of private haul road and overpass of the Kamilaroi Highway; Realignment of Blue Vale Road Closure of southern section of Braymont Road and Shannon Harbour Road
Employment	<ul style="list-style-type: none"> Up to 60 construction workers Up to 250 operational workers with an average of 213 full time equivalent (FTE) workers over the project life. 	<ul style="list-style-type: none"> Up to 500 construction workers, with 90% of the workforce expected to reside in the approved Civeo Boggabri Accommodation Camp Up to 450 operational workers with an average of 344 FTE workers over the project life.

Project Component	Approved Project	Vickery Extension Project
Capital Investment Value	<ul style="list-style-type: none"> Approximately \$461 million 	<ul style="list-style-type: none"> Approximately \$607 million
Hours of Operation	<ul style="list-style-type: none"> Mining operations and transportation 24 hours a day, seven days a week Road transport of ROM coal would occur between 6:00 am and 9:15 pm Mondays to Fridays, and 7:00 am to 5:15 pm on Saturdays 	<ul style="list-style-type: none"> Mining operations and train loading and rail transport on the project rail spur 24 hours per day, seven days per week Road transport of ROM coal would occur between 6:00 am and 9:15 pm Mondays to Fridays, and 7:00 am to 5:15 pm on Saturdays
Rehabilitation	<ul style="list-style-type: none"> Progressive rehabilitation of waste rock emplacement and surface disturbance areas Final landform to include three final voids (the existing Blue Vale void and the Northern and Southern voids) 	<ul style="list-style-type: none"> Progressive rehabilitation of waste rock emplacement and surface disturbance areas Final landform to include two final voids (the existing Blue Vale void and the open cut void)
Disturbance Area, Vegetation Clearing and Biodiversity Offsets	<ul style="list-style-type: none"> Project disturbance area of 2,242 ha including 1,748 ha of native vegetation comprising: <ul style="list-style-type: none"> 464 ha of native woodland; and 1,284 ha of derived native grassland; 2,063 ha of land-based offsets; 1,360 ha of rehabilitation of the Approved Project footprint to native vegetation 	<ul style="list-style-type: none"> An additional disturbance area of 776 ha, including 580 ha of native vegetation comprising: <ul style="list-style-type: none"> 78 ha of native woodland; and 502 ha of derived native grassland; Additional offset areas to include a combination of the following, in accordance with the Framework for Biodiversity Assessment: <ul style="list-style-type: none"> 482 ha mine rehabilitation to woodland in extension disturbance area; 523 ha additional mine rehabilitation to woodland within the Approved Project footprint; use of available credits on identified land based offset areas in the area; Whitehaven's existing biobank site and/or biobanking public register; supplementary measures; and/or contributing to the Biodiversity Conservation Fund.

15. The Project is generally represented by the map shown in **Figure 1**.

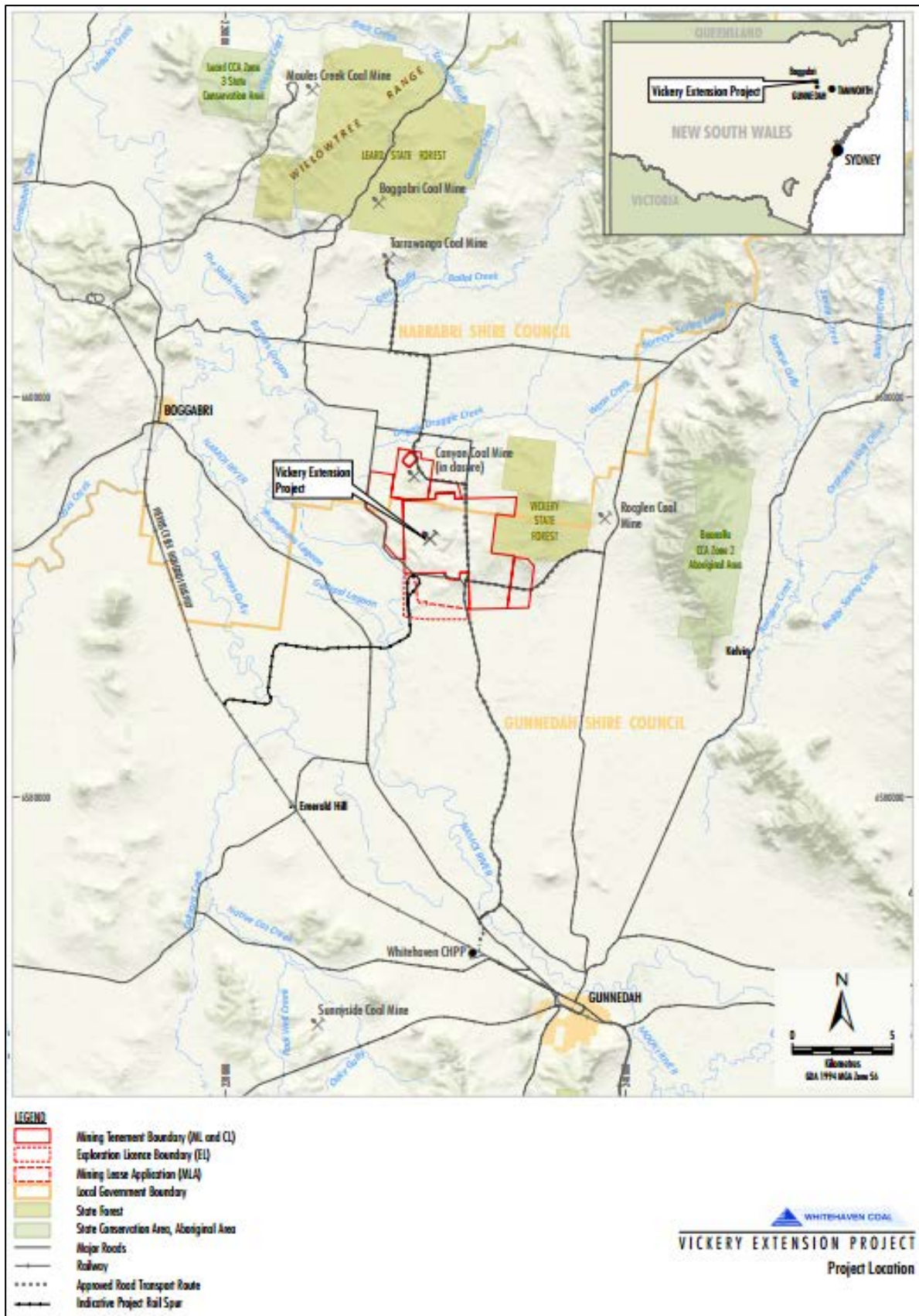


Figure 1: Project Map (Source: EIS)

2 THE COMMISSION'S TASK

2.1 Information Provided to the Commission to Carry Out its Task

16. The information provided to the Commission to carry out its task is listed below (**the Material**):
- Environmental Impact Statement (EIS), prepared by the Applicant dated 12 September 2018, including its appendices;
 - Department's PIR dated 30 November 2018;
 - submissions to the Department, received during exhibition;
 - meetings held with the Department, the Applicant, Gunnedah Shire Council, and Narrabri Shire Council (set out in paragraphs 17 - 22);
 - site inspection and locality tour conducted by the Commission (set out in paragraphs 24 and 25);
 - submissions received at the initial public hearing;
 - additional information prepared by the Applicant (**Additional Material**), including:
 - a Microsoft (MS) PowerPoint presentation given to the Commission on 25 February 2019;
 - subsequent information received by the Commission on 5 March 2019; and
 - a response to the Department's PIR and a Preliminary Response to Submissions received by the Commission on 7 March 2019; and
 - written submissions received by the Commission from 506 members of the public, including 505 submissions which were received prior to publication of the Applicant's Additional Material (Note: the Commission received a number of supplementary submissions following publication of the Applicant's Additional Material from the 505 members of the public who had previously provided submissions).

2.2 The Commission's Meetings

17. The originally constituted Commission (i.e. Peter Duncan, Professor Alice Clark and Professor Garry Willgoose) met with the Department on 6 December 2018. This meeting was recorded and the transcript was published on the Commission's website on 12 December 2018. The Department provided information to the Commission on the background to the Project, the current Approved Project and its context within the Gunnedah and Narrabri regions, and a summary of key aspects of the Department's PIR.
18. The originally constituted Commission met with the Applicant on 6 December 2018. This meeting was recorded and the transcript was published on the Commission's website on 12 December 2018. The Applicant provided a MS PowerPoint presentation to the Commission, and other information on the background of the Approved Project's operations, the Project, the Applicant's assessment of potential impacts and community consultation undertaken by the Applicant to date. The matters raised by the Applicant during the meeting included:
- the justification for the mine expansion;
 - amenity impacts, including changes in noise and dust generation;
 - potential impacts to water resources, including groundwater drawdown and changes to surface flows and flooding;
 - the current social and economic contributions of Whitehaven Coal to the region and the likely benefits of the Project;
 - changes in traffic patterns from the construction of the coal handling and processing plant; and

- post mining rehabilitation and mining.
19. All of the material referred to in paragraphs 17 and 18 was provided to the current Commission.
 20. The Commission met with Gunnedah Shire Council on 19 December 2018. This meeting was recorded and the transcript was published on the Commission's website on 11 January 2019. The matters raised by Council during the meeting included:
 - the importance of the coal mining to the regional economy;
 - the contributions that the Applicant has made to the Gunnedah Shire;
 - emerging social issues, particularly those associated with housing availability and affordability for non-mine workers;
 - social issues around the integration of mine workers with the community if they are based in mine camps rather than the community, and the council's desire for an integrated community;
 - concerns about the insufficient information regarding flooding;
 - need for ongoing consultation particularly with the Aboriginal community;
 - provision of onsite biodiversity offsets, rather than offsite offsets; and
 - emerging skills shortages for non-mine related employment, with potential employees generally opting to seek higher wages through mining employment.
 21. The Commission met with Narrabri Shire Council on 19 December 2018. This meeting was recorded and the transcript was published on the Commission's website on 11 January 2019. The matters raised by Council during the meeting included:
 - the importance of engaging with the Boggabri community regarding the Project;
 - the potential for the Project to have significant social impacts, particularly for Boggabri;
 - concerns regarding the scrutiny of the statistics relating to community support and claims about projected job creation;
 - the view that employees should be encouraged to live in Narrabri / Boggabri area with their families, though the benefits of the workers' accommodation camp are recognised;
 - concerns about the traffic route to the mine from Boggabri, upgrades required for Braymont Road, and whether these will be undertaken or not;
 - concerns about access to and management of water broadly within the region under the existing water sharing plans;
 - concerns over using rehabilitation to meet biodiversity offset requirements, with Narrabri Council expressing a preference for biodiversity offsets to be located outside of Narrabri Shire; and
 - the nature of Whitehaven's relationship with the local community.
 22. The Commission met with the Applicant on 25 February 2019. This meeting was recorded and the transcript was published on the Commission's website on 27 February 2019. The Applicant provided a MS PowerPoint presentation to the Commission, and other information on the background of the Approved Project's proposed operations, the proposed Project, the Applicant's assessment of potential impacts and community consultation undertaken by the Applicant to date. The presentation was made available on the Commission's website on 5 March 2019. The following matters were raised by the Applicant during the meeting:
 - groundwater modelling and the predicted impacts that the Project will have on groundwater during operation of the mine and once the mine is rehabilitated,

- including the impact from the final void;
 - the predicted impacts to the floodplain and the mine's neighbours from the construction of the rail spur across the Namoi River floodplain;
 - surface water issues, particularly around the water quality of the mine water, potential for mine water to be released into the Namoi River and water quality within the void lake;
 - the rationale behind the location of the rail spur and coal handling and processing plant, and a comparison of this location to using the existing Maules Creek rail spur to the north of the Project area;
 - amenity impacts, including air quality and noise impacts associated with both construction and operation of the Project;
 - economic assessment, and the concerns from the community regarding benefits and impacts from the mine;
 - impacts from blasting operations on heritage items and sites; and
 - the Applicant's conservation management plan for Kurrumbede.
23. In follow up to the meeting on 25 February 2019, the Applicant provided the Commission with additional information (i.e. the Additional Material) on the 5 and 7 March 2019. The Additional Material was made available on the Commission's website on the same day of its receipt.

2.3 The Commission's Site Inspection and Locality Tour

24. The Commission inspected the site on 19 December 2018. Consistent with the Commission's *Site Inspection and Locality Tours Guidelines*, the Commission invited to the site inspection representatives of local community groups. Consequently, representatives from the following local community groups attended the site inspection:
- the Vickery Coal Mine Community Consultative Committee;
 - the Boggabri Farming and Community Group;
 - Gunnedah Chamber of Commerce;
 - Lock the Gate Alliance;
 - Red Chief Local Aboriginal Land Council; and
 - NSW Farmers Federation.
25. A record of the site inspection was made available on the Commission's website on 1 February 2019. In summary, the Commission viewed:
- the Gunnedah CHPP;
 - lookouts over the proposed rail spur on the Namoi flood plain and the crossing of Blue Vale Road;
 - the Mirrabinda Property;
 - lookouts on the open cut pit, the north-western overburden dump to view the location for the proposed out-of-pit dumps;
 - the highway overpass of the Maules Creek Coal Project rail line; and
 - the coal loading area, rail loop and the location of the proposed CHPP.

2.4 Initial public hearing

26. The Commission conducted an initial public hearing at the Boggabri RSL Memorial Club, 77-79 Laidlaw St, Boggabri NSW 2382, on Monday, 4 February 2019 and at the Gunnedah Town Hall, 152 Conadilly Street, Gunnedah NSW 2380, on Tuesday, 5 February 2019. In addition to hearing the public's views at the initial public hearing, the Commission also

heard from the Applicant and the Department.

27. Holding a public hearing affects appeal rights. After a public hearing, no appeal may be brought under Division 8.3 of the EP&A Act in respect of any future decisions made by the Commission as consent authority under the EP&A Act in relation to the carrying out of any development that is the subject of that public hearing.
28. 101 speakers registered to present to the Commission at the initial public hearing. This list was made available on the Commission's website on 1 February 2019, and a transcript of the initial public hearing was published on 21 February 2019. The Commission accepted written submissions from the public until 12 February 2019, being one week following the initial public hearing. The Commission received 506 written submissions in total, including one new submission and additional information supplementing several earlier submissions, after 12 February 2019. All written submissions were made available on the Commission's website as soon as reasonably practicable after they were received. The written submissions raised a number of issues, including:
 - Procedure and Process:
 - that the EIS was inadequate and did not contain satisfactory information to allow the community to fully consider the impacts of the Project;
 - the process for the assessment of the Project was being rushed;
 - the Applicant did not have a suitable or demonstrated ability to effectively manage environmental impacts; and
 - the Project represents significant development creep, and whether the Project should be considered as an extension or as a new mine.
 - Groundwater Resources:
 - the impacts on ground and surface water, the scale of the drawdown, loss of base flows to the Namoi River and accumulation of high-saline water bodies in the landscape have not been adequately assessed;
 - concerns in relation to the continued permanent impact on the groundwater systems, including no plan to address the 143 ha of toxic final void, which is understood to possibly rise to six times saltier than seawater;
 - Applicant's record of managing groundwater at other nearby mines;
 - concerns regarding mine blasting impacts on groundwater; and
 - the need for real time monitoring.
 - Surface water resources and flooding:
 - the impacts of the rail spur on the flood levels on the Namoi River flood plain;
 - additional water requirements for the Project may be unsustainable;
 - lack of community confidence in the provided surface water and flood impact assessments; and
 - concerns regarding flood preparedness and the impacts to downstream communities.
 - Agricultural impacts:
 - the loss of productive agricultural land;
 - decreases in value of crops, such as cotton, from dust deposition; and
 - reduced production due to increased competition and cost for water resources.
 - Air quality:
 - the absence of air quality monitoring stations in Boggabri and the need for real time monitoring of air quality;
 - health impacts to nearby families from mining activities and changes to air quality; and
 - Applicant's record of managing air quality at other nearby mines.

- Noise:
 - the noise modelling does not contain sufficient data;
 - the need for real time monitoring of noise impacts;
 - improvements to project design and project equipment which have reduced noise impacts;
 - negative impact on health because of increase in noise levels associated with the Project;
 - Applicant's record of managing noise at other nearby mines;
 - improvements in noise emission technology enabling greater attenuation of noise for primary sources; and
 - the lack of noise assessment for the rail loop as it crosses the floodplain.
- Cumulative impacts:
 - concern that the Namoi Valley would follow the same development and environmental impact path as the Hunter Valley;
 - the Project will result in a significant land use conflict due to its proximity to nearby agricultural producers;
 - the principles of ecologically sustainable development and intergenerational equity have not been met by this Project;
 - the lack of a reasonable, practical method for the State to assess cumulative impacts on biodiversity; and
 - the cumulative impacts of loss of critically endangered habitat, irreversible damage to water sources, and toxic final voids have not been adequately assessed or mitigated for the Project.
- Final void:
 - the Project will reduce the number of final voids;
 - the long term, multi-generational impact of the void on water resources; and
 - inconsistency with the Narrabri Shire Council extractive industry policy, which requires that no voids to be left.
- Rehabilitation:
 - the amount of the site that will be rehabilitated;
 - the quality of rehabilitation; and
 - loss of agricultural land to biodiversity offsets.
- Biodiversity:
 - the high level of impact on threatened species, in particular the koala;
 - inadequate consideration of connectivity; and
 - the lack of consideration of indirect impacts from the development and operation of the Project.
- Heritage:
 - impacts to the Kurrumbede Homestead;
 - quality of the Aboriginal cultural surveys; and
 - impacts to Aboriginal cultural heritage.
- Economics:
 - the Applicant supports local businesses and local jobs; and
 - the benefits and impacts of the Project are not spread evenly, with most of the benefits consolidating in Gunnedah and the impacts being felt in Boggabri.
- Social impacts (both positive and negative):
 - the influx of mining income, including that from the Project, has resulted in increased costs for housing, impacting non-mine workers;
 - the Applicant's insistence of a no-drugs, no-alcohol policy at its other mines has brought great benefits to society in terms of improving social cohesion and reducing crime rates;
 - the Project will exacerbate a skills shortage, making it more difficult for non-

- mine activities;
- non-mining businesses cannot match mining wages;
- the Project will bring new families to both Gunnedah and Narrabri Shires;
- the Project will provide greater opportunities for Aboriginal employment;
- the Project will provide opportunities, allowing more young people to stay in the region; and
- social cost of the voluntary acquisition process on land holders and the need for land devaluation to be considered as part of the Voluntary Land Acquisition and Mitigation Policy (**VLAMP**).
- Visual amenity:
 - night-time lighting;
 - the design of the final landform; and
 - impact of night-time glow on the Siding Springs Observatory.
- Climate Change and the public interest:
 - the contribution of the Project to climate change;
 - impacts to human and environmental health from climate change;
 - moving towards more renewable energy sources; and
 - importance of the NSW Land and Environment Court's recent decision on the *Gloucester Resources Limited v Minister for Planning* [2019] NSWLEC 7 and the consideration of greenhouse gas contributions from all stages of the Project.

2.5 Community participation requirements and public submissions

29. The Department conducted the mandatory requirements for community participation as required by Part 1 of Schedule 1 of the EP&A Act. The Department received 560 submissions from members of the public, special interest groups and government agencies. Of these, 345 submissions (62% of the total) were in support of the Project, 201 submissions (36% of the total) objected to the Project, and 14 (2% of the total) submissions provided comments on the Project.
30. Submissions in support made to the Department contended that the Project would deliver local and regional socio-economic benefits, including:
- job security;
 - job opportunities, particularly for the Aboriginal community;
 - diversifying from a predominantly agricultural economy; and
 - community benefits, i.e. the Applicant's monetary contributions to local causes.
31. Objections to the Project related to a broad range of concerns as represented in Appendix C3 of the Department's PIR. These concerns included:
- the loss of prime agricultural land;
 - impacts of groundwater drawdown and the difficulties for landowners to obtain make good provisions due to difficulty obtaining the evidence;
 - connectivity between the Namoi River and aquifers, and the impacts of blasting on this connectivity;
 - the assumptions used in the flood modelling;
 - impacts to aquatic ecology and fish species from altered hydrology, stream crossings and contamination, and in particular impacts on the stretch of the Namoi River;
 - dust;
 - the assumptions regarding the wind direction;

- changes to the social fabric of Boggabri and the surrounding area;
- the adequacy of the assessment of cumulative impacts;
- impacts on Kurrumbede and its outbuilding used by Andrew “Boy” Charlton; and
- adequacy of consultation with the Aboriginal community.

2.6 Voluntary Surrender of Consent under section 4.63 of the EP&A Act

32. The Applicant stated in the EIS that the:

“Development Consent for the Project will be sought under the State Significant Development provisions (Division 4.7) under Part 4 of the EP&A Act. It is proposed to surrender the Development Consent for the Approved Project (SSD-5000) if the Project is approved with conditions satisfactory to the Applicant.”

33. Section 4.63 of the EP&A Act provides:

4.63 Voluntary surrender of development consent

- (1) *A development consent may be surrendered, subject to and in accordance with the regulations, by any person entitled to act on the consent.*
- (2) *A development consent may be surrendered under this section even if, on an appeal under Part 8, the consent has ceased to be, or does not become, effective.*
- (3) *If a development consent is to be surrendered as a condition of a new development consent and the development to be authorised by that new development consent includes the continuation of any of the development authorised by the consent to be surrendered:*
 - (a) *the consent authority is not required to re-assess the likely impact of the continued development to the extent that it could have been carried out but for the surrender of the consent, and*
 - (b) *the consent authority is not required to re-determine whether to authorise that continued development under the new development consent (or the manner in which it is to be carried out), and*
 - (c) *the consent authority may modify the manner in which that continued development is to be carried out for the purpose of the consolidation of the development consents applying to the land concerned.*

34. The Commission notes that while the consent authority is “not required” to re-assess the likely impact of the continued development, the consent authority is not explicitly precluded from re-assessing the likely impacts.

35. Similarly, the Commission notes the consent authority is explicitly empowered to consider and modify the manner in which, *“continued development is to be carried out for the purpose of the consolidation of the development consents.”*

2.7 Department’s PIR

36. The Department’s PIR addressed the Project’s justification, strategic and statutory context, and the Department’s consultation with the public and relevant NSW Government agencies. It provided a broad summation of what the Department considered to be the key issues raised through the public exhibition process, including the rail spur, air quality, noise, blasting, water resources, biodiversity, final landform, final land use and rehabilitation, economics and social impacts.

37. The Department's PIR stated that:

"The Department has undertaken a preliminary review of the development application, EIS and submissions for the Vickery Extension Project. It has also engaged a number of independent experts to review key aspects of the project, including surface water, flooding, groundwater and economics..."

All of these issues raised in submissions, as well as the issues identified in the Commission's preliminary public hearing report, will be considered in the Department's detailed assessment of the project. This assessment will be completed following receipt of the Commission's preliminary public hearing report and additional information from Whitehaven responding to the issues raised in submissions, agency advice and the preliminary public hearing."

38. The Commission seeks to clarify that this report is not a 'preliminary public hearing report' as referred to in the Department's PIR. The Commission's report is required to address the Minister's Request, as set out above at paragraph 1.

2.8 Relevant NSW Policies and Guidelines

2.8.1 Environmental Planning Instruments

39. There are several environmental planning instruments that are relevant to the Project. They include:

- *State Environmental Planning Policy No.33 – Hazardous and Offensive Development;*
- *State Environmental Planning Policy No.44 – Koala Habitat Protection;*
- *State Environmental Planning Policy No.55 – Remediation of Land;*
- *State Environmental Planning Policy (State and Regional Development) 2011;*
- *State Environmental Planning Policy (Infrastructure) 2007;*
- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the Mining SEPP);*
- *New England North West Strategic Regional Land Use Plan 2012;*
- *Gunnedah Local Environment Plan 2012; and*
- *Narrabri Local Environment Plan 2012.*

2.8.2 Ecologically Sustainable Development

40. A relevant object of the EP&A Act to the Project is the facilitation of ecologically sustainable development (**ESD**).

41. The Commission notes that section 6(2) of the *Protection of the Environment Administration Act 1991*, which is contained in the EP&A Act as the definition of ESD, states that ESD requires the effective integration of social, economic and environmental considerations, and that ESD can be achieved through the implementation of:

- (a) the precautionary principle;
- (b) inter-generational equity;
- (c) conservation of biological diversity and ecological integrity; and/or
- (d) improved valuation, pricing and incentive mechanisms.

42. It was submitted at the initial public hearing that the Project did not achieve the principles of ESD by reason of its failure to implement intergenerational equity. Issues raised in this context included the cumulative impacts of final voids, impacts on critically endangered

habitat, damage to water resources and contribution to greenhouse gas emissions.

43. As set out in paragraph 40, the facilitation of ESD is one of the principles of the EP&A Act. Accordingly, the Commission is of the view that the Applicant and the Department will need to ensure that the principles of ESD, including, in particular, the extent to which the Project achieves inter-generational equity (particularly regarding total greenhouse gas emissions and the retention of a residual void) are explicitly considered as part of any future assessment undertaken for the Project.

2.8.3 State Environmental Planning Policies (SEPPs)

44. The Applicant assessed the Project's compliance with the identified SEPPs through the *Planning Instrument Addendum*, attached to the EIS.

45. The *Planning Instrument Addendum* stated the following SEPPs were relevant to the Project:

- *State Environmental Planning Policy (State and Regional Development) 2011:*
"The Project falls within Item 5 of Schedule 1 of the State and Regional Development SEPP as it is development for the purpose of mining that is coal mining. It is therefore State Significant Development for the purposes of the New South Wales (NSW) Environmental Planning and Assessment Act, 1979 (EP&A Act) (Section 6.3.2)."
- *State Environmental Planning Policy No.33 – Hazardous and Offensive Development:*
"In accordance with the Secretary's Environmental Assessment Requirements and as part of the preparation of this EIS, a PHA [Preliminary Hazard Analysis] has been conducted in accordance with SEPP 33 (Appendix P). The PHA has been prepared in accordance with the general principles of risk evaluation and assessment outlined in Multi-Level Risk Assessment (Department of Planning and Infrastructure, 2011).

In addition, the PHA considers the qualitative criteria provided in Hazardous Industry Planning Advisory Paper No. 4: Risk Criteria for Land Use Safety Planning (DoP, 2011a) and has been documented in general accordance with Hazardous Industry Planning Advisory Paper No. 6: Hazard Analysis"

- *State Environmental Planning Policy No.44 – Koala Habitat Protection:*
"An assessment of Koala habitat for the purposes of SEPP 44 has been undertaken (Section 4.11 and Appendix F) and this assessment has found that portions of the Development Application area comprise potential Koala habitat..."

Notwithstanding that the Project is State Significant Development, a Koala Management Plan would be prepared for the Project to describe avoidance, mitigation and management measures relevant to the Koala."

- *State Environmental Planning Policy No.55 – Remediation of Land:*
"SESL Australia (2018) (Appendix Q) completed a Land Contamination Assessment in accordance with Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land. This investigation included a desktop review and site inspection."

"Following review of the site history and the visual site inspection results, SESL (2018) identified three areas to be investigated further (Tier 1 Detailed Site Investigation)

prior to commencement of the Project (Appendix Q).”

- *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*
“The potential impacts of the Project of groundwater and surface water resources are discussed in Section 4.5 and 4.6 and Appendices A and B, respectively, including measures to minimise potential impacts. The potential impacts of the Project on threatened species and biodiversity are described in Section 4.11 and Appendix F, including measures to minimise potential impact.”

“The Project greenhouse gas assessment is provided in Section 4.10 and Appendix E. Greenhouse gas mitigation measures and relevant State or national policies, programs and guidelines are described in Sections 4.10 and 6.1.3”.

2.8.4 New England North West Strategic Regional Land Use Plan 2012

46. The *New England North West Strategic Regional Land Use Plan (NENW-SLUP)*, released by the NSW Government in September 2012, maps the region’s mineral resources and areas of strategic agricultural land. It states that the region makes a major contribution to the State’s production of agricultural commodities and contains about 12 per cent of the State’s identified coal reserves, as well as large reserves of coal seam gas.
47. To ensure that potential impacts on strategic agricultural lands are appropriately considered, the NENW-SLUP requires any mining or coal seam gas proposals located on strategic agricultural land outside an existing mining lease to be referred to the independent Mining and Petroleum Gateway Panel.
48. The Project would not affect any of the regionally mapped Biophysical Strategic Agricultural Land (**BSAL**), however the proposed private haul road and Kamilaroi Highway overpass is located within an area of BSAL adjacent to the Namoi River.
49. The Department issued a Site Verification Certificate on 8 February 2016, verifying that the mine lease area (**MLA**) associated with the Project (MLA 1) is not located on BSAL. As the Project is not located on strategic agricultural lands, a referral to the Mining and Petroleum Gateway Panel was not required.

2.8.5 Gunnedah Local Environment Plan 2012 and Narrabri Local Environment Plan 2012

50. The Project site is located in the Gunnedah and Narrabri local government areas. The Project site, including the ancillary infrastructure, is wholly located on land zoned RU1 Primary Production, as defined by both the Gunnedah and Narrabri Local Environment Plans.
51. Open cut mining and railways are permissible with consent in zone RU1.

3 THE COMMISSION’S CONSIDERATION IN RELATION TO THE MINISTER’S REQUEST

3.1 The Commission’s approach to its consideration

52. In considering the Project, the Commission has given regard to the Material (see paragraph 16).

53. Additionally, the Commission has also given regard to the assessment documentation for the Approved Project.
54. After carefully considering all of the Material (see paragraph 16), the panel has identified the key issues requiring consideration by the Department by reference to the following broad headings:
- strategic context and Project justification;
 - groundwater,
 - surface water and flooding;
 - water balance;
 - noise and blasting;
 - air quality;
 - Project infrastructure area;
 - biodiversity
 - rehabilitation, final void and final landform;
 - heritage;
 - social and economics;
 - visual amenity;
 - traffic and transport; and
 - public interest.
55. The Commission has identified particular sub-issues within the broad key issues identified above in paragraph 54, which should be given detailed consideration by the Department in evaluating the merits of the Project. These sub-issues are addressed in the balance of this report.

3.2 Strategic Context and Project Justification

56. In September 2014, the Applicant was granted approval for a 4.5 Mtpa mine (namely, the Approved Project) sited in approximately the same location as the Project. The Approved Project has not been commenced and it proposed to be replaced by the Project. The Applicant has provided a set of reasons said to justify approval of the Project in place of the Approved Project. These reasons include:
- more efficient extraction of high-quality coal resources (including additional resources contained in a southern Vickery tenement area acquired in 2013 and not included in the Approved Project application);
 - additional coal resources justify establishment of a CHPP and rail spur onsite (noting a rail spur is unlikely to be economically viable at the approved mine maximum output of 4.5 Mtpa);
 - cessation of coal transport on public roads and operation of the Gunnedah CHPP; and
 - the location of the Project on land primarily approved for mining.
57. However, the Commission notes that restrictive current road transport approvals for the Approved Project were only briefly dealt with by the Applicant in the EIS and the Additional Material, and were not considered in the context of the Applicant's reasons justifying the Project. The Commission notes that the current road transport approvals for the Approved Project, together with the operating Tarrawonga and Rocglen Mines (supplying the Gunnedah CHPP) appear to restrict output (i.e. Approved Project 4.5 Mtpa, Tarrawonga Mine 3 Mtpa, Rocglen Mine 1.5 Mtpa). The Commission notes that the transport assessment for the Approved Project assumed that the 3 Mtpa production from the Tarrawonga Mine would be diverted to rail in 2013, utilising the Boggabri Mine facility. This

rail diversion has not occurred and modifications to the Tarrawonga Mine consent have subsequently provided temporary road limits of up to 4 Mtpa.

58. In addition, the Commission notes in this context that the development consent (DA 79_2002) for the Gunnedah CHPP is limited to 3 Mtpa and that the approval for the train load out facility is limited to 4.1 Mtpa.
59. Based on the current approval restrictions for the three mines, the Gunnedah CHPP and train load out facility, and the fact that each facility will either be replaced by the Project or benefit by enabling full production, the Commission considers that a more comprehensive explanation of the Applicant's justification for the Project would be useful for the Department's assessment. The explanation could include details on the impacts (including economic) on maximum approved outputs from the combined Approved Project, Tarrawonga and Rocglen Mines and the Gunnedah CHPP and train load out facility.
60. Further, the Commission heard concerns from speakers at the initial public hearing that the project should not be considered as an extension, that the Project represented approval creep and that the Project was simply too big, compared to the Approved Project.
61. Based on the information provided in paragraphs 57 to 60, the Commission considers that the Department should give the Applicant an opportunity to supply a detailed consideration of all matters provided to justify the Project, including but not limited to:
 - whether there are limitations imposed by the conditions of consent for the Approved Project, and the Tarrawonga and Rocglen Mines which are located near the Project site (see **Figure 1**);
 - any need for a CHPP and rail load out facility at the Project site itself;
 - the economic impacts of any limitations imposed by the current consents which prevent maximum production for the Approved Project, Tarrawonga and Rocglen Mines, and the Gunnedah CHPP and train load out facility;
 - the economic evidence for an annual production threshold sufficient to support a viable new CHPP and rail loop;
 - details of the additional resources secured within the Vickery South tenements, timing and why these were not included in the Approved Project application; and
 - details of the additional resources confirmed within the northern area of the Approved Project tenements, timing and why these were not included in the Approved Project application.

3.3 Groundwater

62. During the Department's exhibition of the Project, potential impacts to groundwater resources were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential groundwater impacts of the Project, as referred to in paragraph 28.

3.3.1 Existing Environment

63. The EIS provides an overview of the existing environment, in which the Project is situated. The Project mining area is surrounded by Zone 4 of the Upper Namoi Alluvium associated with the Namoi River floodplains, and coal resources within the Project mining area are located within the Maules Creek Formation (as defined in the Applicant's EIS) being the primary coal bearing unit. However, the Applicant has stated in its EIS that the Project is

designed to be isolated from the alluvium. The Namoi River is located to the north, west and south of the Project mining area.

64. There are two groundwater systems identified in the relevant water sharing plans, being:
- **Alluvial groundwater system** – associated with the unconsolidated alluvial sediments of the Namoi River floodplains; and
 - **Porous rock groundwater system** – including coal measures of the Maules Creek Formation.
65. The EIS states that the open cut would be entirely located within the Maules Creek Formation, which lies within the boundary defined in the *Water Sharing Plan for the NSW Murray Darling Basin Porous Rock Water Sources 2011*. The coal resource is located within the ‘less productive’ Gunnedah-Oxley Basin MDB Groundwater Source of the porous rock groundwater.

3.3.2 Modelling and Predictions

66. The Applicant provided an assessment of groundwater impacts as part of its EIS, undertaken by HydroSimulations and peer reviewed by Kalf and Associates. The assessment of groundwater impacts was noted as building upon the assessment conducted by Heritage Computing, which assessed the groundwater impacts of the Approved Project. The current groundwater assessment included:

“A desktop review of the previous groundwater investigations, assessments and monitoring programs in the Project mining area and surrounds has been conducted as part of this study. The relevant findings have been used to assist in the characterisation of the existing groundwater environment and the regional numerical groundwater modelling and impact assessment.”

“The first assessments of the local hydrogeology and groundwater resources were conducted in the early to mid-1980s as part of the original feasibility studies and environmental impact assessment of the Vickery Coal Mine. The studies included geotechnical, hydrogeological and hydrogeochemical studies conducted by Coffey & Partners Pty Ltd (Coffey) (1982, 1984a, 1984b), as well as the EIS for the original Vickery Coal Mine (Vickery Joint Venture, 1986), which at the time was referred to as the “Namoi Valley Coal Project”.

“The EIS for the original Vickery Coal Mine (Vickery Joint Venture, 1986) described two main groundwater systems as being present in the region:

- *groundwater associated with the unconsolidated alluvial sediments of the Namoi River floodplain which are characterised by high hydraulic conductivity and good water quality (i.e. less than 500 milligrams per litre [mg/L] Total Dissolved Solids [TDS]); and*
- *fractured hard rock groundwater systems with relatively low hydraulic conductivity and good to slightly brackish water quality (i.e. between 500 and 2,500 mg/L TDS).”*

67. The Commission notes the importance of distinguishing between the two different aquifer systems. The Applicant has proposed that the borefield to the north of the Project site be situated in the unconsolidated alluvial sediments so that the borefield’s impact would be greatest there. On the other hand, the mine void is isolated from the alluvial sediments and the drawdowns that it creates (both during operation and post-mining) would be greatest in the deeper fractured rock aquifers. The Commission observes that the

groundwater assessments provided by the Applicant do not distinguish drawdowns in the two different aquifer systems, (which are claimed to be isolated from each other), nor do the assessments make explicit any interconnection (or lack of it) between the two different aquifer systems.

68. Further, the Commission notes that in the Preliminary Response to Submissions:
- at point 5 the Applicant has not responded to concerns with respect to the impacts on the alluvials of the borefield, but rather has focussed on the impacts of themine void on the deep fractured rock groundwater system; and
 - at point 6N the Application has not committed to providing more detailed information about the groundwater water model construction and drawdowns.

69. The groundwater assessment identified that the Project site is:

“bordered by alluvial sediments of the Namoi River, Driggle Draggie Creek and Stratford Creek surface drainages (Figure 5 and Figure 8). These sediments, also known as the Upper Namoi Zone 4 water source, are part of the Upper Namoi Alluvium that contain groundwater designated as the Namoi Valley (Keepit Dam to Gin’s Leap) Groundwater Source. Alluvial sediments of the Upper Namoi Alluvium are usually subdivided into two formations, although they are not always distinguishable.”

70. The conceptual groundwater model in the groundwater assessment identified that:

“Recharge to the groundwater systems occurs from rainfall and runoff infiltration, lateral groundwater flow, and some leakage from surface water sources. In particular, recharge to the alluvial sediments occurs primarily from the Namoi River. Groundwater levels are therefore sustained by rainfall recharge, but levels are influenced by topography, geology and surface water levels in local drainages. Groundwater tends to mound beneath hills, with ultimate discharge to adjacent drainages and loss by evapotranspiration at shallow depth.”

71. The Applicant’s groundwater assessment detailed the site water balance for the Project. The groundwater assessment identified that:

“The water balance at the end of the transient calibration period across the entire model area is summarised in Table 15. The average inflow (recharge) to the groundwater system was approximately 70 ML/d, comprising mainly rainfall recharge (25%) and leakage from streams into the groundwater system (46%). The leakage from all streams is simulated to be about 32 ML/d. Boundary inflow was also significant (29%).”

“Production bore abstraction accounts for the majority of the groundwater discharge (68%) followed by aquifer outflow from the model domain (16%) and stream baseflow (11%). Evapotranspiration is a relatively small proportion of the total model water loss (4%). The computed inflow to all mines (0.6 ML/day) is about 1% of the total groundwater discharge over the model area.”

72. The Applicant’s groundwater assessment predicted groundwater drawdowns around the mine and borefield. This is presented in **Figure 2**. The Commission notes that these and other drawdown figures in the document do not indicate within which strata the drawdowns occur (i.e. in the Narrabri/Gunnedah formations and/or in the deeper fractured rock). The Commission considers that this information may be important for the Department to be able to assess the potential off-site impacts, as drawdowns in the Narrabri/Gunnedah

formations have the potential to impact on Groundwater Dependent Ecosystems (**GDEs**) in the region around the borefield. Additionally, as indicated in the IESC report, this potential has not been assessed in the EIS or the Preliminary Response to Submissions, so the Commission considers the current documentation appears insufficient for the Department to assess the potential impact of the borefield on GDEs, or to assess the amelioration methods that are proposed in the event of unavoidable impacts.

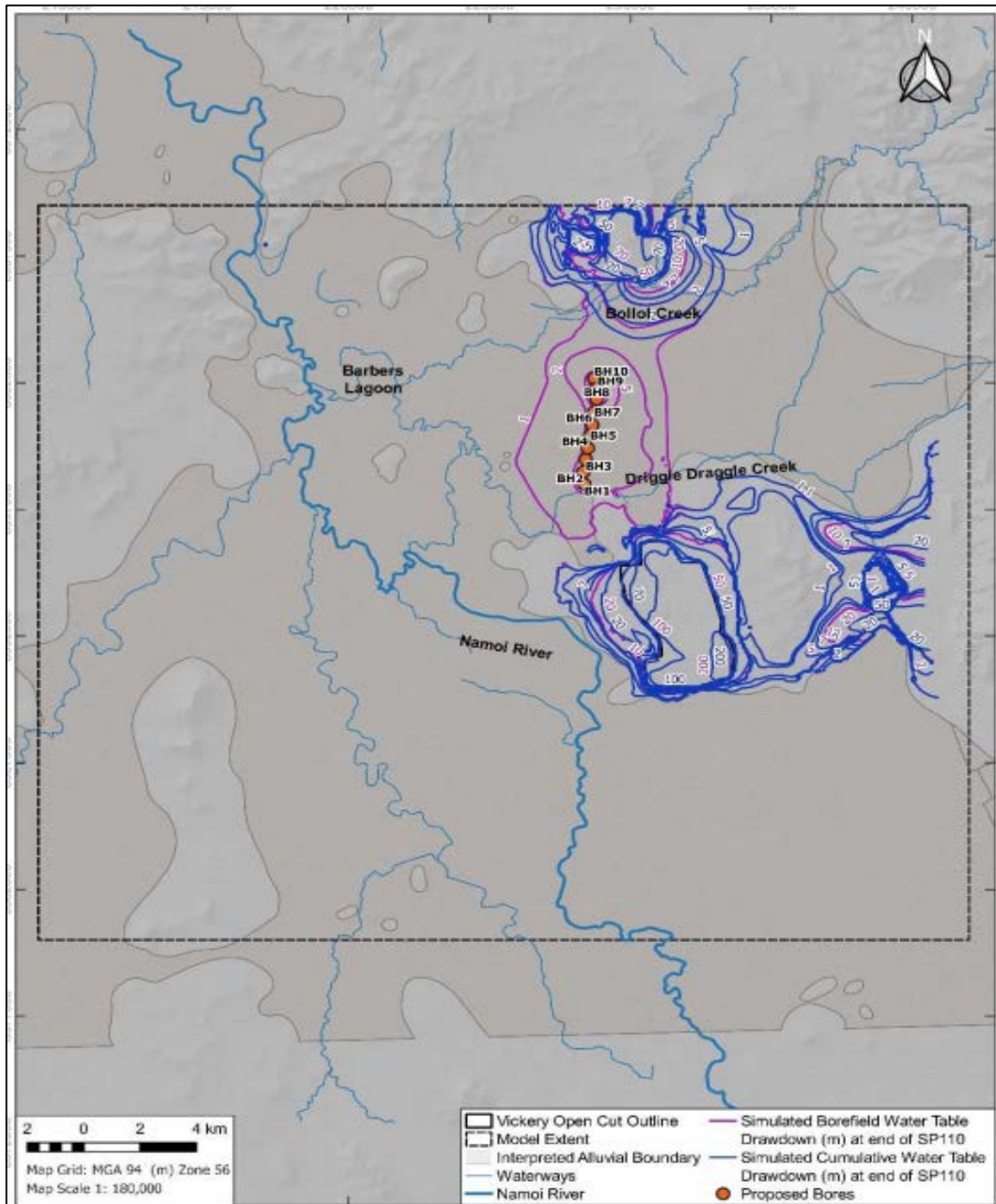


Figure 2: Simulated Water table drawdown (m) at the end of the Vickery Mining (Stress period 110) for the cumulative and borefield scenarios (Source: Vickery Extension Project Groundwater Assessment)

73. The Applicant's groundwater assessment provided an assessment of the likely groundwater impact from the residual mine void and predicted recovery time. The Groundwater assessment:

"estimates that the final void would reach a water level of about 125 m AHD approximately 300 years after mining ceases. The equilibrium water levels would be about 125 m lower than current groundwater levels at the final void (Advisian, 2018). Consequently, the void would act as a permanent groundwater sink."

"The shallow groundwater level pattern predicted by the groundwater model (without the benefit of extra surface water runoff) is displayed in Figure 60 at 100 years after the end of the Project. The contours confirm that the final void would act as a strong sink for groundwater entering from all directions."

3.3.3 Public Submissions

74. During the Department's exhibition of the Project, potential impacts to groundwater resources were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential impacts to groundwater resources of the Project and the incomplete assessment of impacts provided in the EIS, as referred to in paragraph 28.
75. Speakers at the initial public hearing stated that:

"I must also mention that the open-cut hole will have an effect on groundwater flows, due to the pressure release on unconsolidated and consolidated aquifers below and adjacent to it. I note that one – at least one New South Wales Government Department has also raised a similar concern. In my opinion, this could be a breach of the aquifer interference policy. Then again, it's a policy, not a regulation."

"The mine's influence on groundwater is of grave concern. The base levels have not been established and will the observation bores be situated where they won't be conveniently destroyed as the mine expands?"

"For example, the Maules Creek Coal, Boggabri Coal and Turrawonga approval conditions re compensation for groundwater loss puts the burden of proof on landholders, where there be a loss of groundwater. However, the approval conditions do not force the company to transparently, in real-time, provide its water take from bores or the inflow into its pits. Baseline data can be vague, missing or incomplete. As a result, the landholder has no way of meeting this burden of proof to enforce the conditions."

76. With regards to the final void, a representative of Namoi Water spoke to the potential for the Applicant to consider a 'no void' option:

"It's disappointing in this day and age to see the proposal to leave a final void. Quoting the EIS:

'The final void is predicted to have continued inflow of up to 180 megs a year for another 300 years. It will act as a permanent groundwater sink. It will continually evaporate which will lead to progressively increased salinity, and the project will create a permanent reversal in groundwater flow direction.'

This is an unnecessary risk for the Namoi catchment to burden into the future.”

77. The Wando Conservation and Cultural Centre Incorporated also identified the final void as an issue:

“We note on page 33 of the preliminary issues report that a number of government authorities raise issues regarding the final void or final landform and the associated long-term groundwater impacts including the DRG, EPA and Gunnedah and Narrabri Shire Councils. The authorities recommend that further work should be done to investigate alternatives to the final void.”

3.3.4 The Department and Government Agency Submissions

78. The Department’s PIR included independent peer reviews of the Project’s assessment of impacts to groundwater resources, including the independent review *Vickery Extension Groundwater Assessment Independent Review*, prepared by HydroGeoLogic Pty Ltd, dated 9 November 2018 (the **Groundwater Review**).

79. The Department’s PIR stated the Project is:

“...predicted to result in groundwater drawdown of less than 1 metre beyond the mining areas and surrounding alluvium. The project is predicted to comply with the minimal impact considerations of the NSW Aquifer Interference Policy, with no significant impacts predicted on any privately-owned groundwater bores.”

80. In regard to the final void, the Department’s PIR states:

“A number of government authorities raised issues regarding the final void/final landform and the associated long-term groundwater impacts, including DRG, EPA, and Gunnedah and Narrabri Shire Councils. The authorities recommend that further work should be done to investigate alternatives to the final void, including partially or completely filling the void, to (potentially) reduce long term salinity build up within the void, and other groundwater impacts.

The Department’s independent groundwater expert, Hugh Middlemiss (see Appendix E2), also believes that the application of the groundwater model to investigate mine closure and final void options does not fully align with best practice.”

81. The Department’s Groundwater Review provided a desktop review of the water balance model as part of the review of the groundwater modelling of the post-mining final void lake scenario as included in the Applicant’s EIS. The Groundwater Review concluded:

“...that the Vickery Extension hydrogeological and groundwater modelling assessment is fit for the purpose of mine dewatering environmental impact assessment (including cumulative impacts) and informing management strategies and licensing.”

“A few sensitivity and uncertainty scenarios have been conducted but improved assessment is warranted, consistent with best practice.”

“The post-mining final void water balance assessment is adequate, but the application of the groundwater model to investigate closure options and related uncertainties is less than one would expect in terms of best practice.”

82. The submission from the Environment Protection Authority (the **EPA**) to the Department, dated 18 October 2018, generally stated that in relation to groundwater additional information was required including provision of “a detailed map identifying the location of all groundwater monitoring bores used for groundwater quality sampling and review of options for final void design to minimise impacts on groundwater”.
83. The submission from the NSW Department of Industry – Land and Water (**Dol Water**) to the Department, dated 26 October 2018, recommended that the Department seek additional information to inform determination of the Project. Relating to groundwater, Dol Water recommended that the following additional information be sought:

“Confirmation is required that water entitlements currently held are sufficient to account for existing projects and the proposed project as relevant. Sufficient licensed water entitlements must be held in all relevant groundwater, regulated surface water and unregulated surface water sources. Where additional entitlement is required, the EIS should demonstrate how this will be acquired.”

“The EIS should clearly state whether the use of dewatering bores to reduce pit inflows will result in additional impacts to those predicted. This should address the impacts to the groundwater source and any connected water sources, in addition to the requirement to manage the dewatered water.”

“An impact assessment of the borefield against Dol Water groundwater dealing/new bore impact assessment criteria is required, in consultation with Department of Industry - Lands and Water.”

84. The IESC, in its advice on the Project, dated 14 November 2018, summarised the key potential impacts from the Project as:

“...groundwater drawdown from mining operations, primarily in the Maules Creek Formation (part of the Gunnedah-Oxley Basin MDB Groundwater Source in the Murray-Darling Basin Porous Rock Groundwater Source Water Sharing Plan) that may affect groundwater availability and aquifer interactions,”

“...groundwater drawdown mainly associated with the proposed water supply borefield in the Alluvial Groundwater Source (located in Zone 4 of the Upper and Lower Namoi Groundwater Sources Water Sharing Plan) that may affect groundwater availability and the dynamics of surface water groundwater interactions.”

85. Further the IESC stated in its advice:

“that a number of the studies completed for this project such as the surface water assessment and the studies to determine the extent of the alluvium have been completed to a high standard. The proponent should be commended for these studies and for obtaining peer reviews of many of the major reports provided in the impact assessment.”

86. However, the IESC noted that several aspects of the groundwater assessment required additional clarification and justification. Specifically, the IESC’s advice stated additional information was required to fully assess the materiality of impacts, including:

“further transient predictive model simulations are needed to examine a greater range of variability in hydraulic conductivity and specific storage. This information is needed to improve the current understanding of potential variability of drawdown impacts that could occur and to further support the proponent’s statements that seepage losses from both the Upper Namoi Alluvium and the Namoi River will be limited given the intensive use of these water resources.”

“maps are needed that illustrate the distribution of potential groundwater-dependent ecosystems (GDEs), particularly terrestrial ones, superimposed on contours of estimated depths to the water table (in metres below ground level) both pre-mining and at maximum predicted drawdown. These maps should also show the locations of bores used to estimate the water table depths. These maps are needed to be fully understand [sic] the potential impacts to GDEs.”

“an appropriate risk analysis (e.g. Serov et al. 2012) of the potential impacts of groundwater drawdown to GDEs is required, along with proposed mitigation strategies if impacts cannot be avoided.”

“the direction of surface water-groundwater exchange in the river bed and banks strongly affects biogeochemical processes in the sediments, more information is needed on how groundwater drawdown may alter spatial and temporal patterns of surface water-groundwater exchanges in the Namoi River.”

“further geochemical analyses should be undertaken using a range of environmental conditions (especially pH) that are representative of what may occur at the project site, particularly as the solubility and bioavailability of metals depends on water chemistry.”

“monitoring of surface water quality should be improved by increasing the frequency of monitoring and the range of analytes.”

“more information is needed regarding the potential to localised increases in erosion and changes to flood characteristics associated with construction activities and infrastructure (e.g. rail spur) that could impact the state-listed ‘Lowland Darling River Aquatic Ecological Community’.”

3.3.5 Additional Material

87. The Applicant provided the Commission with Additional Material responding to questions raised at the 25 February 2019 meeting, and in the 7 and 8 February 2019 correspondence. The Applicant also provided the Commission with a Preliminary Response to Submissions, dated 7 March 2019, which responded to the Department’s PIR and government agency submissions.

88. The Applicant responded to the EPA concerns, as noted in paragraph 82, in its Preliminary Response to Submissions, dated 7 March 2019, stating that:

“Figure 17 of Appendix A of the EIS (reproduced below as Figure 1), which was included in EPA’s submission, shows the location of test sites for the groundwater investigation programme undertaken to confirm the extent of the Namoi River Alluvium.”

“Figure 16 of Appendix A of the EIS (reproduced below as Figure 2) shows existing groundwater monitoring locations within and in the vicinity of the Project are. Groundwater

monitoring locations are also detailed in Section 2.9 of Appendix A of the EIS.”

89. The Applicant responded to DoI Water’s concerns, as noted in paragraph 83, in its Preliminary Response to Submissions, dated 7 March 2019. In relation to holding sufficient water entitlements, the Applicant confirmed that it holds sufficient groundwater and surface water licences. In relation to dewatering bores, the Applicant stated that any required dewatering bores would be located within the Project open cut footprint.

90. Relating to the borefield concerns raised by DoI Water, the Applicant stated that:

“The northern borefield is proposed to provide a supplementary water source.”

“The use of the Project borefield would be in accordance with Whitehaven’s licensed entitlements and the extraction and positioning rules of Clause 36 of the Water Sharing Plan for the Upper and Lower Namoi Groundwater Sources 2003 (Section 6.4 of Appendix A of the EIS).”

“The northern borefield (i.e. water supply borefield) has been modelled cumulatively with drawdown due to Project mining (as well as other mining operations and agricultural users) to confirm predicted impacts to other water users are insignificant (Section 6.4 of Appendix A of the EIS).”

The Commission notes this specific material and refers it to the Department in its assessment of the Project.

91. The Applicant responded to some of the comments raised by the IESC in its formal response to the Commission, dated 5 March 2019. The Commission notes that the IESC raised issues that in the Commission’s view remain unanswered, which provides the basis for several of the matters identified for consideration by the Department below.

92. Questions asked by the Commission at the 25 February 2019, to which the Applicant provided responses in the Additional Material, covered the below topics:

- stratigraphy used in the groundwater model and the data it is based on;
- hydro-geological functional parameters for the stratigraphy (i.e. storativity, specific yield, hydraulic conductivities, any isotropy and the data they are based on;
- reliability of predictions for the bore field and sensitivity studies conducted; and
- present drawdowns and flow directions for 300 years and justify pit lake as a sink.

93. However, the Commission considers there are remaining gaps in this information, including:

- while the Applicant’s groundwater consultants carried out a sensitivity study of the impacts of an order of magnitude change in hydraulic conductivity and found a maximum of 16% change in groundwater levels, they did not study the impact of changes in specific storage (which was highlighted by the IESC);
- whether the groundwater inflow rates are a minor uncertainty on the final levels of the pit lake, as pit lake levels are largely driven by surface water inflow; and
- no in-situ testing was used to calibrate the groundwater model in the region of the northern borefield, rather the model has been informed by a DoI Water groundwater model from 2006. The Commission observes that it is unable to assess the adequacy of the calibration and predictions from this model because it appears that no comparisons have been carried out between model performance and field data in the alluvials in the region proposed for the northern borefield.

3.3.6 Commission's Observations

94. As set out in paragraphs 74 to 75, the Commission recognises the high level of community concern regarding the security and protection of groundwater resources. This concern was expressed even by some people who spoke in support of the Project, who often caveated this support with the assumption that the impacts, and in particular impacts to groundwater resources, would be minimal and effectively managed and regulated by the Applicant and relevant government agencies.
95. The Commission recognises that a consistent theme from the relevant government agencies, which was taken up in the public submissions, was the level of outstanding information regarding the assessment and management of groundwater impacts.
96. While the Commission recognises that the Applicant has an Approved Project, in a de facto sense the Project site functions as a greenfield coal development. It believes that special attention should be paid to ensuring that any proposed water monitoring and management conforms to 2018 expectations rather than those deemed applicable and acceptable for the Approved Project in 2014.
97. While the Department considered that the predictions of the groundwater model are sound and that the Project would have no significant impacts to groundwater resources, the Commission considers that there is a level of uncertainty regarding the modelling and predictions and considers that additional information would likely be necessary in order to determine whether the groundwater predictions are sound, and whether the impacts will be insignificant to other groundwater users.
98. The Commission observes that the Preliminary Response to Submissions does not appear to address some of the concerns raised by the IESC about the transient modelling of groundwater. These concerns include the uncertainty of the transient predictions for:
 - evidence of the satisfactory transient performance of the model in the region of the northern borefield;
 - the time varying impact of the borefield; and
 - the time varying impact of the drawdowns in the deeper fractured rock caused by the pit.
99. The Commission considers that an issue requiring consideration by the Department is whether the groundwater reports provided by the Applicant and the independent expert reports should make a clearer distinction between the alluvial aquifers (primarily the Narrabri and Gunnedah formations) and the deeper fractured rock aquifers and associated aquicludes. That they are distinct is acknowledged by the Applicant's report (see paragraphs 66 and 70) but the impact assessments do not clearly distinguish the impacts on the two systems, nor how they potentially do, or do not, interact. The Department should consider whether the groundwater reports and available Additional Material clearly indicate:
 - the geology and hydrogeology inputs to the model (e.g. aquifer thicknesses, hydraulic conductivity, storativity), how they were determined (including the evidence for this determination) and sensitivity studies indicating the impacts of uncertainties in their determination;
 - a better definition of the borefield well geometry (e.g. screened depths relative to the stratigraphy in the model, as well as the stratigraphy observed in the field) to allow an assessment of impacts in the targeted aquifers, the role of aquicludes in localising

those impacts to the targeted aquifers, and the implications of any interconnection between the targeted aquifers and the surface (e.g. the alluvials both east and west of the Namoi, and the Driggle Draggie Creek);

- the role of aquicludes, interburden and coal seams in the interconnection between the alluvials and the deeper impacted aquifers;
- the impact on each of the adjacent water sharing plan catchments, both during the operation and post-mining phases;
- predictions for both the operational life of the mine and the post-mining period up until the pit lakes and the surrounding connected groundwaters stabilise (the current EIS states 300 years for the stabilisation of the pit lake water levels, but this time may change if the final void geometry is changed as in the Response to Submissions);
- all possible pathways for groundwater that may flow offsite that has contacted disturbed material (either the western bund or emplaced spoil) both during operation and post-mining;
- the water quality of the groundwater and the implications for offsite groundwater and surface water; and
- the transient calibration of the groundwater model, which in the Commission's view needs to be improved. Currently the calibration and validation of the model shows groundwater levels in the model not changing with time (e.g. MW3, MW7, GW01 and GW044997), or in two cases having an opposite trend with time to that observed (e.g. VNW223, GW11). As a result, Figure 42 in Appendix A is a spurious correlation with the transients for many individual wells falling on a horizontal line (i.e. a model that does change in time even though the observations do change with time). The Applicant needs to justify why this is a satisfactory transient model calibration and, therefore, why the current transient predictions of the model are reliable.

100. The Commission considers that the monitoring of groundwater analytes provided by the Applicant at the supplementary meeting, held 25 February 2019, is likely adequate for the Department's purposes.

101. Based on the Commission's observations, as listed in paragraphs 94 to 100, the Commission considers that the Department should give detailed consideration to:

- the Applicant's groundwater model and surface water assessment, including by reference to the information requirements highlighted by government agencies and the IESC and Additional Material provided by the Applicant to the Commission. The Department may wish to consider obtaining further information from the Applicant in this regard, including a meaningful discussion of the impacts of both the Approved Project and the Project;
- the adequacy of the Applicant's justification and costing of a no void option for consideration. The justification should reflect the requirements in the EP&A Act to ensure intergenerational equity and should appropriately incorporate the cost of the long-term management of the void, including the loss of the water resources to the void;
- the Applicant's consideration of long-term groundwater and water quality models for a no void option to assess the potential impacts of groundwater flow through such a rehabilitated Project site;
- post-mining studies, which should provide details of the groundwater flows to the east of the site and how they interact with drawdowns from the Rocglen Mine site including any potential impacts on the water sharing plan catchment to the east;
- a more extensive sensitivity study of the groundwater model be undertaken by the

- Applicant, or any explanation be given by the Applicant for its absence;
- the provision of maps that illustrate the potential distribution of GDEs, as indicated by the IESC in paragraph 84; and
- a risk analysis as indicated by the IESC in paragraph 84.

3.4 Surface Water and Flooding

102. During the Department's exhibition of the Project, potential impacts to surface water resources were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential surface water and flooding impacts of the Project, as referred to in paragraph 28.

3.4.1 Existing Environment

103. The EIS provides an overview of the existing environment in which the Project is proposed. The Project mining area is located within the Lower Namoi Regulated River Water Source under the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016*. The Namoi River is located to the north, west and south of the Project mining area.

104. The Namoi River adjacent to the Project area is characterised by a 50 m to 70 m wide meandering main channel, with a terraced floodplain, the lower terrace of which is between 500 m to 1.2 km wide.

105. The Project is partially within the extent of the gazetted *Carroll to Boggabri Floodplain Management Plan September 2006* (Carroll to Boggabri FMP) area. OEH and DoI Water have developed a Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain (draft FMP). The draft FMP contains rules to coordinate the approval of new flood works or amendments to existing flood works in a similar manner to the existing FMP. The rules have been defined for a number of management zones that represent different hydraulic and ecological regions across the floodplain. The management zones have been defined in accordance with Clause 41A of the *Water Management (General) Regulation (2011)*.

3.4.2 Modelling and Predictions

106. As part of the EIS, a Surface Water Assessment (**SWA**) undertaken by Advisian and peer reviewed by Emeritus Professor Tom McMahon considered the requirements of the *Water Sharing Plan for the Upper Namoi and Lower Namoi Regulated River Water Sources 2016 and Alluvial Water Sources 2012*.

107. The EIS states that water quality of the Namoi River is generally characterised by moderate alkalinity, has elevated electrical conductivity (**EC**) levels and elevated total nitrogen and total phosphorous concentrations (relative to the Australian and New Zealand Environmental and Conservation Council (**ANZECC**) guideline trigger values for aquatic ecosystems).

108. The SWA considered the impact of the Project on the catchments of the Namoi River and its tributaries impacted by the Project, compared to the impacts from the Approved Project.

109. The SWA predicted that the maximum change in catchment of the Namoi River over the

life of the Project would be a 0.07% reduction. The reduction to the Namoi River catchment of the Approved Project was 0.02%.

110. Post-mining, the final void will remain permanently removed from the Namoi Surface Water Catchment, resulting in a reduction of approximately 250 ha or 0.01% of the Naomi catchment.
111. The SWA predicted that the salinity of the final void lake would continue to increase to approximately 10,000 mg/L under higher rainfall scenarios, and significantly greater than 10,000 mg/L under lower rainfall scenarios.
112. Flood modelling was undertaken as part of the EIS and documented in the Flood Assessment (FA).
113. The FA assessed the impacts of the Project on the Namoi floodplain, particularly the impacts of the mining landforms, levees around the secondary infrastructure area in the south-east corner of the Project area and the Project rail spur, which crosses the Namoi River floodplain.
114. Modelling was undertaken for the 20%, 5% and 1% Annual Exceedance Probability (AEP) flood events.
115. The FA states that the impact of the Project rail spur on peak flood levels and velocities will be:

“the flood level and velocity impacts for the 20% (small event) and 5% AEP (large event) are small and generally confined to Whitehaven owned land. There are no flood level impacts at the Kamilaroi Highway or at dwellings for these events.”

“with respect to the 1% AEP event, the impacts on flood level dissipates to zero within 1.5 km upstream of the Project rail spur. The impact at the Project rail spur is up to 0.3 m for the 1% AEP event within the Whitehaven owned land and not in the close vicinity of the high infrastructure. Peak 1% AEP flood levels on the Kamilaroi Highway increase by up to 0.1 m. However, Kamilaroi Highway is already inundated by up to 1 m for this event and is therefore impassable.”

“the distribution of flow across the floodplain is not significantly altered by the Project rail spur.”

3.4.3 Public Submissions

116. During the Department’s exhibition of the Project, potential impacts to surface water resources, including the proximity to the floodplain, were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing, and received written submissions, regarding the potential impacts of the Project to surface water resources and flooding and the incomplete assessment of impacts provided in the EIS, as referred to in paragraph 28.
117. Speakers at the initial public hearing stated:

“It concerns me that Whitehaven can blankly say the whole project will have no notable effect on the flood plain, the Namoi River and our underground water system. The models

that they provide are only as good as the information they put into them, which answers to how the models to comply with standards, and not to mention the averages and assumptions used to make the data favourable for Whitehaven.”

“I’m here to state that I support the Vickery Extension with the insurances [sic] that the Namoi River, underground aquifers and neighbours remain unaffected.”

“This is an already over-allocated system and the river is already losing something like 19 gigitalitres a year to ground water because of ground water extraction so surface water is a serious constraint. It’s important for this project because 60 per cent of the water in the water balance over the life of this mine supplied to this project is going to be coming from captured runoff on the mine site; another 18 and a half per cent from the river itself. Our contention is that the Applicant doesn’t hold sufficient surface water licences to account for that capture of that runoff and it would be very difficult for them to obtain that.”

3.4.4 The Department and Government Agency Submissions – Surface Water

118. The Department’s PIR commented that the issues, *“raised by the agencies and independent expert are likely able to be managed through additional consideration of the disturbed runoff water system, and the sizing of the project’s sediment basins. Nonetheless, the Department agrees that additional consideration is warranted to address the matters raised by Mr Giles and relevant government authorities.”*

119. The Department’s Independent Surface Water Review provided a desktop review of the surface water assessment included in the Applicant’s EIS. The Surface Water Review concluded:

“The review determined that the parameters and methodology adopted for the modelling of surface water are appropriate. The results obtained from the modelling can be used to consider the water balance of the mine and the likelihood of discharges occurring from the mine to receiving downstream watercourses.”

“However, the assessment is considered to be deficient in relation to its consideration of existing water quality, and the potential for discharge from the site to adversely impact on local water quality.”

The assessment presents the results of water quality sampling conducted in the region. The available water quality data is considered to be insufficient for the purpose of providing an understanding of existing water quality. Specifically, insufficient data has been collected to define the quality of water in the watercourses downstream of the site.”

“The modelling suggests that the salinity of the stored water would increase over time as a result of groundwater inflow. While the increase in salinity would occur over hundreds of years, the level of salinity is of concern. It is therefore recommended that options for reducing salinity (primarily filling the void) be considered.”

120. The submission from DoI Water, dated 26 October 2018, recommended that the Department seek additional information prior to determining the Project. Regarding surface water resources, the identified additional information included:

“It is noted that surface water quality monitoring undertaken by the Applicant indicates that

current water quality may exceed the default trigger levels for the ANZECC guidelines. Site specific triggers for surface water quality should be developed to address these characteristics.”

121. The IESC reviewed the Project’s surface water impacts. In its advice on the Project, dated 14 November 2018, the IESC stated:

“Additional calculations should then be undertaken examining the range of salt loads and discharge volumes which could occur in the receiving environment (e.g. the Namoi River) during leakage. This information is needed to understand if changes to water quality within the receiving environment will always be within the minimal impact considerations of the NSW Aquifer Interference Policy.

Further information on the use of chemical dust suppressants should be provided and considered in the project risk assessment. This would include the proposed chemicals, typical application rates, and an assessment of the chemicals including the likelihood that they will enter the environment (e.g. soil, groundwater or surface water) and the potential persistence and toxicity of these chemicals or their breakdown product.”

3.4.5 Additional Material – Surface Water

122. In response to the Department’s PIR as noted in paragraphs 118 and 119, in its presentation to the Commission on 25 February, and in its Preliminary Response to Submissions, dated 7 March 2019, the Applicant addressed a number of surface water issues including receiving environment water quality, sediment dam design criteria, controlled releases and overflows, contemporary licensing of sediment dams in EPLs and peer review recommendations.

123. In response to the Department’s independent peer reviewer, Martin Giles of BMT, the Applicant stated:

“...recommended a water quality monitoring program be implemented for the Project sediment dams to confirm potential impact to downstream watercourses.”

“In addition, it was recommended that the design capacity of the sediment dams be increased beyond standard practice (i.e. Landcom [2004]), to further reduce the frequency of controlled discharges and overflows.”

“Whitehaven will consider the above recommendations as part of the Response to Submissions and Project operations and will incorporate them into the Project Water Management Plan, where appropriate.”

124. The Applicant, in its Preliminary Response to Submissions, dated 7 March 2019, responded to agency comments on surface water impacts, trigger values for release, worst case climate conditions and the parameter suite for surface water monitoring.

3.4.6 The Department and Government Agency Submissions – Flooding

125. The Department in its PIR, notes the consideration of its independent flooding expert, Erin Askew of WMA Water. Ms Askew considered that the Applicant’s assessment was undertaken generally in accordance with best practice and the draft *Floodplain Management Plan for the Upper Namoi Valley*. The Department’s PIR further states:

“Ms Askew considers that some aspects of assessment are not adequately documented and/or addressed, and has recommended additional information be provided on a number of matters to confirm and clarify the conclusions. This includes further detail on components of the project rail spur and associated culverts, bridges and embankments, and the method applied within the flood model to assess these components. However, little detail on this structure is provided in the EIS, including details of where embankments and culverts might be required.”

126. Further the Department states in the PIR:

“Ms Askew also recommended further discussion to confirm the consistency of the project with the draft FMP criteria, including flow redistribution on individual properties, which is a key issue for adjacent landholders.”

127. The submission from DoI Water, dated 26 October 2018, recommended that the Department seek additional information in its assessment of the Project. Regarding flooding, the identified additional information included:

“The flood assessment provided to assess impacts of the rail spur and the levees in the south-east of the project predicts the impacts on flood levels, velocity and distribution to comply with the Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain 2016. Increases of up to 20% in flow velocity is predicted in the vicinity of the rail spur which has the potential to result in erosion of the floodplain and the watercourses. This will need to be mitigated through appropriate controls or modification of the design.”

“It appears there is a requirement for a diversion of approximately 500m of South Creek near its confluence with Stratford Creek. An assessment of the impacts of the loss of this section of creek and a proposal to establish a diversion are not adequately addressed in the EIS.”

“The rail spur near the Namoi River is in close proximity to an actively eroding river bend. This represents a risk into the future of potential undermining of infrastructure that needs to be considered and planned for.”

3.4.7 Additional Material – Flooding

128. In response to the Department’s PIR as noted in paragraphs 125 and 126 , in its meeting with the Commission on 25 February, and in its Preliminary Response to Submissions, dated 7 March 2019 the Applicant addressed a number of flooding concerns as raised by Ms Askew.

129. Specifically, the Applicant stated:

“the objective of the flood modelling included in the EIS was to demonstrate that the proposed location of the Project rail spur would comply with the design objectives of the Draft Floodplain Management Plan for the Upper Namoi Valley Floodplain 2016 (Draft FMP) and the Carroll to Boggabri Floodplain Management Plan 2006 (Department of Natural Resources, 2006) (FMP), which includes impacts to flood levels, velocities and distributions on privately-owned land.”

“initial conceptual design decisions involved elevating the Project rail spur above predicted

flood levels (i.e. a superstructure supported on either pylon-like structures or in-filled embankment sections) and conceptually locating openings to provide for minimal impact to existing flooding regimes. Proceeding with a conceptual design involved an iterative approach during flood modelling, whereby the distribution of openings under the superstructure of the Project rail spur was adjusted to achieve consistency with the Draft RMP (Figure 1).”

“It is noted the objectives of the FMP and draft FMP relevant to privately-owned land are for “large design floods”, which approximate the 1 in 20 year (i.e. 5% AEP) flood event. Therefore, the Project rail spur conceptual design, which includes the provision to elevate the superstructure above the 1 in 100 year (i.e. 1% AEP) flood level, is considered to be conservative and prevents impacts for flood events well above what is required by the FMP and draft FMP.”

“Consistent with industry best practice, following determination of the Project, Whitehaven will engage suitably qualified and experienced infrastructure design and construction contractors to identify the most appropriate design of the Project rail spur, in consideration of structural adequacy, constructability, cost efficiency and potential flood impacts. Whitehaven will provide DPE and OEH with the final detailed rail spur design and updated flood assessment results to confirm compliance with the objective of the Draft FMP.”

130. The Applicant, in its Preliminary Response to Submissions, dated 7 March 2019, responded to DoI Water’s comments and recommendations, which are noted in paragraph 127, covering aspects such as impact of the rail line on flow distribution, cumulative impacts and potential erosion.

3.4.8 Commission’s Observations

131. As set out in paragraphs 116 to 117, the Commission recognises the high level of community concern regarding the security and protection of surface water resources and the incremental impacts on flooding. This concern was expressed by some people who spoke in support of the Project, who caveated this support with the assumption that the impacts, and impacts to surface water resources, would be minimal and effectively managed and regulated by the Applicant and relevant government agencies.
132. The Commission notes that the extent of outstanding information regarding the assessment and management of surface water impacts was a consistent theme raised by the relevant government agencies and included in public submissions.
133. As referred to in paragraph 96, while the Commission recognises that the Applicant has an approved project, in a de facto sense the Project site functions as a greenfield coal development. Special attention should be paid to ensuring that any proposed water monitoring and management conforms to 2018 expectations rather than those deemed applicable and acceptable for the smaller project in 2014.
134. The Department should consider whether the Applicant should carry out a formal quantitative risk assessment (**QRA**) of potential failures of the sediment and retention dams (i.e. discharges from them to off-site). The Commission notes in this context that the Applicant claims the site is a no-discharge site but then proceeds to discuss management options for discharges that they estimate will be needed about once a year.

135. The Commission notes that water quality sampling data presented in the Surface Water Assessment is of limited use because it only presents an overview of receiving stream characteristics for a narrow range of parameters. Accordingly, in the Commission's view, the Department in its assessment should consider whether it would be appropriate for the Applicant to commit to a water quality monitoring program for water contained in sediment basins and other mine storages that includes a full range of analytes that will aid in its meeting discharge standards consistent with the quality of target watercourses and, by pre-commencement monitoring, set up appropriate trigger values for acceptable discharge.
136. The Commission considers that the Department should also give detailed consideration to how the Applicant proposes to ensure that the walls of sedimentation dams and other site water storages are constructed to the appropriate standard of impermeability, to prevent water from seeping through the walls of the dams and exiting the Project area.
137. The Commission considers that the monitoring of groundwater analytes provided by the Applicant at the supplementary meeting, held 25 February 2019, is likely to be adequate for the Department's purposes.
138. The Department may wish to consider whether a flood study should be performed for the newly proposed all-viaduct rail solution indicating the incremental impact on flood levels up to and including 1% AEP floods (or the 1955 flood which is generally considered to be equivalent to the 1% AEP flood).
- the study could be performed for the Namoi, Stratford and South Creeks alone, and also for the combination of them occurring simultaneously unless the Applicant can show that the extreme floods on the smaller tributaries are not embedded in the storms that cause the larger floods in the Namoi;
 - this flood study could also be carried out for any alternative infrastructure options suggested elsewhere in this report (e. g. CHPP in the SE corner, and any other location option investigated);
 - the flood studies around the rail loader, final void, and CHPP which were done using an empirical factor for the probable maximum flood (PMF) estimating the PMF discharge to be 3 x the 1% AEP flood could instead be done using either (1) the GSDM method for PMF estimation developed by the Bureau of Meteorology or (2) the PMF methodology recommended in Australian Rainfall and Runoff; and
 - a QRA of the off-site water quality consequences of flood exceedances of the on-site infrastructure (i.e. dams, stockpiles, CHPP) could be carried out.
139. Based on the Commission's observations, as listed in paragraphs 131 to 138, and the Additional Material now available, the Commission considers that the Department should give detailed consideration to:
- how the Applicant proposes to ensure that the walls of sedimentation dams and other site water storages are constructed to the appropriate standard of impermeability;
 - the commitment of the Applicant to an appropriate water quality monitoring program for water contained in sediment basins and other mine storages. Detail of any such program should include whether it includes a full range of analytes, including those outlined in paragraph 137, that will aid in its meeting discharge standards consistently with the quality of target watercourses and, by pre-commencement monitoring, sets up appropriate trigger values for acceptable discharge;
 - whether the flood study could be performed for the Namoi, Stratford and South Creeks alone, and also for the combination of them occurring simultaneously unless

- the Applicant can show that the extreme floods on the smaller tributaries are not embedded in the storms that cause the larger floods in the Namoi;
- whether this flood study could also be carried out for any alternative infrastructure options suggested elsewhere in this report (e.g. CHPP in the SE corner, and any other location option investigated);
 - whether the flood studies around the rail loader, final void, and CHPP which were done using an empirical factor for the probable maximum flood (PMF) estimating the PMF discharge to be 3 x the 1% AEP flood could instead be done using either:
 - the GSDM method for PMF estimation developed by the Bureau of Meteorology; or
 - the PMF methodology recommended in Australian Rainfall and Runoff; and
 - whether a QRA of the off-site water quality consequences of flood exceedances of the on-site infrastructure (i.e. dams, stockpiles, CHPP) could be carried out.

3.5 Water Balance

3.5.1 Public Submissions

140. The Commission heard concerns from speakers at the initial public hearing and received written submissions regarding the Project's water balance. Specifically, a representative of Namoi Water stated:

"We have over 800 members, who use both surface water and groundwater for agricultural purposes. Our members generate a revenue in excess of \$800 million per annum; the majority of these, more than 90 per cent, are family farming operations. This production is solely possible due to the secure supply of high quality water. Our members have experienced over two decades of painful water reforms that, in some cases, have forced people out of agriculture altogether. In the last few years, we've seen farmers in this region, on average, lose 50 per cent of the entitlements that they had paid for and planned their farming around.

We find it galling to hear that Whitehaven claims repeatedly that they only use one to two per cent of the water in the Namoi Valley. This is untrue, in reality. Whitehaven Coal own 3000 megalitre high-security licence for the Namoi River, plus considerable ground general-security water. After water flows into the river, entitlements are allocated, first and foremost, to essential supplies, such as town water needs, and also to high-security water licence holders. It's then allocated also 10 for transmission losses, where water is absorbed into the river when it's put down and it – in dry conditions. What's left over is divvied up for general-security licence holders.

Whitehaven owns 88 per cent of all the high-security licences in the valley. They get their water first. The total entitlements for the river is 248,000 megalitres, but the majority of these are general-security licence holders who rarely get their full allocation. Over the last 10 years, the mining industry use of the Namoi water resources was, on average, eight per cent of the total water take each year. In this year that we're in currently, they're taken 12 per cent of the river resource. This excludes the surface water that is captured on the mine site which no longer flows to the river and no longer recharges groundwater systems. Furthermore, as Whitehaven is limited by the amount of water that they can store on site, they incur increased transmission losses, as they can demand water out of irrigation season when the river system is dry. So if, like in 2015 – and Whitehaven needed 300 megalitres of water out of irrigation season, to get this to them, it cost the system 3000 megalitres of water."

141. Additionally, a representative from the Lock the Gate Alliance stated:

"It's important for this project because 60 per cent of the water in the water balance of the life of this mine supplied to this project is going to be coming from captured runoff on the site; another 18 and a half per cent from the river itself. Our contention is that the proponent doesn't hold sufficient surface water licences to account for that capture of that runoff and it would be very difficult for them to obtain that. The proponent claims that its exempt from requiring - from having to have a licence to account for that water take, citing their harvestable right under the Water Management Act. But the exemption that they cite is an exemption to the harvestable right calculation, the size of the dam calculation."

3.5.2 The Commission's Observations

142. The Commission notes that having sufficient water for the Project during operation is dependent on the water access licence that the Applicant has acquired. The NSW Water Allocations Dashboard¹ indicates that since 2004 there have been periods of several years where general security water extraction licences have been restricted (generally 1 share is equivalent to 1ML/year). For instance, in 2007 general security licences for the Namoi Regulated Source were restricted to 0.25ML/year. This may have two implications for the Department's assessment:

- it is important to know what the water source is that the licence held by the applicant is for access to (e.g. Zone 4 groundwater, Upper Namoi Regulated, etc); and
- it is important to know what the reliability of access to that water allocation may be during dry periods. The Applicant currently appears to assume 1ML/year per share no matter whether it is drought or flood.

143. Based on the Commission's observations, as listed in paragraphs 131 to 138 and Additional Material now available, the Commission considers that the Department should give detailed consideration to:

- the water balance for the Project site while operational and whether the Applicant holds sufficient water extraction licences in the event of restrictions on extraction during drought, as has occurred in the Zone 4 alluvial aquifers and Namoi River in the past, and methods for addressing any water shortfall; and
- a water balance model for the two final void lakes, which should include an assessment of the uncertainties in inflow rates, infiltration, evaporation, and sensitivity studies of the long-term trajectory to equilibrium (i.e. duration of recovery, salinity trends, rate of lake rise relative to groundwater recovery rates).

3.6 Noise and Blasting

144. The EIS included a Noise and Blasting Assessment (**NBA**), prepared by Wilkinson Murray, dated August 2018. The NBA included predictions of what the Applicant believed to be the potential 'worst case' noise levels at privately-owned residences, and an evaluation of the potential amenity impacts of these noise levels.

145. The NBA was undertaken in accordance with the *NSW Noise Policy for Industry (NPI)*, *NSW Road Noise Policy*, *Rail Infrastructure Noise Guidelines (RING)* and included consideration of the Department's VLAMP.

¹ <https://www.industry.nsw.gov.au/water/allocations-availability/allocations/dashboard>

3.6.1 Existing noise environment

146. The NBA undertook a background noise survey to establish the background noise levels that would be used to define the Project Noise Trigger Levels. This work was undertaken by Wilkinson Murray in 2011 as part of the noise and blasting assessment for the Approved Project.
147. The NBA states that based on the background noise survey the Rating Background Levels (RBLs) of 35 dBA, 30 dBA, and 30 dBA (i.e. the most conservatively low RBLs possible in accordance with the NPI) were adopted for the day, evening and night periods, respectively. However, the NBA acknowledged that these levels are higher than background levels measured at several sensitive receivers.

3.6.2 Project Noise Trigger Levels

148. Under the NPI, Project Noise Trigger Levels are the lower (i.e. more stringent) of the Project Intrusiveness Noise Level and Project Amenity Noise Levels. **Table 2** below, from the NBA, outlines the Project Noise Trigger Levels, along with the Project Intrusiveness Noise Level and Project Amenity Noise Levels.

Table 2: Project Noise Trigger Levels (Source: Noise and Blasting Assessment)

Trigger Level	Day	Evening	Night Time
Project Intrusiveness Noise Levels	40 LAeq,15min (dBA)	35 LAeq,15min (dBA)	35 LAeq,15min (dBA)
Project Amenity Noise Levels	48 LAeq,15min (dBA)	43 LAeq,15min (dBA)	38 LAeq,15min (dBA)
Project Noise Trigger Levels	40 LAeq,15min (dBA)	35 LAeq,15min (dBA)	35 LAeq,15min (dBA)

Notes:

Day: the period from 7.00 am to 6.00 pm.

Evening: the period from 6.00 pm to 10.00 pm.

Night: the period from 10.00 pm to 7.00 am.

3.6.3 Noise Modelling

149. The EIS states that three scenarios were modelled to assess the potential noise impacts over the Project's operational duration. These are:
- *“Project Year 3 – considers mining operations in the north-west and central portions of the open cut; and waste rock emplacement at the Western Emplacement. The acoustic centre of the mining operations considered in this scenario is closest to the west and north-west receivers. Although this scenario would use a reduced fleet (compared with subsequent scenarios with increased waste rock and ROM coal mining sites), shielding by the Western Emplacement would also be reduced (compared with subsequent scenarios);*
 - *Project Year 7 – considers mining operations in the eastern portion of the open cut; and waste rock emplacement at the Western Emplacement. The acoustic centre of the mining operations considered in this scenario is closest to the east and north-east receivers; and*
 - *Project Year 21 – considers mining operations in the southern portion of the open cut. The acoustic centre of the mining operations considered in this scenario is closest to the south, south-west and south-east receivers.”*

150. The Commission notes that these are the same three years modelled in the air quality assessment.
151. The Commission notes that the modelling scenarios are based on the operational extraction rates and location of extraction within the mining area, as described in paragraph 149. The Commission notes that there are other years that have similar levels of operational intensity and proximity to sensitive receivers.
152. The Commission noted that the modelling contained within the NBA does not explicitly model noise generated from the CHPP.

3.6.4 Construction Noise

153. The NBA assessed construction noise, specifically the two major construction activities that were identified as having potential for intrusive noise along with the expected durations. These are:
 - construction of the mine infrastructure area (duration of approximately 12 months); and
 - construction of the rail loop (duration of approximately 12 months).
154. The NBA states that construction activities would generally be undertaken between the hours of 7:00 am and 6:00 pm Monday to Sunday (inclusive).
155. Standard construction hours set out in the ICNG are Monday to Friday between 7:00 am and 6:00 pm and Saturday between 8:00 am and 1:00 pm.
156. The Commission notes that no information has been provided which details the reduction in the overall construction timeframe through the use of the extended construction hours, rather than the standard construction hours set out in the ICNG and noted in paragraph 155.
157. The NBA states the rail spur:

“would involve bridges and an elevated section of rail line. Construction of the rail spur would have multiple working areas occurring simultaneously, including the two bridge sites and three work fronts outside the bridge sections (approximately 3 km apart).”

“The construction phase with the highest potential for noise impacts on the surrounding community is expected to be crainage of pre-fabricated sections. During that phase, the construction fleet for a bridge section would generally comprise of two mobile cranes, two trucks, and one excavator. For a viaduct work area, the fleet would generally comprise of two mobile cranes and two trucks.”

“The total SWL for a bridge site is estimated to be 115 dBA, while the total SWL for the viaduct section areas is estimated to be 113 dBA. A correction of -3 dB was applied to the total sound power lever of both construction components to account for time correction, as the construction fleet would not always operate concurrently.”

158. The NBA predicted noise levels for the construction of the rail spur are within the INCG's 'Noise Affected' Management Level for recommended standard hours. **Table 3** below shows the predicted noise levels for both privately-owned and mine-owned residences.

Table 3: Predicted Noise Level - Rail Spur Construction (Source: Noise and Blasting Assessment)

Receiver ID	Predicted LAeq,15min Noise Level (dBA)	Interim Construction Noise Guideline 'Noise Affected Management Level LAeq,15 min (dBA) – Recommended Standard Hours
Privately-owned Dwellings		
127c	35	45
131a	33	45
131b	37	45
132	40	45
133a	25	45
141	37	45
143	29	45
144a	36	45
144b	42	45
146a	34	45
146b	34	45
147a	25	45
147b	10	45
153	25	45
160	14	45
Mine-owned Dwellings		
1af	21	45
1v	47	45
1w	43	45
1y	46	45
1z	30	45

159. The NBA notes that:

“assessment of the potential for noise impacts from construction associated with the rail spur indicates that construction noise levels would comply with the ICNG ‘noise affected’ level during standard hours at all receivers and may exceed the ‘noise affected’ level only outside the recommended standard hours (e.g. Saturday afternoon and Sunday daytime) at privately-owned receivers 132 and 144b. Construction noise levels would be managed to comply with the ‘noise affected’ level at the approved dwelling location on property 144 (if the approved dwelling was construction prior to construction of the rail spur). During construction actual noise impacts at the receivers would be monitored.”

160. The Commission notes that while the predicted noise levels are within the criteria set out within the ICNG, the levels are close to the ‘Noise Affected’ criteria levels of 45 dBA for two residences, namely Property ID 132 and Property ID144.

161. The Commission notes that there is a DA approved residential site on property 144 (Property ID 144b). The Commission has concerns that if a residential dwelling is built at

this location, the noise levels may exceed the ‘Noise Affected’ criteria levels. The Commission acknowledges that the Applicant has committed to managing noise at the approved dwelling location on property 144, as stated in paragraph 159.

3.6.5 Operational noise impacts

162. As noted in paragraph 149, three different years were modelled in the NBA.
163. This modelling predicted that there would be exceedances at five privately-owned residents in Year 21, being receivers 127b; 127c; 131a; 131b; and 132. In Year 7 exceedances would be experienced at four of those five receivers, including 127b; 127c; 131a and 131b, while in Year 3 exceedances would be experienced at receivers 127b; 127c and 131a. These exceedances are between 1 – 7 dBA.
164. The Commission notes that receivers 127a, 127b and 12c have existing acquisition rights under the Development Consent for the Approved Project.
165. As noted in section 3.8 Project Infrastructure Area section of this report at paragraphs 223 to 242, the close proximity of the proposed CHPP, rail load out facility and rail spur to private and mine-owned properties would have operational noise and air quality impacts. These are addressed in section 3.8 Project Infrastructure Area section.

3.6.6 Blasting

166. The NBA included an assessment of the Project’s blasting impacts, including the potential ground vibration, airblast overpressure and fly rock impacts of the Project’s blasting events on nearby sensitive receivers.
167. The Applicant proposes that blasting activities would typically be five blasts per week, however up to six blasts a week in some locations is possible.
168. The NBA notes that the EPA guideline refers to the following human annoyance criteria for blasting for any privately-owned receivers or other sensitive locations:
- *“minimum overpressure due to blasting should not exceed 115 dB for more than 5% of blasts in any year, and should not exceed 120 dB for any blast; and*
 - *maximum peak particle ground velocity should not exceed 5 mm/s for more than 5% of blasts in any year, and should not exceed 10 mm/s for any blast.”*
169. The NBA predicted overpressures and vibration impacts on nearby receivers resulting from blasting within the Project open cut. **Table 4** below from the NBA:

“indicates the range of 5% exceedance overpressure and ground vibration levels expected at the nearest residences. These include mine-owned residences and privately-owned residences. The 5% exceedance levels are the levels that should be compared to the 5% exceedance criteria of 115 dBLinear (dBL) for overpressure and 5 mm/s for vibration. Peak or maximum blasting levels are not presented because these levels are typically caused by geological or blasting anomalies, which are unpredictable.”

Table 4: Predicted Overpressure & Vibration ⁽¹⁾ Levels Resulting from Blasting within Project Open Cut (5% Exceedance Levels) (Source: Noise and Blasting Assessment)

Rec ID	Direction	Peak Overpressure (dBL)	PPV Ground Vibration (mm/s)
Privately-owned Dwellings			

Rec ID	Direction	Peak Overpressure (dBL)	PPV Ground Vibration (mm/s)
Rec 67	North-East	111.2 to 111.3	0.3 to 0.6
Rec 98	East	111.1 to 112.1	0.5 to 1.3
Rec 108a	South-East	111.1 to 112.4	0.4 to 1.4
Rec 127a ⁽²⁾	West	111.2 to 113.0	0.7 to 1.8
Rec 127b ⁽²⁾	West	111.6 to 114.7	1.0 to 3.1
Rec 127c ^(2, 3)	South-West	111.4 to 115.0	0.8 to 3.5
Mine-owned Dwellings			
Rec 1ad	North	111.4 to 119.3	0.8 to 8.4
Rec 1ae	North	111.4 to 117.3	0.8 to 5.7
Rec 1f	North-West	111.2 to 116.9	0.6 to 5.2
Rec 1g	East	111.2 to 111.9	0.5 to 1.2
Rec 1l	East	111.3 to 114.5	0.7 to 3.0
Rec 1t	North	111.2 to 115.2	0.6 to 3.6
Rec 1u	West	111.3 to 113.9	0.7 to 2.5
Rec 1v (Kurrumbede Homestead)	South-West	111.5 to 120.2	0.9 to 9.7
Rec 1x	North	111.5 to 124.6	0.9 to 18.8
Rec 88	North-West	111.2 to 111.8	0.4 to 1.1

Notes:

1. Overpressure and ground vibration levels likely to result from indicative blasts for an open cut coal mine.
2. Whitehaven has been in dialogue with the owner of this property regarding entering into a potential noise agreement. In addition, the owner of this property has the right to acquisition upon request in Development Consent (SSD-5000) for the Approved Project.
3. Overpressure and ground vibration levels predicted for blasts at least 2,540 m from the receiver.

170. The NBA sets out overpressure and ground vibration criteria specific to the Kurrumbede Homestead (Property ID 1v). A vibration limit of 10 mm/s and airblast limit of 133 dB were adopted, based on the understanding that the structure is in good condition, and that the blasting will occur at a minimum distance of 1.235 km away.

171. The Commission notes that the overpressure and ground vibration criteria determined by the Applicant for the Kurrumbede Homestead (Property ID 1v) is less stringent than the EPA criteria for privately-owned residences. The Commission notes that Kurrumbede Homestead is a mine-owned residence, but a number of members of the public raised concerns in respect of its preservation. The Commission has concerns as to the potential damage that may result to Kurrumbede Homestead from blasting, given the less stringent criteria that the Application has set, as outlined in paragraph 170.

3.6.7 Public Submissions

172. During the Department's exhibition of the Project, potential noise impacts were raised as a significant concern in public submissions, as referred to in paragraph 16. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential noise impacts of the Project, including construction and operational noise, along with concerns about the noise modelling, as referred to in paragraph 28.

3.6.8 The Department and Government Agency Submissions

173. The Department's PIR notes that the:

- *“operational noise emissions would comply with applicable criteria (based on the EPA's Noise Policy for Industry) at all receivers (see Figure 11), apart from:*
 - *a significant impact (>5dBA exceedance) at one residence to the south-west of the project mining area and rail loop (Residence 127c), This residence is already predicted to be significantly impacted (and has acquisition rights) under the approval for the Approved Project;*
 - *moderate impacts (3 to 5dBA exceedance) at one residence on the same property (Residence 127b), which also has acquisition rights under the Approved Project; and*
 - *negligible impacts (1 to 2dBA exceedance) at three residences also located to the south-west of the project mining area (Residences 131a, 131b and 132);*
- *construction noise impacts would be largely consistent with the operational noise impacts, although construction of the project rail spur would exceed applicable noise management levels (based on EPA's Interim Construction Noise Guidelines) at two receivers (Residences 132 and 144b) for some construction activities; and*
- *sleep disturbance, rail noise and cumulative emissions would comply with applicable criteria.”*

174. The Department's PIR further notes that:

“the EPA and some other submitters questioned some of the inputs into the modelling, including the sound power levels used in the noise assessment, and emissions factors used in the air quality assessment. Some public submitters also questioned why predicted noise and dust levels are lower than the Approved Project, despite the project's increased size and additional infrastructure.”

175. The EPA in its submission, dated 18 October 2018, identified several issues with the NBA relating to Sound Power Levels, Low Frequency Correction, Cumulative Noise Impact Assessment, Sleep Disturbance Assessment – Impact of Horns, Rail Noise Impact Assessment and Cumulative Frequency of Occurrence Graphs.

176. Further the EPA in its submission, raised concerns relating to the proposed construction hours. Specifically, the EPA noted:

“noise from construction activities associated with mines is typically similar in character to noise from mining operations and is thus assessed as operational noise.”

“the EPA notes that construction activities are proposed to from Monday to Sunday during daytime hours, which is outside the ICNGs recommended standard hours of Monday to Friday 7am-6pm and Saturday 8am-1pm.”

“the EPA recommends that construction activities be carried out only during the ICNGs standard hours, unless adequate justification is provided in accordance with Section 2.3 of the ICNG.”

177. The EPA went on to say in relation to the rail noise impact assessment:

“The proponent [sic] assesses noise impacts from rail operations close to the project site under the Noise Policy for Industry (NPfI), and outside of this the Rail Infrastructure Noise

Guideline (RING) is applied in Section 7 of the NBA. The noise impacts at Rail Section 1 are stated as being low according to Table 7-4 of the NBA. The corresponding night time noise impacts in Rail Section 5 indicate that the impacts may be greater, increasing the compliance offset distance from 345m to 441m (a 27% increase). It is unclear how these differing impacts have been determined, and the proponent [sic] should review and clarify the rail noise impact assessment.”

3.6.9 Additional Material

178. The Applicant responded to concerns regarding the reduction in predicted noise levels in its 7 March 2019 response to the Department’s PIR. The Applicant noted that while operations increased, including the amount of mobile equipment, several mitigating factors are the reason for the reduction in the predicted noise levels. It also responded to concerns about the reduction Sound Power Levels (**SWLs**).

179. The Applicant stated that:

“while key aspects of the Project may appear likely to increase noise levels at sensitive receivers in comparison to the Approved Project (e.g. the mining rate and number of mobile equipment have increased and an on-site CHPP and train loading facility is proposed), the Project includes a number of improvements with regard to acoustic design.”
“In addition to design of the waste rock emplacement area, haul roads and mine progression direction to minimise noise impacts to key sensitive receivers, the Noise and Blasting Assessment also adopted indicative SWLs consistent with current leading practice mining equipment for noise performance (Section 5.5 of Appendix D of the EIS). As a result, while the total number of mobile equipment expected to be required for the Project has increased compared to the Approved Project, the total SWL has reduced.”

180. The Applicant responded to the EPA concerns, noted in paragraph 175, in its Preliminary Response to Submissions, dated 7 March 2019, stating that:

“the indicative sound power levels (SWLs) adopted in the Noise and Blasting Assessment (section 5.5 of Appendix D of the EIS) are representative of current practice mining equipment, as evidenced by noise performance monitoring from the Maules Creek Coal Mine and other mines in the region.”

181. The Applicant responded to the EPA’s comments about working outside the ICNG standard construction hours, as noted in paragraph 176, to the effect that the extension is justified to reduce the overall construction timeframe and hence the duration and impacts to receivers. The Applicant stated:

“construction activities outside standard hours (e.g. Saturday afternoon and Sunday) are considered justified as it would allow continuity of work for construction crews, reducing the length of the construction period and therefore the overall duration of potential impacts at receivers.”

182. Further the Applicant responded to the EPA’s concerns regarding the rail noise impact assessment, as noted in paragraph 177, stating that assessment relates to noise along the Werris Creek Mungindi Railway (the Main Line) and includes noise generated by “others” as the Main Line gets closer to Newcastle. Specifically, the Applicant states that:

“it is noted this comment relates to noise along the Werris Creek Mungindi Railway (the

Main Line) (i.e. not the Project rail spur). The rail noise assessment undertaken for the Project (Section 7 of Appendix D of the EIS) considers the increase in rail noise along five sections of the main line by comparing the number of rail movements with and without the Project. The number of 'other' movements (i.e. not Project-related) increases along the Main Line as it gets closer towards Newcastle.”

“The sections of the Main Line considered in the rail noise assessment were:

- Section 1 – Junction of the Main Line and Project Rail Spur to Whitehaven CHPP.
- Section 2 – Whitehaven CHPP to Junction with Watermark Spur.
- Section 3 – Junction of Watermark Spur to Junction with Werris Creek Mungindi Railway.
- Section 4 – Werris Creek Mungindi Railway to Main Northern Railway.
- Section 5 – Main Northern Railway to Muswellbrook Junction.”

183. At its 25 February 2019 meeting with the Commission and in the Additional Material, the Applicant responded to questions asked by the Commission that covered the following topics:

- whether the approach used in developing noise monitoring contours has given valid results for similar scenarios at other local mine sites;
- if the potential noise from the elevated rail spur can be ameliorated;
- what the modelling assumptions and outputs were, specifically in regard to comparing the Approved Project with the Project;
- details confirming the worst case scenarios modelled;
- modelling of staged infrastructure and handling coal from the Tarrawonga and Rocglen Mines;
- timing of overburden placement and worst-case noise emissions; and
- details of any further proposed mitigation measures.

3.6.10 Commission's Observations

184. The Commission notes that the modelling scenarios have been undertaken for three different years throughout the life of the Project, based on the operational extraction rates and location of extraction within the mining area, as described in paragraph 149. The Commission notes that there may be other years that have similar levels of operational intensity and proximity to sensitive receivers. The Commission acknowledges the additional information provided by the Applicant addressing this issue, however in the absence of noise modelling data for each year, considers it is not possible to confirm which years are predicted to experience elevated noise impacts.

185. The Commission notes that the construction hours proposed extend outside the ICNG recommended standard construction hours of 7:00 am and 6:00 pm Monday to Friday and 8:00 am and 1:00 pm Saturday. However, no specific details regarding the reduction in the construction timeframe have been provided to justify the extension of the construction hours.

186. The Commission notes that while Kurrumbede Homestead is a mine-owned residence, a number of members of the public raised concerns in respect of its preservation. The Commission has concerns as to the potential damage that may result to the Kurrumbede Homestead from blasting, given the less stringent criteria that the Application has set, as outlined in paragraph 170.

187. The Commission has considered the Material and Additional Material. Based on this consideration, the Commission makes the following observations at this stage:
- there is some concern regarding the noise modelling, particularly which specific range of years are predicted to generate higher noise impacts, given that the predicted noise levels at a number of privately-owned residences are very close to or exceed the allowable noise criteria;
 - the construction hours proposed exceed the allowable construction hours set out in the ICNG, with limited justification being given for the extended hours; and
 - there is uncertainty regarding the potential for impact to the Kurrumbede Homestead given the less stringent blasting criteria chosen.
188. Accordingly, the Commission considers that the Department should give detailed consideration to:
- the Applicant's demonstration of which years are the 'worst case' years for operations and any articulation of what impacts are predicted for nearby residents. Predicted noise emissions and impacts at sensitive receptors for all years of operation may be of assistance in this regard;
 - the Applicant's justification for the construction hours being beyond what is set out in the ICNG;
 - the Applicant's monitoring data of trains, both loaded and empty, travelling across the Maules Creek viaduct, which will provide the stakeholders with a sense of the noise level that could be expected from the project's viaduct. The Department should also give detailed consideration to noise modelling across the floodplain based on this monitoring data and other appropriate data for resonance emissions of the viaduct superstructure;
 - details on the investigation of noise and blast exceedances at Maules Creek, Rocglen and Tarrawonga Coal Mines in the past 5 years, including the findings of the investigations by the regulatory authorities; and
 - whether any of the recommendations made in the report summarising Whitehaven's 2016 Mandatory Noise Management Audit will be implemented on this Project; and
 - whether the blasting criteria determined for the Kurrumbede Homestead will protect the Homestead from damage due to blasting.

3.7 Air Quality

189. The Applicant's EIS was accompanied by an Air Quality and Greenhouse Gas Assessment prepared by Ramboll, dated February 2018, referred to as the Air Quality Impact Assessment (**AQIA**). The AQIA modelled the likely particulate matter and dust emissions generated by the Project. The AQIA relied on dispersion modelling to predict incremental (Project only) and cumulative (Project plus background where background includes nearby mines, specifically Maules Creek, Boggabri, Tarrawonga and Rocglen coal mines) emissions for three years over the life of the Project (Project Years 3, 7 and 21) at all surrounding sensitive receivers during worst case conditions.
190. The EIS states that there were three scenarios modelled to assess the potential air quality impacts, which are the same years used for noise modelling. These are:
- *“Project Year 3 – representative of initial operations (i.e. mining operations in the north-west and central portions of the open cut and waste rock emplacement at the Western Emplacement);*
 - *Project Year 7 – representative of ongoing operations (i.e. mining operations in the eastern portion of the open cut and waste rock emplacement at the Western*

- *Emplacement); and*
- *Project Year 21 – representative of ongoing operations (i.e. mining operations in the southern portion of the open cut.”*

3.7.1 Existing Environment

191. The Applicant's AQIA provides details on the existing air quality for the area. **Table 5** and **Table 6** below details the annual average PM₁₀ (i.e. particulate matter 10 micrometers or less in diameter) and PM_{2.5} (i.e. particulate matter 2.5 micrometres or less in diameter) concentrations and annual average dust depositions for the region, which were adopted as the background levels for the assessment.

Table 5: Annual average PM₁₀ and PM_{2.5} (Source: EIS)

Pollutant	2013	2014	2015	2016
PM10 concentration (µg/m ³)	12.0	13.8	9.6	12.5
PM2.5 concentration (µg/m ³)	5.3	4.6	4.1	5.3

Table 6: Annual average dust deposition (Source: EIS)

Site	2012	2013	2014	2015	2016
DDG1	1.0	0.9	1.8	2.5	2.3
DDG2	9.7	7.0	17.5	8.2	1.2
DDG3	1.7	1.7	1.8	1.2	0.8
V1	1.2	1.2	2.9	2.8	4.0
V2	0.6	0.8	1.2	1.0	0.6
V3	3.4	2.5	1.8	8.6	4.0
V4	1.7	2.1	0.9	4.3	2.1
V5	0.7	0.9	1.7	1.4	0.8
Average	2.5	2.1	3.7	3.7	2.0

3.7.2 Modelling and Predictions

192. The AQIA undertaken for the EIS assessed the air quality impacts for the Project in isolation, and the cumulative air quality impacts, resulting from the existing background air quality environment, mining at the Project and along with Maules Creek, Boggabri, Tarrawonga and Rocglen coal mines.

193. The AQIA identified that the Project in isolation from any other sources of reduced air quality, would not result in any exceedances of the annual average PM₁₀ and PM_{2.5} criteria for any private receivers. These are provided in Tables 7-1 and 7-2 of the AQIA Appendix E of the EIS.

194. The AQIA identified that the Project in isolation from any other sources of reduced air quality, would not result in any exceedances of the 24-hour PM₁₀ and PM_{2.5} criteria for any private receivers. These are provided in Tables 7-3 and 7-4 of the AQIA Appendix E of the

EIS.

195. The AQIA did not explicitly model diesel emissions as a separate source; rather, diesel emissions were assumed to be included in the total emissions for each relevant source.
196. The Commission acknowledges that several stakeholders raised concerns regarding the air quality modelling predictions, given that the air quality impacts are predicted to be lower for the Project than for the Approved Project; even though the Project proposes to extract more coal at a higher extraction rate.
197. In considering the evidence for the 'worst case' years, the Commission questioned the Applicant as to why the three modelled scenarios were determined to be the 'worst case' when other years may have similar levels of extraction, operational activity including exposed areas and proximity to sensitive receptors. The Applicant's response is set out below at paragraph 212.

3.7.3 Operational Impacts

198. The air quality impacts to private receivers and mine owned properties are provided in the AQIA, Appendix E of the EIS.
199. The Commission notes that the predictions for PM₁₀ at several private receivers are particularly close to the National Environment Protection Measures (**NEPM**) criteria for both annual average and 24-hour levels. The Commission notes that the annual average PM₁₀ level at Property ID 127b is predicted to be 19.9 µg/m³ in Year 7, the NEPM criterion for annual average PM₁₀ is 25 µg/m³. Similarly, the 24-hour PM₁₀ level at Property ID 127c is predicted to be 44.3 µg/m³ in Year 7, the NEPM criterion for 24-hour PM₁₀ is 50 µg/m³.
200. The Commission further notes that the predictions for PM_{2.5} at several private receivers are particularly close to the NEPM criteria for both annual average and 24-hour levels. The Commission notes that the annual average PM_{2.5} level at Property ID 127b is predicted to be 7.0 µg/m³ in Year 7; at Property 127c is 6.6 µg/m³; and at Property 127a is 6.6 µg/m³. The NEPM criterion for annual average PM_{2.5} is 8.0 µg/m³. Similarly, the 24-hour PM_{2.5} level at Property ID 127b is predicted to be 24.8 µg/m³ in Year 7; at Property ID 132 is 24.7 µg/m³; at Property ID 131b is 24.6 µg/m³; and at Property ID 131a is be 24.5 µg/m³. The NEPM criterion for 24-hour PM_{2.5} is 25 µg/m³.
201. The Commission acknowledges that with the reduction in the NEPM criteria, due to come into effect in 2025, for annual average PM_{2.5} levels from 8 µg/m³ to 7µg/m³ and the 24-hour PM_{2.5} from 25 µg/m³ to 20 µg/m³, there are likely to be exceedances of the criteria at private receivers when considering the cumulative air quality predictions.
202. The AQIA identifies several properties surrounding the Project that are owned by the Applicant and are tenanted. Exceedances are likely to be experienced at these residences due to both Project only and cumulative 24-hour average PM₁₀ criteria and cumulative 24-hour average PM_{2.5} criterion. These are provided in Table A6-2 of the AQIA Appendix E of the EIS.
203. The Commission notes that there are no applicable air quality criteria for mine-owned properties. However, the Department's VLAMP requires that the Applicant must inform tenants leasing such affected properties of any potential health risks associated with predicted air quality impacts.

3.7.4 Public Submissions

204. During the Department's exhibition of the Project, potential air quality impacts were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential air quality impacts of the Project including dust, amenity impacts and requests for an air quality monitoring station at Boggabri, as referred to in paragraph 28.

3.7.5 The Department and Government Agency Submissions

205. The Department's PIR notes that the *"air quality emissions would comply with applicable criteria (based on the EPA's Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in NSW) at all sensitive receivers throughout the project"*.
206. The Department's PIR further notes that some *"public submitters also questioned why predicted noise and dust levels are lower than the Approved Project, despite the project's increased size and additional infrastructure."*
207. The EPA, in its submission dated 18 October 2018, reviewed the Applicants EIS and generally *"determined that it is unable to recommend project approval conditions for the proposal due to inadequate information provided in the EIS."*
208. Further, the EPA generally concluded that *"additional information is required to support the emissions inventory including, but not limited to, emissions from onsite hauling from neighbouring mines and further explanation and/or reconsideration of the use of unverified emission factors."*
209. The EPA submission also stated that:
- "The emissions inventory is not transparent and there is not enough information provided for it to be reproduced and assessed."*
- "It is unclear how emissions from processing at the CHPP were included in the assessment. The emissions inventory does not include emissions due to onsite hauling from the other mines to the CHPP. Since emissions from hauling are substantial, these should be included."*
- "It also appears from the emissions inventory that crushing and screening are assessed at the Tarrawonga and Rocglen coal mines, and not at the Vickery CHPP. It is understood that crushing and screening of ROM from Tarrawonga and Rocglen coal mines will be undertaken at the Vickery CHPP, and therefore the source of all crushing and screening emissions should be from the Vickery CHPP. This needs to be clarified, and the model revised if necessary."*
- "The AQIA references the use of particle emission control factors derived from ACARP Project C22027 and ACARP 20023 (ACARP factors). These ACARP factors are not routinely adopted in air quality impact assessments in NSW and are not endorsed by the EPA at this time."*
210. The EPA recommended that regarding the emissions factors that the Applicant *"is to revise the AQIA to use established control factors (for example, as documented in Katestone 2011)."*

3.7.6 Additional Material

211. The Applicant provided Additional Material to the Commission at its meeting on the 25 February 2019, and in its additional information dated 7 March 2019. The topics covered included:

- impacts of traffic on unsealed roads;
- modelling assumptions and outputs;
- details confirming the worst case scenarios modelled;
- results of any model calibration with existing operating mines;
- dust impacts on agricultural activity, particularly cotton;
- consideration of the use of covered coal wagons;
- consideration of air quality monitoring station at Boggabri.

212. In response to the Commission's question, noted in paragraph 197, the Applicant provided further clarification as to the choice of the modelling scenarios as the 'worst case' for several nearby receivers, in its formal response to the Commission dated 5 March 2019. The Applicant stated that:

"the scenarios are considered to encompass the likely worst case for the range of nearby receptors in terms of likely dust effects. This was determined on the basis of the cases where material movement is high and where extraction or wind erosion areas are largest, or where operations are located closest to receivers. Thus the amount of material handled, the size of exposed areas, and also the relative proximity of activity to receptors was considered when selecting the worst case scenarios."

"Other scenarios that were not modelled either had less or equal materials handling and/or less or equal exposed areas and therefore these scenarios would have the same or lower levels of dust emissions. However, in other scenarios with similar dust emissions (e.g. Project Year 16), mining activities are no closer to receivers compared to the scenarios modelled and therefore would not result in an increase predicted dust concentrations."

213. In response to public submissions calling for an air quality monitoring station to be installed in Boggabri, the Applicant in its formal response to the Commission, dated 5 March 2019, stated:

"Considering dust from the Project is predicted to be undetectable in Boggabri (Ramboll, 2018) and the extensive coverage of existing monitors in the region, Project-specific air quality monitoring in Boggabri is not considered to be required."

"The NRAQMP [Namoi Regional Air Quality Monitoring Program] 'Wil-gai' monitor, which has been operational since 2012, is located within the Project mining area and considered by the EPA to be representative of ambient air quality at Boggabri and other rural residences in the region."

"A monitor in Boggabri would not be able to reasonably measure dust from the mine, therefore following Project commencement, real-time air quality monitoring would be conducted at locations significantly closer to the Project than Boggabri, where dust from the mine may potentially be measurable, in order to demonstrate compliance with air quality limits. The Project monitoring, in addition to OEH, EPA and other industry monitoring, is considered to provide sufficient information to confirm there would be no tangible air quality impacts from the Project at Boggabri."

214. In response to the concerns noted in the Department's PIR, as well as in public submissions (as noted in paragraph 205, in its Preliminary Response to Submissions, dated 7 March 2019, the Applicant stated:

"The Air Quality and Greenhouse Gas Assessment determined that wheel-generated dust from haul roads is predicted to be the dominant emission source from the Project. Control factors adopted for surface treatment of haul roads for the Project have improved from those modelled for the Approved Project (i.e. 90% control has been assumed for the Project compared to 75% for the Approved Project). The improved control factors were determined based on efficiencies achieved at other Whitehaven operations and results of recent benchmarking studies undertaken at other operations in the region."

"The modelled dust emissions for the Project, presented as a ratio of total suspended particulates (kg) per tonne of ROM coal mined, area between 0.55 and 0.88 over the life of the Project. This range is consistent with existing mining operations in NSW including, for example: Maules Creek Coal Mine (0.53 to 0.68); Bengalla Coal Mine (0.47 to 0.65); Hunter Valley Operations (0.55 to 0.64); and Warkworth Coal Mine (0.67 to 0.73). The Approved Project has a TSP:ROM coal ratio of between 1.38 and 2.39, which indicates the Approved Project model used conservative assumptions that overestimate the potential dust generation."

215. In response to the concerns raised by the EPA, in its Preliminary Response to Submissions, dated 7 March 2019, the Applicant included detailed emission inventories and stated:

"these emission inventories include all assumptions made with regard to air quality modelling, such as wind erosion, haul lengths/load and indicative fleet numbers."

"These detailed emissions inventories also clarify that crushing and screening emissions (including handling) associated with run-of-mine (ROM) coal from the Tarrawonga and Rocglen Coal Mines have been modelled at the Project Coal Handling and Preparation Plant (CHPP)."

"Haulage of ROM coal from the Tarrawonga and Rocglen Coal Mines to the Project CHPP is included in the cumulative modelling on the basis that this activity (i.e. on-road haulage of coal from the Tarrawonga and Rocglen Coal Mines) is approved and would occur regardless of the Project, as described in Appendix 1 of the Air Quality and Greenhouse Gas Assessment (Appendix E of the EIS)."

"Note that hauling from the Tarrawonga and Rocglen Coal Mines would occur along sealed roads (including the on-site access road to the mine infrastructure area). Wheel generated dust emissions along sealed roads are very low (e.g. by comparison to wheel generated dust from unsealed roads)."

3.7.7 Commission's Observations

216. The Commission notes that the Applicant has undertaken an assessment of air quality to predict some of the likely impacts of the Project, particularly around particulate matter and dust deposition.
217. The Commission notes that the modelling scenarios have been undertaken for three different years throughout the life of the Project, based on the operational extraction rates

and location of extraction within the mining area, as described in paragraph 190. The Commission notes that there are other years that may have similar levels of operational intensity, exposed areas and proximity to sensitive receivers. The Commission acknowledges the additional information provided by the Applicant addressing this issue, however in the absence of air quality modelling data for each year, it is not possible to confirm which years are predicted to experience elevated air quality impacts.

218. The Commission notes the concerns raised by the EPA regarding the emission inventory not including enough information for it to be reproduced and assessed. The Commission notes that the Applicant has responded to the EPA's comments, and considers that the additional information which details the emission inventory is likely to be satisfactory.
219. The Commission notes the concerns raised in submissions regarding how the dust levels are predicted to be lower than those for the Approved Project, even though the Project will be extracting and handling more coal, will have a higher production rate and includes operating a CHPP and rail load out facility. The Commission notes the response to this concern by the Applicant.
220. The Commission notes that while the AQIA does not predict any exceedances of the criteria, the predicted levels are close to criteria levels, and is therefore concerned that there is potential for the model to under-predict the impacts. Further the Commission considers that with the future reduction of NEPM criteria for annual average and 24-hour PM_{2.5} levels, exceedances will likely be predicted at private receivers.
221. The Commission has considered the Material and Additional Material. Based on this consideration, the Commission makes the following observations at this stage:
 - the modelling has the potential to under-predict the noise impacts of the Project, given that it is not clear that all the 'worst case' years have been modelled and that predicted levels are very close to the relevant criteria; and
 - further information, including by reference to changes in technology and practices, is needed to address the uncertainty regarding how the Project's dust levels will be lower than the Approved Project, even though the extraction rate and volume of extraction is greater.
222. Based on the Commission's observations, as listed in paragraph 221, the Commission considers that the Department should give detailed consideration to:
 - why the dust levels of the Project are predicted to be lower than those for the Approved Project, even though the Project will be extracting and handling more coal, will have a higher production rate and includes operating a CHPP and rail load out facility;
 - any comparison of modelling assumptions used for the Approved Project and the Project provided by the Applicant to demonstrate how the changes in technology and practices impact the results; and
 - which years are the 'worst case' years for operations from the perspective of air quality emissions and identify what are the impacts predicted for nearby residents. The Department may be assisted in this regard by the Applicant providing annual predicted air quality emissions and impacts at sensitive receptors for each year of operation.

3.8 Project Infrastructure Area

223. During the Department's exhibition of the Project, potential amenity impacts due to the location of the proposed mining infrastructure, the CHPP, the train load out facility and the

rail spur were raised as a significant concern in public submissions, as referred to in paragraph 16.

224. The Applicant's EIS states that the Project CHPP, train load out facility and rail spur will be constructed in the south-west corner of the project mining area. The Commission notes that the proposed location of the CHPP and train load out facility is relatively close to several residences.
225. The EIS states that until the rail spur is constructed, ROM coal will be hauled by road to the existing Whitehaven CHPP near Gunnedah. Once the rail spur is operational, then all coal will be loaded onto trains within the CHPP area, including coal from the Tarrawonga and Rocglen Mines.
226. Noise generated from the viaduct superstructure has been predicted to be within the night time noise criteria set out in the RING of 40 dBA $L_{Aeq, period}$. The Commission notes that night time noise levels at two receivers (Property ID 132 and the approved dwelling site on Property ID 144) are predicted to be within 3 dB of the criteria.

3.8.1 Public Submissions

227. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the potential amenity impacts of the Project, as referred to in paragraph 28.
228. Specifically, questions were raised by members of the public about why the primary infrastructure area was moved from the approved south-east location in the Approved Project to the proposed south-west location. The south-west location is near 22 dwellings (being both privately-owned and mine-owned). In particular, the Boggabri Farming and Community Group questioned:

"When you look at a map showing the dwelling locations, it appears that the CHPP rail and infrastructure has been moved now where it affects the absolute amount of dwellings – 22 in total. Was this move necessary?"

229. Additionally, Boggabri Business and Community Progress Association stated:

"The proposed extension indicates an extensive overhead rail viaduct and river crossing to the west linking the mine with Narrabri-Gunnedah railway line. Given there is a potential northern option to the existing Maules Creek Berrinba line, this additional infrastructure is not supported. There are a number of environmental, amenity and social impact reasons to back this up."

230. The Commission notes that the south-east location is intended to remain as a secondary infrastructure area as part of the Project.
231. The Commission requested additional information from the Applicant regarding details of the assessment of all rail options including the northern loop, providing assumptions and specific reasons for conclusions.

3.8.2 The Department and Government Agency Submissions

232. The Department in its PIR, acknowledged that seven residences are within 1 km of the rail

spur, with the closest (Property ID 144b) being approximately 500 metres from the line. The Department went on to say that:

“whilst compliance is predicted, these receivers have the potential to be affected to some extent by noise and/or visual impacts associated with rail activities, including rail noise during the sensitive night time period, particularly given the change in land use from the existing quiet rural setting.”

3.8.3 Additional Material

233. In response to the Commission’s request for additional information regarding the assessment of alternate rail options, the Applicant’s formal response to the Commission dated 5 March 2019, stated that:

“a number of rail spur alignments were analysed for the Project, in particular, the:

- *Project rail spur alignment (as presented in the Project Environmental Impact Statement [EIS]).*
- *Northern rail option, which comprised a northern rail corridor connecting to the common section of the Maules Creek Coal Mine and Boggabri Coal Mine private rail spur (Maules Creek-Boggabri rail spur).”*

“Whitehaven considers the Project rail spur provides the superior outcome for the Project, given the following:

- *Private land access:*
 - *Whitehaven does not own all private land required for the northern rail option (Figure 1), whereas Whitehaven owns all private land required for the Project rail spur (or a land access agreement is already in place).*
 - *Logistics and congestion on the common section of the existing Maules Creek-Boggabri rail spur:*
 - *The Common Section of the Maules Creek-Boggabri rail spur has six participants in the joint venture (one of which is Whitehaven).*
 - *Whitehaven has a share of the capacity of the Maules Creek-Boggabri rail spur commensurate with its percentage of ownership.*
 - *At the time the original joint venture was formed, the capacity of the Common Section of the Maules Creek-Boggabri rail spur was 28 Mtpa. The Maules Creek Coal Mine has approval to rail 12.4 Mtpa and the Boggabri Coal Mine has approval to rail 10 Mtpa (i.e. 5.6 Mtpa remaining capacity).*
 - *The Project proposes the rail transport of up to 11.5 million tonnes per annum (Mtpa) run-of-mine (ROM) coal (inclusive of coal from the Rocglen and Tarrawonga Coal Mines).*
 - *This would create congestion on the common section of the existing Maules Creek-Boggabri rail spur and the adjacent section of the Werris Creek Mungindi Railway (the Main Line) unless new passing loop(s) are constructed and additional train units purchased. An additional crossing of the floodplain may also be required.*
 - *Given these constraints to the feasibility of this option, the Project rail spur alignment was progressed.*
- *Environmental considerations:*
 - *The Project rail spur would result in the avoidance of additional coal trains travelling through the town of Boggabri (the majority of dwellings in Boggabri are within 500 metres (m) of the Main Line, with many dwellings within approximately 150 m of the Main Line [see Plate 1a, below]).*

- *By comparison, the two closest existing privately-owned dwellings (on Property ID 144) are approximately 500 m and 750 m distance from the Project rail spur (see Plate 1b). All other existing dwellings are further than 800 m from the Project rail spur. Compliance with the relevant rail noise criteria as outlined in Appendix 3 of the NSW Rail Infrastructure Noise Guideline (RING) (NSW Environment Protection Authority [EPA], 2013) for noise from trains on non-network rail lines on or exclusively servicing industrial sites (e.g. private rail spurs) is predicted at all existing privately-owned dwellings (refer to Section 7.3.1 of the Project Noise and Blasting Assessment [Wilkinson Murray, 2018]).*
- *The Project rail spur would result in the avoidance of impacts to existing Boggabri Coal Mine biodiversity offset areas (Figure 1). Note Whitehaven isn't a participant of the joint venture for the Boggabri Coal Mine private rail spur and the capacity constraints outlined above for the Common Section also apply. Hence, the Project rail spur could not be realigned to connect directly with the Boggabri Coal Mine private rail spur to avoid impacts to the existing offset areas.*
- *Economic considerations:*
 - *Elevation of the Project rail spur (to avoid flooding impacts on any private property and cross the Kamilaroi Highway) would result in increased construction costs to approximately \$40 million net present value (NPV) compared to the northern rail option.*
 - *Notwithstanding, when considering both capital and operational costs over the life of the Project, the economic advantage of the Project rail spur over the northern rail option is in excess of \$150 million NPV due to:*
 - *increased fuel consumption and other operational costs associated with additional distance travelled by coal trains (approximately 30 km each way when travelling to the Project via the Maules Creek-Boggabri rail spur);*
 - *ongoing fees to access the common section of the Maules Creek-Boggabri rail spur;*
 - *main Line passing loop construction costs;*
 - *additional train unit costs;*
 - *further land acquisition and agreement costs; and*
 - *establishment of additional biodiversity offsets for the Boggabri Coal Mine."*

234. In the Applicant's formal response to the Commission dated 5 March 2019, the Applicant provided additional information regarding the choice of location for the CHPP, in addition to the location being determined by the rail spur. The Applicant stated that:

"the location of the Project CHPP was developed in consideration of the following legal, economic and environmental considerations:

- *It must be located outside the extent of the open cut to avoid resource sterilisation.*
- *It must be located outside the predicted extent of flooding of the Namoi River.*
- *It must be located within existing Whitehaven mining tenements and the Mining Lease Application area (MLA1).*
- *It should provide the shortest coal haulage distance for the majority of the Project life to minimise potential impacts from noise and dust emissions as far as practicable and minimise construction and operational costs.*
- *It should provide the shortest practicable rail spur (i.e. be located on the western side of the project) to minimise potential noise impacts from rail movements and minimise construction and operational costs associated with a further extension of the rail spur around the Project."*

235. In addition, the Applicant provided a response to the Commission’s question regarding the potential to bund the CHPP to reduce noise impacts to local landowners. The Applicant in its formal response to the Commission dated 5 March 2019, stated that due to the design of the potential bund, it would not be feasible to bund the CHPP as it would require the relocation of the CHPP and associated rail loop by at least 400 m to the east of the site proposed in the EIS, impinging on the extraction area and as a consequence, sterilising coal resources.
236. Further, the Applicant provided information regarding the modelling of the CHPP, stating that:

“Modelling of the CHPP in its proposed location has been undertaken for the EIS, which indicates there would be:

- *Compliance with noise criteria at all private receivers, except:*
 - *During the evening and night-time, ‘negligible’ exceedances of the operational noise criteria are predicted at receivers on private Property IDs 131 and 132 during adverse meteorological conditions.*
 - *During the evening and night-time, ‘significant’ exceedances are predicted at a receiver on private Property ID 127 during adverse meteorological conditions (noting that this property has the right to acquisition upon request under the Development Consent for the Approved Project due to predicted ‘significant’ exceedances).*

It should be noted that under P10 noise levels (i.e. the level that is exceeded 10% of the time), receivers on private Property IDs 131 and 132 comply with the operational noise criteria and predicted exceedances at the receiver of Property ID 127 are considered ‘moderate’ (according to the Voluntary Land Acquisition and Mitigation Policy – For State Significant Mining, Petroleum and Extractive Industry Developments [NSW Government, 2014]).”

237. The Commission acknowledges that the additional information provided shows that the northern rail loop is most likely a less desirable option than that of the proposed location within the EIS.
238. The Commission questioned the Applicant during the supplementary meeting on 25 February 2019 about whether the south-east location (secondary infrastructure area) was considered for the rail spur and CHPP. The Applicant responded that this location had been assessed, but due to space considerations was not adopted. As part of the Approved Project there was only going to be a crushing plant at the south-east location and not a full CHPP. In addition, the Application considered the flooding risk from ephemeral streams was prohibitive. Consequently, the Applicant considered the south-west site to be preferable.

3.8.4 Commission’s Observations

239. The Commission notes that seven privately-owned properties are located within close proximity of the proposed CHPP, train load out facility and rail spur, and are likely to experience both noise and air quality impacts. Several of these properties have existing acquisition rights under the Approved Project.
240. The Commission notes the response from the Applicant, however considers that a comparative analysis of the proposed infrastructure area (located in the south-west corner) may need to be carried out against a potential site in the vicinity of the secondary

infrastructure area as identified for infrastructure for the Approved Project. This is because the Commission considers the evidence provided may be insufficient.

241. The Commission has considered the Material and Additional Material. Based on that consideration, the Commission makes the following observations at this stage:

- the northern rail loop appears to be a less desirable option;
- there are amenity impacts to receivers near the Project infrastructure area, as noted in sections 3.5 Noise and Blasting and 3.7 Air Quality of this report;
- bunding of the CHPP appears to be problematic due to the required width of the bund to ensure the stability of the bund and potential to sterilise coal resources;
- the evidence provided to justify the location of the CHPP and rail loop site appears to be inadequate, as there is no comparative analysis available to demonstrate that the Project infrastructure area allocated in the Approved Project is not a suitable site to locate the CHPP and rail loop for the Project; and
- given the closeness of the modelling predictions as outlined in paragraph 158 for the operation of the Project rail spur, the Commission considers that the Department may be assisted by further information regarding actual noise levels from both empty and full coal trains using the Maules Creek viaduct. This may give certainty to all stakeholders as to the noise levels expected from the Project rail spur viaduct.

242. Based on the Commission's observations, as listed in paragraph 241, the Commission considers that the Department should give detailed consideration to:

- any noise modelling results provided by the Applicant for alternative rail spur and CHPP locations. Specifically, the Department should consider noise modelling results for the siting of the CHPP approximately 400 m east to enable a noise bund to be located on the western side of the plant, and quantifying any impacts from a loss of reserves. In addition, the Department should consider noise modelling of an alternative site for the CHPP and rail spur located within the infrastructure area allocated for the Approved Project in the south east;
- any details of the comparative noise impacts from the construction of an alternative rail spur in the south east, including but not limited to the intensity and duration of construction of the rail spur;
- any assessment provided by the Applicant as to the potential for locating the CHPP and rail spur in the south-eastern portion of the Project provided by the Applicant including, in particular, a comparison of the impacts of the CHPP and rail spur in the proposed location and the south-eastern location, including flooding, noise, air quality and economic impacts; and
- the Applicant's justification as to why the CHPP cannot be fitted with acoustic cladding to reduce the noise of the CHPP, given the apparent constraints on bunding the CHPP.

3.9 Biodiversity

3.9.1 Identified Biodiversity Impacts

243. The Applicant's EIS included a *Biodiversity Assessment Report and Biodiversity Offset Strategy* (the **BARBOS**). The BARBOS identified that the:

“assessment uses the results of flora surveys undertaken by FloraSearch and fauna surveys undertaken by Future Ecology during 2015, 2016 and 2017. The surveys were conducted in consideration of the relevant State survey guidelines and included targeted searches for potentially occurring threatened species and communities listed under the

244. The Biodiversity Assessment Report (**BAR**) (as part of the BARBOS) identified that the Project is a ‘controlled action’ under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) and will be assessed by NSW Government under the 2015 Bilateral Agreement. The Project is a controlled action under:
- sections 18 and 18A (listed threatened species and communities); and
 - sections 24D and 24E (a water resource, in relation to coal seam gas development and large coal mining development).
245. The area identified in the BAR for the Commonwealth assessment is larger than that for the NSW assessment, since the Approved Project was not considered to be a controlled action. The Commonwealth assessment area is 984.4 ha which is 208.6 ha larger than the NSW assessment area, noted in paragraph 246.
246. The Applicant stated in the BAR that the Project would have an additional disturbance area of 776 ha, in addition to the 2,242 ha of disturbance for the Approved Project, including 580 ha of native vegetation. This additional area comprises 77.8 ha (10%) of native woodland/forest vegetation and 502 ha (65%) of secondary/derived native grassland (Table 4-24; Figures 4-20a and 4-20b of the BAR). The remaining 196 ha (25%) consists of previously cleared land comprising exotic grassland or land with no vegetation cover.
247. Some of this vegetation conforms to the definition of an Endangered Ecological Community (**EEC**) under the BC Act, including:
- White Box Yellow Box Blakely’s Red Gum Woodland listed as an Endangered Ecological Community (EEC) under the BC Act (Box-Gum Woodland EEC); and
 - Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions listed as an Endangered Ecological Community under the BC Act (Weeping Myall Woodland EEC).
248. The BARBOS detailed the Mitchell Landscapes associated with the Project, as set out in **Table 7**, and identified that the Project was predominately located within the Liverpool Alluvial Plains, an identified over cleared landscape.

Table 7: Mitchell Landscapes in the BAR Footprint associated with the Mining Area. (Source: The BARBOS)

Landscape Name	Percentage Cleared Estimate ¹	Percentage of BAR Footprint associated with the Mining Area Covered by Landscape	Patch Size
Liverpool Alluvial Plains	84	87.2	>1,001 ha
Bugaldie Uplands	26	12.7	>1,001 ha
Upper Namoi Swamps and Lagoons	49	0.1	>1,001 ha

¹ Sourced from the ‘Over-cleared Landscapes Database’ within the NSW Vegetation Information System and Classification Database (OEH, 2017a).

249. The BAR stated that 18 threatened fauna have the potential to occur within, or in close proximity to, the proposed disturbance area. Of these, 11 threatened fauna species were recorded within the BAR footprint. The 18 threatened fauna species are:
- Little Eagle (*Hieraaetus morphnoides*);
 - Speckled Warbler (*Chthonicola sagittata*);

- Hooded Robin (south-eastern form) (*Melanodryas cucullata subsp. cucullata*);
- Grey-crowned Babbler (eastern subspecies) (*Pomatostomus temporalis subsp. temporalis*);
- Diamond Firetail (*Stagonopleura guttata*);
- Yellow-bellied Sheath-tail-bat (*Saccolaimus flaviventris*);
- Eastern Bentwing-bat (*Miniopterus schreibersii oceanensis*);
- Eastern Freetail-bat (*Mormopterus norfolkensis*);
- Squirrel Glider (*Petaurus norfolcensis*);
- Koala (*Phascolarctos cinereus*);
- Painted Honeyeater (*Grantiella picta*);
- Eastern Cave Bat (*Vespadelus troughtoni*);
- Dusky Woodswallow (*Artamus cyanopterus cyanopterus*);
- Turquoise Parrot (*Neophema pulchella*);
- Spotted Harrier (*Circus assimilis*);
- Little Lorikeet (*Glossopsitta pusilla*);
- Corben's Long-eared Bat (*Nyctophilus corbeni*); and
- Large-eared Pied Bat (*Chalinolobus dwyeri*).

250. Given the biodiversity impact of the Project, offsets may be required in accordance with the *NSW Biodiversity Offsets Policy for Major Projects* (the NSW Offset Policy), in the form of both species and ecosystem credits. In terms of species credit calculation, these are based on three threatened species, Koala, Squirrel Glider and the Regent Honeyeater. The total credits calculated (based on the OEH calculator, for the NSW Assessment) are provided in **Table 8** below.

Table 8: Project Biodiversity Credit Requirements. (Source: The BARBOS)

Species	Clearance Area within BAR Footprint	Credit Requirement
Ecosystem Credits	579.8 ha of native vegetation (of which approximately 87% is secondary/derived native grassland)	16,401
Regent Honeyeater Species Credit	48.1 ha of potential habitat	3,703
Squirrel Glider Species Credit	74.7 ha of potential habitat	1,643
Koala Species Credit	50.3 ha of potential habitat	1,308

251. As the Commonwealth assessed impact area is larger than the NSW assessed impact area, and the BARBOS has calculated the species credits that would be required to offset the impacts to the Regent Honeyeater and Koala under the EPBC Act. **Table 9** below outlines the credits that would be required.

Table 9: Project Commonwealth Credit Requirements. (Source: The BARBOS)

Species	Credit Requirement			Offset Location	Offset Size (ha) ^{1,2}	Offset Ratio
	Mine Site (Table 27)	Project Rail Spur (Table 20)	Total ²			
Regent Honeyeater (<i>Anthochaera Phrygia</i>)	5,444 (for clearance of 70.7 ha)	346 (for clearance of 4.5 ha)	5,790 (for clearance of 75.2 ha)	Anywhere in NSW	815.5	1:10.84
Koala (<i>Phascolarctos</i>)	1,955 (for	148 (for	2,103 (for	Anywhere in NSW	296.2	1:3.65

cinereus)	clearance of 75.2 ha)	clearance of 5.7 ha)	clearance of 80.9 ha)			
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1 Calculated in accordance with the *BioBanking Assessment Methodology 2014*, or its revision where: size of the offset = species

2 The species credit requirements can overlap with other species credit requirements and the ecosystem credit requirements (i.e. the requirements are not mutually exclusive)

252. The EIS provided a consideration of the cumulative impacts associated with the Approved Project. The EIS states that:

“the Approved Project is located in a widely cleared landscape. It was approved under the EP&A Act in September 2014. The Approved Project will clear approximately 1,748 ha of native vegetation (of which approximately 464 ha is woodland/forest and 1,284 ha is derived grassland) and has an approved Biodiversity Offset Strategy of approximately 3,423 ha under Development Consent (SSD-5000) (comprising 2,063 ha within offset areas and 1,360 ha of mine site rehabilitation within the Approved Project footprint).”

“Operating mines in the vicinity of the Project include the Rocglen, Tarrawonga, Boggabri and Maules Creek Coal Mines (Figure 1-2). In addition to potential cumulative impacts, these mining operations also have potential cumulative benefits in the form of offset areas (Appendix F).”

“The change in potential cumulative impacts on threatened species and communities arising from the Project is considered to be minimal because of the localised nature of the Project compared to the wider distribution of the species (their habitats) and communities (Appendix F).”

253. The Commission notes that the EIS does not directly discuss GDEs and this commented on in the IESC assessment of the report. The Commissions considerations on this are provided in the Groundwater Section at paragraph 70.

3.9.2 The Proposed Biodiversity Offset Strategy

254. As noted in **Table 8** in paragraph 250, ecosystem credits are required to offset the impacts to ecosystem values under the BC Act. The BAR noted several options to retire the ecosystem credits required to offset the Project’s biodiversity impacts, including:

- acquiring or retiring credits under the biobanking scheme in the BC Act;
 - retiring existing credits on the existing Whitehaven Biobank Site;
 - purchasing existing credits on the Biodiversity Credits Register; and/or
 - creating new credits by establishing a land-based offset area owned by Whitehaven or another entity;
- making payments into an offset fund (i.e. the Biodiversity Conservation Fund); and/or
- providing supplementary measures as outlined in the NSW Offset Policy.

255. The final credits that are required to offset the impacts are those in **Table 8** in paragraph 250. As noted these are lower than those required under the Commonwealth assessment. The Applicant in its BARBOS provided the following justification for the providing the lower species credits. The BARBOS states:

“The Regent Honeyeater and Koala species credit requirements for the Commonwealth Assessment Footprint (Table 30) are larger than those for the NSW Assessment Footprint (Table 39). However, as described in Section 6.2.4, the additional species credits are for the portion of the Commonwealth Assessment Footprint which was covered by the

Approved Project (SSD-5000) and therefore subject to the existing biodiversity offset strategy described in Section 6.1. For this reason, the additional species credits are not included in Table 39.”

“The existing Biodiversity Offset Strategy for the Approved Project is outlined in Table 40 and shown on Figures 31a, 31b, 32 and 33. The Biodiversity Offset Areas were approved by the DP&E in September 2014. The approved Biodiversity Offset Strategy covers a total area of approximately 3,422.5 ha (2,062.5 ha of land-based offset areas on Whitehaven-owned land and 1,360 ha of mine rehabilitation to woodland/forest at the Approved Project) (Table 40).”

256. The Applicant proposed in its BAR to offset the Project by providing a mixed approach of securing land-based offsets, rehabilitating mine impacted areas to native vegetation and making financial payments into the Biodiversity Conservation Fund.

3.9.3 Public Submissions

257. During the Department’s exhibition of the Project, biodiversity impacts were raised as a significant concern in public submissions, as referred to in paragraph 16. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the Project’s biodiversity impacts, as referred to in paragraph 28.

3.9.4 The Department and Government Agency submissions

258. The Department in its PIR notes the concerns raised by OEH, and Gunnedah and Narrabri Shire Councils, in relation to the offsets and the Koala Plan of Management (**KPoM**). The Department concludes that it, *“will require the KPoM to be prepared as part of Whitehaven’s Response to Submissions, and will consider the plan in consultation with the applicable authorities in its detailed assessment report.”*
259. OEH in its submission dated 24 October 2018 identified gaps in the BARBOS in respect of meeting its requirements under the *NSW Biodiversity Offsets Policy for Major Projects Framework for Biodiversity Assessment (FBA)*, which were likely to require a recalculation of the required ecosystem credits and an amended Biodiversity Offset Strategy (BOS) to ensure that the biodiversity credit liability is met.
260. Further in its submission, OEH stated:

“The Biodiversity Offset Strategy (BOS) should be updated to include all of the information required in Section 12.2 of the FBA.

“Section 6.2.2.1 of the BAR proposes that ecosystem credits will be generated from the ecological rehabilitation of 1,005 hectares of previously mined land. This includes 482 hectares from the current project proposal and 523 hectares from the existing Vickery Coal Project approval that was intended to be rehabilitated to agricultural land.

“...the FBA requires that the BOS sets out the completion/relinquishment criteria for each plant community type (PCT) that is the target of the proposed ecological rehabilitation works. In addition, Section 12.2.1.6 sets out additional information to be included in the BOS including rehabilitation objectives, target PCTs, and the area of land that will be rehabilitated to each PCT. The BOS does not contain any of these items.”

261. The OEH also raised concerns regarding the assessment of Commonwealth Matters, specifically the area of habitat for EPBC Act-listed species that are likely to be significantly impacted. OEH stated:

“Further information should be provided detailing how the area of potential habitat was determined for each EPBC Act-listed species likely to be significantly impacted by the proposed development. This should include the area of each vegetation community considered to be habitat for each species.”

3.9.5 Additional Material

262. In response to the comments made regarding the KPoM, noted in paragraph 258, the Applicant in its Preliminary Response to Submissions, dated 7 March 2019, stated that:

“Whitehaven is preparing a Koala Plan of Management for the Project that describes measures to manage the impact to koala habitat along the Namoi River, in accordance with State Environmental Planning Policy No 44 – Koala Habitat Protection.”

“The Koala Plan of Management will be provided to DPE and OEH for review as a component of the Responses to Submissions. The final Koala Plan of Management will be made available on Whitehaven’s website.”

263. In response to the concerns and recommendations made by OEH, noted in paragraphs 259 to 261, the Applicant in its Preliminary Response to Submissions, dated 7 March 2019, stated that it considers that the information was provided in the EIS, and does not consider additional work is required. The Applicant has committed to continue to work with OEH on finalising the offset requirements for the Project.

3.9.6 Commission’s Observations

264. The Commission notes that although there are several options available to the Applicant to acquire ecosystem credits, OEH is of the opinion that the Applicant has not provided sufficient information in relation to the proposed approach(es) for offsetting the Project’s biodiversity impacts. The Commission notes that the Applicant is not required to offset the Project prior to approval, however the Commission also notes that the Applicant is required to provide adequate information in relation to its proposed approach(es) to retiring ecosystem credits to enable the consent authority to undertake a proper assessment of the Project’s biodiversity impacts.
265. The Commission notes that the Applicant has indicated that a significant proportion of its biodiversity offsets will be met through mine rehabilitation. However, the Commission notes the concerns raised in submissions about using rehabilitation as part of the BOS.
266. The Commission notes that several agencies are concerned about the impacts to koalas and have requested that the Koala Plan of Management be provided with the Response to Submissions. The Commission acknowledges the Applicant’s commitment to do so.
267. The Commission notes that the Department has not considered the Commonwealth assessment requirements.
268. The Commission has considered the Material and Additional Material. Based on that consideration, the Commission makes the following observations at this stage:

- the Applicant has placed a high importance on rehabilitating mine affected landscapes to the standard of native vegetation to compensate for the Project's biodiversity impacts. Significant additional work is required to demonstrate the feasibility of achieving success and establishing a self-sustaining adequate standard of woodland communities;
- there are concerns as set out in paragraph 259 regarding the BARBOS, and updates to this are required, which will change the number of credits required for the Project;
- there are concerns regarding the Koala Plan of Management, and a desire to see the Koala Plan of Management as part of the Response to Submissions;
- updated breakdown of the biodiversity impacts and associated offset requirements for the Approved Project, the Project and the totals need to be presented; and
- alternative measures need to be considered and demonstrated that could meet the credit requirements if adequate rehabilitation standards are not considered achievable.

269. Based on the Commission's observations, as listed in paragraph 268, the Commission considers that the Department should give detailed consideration to:

- the Commonwealth Matters;
- any quantification of the potential impact to the local Koala population and measures to avoid impacts and offset to any impacts to Koalas, within the Koala Plan of Management;
- any evidence-based feasibility assessment provided by the Applicant for establishing self-sustaining woodland communities to a standard to satisfy the biodiversity offset requirements;
- any offsetting approach provided by the Applicant, which may include, if necessary, details of how its approach will be staged, the timing, offset value and how it could be successfully undertaken, as well as alternative measures to meet the credit requirements if rehabilitation is not considered achievable; and
- the Applicant's BARBOS and, in particular, whether its BARBOS addresses the information requirements set out by OEHL, including agreed upon credit calculations, and provides adequate supporting information in relation to the use of mine rehabilitation.

3.10 Rehabilitation, Final Void and Final Landform

270. The EIS included a Rehabilitation Strategy that set out overarching rehabilitation outcomes and objectives to guide the rehabilitation program for the project. Generally, the Rehabilitation Strategy is consistent with the Rehabilitation Strategy for the Approved Project, with the following amendments:

- *“reduction in the number of final voids from five to two within the Project area (noting that three final voids be retained for the Approved Project);*
- *removing the requirement for the Eastern Emplacement as a waste rock emplacement (i.e. creating a permanent change to the final landform), with its approved footprint to be used as a temporary secondary infrastructure area for the Project;*
- *introduction of micro-relief (i.e. gently undulating surface typically ranging in elevation by 1 to 2m) to the waste rock emplacement to assist in drainage design that replicates natural drainage systems;*
- *introduction of macro-relief (i.e. 10 to 20m hills similar to those found in the Vickery State Forest) to the top surface of the waste rock emplacement to improve the integration of the landform with the surrounding environment and mitigate potential*

- *visual impacts; and*
- *increased areas of woodland/forest revegetation to enhance the biodiversity value of the rehabilitated Project mining area and improve the connectivity of woodland between the Vickery State Forest and the Namoi River.”*

3.10.1 Public Submissions

271. During the Department’s exhibition of the Project, the final void was raised as a significant concern in public submissions, as referred to in paragraph 16. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding concerns with the Project’s rehabilitation, final void and final landform, as referred to in paragraph 28.

272. Specifically, at the initial public hearing a representative from the Lock the Gate Alliance stated:

“This final void is really posing a hydrological risk that will last for generations a long time after the mine has ceased operating.”

273. Additionally, a local resident stated:

“While many have focused on the potential economic benefits it could provide in the short term, we’re ignoring the intergenerational debt it will create from this gross environmental mismanagement.”

274. Maules Creek Community Council stated:

“The State has a responsibility for ensuring appropriate environmental planning outcomes for all generations under the EP&A Act, not just this one.”

3.10.2 Rehabilitation

275. As noted in paragraph 255, a proportion of the final landform will be rehabilitated as part of the BOS.

276. The rehabilitation will be undertaken progressively using soils from newly cleared areas.

277. The Commission notes that a number of agencies including DPI, Gunnedah and Narrabri Councils recommend that the rehabilitation should be aimed at returning the land to agricultural uses, which is in conflict with the Applicant’s proposal to rehabilitate the mining area to native woodland, as part of its BOS see paragraph 255.

3.10.3 Final Voids and Final Landform

278. The Applicant’s EIS states that of the two final voids, the Blue Vale void is an existing void from earlier mining operations, which has already been rehabilitated.

279. The EIS states that the construction of the waste rock emplacement area will incorporate micro-relief and macro-relief, to appear similar to the natural landforms found in the Vickery State Forest. Further, the final top surface of the waste rock emplacement area will be constructed so that rainfall runoff drains in a natural, stable manner that minimises the use of engineered drop structure.

280. The EIS states that the final void left as part of the Project will comprise of a pit lake that will be 135 ha in size and will be between 18 m and 120 m deep (depending on modelling scenarios), and act as a permanent groundwater sink, as noted in paragraph 73. The water level will be at least 140 m below the crest of the final void.

3.10.4 The Department and Government Agency Submissions

281. The Department in its PIR noted that several government agencies raised issues regarding the rehabilitation and final land use proposed by the Applicant. The Department stated:

“...DPI, Gunnedah Shire Council, Narrabri Shire Council and some public submitters recommended that rehabilitation should aim to maximise the area of land suitable for future sustainable agricultural land use. Narrabri Shire Council has recommended that Whitehaven rehabilitates the mine to provide at least 9000 ha of Class 3 agricultural suitability land (i.e. similar to the area of Class 2 and 3 land that would be disturbed).”

“While this would conflict with the proposed biodiversity conservation outcomes for the project, the Department agrees that detailed consideration of the rehabilitation strategy and post-mining land use is warranted for the project in consultation with relevant stakeholders, to ensure the highest and best use of the land is achieved over the long term.”

282. Further the Department in its PIR noted that a number of government agencies raised issues regarding the final void / final landform and the associated long-term groundwater impacts. The Department considered the issues raised by government agencies and its independent groundwater expert and concluded that there is a basis for further investigation into alternative final void / final landform design. The Department stated:

“... the Department agrees that there is merit in investigating best practice alternative final void/final landform designs in more detail, including additional groundwater assessment, to assist in determining the acceptability of the proposed final landform based on cost, operational constraints and environmental costs/benefits associated with a permanent groundwater sink/pit lake.”

3.10.5 Additional Material

283. The Applicant responded to the Department’s comment regarding the conflict between rehabilitation as part of the BOS and rehabilitating the land for agricultural uses, noted in paragraph 281, in its Preliminary Response to Submissions, dated 7 March 2019. It stated:

“...the overall rehabilitation goal for the Project is to enhance the cover and connectivity of native woodland on the final landform between the Vickery State Forest and the Namoi River. Maximising the ability to meet Federal and State biodiversity offset requirements, while returning some areas of the final landform to agricultural land capable of supporting grazing.”

“Sections of the Project mining area to be rehabilitated to agricultural land include the mine infrastructure area, the southern part of the secondary infrastructure area, water management dams (except those retained for agricultural purposes or as passive water control storages) and the Project rail spur corridor (see Figure 5-3 of the EIS).”

“If the waste rock emplacement were to be rehabilitated to agricultural land, Whitehaven may need to secure additional areas for biodiversity conservation in perpetuity outside the Project mining area to meet its offset obligations. This may result in the sterilisation of existing agricultural land.”

284. The Applicant responded to the Department’s comment, noted in paragraph 282, in its Preliminary Response to Submissions, dated 7 March 2019, stating that it does not consider that further assessment of alternate landforms and justification for the final void is necessary given:
- *“the Project final land form is an improvement compared to the Approved Project (i.e. one final void compared to two final voids [in addition to the existing Blue Vale final void.]”*
 - *the Project final void would comply with the requirements of the Approved Project Development Consent with respect to remaining a groundwater sink.*
 - *the cost of completely backfilling the final void is considered to be prohibitive for the Project.*
 - *the cost of partially backfilling the final void is also cost-prohibitive, and would still result in a depression in the landscape but without the environmental benefit of the void acting as groundwater sink. Under a partial backfill scenario poorer quality groundwater could migrate out of the void to the surrounding groundwater system, whereas this cannot occur where the final void acts as a groundwater sink.”*

3.10.6 Commission’s Observations - Rehabilitation

285. The Commission acknowledges the conflict regarding the final land use of the mine and considers that further consideration to the final land use is warranted.
286. The Commission has considered the Material and Additional Material. Based on that consideration, the Commission makes the following observations at this stage:
- as set out in paragraph 255, the Applicant is seeking to utilise mine rehabilitation to address a significant proportion of its likely biodiversity offsets. Detailed information regarding how this will be achieved is required prior to approval;
 - the Commission agrees with concerns, set out in paragraph 281 that there is a need for greater clarity and certainty around realistically achievable rehabilitation outcomes, in particular the potential post-mining land uses for the site;
 - macro and micro relief of the final landform requires further description and justification, and this should include consideration of whether the overburden emplacement areas need to or can be shifted;
 - the flatter interior section is proposed to be a mixture of pasture and woodland, while the ecosystem for the outer batter is not indicated even though it is almost the same area. The outer batter will potentially have greater offsite impact because of its steeper slopes and planar surfaces.
287. Based on the Commission’s observations, as listed in paragraph 286, the Commission considers that the Department should give detailed consideration to:
- how areas of existing rehabilitated soils would be effectively used for further rehabilitation in other areas of the proposed mine;
 - how the final landform (including the outer batters) would be designed using both macro and micro relief to ensure that the final landform is consistent with and ties into the surrounding landscape;

- if the final landform would be suitable for other land uses. For instance, the rehabilitated area could be classed as Class 2 or Class 3 Agricultural Land;
- agricultural land versus offset (rehabilitation to woodland communities) for the final land use;
- if the definition of the long-term sediment and chemical consequences of runoff from the external batters should be better defined. For instance, at what date would the sediment basins fill with sediment and what would the sediment loads be that subsequently drain offsite; and
- if the Applicant should revise the Rehabilitation Strategy to include additional detailed information around the final void water levels and water quality, including an assessment of any potential beneficial uses for the water that could be considered following closure of the mine.

3.10.7 Commission's Observations - Final Void and Final Landform

288. The Commission acknowledges that the Applicant has reduced the overall number of final voids left as part of the Project as compared to the Approved Project.
289. The Commission notes the concerns raised at the initial public hearing and in the written submission regarding having voids as part of the final landform, and expressing that the final landform should not include any final voids. Further the Commission acknowledges the cost implications of backfilling all voids as part of the final landform.
290. The Commission notes that the final void will act as a permanent groundwater sink, draining groundwater from the surrounding area for at least 300 years post mining before stabilising. The Commission also notes the continued decrease in water quality within the pit lake as noted in the Groundwater and Surface Water and sections of this report.
291. The Commission acknowledges the concerns raised by the community regarding intergenerational inequality of the impact of the final void on water resources (refer to paragraph 28).
292. The Commission has considered the Material and Additional Material. Based on that consideration, the Commission makes the following observations at this stage:
- the Department's analysis would be assisted by a clear assessment of the relative size and depth of the final void of the Project and the Approved Project to compare the change in scale;
 - the Commission is concerned about the ongoing impact from the final void that has been identified as a permanent groundwater sink with ever-decreasing water quality;
 - the Commission is concerned that the final void may be a significant and permanent cost being shifted to future generations, resulting in intergenerational inequality. As a result, the Applicant should explain how the final void meets the principles of ESD, is in the public interest and why backfilling the void is not feasible or reasonable.
293. Based on the Commission's observations, as listed in paragraph 292, the Commission considers that the Department should give detailed consideration to:
- if the Applicant should quantify the water quality impacts offsite of the surface runoff (and any groundwater seeps) from the rehabilitated landform. This would include an assessment of the potential impact of the type of ecosystem to be developed on the site (e.g. woodland versus agriculture will have different implications for sediment delivery and thus transport of sorbed pollutants);
 - the Applicant's evidence of the trials that were taken for three different spoil

- properties that demonstrate that the change in spoil properties did not have an impact on the groundwater inflows;
- any available evidence (including such evidence as the Applicant may provide) to support final voids as a preferred landform outcome versus infill, and evidence of all risks associated with each landform outcome; and
 - the definition of the incremental long-term deep hard rock (i.e. non-alluvial) groundwater impacts (both head and flow) over the long-term (at least to the 300 years that it takes for the final void water levels to stabilise), particularly to the east of the Project where drawdowns interact with the drawdowns from the Rocglen Mine site.

3.11 Heritage

3.11.1 Public Submissions

294. During the Department's exhibition of the Project, heritage impacts were raised in public submissions, as referred to in paragraph 16. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the Project's heritage concerns and impacts, as referred to in paragraph 28.

295. Specifically, at the initial public hearing Red Chief Local Aboriginal Land Council stated that the survey of Aboriginal heritage was incomplete and:

"This should not be approved because they have failed the Aboriginal culture and heritage value assessment."

296. The Commission acknowledges the concerns raised by the community on the completeness of the non-Aboriginal and Aboriginal heritage surveys. The Commission notes that in its PIR the Department considered these issues.

3.11.2 The Department and Government Agency Submissions

297. Regarding Aboriginal heritage, OEH in its submission dated 24 October 2018, stated that the Applicant has complied with the prescribed Aboriginal consultation requirements, and noted that the Applicant has committed to continuing to engage and consult with Registered Aboriginal Parties (RAPs).

298. OEH also noted that there were some discrepancies in the identification of scarred trees between the 2011/2012 surveys and 2016 surveys. OEH stated:

"that in cases where scarred trees prove difficult to determine or when claims are questioned then it is best practice to seek expert assistance, for example, an arborist or archaeologist with skills in scarred tree recording, to conclude the identification. This is consistent with the procedures set down in the Code (DECCW 2010:32)."

299. OEH recommended that:

"the Proponent [sic] facilitates and documents on-site discussion between the RAPs and the experts about the results of the technical investigation of the scarred trees, allowing opportunities for the RAPs to discern the technical findings of the expert assessments, and to also be given opportunity to discuss the findings."

300. Regarding non-Aboriginal heritage, the Dorothea Mackellar Society in its oral presentation at the initial public hearing on 5 February 2019 noted that the:

“Kurrumbede Homestead does not appear on the 2012 Gunnedah Local Environment Plan as the Local Council at the time decided to defer consideration. The heritage report also finds there’s a strong case for the buildings to be included on the State Heritage Register. With this in mind, the society has taken a step towards ensuring the homestead and outbuildings are preserved and maintained.”

“We have lodged a nomination for Kurrumbede to be included on the State Heritage Register with the New South Wales Office of Environment and Heritage. A listing on the State Heritage Register would also make the buildings eligible for government grants to assist with maintenance and preservation. This has not been met with enthusiasm by the proponent, which I would have expected had they been serious about the preservation of the property.”

“Society representatives have met with the mining company on two occasions so far to discuss plans for Kurrumbede. Until we see the heritage management plan and are permitted to visit the property, it is difficult to discuss specific plans or gauge their commitment. The recommendations made in the company’s heritage assessment report will require monitoring to ensure preservation and maintenance measures are implemented.”

301. OEH’s Heritage Division in its submission dated 18 October 2018, has noted that the Kurrumbede Homestead is not a heritage listed item, but supports the Applicant’s commitment to preparing a Heritage Management Plan for the Kurrumbede Homestead prior to commencing construction.

3.11.3 Additional Material

302. In its Preliminary Response to Submissions, dated 7 March 2019, the Applicant responded to the concerns about the identification of scarred trees, as noted in paragraph 297, stating that:

“this requirement has already occurred. The scarred tree reassessment reports prepared by Kamminga and Lance (2016) and Burns (2016) were appended to the draft (and final) Aboriginal Cultural Heritage Assessment (ACHA), which was provided to the Registered Aboriginal Parties (RAPs) for comment during each of the consultation periods as well as during the EIS public exhibition.”

“No comments received from the RAPs during any of the ACHA consultation periods identified any issues with the results of the scarred tree reassessment.”

303. The Applicant in its formal response to the Commission dated 5 March 2019, confirmed that Project would not disturb the Kurrumbede Homestead or its associated outbuildings. The Applicant confirmed that:

“consistent with the recommendations to the Project Historic Heritage Assessment (Extent Heritage, 2018), Whitehaven will implement the following management measures for the Kurrumbede Homestead:

- *blast monitoring to demonstrate blast levels remain below building damage criteria;*
- *maintenance of the landscaping surrounding the Homestead; and*

- *maintenance of the Homestead and associated outbuildings to ensure they are safe and weatherproof.”*

“Whitehaven will prepare a Heritage Management Plan for the Project incorporating the recommended management measures in the Historic Heritage Assessment, including those specific to the Kurrumbede Homestead.”

3.11.4 Commission’s Observations

304. The Commission notes that OEH considers further consultation regarding the scarred trees needs to be completed during the Department’s assessment, to ensure that the matter is adequately addressed before concluding the assessment phase of the Project. The Commission considers that there is a need for continued Aboriginal consultation prior to determination, as per OEH’s submission, due to the discrepancies in the assessment of scarred trees to date. This consultation needs to include the management of impacts to Aboriginal cultural heritage, as described in the OEH submission.
305. The Commission notes that while the Kurrumbede Homestead (Property ID 1v) is not a listed heritage item, it is of significance for the local community. The Commission considers that the Department should give consideration to whether the Kurrumbede Homestead should be protected from the impacts of the Project and whether further details regarding the proposed management of the site are required.
306. The Commission acknowledges the Applicant’s commitment to prepare a Heritage Management Plan for the Kurrumbede Homestead.
307. Based on the Commission’s observations, as listed in paragraph 294, the Commission considers that the Department should give detailed consideration to:
- the deficiencies identified by the Commission in the Applicant’s engagement with the local traditional owners and the Aboriginal surveys; and
 - how the Kurrumbede Homestead could be protected from the impacts of the Project, and details of the proposed Kurrumbede Homestead Management Plan, including timing and funding, to be provided by the Applicant.

3.12 Social and Economic

3.12.1 Social

308. During the Department’s exhibition of the Project, social impacts and economic impacts were raised as a significant concern in public submissions, as referred to in paragraph 16. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the Project’s social and economic impacts, as referred to in paragraph 28.
309. The Applicant’s EIS included a Social Impact Assessment (**SIA**) that considered the social costs and benefits of the Project. The SIA included social baseline information, community and stakeholder engagement undertaken for the assessment, proposed targeted strategies with objectives and performance measures, and ongoing monitoring to avoid, manage and/or mitigate identified social impacts.
310. The SIA stated that there are a range of community issues associated with the Project’s potential negative social impacts that predominantly relate to amenity, health and

wellbeing arising from air quality, noise, blasting and visual impacts. The Applicant noted in the SIA that identification of these impacts generally satisfies the relevant NSW Government criteria, and that mitigation and management strategies are proposed to reduce the impact to acceptable levels where the impact occurs.

Public Submissions

311. Submissions noted current contributions of the Applicant (from its other operations in the area) to the local community and the generation of employment opportunities, including for the Aboriginal community as positive social impacts. Social impact concerns raised in submissions included the impacts to the local farming community particularly due to acquisitions, and that larger regional towns like Gunnedah and Narrabri benefit more than smaller towns like Boggabri.

312. Speakers at the initial public hearing stated that:

“recent experiences of farming communities surrounding Boggabri and the township indicated that large scale coal mining has been disruptive and damaging to the social fabric....”

“it seems to me that, in the EIS, Boggabri kind of slips through the cracks when we look at a bigger picture of the social impacts and we don’t quite see the scaling down of that for Boggabri and what the actual impacts will be here in our community. We’ve heard a lot of positive stuff about the impact to Gunnedah in terms of employees moving to town and some fabulous stories there. I’m just worried that Boggabri does not fit that bill.”

“residential workforces, as will be in the case with Vickery, tend to show greater stability and less prevalent family dysfunction and mental health challenges. Modern mining companies, as many know, work across a range of social impact areas and we regularly engage with and support our workforces, their families, local stakeholders, neighbours and government across the towns of Boggabri, Gunnedah, Narrabri and the associated regions.”

“the proponent [sic] has no social licence within this town.”

“the social impact is huge and has already had an effect and the expansion hasn’t even been approved yet.”

“there are not only the economic but also the social benefits of the extra opportunities flowing at the moment.”

“Whitehaven has achieved their social licence to operate through a continual program of engagement with their employers, local community and indigenous community and government.”

“Council recognises the potential economic and social benefits that the development of this nature would bring to the region. While council recognises the benefit of such a development, it also holds concerns in addition to those notes in its submission with respect to the impact of the project on the availability of affordable housing within the shire and the supply and trading of appropriately skilled labour. Council seeks the commitment of both the state government and Whitehaven in collaboration to find solutions for these issues.”

The Department and Government Agency Submissions

313. The Department's PIR assessed the SIA and concluded that it was undertaken generally in accordance with the Department's *Social Impact Assessment Guideline for State Significant Mining, Petroleum Production and Extractive Industry Development* (2017). The Department stated that it *"will carefully consider the likely effectiveness of these proposed strategies in its detailed assessment of the project."*

314. Narrabri Shire Council in its submission made several comments relating to social impacts including:

"that the proponent undertaken further Local Effects Analysis, which is specific to the Narrabri Local Government Area."

"that the overall impacts on the Narrabri Local Government Area are properly assessed and that cumulative labour impacts resulting from other major construction projects in the region have been properly considered."

"that the proponent [sic] adopt a more ambitious target for the employment of local Aboriginal people, including additional support and training for local Aboriginal apprentices and workers."

"that the Proponent [sic] outline specific long-term plans, in addition to transition arrangements, for the township Boggabri once mine operations have ceased."

315. Gunnedah Shire Council in its submission noted that the social and economic assessment of the development does not provide adequate detail on several issues including:

"the project has the capacity to be a significant economic driver for the region however it is noted that the use of external workforces to such a large scale will reduce its potential for economic generation and job growth for the Gunnedah and Narrabri Shires... The assessment goes further to indicate that to relieve suggested pressure on local rental stock, all non-local construction workers in the 12 months construction phase would be encouraged to live in the Civeo Boggabri Accommodation Village. Council suggests that a higher emphasis be given to the use of local workforce during both the construction and operational phases of the mine and that consideration be given to strategies that yield a greater balance between village accommodation and town based accommodation to local investment and social cohesion."

"displacement of employment opportunities from agricultural sector needs to be considered within the social and economic assessments. A suggestion would be to update the EIS to address the reduction in economic activity that would occur due to the displacement of agriculture as a result of the proposed activity. This should be expanded to consider displacement from other industries."

Additional Material

316. In its Preliminary Response to Submissions, dated 7 March 2019, the Applicant responded to the issues raised in Narrabri Shire Council's submission, as set out in paragraph 314. The Applicant stated that:

“Whitehaven is happy to work with Council in this regard and to provide additional relevant information regarding Local Effects Analysis.”

“Cumulative impacts of other proposed major projects in the region have been assessed in Section 4.8 of the Social Impact Assessment (Appendix R) and Section 4.2 of the Economic Assessment (Appendix J) during both construction and operational phases of the Project.”

“Whitehaven would target employment of 10% of the operational workforce being of Aboriginal and/or Torres Strait Islander descent within five years of commencement of operations. This is representative of the demographics of the regional population and in accordance with Whitehaven’s Stretch Reconciliation Action Plan (prepared in consultation with the community).”

“Whitehaven’s Stretch Reconciliation Action Plan (which includes Aboriginal Employment Strategy) details Indigenous employment targets and strategies for ongoing Aboriginal training and apprenticeships in the region, including continued support for the Winanga-Li Aboriginal Child and Family Centre and partnership with the Girls Academy at Gunnedah High School.”

“Whitehaven would prepare a Mine Closure Plan three to five years in advance of the Project’s anticipated closure date to accurately inform mine closure planning and management of potential social impacts. The Mine Closures Plan would be prepared in consultation with the GSC, NSC and relevant community stakeholders, including within the Boggabri township.”

317. The Applicant responded to the issues raised in Gunnedah Shire Council’s submission, as set out in paragraph 315. The Applicant stated that:

“as a result of the specialised construction workforce required, Whitehaven is predicting that the majority of construction personnel would be non-local (i.e. sourced from outside the Project region) these non-local personnel would be required only during the construction phase of the Project (approximately a 12 month period).”

“non-local construction personnel would be encouraged by Whitehaven to use the Boggabri Accommodation Camp to relieve short-term pressure on local housing prices and availability, consistent with feedback from the local community.”

“labour draw from the agricultural sector as a result of the Project is predicted to be negligible (Section 3.3.7 of Appendix J of the EIS). However, stakeholders consulted as part of the Social Impact Assessment engagement noted that mining recruitment exacerbated local shortages of tradespeople in the construction and manufacturing industries (Section 4.2.1 of Appendix R of the EIS.)”

Commission’s Observations

318. The Commission notes that while the Department considered that the SIA was undertaken generally in accordance with the guidelines, the Commission considers that the SIA risk assessment matrix could be expanded to provide more detail for post mining impacts, particularly focused on community transition strategies.

319. The Commission acknowledges that the community has varying opinions on the social

benefits and impacts that the mine will bring to the community, as is documented in the submissions raised in paragraph 28.

320. The Commission has considered the Material and Additional Material. Based on that consideration, the Commission makes the following observations at this stage:
- the Project would potentially impact on the social cohesiveness of Boggabri, including negative impacts post mining;
 - there would likely be social benefits from drug and alcohol-free environment at the mine;
 - there seems to be a need for affordable housing, for non-mine workers, should the Project be approved;
 - increased employment, training opportunities and social contributions seem likely to flow from the Project; and
 - SIA risk assessment for post mining impacts appears to provide limited detail on transition strategies for impacted communities such as Boggabri.

Voluntary Planning Agreement

321. The Department's PIR identified that the Applicant has entered into Voluntary Planning Agreements (**VPAs**) with Gunnedah Shire Council and Narrabri Shire Council for the Approved Project. The Department's PIR identifies that the Applicant is currently negotiating updated VPAs with the two Councils for the Project and expects these VPAs to be complete prior to the determination of the Project.

3.12.2 Economics

322. As referred to in paragraph 308, during the Department's exhibition of the Project, social impacts and economic impacts were raised as a significant concern in public submissions. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the Project's social and economic impacts.
323. The Applicant's EIS Economic Assessment (**EA**) is comprised of a cost-benefit analysis (**CBA**) for NSW and a local effects analysis (**LEA**) for the local region. The EA evaluated the Project's potential direct and indirect economic costs and benefits for local and regional communities, and the State. This included a CBA that estimated the net present value (**NPV**) of the Project.
324. The Applicant stated in its EA that the EA was prepared generally in accordance with the NSW Government's Guideline for the Economic Assessment of Mining and Coal Seam Gas Proposals 2015 (**Economic Guidelines 2015**) and the Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals (Department of Planning & Environment 2018).
325. The EA concluded that the Project would result in an overall benefit for the State of \$1,208 million NPV. This benefit included \$671 million in royalties to the NSW Government, \$224 million (NPV) in incremental disposal income, and \$121 million in company tax attributable to NSW.

Public Submissions

326. The submissions to the Commission raised both positive and negative economic effects of the Project, including that the Applicant supports local businesses; the benefits and

impacts are not spread evenly across the region; the influx of mining, including the Project, have resulted in increased costs for housing, impacting non-mine workers; the Project will exacerbate a skills shortage; and the Project will provide opportunities allowing more young people to stay in the region.

The Department and Government Agency Submissions

327. The Department engaged an independent expert (Mr Gavan Dwyer of Marsden Jacobs Associates) to review the economic costs and benefits of the Project. The Marsden Jacobs review concluded that the Applicant's economic assessment is robust, aligns with the applicable guidelines, and the results are consistent with expectations.

Additional Material

328. In its Preliminary Response to Submissions, dated 7 March 2019, the Applicant noted the comments of the Department's independent expert regarding the adequacy of the Economic Assessment, however, did not provide a detailed response

Commission's Observations – Social and Economics

329. The Commission notes that the EA compares the Project against the Approved Project and a Reference Case (being a "do nothing" case, which excludes the existing Tarrawonga and Rocglen Mines, since these mines are already operational at a 4.5 Mtpa capacity). However, the EA does not consider the impact of the Approved Project on the existing Tarrawonga and Rocglen Mines, in circumstances where the Approved Project consent restricts output to a combined total of 4.5 Mtpa for all three mines, the effect of which is that the Approved Project can only operate at full capacity if the Tarrawonga and Rocglen Mines close or output is significantly constrained. The EA does not consider this impact.

330. The Commission further notes that the existing Gunnedah CHPP has an approved capacity of 3 Mtpa, thereby restricting output of the three approved mines (given the combined approved output of the three mines is 9 Mtpa). The EA does not consider this impact.

331. As such, the Commission considers that the incremental economic benefits of the Project may not be an accurate assessment, since if the Approved Project scenario were to be followed, compared with the Project there would be a significant negative economic impact on the existing Tarrawonga and Rocglen Mines (see paragraph 329).

332. The Commission notes that the EA was undertaken generally in accordance with the Economic Guidelines and accompanying Technical Notes.

333. The Commission also notes that the Applicant's CBA indicates that the Project is sensitive to variations in key inputs (e.g. availability of resources such as land and water and labour with adequate skills).

334. The Commission has considered the Material and Additional Material. Based on this consideration, the Commission makes the following observations at this stage:

- further clarification and consideration of the EA would be of assistance to identify the costs and benefits of the Project;
- further clarification would be of assistance on the economic impact, including the potential loss of resources of locating the CHPP 400m east in order to accommodate

- a bund to its west; and
 - further clarification would be of assistance on the economic impact of locating the CHPP and rail loop to the south east (i.e. in the secondary infrastructure area), as outlined in section 3.7 Project Infrastructure Area of this report in paragraphs 223 - 240.
335. Based on the Commission's observations, as listed in paragraphs 320 and 334, the Commission considers that the Department should give detailed consideration to:
- the impacts of a 'mining' based economy on that section of the community that does not receive 'mining' income;
 - all matters relevant to the economic contribution of the Project, including but not limited to:
 - assumptions used in the CBA in comparing the Approved Project to the Project, particularly in regard to the current consent conditions for the Approved Project relating to total combined output of the three mines (i.e. Approved Project, Tarrawonga and Rocglen Mines);
 - economic impact of the Approved Project scenario after accounting for the restrictions on output from the Rocglen and Tarrawonga Mines and current approval limitation of the Gunnedah CHPP;
 - incremental economic impact of the Project compared to the Approved Project, after taking account of the Approved Project 2014 consent conditions for combined mine output and the CHPP;
 - comparative economic assessment of the relocation of the CHPP 400 m east to accommodate a bund to the west of the CHPP, including impact on sterilisation of coal resources;
 - comparative economic assessment of the relocation of the CHPP and rail loop, to an alternative location in the south east (secondary infrastructure area); and
 - the SIA risk assessment for post mining impacts could be expanded to provide more detail, particularly focused on transitional strategies for impacted communities such as Boggabri.

3.13 Visual Amenity

336. The Applicant has undertaken a Visual Assessment (**VA**) as part of EIS. The VA states that there is the potential for direct and indirect night-time lighting impacts on nearby roads and residences. The sources of night-time lighting are: stationary work lights; fixed/permanent light; and vehicle and train-mounted lights.
337. The VA predicts that the scale and intensity of night-time lighting for the Project would be similar in intensity to the existing night-time lighting at other nearby coal mines, and to the intensity of the Approved Project.
338. The Applicant's EIS also states that there is the potential for night-time lighting to impact the Siding Springs Observatory, though the impacts will be minimised as far as possible through mitigation measures.
339. The VA considers the visual impact from the Western Emplacement, which, once constructed would have a maximum height of up to approximately 370 m AHD. This is approximately 110 m above the nearby Namoi River floodplain and approximately 110 m lower than the peak of the ridge in the Vickery State Forest. This will be the most visible element of the Project.

340. The VA states that:

“The waste rock emplacement would be progressively shaped for rehabilitation activities (i.e. final re-contouring, topsoiling and revegetation). The waste rock emplacement is located in proximity to existing elevated areas in the Vickery State Forest so it would effectively form an extension to these elevated areas. The final landform design of the waste rock emplacement incorporates elements of macro- and micro-relief (Figure 9). This would improve the integration of the landform with the surrounding environment and mitigate potential visual impacts.”

341. The VA states that the waste rock emplacement area will have a moderate to high impact at the regional and sub-regional scale, during construction. The visual impact is predicted to reduce to very low to low impact following the completion of the final rehabilitation of the Western Emplacement.

3.13.1 Public submissions

342. The Commission also heard concerns from speakers at the initial public hearing and received written submissions regarding the Project’s visual amenity impacts, as referred to in paragraph 28.

3.13.2 The Department and Government Agency Submissions

343. The Siding Spring Observatory noted in its submission:

“the glow from existing open cut mining operations in the Gunnedah Basin are already easily visible from the Observatory. It is the cumulative effect of all lighting sources, and not the light coming from a single mine that dictates how bright the night sky is above the Observatory. Any light emissions from the Vickery Extension Project would add to the existing emission from other resource extraction project, neighbouring communities and regional cities, pushing the night sky background inexorably towards the critical threshold quoted in Section 3.3 of the Dark Sky Planning Guideline.”

“We request that Whitehaven Coal compute the impact of their project on the natural, moon free skyglow at 550nm at 30 degrees above the horizon in the direction of the mine from the Observatory.”

3.13.3 Additional Material

344. The Applicant responded to the request from the Siding Spring Observatory, as noted in paragraph 343, in its Preliminary Response to Submissions, dated 7 March 2019, stating that:

“This level of modelling is not considered necessary as all reasonable and feasible night-lighting mitigation measures will be implemented for the Project.”

“Whitehaven will continue to consult with the Siding Springs Observatory in regard to the implementation of feasible and reasonable night-lighting mitigation measures at the Project.”

3.13.4 Commission's Observations

345. The Commission acknowledges the concerns raised by the community regarding the visual impact of the Project.
346. The Commission notes that it seems to be generally accepted that during construction, the waste emplacement areas will have a visual impact on a regional and sub-regional scale. The Commission further notes that once the emplacement areas are rehabilitated the visual impact will likely decrease.
347. The Commission acknowledges the concerns raised by the Siding Spring Observatory in relation to night-time glow and the potential impact this may have on the Observatory. The Commission notes that the Applicant has committed to working with the Siding Spring Observatory.
348. The Commission has considered the Material and Additional Material. Based on this consideration, the Commission makes the following observations at this stage:
- there is residual uncertainty regarding the extent of the visual impacts, as they relate to the waste emplacement areas; and
 - the uncertainty of night-time lighting impacts from the Project on nearby roads, residences and the Siding Spring Observatory.
349. Based on the Commission's observations, as listed in paragraph 348, the Commission considers that the Department should give detailed consideration to:
- mitigation options for those residences forecast to experience high visual impact, particularly from the waste emplacement areas during the mine's operation;
 - requesting the Applicant to provide montages showing the proposed infrastructure and waste and coal handling areas superimposed on photographs of existing land forms, to be done from a number of vantage points;
 - the Applicant's ongoing consultation with the Siding Spring Observatory; and
 - the potential night-time lighting impact on the Siding Spring Observatory, in line with the Department's Dark Sky Planning Guideline.

3.14 Traffic and Transport

350. The Applicant's EIS states that while the rail spur is being constructed, haul trucks will transport ROM coal to the Whitehaven CHPP near Gunnedah via the approved haulage route, which includes the Kamilaroi Highway.
351. The Applicant's EIS states that once the rail spur is operational all ROM coal will be moved via rail and not via the haulage route.
352. The EIS's Road Traffic Assessment (**RTA**) compares the existing situation with forecast increases in the rail line use both without the Project and with the Project in 2030. The RTA states the difference in queuing time for traffic at level crossings to be minimal, and the additional number of train movements to be minor. The RTA reports these outcomes in the form of probabilities rather than providing estimates of the increased queuing time.
353. The Commission heard concerns from speakers at the initial public hearing and received written submissions regarding the Project's traffic and transport impacts, particularly around the fact that the use of road haulage would continue for several years after the completion of the rail spur, as referred to in paragraph 28.

3.14.1 The Department and Government Agency Submissions

354. Narrabri Shire Council, in its submission to the Department, dated 30 October 2018, raised concerns that:
- mine-related traffic would use Braymont Road to get to or from the Project site, and that this had not been assessed in the Applicant's RTA; and
 - a number of local roads, including Braymont Road, would require upgrading as a result of the cumulative traffic impacts from the traffic associated with multiple mines in the area.
355. Liverpool Plains Shire Council, in its submission to the Department, dated 25 October 2018, raised concerns about the cumulative impacts of mine related traffic on level crossings and stated:

"From a cumulative impact perspective, should the project be approved, it is likely that increased pressure will be placed on regional freight 'pinch points' within the Liverpool Plains LGA. These include at Gap Road, Werris Creek and the Werris Creek Road Railway crossing."

3.14.2 Additional Material

356. In response to Narrabri Shire Council's submission, as noted in paragraph 354, the Applicant stated in its Preliminary Response to Submissions, dated 7 March 2019:

"Condition 43 of the Approved Project Development Consent (SSD-5000) provides that Braymont Road would not be used by any mine-related traffic to get to from the site, except in an emergency to avoid the loss of lives, property and/or environmental harm."

"Whitehaven's existing Traffic Management Plan, which would be revised for the Project, will detail the prescribed site access route for mine-related traffic, access restrictions (i.e. no use of Braymont Road) and access route management measures (e.g. personnel inductions and signage)."

357. In response to concerns raised at the initial public hearing regarding the use of the road network for coal haulage, as noted in paragraph 353, the Applicant provided the Commission with clarification on this issue, in its response dated 5 March 2019. The Applicant stated that the community has misunderstood the term "full operational capacity", meaning maximum coal processing, rather than commissioning of the CHPP and rail spur. This means that coal will be loaded onto trains from Year 2 onwards, and not from Year 9 (when maximum coal processing rate is reached).

3.14.3 Commission's Observations

358. The Commission notes that there are limitations on the approved tonnage for the haulage route to service the Approved Project, Tarrawonga and Rocglen operating mines .
359. The Commission notes that there is concern that the Applicant will continue to use the approved haulage route even when the rail spur is operational.
360. The Commission notes that there are concerns regarding waiting time at level crossings.

361. The Commission considers that quantifying the increase in queuing time at the level crossing by reason of the Project would likely provide all stakeholders with a better understanding of the impact that the Project will have on the level crossings.
362. The Commission notes that the Department did not consider traffic and transport to be a key issue in its PIR.
363. The Commission has considered the Material and the Additional Material and makes the following observations at this stage:
- the Department should consider whether it would be appropriate to require that once the rail spur is operational, all movements of ROM coal for the site will be undertaken by rail and not by road; and
 - that further quantitative information is required on the road and rail capacities, and the potential wait time at level crossings, as the information provided by the Applicant based on probabilities is unlikely to be sufficient.
364. Based on the Commission's observations, as listed in paragraph 363, the Commission considers that the Department should give detailed consideration to:
- whether it would be appropriate to require that once the CHPP and rail spur is operational, all movement of product coal must be via the Project's rail spur; and
 - the available information/data on road and rail capacities and wait times at level crossings, and whether or not further information is required from the Applicant in this regard.

3.15 Public Interest

365. As noted in paragraphs 40 to 43, a relevant object of the EP&A Act to the Project is the facilitation of ESD.
366. The Commission notes that section 6(2) of the *Protection of the Environment Administration Act 1991*, which is contained in the EP&A Act as the definition of ESD, states that ESD requires the effective integration of social, economic and environmental considerations, and that ESD can be achieved through the implementation of:
- (a) the precautionary principle;
 - (b) inter-generational equity;
 - (c) conservation of biological diversity and ecological integrity; and/or
 - (d) improved valuation, pricing and incentive mechanisms.

3.15.1 Public submissions

367. The Commission notes that a number of submissions were received at the initial public hearing (as outlined in paragraph 28) that the Project did not achieve the principles of ESD by reason of its failure to implement intergenerational equity. Issues raised in this context included the cumulative impacts of final voids, impacts on critically endangered habitat, damage to water resources and contribution to climate change through greenhouse gas emissions.
368. Specifically in regards to the contribution of the Project to climate change and reference to the Paris Agreement, local residents stated:

"This project will create 15 million tonnes annually every year for 25 years of scope 3 greenhouse gas emissions. The world experts, the International Energy Agency, has

predicted that if we want to keep it below two degrees warming, our global thermal coal must decline by more than 50 percent over the next two decades. The entire basis of this project has been based on an increasing demand for coal, which I believe is a fallacy and I also believe will directly contradict our Paris commitments.

“Two of the main considerations in this assessment should be the contribution that the proposed Vickery extension will make to greenhouse gas emissions and therefore global warming, and the need to protect our water resources.”

3.15.2 The Department and Government Agency Submissions

369. Narrabri Shire Council, in its submission to the Department, dated 30 October 2018, stated:

“That the Department of Planning and Environment (DPE) ensure that the Project is ecologically sustainable from an economic, environmental and social perspective.”

“That DPE apply the precautionary principle in the assessment of the economic, environmental and social impact of the Project.”

370. In its PIR, the Department stated that the contribution of the mine to climate change over the medium to long term was not considered to be significant on the basis that:

“greenhouse gas emissions would be comparable to other coal mining projects, and would contribute a small proportion to Australian and global emissions.”

3.15.3 Additional Material

371. In response to Narrabri Shire Council’s submission, the Applicant stated in its Preliminary Response to Submissions, dated 7 March 2019:

“the Project EIS was prepared having regard to biophysical, economic and social considerations, including consideration of alternatives, the principles of ecologically sustainable development (ESD) and the consistency of the Project with the objects of the EP&A Act.”

3.15.4 Commission’s Observations

372. The Commission notes the concerns raised by the community regarding ESD, as outlined in paragraph 367.

373. Notwithstanding the Applicant’s statement in its Preliminary Response to Submissions, the Commission considers that the Applicant’s EIS does not sufficiently detail consideration of the project against the principles of ESD.

374. The Commission has considered the Material and the Additional Material and makes the following observations at this stage:

- that consideration of the Project against the principles of ESD is critical as required under the EP&A Act;
- issues of intergenerational equity need to be assessed; and
- further detailed assessment of direct and indirect GHG emissions is likely to be of assistance.

375. Based on the Commission's observations, as listed in paragraph 374, the Commission considers that the Department should give detailed consideration to:
- how the Project adheres to the objects of the EP&A Act, in particular the principles of ESD;
 - the assessments which have been completed for the Project in relation to the forecast of direct and indirect GHG emissions (i.e. Scope 1, Scope 2 and Scope 3 emissions);
 - GHG emission forecasts provided by the Applicant having regard to current relevant climate change policy frameworks (e.g. NSW Climate Change Policy Framework and the Paris Agreement); and
 - the demand for product coal from the Project and whether its sale will be to a country that is a signatory to the Paris Agreement.

3.16 Procedural Concerns

376. The Commission heard concerns from speakers at the initial public hearing and received written submissions regarding the new procedure of the IPC, as referred to in paragraph 28.
377. In these submissions it was expressed that the community is forced to read, make submissions and appear at a hearing in response to an EIS, which is missing key pieces of information in relation to groundwater, and the railway track alignment and construction. Certain members of the community indicated that they consider that it is a waste of their time.
378. The Commission notes that this Project is the first to be dealt with under the new *Guidelines for a Preliminary Public Hearing Held in Multiple Stages*, and acknowledges the frustration raised in the submissions.

4 CONCLUSION

379. In response to the Minister's Request, the Commission has carefully considered the Project, the Material, the Additional Material as well as relevant NSW Government Policies.
380. The Commission considers that there are several issues where uncertainty remains about the predicted impacts of the Project, including those related to:
- strategic context and Project justification;
 - groundwater;
 - surface water and flooding;
 - water balance;
 - noise and blasting;
 - air quality;
 - Project infrastructure area;
 - biodiversity;
 - rehabilitation, final void and final landform;
 - heritage;
 - social and economics;
 - visual amenity;
 - traffic and transport; and
 - the public interest.

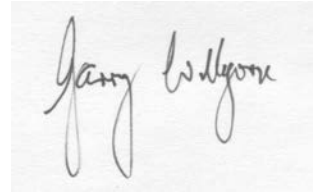
381. The Commission has identified a number of issues associated with these 14 aspects of the Project, all of which the Commission considers are key issues requiring detailed consideration by the Department in its evaluation of the merits of the Project.



John Hann
Chair of the Commission



Professor Chris Fell
Member of the Commission



Professor Garry Willgoose
Member of the Commission