

# **VICKERY EXTENSION PROJECT**

## **ENVIRONMENTAL IMPACT STATEMENT**

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# **EXECUTIVE SUMMARY**

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## EXECUTIVE SUMMARY

### ES1 BACKGROUND

The Vickery Coal Project (the Approved Mine) is an approved, but yet to be constructed, open cut coal mine located in the Gunnedah Coalfield, approximately 25 kilometres (km) north of Gunnedah in New South Wales (NSW) (Figure ES-1).

The Approved Mine is owned by Whitehaven Coal Limited (Whitehaven).

This document is an Environmental Impact Statement (EIS) for the Vickery Extension Project (the Project). The Project would involve the extension of open cut mining operations at the Approved Mine. This EIS provides:

- a description of the Project;
- a summary of consultation undertaken;
- an assessment of potential impacts;
- the Project environmental management strategy; and
- a Project justification and summary of the requirements and application of relevant legislation.

### ES2 APPROVAL PROCESS

#### ES2.1 NEW SOUTH WALES

The Project is ‘State Significant Development’ to which Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* applies.

This EIS has been prepared to accompany a Development Application made for the Project, in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act, 1979*.

The EIS considers the potential environmental impacts of the Project in accordance with the Secretary’s Environmental Assessment Requirements issued by the NSW Department of Planning and Environment on 19 February 2016 (and reissued on 19 July 2018), including input from the (then) Commonwealth Department of the Environment (now the Department of the Environment and Energy).

Whitehaven is seeking Development Consent for the Project, which would replace the existing Approved Mine Development Consent (SSD-5000).

#### ES2.2 COMMONWEALTH

The proposed action to extend open cut coal mining and processing operations at the Approved Mine was referred to the Commonwealth Minister in February 2016 (EPBC 2016/7649) (the proposed action).

A delegate of the Commonwealth Minister determined on 14 April 2016 that the proposed action is a ‘controlled action’ for the purposes of the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

This EIS provides an assessment of potential impacts to the following controlling provisions, considered by the Commonwealth Minister to be relevant to the action:

- listed threatened species and communities; and
- a water resource (in relation to large coal mining development).

The delegate of the Commonwealth Minister also determined on 14 April 2016 that the proposed action is to be assessed under the assessment bilateral agreement with the NSW Government.

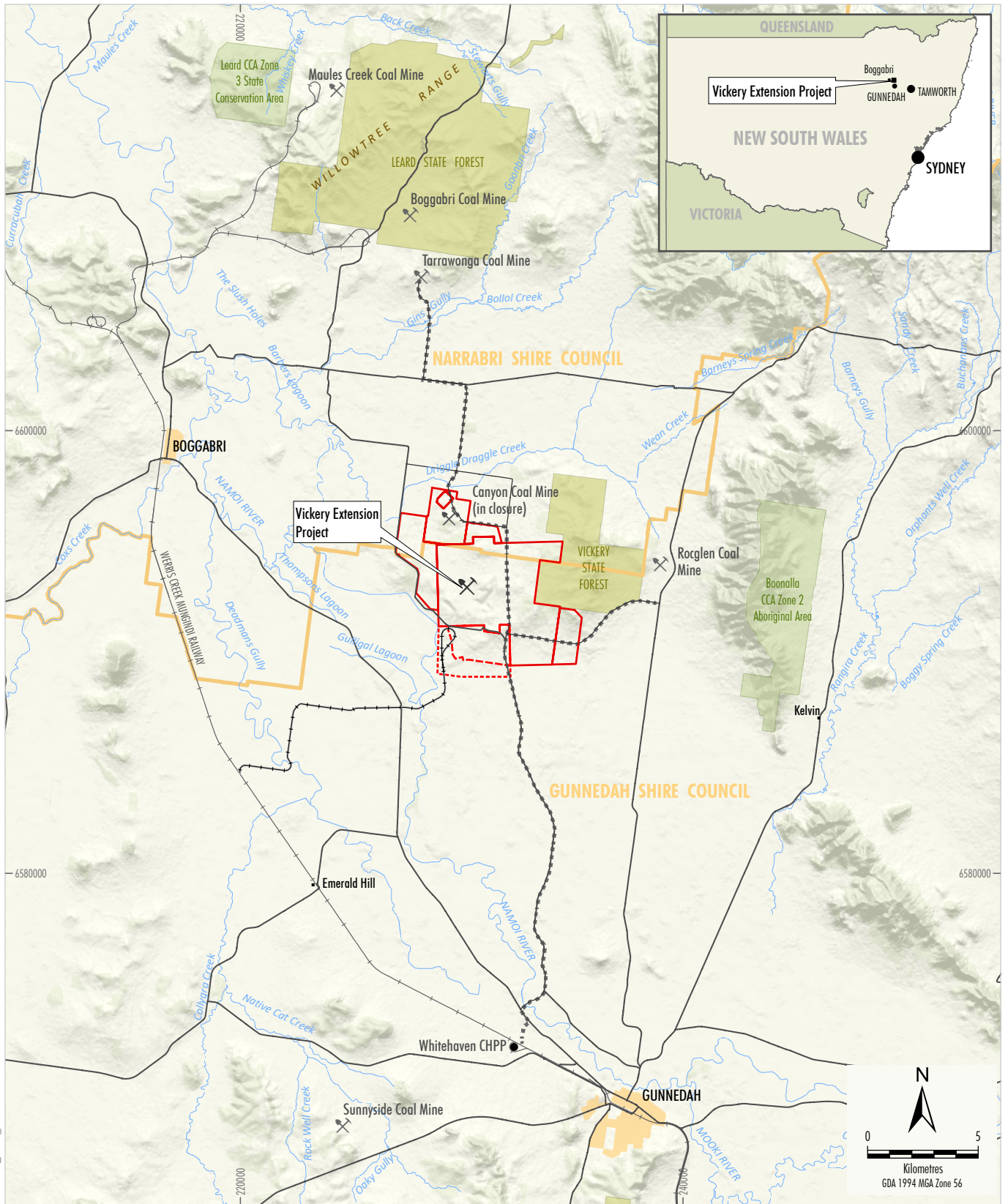
On 17 July 2018 the delegate of the Commonwealth Minister accepted a variation to the proposed action to reflect changes to the Project layout in comparison to the February 2016 referral.

#### ES2.3 DETERMINATION

Following public exhibition of this EIS by the NSW Department of Planning and Environment, submissions from the community and government agencies will be addressed by Whitehaven.

The Project will then be determined by the NSW Minister for Planning or the Independent Planning Commission under the NSW *Environmental Planning and Assessment Act, 1979*.

Following completion of the NSW assessment process, the Project will then also be determined by the Commonwealth Minister for the Environment under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

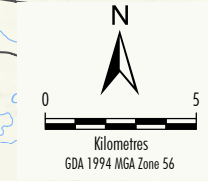


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**LEGEND**

- Mining Tenement Boundary (ML and CL)
- Exploration Licence Boundary (EL)
- Mining Lease Application (MLA)
- Local Government Boundary
- State Forest
- State Conservation Area, Aboriginal Area
- Major Roads
- Railway
- Approved Road Transport Route
- Indicative Project Rail Spur

Source: LPMA - Topographic Base (2010); NSW Department of Industry (2015)



**WHITEHAVEN COAL**

**VICKERY EXTENSION PROJECT**  
Project Location

**Figure ES-1**

## ES3 THE PROJECT

### ES3.1 SUMMARY OF THE APPROVED MINE

The NSW Minister for Planning granted Development Consent for the Approved Mine on 14 September 2014.

The Approved Mine would involve open cut mining with annual run-of-mine (ROM) coal production of 4.5 million tonnes per annum (Mtpa) over a 30 year mine life. ROM coal from the Approved Mine is approved to be transported by road to the Whitehaven Coal Handling and Preparation Plant (CHPP) located 5 km north-west of Gunnedah (Figure ES-1). From the Whitehaven CHPP, product coal is approved to be transported by rail to market.

Major components of the Approved Mine include an open cut pit, waste rock emplacements, ROM coal pads and handling infrastructure, water management infrastructure and other infrastructure areas. The approximate extent of the Approved Mine is shown on Figure ES-2.

The open cut mining sequence would result in the development of two final voids and two out-of-pit waste rock emplacements within the final landform. An existing final void, located between the Approved Mine and the Namoi River (the Blue Vale final void) would also remain within the landscape.

The Approved Mine would operate 24 hours per day, seven days per week. Transport of ROM coal from the Approved Mine along public roads is approved to be conducted six days per week, between 6.00 am and 9.15 pm Monday to Friday and between 7.00 am and 5.15 pm on Saturday.

### ES3.2 PROJECT SUMMARY AND BENEFITS

In 2013 Whitehaven acquired Exploration Licence (EL) 7407, located to the immediate south of the Approved Mine (Figure ES-2).

Following acquisition of EL 7407 and further definition of resources within its mining tenements, Whitehaven reviewed the Approved Mine plan and identified opportunities to improve its design with the following benefits:

- a more efficient extraction of ROM coal reserves within the existing mining tenements;

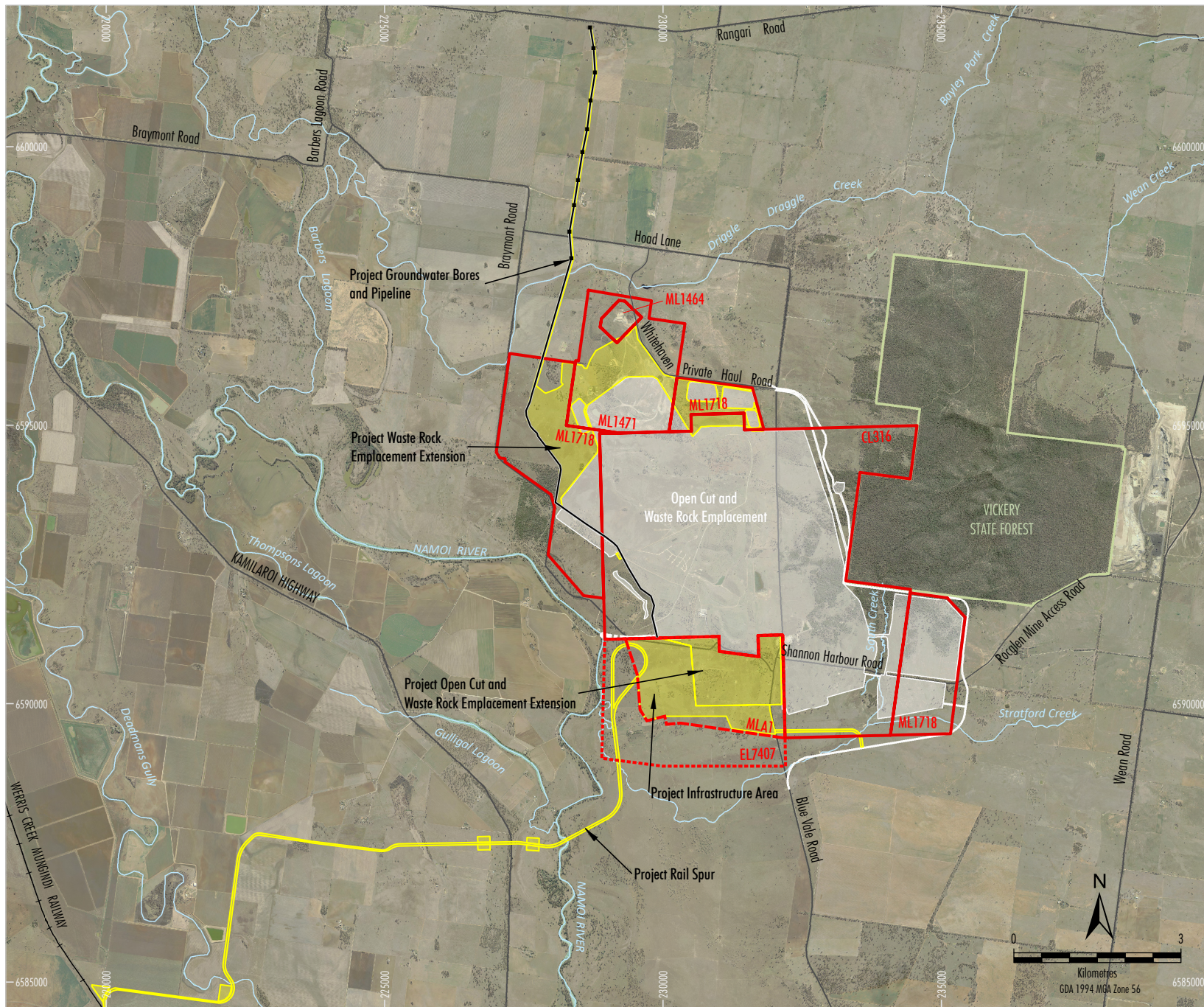
- removal of the requirement for ROM coal from the Project (and other Whitehaven mines) to be transported on public roads once an on-site CHPP at the Project, train load-out facility and rail spur infrastructure are constructed and reach full operational capacity; and
- improvement of the compatibility of the final landform with the surrounding landscape by:
  - reducing the number of final voids resulting from the proposed mining operations from two (for the Approved Mine) to one (for the Project) (in addition to the existing Blue Vale final void, which would remain for both the Approved Mine and the Project);
  - designing the waste rock emplacement to incorporate natural landform design features (i.e. micro- and macro-relief); and
  - removing the requirement to construct the approved Eastern Emplacement, avoiding this approved emplacement area becoming a permanent feature of the final landform.

The main activities associated with the Project would include:

- open cut mining of the coal reserves associated with the Approved Mine;
- a physical extension to the Approved Mine footprint to gain access to additional ROM coal reserves within EL 7407 (Figures ES-2 and ES-3);
- an increase in ROM coal mining rate to an average of 7.2 Mtpa over the mine life, with a peak production of approximately 10 Mtpa;
- an increase in the footprint of waste rock emplacement areas; and
- construction and operation of the Project CHPP, train load-out facility and rail spur (Figure ES-4) for the handling, processing and transport of coal from the Project, as well as other Whitehaven mines.

The Project would be conducted over a mine life of approximately 25 years and employ a workforce of up to approximately 450 full-time equivalent construction personnel and up to approximately 500 full-time equivalent operational personnel.

Table ES-1 provides a summary comparison of the Approved Mine and the Project components.



**LEGEND**

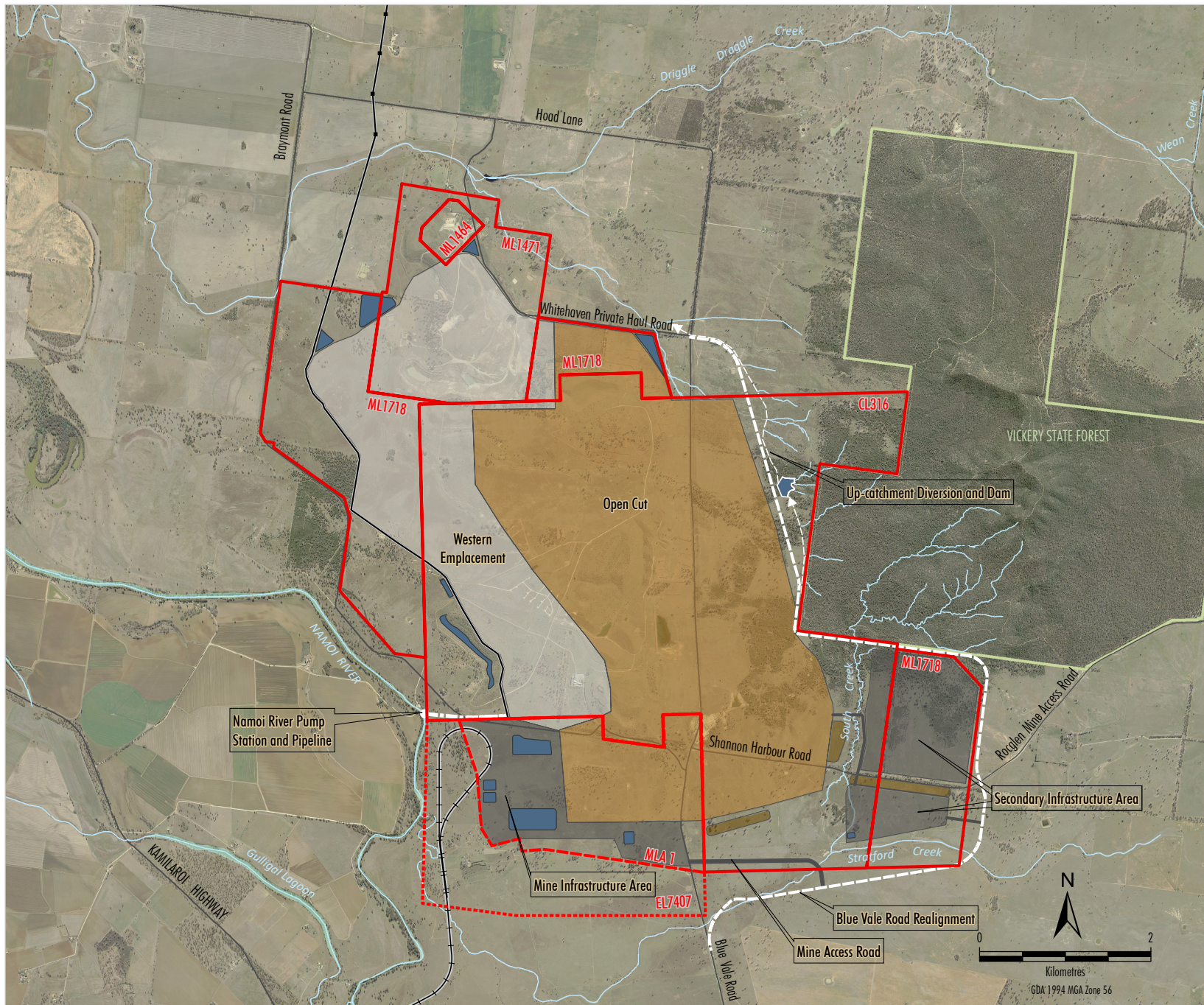
- Mining Tenement Boundary (ML and CL)
- Exploration Licence Boundary (EL)
- Mining Lease Application (MLA)
- NSW State Forest
- Indicative Extent of Approved Mine
- Indicative Namoï River Pump Station and Pipeline
- Indicative Extent of Vicky Extension Project Additional Area

Source: Department of Industry (2015)  
 Orthophoto - Department of Land and Property Information,  
 Aerial Photography (July 2011)



**VICKERY EXTENSION PROJECT**  
 Approximate Extents of Approved Mine and  
 Vicky Extension Project

**Figure ES-2**

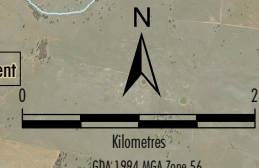


- LEGEND**
- Mining Tenement Boundary (ML and CL)
  - Exploration Licence Boundary (EL)
  - Mining Lease Application (MLA)
  - State Forest
- Project Components**
- Indicative Extent of Open Cut
  - Indicative Extent of Out of Pit Waste Rock Emplacement
  - Indicative Extent of Infrastructure Area
  - Indicative Extent of Soil Stockpile
  - Indicative Extent of Water Storage
  - Indicative Mine Access Road Alignment
  - Indicative Namoi River Pump Station and Pipeline
  - Indicative Road Realignment
  - Indicative Up-catchment Diversion and Dam Location
  - Indicative Rail Spur Alignment
  - Indicative Location of Groundwater Bores and Pipeline

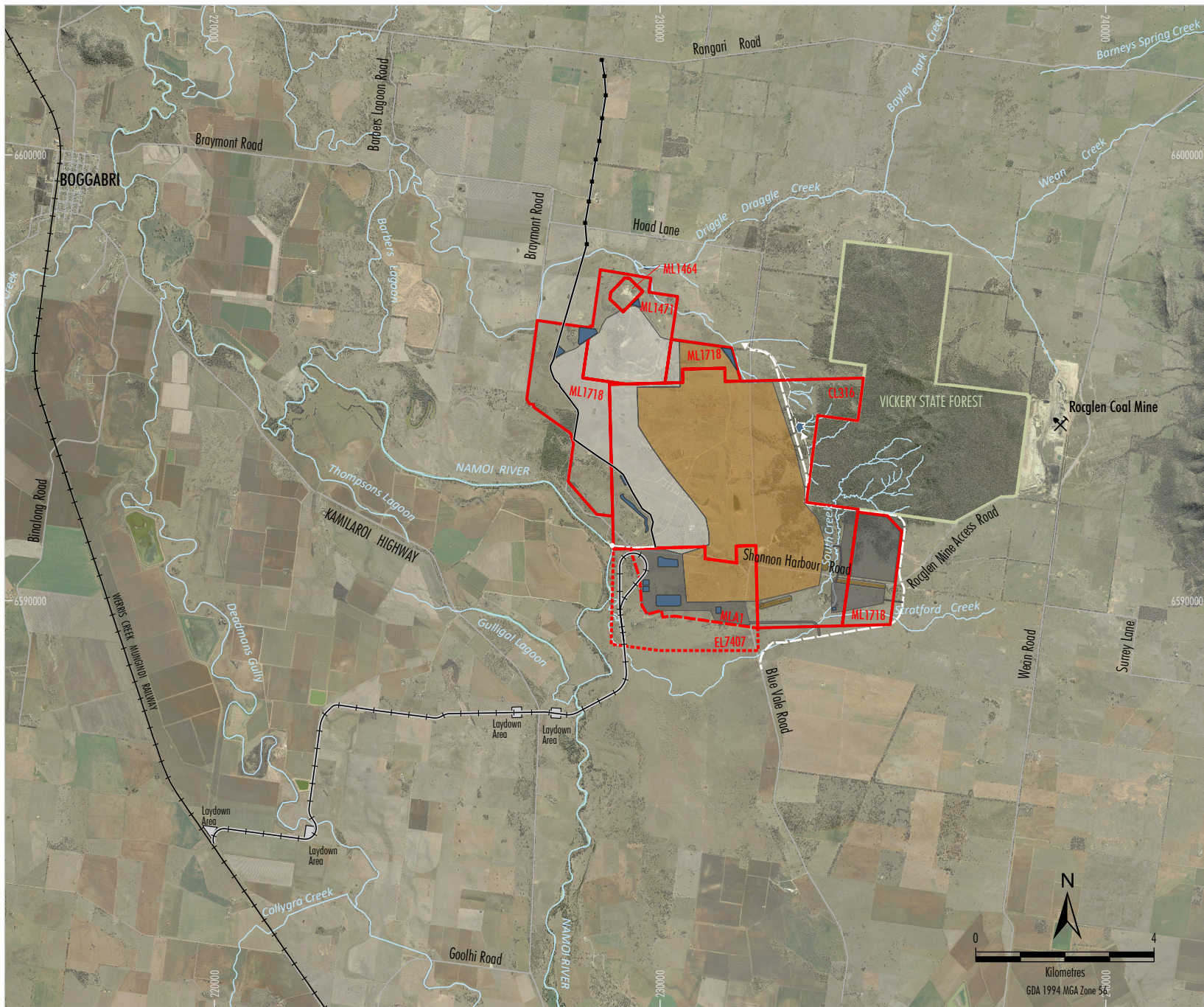
Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015); Essential Energy (2015)



**VICKERY EXTENSION PROJECT**  
**Project General Arrangement -**  
**Project Mining Area**



**Figure ES-3**



**LEGEND**

- Mining Tenement Boundary (ML and CL)
- Exploration Licence Boundary (EL)
- Mining Lease Application (MLA)
- State Forest
- Railway

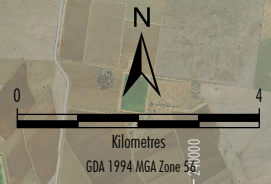
**Project Components**

- Indicative Extent of Open Cut
- Indicative Extent of Out of Pit Waste Rock Emplacement
- Indicative Extent of Infrastructure Area
- Indicative Extent of Soil Stockpile
- Indicative Extent of Water Storage
- Indicative Mine Access Road Alignment
- Indicative Road Realignment
- Indicative Namoi River Pump Station and Pipeline
- Indicative Up-catchment Diversion and Dam Location
- Indicative Rail Spur Alignment
- Indicative Location of Groundwater Bores and Pipeline

Source: Orthophoto - Department of Land and Property Information, Aerial Photography (July 2011); Department of Industry (2015)



**VICKERY EXTENSION PROJECT**  
**Indicative Rail Spur Alignment and**  
**Groundwater Bore Locations**



**Figure ES-4**



**Table ES-1  
Approved Mine and Project Summary**

Project Component	Summary of the Approved Mine	Summary of the Project
Mine life	Approximately 30 years.	Approximately 25 years.
Mining method	Open cut mining to a depth of approximately 250 metres below ground level.	Unchanged from the Approved Mine.
Open cut extent	One open cut.	Extension of the Approved Mine's open cut.
Annual production rate	Up to 4.5 Mtpa of ROM coal.	Up to approximately 10 Mtpa ROM coal.
Total resource	135 Mt ROM coal.	179 Mt ROM coal.
Management of waste rock, coal rejects and final landform	<p>Co-disposal of waste rock and coal rejects from the Whitehaven CHPP within the Western and Eastern Emplacements and within the footprint of the open cut voids.</p> <p>The Project area currently includes five final voids associated with historic mining activity. The final landform would include three final voids (Northern and Southern voids and the existing Blue Vale final void).</p>	<p>Co-disposal of waste rock and coal rejects within the Western Emplacement and within the footprint of the open cut void.</p> <p>No requirement to construct the approved Eastern Emplacement.</p> <p>The final landform would reduce the number of final voids from five to two (the Project open cut final void and the existing Blue Vale final void).</p>
Coal handling, processing and transport infrastructure	<p>On-site coal crushing and screening facilities.</p> <p>Use of the Approved Road Transport Route to haul ROM coal from the Project to the Whitehaven CHPP for processing.</p> <p>Use of the Whitehaven CHPP, train load-out and rail spur infrastructure to transport product coal to market.</p>	<p>Use of the Approved Road Transport Route to haul ROM coal from the Project to the Whitehaven CHPP until the Project CHPP, train load-out facility and rail spur infrastructure reach full operational capacity.</p> <p>Ability to receive ROM coal via road from other Whitehaven mining operations for stockpiling and/or processing at the Project CHPP.</p> <p>On-site processing of up to approximately 13 Mtpa of ROM coal (combined) from the Project and other Whitehaven mining operations.</p> <p>Use of the Project train load-out facility and rail spur infrastructure to transport up to approximately 11.5 Mtpa of product coal (combined) to market from the Project and other Whitehaven mining operations.</p>
Water management	On-site water management system, comprising water management storages and collection drains, up-catchment diversions, sediment control and open cut dewatering.	As per the Approved Mine, with construction and use of a groundwater supply borefield to the north of the Project.
Water supply	Mine water supply to be obtained from inflows to open cut areas, sediment dams and storage dams, plus surface water and/or groundwater licences as required.	Unchanged from the Approved Mine.
Workforce	<p>Up to 60 full-time equivalent construction workforce plus additional contract personnel.</p> <p>Up to 250 full-time equivalent on-site operational personnel plus additional contract personnel.</p>	<p>Up to approximately 500 full-time equivalent construction personnel.</p> <p>Up to approximately 450 full-time equivalent on-site operational personnel.</p>
Operating hours	Mining would occur 24 hours per day, seven days per week.	Unchanged from the Approved Mine.

During initial consultation with the community on a range of aspects regarding the Project, feedback indicated some sensitivity about the proximity of the proposed Blue Vale Open Cut (as per the extent described in the *Project Description and Preliminary Environmental Assessment*) to the Namoi River.

As a result of this community feedback, Whitehaven has decided to remove the Blue Vale Open Cut from the Project scope.

This results in a reduction in total ROM coal reserves associated with the Project from 186 Mt to 179 Mt, with an associated value of some \$900M which would be foregone.

### ES3.3 POTENTIAL IMPACT COMPARISON

This Environmental Impact Statement describes potential impacts associated with the Project in its entirety (i.e. as opposed to only incremental impacts beyond the Approved Mine).

Notwithstanding, when compared to the Approved Mine, the findings of this EIS indicate the Project would result in:

- Increased net benefits to NSW of an estimated \$500 million (net present value) over the life of the Project.
- Increased employment opportunities (approximately 200 additional full-time equivalent personnel), with associated benefits to the local and regional economies.
- Increased community and local government contributions.
- Reduction in road traffic noise along Blue Vale Road and the Kamilaroi Highway, and a reduction in amenity impacts (e.g. noise, dust) for residences in the vicinity of the Whitehaven CHPP, following the cessation of ROM coal haulage to the Whitehaven CHPP.
- No increase in groundwater drawdown at bores located on privately-owned properties (i.e. drawdown is within the 'Level 1' minimal impact criteria specified in the *NSW Aquifer Interference Policy*).
- No external water demands beyond groundwater and surface water licences currently held by Whitehaven.

- No additional impacts to the water resources associated with the Namoi River and its alluvium (e.g. the Project waste rock emplacement and open cut are no closer to the Namoi River).
- No additional 'noise affected' properties (i.e. no additional properties are predicted to be in the acquisition or mitigation upon request zones).
- No increased air quality impacts (i.e. compliance with air quality criteria is predicted at all privately-owned receivers).
- No significant change in visual impacts from mine landforms following rehabilitation (i.e. the extent and height of Project mine landforms would be similar to the Approved Mine when viewed from privately-owned dwellings).

### ES3.4 PROJECT CONSTRUCTION ACTIVITIES

Construction would occur during a number of stages over the life of the Project.

The major construction period would be in the first 12 months of the Project.

Initial construction activities would involve development of the following key Project infrastructure components:

- mine infrastructure area (incorporating the Project CHPP) and mine access road;
- rail spur and rail loop;
- water management infrastructure; and
- water and electricity supply infrastructure.

### ES3.5 MINING OPERATIONS

The mobile equipment used for the Project would vary according to the requirements of the open cut mining operations. It would include a combination of excavators and/or shovels and haul trucks, with a support fleet that includes dozers, scrapers, graders, front end loaders, drill rigs and water trucks. Approximately 179 Mt of ROM coal would be mined from the open cut over the life of the Project at an average rate of approximately 7.2 Mtpa, and a maximum rate of 10 Mtpa.

## ES3.6 KEY PROJECT INFRASTRUCTURE

### ES3.6.1 Mine Infrastructure Areas

The mine infrastructure area would be constructed to the south of the Western Emplacement (Figure ES-3). Key components of the mine infrastructure area would include:

- coal pads and stockpiles, ROM handling and dumping facilities, product coal stacking and reclaim facilities;
- CHPP incorporating coal handling, reject handling, crushing, screening and washing infrastructure;
- rail spur, rail loop and train load-out facilities;
- water and flood management infrastructure;
- administration, crib room, ablution and first aid facilities;
- storage, laydown, maintenance and emergency management facilities;
- vehicle parking and washdown facilities;
- sewage and water treatment facilities; and
- communication and electricity distribution infrastructure.

Other infrastructure areas may also be constructed as part of the Project, including a temporary infrastructure area within the Western Emplacement footprint that may be used during the initial stage of the Project, and secondary infrastructure areas to the east of the open cut (Figure ES-3).

### ES3.6.2 Project Rail Spur

A rail spur and loop would be constructed to connect the Project to the Werris Creek Mungindi Railway (Figure ES-4).

A number of alternative rail spur alignments were analysed during the conceptual design of the Project. The analysis considered a number of factors, including:

- length of rail spur and cycle times;
- land ownership and proximity to dwellings;
- watercourse and road crossing requirements;

- impacts to vegetation, threatened species habitat, existing biodiversity offset areas, flood characteristics and heritage sites;
- existing rail infrastructure capacity and upgrade requirements;
- capital costs and operating costs; and
- operational and scheduling impacts to other rail users.

The outcome of the analysis identified an alignment connecting the Project directly to the Werris Creek Mungindi Railway (Figure ES-4) to be superior to other alternatives.

The Project rail spur and loop would generally be an elevated structure with some in-filled embankment sections where conditions permit.

Where the Project rail spur crosses the Namoi River (and Kamilaroi Highway) it would be elevated on a viaduct structure to minimise impacts to the flooding regime and provide sufficient clearance for vehicles travelling along the Kamilaroi Highway. The viaduct structure would consist of spans between piers supporting the rail track.

## ES3.7 COAL PROCESSING AND TRANSPORT

Until the Project CHPP, train load-out facility and rail spur reach full operational capacity, transport of ROM coal from the Project by road to the Whitehaven CHPP (Figure ES-1) would be conducted consistent with the Development Consent conditions for coal haulage for the Approved Mine.

Once the Project CHPP, train load-out facility and rail spur reach full operational capacity, ROM coal from the Project would no longer be processed at the Whitehaven CHPP.

Over the life of the Project, additional ROM coal would be hauled from other Whitehaven mining operations to the Project CHPP by on-road haul trucks.

Product coal from the Project CHPP would be stockpiled before being conveyed to the train load-out facility located at the rail loop.

Product coal would be loaded onto trains for transportation to market via the Project rail spur and the Werris Creek Mungindi Railway and Main Northern Railway.

Coal processing at the Project CHPP and transport via the Project rail spur would be conducted up to 24 hours per day, seven days per week.

### **ES3.8 WATER MANAGEMENT AND SUPPLY INFRASTRUCTURE**

The objectives and design criteria of the Project Water Management System are consistent with those presented for the Approved Mine, which are to:

- protect the integrity of local and regional water resources;
- separate runoff from undisturbed, rehabilitated and mining affected areas;
- design and manage the system to operate reliably throughout the life of the mine in all seasonal conditions, including both extended wet and dry periods;
- provide a sufficient source of water for use in mining operations, including during periods of extended dry weather;
- provide sufficient storage capacity in the system to store, treat and discharge runoff as required, including during periods of extended wet weather;
- develop facilities required for the long-term functioning of the Project Water Management System as soon as practicable and to minimise the number of facilities that will be removed by mining activities during the Project life;
- minimise the requirement for external water supply; and
- minimise the number of licensed discharge points.

Key components of the water management system would include:

- up-catchment diversion structures;
- sediment dams, mine water dams, coal contact dams and mine water surge storages;
- licensed discharge points from sediment dams; and
- flood bunds.

The main water requirements for the Project would be for the Project CHPP make-up supply and dust suppression on haul roads and active waste rock emplacements.

Water required for the Project would be preferentially sourced from mine water dams, coal contact water dams and other on-site storages.

Water supply required over the life of the Project would be sourced from the Namoi River, via the Project pump station and pipeline, or from the groundwater supply borefield and associated pipeline to be located to the north of the Project mining area (Figure ES-4). There may be opportunity to transfer water to or from other mining operations when necessary.

All water demands are predicted to be within surface and groundwater licences currently held by Whitehaven.

### **ES3.9 WORKFORCE**

At full development, the Project operational workforce would be in the order of up to approximately 450 full-time equivalent on-site personnel.

Whitehaven anticipates that the majority of the Project operational workforce would be drawn from the Gunnedah and Narrabri Local Government Areas.

Construction/development activities (e.g. construction of the mine infrastructure area and service facilities) would require an additional construction workforce of up to approximately 500 full-time equivalent personnel.

## **ES4 CONSULTATION**

Consultation conducted during the preparation of this EIS has provided the opportunity to explain the Project and identify issues of concern or interest to stakeholders.

### **ES4.1 COMMUNITY CONSULTATION**

Community engagement has occurred through the development of the EIS for the Project and, prior to that, through the EIS for the Approved Mine.

A Community Consultative Committee established for the Approved Mine was provided regular updates on the Project and development of the EIS during 2016 to 2018.

In addition to briefing the Community Consultative Committee, Whitehaven met with a number of local landholders, including those predicted to be directly and indirectly impacted by the Project, to discuss the Project and relevant environmental assessments.

Key issues raised by the landholders were used to inform the design of the Project and management measures to mitigate potential impacts.

Whitehaven presented updates on the Project and environmental studies at Boggabri Business and Community Progress Association meetings.

Project-specific information was distributed during preparation of the EIS to inform the local community and to provide updates on the progress of the Project.

Project fact sheets have been prepared by Whitehaven and will be distributed to the local community following submission of this EIS.

Consultation was undertaken by Elliott Whiteing to inform the Social Impact Assessment. Interviews were held with local landholders and representatives of the broader community to establish a social baseline and identify potential social opportunities and impacts.

### **Aboriginal Community**

Aboriginal community consultation was undertaken in accordance with the NSW Office of Environment and Heritage's policy *Aboriginal cultural heritage consultation requirements for proponents 2010* and clause 80C of the *NSW National Parks and Wildlife Regulation, 2009*.

All stakeholders who registered an interest in the Project were invited to participate in the Aboriginal Cultural Heritage Assessment.

### **ES4.2 GOVERNMENT AND INFRASTRUCTURE OWNERS**

Whitehaven consults with relevant NSW State Government agencies on a regular basis in relation to its other operations in the Gunnedah Basin.

Consultation with key NSW State Government agencies in relation to the Project commenced in 2015.

During the preparation of this EIS, a wide range of meetings and briefings were held with Commonwealth, State and local government agencies to ascertain and discuss issues of potential relevance to the Project.

Whitehaven also consulted with owners of infrastructure located proximal to the Project (e.g. the Australian Rail Track Corporation) and the owners of other local mining developments (e.g. Idemitsu Australia Resources Pty Ltd).

## **ES5 KEY ENVIRONMENTAL ASSESSMENT ISSUES AND MANAGEMENT**

### **ES5.1 LAND RESOURCES AND AGRICULTURAL PRODUCTION**

An Agricultural Impact Statement, including a Soil Resource Assessment, was prepared for the Project in accordance with the *Strategic Regional Land Use Policy – Guideline for Agricultural Impact Statements* and the *Agricultural Impact Statement Technical Notes*.

The majority of the Project area is cleared and is dominated by grassland areas with occasional re-growth trees. In addition, the Project mining area includes areas of land that have been previously disturbed by mining activities and are now rehabilitated. The existing rehabilitated landform includes five final voids from the historical mining activities.

The natural topography in the Project mining area consists of undulating hills and slopes, with the elevation ranging from approximately 255 metres (m) Australian Height Datum (AHD) to approximately 325 m AHD. The topography is more dissected and steeper within the Vickery State Forest to the east of the Project where it rises to approximately 479 m AHD.

To the north, south and west of the Project mining area the topography is gently sloping to almost flat, and generally drains towards the Namoi River. These floodplains typically have elevations of between 250 to 260 m AHD.

The entire Project mining area, and the properties traversed by the Project rail spur east of the Namoi River, are currently owned by Whitehaven, and are primarily used for cattle grazing under licence agreement with Whitehaven. The carrying capacity of the Project mining area is generally considered to be relatively low.

West of the Namoi River, the Project rail spur would be located on land where Whitehaven has entered into access agreements.

Development of the Project, and rehabilitation of disturbed areas to woodland, would impact on approximately 2,541 hectares (ha) of agricultural land in the long-term. Approximately 342 ha would be rehabilitated to land suitable for agricultural use.

## ES5.2 GROUNDWATER

A Groundwater Assessment including numerical modelling for the Project was undertaken by HydroSimulations.

The two groundwater systems identified in the relevant water sharing plans in the vicinity of the Project are:

- Alluvial groundwater system – associated with the unconsolidated alluvial sediments of the Namoi River floodplains.
- Porous rock groundwater system – including coal measures of the Maules Creek Formation.

The alluvial groundwater system includes the productive aquifers used extensively to support irrigation in the Namoi Valley. Conversely, the porous rock groundwater system is not considered productive, with relatively low yields and poor quality.

Studies undertaken for the Approved Mine and the Project, including drilling transects of shallow holes and geophysics surveys, have confirmed the open cut extent is located entirely within the porous rock groundwater system of the Maules Creek Formation, and does not extend into the surrounding alluvial system associated with the Namoi River floodplains.

Groundwater modelling conducted for the Project concluded:

- there would be negligible groundwater drawdown within the alluvial groundwater system associated with the Namoi River floodplain;
- impacts at privately-owned groundwater bores are predicted to be negligible (i.e. less than 1 m);
- no adverse water quality impacts to the alluvial groundwater system are predicted; and
- no impacts to high priority Groundwater Dependent Ecosystems are predicted.

Whitehaven currently holds licences sufficient to cover the modelled groundwater inflows from the porous rock groundwater sources and associated losses from the alluvium and Namoi River due to enhanced leakage to the Maules Creek Formation.

## ES5.3 SURFACE WATER

A Surface Water Assessment for the Project was undertaken by Advisian.

The Project mining area is situated within the Namoi River Catchment. The Namoi River is located to the west of the Project mining area (Figure ES-3) and generally flows in a north-westerly direction from its headwaters in the Great Dividing Range.

The headwaters of Driggle Draggie Creek and a number of other unnamed ephemeral streams originate in the slopes of the Vickery State Forest (Figure ES-3). As they descend onto the flatter areas they are less well-defined, becoming expansive, ponded, overland flow areas during and following heavy rainfall. These flows slowly move down gradient and merge with the Namoi River.

The surface water quality and flow regimes in the Project mining area reflect the influences of the historical clearing and the elevated catchments within the Vickery State Forest.

The Project Water Management System has been designed to protect the integrity of local and regional water sources and separate runoff from undisturbed, rehabilitated and mining affected areas. Water that has been in contact with the open cut or coal stockpiles would be captured and stored in mine water dams and coal contact water dams. Mine water dams and coal contact water dams would be managed to contain and re-use this water on-site.

Prior to rehabilitation becoming established, runoff from active waste rock emplacement areas would be captured in appropriately designed sediment dams and either transferred to the Project Water Management System for re-use or discharged off-site (subject to achieving the desired water quality) to restore the capacity of the dam.

With these controls in place, the Project is predicted to have negligible impact on water quality in the receiving watercourses.

Progressive development of the Project would result in changes to flow in local drainage lines and watercourses, however the changes are not predicted to impact downstream surface water users or the geomorphologic characteristics or riparian values of the watercourses themselves.

Consistent with the approach for the Approved Mine, water would be extracted from the Namoi River when supply from the mine storages is insufficient to meet the demand. As all extraction from the Namoi River would be conducted in accordance with licensed entitlements, and in accordance with the rules in the relevant Water Sharing Plan, impacts to the Namoi River water source are not anticipated to be significant.

## ES5.4 FLOODING

A Flood Assessment for the Project was undertaken by WRM Water and Environment.

A numerical flood model of the Namoi River floodplain has been developed to identify the extent and characteristics of existing flood events and the predicted changes to flood characteristics due to development of the Project.

Parts of the Project infrastructure (e.g. the mine infrastructure area, rail loop and Project rail spur) are located within the Namoi River floodplain, however the Project open cut and waste rock emplacement areas are located beyond the predicted extent of flooding from the Namoi River.

The Project rail spur has been conceptually designed with openings and elevated structures to manage impacts to flood characteristics. The design considered the requirements of the draft *Floodplain Management Plan for the Upper Namoi Valley Floodplain* (NSW Office of Environment and Heritage and NSW Department of Industry, 2016), with objectives of minimising afflux upstream, changes to flood velocities and the diversion of flood flows.

Increases to flood levels at the Project rail spur during a 1 in 100 year flood event are predicted to increase by up to 0.3 m within Whitehaven-owned land. This impact is predicted to dissipate to zero within 1.5 km of the Project rail spur.

A negligible impact at the nearest privately-owned dwelling is predicted for the 1 in 100 year flood event (i.e. approximately 1 centimetre). No change to flood levels at any other dwellings are predicted as a result of the construction of the Project rail spur.

The development of the Project mining area, including the mine infrastructure areas and rail loop, are predicted to have a negligible impact on flood characteristics, with any changes being restricted to Whitehaven-owned land.

The residual predicted flooding impacts described above would be mitigated further during the detailed design and construction of the Project.

## ES5.5 NOISE AND BLASTING

### *Operational Noise*

A Noise and Blasting Assessment for the Project was undertaken by Wilkinson Murray.

Three operational scenarios were assessed to predict potential noise impacts due to the Project. The scenarios were selected in consideration of maximum potential noise emissions (e.g. to account for the maximum mobile equipment fleet and proximity to sensitive receivers) to evaluate the potential impacts at the nearest privately-owned receivers.

An assessment of feasible and reasonable noise mitigation measures for the Project was conducted during the modelling, particularly in relation to evening and night-time operations.

A number of iterative steps were undertaken to develop noise mitigation measures for the Project, including the following:

1. Preliminary noise modelling of scenarios representative of the maximum noise emissions from the Project to identify potential for noise exceedances. As a result of this preliminary modelling, modifications to the mine plan were undertaken in order to improve acoustic performance, including:
  - a. Removal of the proposed Blue Vale Open Cut.
  - b. Redesign of the waste rock emplacement area and mine progression direction to provide opportunities for shielding of operations during adverse meteorological conditions.
  - c. Treatment of a selection of mobile plant and infrastructure items to reduce emitted noise levels.
2. Evaluation of various combinations of noise management and mitigation measures to assess their relative effectiveness.
3. Review of the effectiveness of these measures and assessment of their feasibility.
4. Adoption of management and mitigation measures to optimise noise emissions associated with the Project.

With the implementation of reasonable and feasible mitigation measures, moderate or significant exceedances (as defined in the *NSW Noise Policy for Industry* [NPfI]) are predicted at only two dwellings on the nearest privately-owned property (property 127). No exceedances of the Project-specific noise trigger levels are predicted at a third dwelling on this property, which is understood to currently be the main homestead for the property. The owner of property 127 currently has the right to acquisition upon request for the Approved Mine.

For other privately-owned receivers to the west and south-west, maximum predicted noise levels would result in negligible exceedances of the evening and night-time Project-specific noise trigger levels at two additional properties (properties 131 and 132). As explained in the NPfI, the predicted noise levels at these two properties are not likely to be discernible by the average listener (when compared to compliance with the Project-specific noise trigger levels).

A pro-active noise management system would be implemented to manage noise levels from the Project at receiver locations (i.e. to reduce the likelihood that Project noise levels would exceed predicted operational noise levels at receiver locations).

A meteorological forecasting system would be used in conjunction with a real-time noise monitoring system to provide an alert for mine personnel to review the real-time data and manage mining activities as may be required to maintain compliance with noise limits.

### **Project Rail Spur Noise**

An assessment of the potential noise impacts associated with Project rail movements along the Project rail spur, against the criteria specified in Appendix 3 of the *NSW Rail Infrastructure Noise Guideline*, predicted no privately-owned receivers would experience exceedances of the relevant non-network rail line noise criteria.

### **Blasting**

An assessment of impacts from blasting activities predicted that no exceedances of vibration and airblast criteria would occur at any privately-owned receiver.

## **ESS.6 AIR QUALITY**

An Air Quality and Greenhouse Gas Assessment for the Project was undertaken by Ramboll.

An existing air quality monitoring network established for the Approved Mine was used to characterise the existing air quality of the Project area. As no mining activity is conducted at the Approved Mine, the monitoring captures particulate matter from localised particulate matter sources (e.g. vehicles using unsealed roads, stock movements, exposed areas and agricultural activities), as well as any influence from existing mining operations in the region (e.g. Rocglen, Tarrawonga, Boggabri and Maules Creek Coal Mines) and other regional particulate matter sources (e.g. bushfires and dust storms).



The three operational scenarios assessed for noise were also used to predict potential air quality impacts for the Project. The operational scenarios were selected in consideration of maximum potential dust emissions (e.g. to account for the maximum coal production rate, waste rock extraction rate and active disturbance area) to evaluate the potential impacts at the nearest privately-owned receivers over the life of the Project.

Air quality emission inventories were prepared for the operational scenarios in consideration of the indicative mining activities for each year, including ROM coal extraction, waste rock removal rates, haul distances and routes, active stockpile and pit areas and mobile equipment operating hours.

The assessment considered the contributions from the Project, cumulatively with the Tarrawonga, Boggabri, Rocglen and Maules Creek Coal Mines and background (non-mining) sources.

All privately-owned receivers were predicted to comply with the NSW Environment Protection Authority's criteria for:

- concentrations of particulate matter with an equivalent aerodynamic diameter of 10 micrometres [ $\mu\text{m}$ ] or less ( $\text{PM}_{10}$ ) (24-hour and annual average);
- concentrations of particulate matter with an equivalent aerodynamic diameter of 2.5  $\mu\text{m}$  or less ( $\text{PM}_{2.5}$ ) (24-hour and annual average);
- concentrations of total suspended particulate matter (annual average); and
- dust deposition (annual average).

Whitehaven would operate a real-time air quality monitoring network and meteorological forecasting system to identify potential scenarios when air quality levels reach specified short-term trigger levels, and identify potential adverse meteorological conditions, to enable appropriate mitigation and response measures to be implemented to maintain compliance with air quality limits at receiver locations.

## ESS.7 BIODIVERSITY

The former mining and agricultural (grazing) land uses of the Project locality would result in the Project having relatively minor impacts to biodiversity.

A terrestrial ecology assessment (i.e. the Biodiversity Assessment Report and Biodiversity Offset Strategy) for the Project was undertaken by Resource Strategies, with input from FloraSearch and Future Ecology.

A separate Aquatic Ecology Assessment for the Project was undertaken by EcoLogical Australia.

FloraSearch surveyed those parts of the Project beyond the extent of the Approved Mine (the Biodiversity Assessment Report [BAR] Footprint). The Project would require clearance of approximately 580 ha of native vegetation in the BAR Footprint, comprising approximately 78 ha of native woodland/forest and 502 ha of secondary/derived native grassland.

Five native vegetation communities were identified within the BAR Footprint. None of these communities are listed as a threatened ecological community under the NSW *Biodiversity Conservation Act, 2016* and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999*.

No threatened flora species have been recorded within the BAR Footprint.

Terrestrial ecology surveys undertaken by Future Ecology identified 16 threatened species within and adjacent to the BAR Footprint.

The NSW *Framework for Biodiversity Assessment* requires the use of an online program (the *Credit Calculator for Major Projects and BioBanking* [the Credit Calculator]) to assess biodiversity impacts and determine the biodiversity offset requirements for those impacts.

The result of running the Credit Calculator is that the Project requires a Biodiversity Offset Strategy which accounts for a total of 16,401 ecosystem credits and 6,654 species credits for the Koala, Regent Honeyeater and Squirrel Glider.

Assessments of Significance have been prepared for the Project on the threatened species and communities known or predicted to occur in the BAR Footprint in accordance with section 5A of the NSW *Environmental Planning and Assessment Act, 1979* and the *Threatened Species Assessment Guidelines - the Assessment of Significance* (DECC, 2007). It was determined that the Project is not likely to have a significant impact on any threatened species and communities listed under the NSW *Biodiversity Conservation Act, 2016*.

In addition, the significance of potential residual impacts on protected matters within the Commonwealth Assessment Footprint under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* have been evaluated and it was determined that none of the protected matters would be significantly impacted.

A number of measures to avoid and minimise impacts on biodiversity were proposed for implementation at the Approved Mine, which would be continued for the Project (e.g. vegetation clearance protocols and weed management).

The existing Biodiversity Offset Strategy for the Approved Mine would be augmented with an additional Biodiversity Offset Strategy for the Project to account for additional residual impacts on flora and fauna.

This Biodiversity Offset Strategy addresses both Commonwealth and NSW biodiversity offset requirements.

The credits generated by the Credit Calculator for the Project would be offset using mine site rehabilitation as well as one, or a combination, of the following:

- acquiring or retiring credits under the biobanking scheme in the NSW *Biodiversity Conservation Act, 2016*;
  - 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.

## ESS.8 HERITAGE

### *Aboriginal Cultural Heritage*

An Aboriginal Cultural Heritage Assessment for the Project was undertaken by Whincop Archaeology.

A large portion of the area investigated for the assessment has been subjected to intensive disturbance over the past 150 years, mainly associated with the agricultural and pastoral uses of the land and localised historic mining activity, which has variously impacted upon the survival of Aboriginal cultural heritage sites.

A total of 62 Aboriginal heritage sites were identified within the Project area and immediate surrounds.

The Project would result in direct disturbance to 55 of these sites (31 of which are located within the disturbance footprint for the Approved Mine), however disturbance to sites of moderate scientific significance would be avoided.

In relation to Aboriginal cultural heritage sites, a number of mitigation measures and management strategies have been developed and included in consultation with the Registered Aboriginal Parties, including:

- Maintenance of a comprehensive Aboriginal Heritage Sites Database for all known Aboriginal heritage sites within the Project area.
- Where practicable, known Aboriginal heritage sites would be avoided.
- Implementation of a protocol for surface disturbance works to reduce the risk of accidental damage to known Aboriginal cultural heritage sites.
- The location of known Aboriginal cultural heritage sites would be considered during detailed design of road realignments and ancillary infrastructure.
- Salvage of a representative collection of visible surface artefacts would be undertaken in consultation with the RAPs.

### **Historic Heritage**

A Historic Heritage Assessment for the Project was undertaken by Extent Heritage Pty Ltd.

The Historic Heritage Assessment identified one item of historic heritage significance within the Project area (potential local significance) and three sites within 2 km of the Project (two of potential local significance and the Kurrumbede Homestead Complex of potential State significance).

None of these sites are listed on any local or State heritage registers.

The historic heritage site located within the Project area (a weatherboard home) would be directly disturbed by the Project. Potential impacts to this heritage would be mitigated through archival recording of the site, as recommended by Extent Heritage Pty Ltd.

Vibration and airblast overpressure levels from Project blasting would be within building damage limits at the three sites of potential heritage significance, and other indirect impacts (e.g. noise, dust and visual amenity) are expected to be manageable and reversible.

Management measures for these sites, including for the Kurrumbede Homestead Complex, would be detailed in a Heritage Management Plan for the Project.

### **ES5.9 OTHER ENVIRONMENTAL SPECIALIST STUDIES**

A range of other environmental specialist studies have been undertaken for the Project. These include:

- Road Transport Assessment;
- Geochemistry Assessment;
- Land Contamination Assessment;
- Economic Assessment;
- Social Impact Assessment; and
- Visual Assessment.

These assessments and their key findings are presented in this EIS.

### **ES5.10 REHABILITATION AND MINE CLOSURE**

A rehabilitation strategy for the Project has been developed in consideration of relevant guidelines, Whitehaven's extensive operational rehabilitation at its other mine in the Gunnedah Basin and the site-specific success of rehabilitation of the former Vickery and Canyon Coal Mines.

The overall rehabilitation goal for the Project mining area is to enhance the cover and connectivity of native woodland, while retaining some areas of agricultural land capable of supporting cattle grazing.

The Project rehabilitation and mine closure goals are generally consistent with those for the Approved Mine, with the following improvements:

- Reduction in the number of final voids from five to two within the Project area (noting that three final voids would be retained for the Approved Mine).
- 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 2 m) to the waste rock emplacement to assist in drainage design that replicates natural drainage systems.
- Introduction of macro-relief (i.e. 10 to 20 m 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.
- 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.

The Mining Operations Plan (MOP) for the Project would include detailed and quantifiable performance measures and completion criteria (based on the Development Consent requirements for the Project). The rehabilitation performance measures and completion criteria included in the MOP would be specific, measureable, achievable, realistic and time-bound.

Planning for mine closure would be conducted over the life of the Project, in consultation with the Gunnedah Shire Council, Narrabri Shire Council, NSW Department of Planning and Environment and the local community.

### ES5.11 CONCLUSION

The Secretary's Environmental Assessment Requirements for the Project require that the EIS provide reasons why the development should be approved, having regard to environmental, economic and social considerations.

In this regard, approval of the Project is justified for the following reasons:

- The Project area is located on land that is primarily approved for mining development (i.e. the Approved Mine) and has been disturbed by previous mining activities (i.e. the former Vickery and Canyon Coal Mines). The Project is entirely located on land owned by Whitehaven, or where Whitehaven has entered into access agreements, and mining areas are within Whitehaven-owned mining tenements.
- The Project is permissible under both the Gunnedah and Narrabri Local Environmental Plans.
- Extensive consultation has been undertaken for the Project to understand key opportunities for community benefits and to identify community concerns to inform Project design. This includes the decision to remove the Blue Vale Open Cut from the Project following the outcomes of initial consultation.
- Potential impacts of the Project (in its entirety) have been assessed against established thresholds of acceptability contained in relevant guidelines and policies, including for noise, blasting, air quality, groundwater, surface water and flooding. Potential impacts have been avoided or minimised as far as is reasonable or feasible. Mitigation, management measures and offset strategies are proposed where residual impacts are predicted.
- A net economic benefit of \$1.2 billion (net present value) from the generation of additional tax revenue and royalties is predicted to accrue for NSW over the life of the Project, in addition to contributions to the community and local governments.

- The Project would provide employment opportunities due to the requirement for approximately 500 full-time equivalent on-site construction personnel and 450 full-time equivalent on-site operational personnel.
- When compared to the Approved Mine, the Project would result in:
  - incremental economic flow-on benefits of \$500 million (net present value);
  - additional social opportunities for residents of Gunnedah and Narrabri Local Government Areas, including additional employment opportunities;
  - no significant further environmental impacts from mining operations, and in some cases a reduction in impacts;
  - more efficient extraction of the coal resource; and
  - improvement of the final landform design and compatibility with the surrounding landscape.

It is considered that, on balance of the predicted impacts and benefits, approval of the Project is in the public interest.