Gateway Certificate Application
Technical Overview

WHITEHAVEN COAL

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OVERVIEW

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield. The mine is located approximately 25 kilometres (km) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council Local Government Area (LGA), in the New England North West region of New South Wales (NSW).

Narrabri Coal Operations Pty Ltd (NCOPL), on behalf of the Narrabri Mine Joint Venture, is seeking a Gateway Certificate for an underground extension to the south of the existing Narrabri Mine (the Narrabri Underground Mine Stage 3 Extension Project [the Project]).

The Project is located in the New England North West region of NSW, which includes the Namoi River valley and associated agricultural land uses and elevated, vegetated country managed as State Forests and some National Parks.

The Northern Plains sub-region (comprising the Moree Plains and Narrabri LGAs) is dominated by irrigation on predominantly grey cracking clay soils along the Namoi, Gwydir and Macintyre Rivers. Cotton is the area's major crop, and irrigated agriculture is possible due to government investment through the construction of the Pindari, Copeton, Keepit and Split Rock dams. Artesian bores support the beef cattle industry, supplying stock and domestic water in many areas (Department of Planning and Infrastructure, 2012).

The coal industry is becoming a more prominent industry and a driver of the local economy, particularly in the Gunnedah and Narrabri Shires (Department of Planning and Infrastructure, 2012). Exploration Licence (EL) 6243 is identified in the *Strategic Regional Land Use Plan New England North West* (Department of Planning and Infrastructure, 2012) as an area with the potential for future coal resource development. The Gateway Certificate Application Area is a subset of EL 6243.

The Gateway Certificate Application Area includes land verified as Biophysical Strategic Agricultural Land (BSAL) in accordance with the *Strategic Regional Land Use Policy – Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (Interim Protocol) (NSW Government, 2013).

No land mapped as equine critical industry cluster or viticulture critical industry cluster in the NSW *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) is located in the Gateway Certificate Application Area.

This Gateway Certificate Application Technical Overview is supported by the following assessments:

- Agricultural Impact Assessment – Eco Logical Australia Pty Ltd (2019).
- Agricultural Resource Assessment – Soil Management Designs (2019).
- Preliminary Groundwater Assessment – HydroSimulations (2019).
- Subsidence Assessment – Ditton Geotechnical Services (2019).

Sixty-nine soil test pits were excavated to verify BSAL within the Gateway Certificate Application Area. In addition, several interviews were conducted with local stakeholders to further characterise the agricultural enterprises in the area.

Some landholders were reluctant to participate in the Gateway Process. Specifically, three landholders withheld access for soil test pits by Soil Management Designs and agricultural interviews with Dr Paul Frazier.

Approximately 107 hectares (ha) of Interim Protocol Verified BSAL has been identified within the Gateway Certificate Application Area by Soil Management Designs (2019). Of this, approximately 15 ha is located above the proposed longwalls.

In addition, approximately 95 ha of Potential BSAL, as mapped in the Mining SEPP, is located on land within the Gateway Certificate Application Area where no access was available for ground survey. Of this, approximately 60 ha is located above the proposed longwalls.

Minor surface disturbance to Interim Protocol Verified BSAL and Potential BSAL is proposed as part of the development of underground mine surface infrastructure. Some of these areas would be used for the duration of the Project, and would be subsequently rehabilitated. Other areas would be progressively rehabilitated as mining progresses.

Some BSAL would experience mine subsidence from the Project. Subsidence would result in some cracking on the surface; however, this would not affect soil fertility, effective rooting depth or soil drainage. Therefore, the Project should not result in a long-term or permanent change to the agricultural productivity of BSAL. Where necessary, NCOPL would remediate surface cracking that develops as a result of subsidence.

Eco Logical Australia Pty Ltd (Eco Logical) (2019) concluded that several studies from within Australia and worldwide show that localised impacts do occur as a result of longwall mining. However, none of the studies have shown widespread impacts that have significantly reduced agricultural productivity over the short or long-term, during or following longwall mining. Further, common agricultural maintenance practices such as cultivation, ripping or minor land-forming (for instance, restoring contour banks or small channel formation) have proven effective in managing short-term impacts.

Eco Logical (2019) also noted that case studies at the Narrabri, Beltana and Kestrel mines have demonstrated that agricultural production can continue above longwall mining with little or no impact to productive capacity. At these sites, detailed examination of yield and soil qualities has shown no impact from planned subsidence.

Creek line ponding may also develop in some areas as a result of subsidence; however, ponding would be remediated through creek channel works, or would be incorporated into the working agricultural landscape.

The groundwater assessment shows that the Project meets the ‘Level 1’ minimal impact considerations of the Aquifer Interference Policy for key regional ‘highly productive’ groundwater resources, including the Namoi alluvium.

Given the nature of the production systems and the nature of the impacts predicted for the Project, it is likely that agricultural production can continue throughout the operation of the Project, with small areas being excluded temporarily while subsidence and rehabilitation are taking place. Small areas would also be temporarily required for infrastructure development and would be rehabilitated to their agreed post-mining land use (e.g. agricultural use or native vegetation).

It is expected that impacts to agricultural land use would be short-term, with minimal to no impacts on agricultural production in areas of BSAL (Eco Logical, 2019).

1 INTRODUCTION

1.1 PURPOSE OF THIS DOCUMENT

Narrabri Coal Operations Pty Ltd (NCOPL) is seeking a new Development Consent to extend the underground mining areas at the Narrabri Mine. The proposal is herein referred to as the Narrabri Underground Mine Stage 3 Extension Project (the Project).

The Narrabri Mine is located approximately 25 kilometres (km) south-east of Narrabri and approximately 60 km north-west of Gunnedah, within the Narrabri Shire Council (NSC) Local Government Area (LGA) (Figure 1), in the New England North West region of New South Wales (NSW).

Narrabri Mine is operated by NCOPL, on behalf of the Narrabri Mine Joint Venture, which consists of Whitehaven Coal Limited's wholly owned subsidiary Narrabri Coal Pty Ltd (70 per cent [%]), Upper Horn Investments (Australia) Pty Ltd (7.5%), J-Power Australia Pty Limited (7.5%), EDF Trading Australia Pty Limited (7.5%), and Posco Daewoo Narrabri Investment Pty Limited and Kores Narrabri Pty Limited (7.5%).

The Gateway Certificate Application Area includes land verified as Biophysical Strategic Agricultural Land (BSAL) in accordance with the *Strategic Regional Land Use Policy – Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (Interim Protocol) (NSW Government, 2013).

No land mapped as equine critical industry cluster or viticulture critical industry cluster in NSW *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* (Mining SEPP) is located in the Gateway Certificate Application Area.

This document is a Gateway Certificate Application Technical Overview in support of an application for a Gateway Certificate (Gateway Certificate Application), pursuant to clause 17F of the Mining SEPP.

1.2 SCOPE OF APPLICATION

The Gateway Certificate Application will be assessed by the Mining and Petroleum Gateway Panel (the Gateway Panel) for potential impacts of the Project on strategic agricultural land and its associated water resources. The Gateway Panel undertakes its assessment in accordance with the relevant criteria, outlined in clause 17H(4) of the Mining SEPP, that apply specifically to BSAL.

The Gateway process applies to State Significant mining developments that require a new mining lease (ML). The Gateway Certificate Application Area, as described in this document, is defined as the extent of underground mining and surface infrastructure areas (incorporating a suitable buffer). Components of the Project that are outside of the Gateway Certificate Application Area (e.g. existing Narrabri Mine components) are not subject to the Gateway Certificate Application.

1.3 BACKGROUND

The Narrabri Mine is an existing underground coal mining operation situated in the Gunnedah Coalfield.

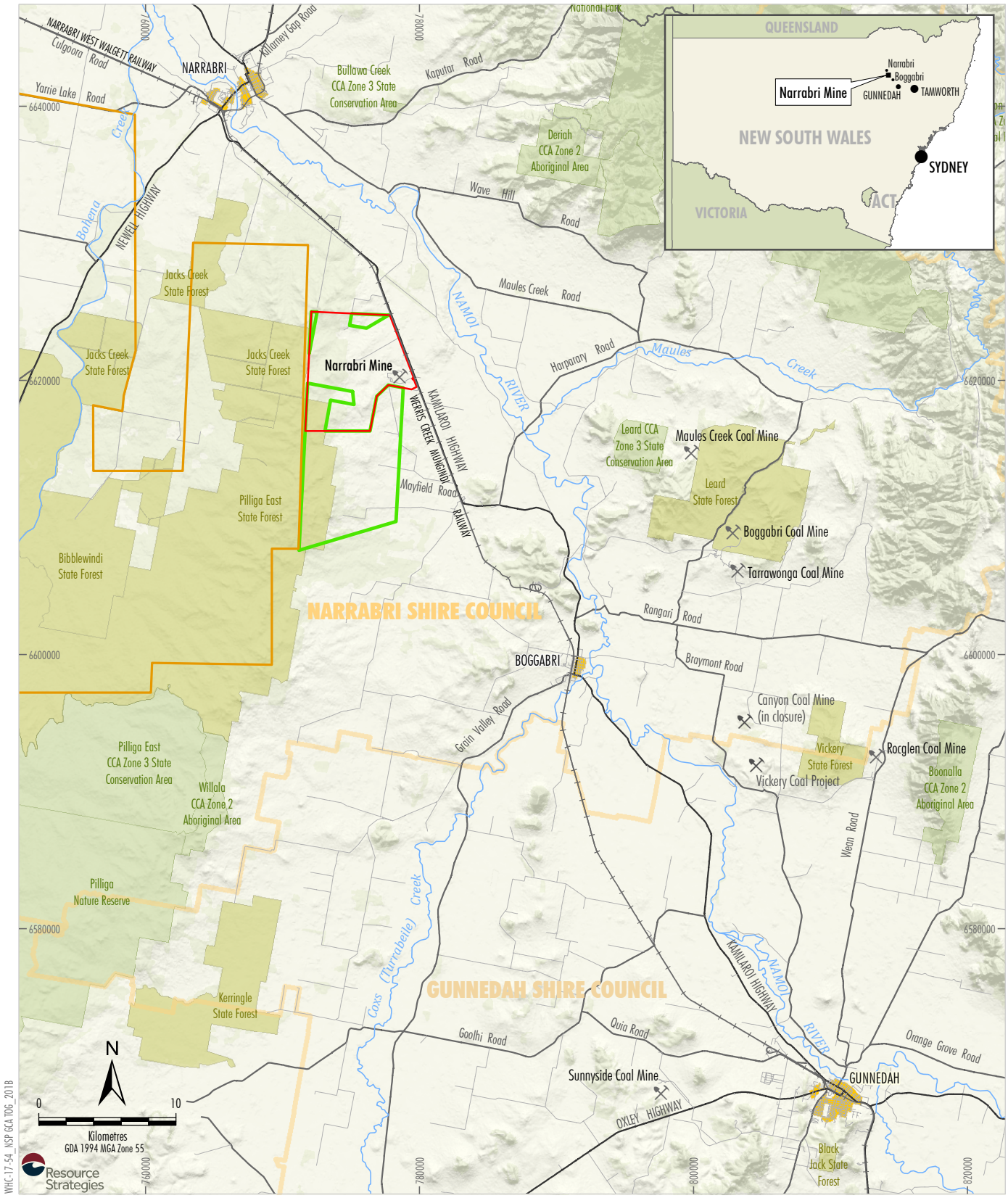
Exploration Licence (EL) 6243 was granted to NCOPL in May 2004, and exploration activities, engineering studies and environmental baseline studies have been ongoing.

The Project involves an underground extension of the existing Narrabri Mine to the south within EL 6243.

This document is included within a Gateway Certificate Application for the Project. It is anticipated that the Gateway Panel will issue a Gateway Certificate for the Project in accordance with the Mining SEPP.

As well as this Gateway Certificate Application, NCOPL will lodge a separate Scoping Report that will provide a description of the Project to key State regulatory agencies, to initiate the preparation of the Secretary's Environmental Assessment Requirements (SEARs) in accordance with clause 3 of Schedule 2 of the NSW *Environmental Planning and Assessment Regulation, 2000*. The SEARs will identify any further matters that will need to be addressed in the Environmental Impact Statement (EIS).

The Project will also be referred to the Commonwealth Minister for the Environment and Energy for consideration as to whether the Project is a 'Controlled Action' requiring approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act).



LEGEND

- Mine Site
- Mining Lease (ML 1609)
- Exploration Licence (EL 6243)
- Local Government Boundary
- State Forest
- State Conservation Area, Aboriginal Area
- Proposed Narrabri Gas Project (Santos NSW [Eastern] Pty Ltd)

Source: Department of Land and Property Information (2017); NSW Department of Industry (2017); Geoscience Australia (2011)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Regional Location

Figure 1

It is anticipated that the SEARs will be prepared by the NSW Department of Planning and Environment (DP&E) in consideration of:

- the Scoping Report;
- issues raised by relevant regulatory agencies;
- *Indicative Secretary's Environmental Assessment Requirements for State Significant Mining Developments* (NSW Government, 2015);
- the decision of the Commonwealth Minister for the Environment and Energy regarding the referral of the relevant 'Action' under the EPBC Act;
- any recommendations of the Gateway Panel for any Gateway Certificate issued in relation to the Project; and
- applicable guidelines and statutory considerations.

1.4 PROPONENT

NCOPL (ABN 15 129 850 139) is the proponent for the Project. The contact details for NCOPL are:

Narrabri Coal Operations Pty Ltd
Locked Bag 1002
Narrabri NSW 2390
Phone: (02) 6794 4755

The Narrabri Mine is located at 10 Kurrajong Creek Road, Baan Baa, NSW, 2390.

Whitehaven is the parent company of NCOPL and further information on Whitehaven and its coal mining operations can be found at:

http://www.whitehavencoal.com.au/

1.5 PROJECT OVERVIEW

The main components comprising the Project include:

- continued longwall mining of the Hoskissons Seam, including a southern extension of the existing underground mining area;
- development of roadways within the Hoskissons Seam and adjacent strata to access mining areas;
- continued use of existing roadways and drifts for personnel and materials access, ventilation, dewatering and other ancillary activities;
- increased production of up to 13 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal (increased from 11 Mtpa);
- continued use of the existing surface facilities (with minor upgrades and extensions) and development of additional surface infrastructure associated with mine ventilation and gas management, and other ancillary infrastructure above the extended underground mining area;
- continued use and extension of the existing coal reject emplacement area;
- continued transport of product coal from site by rail;
- continued use and progressive development of the Namoi River water pipeline, sumps, pumps, pipelines, water storages and other water management infrastructure;
- continued employment of the existing residentially based workforce;
- continued monitoring, rehabilitation and remediation of subsidence and other mining effects;
- development associated with exploration in EL 6243; and
- other associated minor infrastructure, plant, equipment and activities.

Additional details of each of the main Project components are provided in Section 4.

1.6 PROJECT TEAM

This Gateway Certificate Application Technical Overview was prepared by Resource Strategies Pty Ltd with specialist input provided by the following organisations:

- NCOPL project team (*project design, project rationale consultation*);
- Eco Logical Australia Pty Ltd (Eco Logical) (Dr Paul Frazier) (*agricultural impact assessment)*;
- Soil Management Designs (Dr David McKenzie) (*agricultural resource assessment*);
- HydroSimulations (Dr Noel Merrick) (*groundwater assessment*); and
- Ditton Geotechnical Services Pty Ltd (Mr Steven Ditton) (*subsidence assessment*).

1.7 DOCUMENT STRUCTURE

This Gateway Certificate Application Technical Overview is structured as follows:

Section 1 Introduction – provides a background of the Narrabri Mine and an overview of the Project.

Section 2 Consultation – provides a description of the consultation undertaken in support of the Gateway Certificate Application.

Section 3 Agricultural Context – describes the local and regional agricultural context.

Section 4 Project Description and Project Rationale – provides a clear and concise description of the Project, indicates the types of activities that will be undertaken and summarises the Project rationale.

Section 5 Consideration of Gateway Criteria for BSAL – provides an assessment of BSAL in the Gateway Certificate Application Area.

Section 6 Strategies to Minimise Potential Impacts on BSAL – describes strategies that would be implemented to minimise the potential impacts.

Section 7 Conclusion – provides the key conclusions of the Gateway Certificate Application.

Section 8 References – lists the documents cited in Sections 1 to 7.

2 CONSULTATION

2.1 COMMUNITY ENGAGEMENT

Whitehaven Coal Pty Ltd and NCOPL regularly engage with the community through the following mechanisms:

- a dedicated website (http://www.whitehavencoal.com.au/);
- Narrabri Mine Community Consultative Committee (CCC) quarterly meetings (with meeting minutes provided on the website and emailed to interested stakeholders);
- community information sheets and letterbox drops;
- media releases and other media activities;
- general community surveys and reports; and
- a landholder relations program.

2.2 PROJECT CONSULTATION TO DATE

Specific engagement completed to date in relation to the Project has included:

- Presentations to the CCC in June 2017 and December 2018 to provide a briefing regarding the Project and to seek validation of key social attributes.
- Presentations to Gomeroi Nation Aboriginal Corporation (GNAC) and Narrabri Local Aboriginal Land Council (NLALC) and the NSC regarding the Project in December 2018 and January 2019.
- A Conceptual Project Development Plan meeting with representatives of the NSW Division of Resources and Geoscience in June 2017.
- Discussions with landholders located above the proposed extended underground mining area.
- Project briefings with the DP&E in July and September 2017 and November 2018.
- NSC in December 2018.
- Narrabri Chamber of Commerce in December 2018.

In addition, Dr Paul Frazier conducted interviews with landholders and property managers as part of the Agricultural Impact Assessment.

Some landholders were reluctant to participate in the Gateway Process. Specifically, three landholders withheld access for soil test pits by Soil Management Designs and landholder interviews with Dr Paul Frazier.

2.3 ONGOING CONSULTATION

A stakeholder engagement program has been developed for the Project. Key objectives of this program are to:

- engage with government and public stakeholders about the Project;
- seek input from key stakeholders on elements of the Project;
- recognise and respond to local interest or concerns regarding the Project; and
- continue the ongoing dialogue between NCOPL and stakeholders initiated through the development and operation of the Narrabri Mine.

Consultation will include, but not necessarily be limited to, the following government agencies and authorities:

- DP&E;
- Forestry Corporation of NSW;
- NSC;
- NSW Division of Resources and Geoscience;
- NSW Office of Environment and Heritage (including the National Parks and Wildlife Service and Heritage Branch);
- NSW Environment Protection Authority;
- NSW Department of Primary Industries (DPI) (including DPI Lands and Forestry, DPI Agriculture and DPI Fisheries);
- NSW Department of Industry – Water;
- NSW Health;
- Subsidence Advisory NSW;
- Transport for NSW (including the Roads and Maritime Services); and
- Commonwealth Department of the Environment and Energy.

3 AGRICULTURAL CONTEXT

3.1 REGIONAL CONTEXT

The Project is located in the New England North West region of NSW, which includes the Namoi River valley and associated agricultural land uses and elevated, vegetated country managed as State Forests and some National Parks (Figure 1).

The New England North West region generates more than $2 billion per annum of agricultural product. Almost a quarter of the gross value of all crops in NSW is produced in the region (NSW Trade & Investment, 2015). The main agricultural activities are sheep and cattle grazing, broadacre cereal crops, irrigated cotton, intensive livestock, plant agriculture and poultry production.

The Northern Plains sub-region (comprising the Moree Plains and Narrabri LGAs) is dominated by irrigation on predominantly grey cracking clay soils along the Namoi, Gwydir, and Macintyre Rivers. Cotton is the area's major crop, and irrigated agriculture is possible due to government investment through the construction of the Pindari, Copeton, Keepit and Split Rock dams. Artesian bores support the beef cattle industry, supplying stock and domestic water in many areas (Department of Planning and Infrastructure, 2012).

The coal industry is becoming a more prominent industry and a driver of the local economy, particularly in the Gunnedah and Narrabri Shires (Department of Planning and Infrastructure, 2012).

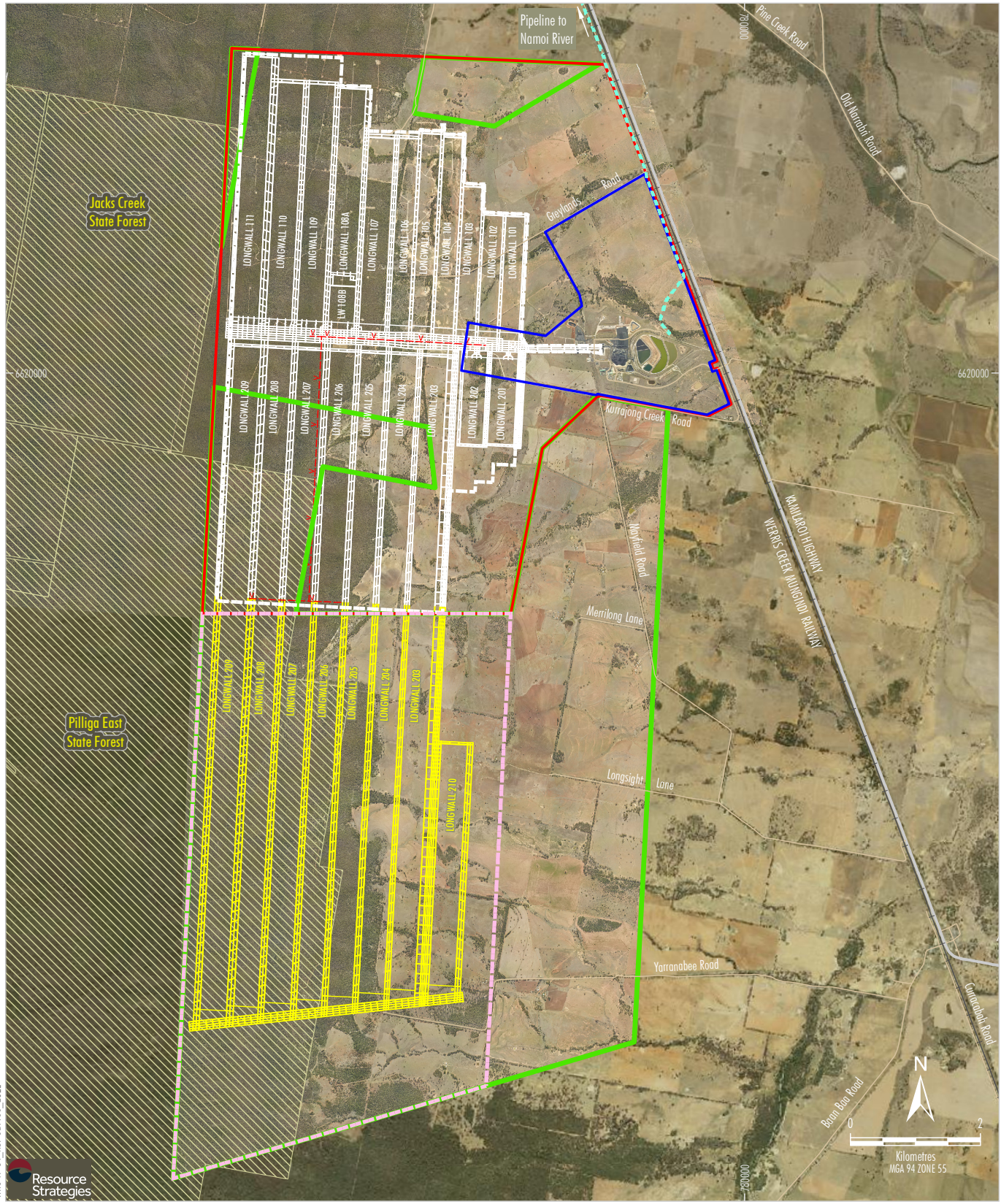
EL 6243 is identified in the *Strategic Regional Land Use Plan New England North West* (Department of Planning and Infrastructure, 2012) as an area with the potential for future coal resource development. The Gateway Certificate Application Area is a subset of EL 6243 (Figure 2).

3.2 LOCAL CONTEXT

The existing/approved land use in the vicinity of the existing Narrabri Mine and the Project is characterised by a combination of mining and agricultural (sheep and cattle grazing, cereal production and horticulture) land uses, as well as the Pilliga East State Forest.

Within the Gateway Certificate Application Area (Figure 2), land use is grazing of sheep and cattle (Eco Logical, 2019), with some dryland cropping of cereal crops. The Pilliga East State Forest also lies within the Gateway Certificate Application Area, which involves limited commercial harvesting. No irrigated land use occurs in the Gateway Certificate Application Area and water for stock is sourced from overland flow (not groundwater) (Eco Logical, 2019).

Relevant land tenure in the Gateway Certificate Application Area is shown on Figure 3.



LEGEND

- State Forest
- Mining Lease Boundary (ML 1609)
- Exploration Licence (EL 6243)
- Project Underground Mine Development
- Approved Narrabri Mine
  - Pit Top Area
  - Underground Mine Footprint
  - Underground Mine Development
- Namoi River Water Pipeline
- Gateway Certificate Application Area

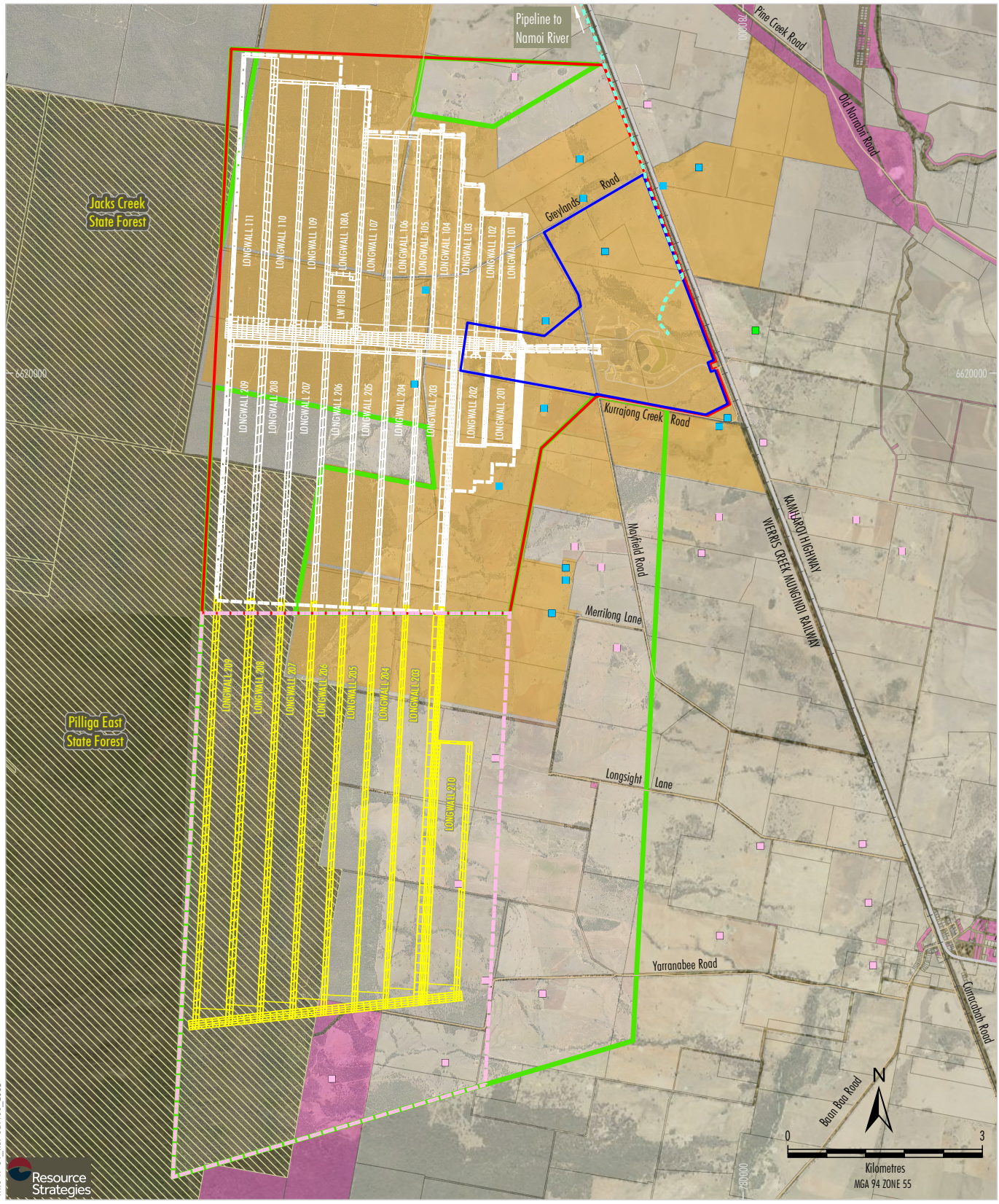
Source: Orthophotos - Whitehaven Coal (2017); R.W. Corkery & Co Pty Ltd (2009); NSW Trade & Investment (2017); NCOPL (2018)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Gateway Certificate Application Area

Figure 2



LEGEND

- State Forest
- Mining Lease Boundary (ML 1609)
- Exploration Licence (EL 6243)
- Project Underground Mine Development
- Approved Narrabri Mine
- Pit Top Area
- Underground Mine Footprint
- Underground Mine Development
- Namoi River Water Pipeline
- NCOPL-owned Dwelling
- Private Dwelling
- Private Dwelling - NCOPL Agreement
- Gateway Certificate Application Area
- NCOPL-owned Land
- Privately Owned
- Crown Land

Source: Orthophotos - Whitehaven Coal (2017); R.W. Corkery & Co Pty Ltd (2009); NSW Trade & Investment (2017); NCOPL (2018)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Relevant Land Ownership

Figure 3

4 PROJECT DESCRIPTION AND PROJECT RATIONALE

4.1 EXISTING NARRABRI MINE

The Narrabri Mine has an operational capacity of 11 Mtpa of ROM coal from the Hoskissons Seam, approved until July 2031.

Surface Facilities

Key surface infrastructure at the existing/approved Narrabri Mine pit top area includes:

- box cut;
- coal handling and processing plant (CHPP);
- ROM and product coal stockpiles and associated coal handling infrastructure;
- reject emplacement area;
- rail loop and product coal load-out infrastructure;
- site water management infrastructure (water treatment plants, water storages, brine storage area, environmental storages and associated pumps and pipelines);
- administration, workshop, store and bathhouse buildings;
- range of service facilities (i.e. potable water, sewerage, electricity, waste management);
- longwall unit assembly area;
- access roads;
- car parking; and
- amenity bunds.

The CHPP produces a combination of part-washed (thermal) and washed (Pulverised Coal Injection) coal products. Product coal is then transported from site by rail.

Underground Mining Areas

The Narrabri Mine comprises 20 longwall panels, Longwalls 101 to 120. Longwall mining is currently being undertaken in Longwall 108a, with extraction of Longwalls 101 to 107 complete.

Key existing/approved underground mine surface infrastructure includes:

- mine safety pre-conditioning sites;
- ventilation shafts;
- pre-drainage and post-drainage sites;
- access roads; and
- electricity transmission lines.

Water Management

The site water management strategy for the Narrabri Mine is based on the containment and re-use of mine water while diverting upstream water around the Narrabri Mine. The approved water management system includes:

- up-catchment diversion structures;
- raw water storage dams;
- saline water storage dams;
- filtered water storage dams;
- brine storage dams;
- sediment dams;
- evaporation ponds;
- reverse osmosis plant;
- Namoi River water pipeline and pump station;
- any groundwater supplementary supply and associated infrastructure;
- Namoi River licensed discharge point; and
- other water transfer infrastructure (i.e. tanks, pumps and pipelines).

The water management system is progressively developed, subject to its ongoing performance, prevailing climatic conditions and actual underground mine inflows.

4.2 PROJECT ACTIVITIES

The Project objectives are to develop and extract additional and/or longer longwall panels at the Narrabri Mine, and to use existing major surface infrastructure to handle, process and transport the resulting product coal.

This would include a physical extension to the approved underground mining area to gain access to additional ROM coal reserves, an increase in the ROM coal production rate, extension of the mine life to 2045, and development of supporting surface infrastructure (including gas drainage, mine safety pre-conditioning and mine ventilation).

A summary of the Project is provided in Table 1.

Underground Mining Operations

The Project involves extension of longwall mining operations in ML 1609 and in new Mining Lease Application areas (within EL 6243) to extract coal within the Hoskissons Seam.

Table 1: Summary Comparison of the Approved Narrabri Mine and the Project

Project Component	Approved	Project
Mining Method	• Longwall mining of the Hoskissons Seam.	• Unchanged.
Underground Mine Geometry	• Twenty longwall panels (LW101 to LW120). • 295 metres (m) wide longwall panels for LW101 to LW106. • 400 m wide longwall panels for LW107 to LW120.	• Additional and/or longer longwall panels within EL 6243. • Variable longwall panel widths of approximately 400 m.
Tenement	• Mining operations conducted within ML 1609.	• Continued mining operations conducted within ML 1609. • Mining operations conducted within new Mining Lease Application areas to the south in EL 6243.
Mine Life	• Mining operations approved until July 2031.	• An extension in mine life to 2045.
ROM Coal Production	• Total ROM coal production of approximately 170 million tonnes (Mt). • ROM coal production of up to 11 Mtpa.	• Total ROM coal production increased to approximately 280 Mt. • ROM coal production rate increased to 13 Mtpa.
Underground Mine Surface Infrastructure	• Ventilation shafts, pre-drainage and post-drainage sites, mine safety pre-conditioning sites (LW101 to LW120), access roads and electricity transmission lines.	• Augmentation of the existing gas drainage, mine safety pre-conditioning and mine ventilation system.
Coal Washing	• CHPP and secondary crusher/screen capable of processing approximately 2,000 tonnes (t) per hour.	• Unchanged.
Coal Handling and Stockpiling	• ROM coal stockpile capacity of 700,000 t. • Product coal stockpile capacity of 500,000 t.	• Unchanged.
Coal Reject Management	• CHPP rejects placed in rejects emplacement area.	• Total rejects production increased. • Increased rejects emplacement capacity.
Product Coal Transport	• Product coal transported from site by rail. • Average of four trains per day. • Peak of eight trains per day.	• Average increased to five trains per day. • No change to peak number of trains per day.
Subsidence Commitments and Management	• The subsidence impact performance measures listed in Conditions 1 and 2, Schedule 3 of Project Approval 08_0144.	• To be determined through the EIS process.
Water Management	• Conducted in accordance with the Water Management Plan (including discharge under the conditions of Environment Protection Licence 12789).	• Water management strategy generally unchanged.
Water Supply	• Make-up water demand to be met from mine dewatering, runoff recovered from operational areas, and licensed extraction from Namoi River and Namoi River Alluvium.	• Unchanged.
Power	• Permanent mains power supplied via a spur line from a 66 kilovolt (kV) powerline located to the east of Kamilaroi Highway. • Power converted from 66 kV to 11 kV on-site and reticulated, using progressively developed 11 kV powerlines.	• No change to key power supply infrastructure, however demand for mains power may increase. • Continued progressive development of powerlines to service the extended underground mining area.
Hours of Operation	• 24 hours per day, seven days per week.	• Unchanged.
Employment	• Residential operational workforce (employees and contractors) of approximately 370 employees.	• Operational workforce unchanged. • Possible short-term increases in employment for construction activities and additional development requirements.
Surface Development Footprint	• Approximately 750 hectares (ha).	• Additional surface development areas to support underground mining, similar to the existing Narrabri Mine.
Rehabilitation Strategy	• Conducted in accordance with the Landscape Management Plan.	• Unchanged.
Capital Investment Value	• Not applicable.	• To be determined through the EIS process.

Ancillary Surface Infrastructure

The locations of underground mine surface infrastructure would be refined through detailed mine planning, environmental assessment outcomes and consideration of alternatives, and would be documented in the EIS.

Coal Processing, Handling and Transport Infrastructure

The Project would include the use of the existing Narrabri Mine surface facilities (Section 4.1) for handling, processing and transportation of coal for the life of the Project.

The Project may incorporate minor upgrades and extensions to existing infrastructure, which would be documented in the EIS.

Water Management

The Project would involve the use of the existing infrastructure with minor augmentations and extensions, including the progressive development of sumps, pumps, pipelines, water storages and other water management infrastructure.

Water supply and release requirements for the Project would be subject to the outcomes of a detailed water balance that would be presented in the EIS.

Other Activities

Other activities that would be conducted as a component of the Project include development associated with exploration in EL 6243 and development of other associated minor infrastructure, plant, equipment and activities.

Rehabilitation Activities and Remediation Works

The Project would include the continued monitoring, rehabilitation and remediation of subsidence and other mining effects.

Hours of Operation

The Narrabri Mine would continue to be operated on a continuous basis (24 hours per day, seven days per week) during the Project.

4.3 EMPLOYMENT

The Narrabri Mine currently employs approximately 370 personnel (employees and contractors). The number of employees (particularly contractors) fluctuates according to requirements at the time.

The Project would facilitate continued employment of the existing residential workforce and would also result in the extension of existing economic opportunities for NCOPL's suppliers and service providers.

Possible short-term increases in employment would be generated by Project construction activities and additional development requirements. This additional employment would be quantified and assessed in the EIS.

4.4 SUMMARY OF PROJECT DISTURBANCE AREA

Approximately 107 ha of Interim Protocol Verified BSAL has been identified within the Gateway Certificate Application Area by Soil Management Designs (2019). Of this, approximately 15 ha is located above the proposed longwalls.

In addition, approximately 95 ha of Potential BSAL, as mapped in the Mining SEPP, is located on land within the Gateway Certificate Application Area where no access was available for ground survey. Of this, approximately 60 ha is located above the proposed longwalls.

Minor surface disturbance to Interim Protocol Verified BSAL and Potential BSAL is proposed as part of the development of underground mine surface infrastructure. Some of these areas would be used for the duration of the Project, and would be subsequently rehabilitated. Other areas would be progressively rehabilitated as mining progresses.

4.5 PROJECT RATIONALE

The extraction of coal from the Narrabri Mine provides benefits at national, state and local levels.

Benefits from the Narrabri Mine occur through employment, expendable income, export earnings and government revenue. NCOPL provides local jobs for its direct employees and contract workforce, suppliers and service providers with flow-on benefits for the Narrabri region.

The Project involves the continuation of the existing/approved longwall panels to the south, within EL 6243. These coal resources have been adequately explored, and extraction of ROM coal in the manner described (i.e. using existing Narrabri Mine infrastructure) is the most efficient and cost-effective method available.

The Project would facilitate the continuation of benefits derived from the Narrabri Mine and would also result in increased coal production.

5 CONSIDERATION OF GATEWAY CRITERIA FOR BIOPHYSICAL STRATEGIC AGRICULTURAL LAND

5.1 ASSESSMENT OF BIOPHYSICAL STRATEGIC AGRICULTURAL LAND

An assessment of BSAL within the Gateway Certificate Application Area was conducted by Soil Management Designs (2019). Verification included 69 soil test pits across the Gateway Certificate Application Area and surrounds, in accordance with the Interim Protocol. The Interim Protocol outlines 12 steps that must be satisfied to meet BSAL characteristics (Figure 4).

BSAL mapping for the Project is shown on Figure 5. As described in Section 4.4, approximately 107 ha of Interim Protocol Verified BSAL has been identified within the Gateway Certificate Application Area by Soil Management Designs (2019).

In addition, approximately 95 ha of Potential BSAL, as mapped in the Mining SEPP, is located on land within the Gateway Certificate Application Area (Figure 5) where no access was available for the soil survey[1].

The combined Interim Protocol Verified BSAL and Potential BSAL represents approximately 5% of the Gateway Certificate Application Area.

5.2 CONSIDERATION OF GATEWAY CRITERIA

Table 2 provides a summary of the assessment of the Project against the relevant criteria in the Mining SEPP. Relevant potential impacts on BSAL and highly productive groundwater are discussed below.

Potential Effects on BSAL

Eco Logical (2019) has assessed the potential for impacts on BSAL due to subsidence based on a subsidence assessment conducted by Ditton Geotechnical Services (2019).

The Project would cause changes to the topography of the landscape with subsidence of up to 2.8 m likely in some areas (Ditton Geotechnical Services, 2019). Subsidence would lead to some surface cracking, changes to surface water drainage patterns and some impacts to built features (e.g. buildings, dams, roads, fences, etc.).

During active subsidence, Eco Logical (2019) recommends that high levels of groundcover are maintained and cultivation avoided to improve surface soil stability and minimise erosion risk. Grazing of livestock can largely continue as usual with temporary removal of livestock from areas undergoing active subsidence until the area is deemed stable, to minimise the risk to animal safety (Eco Logical, 2019).

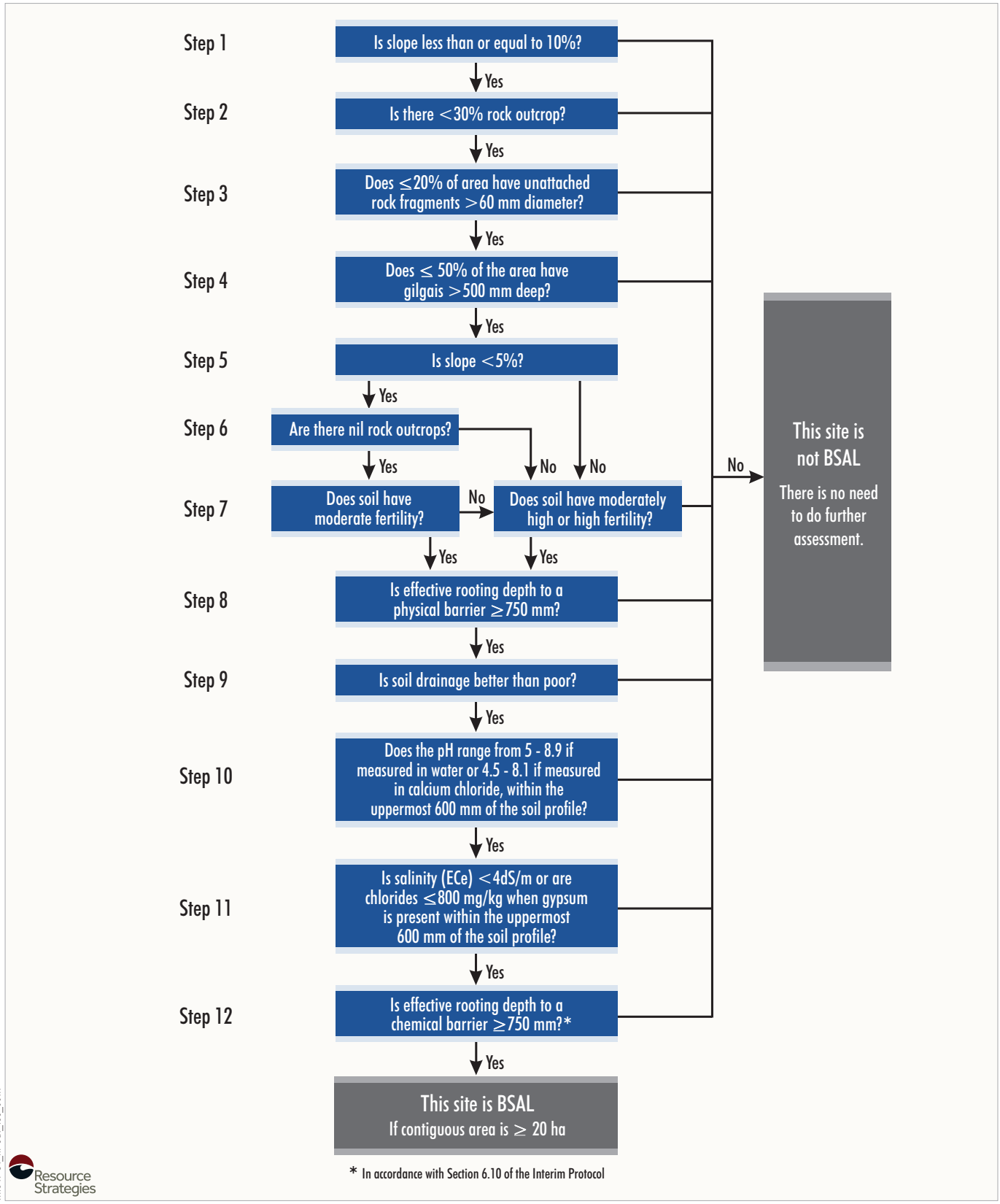
Minor surface disturbance to Interim Protocol Verified BSAL and Potential BSAL is proposed as part of the development of underground mine surface infrastructure. Some of these areas would be used for the duration of the Project, and would be subsequently rehabilitated. Other areas would be progressively rehabilitated as mining progresses.

In general, it is expected that impacts to agricultural land use would be short-term, with minimal to no impacts on agricultural production in areas of BSAL (Eco Logical, 2019).

Potential Impacts on Highly Productive Groundwater

As there are no irrigated areas, and water for domestic and stock use is not sourced from groundwater in the Gateway Certificate Application Area, there is no impact expected on groundwater use in the Gateway Certificate Application Area (Eco Logical, 2019). Furthermore, no impacts have been identified on highly productive groundwater in the context of the Aquifer Interference Policy (HydroSimulations, 2019).

[1] Three landholders withheld access for soil test pits by Soil Management Designs (Section 2.2).



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Resource Strategies

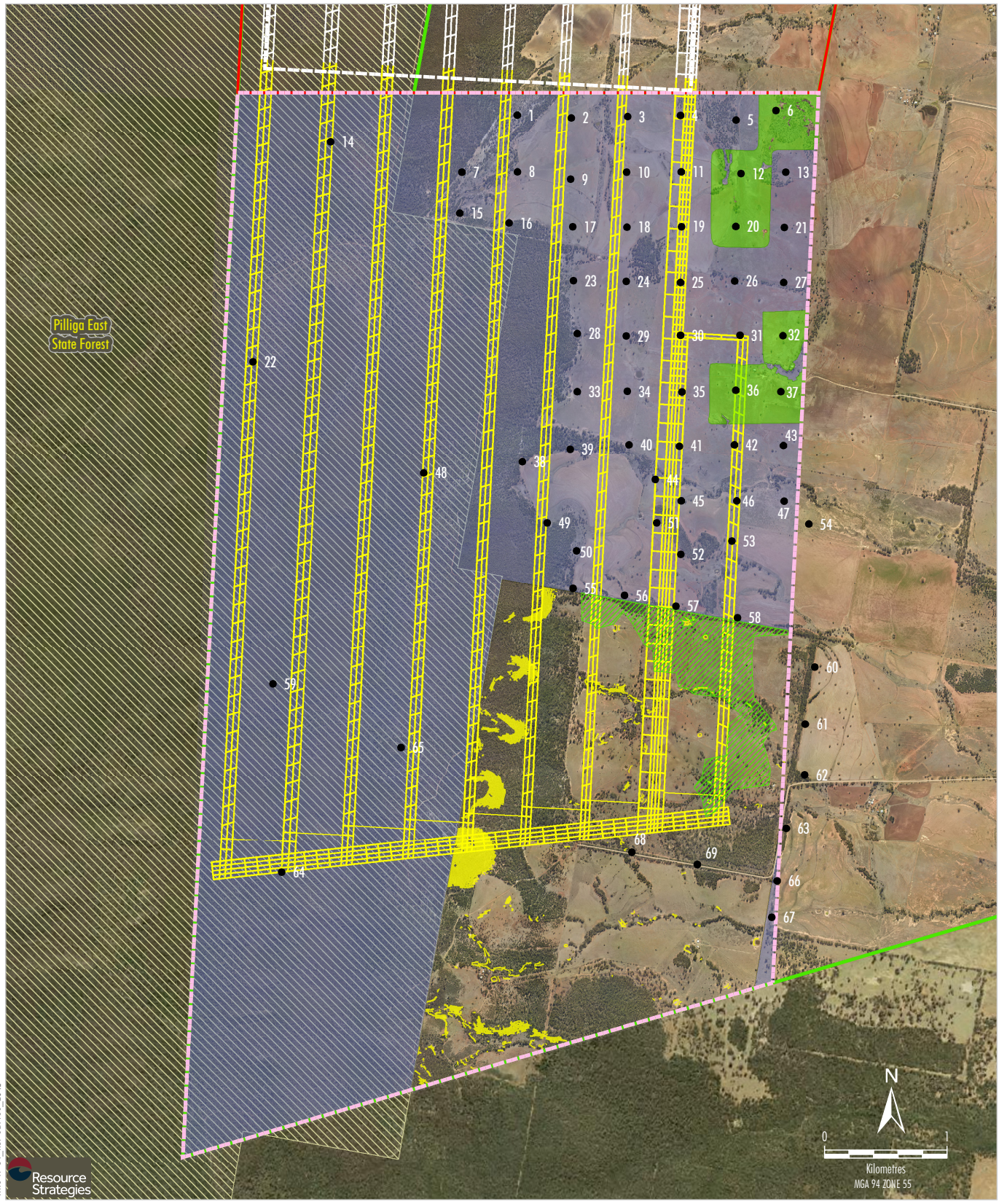
Source: After NSW Government (2013)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

Flow Chart for Site, Soil and Landscape Verification Criteria

Figure 4



LEGEND

- State Forest
- Mining Lease Boundary (ML 1609)
- Exploration Licence (EL 6243)
- Project Underground Mine Development
- Approved Narrabri Mine
- Underground Mine Footprint
- Underground Mine Development
- Gateway Certificate Application Area
- Soil Test Pit
- Interim Protocol Verified BSAL
- Interim Protocol Verified Non-BSAL
- Mining SEPP Potential BSAL in Unmapped Areas
- Interpreted as Interim Protocol Verified Non-BSAL Using Desktop Method

Source: Orthophotos - Whitehaven Coal (July 2017); R.W. Corkery & Co Pty Ltd (2009), NSW Trade & Investment (2015); NCOPL (2018); McKenzie Soil Management (2019) Department of Planning and Environment (2015)

WHITEHAVEN COAL

NARRABRI STAGE 3 PROJECT

BSAL within the Gateway Certificate Application Area

Figure 5

Table 2: Consideration of Relevant Criteria for Biophysical Strategic Agricultural Land

Criteria	Assessment
Any impacts on the land through surface area disturbance and subsidence	The area would be subject to longwall mine subsidence and minimal surface disturbance for mining related infrastructure. Subsidence of up to 2.8 m is predicted with minimal impact on the surface agricultural resources.
Any impacts on soil fertility, effective rooting depth or soil drainage	Evidence from the Narrabri Mine, other sites within Australia and the Agricultural Resource Assessment (Soil Management Designs, 2019) undertaken for the Project, indicate that there would be no significant impact to soil fertility or soil rooting depth. There would be some changes to the landscape topography that would result in small areas of ponding along existing watercourses and creek lines. These ponds could be drained to reinstate the previous soil drainage patterns or incorporated into the landscape as an environmental or agricultural resource.
Increases in land surface micro-relief, soil salinity, rock outcrop, slope and surface rockiness or significant changes to soil pH	There would be some changes to the landscape topography that would result in localised increases and decreases in land slope. With appropriate management including maintaining cover and rehabilitation of any cracking, these changes are expected to be insignificant.
Any impacts on highly productive groundwater (Aquifer Interference Policy)	The highly productive Namoi Alluvium and Great Artesian Basin aquifers have been assessed (HydroSimulations, 2019). The Project meets the Level 1 minimal impact considerations in the Aquifer Interference Policy for these resources.
Any fragmentation of agricultural land uses	Throughout the Project life, the majority of the Gateway Certificate Application Area would be suitable for agricultural production under the current land use intensity. Therefore, there would be no significant fragmentation of agricultural land use.
Any reduction in the area of biophysically strategic agricultural land	The total area of BSAL (Interim Protocol Verified and Potential BSAL) within the Gateway Certificate Application Area is approximately 202 ha, with approximately 75 ha directly overlying the proposed longwalls. Minor surface disturbance to BSAL is proposed as part of the development of underground mine surface infrastructure. Some of these areas would be used for the duration of the Project, and would be subsequently rehabilitated. Other areas would be progressively rehabilitated as mining progresses. There would be no significant impact to the area of BSAL within the Gateway Certificate Application Area.

Source: After Eco Logical (2019).

6 STRATEGIES TO MINIMISE POTENTIAL IMPACTS ON BIOPHYSICAL STRATEGIC AGRICULTURAL LAND

6.1 MINE PLANNING AND DESIGN

The Project would constitute a logical southern extension of the existing Narrabri Mine. Features of the Narrabri Mine that limit its impact on agricultural land include:

- The underground mining method, which involves limited surface supporting infrastructure.
- Surface infrastructure required for the Project is largely temporary in nature and is progressively constructed, operated, decommissioned and rehabilitated as mining progresses.
- Subsidence impacts (e.g. cracking and ponding) result in limited impediment on agricultural activities and are progressively remediated.

In addition, the Project would use the existing Narrabri Mine coal handling and transportation infrastructure, which further serves to limit the disturbance footprint and consequential potential impacts on agriculture.

6.2 SUBSIDENCE MANAGEMENT

Consistent with land management practices at the current Narrabri Mine, subsidence management would include (Eco Logical, 2019):

- Land management planning and action to minimise erosion through retention of high levels of ground cover, minimising cultivation, repairing residual soil cracks and managing areas of poor drainage.
- Creek line ponding would be drained through channel creation and/or creek channel works, or incorporated into the working agricultural landscape.

6.3 GROUNDWATER MANAGEMENT

Impacts on highly productive groundwater are not anticipated; however, groundwater level and quality monitoring would be undertaken for the Project.

Should unexpected impacts occur, the currently approved Water Management Plan (URS, 2013) incorporates a Surface and Groundwater Response Plan which includes a process to deal with a complaint received in relation to loss of groundwater supply. NCOPL would continue to implement the approved Surface and Groundwater Response Plan (or latest approved version) for the Project.

A comparison of NCOPL's existing licence entitlements against the predicted maximum Project annual groundwater takes are provided in Table 3.

Table 3: Groundwater Licensing Summary for the Project

Water Sharing Plan	Management Zone / Groundwater Source	Predicted Maximum Annual Groundwater Takes Requiring Licensing (Megalitres [ML]/year)	NCOPL Water Access Licence (WAL) and Share Component
NSW Great Artesian Basin Groundwater Sources	Southern Recharge Groundwater Source	321	WAL15922 248 ML/year
Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source	139	WAL20131 150 ML/year WAL12833 67 ML/year
NSW Murray-Darling Basin Porous Rock Groundwater Sources	Gunnedah - Oxley Basin Murray-Darling Basin Groundwater Source	1,247	WAL29549 818 ML/year. In addition, 403 ML/year of share component to be issued by DI Water following a successful bid under the Controlled Allocation Order

Source: After HydroSimulations (2019).

NCOPL has adequate licences available to account for the potential take of water associated with the Project in the Upper and Lower Namoi Groundwater sources (Table 3).

NCOPL would obtain additional licences required to account for the potential take of water associated with the Project in the NSW Murray-Darling Basin Porous Rock Groundwater Source and the NSW Great Artesian Basin Groundwater Sources (Table 3).

6.4 REHABILITATION

Minor Project surface disturbance areas that would be progressively rehabilitated include those associated with surface exploration activities, underground mine surface infrastructure (e.g. surface gas drainage works, service boreholes, access tracks), environmental monitoring and management activities (e.g. installation of monitoring equipment) and mine subsidence surface impacts. These areas would be rehabilitated to their agreed post-mining land use (e.g. agricultural use or native vegetation).

Soil resource management practices would involve the stripping and stockpiling of soil resources prior to any mine-related disturbance. The objectives of soil resource management for the Project would be to:

- Identify and quantify potential soil resources for rehabilitation.
- Optimise the recovery of useable topsoil and subsoil during stripping operations.
- Manage topsoil and subsoil reserves so as not to degrade whilst stockpiled.
- Establish effective soil amelioration procedures to maximise the availability of soil for future rehabilitation.
- Take into account the need to provide soil conditions that minimise the risk of soil loss via wind and water erosion during and after rehabilitation.

Soil Management Designs (2019) has developed soil resource management measures that would be considered in the preparation of the EIS and Rehabilitation Management Plan for the Project.

7 CONCLUSION

This Gateway Certificate Application is for a physical extension to the approved Narrabri Mine underground mining area to gain access to additional ROM coal reserves, an increase in the ROM coal production rate, extension to the mine life to 2045, and development of supporting surface infrastructure (including gas drainage, mine safety pre-conditioning and mine ventilation).

Sixty-nine soil test pits were excavated to verify BSAL within the Gateway Certificate Application Area. In addition, several interviews were conducted with local stakeholders to further characterise the agricultural enterprises in the area.

Approximately 107 ha of Interim Protocol Verified BSAL has been identified within the Gateway Certificate Application Area by Soil Management Designs (2019). Of this, approximately 15 ha is located above the proposed longwalls.

In addition, approximately 95 ha of Potential BSAL, as mapped in the Mining SEPP, is located on land within the Gateway Certificate Application Area where no access was available for ground survey. Of this, approximately 60 ha is located above the proposed longwalls.

Minor surface disturbance to Interim Protocol Verified BSAL and Potential BSAL is proposed as part of the development of underground mine surface infrastructure. Some of these areas would be used for the duration of the Project, and would be subsequently rehabilitated. Other areas would be progressively rehabilitated as mining progresses.

Some BSAL would experience mine subsidence from the Project. Subsidence would result in some cracking on the surface; however, this would not affect soil fertility, effective rooting depth or soil drainage. Therefore, the Project should not result in a long-term or permanent change to the agricultural productivity of BSAL. Where necessary, NCOPL would remediate surface cracking that develops as a result of subsidence.

Eco Logical Australia Pty Ltd (2019) concluded that several studies, from within Australia and worldwide, show that localised impacts, do occur as a result of longwall mining. However, none of the studies have shown widespread impacts that have significantly reduced agricultural productivity over the short or long-term, during or following longwall mining. Further, common agricultural maintenance practices such as cultivation, ripping or minor land forming (such as restoring contour banks or small channel formation) have proven effective in managing short-term impacts.

Eco Logical Australia Pty Ltd (2019) also noted that case studies at the Narrabri, Beltana and Kestrel mines have demonstrated that agricultural production can continue above longwall mining with little or no impact to productive capacity. At these sites, detailed examination of yield and soil qualities has shown no impact from planned subsidence.

Creek line ponding may also develop in some areas as a result of subsidence; however, ponding would be remediated through creek channel works or would be incorporated into the working agricultural landscape.

The groundwater assessment shows that the Project meets the ‘Level 1’ minimal impact considerations of the Aquifer Interference Policy for key regional ‘highly productive’ groundwater resources, including the Namoi alluvium.

Given the nature of the production systems and the nature of the impacts predicted for the Project, it is likely that agricultural production can continue throughout the operation of the Project, with small areas being excluded temporarily while subsidence and rehabilitation are taking place. Small areas would also be temporarily required for infrastructure development and would be rehabilitated to their agreed post-mining land use (e.g. agricultural use or native vegetation).

It is expected that impacts to agricultural land use would be short term with minimal to no impacts on agricultural production in areas of BSAL (Eco Logical, 2019).

8 REFERENCES

Department of Planning and Infrastructure (2012) *Strategic Regional Land Use Plan New England North West.*

Ditton Geotechnical Services (2019) *Narrabri Underground Mine Stage 3 Extension Project Gateway Application – Subsidence Assessment.*

Eco Logical Australia Pty Ltd (2019) *Narrabri Underground Mine Stage 3 Extension Project Agricultural Impact Assessment.*

HydroSimulations (2019) *Narrabri Underground Mine Stage 3 Extension Project Gateway Application – Preliminary Groundwater Assessment.*

New South Wales Government (2013) *Strategic Regional Land Use Policy - Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land*.

New South Wales Government (2015) *Indicative Secretary's Environmental Assessment Requirements for State Significant Mining Developments*.

New South Wales Department of Trade & Investment (2015) *Economic Profile – New England-North West, Prepared for the Economic Development Strategy for Regional NSW, February 2015. Available:* https://www.industry.nsw.gov.au.

Soil Management Designs (2019) *Narrabri Underground Mine Stage 3 Extension Project Gateway Application – Agricultural Resource Assessment*.

URS Australia (2013) *Narrabri Mine Water Management Plan.*